

ANNUAL GROUNDWATER MONITORING REPORT
HAZARDOUS WASTE MANAGEMENT UNITS 4, 5, 7, 10, 13, 16 AND 39
CALENDAR YEAR 1998

RADFORD ARMY AMMUNITION PLANT
RADFORD, VIRGINIA

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March 1, 1999
DAA Job No. 7774.02

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INTRODUCTION

This document represents a compilation of the annual groundwater monitoring reports for each of the permitted hazardous waste management facilities at the Radford Army Ammunition Plant (RFAAP) in Radford, Virginia. The units are designated as HWMU-4, HWMU-5, HWMU-7, HWMU-10, HWMU-13, HWMU-16 and HWMU-39. These reports have been compiled in accordance with 9 VAC 20-60-570, sections E.1.b.2 and 3.

The reports present the following set of information for each unit: basic information and unit identification, a description of the groundwater monitoring plan, a discussion of groundwater movement, an updated potentiometric map, a table of groundwater elevations and detailed statistical evaluations of the analytical data. In general, the reports evaluate the analytical data from the four 1998 quarterly sampling events; these data were submitted previously to the VDEQ in quarterly monitoring reports for the units.

During the past year the *Revised RCRA Hazardous Waste Management Permit Application (Part A and Part B): Hazardous Waste Management Unit 7 (revised October 1, 1998)* was submitted to the VDEQ and was determined to be complete. A meeting was conducted at the VDEQ Richmond, Virginia offices on August 17, 1998 to discuss the submittal requirements for this application. The Groundwater Quality Assessment Report (GWQAR) for HWMU-10 will be submitted to the VDEQ within 30 days of the approval of the Permit Application for HWMU-7.

SIGNATURE/CERTIFICATION

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I certify that I have prepared or supervised preparation of the attached reports, that they have been prepared in accordance with industry standards and practices, and that the information contained herein is truthful and accurate to the best of my knowledge.

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HWMU-4 ANNUAL GROUNDWATER MONITORING REPORT

CALENDAR YEAR: 1998
REPORT DATE: March 1, 1999

Prepared for the Virginia Department of Environmental Quality - Waste Division (VDEQ-WD)
in accordance with 9 VAC 20-60-570.

A. WASTE MANAGEMENT UNIT INFORMATION

UNIT NAME: Hazardous Waste Management Unit 4 (HWMU-4)
OWNER/OPERATOR: United States Army / Alliant TechSystems, Inc.
UNIT LOCATION: Radford AAP Main Plant Area, Radford, Virginia
CLASS: Hazardous Waste Management Unit
TYPE: Former Acid and Wastewater Equalization Basin

B. GROUNDWATER MONITORING PLAN

MONITORING NETWORK

UPGRADIENT WELL: 4P3
DOWNGRADIENT WELLS: 4W2B, 4W4B, 4MW7, 4WC9B, 4WC21, 4WC22, 4WC23,
4WC32, 4WC41, 4WC42, 4WC43, 4W5A, 4W6A, 4W7A
OBSERVATION WELL: 4WC8B
(static water level measurements only)

MONITORING STATUS: Groundwater Quality Assessment Program

DATA COLLECTION STATUS:

Quarterly Event	Jan. 21-22, 26, 29-30; Feb. 2, 1998
Quarterly Event	April 8-9 and 13-16, 1998
Quarterly Event	July 7-10 and 13-14, 1998
Quarterly Event	Oct. 13-16 and 19-20, 1998

C. GROUNDWATER MOVEMENT

The monitoring wells at HWMU-4 are screened entirely within either carbonate bedrock, weathered carbonate bedrock residuum or alluvium, or across the interfaces between two of the listed strata. The static water level measurements gathered during the 1998 quarterly monitoring events are summarized in **Table 1 (Appendix A)**. Groundwater fluctuations did not appear to exceed 0.5 to 3.5 feet annually, although individual wells tapping karst conduits could have experienced dramatic fluctuations following storm events. As shown on the HWMU-4 Potentiometric Surface Map for Third Quarter 1998 (**Appendix B**), groundwater movement beneath the site is generally to the northeast.

For the purposes of this report, Darcian flow conditions were assumed for the alluvium, residuum, and karst carbonate bedrock beneath HWMU-4. As a result, the groundwater velocities were calculated by multiplying the hydraulic conductivity (determined from previously conducted slug tests) by the average hydraulic gradient across the site, and dividing by an assumed effective porosity for the aquifer materials. The average hydraulic gradient was

determined by superimposing three evenly spaced flow line vectors over the Potentiometric Surface Map, measuring their lengths, calculating the head differential over the distances measured, and dividing the head differential by the length of the flow line vectors. The three calculated gradients were then averaged to a single value. Using this method, the average groundwater hydraulic gradient across the site based on Third Quarter 1998 groundwater elevations was calculated to be 0.055 ft/ft. Historical slug test data for the site yielded an average hydraulic conductivity of 1.18×10^{-5} ft/second. This value is consistent with literature values for karst carbonate rock and for clayey, silty sand and gravel alluvium and residuum (Domenico and Schwartz, 1990).

The estimated groundwater velocity across the site was calculated to be approximately 0.14 ft/day or 51 ft/year, based on the following:

- an average hydraulic conductivity of 1.18×10^{-5} ft/second;
- an average hydraulic gradient of 0.055 ft/ft; and
- an assumed effective porosity of 0.40, based on a representative range of porosities for karst carbonate rock, weathered residuum, and clayey, silty sand and gravel alluvium (Domenico and Schwartz, 1990).

The actual groundwater flow velocities in the carbonate bedrock may vary as much as one to two orders of magnitude from the velocity presented above, depending on water level conditions and the distribution of karst conduits.

D. STATISTICAL EVALUATIONS

D.1 HWMU-4 GROUNDWATER BACKGROUND CONCENTRATIONS

Background concentrations were calculated for each constituent in the groundwater monitoring program using the 1998 quarterly analytical data from upgradient well 4P3. The background concentration calculations were based on site wide 95% confidence, 95% coverage upper prediction intervals. When adjusted for multiple comparisons of the background data, the minimum required false positive rate was well below 1%. A 99% confidence level (0.01 false positive rate) was used for all individual comparisons. These coverage limits were only achieved for constituent data on which parametric prediction intervals were performed. In cases where non-parametric prediction intervals were computed to determine the background levels, the confidence level and error rate were calculated based on the number of background data points available and number of future comparisons. Because the upper control limit of a non-parametric interval cannot be adjusted for multiple comparisons and an inadequate number of background data, the number of resampling events required was adjusted to account for the high error rates inherent in those situations. No confidence levels were defined in cases where the background data were 100% non-detected; the detection limits of such constituents were used to define their respective background levels.

D.2 HWMU-4 STATISTICAL ANALYSIS

Statistical evaluations were performed for HWMU-4 as specified in VHWMR 9 VAC 20-60-570. The statistical evaluations were performed in accordance with the procedures and guidance provided in the following documents:

- Virginia Hazardous Waste Management Regulations, 9 VAC 20-60-790 H and I;
- VDEQ Guidance for statistical analysis titled "Data Analysis Plan," undated;

- Interim Final Guidance for Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, USEPA, April 1989;
- Addendum to Interim Final Guidance for Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, USEPA, July 1992; and
- Statistical Methods for Groundwater Monitoring, Gibbons, R.D., 1994.

Statistical threshold values were computed for the 32 constituents for which HWMU-4 is currently monitored based on the concentrations of those constituents in upgradient (background) well 4P3. The 1998 quarterly monitoring data for well 4P3 were used for this purpose. Comparison statistical analyses were performed for all constituents which were detected in any downgradient well during Fourth Quarter 1998.

D.2.1 Background Data and Statistical Comparisons

Statistical analyses were performed using the 1998 quarterly analytical results from upgradient well 4P3 as background data. Based on the percentage of non-detects and the distribution of the background data, methods of statistical comparisons varied. Background average, standard deviation and other descriptive statistical data were computed for all constituents and are presented in **Appendix C**.

The constituents listed below were 100% non-detected in the background data. The background threshold levels (BTLs) for these constituents were established as equal to their detection limits (DLs). Detections of these constituents in the downgradient wells during Fourth Quarter 1998 were compared to these BTLs.

Background Threshold Level (BTL) = Detection Limit (DL)				
Parameter	Sample Size	% Non-Detects	DL (µg/l)	BTL (µg/l)
Antimony	4	100	3	3
Beryllium	4	100	0.2	0.2
Bis(2-ethylhexyl)phthalate	4	100	10	10
Chloroform	4	100	0.1	0.1
Chloromethane	4	100	0.3	0.3
Di-n-butylphthalate	4	100	5	5
2,4-Dinitrophenol	4	100	50	50
Dichloromethane	4	100	0.2	0.2
Diethyl phthalate	4	100	5	5
Diphenylamine	4	100	10	10
Mercury	4	100	0.2	0.2
Methylethyl ketone	4	100	1.1	1.1
Nickel	4	100	15	15
Silver	4	100	0.2	0.2
Toluene	4	100	0.1	0.1
Trans 1,2-dichloroethene	4	100	0.1	0.1
Trichloroethene	4	100	0.1	0.1
Vanadium	4	100	4	4
Vinyl chloride	4	100	0.1	0.1
Xylene	4	100	0.1	0.1

Non-parametric prediction intervals were computed for all of the constituents for which the data from background well 4P3 satisfied one of the following two criteria, per VDEQ regulations and guidance as well as USEPA guidance:

- Percentage of non-detects was greater than or equal to 50 and less than 100; or
- Percentage of non-detects was less than 50, but data was not normally distributed.

The constituents total organic carbon (TOC), arsenic, cadmium, lead, chromium, and zinc satisfied the first criterion above. Hence, non-parametric upper prediction limits (UPL) were computed for these constituents. The background threshold levels for these constituents were set as equal to their UPLs. The confidence level and false positive rate were calculated based on the number of background data points available and number of future comparisons. For all constituents, the confidence level was determined to be equal to 0.604, and the false positive rate was equal to 0.396. Since the upper control limit of a non-parametric interval cannot be adjusted for multiple comparisons and inadequate number of background data, the number of resampling events required was adjusted to account for the high error rates inherent in those situations. The number of confirmation resamples required for all constituents is greater than 5. The background and relevant statistical data for these constituents are summarized below. Associated statistical computations are presented in **Appendix C**.

BTL = Upper Prediction Limit of Non-parametric Prediction Interval w/false positive rate=0.396				
Parameter	Sample Size	% Non-Detects	DL (µg/l)	BTL (µg/l)
Arsenic	4	75	1	1
Cadmium	4	75	0.2	0.2
Chromium	4	50	1	9
Lead	4	75	1	1
TOC	4	75	1000	1425
Zinc	4	50	5	20

The constituents total organic halides (TOX) and copper exhibited normally distributed data (excluding non-detects) with between 25% and 50% non-detects in the background well. The mean and standard deviation of the background data for these constituents were adjusted using Cohen's Maximum Likelihood Estimator Method (1959, 1961). One-sided parametric prediction intervals were then computed for those constituents based on the adjusted mean and standard deviation. Their Upper Prediction Limits were set as their BTLs. The background and relevant statistical data are summarized below. Cohen's adjustment computations and prediction interval computations are presented in **Appendix C**.

BTL = Upper Prediction Limit of Prediction Interval with false positive rate=0.05				
Parameter	Sample Size	% Non-Detects	DL (µg/l)	BTL (µg/l)
TOX	4	25	5	7.5
Copper	4	25	1	10.4

The following constituents exhibited normally distributed background data with less than 25% non-detects. One sided parametric prediction intervals were computed on the background data for all of these constituents. The UPLs for these constituents were set as their respective BTLs, with one exception. For pH, a two-sided parametric prediction interval was computed;

therefore, the BTL for pH consisted of a range between the lower prediction limit (LPL) and the upper prediction limit. The background concentration calculations were based on site wide 95% confidence, 95% coverage upper prediction intervals. When adjusted for multiple comparisons of the background data, the minimum required false positive rate was well below 1% (0.01). A 99% confidence level (0.01 false positive rate) was used for all individual comparisons, which with the most conservative assumptions provided a site-wide false positive rate of <0.05 for all constituents. The background and relevant statistical data for these constituents are summarized below. The prediction interval computations for these constituents are presented in **Appendix C**.

BTL = UPL of one-sided Prediction Interval (exception pH) w/site-wide false positive rate>0.05 (individual comparisons false positive rate=0.01) BTL for pH = LPL – UPL of two-sided Prediction Interval				
Parameter	Sample Size	% Non-Detects	DL (µg/l)	BTL (µg/l)
Barium	4	0	2	127
Specific Conductivity	4	0	1 µS/cm	640 µS/cm
Cobalt	4	0	2	5.4
pH	4	0	0.1 pH units	9.1 to 4.2 pH units

D.2.2 Results of Statistical Comparisons

The following table lists the constituents which were detected during the Fourth Quarter 1998 event at concentrations exceeding their respective background threshold levels (BTLs), and the downgradient wells in which they were detected.

Parameter	Monitoring Well(s)
Arsenic	4WC21, 4WC41, 4W7A
Barium	4MW7, 4WC9B, 4WC21, 4W2B, 4WC32, 4WC41, 4W6A
Beryllium	4WC21
Chloroform	4WC21, 4W5A
Lead	4WC21, 4WC41, 4W5A, 4W6A
Nickel	4WC21
Vanadium	4WC21
Zinc	4WC21, 4WC41
Bis(2-ethylhexyl)phthalate	4W7A
Specific Conductivity	4W4B, 4WC9B, 4WC41, 4WC42, 4WC43, 4W7A

Any HWMU-4 target constituents not listed above were not detected in the downgradient monitoring wells at concentrations exceeding their respective BTLs.

HWMU-5 ANNUAL GROUNDWATER MONITORING REPORT

CALENDAR YEAR: 1998
REPORT DATE: March 1, 1999

Prepared for the Virginia Department of Environmental Quality - Waste Division (VDEQ-WD)
in accordance with 9 VAC 20-60-570.

A. WASTE MANAGEMENT UNIT INFORMATION

UNIT NAME: Hazardous Waste Management Unit 5 (HWMU-5)
OWNER/OPERATOR: United States Army / Alliant TechSystems, Inc.
UNIT LOCATION: Radford AAP Main Plant Area, Radford, Virginia
CLASS: Hazardous Waste Management Unit
TYPE: Former Neutralization Pond

B. GROUNDWATER MONITORING PLAN

MONITORING NETWORK

UPGRADIENT WELL: 5W8B
DOWNGRADIENT WELLS: 5W5B, 5W7B, 5WC21, 5WC22, 5WC23, S5W5, S5W7,
5W9A, 5W10A, 5W11A
OBSERVATION WELL: S5W6
(static water level measurements only)

MONITORING STATUS: Groundwater Quality Assessment Program

DATA COLLECTION STATUS:

Quarterly Event	Feb. 6 and 9-12, 1998
Quarterly Event	April 20-23, 1998
Quarterly Event	July 16-17 and 20-21, 1998
Quarterly Event	Oct. 22-23 and 26-27, 1998

C. GROUNDWATER MOVEMENT

The monitoring wells at HWMU-5 are screened entirely within either weathered carbonate bedrock residuum or alluvium, or across the weathered residuum/carbonate bedrock interface. The static water level measurements gathered during the 1998 quarterly monitoring events are summarized in **Table 2 (Appendix A)**. Groundwater fluctuations ranged from 3.5 to 10 feet annually. As shown on the HWMU-5 Potentiometric Surface Map for Third Quarter 1998 (**Appendix B**), groundwater movement beneath the site is generally to the northeast.

For the purposes of this report, Darcian flow conditions were assumed for the alluvium, residuum, and karst carbonate bedrock beneath HWMU-5. As a result, the groundwater velocities were calculated by multiplying the hydraulic conductivity (determined from previously conducted slug tests) by the average hydraulic gradient across the site, and dividing by an assumed effective porosity for the aquifer materials. The average hydraulic gradient was determined by superimposing three evenly spaced flow line vectors over the Potentiometric Surface Map, measuring their lengths, calculating the head differential over the distances

measured, and dividing the head differential by the length of the flow line vectors. The three calculated gradients were then averaged to a single value. Using this method, the average groundwater hydraulic gradient across the site based on Third Quarter 1998 groundwater elevations was calculated to be 0.032 ft/ft. Historical slug test data for the site yielded an average hydraulic conductivity of 5.25×10^{-5} ft/second. This value is consistent with literature values for karst carbonate rock and for clayey, silty sand and gravel alluvium and residuum (Domenico and Schwartz, 1990).

The estimated groundwater velocity across the site was calculated to be approximately 0.36 ft/day or 131 ft/year, based on the following:

- an average hydraulic conductivity of 5.25×10^{-5} ft/second;
- an average hydraulic gradient of 0.032 ft/ft; and
- an assumed effective porosity of 0.40, based on a representative range of porosities for karst carbonate rock, weathered residuum, and clayey, silty sand and gravel alluvium (Domenico and Schwartz, 1990).

The actual groundwater flow velocities in the carbonate bedrock may vary as much as one to two orders of magnitude from the velocity presented above, depending on water level conditions and the distribution of karst conduits.

D. STATISTICAL EVALUATIONS

D.1 HWMU-5 GROUNDWATER BACKGROUND CONCENTRATIONS

Background concentrations were calculated for each constituent in the groundwater monitoring program using the 1998 quarterly analytical data from upgradient well 5W8B. The background concentration calculations were based on site wide 95% confidence, 95% coverage upper prediction intervals. When adjusted for multiple comparisons of the background data, the minimum required false positive rate was well below 1%. A 99% confidence level (0.01 false positive rate) was used for all individual comparisons. These coverage limits were only achieved for constituent data on which parametric prediction intervals were performed. In cases where non-parametric prediction intervals were computed to determine the background levels, the confidence level and error rate were calculated based on the number of background data points available and number of future comparisons. Because the upper control limit of a non-parametric interval cannot be adjusted for multiple comparisons and an inadequate number of background data, the number of resampling events required was adjusted to account for the high error rates inherent in those situations. No confidence levels were defined in cases where the background data were 100% non-detected; the detection limits of such constituents were used to define their respective background levels.

D.2 HWMU-5 STATISTICAL ANALYSIS

Statistical evaluations were performed for HWMU-5 as specified in VHWMR 9 VAC 20-60-570. The statistical evaluations were performed in accordance with the procedures and guidance provided in the following documents:

- Virginia Hazardous Waste Management Regulations, 9 VAC 20-60-790 H and I;
- VDEQ Guidance for statistical analysis titled "Data Analysis Plan," undated;
- Interim Final Guidance for Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, USEPA, April 1989;

- Addendum to Interim Final Guidance for Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, USEPA, July 1992; and
- Statistical Methods for Groundwater Monitoring, Gibbons, R.D., 1994.

Statistical threshold values were computed for the 40 constituents for which HWMU-5 is currently monitored based on the concentrations of those constituents in upgradient (background) well 5W8B. The 1998 quarterly monitoring data for well 5W8B were used for this purpose. Comparison statistical analyses were performed for all constituents which were detected in any downgradient well during Fourth Quarter 1998.

D.2.1 Background Data and Statistical Comparisons

Statistical analyses were performed using the 1998 quarterly analytical results from upgradient well 5W8B as background data. Based on the percentage of non-detects and the distribution of the background data, methods of statistical comparisons varied. Background average, standard deviation and other descriptive statistical data were computed for all constituents and are presented in **Appendix D**.

The constituents listed below were 100% non-detected in the background data. The background threshold levels (BTLs) for these constituents were established as equal to their detection limits (DLs). Detections of these constituents in the downgradient wells during Fourth Quarter 1998 were compared to these BTLs.

Background Threshold Level (BTL) = Detection Limit (DL)				
Parameter	Sample Size	% Non-Detects	DL (µg/l)	BTL (µg/l)
1,1,2-Trichloroethane	4	100	0.5	0.5
1,2-Dichloroethane	4	100	0.1	0.1
2,4-Dinitrotoluene	4	100	0.08	0.08
2,6-Dinitrotoluene	4	100	0.08	0.08
Acetone	4	100	10	10
Antimony	4	100	3	3
Arsenic	4	100	1	1
Benzene	4	100	0.1	0.1
Bis(2-ethylhexyl)phthalate	4	100	10	10
Chloromethane	4	100	0.3	0.3
Dichloromethane	4	100	0.7	0.7
Diethylphthalate	4	100	5	5
Di-n-butylphthalate	4	100	5	5
Diphenylamine	4	100	10	10
Lead	4	100	1	1
Mercury	4	100	0.2	0.2
Methylethyl ketone	4	100	1.1	1.1
Nickel	4	100	15	15
Selenium	4	100	1	1
Silver	4	100	0.2	0.2
Tetrachloroethene	4	100	0.1	0.1
Thallium	4	100	1	1
Toluene	4	100	0.1	0.1

Background Threshold Level (BTL) = Detection Limit (DL)				
Parameter	Sample Size	% Non-Detects	DL (µg/l)	BTL (µg/l)
Trans-1,2-dichloroethene	4	100	0.1	0.1
Trichloroethene	4	100	0.1	0.1
Trichlorofluoromethane	4	100	0.5	0.5
Vanadium	4	100	4	4
Vinyl chloride	4	100	0.1	0.1
Xylenes	4	100	0.1	0.1

Non-parametric prediction intervals were computed for all of the constituents for which the data from background well 5W8B satisfied one of the following two criteria, per VDEQ regulations and guidance as well as USEPA guidance:

- Percentage of non-detects was greater than or equal to 50 and less than 100; or
- Percentage of non-detects was less than 50, but data was not normally distributed.

Non-parametric upper prediction limits (UPL) were computed for eight constituents which met one of the above two criteria. The background threshold levels for these constituents were set as equal to their UPLs. The confidence level and false positive rate were calculated based on the number of background data points available and number of future comparisons. For all constituents, the confidence level was determined to be equal to 0.661, and the false positive rate was equal to 0.339. Since the upper control limit of a non-parametric interval cannot be adjusted for multiple comparisons and inadequate number of background data, the number of resampling events required was adjusted to account for the high error rates inherent in those situations. The number of confirmation resamples required for all constituents is 5. The background and relevant statistical data for these constituents are summarized below. Associated statistical computations are presented in **Appendix D**.

BTL = Upper Prediction Limit of Non-parametric Prediction Interval w/false positive rate=0.339				
Parameter	Sample Size	% Non-Detects	DL (µg/l)	BTL (µg/l)
Barium	4	0	2	126
Cadmium	4	75	0.1	0.1
Chloroform	4	75	0.3	0.5
Cobalt	4	50	1	2
Copper	4	75	1	2
Specific Conductivity	4	0	1 µS/cm	450 µS/cm
TOC	4	50	1000	1125
TOX	4	50	5	13.4

The constituent zinc exhibited normally distributed data (excluding non-detects) with between 25% and 50% non-detects in the background well. The mean and standard deviation of the background data for this constituent was adjusted using Cohen's Maximum Likelihood Estimator Method (1959, 1961). One-sided parametric prediction interval was then computed for this constituent based on the adjusted mean and standard deviation. The Upper Prediction Limit was set as the BTL. The background and relevant statistical data are summarized below. Cohen's adjustment computations and prediction interval computations are presented in **Appendix D**.

BTL = Upper Prediction Limit of Prediction Interval w/site wide false positive rate=0.05				
Parameter	Sample Size	% Non-Detects	DL (µg/l)	BTL (µg/l)
Zinc	4	25	5	65.1

The following constituents exhibited normally distributed background data with less than 25% non-detects. One sided parametric prediction intervals were computed on the background data for all of these constituents. The UPLs for these constituents were set as their respective BTLs, with one exception. For pH, a two-sided parametric prediction interval was computed; therefore, the BTL for pH consisted of a range between the lower prediction limit (LPL) and the upper prediction limit. The background concentration calculations were based on site wide 95% confidence, 95% coverage upper prediction intervals. When adjusted for multiple comparisons of the background data, the minimum required false positive rate was well below 1% (0.01). A 99% confidence level (0.01 false positive rate) was used for all individual comparisons, which with the most conservative assumptions provided a site-wide false positive rate of 0.05 for all constituents. The background and relevant statistical data for these constituents are summarized below. The prediction interval computations for these constituents are presented in **Appendix D**.

BTL = UPL of one-sided Prediction Interval (exception pH) w/site-wide false positive rate=0.05 (individual comparisons false positive rate=0.01) BTL for pH = LPL - UPL of two-sided Prediction Interval				
Parameter	Sample Size	% Non-Detects	DL (µg/l)	BTL (µg/l)
Beryllium	4	0	0.2	1.01
pH	4	0	0.1 pH units	6.1 to 3.4 pH units

D.2.2 Results of Statistical Comparisons

The following table lists the constituents which were detected during the Fourth Quarter 1998 event at concentrations exceeding their respective background threshold levels (BTLs), and the downgradient wells in which they were detected.

Parameter	Monitoring Well(s)
2,4-Dinitrotoluene	5W5B, 5W7B, 5WC21, 5WC22, 5WC23
2,6-Dinitrotoluene	5W5B, 5W7B, 5WC21, 5WC22, 5WC23, 5W9A
Barium	5W11A
Beryllium	5W7B, 5WC21, 5W11A
Cadmium	5W7B, 5WC21, 5WC22, 5WC23, S5W7, 5W11A
Chloroform	5W5B, 5W7B, 5WC21, 5WC22, 5WC23, S5W5, 5W9A
Cobalt	5W7B, 5WC21, 5WC22, 5WC23, 5W11A
Copper	5W7B, 5WC21, 5WC22, 5WC23, S5W7, 5W9A, 5W11A
Lead	5W7B, S5W5, S5W7, 5W11A
Nickel	5W7B, 5WC21, 5WC22, 5WC23, S5W7, 5W11A
pH	5W7B, 5WC21, 5WC22, 5WC23, S5W5, S5W7, 5W9A, 5W10A, 5W11A
Selenium	5W5B, 5WC21, 5W9A

Parameter	Monitoring Well(s)
Specific Conductivity	5W7B, 5WC21, 5WC22, 5WC23, S5W5, S5W7, 5W9A, 5W10A, 5W11A
TOC	5W11A
TOX	5WC21
Trichloroethene	5W5B, 5WC21, 5WC22, 5WC23,
Vanadium	5W5B, S5W5, S5W7, 5W11A
Zinc	5W7B, 5WC21, S5W7, 5W11A

Any HWMU-5 target constituents not listed above were not detected in the downgradient monitoring wells at concentrations exceeding their respective BTLs.

HWMU-7 ANNUAL GROUNDWATER MONITORING REPORT

CALENDAR YEAR: 1998
REPORT DATE: March 1, 1999

Prepared for the Virginia Department of Environmental Quality - Waste Division (VDEQ-WD)
in accordance with 9 VAC 20-60-570.

A. WASTE MANAGEMENT UNIT INFORMATION

UNIT NAME: Hazardous Waste Management Unit 7 (HWMU-7)
OWNER/OPERATOR: United States Army / Alliant TechSystems, Inc.
UNIT LOCATION: Radford AAP Main Plant Area, Radford, Virginia
CLASS: Hazardous Waste Management Unit
TYPE: Closed Holding and Neutralization Basin

B. GROUNDWATER MONITORING PLAN

MONITORING NETWORK

UPGRADIENT WELL: 7W12B
DOWNGRADIENT WELLS: 7MW5, 7MW6, 7WCA, 7W9C, 7W10B, 7W10C, 7W11B, 7W13
OBSERVATION WELLS: S7W9, 7W10, 7W11
(static water level measurements only)

MONITORING STATUS: Groundwater Quality Assessment Program

DATA COLLECTION STATUS:	Quarterly Event	Feb. 13, 16-18 and 25, 1998
	Quarterly Event	June 16-17, 1998
	Quarterly Event	July 24, 27-28, 1998
	Quarterly Event	Oct. 28-30 and Nov. 2-3, 1998

C. GROUNDWATER MOVEMENT

The monitoring wells at HWMU-7 are screened entirely within either alluvium, weathered carbonate bedrock residuum or carbonate bedrock, or across the interfaces between two of the listed strata. The static water level measurements gathered during the 1998 quarterly monitoring events are summarized in **Table 3 (Appendix A)**. Groundwater fluctuations did not appear to exceed 1 to 2 feet annually, although individual wells tapping karst conduits could have experienced dramatic fluctuations following storm events. As shown on the HWMU-7 Potentiometric Surface Map for Third Quarter 1998 (**Appendix B**), groundwater movement beneath the site is generally to the west towards the New River and to the northeast and southwest toward the unnamed intermittent drainages that flow into the New River north and south of the site.

For the purposes of this report, Darcian flow conditions were assumed for the alluvium, residuum, and karst carbonate bedrock beneath HWMU-7. As a result, the groundwater velocities were calculated by multiplying the hydraulic conductivity (determined from previously

conducted slug tests) by the average hydraulic gradient across the site, and dividing by an assumed effective porosity for the aquifer materials. The average hydraulic gradient was determined by superimposing three evenly spaced flow line vectors over the Potentiometric Surface Map, measuring their lengths, calculating the head differential over the distances measured, and dividing the head differential by the length of the flow line vectors. The three calculated gradients were then averaged to a single value. Using this method, the average groundwater hydraulic gradient across the site based on Third Quarter 1998 groundwater elevations was calculated to be 0.020 ft/ft. Historical slug test data for the site yielded an average hydraulic conductivity of 5.1×10^{-6} ft/second. This value is consistent with literature values for karst carbonate rock and for clayey, silty sand and gravel alluvium and residuum (Domenico and Schwartz, 1990).

The estimated groundwater velocity across the site was calculated to be approximately 2.20×10^{-2} ft/day or 8 ft/year, based on the following:

- an average hydraulic conductivity of 5.1×10^{-6} ft/second;
- an average hydraulic gradient of 0.020 ft/ft; and
- an assumed effective porosity of 0.40, based on a representative range of porosities for karst carbonate rock, weathered residuum, and clayey, silty sand and gravel alluvium (Domenico and Schwartz, 1990).

The actual groundwater flow velocities in the carbonate bedrock may vary as much as one to two orders of magnitude from the velocity presented above, depending on water level conditions and the distribution of karst conduits.

D. STATISTICAL EVALUATIONS

D.1 HWMU-7 GROUNDWATER BACKGROUND CONCENTRATIONS

Background concentrations were calculated for each constituent in the groundwater monitoring program using the 1998 quarterly analytical data from upgradient well 7W12B. The background concentration calculations were based on site wide 95% confidence, 95% coverage upper prediction intervals. When adjusted for multiple comparisons of the background data, the minimum required false positive rate was approximately 1%. Therefore, a 99% confidence level (0.01 false positive rate) was used for all individual comparisons. These coverage limits were only achieved for constituent data on which parametric prediction intervals were performed. In cases where non-parametric prediction intervals were computed to determine the background levels, the confidence level and error rate were calculated based on the number of background data points available and number of future comparisons. Because the upper control limit of a non-parametric interval cannot be adjusted for multiple comparisons and an inadequate number of background data, the number of resampling events required was adjusted to account for the high error rates inherent in those situations. No confidence levels were defined in cases where the background data were 100% non-detected; the detection limits of such constituents were used to define their respective background levels.

D.2 HWMU-7 STATISTICAL ANALYSIS

Statistical evaluations were performed for HWMU-7 as specified in VHWMR 9 VAC 20-60-570. The statistical evaluations were performed in accordance with the procedures and guidance provided in the following documents:

- Virginia Hazardous Waste Management Regulations, 9 VAC 20-60-790 H and I;

- VDEQ Guidance for statistical analysis titled "Data Analysis Plan," undated;
- Interim Final Guidance for Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, USEPA, April 1989;
- Addendum to Interim Final Guidance for Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, USEPA, July 1992; and
- Statistical Methods for Groundwater Monitoring, Gibbons, R.D., 1994.

Statistical threshold values were computed for the 40 constituents for which HWMU-7 is currently monitored based on the concentrations of those constituents in upgradient (background) well 7W12B. The 1998 quarterly monitoring data for well 7W12B were used for this purpose. Comparison statistical analyses were performed for all constituents which were detected in any downgradient well during Fourth Quarter 1998.

D.2.1 Background Data and Statistical Comparisons

Statistical analyses were performed using the 1998 quarterly analytical results from upgradient well 7W12B as background data. Based on the percentage of non-detects and the distribution of the background data, methods of statistical comparisons varied. Background average, standard deviation and other descriptive statistical data were computed for all constituents and are presented in **Appendix E**.

The constituents listed below were 100% non-detected in the background data. The background threshold levels (BTLs) for these constituents were established as equal to their detection limits (DLs). Detections of these constituents in the downgradient wells during Fourth Quarter 1998 were compared to these BTLs.

Background Threshold Level (BTL) = Detection Limit (DL)				
Parameter	Sample Size	% Non-Detects	DL (µg/l)	BTL (µg/l)
Acetone	4	100	10	10
Antimony	4	100	3	3
Benzene	4	100	0.1	0.1
Benzyl alcohol	4	100	10	10
Butylbenzylphthalate	4	100	5	5
Cadmium	4	100	0.1	0.1
Cobalt	4	100	1	1
Cyanide	4	100	10	10
2,4-Dinitrotoluene	4	100	0.08	0.08
2,4-Dinitrophenol	4	100	50	50
1234678-HPCDF	4	100	0.0773 ppt	0.0773 ppt
1234789-HPCDF	4	100	0.097 ppt	0.097 ppt
123478-HXCDF	4	100	0.0515 ppt	0.0515 ppt
123678-HXCDF	4	100	0.0456 ppt	0.0456 ppt
123789-HXCDF	4	100	0.0573 ppt	0.0573 ppt
234678-HXCDF	4	100	0.0529 ppt	0.0529 ppt
Mercury	4	100	0.2	0.2
Nickel	4	100	15	15
2-Nitrophenol	4	100	5	5
4-Nitrophenol	4	100	10	10

Background Threshold Level (BTL) = Detection Limit (DL)				
Parameter	Sample Size	% Non-Detects	DL (µg/l)	BTL (µg/l)
OCDF	4	100	0.1638 ppt	0.1638 ppt
12378-PECDF	4	100	0.0634 ppt	0.0634 ppt
23478-PECDF	4	100	0.0614 ppt	0.0614 ppt
Silver	4	100	0.2	0.2
2378-TCDF	4	100	0.0491 ppt	0.0491 ppt
Thallium	4	100	1	1
Vanadium	4	100	4	4
TOX	4	100	5	5

Non-parametric prediction intervals were computed for all of the constituents for which the data from background well 7W12B satisfied one of the following two criteria, per VDEQ regulations and guidance as well as USEPA guidance:

- Percentage of non-detects was greater than or equal to 50 and less than 100; or
- Percentage of non-detects was less than 50, but data was not normally distributed.

The constituents TOC, bis(2-ethylhexyl)phthalate, 2,6-DNT, lead, selenium and arsenic satisfied the first criterion above, and chromium satisfied the second criterion. Hence, non-parametric upper prediction limits (UPLs) were computed for these constituents. The background threshold levels for these constituents were set as equal to their UPLs. The confidence level and false positive rate were calculated based on the number of background data points available and number of future comparisons. For all constituents, the confidence level was determined to be equal to 0.698, and the false positive rate was equal to 0.302. Since the upper control limit of a non-parametric interval cannot be adjusted for multiple comparisons and inadequate number of background data, the number of resampling events required was adjusted to account for the high error rates inherent in those situations. The number of confirmation resamples required for all constituents is 5. The background and relevant statistical data for these constituents are summarized below. Associated statistical computations are presented in **Appendix E**.

BTL = Upper Prediction Limit of Non-parametric Prediction Interval w/false positive rate=0.302				
Parameter	Sample Size	% Non-Detects	DL (µg/l)	BTL (µg/l)
Arsenic	4	75	1	1
Bis(2-ethylhexyl)phthalate	4	75	10	10
Chromium	4	0	1	14
2,6-DNT	4	50	0.08	0.15
Lead	4	75	1	1
Selenium	4	75	1	1
TOC	4	75	1000	1375

The following constituents exhibited normally distributed background data with less than 25% non-detects. One sided parametric prediction intervals were computed on the background data for all of these constituents. The UPLs for these constituents were set as their respective BTLs, with one exception. For pH, a two-sided parametric prediction interval was computed; therefore, the BTL for pH consisted of a range between the lower prediction limit (LPL) and the

upper prediction limit. The background concentration calculations were based on a site wide 95% confidence, 95% coverage upper prediction intervals. When adjusted for multiple comparisons of the background data, the minimum required false positive rate was less than 1% (0.01). A 99% confidence level (0.01 false positive rate) was used for all individual comparisons, which with the most conservative assumptions provided a site-wide false positive rate of <0.05 for all constituents. The background and relevant statistical data for these constituents are summarized below. The prediction interval computations for these constituents are presented in **Appendix E**.

BTL = UPL of one-sided Prediction Interval (exception pH) w/site-wide false positive rate<0.05 (individual comparisons false positive rate=0.01) BTL for pH = LPL – UPL of two-sided Prediction Interval				
Parameter	Sample Size	% Non-Detects	DL (µg/l)	BTL (µg/l)
Barium	4	0	2	50.5
Copper	4	0	1	13.05
Specific Conductivity	4	0	1 µS/cm	1009 µS/cm
Zinc	4	0	5	69.08
pH	4	0	0.1 pH units	8.3 to 5.1 pH units

D.2.2 Results of Statistical Comparisons

The following table lists the constituents which were detected during the Fourth Quarter 1998 event at concentrations exceeding their respective background threshold levels (BTLs), and the downgradient wells in which they were detected.

Parameter	Monitoring Well(s)
2,4-DNT	7MW5, 7WCA, 7W11B, 7MW6, 7W9C, 7W10B
2,6-DNT	7MW5, 7WCA, 7W11B
Acetone	7MW5
Arsenic	7WCA, 7W9C
Barium	7MW6, 7W10B, 7W10C
Bis(2-ethylhexyl)phthalate	7W10C
Cadmium	7MW5, 7W11B, 7W13
Chromium	7MW6
Cobalt	7MW5, 7WCA, 7W11B, 7MW6, 7W10B, 7W13
Lead	7MW6
Nickel	7MW5, 7WCA, 7W11B, 7MW6, 7W13
Selenium	7MW6, 7W9C
Specific Conductivity	7W1B, 7MW5, 7WCA, 7W13, 7MW6, 7W9C, 7W10B
TOC	7MW6, 7W11B, 7W13
TOX	7MW5, 7W9C, 7W10C, 7W11B

Any HWMU-7 target constituents not listed above were not detected in the downgradient monitoring wells at concentrations exceeding their respective BTLs.

HWMU-10 ANNUAL GROUNDWATER MONITORING REPORT

CALENDAR YEAR: 1998
REPORT DATE: March 1, 1999

Prepared for the Virginia Department of Environmental Quality – Waste Division (VDEQ-WD)
in accordance with 9 VAC 20-60-570.

Waste Management Unit Information

UNIT NAME: Hazardous Waste Management Unit 10 (HWMU-10)
OWNER/OPERATOR: United States Army / Alliant TechSystems, Inc.
UNIT LOCATION: Radford AAP Main Plant Area, Radford, Virginia
CLASS: Hazardous Waste Management Unit
TYPE: Closed Equalization Basin for the Biological Treatment System

B. GROUNDWATER MONITORING PLAN

MONITORING NETWORK

UPGRADIENT WELL: 10D4
DOWNGRADIENT WELLS: 10MW1, 10DDH2, 10D3, 10D3D
OBSERVATION WELLS: 10DG-1, 10DDH4
(static water level measurements only)

MONITORING STATUS: Groundwater Quality Assessment Program

DATA COLLECTION STATUS:

Quarterly Event	March 17-18, 1998
Quarterly Event	May 21-22 and 27, 1998
Quarterly Event	Aug. 27-28 and Sept. 4, 1998
Quarterly Event	Dec. 4 and 7, 1998

C. GROUNDWATER MOVEMENT

The monitoring wells at HWMU-10 are screened either across the alluvium/limestone bedrock interface or entirely within bedrock. The static water level measurements gathered during the 1998 quarterly monitoring events are summarized in **Table 4 (Appendix A)**. Groundwater fluctuations did not appear to exceed 2 to 4 feet annually, although individual wells tapping karst conduits could have experienced dramatic fluctuations following storm events. As shown on the HWMU-10 Potentiometric Surface Map for Third Quarter 1998 (**Appendix B**), groundwater movement beneath the site is generally to the north towards the New River.

For the purposes of this report, Darcian flow conditions were assumed for the alluvium and karst limestone bedrock beneath HWMU-10. As a result, the groundwater velocities were calculated by multiplying the hydraulic conductivity (determined from previously conducted slug tests) by the average hydraulic gradient across the site, and dividing by an assumed effective porosity for the aquifer materials. The average hydraulic gradient was determined by superimposing three evenly spaced flow line vectors over the Potentiometric Surface Map, measuring their lengths, calculating the head differential over the distances measured, and

dividing the head differential by the length of the flow line vectors. The three calculated gradients were then averaged to a single value. Using this method, the average groundwater hydraulic gradient across the site based on Third Quarter 1998 groundwater elevations was calculated to be 0.015 ft/ft. Historical slug test data for the site yielded an average hydraulic conductivity of 4.9×10^{-4} ft/second. This value is consistent with literature values for karst limestone and for clayey, silty sand and gravel alluvium (Domenico and Schwartz, 1990).

The estimated groundwater velocity across the site was calculated to be approximately 1.59 ft/day or 580 ft/year, based on the following:

- an average hydraulic conductivity of 4.9×10^{-4} ft/second;
- an average hydraulic gradient of 0.015 ft/ft; and
- an assumed effective porosity of 0.40, based on a representative range of porosities for karst limestone and for clayey, silty sand and gravel alluvium (Domenico and Schwartz, 1990).

The actual groundwater flow velocities in the limestone bedrock may vary as much as one to two orders of magnitude from the velocity presented above, depending on water level conditions and the distribution of karst conduits.

D. STATISTICAL EVALUATIONS

D.1 HWMU-10 GROUNDWATER BACKGROUND CONCENTRATIONS

Background concentrations were calculated for each constituent in the groundwater monitoring program using the 1998 quarterly analytical data from upgradient well 10D4. The background concentration calculations were based on site wide 95% confidence, 95% coverage upper prediction intervals. When adjusted for multiple comparisons of the background data, the minimum required false positive rate was approximately 1%. Therefore, a 99% confidence level (0.01 false positive rate) was used for all individual comparisons. These coverage limits were only achieved for constituent data on which parametric prediction intervals were performed. In cases where non-parametric prediction intervals were computed to determine the background levels, the confidence level and error rate were calculated based on the number of background data points available and number of future comparisons. Because the upper control limit of a non-parametric interval cannot be adjusted for multiple comparisons and an inadequate number of background data, the number of resampling events required was adjusted to account for the high error rates inherent in those situations. No confidence levels were defined in cases where the background data were 100% non-detected; the detection limits of such constituents were used to define their respective background levels.

D.2 HWMU-10 STATISTICAL ANALYSIS

Statistical evaluations were performed for HWMU-10 as specified in VHWMR 9 VAC 20-60-570. The statistical evaluations were performed in accordance with the procedures and guidance provided in the following documents:

- Virginia Hazardous Waste Management Regulations, 9 VAC 20-60-790 H and I;
- VDEQ Guidance for statistical analysis titled "Data Analysis Plan," undated;
- Interim Final Guidance for Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, USEPA, April 1989;

- Addendum to Interim Final Guidance for Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, USEPA, July 1992; and
- Statistical Methods for Groundwater Monitoring, Gibbons, R.D., 1994.

Statistical threshold values were computed for the 27 constituents for which HWMU-10 is currently monitored based on the concentrations of those constituents in upgradient (background) well 10D4. The 1998 quarterly monitoring data for well 10D4 were used for this purpose. Comparison statistical analyses were performed for all constituents which were detected in any downgradient well during Fourth Quarter 1998.

D.2.1 Background Data and Statistical Comparisons

Statistical analyses were performed using the 1998 quarterly analytical results from upgradient well 10D4 as background data. Based on the percentage of non-detects and the distribution of the background data, methods of statistical comparisons varied. Background average, standard deviation and other descriptive statistical data were computed for all constituents and are presented in **Appendix F**.

The constituents listed below were 100% non-detected in the background data. The background threshold levels (BTLs) for these constituents were established as equal to their detection limits (DLs). Detections of these constituents in the downgradient wells during Fourth Quarter 1998 were compared to these BTLs.

Background Threshold Level (BTL) = Detection Limit (DL)				
Parameter	Sample Size	% Non-Detects	DL (µg/l)	BTL (µg/l)
Bromodichloromethane	4	100	0.2	0.2
Chloromethane	4	100	0.3	0.3
Cyanide	4	100	10	10
Di-n-butylphthalate	4	100	5	5
2,4-Dinitrotoluene	4	100	0.08	0.08
2,6-Dinitrotoluene	4	100	0.08	0.08
Mercury	4	100	0.2	0.2
Methylethyl ketone	4	100	1.1	1.1
Nickel	4	100	15	15
Silver	4	100	0.2	0.2
Thallium	4	100	1	1
Trans 1,2-dichloroethene	4	100	0.1	0.1
Trichloroethene	4	100	0.1	0.1
Trichlorofluoromethane	4	100	0.5	0.5
Xylene	4	100	0.1	0.1
Total Organic Carbon (TOC)	4	100	1000	1000

Non-parametric prediction intervals were computed for all of the constituents for which the data from background well 10D4 satisfied one of the following two criteria, per VDEQ regulations and guidance as well as USEPA guidance:

- Percentage of non-detects was greater than or equal to 50 and less than 100; or
- Percentage of non-detects was less than 50, but data was not normally distributed.

The constituents arsenic and selenium satisfied the first criterion above, and specific conductivity, chromium and total organic halides satisfied the second criterion. Hence, non-parametric upper prediction limits (UPLs) were computed for these constituents. The background threshold levels for these constituents were set as equal to their UPLs. The confidence level and false positive rate were calculated based on the number of background data points available and number of future comparisons. For all constituents, the confidence level was determined to be equal to 0.802, and the false positive rate was equal to 0.198. Since the upper control limit of a non-parametric interval cannot be adjusted for multiple comparisons and inadequate number of background data, the number of resampling events required was adjusted to account for the high error rates inherent in those situations. The number of confirmation resamples required for all constituents is 4. The background and relevant statistical data for these constituents are summarized below. Associated statistical computations are presented in **Appendix F**.

BTL = Upper Prediction Limit of Non-parametric Prediction Interval w/false positive rate=0.198				
Parameter	Sample Size	% Non-Detects	DL (µg/l)	BTL (µg/l)
Arsenic	4	75	1	2
Chromium	4	0	1	16
Selenium	4	75	1	2
Specific Conductivity	4	0	1	353
TOX	4	0	5	78

The constituents chloroform, copper and lead exhibited normally distributed data (excluding non-detects) with between 25% and 50% non-detects in the background well. The mean and standard deviation of the background data for these constituents were adjusted using Cohen's Maximum Likelihood Estimator Method (1959, 1961). One-sided parametric prediction intervals were then computed for those constituents based on the adjusted mean and standard deviation. Their Upper Prediction Limits were set as their BTLs. The background and relevant statistical data are summarized below. Cohen's adjustment computations and prediction interval computations are presented in **Appendix F**.

BTL = Upper Prediction Limit of Prediction Interval w/site wide false positive rate=0.05				
Parameter	Sample Size	% Non-Detects	DL (µg/l)	BTL (µg/l)
Chloroform	4	25	3.5	40.8
Copper	4	25	1	23.1
Lead	4	25	1	20.5

The following constituents exhibited normally distributed background data with less than 25% non-detects. One sided parametric prediction intervals were computed on the background data for all of these constituents. The UPLs for these constituents were set as their respective BTLs, with one exception. For pH, a two-sided parametric prediction interval was computed; therefore, the BTL for pH consisted of a range between the lower prediction limit (LPL) and the upper prediction limit. The background concentration calculations were based on site wide 95% confidence, 95% coverage upper prediction intervals. When adjusted for multiple comparisons of the background data, the minimum required false positive rate was approximately 1% (0.01). Therefore, a 99% confidence level (0.01 false positive rate) was used for all individual comparisons, which with the most conservative assumptions provided a site-wide false positive

rate of 0.05 for all constituents. The background and relevant statistical data for these constituents are summarized below. The prediction interval computations for these constituents are presented in **Appendix F**.

BTL = UPL of one-sided Prediction Interval (exception pH) w/site-wide false positive rate=0.05 (individual comparisons false positive rate=0.01) BTL for pH = LPL – UPL of two-sided Prediction Interval				
Parameter	Sample Size	% Non-Detects	DL (µg/l)	BTL (µg/l)
Barium	4	0	2	216
Zinc	4	0	5	35.2
pH	4	0	0.1 pH units	8.1 to 4.7 pH units

D.2.2 Results of Statistical Comparisons

The following table lists the constituents which were detected during the Fourth Quarter 1998 event at concentrations exceeding their respective background threshold levels (BTLs), and the downgradient wells in which they were detected.

Parameter	Monitoring Well(s)
Bromodichloromethane	10MW1
2,6-DNT	10D3, 10D3D
Nickel	10DDH2, 10D3, 10D3D, 10MW1
Specific Conductivity	10DDH2, 10D3, 10D3D, 10MW1
Selenium	10D3, 10MW1
Total Organic Carbon (TOC)	10MW1

Any HWMU-10 target constituents not listed above were not detected in the downgradient monitoring wells at concentrations exceeding their respective BTLs.

HWMU-13 ANNUAL GROUNDWATER MONITORING REPORT

CALENDAR YEAR: 1998
REPORT DATE: March 1, 1999

Prepared for the Virginia Department of Environmental Quality - Waste Division (VDEQ-WD)
in accordance with 9 VAC 20-60-570.

A. WASTE MANAGEMENT UNIT INFORMATION

UNIT NAME: Hazardous Waste Management Unit 13 (HWMU-13)
OWNER/OPERATOR: United States Army / Alliant TechSystems, Inc.
UNIT LOCATION: Radford AAP Main Plant Area, Radford, Virginia
CLASS: Hazardous Waste Management Unit
TYPE: Waste Propellant Burning Ground

B. GROUNDWATER MONITORING PLAN

MONITORING NETWORK

UPGRADIENT WELLS: 13MW1, 13MW2
DOWNGRADIENT WELLS: 13MW3, 13MW4, 13MW5, 13MW6, 13MW7

MONITORING STATUS: Groundwater Quality Assessment Program

DATA COLLECTION STATUS:

Quarterly Event	March 9-12, 1998
Quarterly Event	May 14-15 and 18-19, 1998
Quarterly Event	Aug. 14, 18-19, 21 and 26, 1998
Quarterly Event	Nov. 23, 30 and Dec. 3, 1998

C. GROUNDWATER MOVEMENT

The static water level measurements gathered at HWMU-13 during the 1998 quarterly monitoring events are summarized in **Table 5 (Appendix A)**. Groundwater fluctuations ranged from 3 to 9 feet annually. As shown on the HWMU-13 Potentiometric Surface Map for Fourth Quarter 1998 (**Appendix B**), groundwater movement beneath the site is generally to the south toward the New River.

For the purposes of this report, Darcian flow conditions were assumed for the alluvium and karst carbonate bedrock beneath HWMU-13. As a result, the groundwater velocities were calculated by multiplying the hydraulic conductivity (determined from previously conducted slug tests) by the average hydraulic gradient across the site, and dividing by an assumed effective porosity for the aquifer materials. The average hydraulic gradient was determined by superimposing three evenly spaced flow line vectors over the Potentiometric Surface Map, measuring their lengths, calculating the head differential over the distances measured, and dividing the head differential by the length of the flow line vectors. The three calculated gradients were then averaged to a single value. Using this method, the average groundwater hydraulic gradient across the site based on Fourth Quarter 1998 groundwater elevations was calculated to be 0.004 ft/ft. Historical slug test data for the site yielded an average hydraulic

conductivity of 6.56×10^{-5} ft/second. This value is consistent with literature values for karst carbonate rock and for clayey, silty sand and gravel alluvium (Domenico and Schwartz, 1990).

The estimated groundwater velocity across the site was calculated to be approximately 5.67×10^{-2} ft/day or 20.7 ft/year, based on the following:

- an average hydraulic conductivity of 6.56×10^{-5} ft/second;
- an average hydraulic gradient of 0.004 ft/ft; and
- an assumed effective porosity of 0.40, based on a representative range of porosities for karst carbonate rock and clayey, silty sand and gravel alluvium (Domenico and Schwartz, 1990).

The actual groundwater flow velocities in the carbonate bedrock may vary as much as one to two orders of magnitude from the velocity presented above, depending on water level conditions and the distribution of karst conduits.

D. STATISTICAL EVALUATIONS

D.1 HWMU-13 GROUNDWATER BACKGROUND CONCENTRATIONS

Background concentrations were calculated for each constituent in the groundwater monitoring program using the 1998 quarterly analytical data from upgradient wells 13MW1 and 13MW2. The background concentration calculations were based on site wide 95% confidence, 95% coverage upper prediction intervals. When adjusted for multiple comparisons of the background data, the minimum required false positive rate was approximately 1%. Therefore, a 99% confidence level (0.01 false positive rate) was used for all individual comparisons. These coverage limits were only achieved for constituent data on which parametric prediction intervals were performed. In cases where non-parametric prediction intervals were computed to determine the background levels, the confidence level and error rate were calculated based on the number of background data points available and number of future comparisons. Because the upper control limit of a non-parametric interval cannot be adjusted for multiple comparisons and an inadequate number of background data, the number of resampling events required was adjusted to account for the high error rates inherent in those situations. No confidence levels were defined in cases where the background data were 100% non-detected; the detection limits of such constituents were used to define their respective background levels.

D.2 HWMU-13 STATISTICAL ANALYSIS

Statistical evaluations were performed for HWMU-13 as specified in VHWMR 9 VAC 20-60-570. The statistical evaluations were performed in accordance with the procedures and guidance provided in the following documents:

- Virginia Hazardous Waste Management Regulations, 9 VAC 20-60-790 H and I;
- VDEQ Guidance for statistical analysis titled "Data Analysis Plan," undated;
- Interim Final Guidance for Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, USEPA, April 1989;
- Addendum to Interim Final Guidance for Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, USEPA, July 1992; and
- Statistical Methods for Groundwater Monitoring, Gibbons, R.D., 1994.

Statistical threshold values were computed for the 65 constituents for which HWMU-13 is currently monitored based on the concentrations of those constituents in upgradient (background) wells 13MW1 and 13MW2. The 1998 quarterly monitoring data for the background wells were used for this purpose. Comparison statistical analyses were performed for all constituents which were detected in any downgradient well during Fourth Quarter 1998.

D.2.1 Background Data and Statistical Comparisons

Statistical analyses were performed using the 1998 quarterly analytical results from upgradient wells 13MW1 and 13MW2 as background data. Based on the percentage of non-detects and the distribution of the background data, methods of statistical comparisons varied. Background average, standard deviation and other descriptive statistical data were computed for all constituents and are presented in **Appendix G**.

The constituents listed below were 100% non-detected in the background data. The background threshold levels (BTLs) for these constituents were established as equal to their detection limits (DLs). Detections of these constituents in the downgradient wells during Fourth Quarter 1998 were compared to these BTLs.

Background Threshold Level (BTL) = Detection Limit (DL)				
Parameter	Sample Size	% Non-Detects	DL (µg/l)	BTL (µg/l)
1,1,1-Trichloroethane	8	100	0.3	0.3
1,1-Dichloroethene	8	100	0.3	0.3
2,4,6-Trinitrotoluene	8	100	10	10
2,4-Dinitrophenol	8	100	50	50
2,4-Dinitrotoluene	8	100	0.08	0.08
2,6-Dinitrotoluene	8	100	0.08	0.08
2-Nitrodiphenylamine	8	100	10	10
Acetone	8	100	10	10
Ammonia	8	100	100	100
Antimony	8	100	3	3
Benzene	8	100	0.1	0.1
Bis(2-ethylhexyl)phthalate	8	100	10	10
Butylbenzyl phthalate	8	100	5	5
Cadmium	8	100	0.1	0.1
Cyanide	8	100	10	10
Cyclonite	8	100	10	10
Diethyleneglycol dinitrate	8	100	10	10
Diethylether	8	100	10	10
Diethylphthalate	8	100	5	5
Dimethylether	8	100	10	10
Di-n-butylphthalate	8	100	5	5
Di-n-propyladipate	8	100	10	10
Diphenylamine	8	100	10	10
Ethanol	8	100	10	10
Ethyleneglycol monoethylether	8	100	10	10
Homocyclonite	8	100	10	10
Mercury	8	100	0.2	0.2

Background Threshold Level (BTL) = Detection Limit (DL)				
Parameter	Sample Size	% Non-Detects	DL (µg/l)	BTL (µg/l)
Nitrite	8	100	10	10
Nitrocellulose	8	100	10	10
Nitroglycerin	8	100	10	10
Nitroguanidine	8	100	10	10
N-Nitrosodiphenylamine	8	100	5	5
o-Nitroaniline	8	100	50	50
Phenols	8	100	10	10
Resorcinol	8	100	10	10
Silver	8	100	0.2	0.2
Tetryl	8	100	10	10
Toluene	8	100	0.1	0.1
Triethyleneglycol dinitrate	8	100	10	10
Trimethyloethane trinitrate	8	100	10	10
Vinyl chloride	8	100	0.1	0.1
Xylenes	8	100	0.1	0.1

Non-parametric prediction intervals were computed for all of the constituents for which the data from the background wells satisfied one of the following two criteria, per VDEQ regulations and guidance as well as USEPA guidance:

- Percentage of non-detects was greater than or equal to 50 and less than 100; or
- Percentage of non-detects was less than 50, but data was not normally distributed.

Non-parametric upper prediction limits (UPL) were computed for 17 constituents which met one of the above two criteria. The background threshold levels for these constituents were set as equal to their UPLs. The confidence level and false positive rate were calculated based on the number of background data points available and number of future comparisons. For all constituents, the confidence level was determined to be equal to 0.906, and the false positive rate was equal to 0.094. Since the upper control limit of a non-parametric interval cannot be adjusted for multiple comparisons and inadequate number of background data, the number of resampling events required was adjusted to account for the high error rates inherent in those situations. The number of confirmation resamples required for all constituents is 2. The background and relevant statistical data for these constituents are summarized below. Associated statistical computations are presented in **Appendix G**.

BTL = Upper Prediction Limit of Non-parametric Prediction Interval w/false positive rate=0.094				
Parameter	Sample Size	% Non-Detects	DL (µg/l)	BTL (µg/l)
Aluminum	8	0	60	6090
Arsenic	8	88	1	3
Boron	8	50	50	144
Calcium	8	0	400	127000
Chloride	8	0	1000	24800
Chromium	8	0	1	112
Copper	8	0	1	9

BTL = Upper Prediction Limit of Non-parametric Prediction Interval w/false positive rate=0.094				
Parameter	Sample Size	% Non-Detects	DL (µg/l)	BTL (µg/l)
Iron	8	0	30	11800
Manganese	8	0	0.2	186
Nickel	8	75	15	44
Lead	8	50	1	6
Sodium	8	0	100	13200
Selenium	8	63	1	2
Sulfate	8	0	1000	73900
TOC	8	75	1000	1400
TOX	8	38	5	25.5
Zinc	8	38	5	29

The following constituents exhibited normally distributed background data with less than 25% non-detects. One sided parametric prediction intervals were computed on the background data for all of these constituents. The UPLs for these constituents were set as their respective BTLs, with one exception. For pH, a two-sided parametric prediction interval was computed; therefore, the BTL for pH consisted of a range between the lower prediction limit (LPL) and the upper prediction limit. The background concentration calculations were based on site wide 95% confidence, 95% coverage upper prediction intervals. When adjusted for multiple comparisons of the background data, the minimum required false positive rate was approximately 1% (0.01). A 99% confidence level (0.01 false positive rate) was used for all individual comparisons, which with the most conservative assumptions provided a site-wide false positive rate of 0.05 for all constituents. The background and relevant statistical data for these constituents are summarized below. The prediction interval computations for these constituents are presented in **Appendix G**.

BTL = UPL of one-sided Prediction Interval (exception pH) w/site-wide false positive rate=0.05 (individual comparisons false positive rate=0.01) BTL for pH = LPL – UPL of two-sided Prediction Interval				
Parameter	Sample Size	% Non-Detects	DL (µg/l)	BTL (µg/l)
Barium	8	0	2	336
Fluoride	8	0	100	295
Magnesium	8	0	200	65450
Nitrate	8	0	100	993
pH	8	0	0.1 pH units	7.7 to 5.8 pH units
Specific Conductivity	8	0	1 µS/cm	734 µS/cm

D.2.2 Results of Statistical Comparisons

The following table lists the constituents which were detected during the Fourth Quarter 1998 event at concentrations exceeding their respective background threshold levels (BTLs), and the downgradient wells in which they were detected.

Parameter	Monitoring Well(s)
2,4-Dinitrotoluene	13MW7
2,6-Dinitrotoluene	13MW7
Fluoride	13MW3, 13MW4, 13MW5, 13MW6
Nitrate	13MW4, 13MW5, 13MW7
Nickel	13MW3
Lead	13MW4, 13MW5
Sodium	13MW5
Sulfate	13MW3, 13MW5, 13MW6, 13MW7

Any HWMU-13 target constituents not listed above were not detected in the downgradient monitoring wells at concentrations exceeding their respective BTLs.

HWMU-16 ANNUAL GROUNDWATER MONITORING REPORT

CALENDAR YEAR: 1998
REPORT DATE: March 1, 1999

Prepared for the Virginia Department of Environmental Quality - Waste Division (VDEQ-WD)
in accordance with 9 VAC 20-60-570.

A. WASTE MANAGEMENT UNIT INFORMATION

UNIT NAME: Hazardous Waste Management Unit 16 (HWMU-16)
OWNER/OPERATOR: United States Army / Alliant TechSystems, Inc.
UNIT LOCATION: Radford AAP Main Plant Area, Radford, Virginia
CLASS: Hazardous Waste Management Unit
TYPE: Former Hazardous Waste Landfill

B. GROUNDWATER MONITORING PLAN

MONITORING NETWORK

UPGRADIENT WELL: 16C1
DOWNGRADIENT WELLS: 16-2, 16-3, 16-5, 16WC1A, 16WC1B, 16WC2B, 16MW8, 16SPRING
OBSERVATION WELLS: 16-1, 16WC2A, 16MW9, 16C3, 16CDH3
(static water level measurements only)

MONITORING STATUS: Groundwater Quality Assessment Program

DATA COLLECTION STATUS: Quarterly Event Feb. 20 and 25-27, 1998
Quarterly Event Apr. 27-30 and May 4, 1998
Quarterly Event Aug. 3-6, 1998
Quarterly Event Nov. 5-6, 9 and 11, 1998

C. GROUNDWATER MOVEMENT

The monitoring wells at HWMU-16 are screened entirely within either carbonate bedrock or weathered carbonate bedrock residuum, or across the residuum/bedrock interface. The static water level measurements gathered at HWMU-16 during the 1998 quarterly monitoring events are summarized in **Table 6 (Appendix A)**. Groundwater fluctuations ranged from 1 to 10 feet annually. As shown on the HWMU-16 Potentiometric Surface Map for Third Quarter 1998 (**Appendix B**), groundwater movement beneath the site is generally to the northeast.

For the purposes of this report, Darcian flow conditions were assumed for the weathered residuum and karst carbonate bedrock beneath HWMU-16. As a result, the groundwater velocities were calculated by multiplying the hydraulic conductivity (determined from previously conducted slug tests) by the average hydraulic gradient across the site, and dividing by an assumed effective porosity for the aquifer materials. The average hydraulic gradient was determined by superimposing three evenly spaced flow line vectors over the Potentiometric Surface Map, measuring their lengths, calculating the head differential over the distances

measured, and dividing the head differential by the length of the flow line vectors. The three calculated gradients were then averaged to a single value. Using this method, the average groundwater hydraulic gradient across the site based on Third Quarter 1998 groundwater elevations was calculated to be 0.088 ft/ft. Historical slug test data for the site yielded an average hydraulic conductivity of 7.87×10^{-5} ft/second. This value is consistent with literature values for karst carbonate rock and for clay and silt residuum (Domenico and Schwartz, 1990).

The estimated groundwater velocity across the site was calculated to be approximately 1.71 ft/day or 624 ft/year, based on the following:

- an average hydraulic conductivity of 7.87×10^{-5} ft/second;
- an average hydraulic gradient of 0.088 ft/ft; and
- an assumed effective porosity of 0.35, based on a representative range of porosities for karst carbonate rock and clay and silt residuum (Domenico and Schwartz, 1990).

The actual groundwater flow velocities in the carbonate bedrock may vary as much as one to two orders of magnitude from the velocity presented above, depending on water level conditions and the distribution of karst conduits.

D. STATISTICAL EVALUATIONS

D.1 HWMU-16 GROUNDWATER BACKGROUND CONCENTRATIONS

Background concentrations were calculated for each constituent in the groundwater monitoring program using the 1998 quarterly analytical data from upgradient well 16C1. The background concentration calculations were based on site wide 95% confidence, 95% coverage upper prediction intervals. When adjusted for multiple comparisons of the background data, the minimum required false positive rate was well below 1%. A 99% confidence level (0.01 false positive rate) was used for all individual comparisons. These coverage limits were only achieved for constituent data on which parametric prediction intervals were performed. In cases where non-parametric prediction intervals were computed to determine the background levels, the confidence level and error rate were calculated based on the number of background data points available and number of future comparisons. Because the upper control limit of a non-parametric interval cannot be adjusted for multiple comparisons and an inadequate number of background data, the number of resampling events required was adjusted to account for the high error rates inherent in those situations. No confidence levels were defined in cases where the background data were 100% non-detected; the detection limits of such constituents were used to define their respective background levels.

D.2 HWMU-16 STATISTICAL ANALYSIS

Statistical evaluations were performed for HWMU-16 as specified in VHWMR 9 VAC 20-60-570. The statistical evaluations were performed in accordance with the procedures and guidance provided in the following documents:

- Virginia Hazardous Waste Management Regulations, 9 VAC 20-60-790 H and I;
- VDEQ Guidance for statistical analysis titled "Data Analysis Plan," undated;
- Interim Final Guidance for Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, USEPA, April 1989;

- Addendum to Interim Final Guidance for Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, USEPA, July 1992; and
- Statistical Methods for Groundwater Monitoring, Gibbons, R.D., 1994.

Statistical threshold values were computed for the 54 constituents for which HWMU-16 is currently monitored based on the concentrations of those constituents in upgradient (background) well 16C1. The 1998 quarterly monitoring data for well 16C1 were used for this purpose. Comparison statistical analyses were performed for all constituents which were detected in any downgradient well during Fourth Quarter 1998.

D.2.1 Background Data and Statistical Comparisons

Statistical analyses were performed using the 1998 quarterly analytical results from upgradient well 16C1 as background data. Based on the percentage of non-detects and the distribution of the background data, methods of statistical comparisons varied. Background average, standard deviation and other descriptive statistical data were computed for all constituents and are presented in **Appendix H**.

The constituents listed below were 100% non-detected in the background data. The background threshold levels (BTLs) for these constituents were established as equal to their detection limits (DLs). Detections of these constituents in the downgradient wells during Fourth Quarter 1998 were compared to these BTLs.

Background Threshold Level (BTL) = Detection Limit (DL)				
Parameter	Sample Size	% Non-Detects	DL (µg/l)	BTL (µg/l)
Antimony	4	100	3	3
Arsenic	4	100	1	1
Beryllium	4	100	0.2	0.2
Bromoform	4	100	0.3	0.3
Cadmium	4	100	0.1	0.1
Carbon tetrachloride	4	100	0.2	0.2
Chlorobenzene	4	100	0.1	0.1
Chloromethane	4	100	0.3	0.3
Cobalt	4	100	1	1
Copper	4	100	1	1
Cyanide	4	100	10	10
Di-n-butyl phthalate	4	100	5	5
1,4-dichlorobenzene	4	100	0.1	0.1
1,2-dichloroethane	4	100	0.1	0.1
Ethylbenzene	4	100	0.1	0.1
1234678-HPCDF	4	100	0.0615	0.0615
1234789-HPCDF	4	100	0.0709	0.0709
123478-HXCDF	4	100	0.039	0.039
123678-HXCDF	4	100	0.0377	0.0377
123789-HXCDF	4	100	0.0415	0.0415
234678-HXCDF	4	100	0.0428	0.0428
Lead	4	100	1	1
Mercury	4	100	0.2	0.2

Background Threshold Level (BTL) = Detection Limit (DL)				
Parameter	Sample Size	% Non-Detects	DL (µg/l)	BTL (µg/l)
Methylethylketone	4	100	1.1	1.1
OCDF	4	100	0.1307	0.1307
12378-PECDF	4	100	0.0439	0.0439
23478-PECDF	4	100	0.0417	0.0417
Selenium	4	100	1	1
Silver	4	100	0.2	0.2
2378-TCDF	4	100	0.0485	0.0485
1,1,2,2,-tetrachloroethane	4	100	0.1	0.1
Thallium	4	100	1	1
Toluene	4	100	0.1	0.1
trans1,2-dichloroethene	4	100	0.1	0.1
1,1,2-trichloroethane	4	100	0.5	0.5
Trichloroethene	4	100	0.1	0.1
Vanadium	4	100	4	4
Vinyl chloride	4	100	0.1	0.1
Xylene	4	100	0.1	0.1

Non-parametric prediction intervals were computed for all of the constituents for which the data from the background wells satisfied one of the following two criteria, per VDEQ regulations and guidance as well as USEPA guidance:

- Percentage of non-detects was greater than or equal to 50 and less than 100; or
- Percentage of non-detects was less than 50, but data was not normally distributed.

The constituents total organic carbon (TOC), total organic halides (TOX), chromium, 2,4-dinitrotoluene (2,4-DNT), nickel, tetrachloroethene and zinc satisfied the first criterion above. Specific conductivity met the second criterion above. Hence, non-parametric upper prediction limits (UPL) were computed for these constituents. The background threshold levels for these constituents were set as equal to their UPLs. The confidence level and false positive rate were calculated based on the number of background data points available and number of future comparisons. For all constituents, the confidence level was determined to be equal to 0.698, and the false positive rate was equal to 0.302. Since the upper control limit of a non-parametric interval cannot be adjusted for multiple comparisons and inadequate number of background data, the number of resampling events required was adjusted to account for the high error rates inherent in those situations. The number of confirmation resamples required for all constituents is 5. The background and relevant statistical data for these constituents are summarized below. Associated statistical computations are presented in **Appendix H**.

BTL = Upper Prediction Limit of Non-parametric Prediction Interval w/false positive rate=0.302				
Parameter	Sample Size	% Non-Detects	DL (µg/l)	BTL (µg/l)
Chromium	4	50	1	3
Nickel	4	75	15	16
2,4-DNT	4	75	0.08	0.1
Specific conductivity	4	0	1 µS/cm	610 µS/cm

BTL = Upper Prediction Limit of Non-parametric Prediction Interval w/false positive rate=0.302				
Parameter	Sample Size	% Non-Detects	DL (µg/l)	BTL (µg/l)
Tetrachloroethene	4	50	0.1	0.4
TOC	4	75	1000	1025
TOX	4	50	5	30
Zinc	4	75	5	6

The constituent 2,6-dinitrotoluene (2,6-DNT) exhibited normally distributed data (excluding non-detects) with between 25% and 50% non-detects in the background well. The mean and standard deviation of the background data for this constituent was adjusted using Cohen's Maximum Likelihood Estimator Method (1959, 1961). One-sided parametric prediction interval was then computed based on the adjusted mean and standard deviation. The computed Upper Prediction Limits was set as its BTL. The background and relevant statistical data are summarized below. Cohen's adjustment computations and prediction interval computations are presented in **Appendix H**.

BTL = Upper Prediction Limit of Prediction Interval w/site wide false positive rate=0.05				
Parameter	Sample Size	% Non-Detects	DL (µg/l)	BTL (µg/l)
2,6-DNT	4	25	0.08	0.186

The following constituents exhibited normally distributed background data with less than 25% non-detects. One sided parametric prediction intervals were computed on the background data for all of these constituents. The UPLs for these constituents were set as their respective BTLs, with one exception. For pH, a two-sided parametric prediction interval was computed; therefore, the BTL for pH consisted of a range between the lower prediction limit (LPL) and the upper prediction limit. The background concentration calculations were based on a site wide 95% confidence, 95% coverage upper prediction intervals. When adjusted for multiple comparisons of the background data, the minimum required false positive rate was well below 1% (0.01). A 99% confidence level (0.01 false positive rate) was used for all individual comparisons, which with the most conservative assumptions provided a site-wide false positive rate of >0.05 for all constituents. The background and relevant statistical data for these constituents are summarized below. The prediction interval computations for these constituents are presented in **Appendix H**.

BTL = UPL of one-sided Prediction Interval (exception pH) w/site-wide false positive rate>0.05 (individual comparisons false positive rate=0.01) BTL for pH = LPL – UPL of two-sided Prediction Interval				
Parameter	Sample Size	% Non-Detects	DL (µg/l)	BTL (µg/l)
Barium	4	0	2	215.4
Dichlorodifluoromethane	4	0	0.3	27.1
1,1-dichloroethane	4	0	0.2	14.1
1,1,1-trichloroethane	4	0	0.3	9.6
Trichlorofluoromethane	4	0	0.5	6.2
pH	4	0	0.1 pH units	9.2 to 4.1 pH units

D.2.2 Results of Statistical Comparisons

The following table lists the constituents which were detected during the Fourth Quarter 1998 event at concentrations exceeding their respective background threshold levels (BTLs), and the downgradient wells in which they were detected.

Parameter	Monitoring Well(s)
Arsenic	16-5, 16WC2B
Barium	16-2, 16-3, 16WC1A, 16WC1B, 16WC2B, 16-5
Beryllium	16WC1B, 16WC2B
Chromium	16-3, 16WC1B, 16WC2B, 16-5
Lead	16WC1B, 16WC2B, 16-5
Nickel	16WC1A, 16WC2B, 16-5
Vanadium	16-3, 16WC1B, 16WC2B
Zinc	16-3, 16WC1B, 16WC2B, 16-5
Cadmium	16WC1B, 16WC2B, 16-5
Cobalt	16-3, 16WC1A, 16WC1B, 16WC2B, 16-5
Copper	16-3, 16WC1B, 16WC2B, 16-5
Mercury	16WC1B
Selenium	16WC1B, 16WC2B, 16-5
2,4-DNT	16-3, 16WC1B, 16WC2B, 16SPRING, 16-5
2,6-DNT	16WC1A

Any HWMU-16 target constituents not listed above were not detected in the downgradient monitoring wells at concentrations exceeding their respective BTLs.

HWMU-39 ANNUAL GROUNDWATER MONITORING REPORT

CALENDAR YEAR: 1998
REPORT DATE: March 1, 1999

Prepared for the Virginia Department of Environmental Quality - Waste Division (VDEQ-WD)
in accordance with 9 VAC 20-60-570.

A. WASTE MANAGEMENT UNIT INFORMATION

UNIT NAME: Hazardous Waste Management Unit 39 (HWMU-39)
OWNER/OPERATOR: United States Army / Alliant TechSystems, Inc.
UNIT LOCATION: Radford AAP Main Plant Area, Radford, Virginia
CLASS: Hazardous Waste Management Unit
TYPE: Closed Incinerator Spray Pond

B. GROUNDWATER MONITORING PLAN

MONITORING NETWORK

UPGRADIENT WELLS: 39MW1, 39MW4
DOWNGRADIENT WELLS: 39MW3, 39MW5, 39MW6

MONITORING STATUS: Groundwater Quality Assessment Program

DATA COLLECTION STATUS:

Quarterly Event	March 23-26, 1998
Quarterly Event	May 28-29 and June 1, 1998
Quarterly Event	Sept. 2-4, 1998
Quarterly Event	Dec. 8 and 10, 1998

C. GROUNDWATER MOVEMENT

The monitoring wells at HWMU-39 are screened within carbonate bedrock. The static water level measurements gathered at HWMU-39 during the 1998 quarterly monitoring events are summarized in **Table 7 (Appendix A)**. Groundwater fluctuations ranged from 2.5 to 6.5 feet annually. As shown on the HWMU-39 Potentiometric Surface Map for First Quarter 1998 (**Appendix B**), groundwater movement beneath the site is generally to the northeast.

For the purposes of this report, Darcian flow conditions were assumed for the karst carbonate bedrock beneath HWMU-39. As a result, the groundwater velocities were calculated by multiplying an assumed hydraulic conductivity by the average hydraulic gradient across the site, and dividing by an assumed effective porosity for the aquifer materials. The average hydraulic gradient was determined by superimposing three evenly spaced flow line vectors over the Potentiometric Surface Map, measuring their lengths, calculating the head differential over the distances measured, and dividing the head differential by the length of the flow line vectors. The three calculated gradients were then averaged to a single value. Using this method, the average groundwater hydraulic gradient across the site based on First Quarter 1998 groundwater elevations was calculated to be 0.077 ft/ft. A representative range of hydraulic conductivities for

karst limestone yielded an assumed hydraulic conductivity of 3.28×10^{-4} ft/second (Domenico and Schwartz, 1990).

The estimated groundwater velocity across the site was calculated to be approximately 7.27 ft/day or 2,654 ft/year, based on the following:

- an assumed hydraulic conductivity of 3.28×10^{-4} ft/second;
- an average hydraulic gradient of 0.077 ft/ft; and
- an assumed effective porosity of 0.30, based on a representative range of porosities for karst carbonate rock (Domenico and Schwartz, 1990).

The actual groundwater flow velocities in the carbonate bedrock may vary as much as one to two orders of magnitude from the velocity presented above, depending on water level conditions and the distribution of karst conduits.

D. STATISTICAL EVALUATIONS

D.1 HWMU-39 GROUNDWATER BACKGROUND CONCENTRATIONS

Background concentrations were calculated for each constituent in the groundwater monitoring program using the 1998 quarterly analytical data from upgradient wells 39MW1 and 39MW4. The background concentration calculations were based on site wide 95% confidence, 95% coverage upper prediction intervals. When adjusted for multiple comparisons of the background data, the minimum required false positive rate was approximately 1%. A 99% confidence level (0.01 false positive rate) was used for all individual comparisons. These coverage limits were only achieved for constituent data on which parametric prediction intervals were performed. In cases where non-parametric prediction intervals were computed to determine the background levels, the confidence level and error rate were calculated based on the number of background data points available and number of future comparisons. Because the upper control limit of a non-parametric interval cannot be adjusted for multiple comparisons and an inadequate number of background data, the number of resampling events required was adjusted to account for the high error rates inherent in those situations. No confidence levels were defined in cases where the background data were 100% non-detected; the detection limits of such constituents were used to define their respective background levels.

D.2 HWMU-39 STATISTICAL ANALYSIS

Statistical evaluations were performed for HWMU-39 as specified in VHWMR 9 VAC 20-60-570. The statistical evaluations were performed in accordance with the procedures and guidance provided in the following documents:

- Virginia Hazardous Waste Management Regulations, 9 VAC 20-60-790 H and I;
- VDEQ Guidance for statistical analysis titled "Data Analysis Plan," undated;
- Interim Final Guidance for Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, USEPA, April 1989;
- Addendum to Interim Final Guidance for Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, USEPA, July 1992; and
- Statistical Methods for Groundwater Monitoring, Gibbons, R.D., 1994.

Statistical threshold values were computed for the 39 constituents for which HWMU-39 is currently monitored based on the concentrations of those constituents in upgradient (background) wells 39MW1 and 39MW4. The 1998 quarterly monitoring data for wells 39MW1 and 39MW4 were used for this purpose. Comparison statistical analyses were performed for all constituents which were detected in any downgradient well during Fourth Quarter 1998.

D.2.1 Background Data and Statistical Comparisons

Statistical analyses were performed using the 1998 quarterly analytical results from upgradient wells 39MW1 and 39MW4 as background data. Based on the percentage of non-detects and the distribution of the background data, methods of statistical comparisons varied. Background average, standard deviation and other descriptive statistical data were computed for all constituents and are presented in **Appendix I**.

The constituents listed below were 100% non-detected in the background data. The background threshold levels (BTLs) for these constituents were established as equal to their detection limits (DLs). Detections of these constituents in the downgradient wells during Fourth Quarter 1998 were compared to these BTLs.

Background Threshold Level (BTL) = Detection Limit (DL)				
Parameter	Sample Size	% Non-Detects	DL (µg/l)	BTL (µg/l)
2,4,5-Trichlorophenoxypropionic acid	8	100	1	1
2,4-D, salts	8	100	1	1
Antimony	8	100	60	60
Diethylphthalate	8	100	5	5
Di-n-butylphthalate	8	100	5	5
Endrin	8	100	2	2
gamma-BHC	8	100	2	2
Mercury	8	100	0.2	0.2
Methoxychlor	8	100	2	2
Phenols	8	100	10	10
Resorcinol	8	100	10	10
Silver	8	100	0.2	0.2
Toxaphene	8	100	2	2
Thallium	8	100	0.2	0.2

Non-parametric prediction intervals were computed for all of the constituents for which the data from the background wells satisfied one of the following two criteria, per VDEQ regulations and guidance as well as USEPA guidance:

- Percentage of non-detects was greater than or equal to 50 and less than 100; or
- Percentage of non-detects was less than 50, but data was not normally distributed.

The background threshold levels for these constituents were set as equal to their UPLs. The confidence level and false positive rate were calculated based on the number of background data points available and number of future comparisons. For all constituents, the confidence level was determined to be equal to 0.939, and the false positive rate was equal to 0.061. Since the upper control limit of a non-parametric interval cannot be adjusted for multiple comparisons and inadequate number of background data, the number of resampling events required was adjusted to account for the high error rates inherent in those situations. The minimum number of

confirmation resamples required for all constituents is 2. The background and relevant statistical data for these constituents are summarized below. Associated statistical computations are presented in **Appendix I**.

BTL = Upper Prediction Limit of Non-parametric Prediction Interval w/false positive rate=0.061				
Parameter	Sample Size	% Non-Detects	DL (µg/l)	BTL (µg/l)
2,4-DNT	8	68	0.08	0.14
2,6-DNT	8	68	0.08	0.11
Alpha emission	8	38	1 pCi/l	7.9 pCi/l
Arsenic	8	50	1	4
Barium	8	0	2	175
Beryllium	8	63	0.2	0.4
Beta emission	8	25	1 pCi/l	54 pCi/l
Cadmium	8	88	0.2	0.2
Chloride	8	0	1000	5700
Coliform	8	50	2 MPN/ml	30 MPN /l
Chromium	8	0	1	71
Iron	8	0	1	13800
Fluoride	8	50	100	350
Manganese	8	0	0.2	631
Nickel	8	63	15	44
Lead	8	50	1	24
Radium	8	88	1 pCi/l	1.9 pCi/l
Sulfate	8	0	1000	100000
TOC	8	25	1000	1475
TOX	8	50	5	23

Selenium exhibited normally distributed data (excluding non-detects) with between 25% and 50% non-detects in the background well. The mean and standard deviation of the background data for this constituent were adjusted using Cohen's Maximum Likelihood Estimator Method (1959, 1961). One-sided parametric prediction interval was then computed for those constituents based on the adjusted mean and standard deviation. The Upper Prediction Limit was set as the BTL for selenium. The background and relevant statistical data are summarized below. Cohen's adjustment computations and prediction interval computations are presented in **Appendix I**.

BTL = Upper Prediction Limit of Prediction Interval w/site wide false positive rate=0.05				
Parameter	Sample Size	% Non-Detects	DL (µg/l)	BTL (µg/l)
Selenium	4	38	1	7.7

The following constituents exhibited normally distributed background data with less than 25% non-detects. One sided parametric prediction intervals were computed on the background data for all of these constituents. The UPLs for these constituents were set as their respective BTLs, with one exception. For pH, a two-sided parametric prediction interval was computed; therefore, the BTL for pH consisted of a range between the lower prediction limit (LPL) and the

upper prediction limit. The background concentration calculations were based on a site wide 95% confidence, 95% coverage upper prediction intervals. When adjusted for multiple comparisons of the background data, the minimum required false positive rate was approximately 1% (0.01). A 99% confidence level (0.01 false positive rate) was used for all individual comparisons, which with the most conservative assumptions provided a site-wide false positive rate of 0.05 for all constituents. The background and relevant statistical data for these constituents are summarized below. The prediction interval computations for these constituents are presented in **Appendix I**.

BTL = UPL of one-sided Prediction Interval (exception pH) w/site-wide false positive rate=0.05 (individual comparisons false positive rate=0.01) BTL for pH = LPL - UPL of two-sided Prediction Interval				
Parameter	Sample Size	% Non-Detects	DL (µg/l)	BTL (µg/l)
Nitrate	8	0	100	2455
Sodium	8	0	100	24646
Specific Conductivity	8	0	1	987
pH	8	0	0.1 pH units	7.8 to 5.6 pH units

D.2.2 Results of Statistical Comparisons

The following table lists the constituents which were detected during the Fourth Quarter 1998 event at concentrations exceeding their respective background threshold levels (BTLs), and the downgradient wells in which they were detected.

Parameter	Monitoring Well(s)
Arsenic	39MW3, 39MW5, 39MW6
Barium	39MW5, 39MW6
Beryllium	39MW5
Cadmium	39MW5, 39MW6
Chloride	39MW3, 39MW5, 39MW6
Fluoride	39MW5, 39MW6
Iron	39MW5
Lead	39MW5
Manganese	39MW5
Nickel	39MW5, 39MW6
Nitrate	39MW3
Selenium	39MW5
Sodium	39MW3
Sulfate	39MW3
Thallium	39MW5
Total Organic Carbon (TOC)	39MW6

Any HWMU-39 target constituents not listed above were not detected in the downgradient monitoring wells at concentrations exceeding their respective BTLs.

APPENDIX A

TABLES

TABLE 1
HWMU-4
GROUNDWATER ELEVATIONS - 1998
RADFORD ARMY AMMUNITION PLANT
RADFORD, VIRGINIA

MONITORING WELL ID	ELEVATION OF GROUND SURFACE	FIRST QUARTER 1998		SECOND QUARTER 1998		THIRD QUARTER 1998		FOURTH QUARTER 1998	
		DTW	GW ELEV	DTW	GW ELEV	DTW	GW ELEV	DTW	GW ELEV
4P-3	1752.56	4.10	1748.46	4.00	1748.56	4.14	1748.42	4.27	1748.29
4WC9B	1726.50	14.28	1712.22	13.60	1712.90	14.74	1711.76	14.84	1711.66
4WC8B	1740.14	7.95	1732.19	7.78	1732.36	8.55	1731.59	8.90	1731.24
4W4B	1727.50	16.30	1711.20	18.62	1708.88	19.12	1708.38	19.37	1708.13
4MW7	1722.50	11.50	1711.00	12.40	1710.10	11.78	1710.72	11.87	1710.63
4W2B	1733.50	13.00	1720.50	14.50	1719.00	16.56	1716.94	17.00	1716.50
4WC2-1	1735.40	20.74	1714.66	21.20	1714.20	21.47	1713.93	21.57	1713.83
4WC2-2	1735.40	15.57	1719.83	15.62	1719.78	16.60	1718.80	17.05	1718.35
4WC2-3	1735.40	14.60	1720.80	14.65	1720.75	15.58	1719.82	16.07	1719.33
4WC3-2	1726.50	13.82	1712.68	15.50	1711.00	17.07	1709.43	17.51	1708.99
4WC4-1	1713.50	7.00	1706.50	7.40	1706.10	8.26	1705.24	8.29	1705.21
4WC4-2	1713.50	11.30	1702.20	10.50	1703.00	11.81	1701.69	11.95	1701.55
4WC4-3	1713.50	6.95	1706.55	7.36	1706.14	8.19	1705.31	8.21	1705.29
4W5A	1715.40	10.30	1705.10	11.42	1703.98	12.94	1702.46	13.25	1702.15
4W6A	1714.20	10.30	1703.90	11.33	1702.87	12.84	1701.36	13.98	1700.22
4W7A	1705.00	8.22	1696.78	8.30	1696.70	10.10	1694.90	10.14	1694.86

NOTES:

DTW - Depth to water from ground surface.

GW ELEV - Groundwater elevation.

All elevations in feet above mean sea level.

TABLE 2
HWMU-5
GROUNDWATER ELEVATIONS - 1998
RADFORD ARMY AMMUNITION PLANT
RADFORD, VIRGINIA

MONITORING WELL ID	ELEVATION OF GROUND SURFACE	FIRST QUARTER 1998		SECOND QUARTER 1998		THIRD QUARTER 1998		FOURTH QUARTER 1998	
		DTW	GW ELEV	DTW	GW ELEV	DTW	GW ELEV	DTW	GW ELEV
5W8B	1787.58	11.20	1776.38	12.60	1774.98	14.79	1772.79	12.62	1774.96
5W5B	1773.13	4.30	1768.83	6.80	1766.33	9.60	1763.53	10.20	1762.93
5W7B	1772.78	5.40	1767.38	6.70	1766.08	8.40	1764.38	9.98	1762.80
5WC2-1	1768.80	4.42	1764.38	4.03	1764.77	8.60	1760.20	9.12	1759.68
5WC2-2	1768.80	4.30	1764.50	4.00	1764.80	8.67	1760.13	9.19	1759.61
5WC2-3	1768.80	3.60	1765.20	3.35	1765.45	8.14	1760.66	8.65	1760.15
S5W5	1769.81	4.65	1765.16	5.20	1764.61	7.60	1762.21	8.72	1761.09
S5W6	1769.42	2.15	1767.27	12.50	1756.92	7.64	1761.78	8.40	1761.02
S5W7	1773.08	8.35	1764.73	8.08	1765.00	9.67	1763.41	9.74	1763.34
5W9A	1761.10	0.00	1761.10	0.00	1761.10	2.93	1758.17	3.87	1757.23
5W10A	1768.40	9.48	1758.92	10.65	1757.75	12.35	1756.05	13.75	1754.65
5W11A	1764.70	4.90	1759.80	9.25	1755.45	11.38	1753.32	14.25	1750.45

NOTES:

DTW - Depth to water from ground surface.

GW ELEV - Groundwater elevation.

All elevations in feet above mean sea level.

TABLE 3
HWMU-7
GROUNDWATER ELEVATIONS - 1998
RADFORD ARMY AMMUNITION PLANT
RADFORD, VIRGINIA

MONITORING WELL ID	ELEVATION OF GROUND SURFACE	FIRST QUARTER 1998		SECOND QUARTER 1998		THIRD QUARTER 1998		FOURTH QUARTER 1998	
		DTW	GW ELEV	DTW	GW ELEV	DTW	GW ELEV	DTW	GW ELEV
7W12B	1714.81	22.08	1692.73	22.10	1692.71	22.60	1692.21	23.48	1691.33
7WCA	1712.40	21.40	1691.00	21.44	1690.96	21.80	1690.60	22.10	1690.30
7W11B	1712.90	21.42	1691.48	21.49	1691.41	21.90	1691.00	22.15	1690.75
7MW5	1713.20	22.06	1691.14	22.20	1691.00	22.55	1690.65	22.90	1690.30
7MW6	1712.80	22.11	1690.69	22.60	1690.20	23.74	1689.06	24.07	1688.73
S7W9	1710.48	21.57	1688.91	22.02	1688.46	22.50	1687.98	23.45	1687.03
7W9C	1703.70	13.00	1690.70	13.05	1690.65	13.55	1690.15	13.87	1689.83
7W10	1704.98	13.59	1691.39	14.00	1690.98	14.50	1690.48	12.78	1692.20
7W11	1712.82	21.55	1691.27	22.80	1690.02	22.13	1690.69	22.25	1690.57
7W10B	1704.65	12.75	1691.90	12.85	1691.80	13.32	1691.33	13.53	1691.12
7W10C	1707.50	16.90	1690.60	17.10	1690.40	18.08	1689.42	21.08	1686.42
7W13	1702.72	21.30	1681.42	14.48	1688.24	15.80	1686.92	16.17	1686.55

NOTES:

DTW - Depth to water from ground surface.

GW ELEV - Groundwater elevation.

All elevations in feet above mean sea level.

TABLE 4
HW/MU-10
GROUNDWATER ELEVATIONS - 1998
RADFORD ARMY AMMUNITION PLANT
RADFORD, VIRGINIA

MONITORING WELL ID	ELEVATION OF GROUND SURFACE	FIRST QUARTER 1998		SECOND QUARTER 1998		THIRD QUARTER 1998		FOURTH QUARTER 1998	
		DTW	GW ELEV	DTW	GW ELEV	DTW	GW ELEV	DTW	GW ELEV
10DG-1	1709.96	18.39	1691.57	16.95	1693.01	19.45	1690.51	21.35	1688.61
10DDH4	1713.16	20.90	1692.26	19.37	1693.79	21.71	1691.45	23.89	1689.27
10D4	1713.42	20.00	1693.42	19.21	1694.21	20.61	1692.81	20.95	1692.47
10DDH2	1700.78	13.60	1687.18	12.82	1687.96	15.36	1685.42	15.51	1685.27
10D3	1700.51	13.28	1687.23	12.72	1687.79	14.41	1686.10	15.92	1684.59
10D3D	1700.70	13.75	1686.95	13.70	1687.00	15.20	1685.50	16.54	1684.16
10M/W1	1701.28	14.15	1687.13	13.28	1688.00	15.14	1686.14	16.50	1684.78

NOTES:

DTW - Depth to water from ground surface.

GW ELEV - Groundwater elevation.

All elevations in feet above mean sea level.

TABLE 5
HWMU-13
GROUNDWATER ELEVATIONS - 1998
RADFORD ARMY AMMUNITION PLANT
RADFORD, VIRGINIA

MONITORING WELL ID	ELEVATION OF GROUND SURFACE	FIRST QUARTER 1998		SECOND QUARTER 1998		THIRD QUARTER 1998		FOURTH QUARTER 1998	
		DTW	GW ELEV	DTW	GW ELEV	DTW	GW ELEV	DTW	GW ELEV
13MW1	1698.66	17.05	1681.61	14.25	1684.41	23.40	1675.26	19.47	1679.19
13MW2	1701.21	18.75	1682.46	17.35	1683.86	19.96	1681.25	20.51	1680.70
13MW3	1693.41	11.80	1681.61	9.55	1683.86	12.25	1681.16	12.77	1680.64
13MW4	1695.18	15.55	1679.63	11.70	1683.48	15.71	1679.47	16.40	1678.78
13MW5	1695.26	15.14	1680.12	11.50	1683.76	15.48	1679.78	14.71	1680.55
13MW6	1693.81	13.97	1679.84	10.20	1683.61	14.25	1679.56	15.16	1678.65
13MW7	1693.81	13.47	1680.34	10.40	1683.41	14.59	1679.22	15.51	1678.30

NOTES:

DTW - Depth to water from ground surface.

GW ELEV - Groundwater elevation.

All elevations in feet above mean sea level.

TABLE 6
HWMU-16
GROUNDWATER ELEVATIONS - 1998
RADFORD ARMY AMMUNITION PLANT
RADFORD, VIRGINIA

MONITORING WELL ID	ELEVATION OF GROUND SURFACE	FIRST QUARTER 1998		SECOND QUARTER 1998		THIRD QUARTER 1998		FOURTH QUARTER 1998	
		DTW	GW ELEV	DTW	GW ELEV	DTW	GW ELEV	DTW	GW ELEV
16C1	1836.78	47.65	1789.13	44.30	1792.48	44.58	1792.20	45.45	1791.33
16MW8	1815.82	68.72	1747.10	68.97	1746.85	70.55	1745.27	71.71	1744.11
16MW9	1808.88	50.07	1758.81	60.40	1748.48	64.52	1744.36	63.85	1745.03
16WC1B	1812.95	60.05	1752.90	64.30	1748.65	66.15	1746.80	67.85	1745.10
16WC1A	1812.61	64.95	1747.66	65.12	1747.49	66.01	1746.60	67.80	1744.81
16-1	1813.88	50.28	1763.60	40.98	1772.90	40.48	1773.40	44.80	1769.08
16-2	1808.78	58.27	1750.51	54.25	1754.53	56.30	1752.48	54.32	1754.46
16-3	1823.83	55.48	1768.35	53.89	1769.94	53.77	1770.06	54.71	1769.12
16-5	1739.50	1.40	1738.10	0.46	1739.04	1.33	1738.17	1.85	1737.65
16WC2A	1818.05	62.00	1756.05	60.45	1757.60	61.02	1757.03	61.40	1756.65
16WC2B	1818.71	51.35	1767.36	49.30	1769.41	51.28	1767.43	52.18	1766.53
16C3	1819.22	65.05	1754.17	63.35	1755.87	65.22	1754.00	DRY	DRY
16CDH3(2)									
SPRING									

NOTES:

DTW - Depth to water from ground surface.

GW ELEV - Groundwater elevation.

All elevations in feet above mean sea level.

TABLE 7
HWMU-39
GROUNDWATER ELEVATIONS - 1998
RADFORD ARMY AMMUNITION PLANT
RADFORD, VIRGINIA

MONITORING WELL ID	ELEVATION OF GROUND SURFACE	FIRST QUARTER 1998		SECOND QUARTER 1998		THIRD QUARTER 1998		FOURTH QUARTER 1998	
		DTW	GW ELEV	DTW	GW ELEV	DTW	GW ELEV	DTW	GW ELEV
39MW1	1701.12	22.45	1678.67	21.80	1679.32	24.40	1676.72	24.40	1676.72
39MW3	1700.05	17.60	1682.45	20.55	1679.50	22.68	1677.37	23.04	1677.01
39MW4	1700.99	21.27	1679.72	20.87	1680.12	22.77	1678.22	23.21	1677.78
39MW5	1700.28	17.68	1682.60	18.80	1681.48	22.70	1677.58	24.11	1676.17
39MW6	1700.17	21.64	1678.53	20.90	1679.27	23.00	1677.17	23.44	1676.73

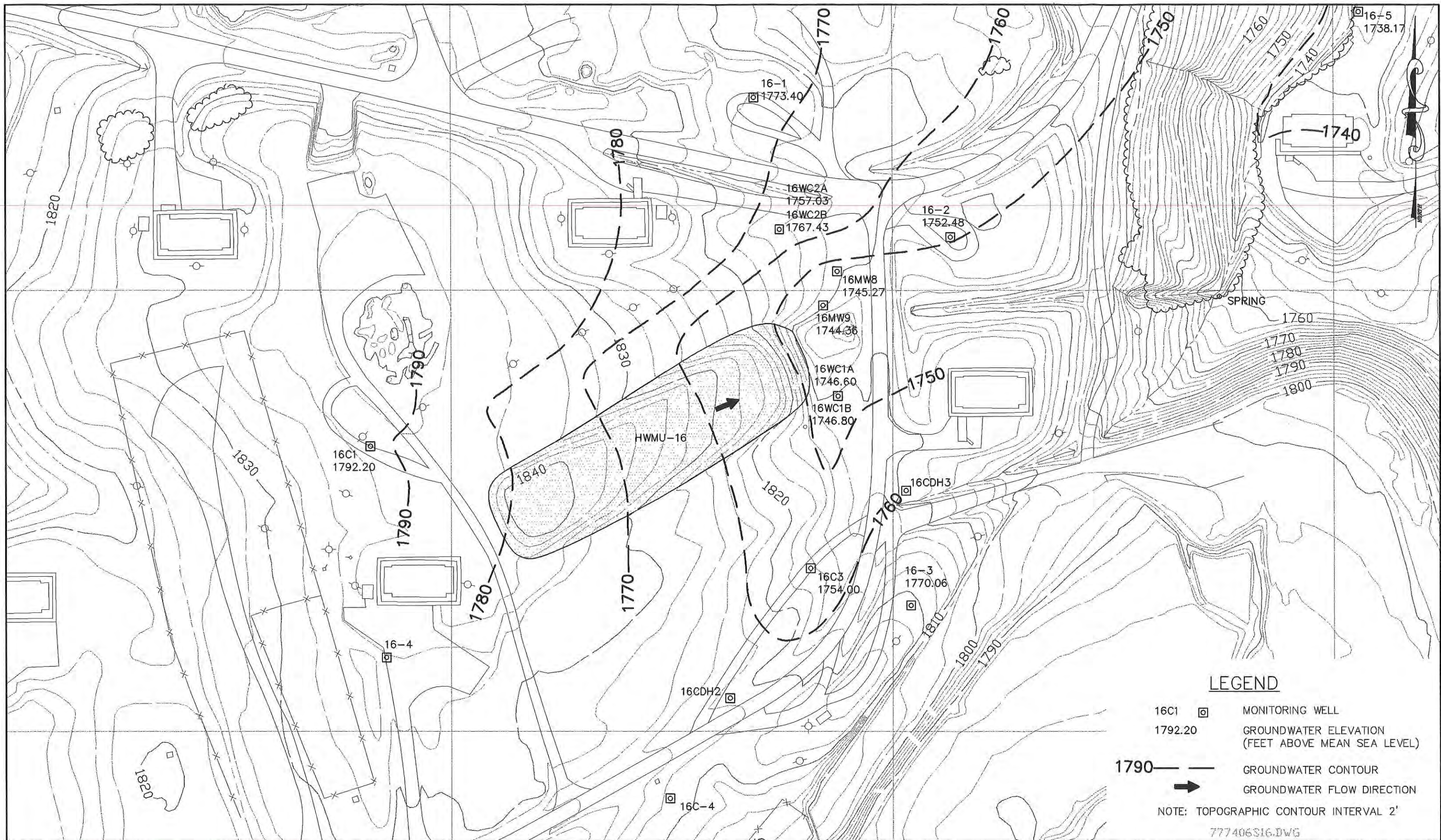
NOTES:

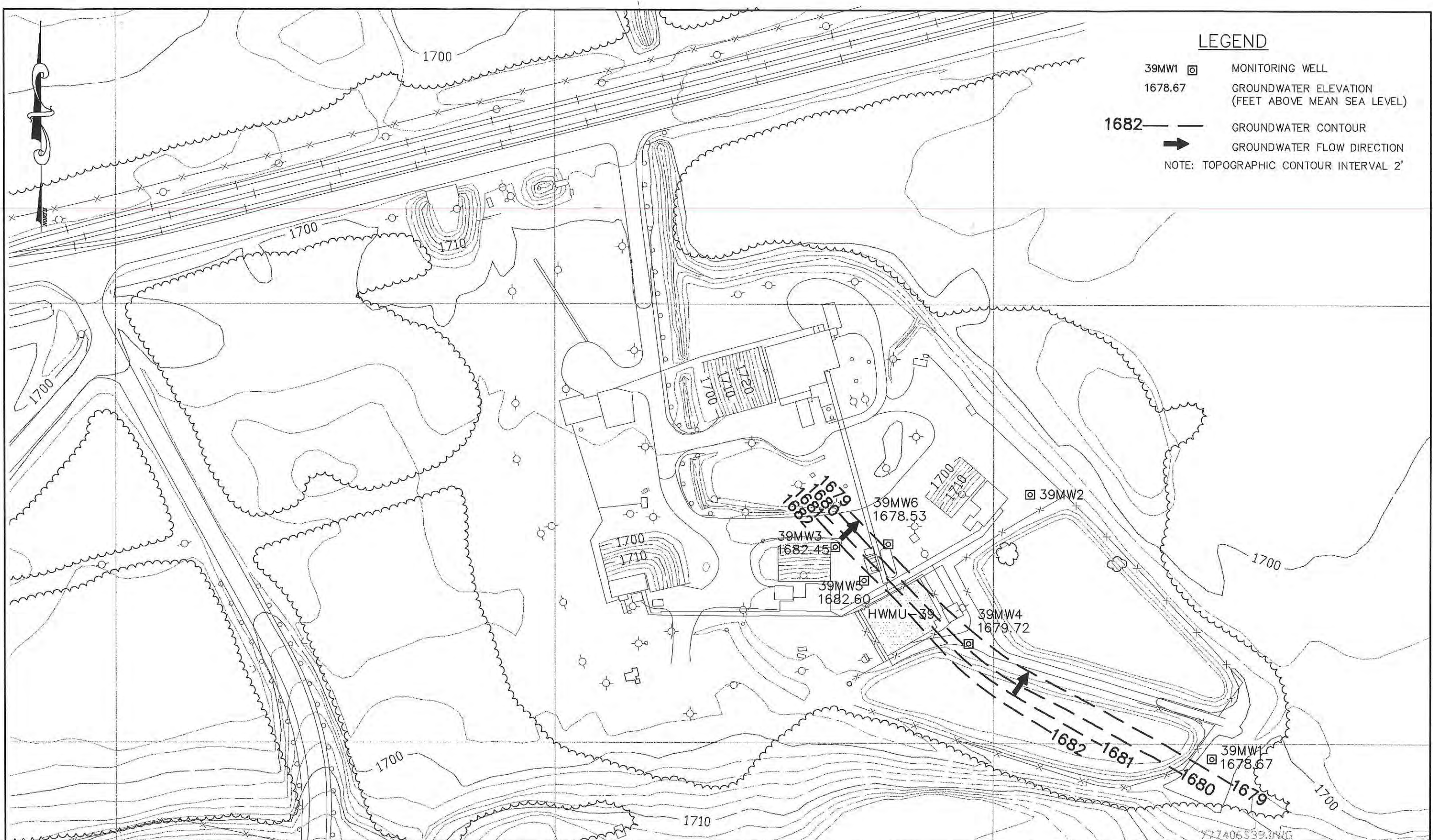
DTW - Depth to water from ground surface.

GW ELEV - Groundwater elevation.

All elevations in feet above mean sea level.

APPENDIX B
FIGURES



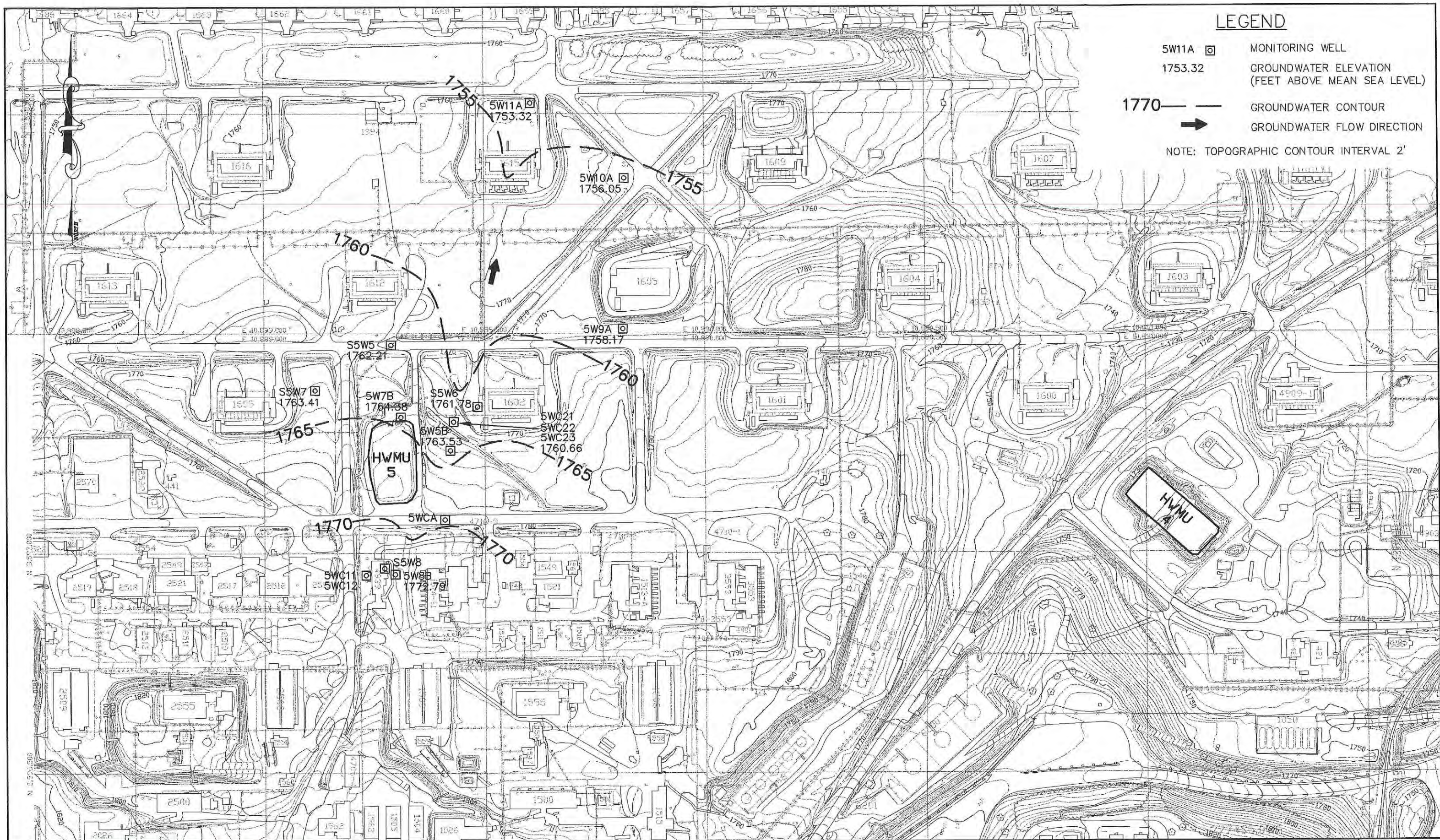


LEGEND

- 4W7A □ MONITORING WELL
- 1694.90 GROUNDWATER ELEVATION
(FEET ABOVE MEAN SEA LEVEL)
- 1740 ——— GROUNDWATER CONTOUR
- GROUNDWATER FLOW DIRECTION

NOTE: TOPOGRAPHIC CONTOUR INTERVAL 2'





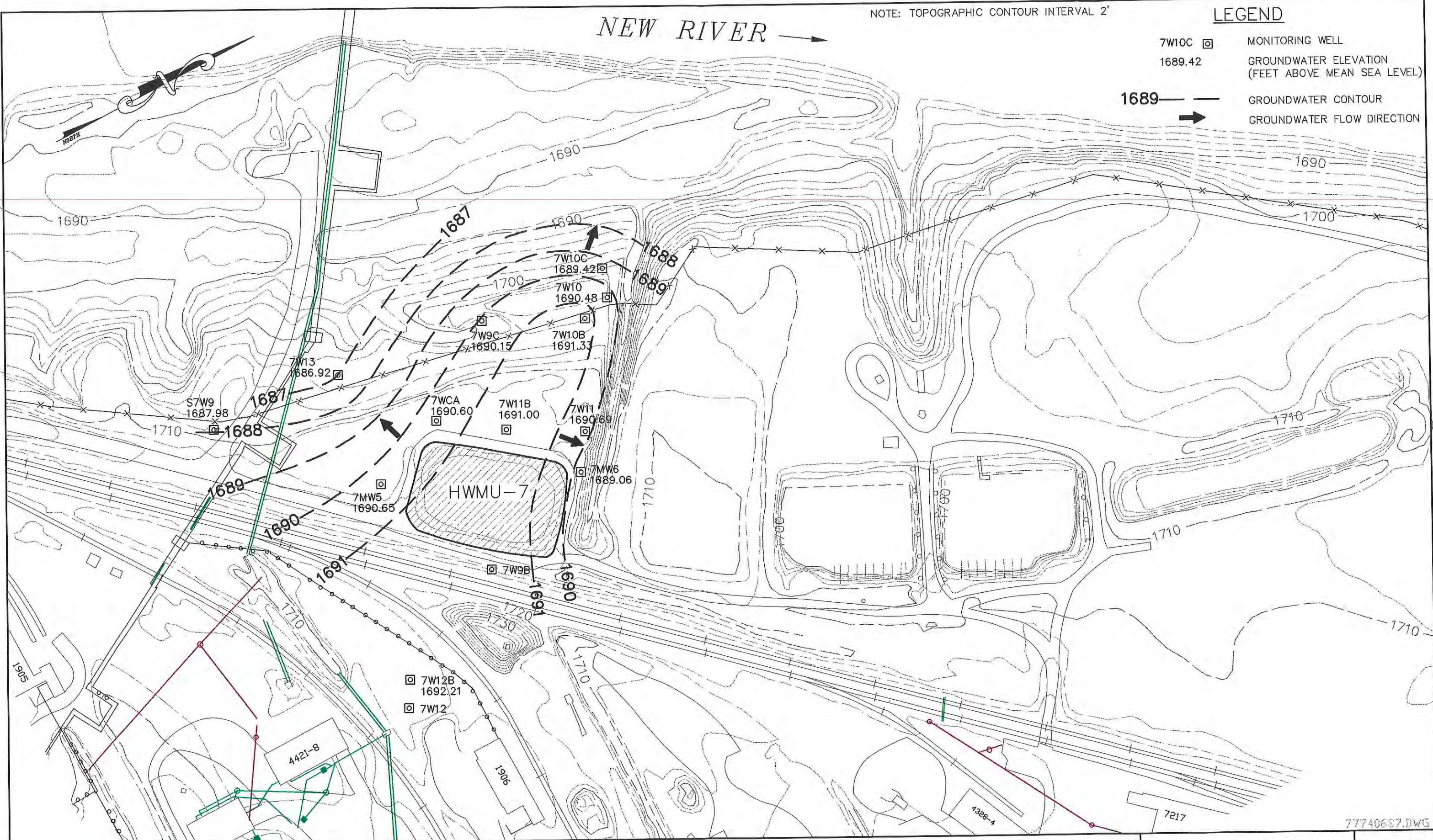
Draper Aden Associates
CONSULTING ENGINEERS
Blacksburg, Virginia — Richmond, Virginia

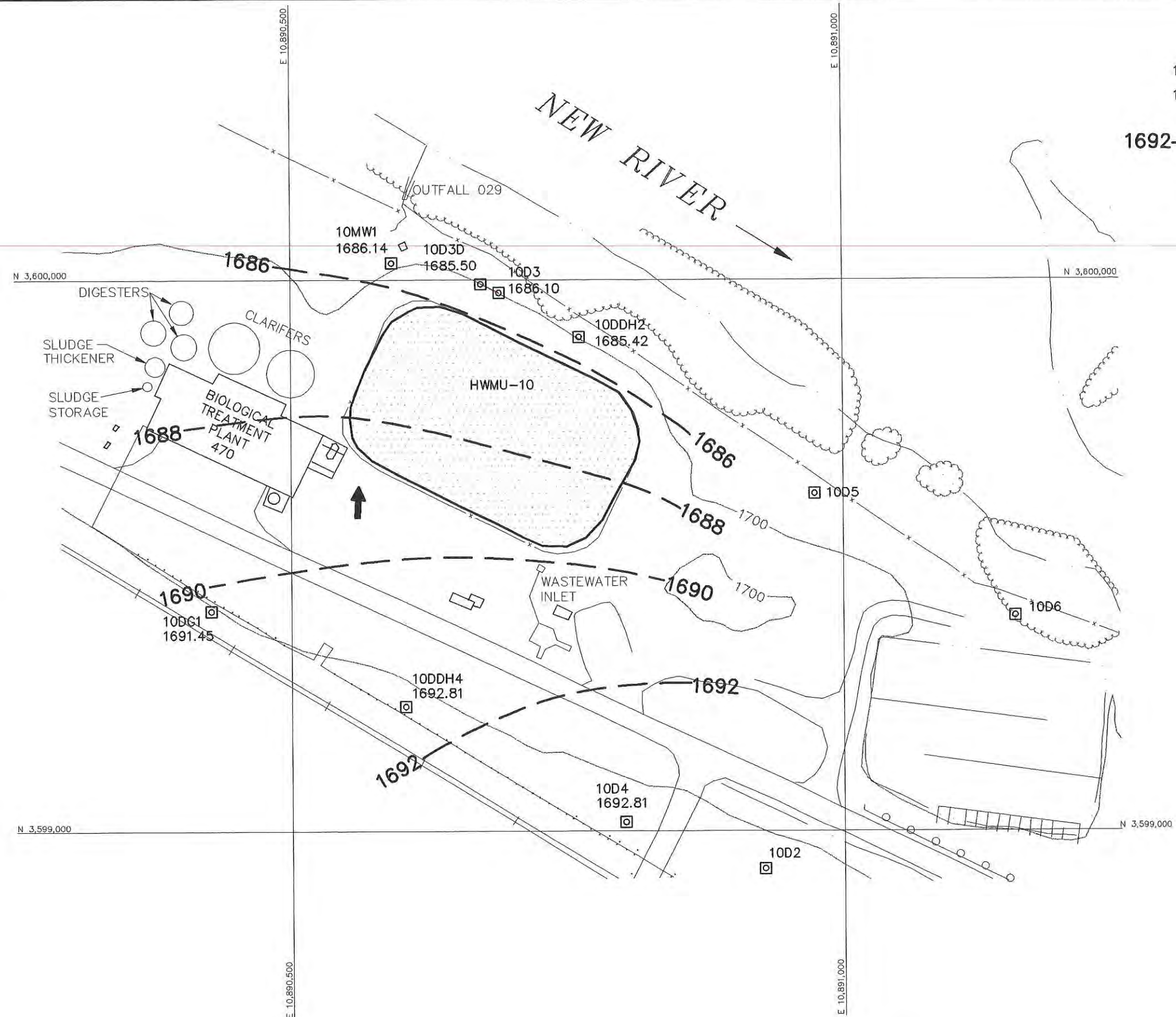
DESIGNED RGM
DRAWN JFF
CHECKED MDL
DATE 2-17-99

HWMU-5 POTENTIOMETRIC SURFACE MAP (THIRD QUARTER 1998)
RADFORD ARMY AMMUNITION PLANT
RADFORD, VIRGINIA

SCALE: 1" = 200'
PLAN NO. 7774-02

FIGURE





LEGEND

- 10MW1 MONITORING WELL
- 1686.14 GROUNDWATER ELEVATION
(FEET ABOVE MEAN SEA LEVEL)
- 1692 GROUNDWATER CONTOUR
- GROUNDWATER FLOW DIRECTION
- NOTE: TOPOGRAPHIC CONTOUR INTERVAL 2'

7774S10.DWG



Draper Aden Associates
CONSULTING ENGINEERS
Blacksburg, Virginia — Richmond, Virginia

DESIGNED RGM
DRAWN JFF
CHECKED AEK
DATE 1-27-99

HWMU-10 POTENTIOMETRIC SURFACE (THIRD QUARTER 1998)
RADFORD ARMY AMMUNITION PLANT
RADFORD, VIRGINIA

SCALE: 1" = 100'
PLAN NO. 7774-02

FIGURE



APPENDIX C
HWMU-4 STATISTICAL ANALYSIS RESULTS

Data Set Summary

Report Printed: 02-15-1999 14:11

Facility:RAAPHMU4 Haz Waste unit 4-RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:TOC Total Organic Carbon

CAS Number: - -

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1000.000 ppb

Start Date:Jan 21 1998

End Date:Oct 13 1998

Well ID:4P3

Sample Date	Observation	Ln
Jan 21 1998	1425.000 ppb	7.262
Apr 08 1998	500.000 ppb	6.215 (* Nondetect *)
Jul 07 1998	500.000 ppb	6.215 (* Nondetect *)
Oct 13 1998	500.000 ppb	6.215 (* Nondetect *)

Well ID:4P3 Summary Statistics

Observations (N): 4

Nondetects (%ND): 75

Minimum:	500.000 ppb	Ln Minimum:	6.215
Maximum:	1425.000 ppb	Ln Maximum:	7.262
Mean:	731.250 ppb	Ln Mean:	6.476
Std. Dev.:	462.500 ppb	Ln Std. Dev.:	0.524

Data Set Summary

Report Printed: 02-15-1999 14:12

Facility:RAAPHMU4 Haz Waste unit 4-RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:TOX Total Organic Halogens, Halides

CAS Number: - -

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 5.000 ppb

Start Date:Jan 21 1998

End Date:Oct 13 1998

Well ID:4P3

Sample Date	Observation	Ln
Jan 21 1998	18.000 ppb	2.890
Apr 08 1998	5.000 ppb	1.609
Jul 07 1998	15.500 ppb	2.741
Oct 13 1998	2.500 ppb	0.916 (* Nondetect *)

Well ID:4P3 Summary Statistics

Observations (N): 4

Nondetects (%ND): 25

Minimum:	2.500 ppb	Ln Minimum:	0.916
Maximum:	18.000 ppb	Ln Maximum:	2.890
Mean:	10.250 ppb	Ln Mean:	2.039
Std. Dev.:	7.643 ppb	Ln Std. Dev.:	0.942

Normality Tests

Report Printed: 02-15-1999 14:12

Facility:RAAPHMU4 Haz Waste unit 4-RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:TOX Total Organic Halogens, Halides

CAS Number: - -

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 5.000 ppb

Start Date:Jan 21 1998

End Date:Oct 13 1998

Normality Test on Observations for wells listed below:

Well:4P3 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	2.500	18.000	10.250	7.643
Log:	0.916	2.890	2.039	0.942

Pooled Statistics

Observations: 4

Statistic	Original Scale	Log Scale
Mean:	10.250	2.039
Std Dev:	7.643	0.942
Skewness:	-0.000	-0.246
Kurtosis:	-1.862	-1.651
Minimum:	2.500	0.916
Maximum:	18.000	2.890
CV:	0.746	0.462

Shapiro-Wilk Statistics

	Test Scale Statistic	5% Critical Value	1% Critical Value
Original:	0.9637	0.7480	0.6870
Log:	0.9881	0.7480	0.6870

* Indicates statistically significant evidence of non-normality.

Data Set Summary

Report Printed: 02-15-1999 14:13

Facility:RAAPHMU4 Haz Waste unit 4-RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Sb Antimony, total

CAS Number: 7440-36-0

MCL: 6.000 ppb

ACL: 0.000 ppb

Detect Limit: 3.000 ppb

Start Date:Jan 21 1998

End Date:Oct 13 1998

Well ID:4P3

Sample Date	Observation	Ln
Jan 21 1998	1.500 ppb	0.405 (* Nondetect *)
Apr 08 1998	1.500 ppb	0.405 (* Nondetect *)
Jul 07 1998	1.500 ppb	0.405 (* Nondetect *)
Oct 13 1998	1.500 ppb	0.405 (* Nondetect *)

Well ID:4P3 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	1.500 ppb	Ln Minimum:	0.405
Maximum:	1.500 ppb	Ln Maximum:	0.405
Mean:	1.500 ppb	Ln Mean:	0.405
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 14:14

Facility:RAAPHMU4 Haz Waste unit 4-RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:As Arsenic, total

CAS Number: 7440-38-2

MCL: 50.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Jan 21 1998

End Date:Oct 13 1998

Well ID:4P3

Sample Date	Observation	Ln
Jan 21 1998	0.500 ppb	-0.693 (* Nondetect *)
Apr 08 1998	0.500 ppb	-0.693 (* Nondetect *)
Jul 07 1998	0.500 ppb	-0.693 (* Nondetect *)
Oct 13 1998	1.000 ppb	0.000

Well ID:4P3 Summary Statistics

Observations (N): 4

Nondetects (%ND): 75

Minimum:	0.500 ppb	Ln Minimum:	-0.693
Maximum:	1.000 ppb	Ln Maximum:	0.000
Mean:	0.625 ppb	Ln Mean:	-0.520
Std. Dev.:	0.250 ppb	Ln Std. Dev.:	0.347

Data Set Summary

Report Printed: 02-15-1999 14:15

Facility:RAAPHMU4 Haz Waste unit 4-RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Ba Barium, total

CAS Number: 7440-39-3

MCL: 2000.000 ppb

ACL: 0.000 ppb

Detect Limit: 2.000 ppb

Start Date:Jan 21 1998

End Date:Oct 13 1998

Well ID:4P3

Sample Date	Observation	Ln
Jan 21 1998	99.000 ppb	4.595
Apr 08 1998	85.000 ppb	4.443
Jul 07 1998	96.000 ppb	4.564
Oct 13 1998	98.000 ppb	4.585

Well ID:4P3 Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	85.000 ppb	Ln Minimum:	4.443
Maximum:	99.000 ppb	Ln Maximum:	4.595
Mean:	94.500 ppb	Ln Mean:	4.547
Std. Dev.:	6.455 ppb	Ln Std. Dev.:	0.071

Normality Tests

Report Printed: 02-15-1999 14:15

Facility:RAAPHMU4 Haz Waste unit 4-RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Ba Barium, total

CAS Number: 7440-39-3

MCL: 2000.000 ppb

ACL: 0.000 ppb

Detect Limit: 2.000 ppb

Start Date:Jan 21 1998

End Date:Oct 13 1998

Normality Test on Observations for wells listed below:

Well:4P3 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	85.000	99.000	94.500	6.455
Log:	4.443	4.595	4.547	0.071

Pooled Statistics

Observations: 4

Statistic	Original Scale	Log Scale
Mean:	94.500	4.547
Std Dev:	6.455	0.071
Skewness:	-1.030*	-1.045*
Kurtosis:	-0.770	-0.758
Minimum:	85.000	4.443
Maximum:	99.000	4.595
CV:	0.068	0.016

Shapiro-Wilk Statistics

	Test Statistic	5% Critical Value	1% Critical Value
Original:	0.8875	0.7480	0.6870
Log:	0.8775	0.7480	0.6870

* Indicates statistically significant evidence of non-normality.

Data Set Summary

Report Printed: 02-15-1999 14:16

Facility:RAAPHMU4 Haz Waste unit 4-RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Be Beryllium, total

CAS Number: 7440-41-7

MCL: 4.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.200 ppb

Start Date:Jan 21 1998

End Date:Oct 13 1998

Well ID:4P3

Sample Date	Observation	Ln
Jan 21 1998	0.100 ppb	-2.303 (* Nondetect *)
Apr 08 1998	0.100 ppb	-2.303 (* Nondetect *)
Jul 07 1998	0.100 ppb	-2.303 (* Nondetect *)
Oct 13 1998	0.100 ppb	-2.303 (* Nondetect *)

Well ID:4P3 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.100 ppb	Ln Minimum:	-2.303
Maximum:	0.100 ppb	Ln Maximum:	-2.303
Mean:	0.100 ppb	Ln Mean:	-2.303
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 14:17

Facility:RAAPHMU4 Haz Waste unit 4-RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:BiEHPth bis (2-Ethylhexyl) Phthalate

CAS Number: 117-81-7

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 10.000 ppb

Start Date:Jan 21 1998

End Date:Oct 13 1998

Well ID:4P3

Sample Date	Observation	Ln
Jan 21 1998	5.000 ppb	1.609 (* Nondetect *)
Apr 08 1998	5.000 ppb	1.609 (* Nondetect *)
Jul 07 1998	5.000 ppb	1.609 (* Nondetect *)
Oct 13 1998	5.000 ppb	1.609 (* Nondetect *)

Well ID:4P3 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	5.000 ppb	Ln Maximum:	1.609
Mean:	5.000 ppb	Ln Mean:	1.609
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 14:17

Facility:RAAPHMU4 Haz Waste unit 4-RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Cd Cadmium, total

CAS Number: 7440-43-9

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.200 ppb

Start Date:Jan 21 1998

End Date:Oct 13 1998

Well ID:4P3

Sample Date	Observation	Ln
Jan 21 1998	0.200 ppb	-1.609
Apr 08 1998	0.100 ppb	-2.303 (* Nondetect *)
Jul 07 1998	0.100 ppb	-2.303 (* Nondetect *)
Oct 13 1998	0.100 ppb	-2.303 (* Nondetect *)

Well ID:4P3 Summary Statistics

Observations (N): 4

Nondetects (%ND): 75

Minimum:	0.100 ppb	Ln Minimum:	-2.303
Maximum:	0.200 ppb	Ln Maximum:	-1.609
Mean:	0.125 ppb	Ln Mean:	-2.129
Std. Dev.:	0.050 ppb	Ln Std. Dev.:	0.347

Data Set Summary

Report Printed: 02-15-1999 14:17

Facility:RAAPHMU4 Haz Waste unit 4-RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Chlorofm Chloroform

CAS Number: 67-66-3

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.100 ppb

Start Date:Jan 21 1998

End Date:Oct 13 1998

Well ID:4P3

Sample Date	Observation	Ln
Jan 21 1998	0.050 ppb	-2.996 (* Nondetect *)
Apr 08 1998	0.050 ppb	-2.996 (* Nondetect *)
Jul 07 1998	0.050 ppb	-2.996 (* Nondetect *)
Oct 13 1998	0.050 ppb	-2.996 (* Nondetect *)

Well ID:4P3 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.050 ppb	Ln Maximum:	-2.996
Mean:	0.050 ppb	Ln Mean:	-2.996
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 14:20

Facility:RAAPHMU4 Haz Waste unit 4-RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:ChlMeth Chloromethane

CAS Number: 74-87-3

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.300 ppb

Start Date:Jan 21 1998

End Date:Oct 13 1998

Well ID:4P3

Sample Date	Observation	Ln
Jan 21 1998	0.150 ppb	-1.897 (* Nondetect *)
Apr 08 1998	0.150 ppb	-1.897 (* Nondetect *)
Jul 07 1998	0.150 ppb	-1.897 (* Nondetect *)
Oct 13 1998	0.150 ppb	-1.897 (* Nondetect *)

Well ID:4P3 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.150 ppb	Ln Minimum:	-1.897
Maximum:	0.150 ppb	Ln Maximum:	-1.897
Mean:	0.150 ppb	Ln Mean:	-1.897
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 14:21

Facility:RAAPHMU4 Haz Waste unit 4-RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Cr Chromium, total

CAS Number: 7440-47-3

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Jan 21 1998

End Date:Oct 13 1998

Well ID:4P3

Sample Date	Observation	Ln
Jan 21 1998	0.500 ppb	-0.693 (* Nondetect *)
Apr 08 1998	0.500 ppb	-0.693 (* Nondetect *)
Jul 07 1998	5.000 ppb	1.609
Oct 13 1998	9.000 ppb	2.197

Well ID:4P3 Summary Statistics

Observations (N): 4

Nondetects (%ND): 50

Minimum:	0.500 ppb	Ln Minimum:	-0.693
Maximum:	9.000 ppb	Ln Maximum:	2.197
Mean:	3.750 ppb	Ln Mean:	0.605
Std. Dev.:	4.093 ppb	Ln Std. Dev.:	1.518

Normality Tests

Report Printed: 02-15-1999 14:21

Facility:RAAPHMU4 Haz Waste unit 4-RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Cr Chromium, total

CAS Number: 7440-47-3

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Jan 21 1998

End Date:Oct 13 1998

Normality Test on Observations for wells listed below:

Well:4P3 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	0.500	9.000	3.750	4.093
Log:	-0.693	2.197	0.605	1.518

Pooled Statistics

Observations: 4

Statistic	Original Scale	Log Scale
Mean:	3.750	0.605
Std Dev:	4.093	1.518
Skewness:	0.438	0.074
Kurtosis:	-1.439	-1.902
Minimum:	0.500	-0.693
Maximum:	9.000	2.197
CV:	1.091	2.509

Shapiro-Wilk Statistics

	Test Statistic	5% Critical Value	1% Critical Value
Original:	0.9541	0.7480	0.6870
Log:	0.8887	0.7480	0.6870

* Indicates statistically significant evidence of non-normality.

Data Set Summary

Report Printed: 02-15-1999 14:22

Facility:RAAPHMU4 Haz Waste unit 4-RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Co Cobalt, total

CAS Number: 7440-48-4

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Jan 21 1998

End Date:Oct 13 1998

Well ID:4P3

Sample Date	Observation	Ln
Jan 21 1998	2.000 ppb	0.693
Apr 08 1998	3.000 ppb	1.099
Jul 07 1998	3.000 ppb	1.099
Oct 13 1998	2.000 ppb	0.693

Well ID:4P3 Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	2.000 ppb	Ln Minimum:	0.693
Maximum:	3.000 ppb	Ln Maximum:	1.099
Mean:	2.500 ppb	Ln Mean:	0.896
Std. Dev.:	0.577 ppb	Ln Std. Dev.:	0.234

Normality Tests

Report Printed: 02-15-1999 14:23

Facility:RAAPHMU4 Haz Waste unit 4-RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Co Cobalt, total

CAS Number: 7440-48-4

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Jan 21 1998

End Date:Oct 13 1998

Normality Test on Observations for wells listed below:

Well:4P3 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	2.000	3.000	2.500	0.577
Log:	0.693	1.099	0.896	0.234

Pooled Statistics

Observations: 4

Statistic	Original Scale	Log Scale
Mean:	2.500	0.896
Std Dev:	0.577	0.234
Skewness:	-0.000	-0.000
Kurtosis:	-2.000	-2.000
Minimum:	2.000	0.693
Maximum:	3.000	1.099
CV:	0.231	0.261

Shapiro-Wilk Statistics

	Test Scale Statistic	5% Critical Value	1% Critical Value
Original:	0.7928	0.7480	0.6870
Log:	0.7928	0.7480	0.6870

* Indicates statistically significant evidence of non-normality.

Data Set Summary

Report Printed: 02-15-1999 14:24

Facility:RAAPHMU4 Haz Waste unit 4-RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Cu Copper, total

CAS Number: 7440-50-8

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Jan 21 1998

End Date:Oct 13 1998

Well ID:4P3

Sample Date	Observation	Ln
Jan 21 1998	1.000 ppb	0.000
Apr 08 1998	0.500 ppb	-0.693 (* Nondetect *)
Jul 07 1998	2.000 ppb	0.693
Oct 13 1998	3.000 ppb	1.099

Well ID:4P3 Summary Statistics

Observations (N): 4

Nondetects (%ND): 25

Minimum:	0.500 ppb	Ln Minimum:	-0.693
Maximum:	3.000 ppb	Ln Maximum:	1.099
Mean:	1.625 ppb	Ln Mean:	0.275
Std. Dev.:	1.109 ppb	Ln Std. Dev.:	0.789

Normality Tests

Report Printed: 02-15-1999 14:24

Facility:RAAPHMU4 Haz Waste unit 4-RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Cu Copper, total

CAS Number: 7440-50-8

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Jan 21 1998

End Date:Oct 13 1998

Normality Test on Observations for wells listed below:

Well:4P3 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	0.500	3.000	1.625	1.109
Log:	-0.693	1.099	0.275	0.789

Pooled Statistics

Observations: 4

Statistic	Original Scale	Log Scale
Mean:	1.625	0.275
Std Dev:	1.109	0.789
Skewness:	0.278	-0.231
Kurtosis:	-1.427	-1.421
Minimum:	0.500	-0.693
Maximum:	3.000	1.099
CV:	0.682	2.872

Shapiro-Wilk Statistics

	Test Scale Statistic	5% Critical Value	1% Critical Value
Original:	1.0679	0.7480	0.6870
Log:	1.0781	0.7480	0.6870

* Indicates statistically significant evidence of non-normality.

Data Set Summary

Report Printed: 02-15-1999 16:28

Facility:RAAPHMU4 Haz Waste unit 4-RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Di-N-Bu Di-n-Butylphthalate

CAS Number: 84-74-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 5.000 ppb

Start Date:Jan 21 1998

End Date:Oct 13 1998

Well ID:4P3

Sample Date	Observation	Ln
Jan 21 1998	2.500 ppb	0.916 (* Nondetect *)
Apr 08 1998	2.500 ppb	0.916 (* Nondetect *)
Jul 07 1998	2.500 ppb	0.916 (* Nondetect *)
Oct 13 1998	2.500 ppb	0.916 (* Nondetect *)

Well ID:4P3 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	2.500 ppb	Ln Minimum:	0.916
Maximum:	2.500 ppb	Ln Maximum:	0.916
Mean:	2.500 ppb	Ln Mean:	0.916
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 16:28

Facility:RAAPHMU4 Haz Waste unit 4-RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:2,4-DNP 2,4-Dinitrophenol

CAS Number: 51-28-5

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 50.000 ppb

Start Date:Jan 21 1998

End Date:Oct 13 1998

Well ID:4P3

Sample Date	Observation	Ln
Jan 21 1998	25.000 ppb	3.219 (* Nondetect *)
Apr 08 1998	25.000 ppb	3.219 (* Nondetect *)
Jul 07 1998	25.000 ppb	3.219 (* Nondetect *)
Oct 13 1998	25.000 ppb	3.219 (* Nondetect *)

Well ID:4P3 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	25.000 ppb	Ln Minimum:	3.219
Maximum:	25.000 ppb	Ln Maximum:	3.219
Mean:	25.000 ppb	Ln Mean:	3.219
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 16:29

Facility:RAAPHMU4 Haz Waste unit 4-RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:DiClMe Dichloromethane

CAS Number: 75-09-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.200 ppb

Start Date:Jan 21 1998

End Date:Oct 13 1998

Well ID:4P3

Sample Date	Observation	Ln
Jan 21 1998	0.100 ppb	-2.303 (* Nondetect *)
Apr 08 1998	0.100 ppb	-2.303 (* Nondetect *)
Jul 07 1998	0.100 ppb	-2.303 (* Nondetect *)
Oct 13 1998	0.100 ppb	-2.303 (* Nondetect *)

Well ID:4P3 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.100 ppb	Ln Minimum:	-2.303
Maximum:	0.100 ppb	Ln Maximum:	-2.303
Mean:	0.100 ppb	Ln Mean:	-2.303
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 16:29

Facility:RAAPHMU4 Haz Waste unit 4-RAAP

Address:

City:Radford

ST:VA Zip:

County:PULASKI

Contact:

Phone:() -

Permit Type:Background

Constituent:DEthPhth Diethylphthalate

CAS Number: 84-66-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 5.000 ppb

Start Date:Jan 21 1998

End Date:Oct 13 1998

Well ID:4P3

Sample Date	Observation	Ln
Jan 21 1998	2.500 ppb	0.916 (* Nondetect *)
Apr 08 1998	2.500 ppb	0.916 (* Nondetect *)
Jul 07 1998	2.500 ppb	0.916 (* Nondetect *)
Oct 13 1998	2.500 ppb	0.916 (* Nondetect *)

Well ID:4P3 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	2.500 ppb	Ln Minimum:	0.916
Maximum:	2.500 ppb	Ln Maximum:	0.916
Mean:	2.500 ppb	Ln Mean:	0.916
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 16:30

Facility:RAAPHMU4 Haz Waste unit 4-RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:DPA Diphenylamine

CAS Number: 122-39-4

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 10.000 ppb

Start Date:Jan 21 1998

End Date:Oct 13 1998

Well ID:4P3

Sample Date	Observation	Ln
Jan 21 1998	5.000 ppb	1.609 (* Nondetect *)
Apr 08 1998	5.000 ppb	1.609 (* Nondetect *)
Jul 07 1998	5.000 ppb	1.609 (* Nondetect *)
Oct 13 1998	5.000 ppb	1.609 (* Nondetect *)

Well ID:4P3 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	5.000 ppb	Ln Maximum:	1.609
Mean:	5.000 ppb	Ln Mean:	1.609
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 16:30

Facility:RAAPHMU4 Haz Waste unit 4-RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Pb Lead, total

CAS Number: 7439-92-1

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Jan 21 1998

End Date:Oct 13 1998

Well ID:4P3

Sample Date	Observation	Ln
Jan 21 1998	0.500 ppb	-0.693 (* Nondetect *)
Apr 08 1998	0.500 ppb	-0.693 (* Nondetect *)
Jul 07 1998	1.000 ppb	0.000
Oct 13 1998	0.500 ppb	-0.693 (* Nondetect *)

Well ID:4P3 Summary Statistics

Observations (N): 4

Nondetects (%ND): 75

Minimum:	0.500 ppb	Ln Minimum:	-0.693
Maximum:	1.000 ppb	Ln Maximum:	0.000
Mean:	0.625 ppb	Ln Mean:	-0.520
Std. Dev.:	0.250 ppb	Ln Std. Dev.:	0.347

Data Set Summary

Report Printed: 02-15-1999 16:30

Facility:RAAPHMU4 Haz Waste unit 4-RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Pb Lead, total

CAS Number: 7439-92-1

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Jan 21 1998

End Date:Oct 13 1998

Well ID:4P3

Sample Date	Observation	Ln
Jan 21 1998	0.500 ppb	-0.693 (* Nondetect *)
Apr 08 1998	0.500 ppb	-0.693 (* Nondetect *)
Jul 07 1998	1.000 ppb	0.000
Oct 13 1998	0.500 ppb	-0.693 (* Nondetect *)

Well ID:4P3 Summary Statistics

Observations (N): 4

Nondetects (%ND): 75

Minimum:	0.500 ppb	Ln Minimum:	-0.693
Maximum:	1.000 ppb	Ln Maximum:	0.000
Mean:	0.625 ppb	Ln Mean:	-0.520
Std. Dev.:	0.250 ppb	Ln Std. Dev.:	0.347

Data Set Summary

Report Printed: 02-15-1999 16:31

Facility:RAAPHMU4 Haz Waste unit 4-RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Hg Mercury

CAS Number: 7439-97-6

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.200 ppb

Start Date:Jan 21 1998

End Date:Oct 13 1998

Well ID:4P3

Sample Date	Observation	Ln
Jan 21 1998	0.100 ppb	-2.303 (* Nondetect *)
Apr 08 1998	0.100 ppb	-2.303 (* Nondetect *)
Jul 07 1998	0.100 ppb	-2.303 (* Nondetect *)
Oct 13 1998	0.100 ppb	-2.303 (* Nondetect *)

Well ID:4P3 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.100 ppb	Ln Minimum:	-2.303
Maximum:	0.100 ppb	Ln Maximum:	-2.303
Mean:	0.100 ppb	Ln Mean:	-2.303
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 16:31

Facility:RAAPHMU4 Haz Waste unit 4-RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:MeEthKe Methylethylketone (MEK) (2-Butanone)

CAS Number: 78-93-3

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.100 ppb

Start Date:Jan 21 1998

End Date:Oct 13 1998

Well ID:4P3

Sample Date	Observation	Ln
Jan 21 1998	0.550 ppb	-0.598 (* Nondetect *)
Apr 08 1998	0.550 ppb	-0.598 (* Nondetect *)
Jul 07 1998	0.550 ppb	-0.598 (* Nondetect *)
Oct 13 1998	0.550 ppb	-0.598 (* Nondetect *)

Well ID:4P3 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.550 ppb	Ln Minimum:	-0.598
Maximum:	0.550 ppb	Ln Maximum:	-0.598
Mean:	0.550 ppb	Ln Mean:	-0.598
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 16:31

Facility:RAAPHMU4 Haz Waste unit 4-RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Ni Nickel, total

CAS Number: 7440-02-0

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 15.000 ppb

Start Date:Jan 21 1998

End Date:Oct 13 1998

Well ID:4P3

Sample Date	Observation	Ln
Jan 21 1998	7.500 ppb	2.015 (* Nondetect *)
Apr 08 1998	7.500 ppb	2.015 (* Nondetect *)
Jul 07 1998	7.500 ppb	2.015 (* Nondetect *)
Oct 13 1998	7.500 ppb	2.015 (* Nondetect *)

Well ID:4P3 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	7.500 ppb	Ln Minimum:	2.015
Maximum:	7.500 ppb	Ln Maximum:	2.015
Mean:	7.500 ppb	Ln Mean:	2.015
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 16:32

Facility:RAAPHMU4 Haz Waste unit 4-RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Ag Silver, total

CAS Number: 7440-22-4

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.200 ppb

Start Date:Jan 21 1998

End Date:Oct 13 1998

Well ID:4P3

Sample Date	Observation	Ln
Jan 21 1998	0.100 ppb	-2.303 (* Nondetect *)
Apr 08 1998	0.100 ppb	-2.303 (* Nondetect *)
Jul 07 1998	0.100 ppb	-2.303 (* Nondetect *)
Oct 13 1998	0.100 ppb	-2.303 (* Nondetect *)

Well ID:4P3 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.100 ppb	Ln Minimum:	-2.303
Maximum:	0.100 ppb	Ln Maximum:	-2.303
Mean:	0.100 ppb	Ln Mean:	-2.303
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 16:32

Facility:RAAPHMU4 Haz Waste unit 4-RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Toluen Toluene

CAS Number: 108-88-3

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.100 ppb

Start Date:Jan 21 1998

End Date:Oct 13 1998

Well ID:4P3

Sample Date	Observation	Ln
Jan 21 1998	0.050 ppb	-2.996 (* Nondetect *)
Apr 08 1998	0.050 ppb	-2.996 (* Nondetect *)
Jul 07 1998	0.050 ppb	-2.996 (* Nondetect *)
Oct 13 1998	0.050 ppb	-2.996 (* Nondetect *)

Well ID:4P3 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.050 ppb	Ln Maximum:	-2.996
Mean:	0.050 ppb	Ln Mean:	-2.996
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 16:32

Facility:RAAPHMU4 Haz Waste unit 4-RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:TranDCEE trans-1,2-Dichloroethene

CAS Number: 156-60-5

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.100 ppb

Start Date:Jan 21 1998

End Date:Oct 13 1998

Well ID:4P3

Sample Date	Observation	Ln
Jan 21 1998	0.050 ppb	-2.996 (* Nondetect *)
Apr 08 1998	0.050 ppb	-2.996 (* Nondetect *)
Jul 07 1998	0.050 ppb	-2.996 (* Nondetect *)
Oct 13 1998	0.050 ppb	-2.996 (* Nondetect *)

Well ID:4P3 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.050 ppb	Ln Maximum:	-2.996
Mean:	0.050 ppb	Ln Mean:	-2.996
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 16:32

Facility:RAAPHMU4 Haz Waste unit 4-RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:TCE Trichloroethene (-ethylene)

CAS Number: 79-01-6

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.100 ppb

Start Date:Jan 21 1998

End Date:Oct 13 1998

Well ID:4P3

Sample Date	Observation	Ln
Jan 21 1998	0.050 ppb	-2.996 (* Nondetect *)
Apr 08 1998	0.050 ppb	-2.996 (* Nondetect *)
Jul 07 1998	0.050 ppb	-2.996 (* Nondetect *)
Oct 13 1998	0.050 ppb	-2.996 (* Nondetect *)

Well ID:4P3 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.050 ppb	Ln Maximum:	-2.996
Mean:	0.050 ppb	Ln Mean:	-2.996
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 16:33

Facility:RAAPHMU4 Haz Waste unit 4-RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Va Vanadium

CAS Number: 7440-62-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 4.000 ppb

Start Date:Jan 21 1998

End Date:Oct 13 1998

Well ID:4P3

Sample Date	Observation	Ln
Jan 21 1998	2.000 ppb	0.693 (* Nondetect *)
Apr 08 1998	2.000 ppb	0.693 (* Nondetect *)
Jul 07 1998	2.000 ppb	0.693 (* Nondetect *)
Oct 13 1998	2.000 ppb	0.693 (* Nondetect *)

Well ID:4P3 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	2.000 ppb	Ln Minimum:	0.693
Maximum:	2.000 ppb	Ln Maximum:	0.693
Mean:	2.000 ppb	Ln Mean:	0.693
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 16:33

Facility:RAAPHMU4 Haz Waste unit 4-RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Va Vanadium

CAS Number: 7440-62-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 4.000 ppb

Start Date:Jan 21 1998

End Date:Oct 13 1998

Well ID:4P3

Sample Date	Observation	Ln
Jan 21 1998	2.000 ppb	0.693 (* Nondetect *)
Apr 08 1998	2.000 ppb	0.693 (* Nondetect *)
Jul 07 1998	2.000 ppb	0.693 (* Nondetect *)
Oct 13 1998	2.000 ppb	0.693 (* Nondetect *)

Well ID:4P3 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	2.000 ppb	Ln Minimum:	0.693
Maximum:	2.000 ppb	Ln Maximum:	0.693
Mean:	2.000 ppb	Ln Mean:	0.693
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 16:33

Facility:RAAPHMU4 Haz Waste unit 4-RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:VC Vinyl chloride

CAS Number: 75-01-4

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.100 ppb

Start Date:Jan 21 1998

End Date:Oct 13 1998

Well ID:4P3

Sample Date	Observation	Ln
Jan 21 1998	0.050 ppb	-2.996 (* Nondetect *)
Apr 08 1998	0.050 ppb	-2.996 (* Nondetect *)
Jul 07 1998	0.050 ppb	-2.996 (* Nondetect *)
Oct 13 1998	0.050 ppb	-2.996 (* Nondetect *)

Well ID:4P3 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.050 ppb	Ln Maximum:	-2.996
Mean:	0.050 ppb	Ln Mean:	-2.996
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 16:33

Facility:RAAPHMU4 Haz Waste unit 4-RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Xylene Xylene

CAS Number: 1330-20-7

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.100 ppb

Start Date:Jan 21 1998

End Date:Oct 13 1998

Well ID:4P3

Sample Date	Observation	Ln
Jan 21 1998	0.050 ppb	-2.996 (* Nondetect *)
Apr 08 1998	0.050 ppb	-2.996 (* Nondetect *)
Jul 07 1998	0.050 ppb	-2.996 (* Nondetect *)
Oct 13 1998	0.050 ppb	-2.996 (* Nondetect *)

Well ID:4P3 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.050 ppb	Ln Maximum:	-2.996
Mean:	0.050 ppb	Ln Mean:	-2.996
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 16:33

Facility:RAAPHMU4 Haz Waste unit 4-RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Zn Zinc, total

CAS Number: 7440-66-6

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 5.000 ppb

Start Date:Jan 21 1998

End Date:Oct 13 1998

Well ID:4P3

Sample Date	Observation	Ln
Jan 21 1998	5.000 ppb	1.609
Apr 08 1998	2.500 ppb	0.916 (* Nondetect *)
Jul 07 1998	2.500 ppb	0.916 (* Nondetect *)
Oct 13 1998	20.000 ppb	2.996

Well ID:4P3 Summary Statistics

Observations (N): 4

Nondetects (%ND): 50

Minimum:	2.500 ppb	Ln Minimum:	0.916
Maximum:	20.000 ppb	Ln Maximum:	2.996
Mean:	7.500 ppb	Ln Mean:	1.609
Std. Dev.:	8.416 ppb	Ln Std. Dev.:	0.980

Normality Tests

Report Printed: 02-15-1999 16:33

Facility:RAAPHMU4 Haz Waste unit 4-RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Zn Zinc, total

CAS Number: 7440-66-6

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 5.000 ppb

Start Date:Jan 21 1998

End Date:Oct 13 1998

Normality Test on Observations for wells listed below:

Well:4P3 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	2.500	20.000	7.500	8.416
Log:	0.916	2.996	1.609	0.980

Pooled Statistics

Observations: 4

Statistic	Original Scale	Log Scale
Mean:	7.500	1.609
Std Dev:	8.416	0.980
Skewness:	1.090*	0.816
Kurtosis:	-0.723	-1.000
Minimum:	2.500	0.916
Maximum:	20.000	2.996
CV:	1.122	0.609

Shapiro-Wilk Statistics

	Test Scale Statistic	5% Critical Value	1% Critical Value
Original:	0.8157	0.7480	0.6870
Log:	0.9197	0.7480	0.6870

* Indicates statistically significant evidence of non-normality.

Data Set Summary

Report Printed: 02-15-1999 16:46

Facility:RAAPHMU4 Haz Waste unit 4-RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:pH F pH, Field

CAS Number: - -

MCL: 0.000 SU

ACL: 0.000 SU

Detect Limit: 0.100 SU

Start Date:Jan 21 1998

End Date:Oct 13 1998

Well ID:4P3

Sample Date	Observation	Ln
Jan 21 1998	7.100 SU	1.960
Apr 08 1998	6.700 SU	1.902
Jul 07 1998	6.200 SU	1.825
Oct 13 1998	6.500 SU	1.872

Well ID:4P3 Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	6.200 SU	Ln Minimum:	1.825
Maximum:	7.100 SU	Ln Maximum:	1.960
Mean:	6.625 SU	Ln Mean:	1.890
Std. Dev.:	0.377 SU	Ln Std. Dev.:	0.057

Normality Tests

Report Printed: 02-15-1999 16:46

Facility:RAAPHMU4 Haz Waste unit 4-RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:pH F pH, Field

CAS Number: - -

MCL: 0.000 SU

ACL: 0.000 SU

Detect Limit: 0.100 SU

Start Date:Jan 21 1998

End Date:Oct 13 1998

Normality Test on Observations for wells listed below:

Well:4P3 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	6.200	7.100	6.625	0.377
Log:	1.825	1.960	1.890	0.057

Pooled Statistics

Observations: 4

Statistic	Original Scale	Log Scale
Mean:	6.625	1.890
Std Dev:	0.377	0.057
Skewness:	0.207	0.148
Kurtosis:	-1.166	-1.174
Minimum:	6.200	1.825
Maximum:	7.100	1.960
CV:	0.057	0.030

Shapiro-Wilk Statistics

	Test Scale Statistic	5% Critical Value	1% Critical Value
Original:	1.1092	0.7480	0.6870
Log:	1.1124	0.7480	0.6870

* Indicates statistically significant evidence of non-normality.

Data Set Summary

Report Printed: 02-15-1999 16:48

Facility:RAAPHMU4 Haz Waste unit 4-RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Cond F Specific Conductivity, Field

CAS Number: - -

MCL: 0.000 umhos/cm

ACL: 0.000 umhos/cm

Detect Limit: 1.000 umhos/cm

Start Date:Jan 21 1998

End Date:Oct 13 1998

Well ID:4P3

Sample Date	Observation	Ln
Jan 21 1998	523.000 umhos/cm	6.260
Apr 08 1998	533.000 umhos/cm	6.279
Jul 07 1998	540.000 umhos/cm	6.292
Oct 13 1998	487.000 umhos/cm	6.188

Well ID:4P3 Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	487.000 umhos/cm	Ln Minimum:	6.188
Maximum:	540.000 umhos/cm	Ln Maximum:	6.292
Mean:	520.750 umhos/cm	Ln Mean:	6.254
Std. Dev.:	23.557 umhos/cm	Ln Std. Dev.:	0.046

Normality Tests

Report Printed: 02-15-1999 16:48

Facility:RAAPHMU4 Haz Waste unit 4-RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Cond F Specific Conductivity, Field

CAS Number: - -

MCL: 0.000 umhos/cm

ACL: 0.000 umhos/cm

Detect Limit: 1.000 umhos/cm

Start Date:Jan 21 1998

End Date:Oct 13 1998

Normality Test on Observations for wells listed below:

Well:4P3 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	487.000	540.000	520.750	23.557
Log:	6.188	6.292	6.254	0.046

Pooled Statistics

Observations: 4

Statistic	Original Scale	Log Scale
Mean:	520.750	6.254
Std Dev:	23.557	0.046
Skewness:	-0.867	-0.888
Kurtosis:	-0.897	-0.881
Minimum:	487.000	6.188
Maximum:	540.000	6.292
CV:	0.045	0.007

Shapiro-Wilk Statistics

	Test Scale Statistic	5% Critical Value	1% Critical Value
Original:	0.9739	0.7480	0.6870
Log:	0.9657	0.7480	0.6870

* Indicates statistically significant evidence of non-normality.

Parametric Prediction Interval
Report Printed February 16,1999

Page 1

Facility:RAAP-Haz Unit 4
Parameter:Cobalt, total(CAS Number:7440-48-4)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 4
Shapiro-Wilk (W): 0.7309
~~Critical W, $\alpha=0.01$: 0.6870~~
Mean: 2.500 ppb
Std Dev: 0.577 ppb
DF: 3
Conf. Level (1- α): ~~0.9500~~ 0.99
Future Samples (k): 1
 $t \left[\begin{array}{c} 1 - \alpha \\ - \\ k \end{array} \right]$: 4.5407
Kappa: 5.0767
UL: 5.431 ppb
LL: $-\infty$

Parametric Prediction Interval
Report Printed February 16,1999

Page 1

Facility:RAAP-Haz Unit 4
Parameter:Specific Conductivity, Field(CAS Number:- -)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 4
Shapiro-Wilk (W): 0.8719
~~Critical W, $\alpha=0.01$: 0.6870~~
Mean: 520.750 umhos/cm
Std Dev: 23.557 umhos/cm
DF: 3
Conf. Level (1- α): ~~0.9500~~ 0.99
Future Samples (k): 1
 $t \left[\begin{array}{c} 1 - \alpha \\ - \\ k \end{array} \right]$: 4.5407
Kappa: 5.0767
UL: 640.339 umhos/cm
LL: $-\infty$

Parametric Prediction Interval
Report Printed February 16,1999

Page 1

Facility:RAAP-Haz Unit 4
Parameter:Barium, total(CAS Number:7440-39-3)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 4
Shapiro-Wilk (W): 0.7930
~~Critical W, $\alpha=0.01$: 0.6870~~
Mean: 94.500 ppb
Std Dev: 6.455 ppb
DF: 3
Conf. Level (1- α): ~~0.9500~~ 0.99
Future Samples (k): 1
 $t \left[\begin{array}{c} 1 - \alpha \\ - \\ k \end{array} \right]$: 4.5407
Kappa: 5.0767
UL: 127.270 ppb
LL: $-\infty$

Parametric Prediction Interval
Report Printed February 16,1999

Page 1

Facility:RAAP-Haz Unit 4
Parameter:pH, Field(CAS Number:- -)

TWO-TAILED PARAMETRIC PREDICTION INTERVAL

Observations (n): 4
Shapiro-Wilk (W): 0.9945
~~Critical W, $\alpha=0.01$: 0.6870~~
Mean: 6.625 SU
Std Dev: 0.378 SU
DF: 3
Conf. Level (1- α): ~~0.9500~~ 0.99
Future Samples (k): 1
 $t \left[\frac{1 - \alpha}{2 \cdot k} \right]$: 5.8409
Kappa: 6.5303
UL: 9.090 SU
LL: 4.160 SU

Cohen's Adjustment of Background Data for HWMU4 (1998 Annual Report)

Cohen's adjustment is performed for all parameters with 25%-49 % non-detect data. Parameters total organic halides (TOX) and copper fit into this category, both with 25 % non-detect data.

Cohen's adjustment for TOX data:

Percentage of non-detects = 25

TOX data excluding non-detects fits normal distribution. Hence Cohen's adjustment of mean and standard deviation is appropriate.

Mean of TOX background data excluding non-detects (xd) = 12.83333 ug/l
Variance excluding non-detects (Sd2) = 47.583

$$h = (n - m) / (n)$$

"n" is the Total number of background observations = 4
"m" is the Number of background observations excluding non-detects = 3

$$h = 0.25$$

$$g = (Sd2 / (xd - DL)^2)$$

DL is the Detection Limit = 5.00

$$g = 0.78$$

$\lambda(h, g)$ values from table 10.1, Statistical Methods for Groundwater Monitoring, Gibbons, R.D, 1994

$\lambda(0.25, 0.78)$ obtained by double linear interpolation based on values for $\lambda(0.2, 0.7)$, $\lambda(0.2, 0.8)$, $\lambda(0.3, 0.7)$, and $\lambda(0.3, 0.8) =$

0.4278

$$\text{Corrected sample mean (X)} = xd - ((h, g) * (xd - DL))$$
$$X = 9.4822$$

Corrected sample standard deviation (S) = $(Sd2 + \lambda(h,g)(xd-DL)2)0.5$
S = 8.5926

Upper Prediction Limit (UPL) for one-sided prediction interval for TOX

$$UPL = X + t(n-1,(1-\alpha^*/k)) * S * (1 + (1/n))0.5$$

$t(n-1,(1-\alpha^*)/k)$ selected from Table 1.2, Gibbons, R.D., 1994, where

Table 1.2: Critical values of the t-distribution for one-sided prediction intervals. The table provides values for various degrees of freedom (n-1) and significance levels (alpha*). The values are arranged in a grid where the first column represents the degrees of freedom and the subsequent columns represent the critical values for different alpha* levels.
--

"t" value selected by linear interpolation based on "t" values for n=4, k=10, and n=4, k=15 which is = 6.56

One-side UPL for TOX = 72.503

Double Interpolation of Lamda

Actual Values	h, g Intervals		Difference
h =	0.25	0.2	0.3
g =	0.78	0.7	0.8

$\lambda(0.2, 0.7)$	=	0.3207		$\lambda(0.2, 0.78)$
$\lambda(0.2, 0.8)$	=	0.329	0.0083	0.32734
$\lambda(0.3, 0.7)$	=	0.518		
$\lambda(0.3, 0.8)$	=	0.5308	0.0128	0.52824

$\lambda(0.25, 0.78)$
0.4278

Cohen's Adjustment of Background Data for HWMU4 (1998 Annual Report)

Cohen's adjustment is performed for all parameters with 25%-49 % non-detect data.
Parameters total organic halides (TOX) and copper fit into this category, both with 25 % non-detect data.

Cohen's adjustment for Copper data:

Percentage of non-detects = 25

Copper data excluding non-detects fits normal distribution. Hence Cohen's adjustment of mean and standard deviation is appropriate.

Mean of background data excluding non-detects ($\bar{x}_d$) = 2 ug/l
Variance excluding non-detects (S_d^2) = 1

$$h = (n - m) / (n)$$

"n" is the Total number of background observations = 4
"m" is the Number of background observations excluding non-detects = 3

$$h = 0.25$$

$$g = (S_d^2 / (x_d - DL)^2)$$

DL is the Detection Limit = 1.00

$$g = 1.00$$

$\lambda(h, g)$ values from table 10.1, Statistical Methods for Groundwater Monitoring, Gibbons, R.D, 1994

$\lambda(0.25, 1)$ obtained by linear interpolation based on values for $\lambda(0.2, 1)$ and $\lambda(0.3, 1) =$

$$\begin{aligned} \text{Corrected sample mean } (X) &= x_d - (l(h, g) * (x_d - DL)) \\ X &= 1.5502 \end{aligned}$$

0.4498

Corrected sample standard deviation (S) = $(Sd2 + \lambda(h,g)(xd-DL)2)0.5$
S = 1.2041

Upper Prediction Limit (UPL) for one-sided prediction interval for Copper

$$UPL = X + t(n-1,(1-\alpha^*/k)) * S * (1 + (1/n))0.5$$

$t(n-1,(1-\alpha^*)/k)$ selected from Table 1.2, Gibbons, R.D., 1994, where

Table 1.2: Critical values of the t-distribution for one-sided prediction intervals. The table provides values for various degrees of freedom (n-1) and significance levels (alpha*). The values are arranged in a grid where the first column represents the degrees of freedom and the subsequent columns represent the critical values for different alpha* levels.
--

"t" value selected by linear interpolation based on "t" values for n=4, k=10, and n=4, k=15 which is = 6.56

One-side UPL for Copper = 10.381

Single Interpolation

Actual Values	h, g Intervals		Difference
h =	0.25	0.2	0.3
g =	1	1	1
			0

$\lambda(0.2, 1)$

=

0.3447

$\lambda(0.3, 1)$

=

0.5548

$\lambda \quad 0.25 \quad , \quad 1.00 \quad)$

0.4498

1998 Annual Statistical Analysis-Non-Parametric Prediction Interval Computations for HWMU4

Non-parametric prediction intervals were computed for HWMU4 for all parameters whose background well (4P3) data satisfied one of the following two criteria, per DEQ regulations, guidance as well as USEPA guidance:

1. Percentage of non-detects were between 50 and 99,
2. Percentage of non-detects less than 50, but data is not normally distributed in original or log-transformed mode.

Parameters total organic carbon (TOC), arsenic, cadmium, lead, chromium, and zinc satisfied the first criteria above. Hence non-parametric upper prediction limits (UPL) were computed for those target parameters.

The non-parametric UPL for each of these parameters was set at the maximum background concentration of each of those parameters in background well 4P3 with,

$n = 4$ (number of background measurements)

$k = 14$ (number of future measurements, based on number of compliance wells (14), number of number of future events (1), and number of compliance parameters (conservatively set as 1))

Probability that at least one of two samples will be below UPL = 0.604

(From Table 2.1, Gibbons, R.D., 1994). Hence the number of confirmation resamples required (following a statistical exceedance) for 0.95 confidence level with $n=4$ and $k=8$ is >5 (Table 2.3, Gibbons, R.D., 1994).

Upper Predictions Limits:

TOC UPL = 1425 $\mu\text{g/l}$

Arsenic UPL = 1.0 $\mu\text{g/l}$

Cadmium UPL = 0.2 $\mu\text{g/l}$

Lead UPL = 1 $\mu\text{g/l}$

Chromium UPL = 9 $\mu\text{g/l}$

Zinc UPL = 20 $\mu\text{g/l}$

APPENDIX D

HWMU-5 STATISTICAL ANALYSIS RESULTS

Data Set Summary

Report Printed: 02-18-1999 15:53

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:2,4-DNT 2,4-Dinitrotoluene

CAS Number: 121-14-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.080 ppb

Start Date:Feb 11 1998

End Date:Oct 26 1998

Well ID:5W8B

Sample Date	Observation	Ln
Feb 11 1998	0.040 ppb	-3.219 (* Nondetect *)
Apr 23 1998	0.040 ppb	-3.219 (* Nondetect *)
Jul 21 1998	0.040 ppb	-3.219 (* Nondetect *)
Oct 26 1998	0.040 ppb	-3.219 (* Nondetect *)

Well ID:5W8B Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.040 ppb	Ln Minimum:	-3.219
Maximum:	0.040 ppb	Ln Maximum:	-3.219
Mean:	0.040 ppb	Ln Mean:	-3.219
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-18-1999 15:53

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:2,6-DNT 2,6-Dinitrotoluene

CAS Number: 606-20-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.080 ppb

Start Date:Feb 11 1998

End Date:Oct 26 1998

Well ID:5W8B

Sample Date	Observation	Ln
Feb 11 1998	0.040 ppb	-3.219 (* Nondetect *)
Apr 23 1998	0.040 ppb	-3.219 (* Nondetect *)
Jul 21 1998	0.040 ppb	-3.219 (* Nondetect *)
Oct 26 1998	0.040 ppb	-3.219 (* Nondetect *)

Well ID:5W8B Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.040 ppb	Ln Minimum:	-3.219
Maximum:	0.040 ppb	Ln Maximum:	-3.219
Mean:	0.040 ppb	Ln Mean:	-3.219
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-18-1999 15:54

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:
Phone:() -

Permit Type:Background

Constituent:Ba Barium, total

CAS Number: 7440-39-3

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 2.000 ppb

Start Date:Feb 11 1998

End Date:Oct 26 1998

Well ID:5W8B

Sample Date	Observation	Ln
Feb 11 1998	122.000 ppb	4.804
Apr 23 1998	125.000 ppb	4.828
Jul 21 1998	96.000 ppb	4.564
Oct 26 1998	126.000 ppb	4.836

Well ID:5W8B Summary Statistics

Observations (N): 4
Nondetects (%ND): 0

Minimum:	96.000 ppb	Ln Minimum:	4.564
Maximum:	126.000 ppb	Ln Maximum:	4.836
Mean:	117.250 ppb	Ln Mean:	4.758
Std. Dev.:	14.268 ppb	Ln Std. Dev.:	0.130

Normality Tests

Report Printed: 02-18-1999 15:54

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Ba Barium, total

CAS Number: 7440-39-3

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 2.000 ppb

Start Date:Feb 11 1998

End Date:Oct 26 1998

Normality Test on Observations for wells listed below:

Well:5W8B Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	96.000	126.000	117.250	14.268
Log:	4.564	4.836	4.758	0.130

Pooled Statistics

Observations: 4

Statistic	Original	Log
	Scale	Scale
Mean:	117.250	4.758
Std Dev:	14.268	0.130
Skewness:	-1.107*	-1.117*
Kurtosis:	-0.706	-0.698
Minimum:	96.000	4.564
Maximum:	126.000	4.836
CV:	0.122	0.027

Shapiro-Wilk Statistics

	Test	5% Critical	1% Critical
Scale	Statistic	Value	Value
Original:	0.7303*	0.7480	0.6870

Log: 0.7193* 0.7480 0.6870

* Indicates statistically significant evidence of non-normality.
GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-18-1999 15:54

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:
Phone:() -

Permit Type:Background

Constituent:Be Beryllium, total

CAS Number: 7440-41-7

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.200 ppb

Start Date:Feb 11 1998

End Date:Oct 26 1998

Well ID:5W8B

Sample Date	Observation	Ln
Feb 11 1998	0.400 ppb	-0.916
Apr 23 1998	0.400 ppb	-0.916
Jul 21 1998	0.200 ppb	-1.609
Oct 26 1998	0.500 ppb	-0.693

Well ID:5W8B Summary Statistics

Observations (N): 4
Nondetects (%ND): 0

Minimum:	0.200 ppb	Ln Minimum:	-1.609
Maximum:	0.500 ppb	Ln Maximum:	-0.693
Mean:	0.375 ppb	Ln Mean:	-1.034
Std. Dev.:	0.126 ppb	Ln Std. Dev.:	0.398

Normality Tests

Report Printed: 02-18-1999 15:54

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:
Phone:() -

Permit Type:Background

Constituent:Be Beryllium, total

CAS Number: 7440-41-7

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.200 ppb

Start Date:Feb 11 1998

End Date:Oct 26 1998

Normality Test on Observations for wells listed below:

Well:5W8B Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	0.200	0.500	0.375	0.126
Log:	-1.609	-0.693	-1.034	0.398

Pooled Statistics

Observations: 4

Statistic	Original Scale	Log Scale
Mean:	0.375	-1.034
Std Dev:	0.126	0.398
Skewness:	-0.652	-0.904
Kurtosis:	-0.903	-0.808
Minimum:	0.200	-1.609
Maximum:	0.500	-0.693
CV:	0.336	-0.385

Shapiro-Wilk Statistics

Test	5% Critical Value	1% Critical Value
Scale Statistic		
Original: 0.8948	0.7480	0.6870

Log: 0.8347 0.7480 0.6870

* Indicates statistically significant evidence of non-normality.
GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-18-1999 15:55

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Cd Cadmium, total

CAS Number: 7440-43-9

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.100 ppb

Start Date:Feb 11 1998

End Date:Oct 26 1998

Well ID:5W8B

Sample Date	Observation	Ln
Feb 11 1998	0.050 ppb	-2.996 (* Nondetect *)
Apr 23 1998	0.050 ppb	-2.996 (* Nondetect *)
Jul 21 1998	0.050 ppb	-2.996 (* Nondetect *)
Oct 26 1998	0.100 ppb	-2.303

Well ID:5W8B Summary Statistics

Observations (N): 4

Nondetects (%ND): 75

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.100 ppb	Ln Maximum:	-2.303
Mean:	0.063 ppb	Ln Mean:	-2.822
Std. Dev.:	0.025 ppb	Ln Std. Dev.:	0.347

Data Set Summary

Report Printed: 02-18-1999 15:56

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Chlorofm Chloroform

CAS Number: 67-66-3

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.300 ppb

Start Date:Feb 11 1998

End Date:Oct 26 1998

Well ID:5W8B

Sample Date	Observation	Ln
Feb 11 1998	0.500 ppb	-0.693
Apr 23 1998	0.150 ppb	-1.897 (* Nondetect *)
Jul 21 1998	0.150 ppb	-1.897 (* Nondetect *)
Oct 26 1998	0.150 ppb	-1.897 (* Nondetect *)

Well ID:5W8B Summary Statistics

Observations (N): 4

Nondetects (%ND): 75

Minimum:	0.150 ppb	Ln Minimum:	-1.897
Maximum:	0.500 ppb	Ln Maximum:	-0.693
Mean:	0.237 ppb	Ln Mean:	-1.596
Std. Dev.:	0.175 ppb	Ln Std. Dev.:	0.602

Data Set Summary

Report Printed: 02-18-1999 15:56

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:
Phone:() -

Permit Type:Background

Constituent:Co Cobalt, total

CAS Number: 7440-48-4
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 1.000 ppb

Start Date:Feb 11 1998
End Date:Oct 26 1998

Well ID:5W8B

Sample Date	Observation	Ln
Feb 11 1998	1.000 ppb	0.000
Apr 23 1998	0.500 ppb	-0.693 (* Nondetect *)
Jul 21 1998	0.500 ppb	-0.693 (* Nondetect *)
Oct 26 1998	2.000 ppb	0.693

Well ID:5W8B Summary Statistics

Observations (N): 4
Nondetects (%ND): 50

Minimum:	0.500 ppb	Ln Minimum:	-0.693
Maximum:	2.000 ppb	Ln Maximum:	0.693
Mean:	1.000 ppb	Ln Mean:	-0.173
Std. Dev.:	0.707 ppb	Ln Std. Dev.:	0.664

Data Set Summary

Report Printed: 02-18-1999 15:56

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:
Phone:() -

Permit Type:Background

Constituent:Cond F Specific Conductivity, Field

CAS Number: - -
MCL: 0.000 umhos/cm
ACL: 0.000 umhos/cm
Detect Limit: 1.000 umhos/cm

Start Date:Feb 11 1998
End Date:Oct 26 1998

Well ID:5W8B

Sample Date	Observation	Ln
Feb 11 1998	78.000 umhos/cm	4.357
Apr 23 1998	78.000 umhos/cm	4.357
Jul 21 1998	78.000 umhos/cm	4.357
Oct 26 1998	450.000 umhos/cm	6.109

Well ID:5W8B Summary Statistics

Observations (N): 4
Nondetects (%ND): 0

Minimum:	78.000 umhos/cm	Ln Minimum:	4.357
Maximum:	450.000 umhos/cm	Ln Maximum:	6.109
Mean:	171.000 umhos/cm	Ln Mean:	4.795
Std. Dev.:	186.000 umhos/cm	Ln Std. Dev.:	0.876

Normality Tests

Report Printed: 02-18-1999 15:56

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Cond F Specific Conductivity, Field

CAS Number: - -

MCL: 0.000 umhos/cm

ACL: 0.000 umhos/cm

Detect Limit: 1.000 umhos/cm

Start Date:Feb 11 1998

End Date:Oct 26 1998

Normality Test on Observations for wells listed below:

Well:5W8B Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	78.000	450.000	171.000	186.000
Log:	4.357	6.109	4.795	0.876

Pooled Statistics

Observations: 4

Statistic	Original Scale	Log Scale
Mean:	171.000	4.795
Std Dev:	186.000	0.876
Skewness:	1.155*	1.155*
Kurtosis:	-0.667	-0.667
Minimum:	78.000	4.357
Maximum:	450.000	6.109
CV:	1.088	0.183

Shapiro-Wilk Statistics

	Test Statistic	5% Critical Value	1% Critical Value
Original:	0.6297*	0.7480	0.6870

Log: 0.6297* 0.7480 0.6870

* Indicates statistically significant evidence of non-normality.
GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-18-1999 15:57

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Cu Copper, total

CAS Number: 7440-50-8

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Feb 11 1998

End Date:Oct 26 1998

Well ID:5W8B

Sample Date	Observation	Ln
Feb 11 1998	0.500 ppb	-0.693 (* Nondetect *)
Apr 23 1998	0.500 ppb	-0.693 (* Nondetect *)
Jul 21 1998	0.500 ppb	-0.693 (* Nondetect *)
Oct 26 1998	2.000 ppb	0.693

Well ID:5W8B Summary Statistics

Observations (N): 4

Nondetects (%ND): 75

Minimum:	0.500 ppb	Ln Minimum:	-0.693
Maximum:	2.000 ppb	Ln Maximum:	0.693
Mean:	0.875 ppb	Ln Mean:	-0.347
Std. Dev.:	0.750 ppb	Ln Std. Dev.:	0.693

Data Set Summary

Report Printed: 02-18-1999 15:59

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Ni Nickel, total

CAS Number: 7440-02-0

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 15.000 ppb

Start Date:Feb 11 1998

End Date:Oct 26 1998

Well ID:5W8B

Sample Date	Observation	Ln
Feb 11 1998	7.500 ppb	2.015 (* Nondetect *)
Apr 23 1998	7.500 ppb	2.015 (* Nondetect *)
Jul 21 1998	7.500 ppb	2.015 (* Nondetect *)
Oct 26 1998	7.500 ppb	2.015 (* Nondetect *)

Well ID:5W8B Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	7.500 ppb	Ln Minimum:	2.015
Maximum:	7.500 ppb	Ln Maximum:	2.015
Mean:	7.500 ppb	Ln Mean:	2.015
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-18-1999 15:59

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:
Phone:() -

Permit Type:Background

Constituent:Pb Lead, total

CAS Number: 7439-92-1

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Feb 11 1998

End Date:Oct 26 1998

Well ID:5W8B

Sample Date	Observation	Ln
Feb 11 1998	0.500 ppb	-0.693 (* Nondetect *)
Apr 23 1998	0.500 ppb	-0.693 (* Nondetect *)
Jul 21 1998	0.500 ppb	-0.693 (* Nondetect *)
Oct 26 1998	0.500 ppb	-0.693 (* Nondetect *)

Well ID:5W8B Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	0.500 ppb	Ln Minimum:	-0.693
Maximum:	0.500 ppb	Ln Maximum:	-0.693
Mean:	0.500 ppb	Ln Mean:	-0.693
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-18-1999 16:00

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:
Phone:() -

Permit Type:Background

Constituent:Se Selenium, total

CAS Number: 7782-49-2
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 1.000 ppb

Start Date:Feb 11 1998
End Date:Oct 26 1998

Well ID:5W8B

Sample Date	Observation	Ln
Feb 11 1998	0.500 ppb	-0.693 (* Nondetect *)
Apr 23 1998	0.500 ppb	-0.693 (* Nondetect *)
Jul 21 1998	0.500 ppb	-0.693 (* Nondetect *)
Oct 26 1998	0.500 ppb	-0.693 (* Nondetect *)

Well ID:5W8B Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	0.500 ppb	Ln Minimum:	-0.693
Maximum:	0.500 ppb	Ln Maximum:	-0.693
Mean:	0.500 ppb	Ln Mean:	-0.693
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-18-1999 16:00

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:
Phone:() -

Permit Type:Background

Constituent:TCE Trichloroethene (-ethylene)

CAS Number: 79-01-6
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 0.100 ppb

Start Date:Feb 11 1998
End Date:Oct 26 1998

Well ID:5W8B

Sample Date	Observation	Ln
Feb 11 1998	0.050 ppb	-2.996 (* Nondetect *)
Apr 23 1998	0.050 ppb	-2.996 (* Nondetect *)
Jul 21 1998	0.050 ppb	-2.996 (* Nondetect *)
Oct 26 1998	0.050 ppb	-2.996 (* Nondetect *)

Well ID:5W8B Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.050 ppb	Ln Maximum:	-2.996
Mean:	0.050 ppb	Ln Mean:	-2.996
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-18-1999 16:01

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:
Phone:() -

Permit Type:Background

Constituent:TOC Total Organic Carbon

CAS Number: - -
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 1000.000 ppb

Start Date:Feb 11 1998
End Date:Oct 26 1998

Well ID:5W8B

Sample Date	Observation	Ln
Feb 11 1998	1100.000 ppb	7.003
Apr 23 1998	1125.000 ppb	7.026
Jul 21 1998	500.000 ppb	6.215 (* Nondetect *)
Oct 26 1998	500.000 ppb	6.215 (* Nondetect *)

Well ID:5W8B Summary Statistics

Observations (N): 4
Nondetects (%ND): 50

Minimum:	500.000 ppb	Ln Minimum:	6.215
Maximum:	1125.000 ppb	Ln Maximum:	7.026
Mean:	806.250 ppb	Ln Mean:	6.614
Std. Dev.:	353.774 ppb	Ln Std. Dev.:	0.462

Data Set Summary

Report Printed: 02-18-1999 16:01

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:TOX Total Organic Halogens, Halides

CAS Number: - -

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 5.000 ppb

Start Date:Feb 11 1998

End Date:Oct 26 1998

Well ID:5W8B

Sample Date	Observation	Ln
Feb 11 1998	13.400 ppb	2.595
Apr 23 1998	7.000 ppb	1.946
Jul 21 1998	2.500 ppb	0.916 (* Nondetect *)
Oct 26 1998	2.500 ppb	0.916 (* Nondetect *)

Well ID:5W8B Summary Statistics

Observations (N): 4

Nondetects (%ND): 50

Minimum:	2.500 ppb	Ln Minimum:	0.916
Maximum:	13.400 ppb	Ln Maximum:	2.595
Mean:	6.350 ppb	Ln Mean:	1.593
Std. Dev.:	5.157 ppb	Ln Std. Dev.:	0.826

Data Set Summary

Report Printed: 02-18-1999 16:01

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Va Vanadium

CAS Number: 7440-62-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 4.000 ppb

Start Date:Feb 11 1998

End Date:Oct 26 1998

Well ID:5W8B

Sample Date	Observation	Ln
Feb 11 1998	2.000 ppb	0.693 (* Nondetect *)
Apr 23 1998	2.000 ppb	0.693 (* Nondetect *)
Jul 21 1998	2.000 ppb	0.693 (* Nondetect *)
Oct 26 1998	2.000 ppb	0.693 (* Nondetect *)

Well ID:5W8B Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	2.000 ppb	Ln Minimum:	0.693
Maximum:	2.000 ppb	Ln Maximum:	0.693
Mean:	2.000 ppb	Ln Mean:	0.693
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-18-1999 16:02

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Zn Zinc, total

CAS Number: 7440-66-6

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 5.000 ppb

Start Date:Feb 11 1998

End Date:Oct 26 1998

Well ID:5W8B

Sample Date	Observation	Ln
Feb 11 1998	2.500 ppb	0.916 (* Nondetect *)
Apr 23 1998	6.000 ppb	1.792
Jul 21 1998	10.000 ppb	2.303
Oct 26 1998	20.000 ppb	2.996

Well ID:5W8B Summary Statistics

Observations (N): 4

Nondetects (%ND): 25

Minimum:	2.500 ppb	Ln Minimum:	0.916
Maximum:	20.000 ppb	Ln Maximum:	2.996
Mean:	9.625 ppb	Ln Mean:	2.002
Std. Dev.:	7.565 ppb	Ln Std. Dev.:	0.876

Normality Tests

Report Printed: 02-18-1999 16:02

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Zn Zinc, total

CAS Number: 7440-66-6

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 5.000 ppb

Start Date:Feb 11 1998

End Date:Oct 26 1998

Normality Test on Observations for wells listed below:

Well:5W8B Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	2.500	20.000	9.625	7.565
Log:	0.916	2.996	2.002	0.876

Pooled Statistics

Observations: 4

Statistic	Original	Log
	Scale	Scale
Mean:	9.625	2.002
Std Dev:	7.565	0.876
Skewness:	0.629	-0.159
Kurtosis:	-1.055	-1.206
Minimum:	2.500	0.916
Maximum:	20.000	2.996
CV:	0.786	0.438

Shapiro-Wilk Statistics

	Test	5% Critical	1% Critical
Scale	Statistic	Value	Value
Original:	0.9390	0.7480	0.6870

Log: 0.9971 0.7480 0.6870

* Indicates statistically significant evidence of non-normality.
GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-18-1999 16:02

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:pH F pH, Field

CAS Number: - -

MCL: 0.000 SU

ACL: 0.000 SU

Detect Limit: 0.100 SU

Start Date:Feb 11 1998

End Date:Oct 26 1998

Well ID:5W8B

Sample Date	Observation	Ln
Feb 11 1998	5.000 SU	1.609
Apr 23 1998	4.500 SU	1.504
Jul 21 1998	4.700 SU	1.548
Oct 26 1998	4.700 SU	1.548

Well ID:5W8B Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	4.500 SU	Ln Minimum:	1.504
Maximum:	5.000 SU	Ln Maximum:	1.609
Mean:	4.725 SU	Ln Mean:	1.552
Std. Dev.:	0.206 SU	Ln Std. Dev.:	0.043

Normality Tests

Report Printed: 02-18-1999 16:02

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:pH F pH, Field

CAS Number: - -

MCL: 0.000 SU

ACL: 0.000 SU

Detect Limit: 0.100 SU

Start Date:Feb 11 1998

End Date:Oct 26 1998

Normality Test on Observations for wells listed below:

Well:5W8B Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	4.500	5.000	4.725	0.206
Log:	1.504	1.609	1.552	0.043

Pooled Statistics

Observations: 4

Statistic	Original Scale	Log Scale
Mean:	4.725	1.552
Std Dev:	0.206	0.043
Skewness:	0.412	0.362
Kurtosis:	-0.962	-0.971
Minimum:	4.500	1.504
Maximum:	5.000	1.609
CV:	0.044	0.028

Shapiro-Wilk Statistics

	Test Scale Statistic	5% Critical Value	1% Critical Value
Original:	0.9260	0.7480	0.6870

Log: 0.9303 0.7480 0.6870

* Indicates statistically significant evidence of non-normality.
GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-24-1999 10:13

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:
Phone:() -

Permit Type:Background

Constituent:1,1,2Tri 1,1,2-Trichloroethane

CAS Number: 79-00-5
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 0.500 ppb

Start Date:Feb 11 1998
End Date:Oct 26 1998

Well ID:5W8B

Sample Date	Observation	Ln
Feb 11 1998	0.250 ppb	-1.386 (* Nondetect *)
Apr 23 1998	0.250 ppb	-1.386 (* Nondetect *)
Jul 21 1998	0.250 ppb	-1.386 (* Nondetect *)
Oct 26 1998	0.250 ppb	-1.386 (* Nondetect *)

Well ID:5W8B Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	0.250 ppb	Ln Minimum:	-1.386
Maximum:	0.250 ppb	Ln Maximum:	-1.386
Mean:	0.250 ppb	Ln Mean:	-1.386
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:13

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:1,2DCE 1,2-Dichloroethane

CAS Number: 107-06-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.100 ppb

Start Date:Feb 11 1998

End Date:Oct 26 1998

Well ID:5W8B

Sample Date	Observation	Ln
Feb 11 1998	0.050 ppb	-2.996 (* Nondetect *)
Apr 23 1998	0.050 ppb	-2.996 (* Nondetect *)
Jul 21 1998	0.050 ppb	-2.996 (* Nondetect *)
Oct 26 1998	0.050 ppb	-2.996 (* Nondetect *)

Well ID:5W8B Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.050 ppb	Ln Maximum:	-2.996
Mean:	0.050 ppb	Ln Mean:	-2.996
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:13

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:2Butanon 2-Butanone (Methyl ethyl ketone)

CAS Number: 78-93-3

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.100 ppb

Start Date:Feb 11 1998

End Date:Oct 26 1998

Well ID:5W8B

Sample Date	Observation	Ln
Feb 11 1998	0.550 ppb	-0.598 (* Nondetect *)
Apr 23 1998	0.550 ppb	-0.598 (* Nondetect *)
Jul 21 1998	0.550 ppb	-0.598 (* Nondetect *)
Oct 26 1998	0.550 ppb	-0.598 (* Nondetect *)

Well ID:5W8B Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.550 ppb	Ln Minimum:	-0.598
Maximum:	0.550 ppb	Ln Maximum:	-0.598
Mean:	0.550 ppb	Ln Mean:	-0.598
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:13

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Acetone Acetone

CAS Number: 67-64-1

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 10.000 ppb

Start Date:Feb 11 1998

End Date:Oct 26 1998

Well ID:5W8B

Sample Date	Observation	Ln
Feb 11 1998	5.000 ppb	1.609 (* Nondetect *)
Apr 23 1998	5.000 ppb	1.609 (* Nondetect *)
Jul 21 1998	5.000 ppb	1.609 (* Nondetect *)
Oct 26 1998	5.000 ppb	1.609 (* Nondetect *)

Well ID:5W8B Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	5.000 ppb	Ln Maximum:	1.609
Mean:	5.000 ppb	Ln Mean:	1.609
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:14

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Ag Silver, total

CAS Number: 7440-22-4

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.200 ppb

Start Date:Feb 11 1998

End Date:Oct 26 1998

Well ID:5W8B

Sample Date	Observation	Ln
Feb 11 1998	0.100 ppb	-2.303 (* Nondetect *)
Apr 23 1998	0.100 ppb	-2.303 (* Nondetect *)
Jul 21 1998	0.100 ppb	-2.303 (* Nondetect *)
Oct 26 1998	0.100 ppb	-2.303 (* Nondetect *)

Well ID:5W8B Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.100 ppb	Ln Minimum:	-2.303
Maximum:	0.100 ppb	Ln Maximum:	-2.303
Mean:	0.100 ppb	Ln Mean:	-2.303
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:14

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:As Arsenic, total

CAS Number: 7440-38-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Feb 11 1998

End Date:Oct 26 1998

Well ID:5W8B

Sample Date	Observation	Ln
Feb 11 1998	0.500 ppb	-0.693 (* Nondetect *)
Apr 23 1998	0.500 ppb	-0.693 (* Nondetect *)
Jul 21 1998	0.500 ppb	-0.693 (* Nondetect *)
Oct 26 1998	0.500 ppb	-0.693 (* Nondetect *)

Well ID:5W8B Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.500 ppb	Ln Minimum:	-0.693
Maximum:	0.500 ppb	Ln Maximum:	-0.693
Mean:	0.500 ppb	Ln Mean:	-0.693
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:14

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Benzene Benzene

CAS Number: 71-43-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.100 ppb

Start Date:Feb 11 1998

End Date:Oct 26 1998

Well ID:5W8B

Sample Date	Observation	Ln
Feb 11 1998	0.050 ppb	-2.996 (* Nondetect *)
Apr 23 1998	0.050 ppb	-2.996 (* Nondetect *)
Jul 21 1998	0.050 ppb	-2.996 (* Nondetect *)
Oct 26 1998	0.050 ppb	-2.996 (* Nondetect *)

Well ID:5W8B Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.050 ppb	Ln Maximum:	-2.996
Mean:	0.050 ppb	Ln Mean:	-2.996
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:14

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:BiEHPhth bis (2-Ethylhexyl) Phthalate

CAS Number: 117-81-7

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 10.000 ppb

Start Date:Feb 11 1998

End Date:Oct 26 1998

Well ID:5W8B

Sample Date	Observation	Ln
Feb 11 1998	5.000 ppb	1.609 (* Nondetect *)
Apr 23 1998	5.000 ppb	1.609 (* Nondetect *)
Jul 21 1998	5.000 ppb	1.609 (* Nondetect *)
Oct 26 1998	5.000 ppb	1.609 (* Nondetect *)

Well ID:5W8B Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	5.000 ppb	Ln Maximum:	1.609
Mean:	5.000 ppb	Ln Mean:	1.609
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:15

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:
Phone:() -

Permit Type:Background

Constituent:ChlMeth Chloromethane

CAS Number: 74-87-3
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 0.300 ppb

Start Date:Feb 11 1998
End Date:Oct 26 1998

Well ID:5W8B

Sample Date	Observation	Ln
Feb 11 1998	0.150 ppb	-1.897 (* Nondetect *)
Apr 23 1998	0.150 ppb	-1.897 (* Nondetect *)
Jul 21 1998	0.150 ppb	-1.897 (* Nondetect *)
Oct 26 1998	0.150 ppb	-1.897 (* Nondetect *)

Well ID:5W8B Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	0.150 ppb	Ln Minimum:	-1.897
Maximum:	0.150 ppb	Ln Maximum:	-1.897
Mean:	0.150 ppb	Ln Mean:	-1.897
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:15

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:DEthPhth Diethylphthalate

CAS Number: 84-66-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 5.000 ppb

Start Date:Feb 11 1998

End Date:Oct 26 1998

Well ID:5W8B

Sample Date	Observation	Ln
Feb 11 1998	2.500 ppb	0.916 (* Nondetect *)
Apr 23 1998	2.500 ppb	0.916 (* Nondetect *)
Jul 21 1998	2.500 ppb	0.916 (* Nondetect *)
Oct 26 1998	2.500 ppb	0.916 (* Nondetect *)

Well ID:5W8B Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	2.500 ppb	Ln Minimum:	0.916
Maximum:	2.500 ppb	Ln Maximum:	0.916
Mean:	2.500 ppb	Ln Mean:	0.916
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:15

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:
Phone:() -

Permit Type:Background

Constituent:DPA Diphenylamine

CAS Number: 122-39-4

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 10.000 ppb

Start Date:Feb 11 1998

End Date:Oct 26 1998

Well ID:5W8B

Sample Date	Observation	Ln
Feb 11 1998	5.000 ppb	1.609 (* Nondetect *)
Apr 23 1998	5.000 ppb	1.609 (* Nondetect *)
Jul 21 1998	5.000 ppb	1.609 (* Nondetect *)
Oct 26 1998	5.000 ppb	1.609 (* Nondetect *)

Well ID:5W8B Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	5.000 ppb	Ln Maximum:	1.609
Mean:	5.000 ppb	Ln Mean:	1.609
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:15

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Di-N-Bu Di-n-Butylphthalate

CAS Number: 84-74-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 5.000 ppb

Start Date:Feb 11 1998

End Date:Oct 26 1998

Well ID:5W8B

Sample Date	Observation	Ln
Feb 11 1998	2.500 ppb	0.916 (* Nondetect *)
Apr 23 1998	2.500 ppb	0.916 (* Nondetect *)
Jul 21 1998	2.500 ppb	0.916 (* Nondetect *)
Oct 26 1998	2.500 ppb	0.916 (* Nondetect *)

Well ID:5W8B Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	2.500 ppb	Ln Minimum:	0.916
Maximum:	2.500 ppb	Ln Maximum:	0.916
Mean:	2.500 ppb	Ln Mean:	0.916
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:15

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Hg Mercury

CAS Number: 7439-97-6

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.200 ppb

Start Date:Feb 11 1998

End Date:Oct 26 1998

Well ID:5W8B

Sample Date	Observation	Ln
Feb 11 1998	0.100 ppb	-2.303 (* Nondetect *)
Apr 23 1998	0.100 ppb	-2.303 (* Nondetect *)
Jul 21 1998	0.100 ppb	-2.303 (* Nondetect *)
Oct 26 1998	0.100 ppb	-2.303 (* Nondetect *)

Well ID:5W8B Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.100 ppb	Ln Minimum:	-2.303
Maximum:	0.100 ppb	Ln Maximum:	-2.303
Mean:	0.100 ppb	Ln Mean:	-2.303
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:16

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:MeCl Dichloromethane (Methylene chloride)

CAS Number: 75-09-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.700 ppb

Start Date:Feb 11 1998

End Date:Oct 26 1998

Well ID:5W8B

Sample Date	Observation	Ln
Feb 11 1998	0.350 ppb	-1.050 (* Nondetect *)
Apr 23 1998	0.350 ppb	-1.050 (* Nondetect *)
Jul 21 1998	0.350 ppb	-1.050 (* Nondetect *)
Oct 26 1998	0.350 ppb	-1.050 (* Nondetect *)

Well ID:5W8B Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.350 ppb	Ln Minimum:	-1.050
Maximum:	0.350 ppb	Ln Maximum:	-1.050
Mean:	0.350 ppb	Ln Mean:	-1.050
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:17

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Sb Antimony, total

CAS Number: 7440-36-0

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 3.000 ppb

Start Date:Feb 11 1998

End Date:Oct 26 1998

Well ID:5W8B

Sample Date	Observation	Ln
Feb 11 1998	1.500 ppb	0.405 (* Nondetect *)
Apr 23 1998	1.500 ppb	0.405 (* Nondetect *)
Jul 21 1998	1.500 ppb	0.405 (* Nondetect *)
Oct 26 1998	1.500 ppb	0.405 (* Nondetect *)

Well ID:5W8B Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	1.500 ppb	Ln Minimum:	0.405
Maximum:	1.500 ppb	Ln Maximum:	0.405
Mean:	1.500 ppb	Ln Mean:	0.405
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:18

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:TClFlMe Trichlorofluoromethane

CAS Number: 75-69-4

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.500 ppb

Start Date:Feb 11 1998

End Date:Oct 26 1998

Well ID:5W8B

Sample Date	Observation	Ln
Feb 11 1998	0.250 ppb	-1.386 (* Nondetect *)
Apr 23 1998	0.250 ppb	-1.386 (* Nondetect *)
Jul 21 1998	0.250 ppb	-1.386 (* Nondetect *)
Oct 26 1998	0.250 ppb	-1.386 (* Nondetect *)

Well ID:5W8B Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.250 ppb	Ln Minimum:	-1.386
Maximum:	0.250 ppb	Ln Maximum:	-1.386
Mean:	0.250 ppb	Ln Mean:	-1.386
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:18

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:TetCEthy Tetrachloroethene (-ethylene)

CAS Number: 127-18-4

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.100 ppb

Start Date:Feb 11 1998

End Date:Oct 26 1998

Well ID:5W8B

Sample Date	Observation	Ln
Feb 11 1998	0.050 ppb	-2.996 (* Nondetect *)
Apr 23 1998	0.050 ppb	-2.996 (* Nondetect *)
Jul 21 1998	0.050 ppb	-2.996 (* Nondetect *)
Oct 26 1998	0.050 ppb	-2.996 (* Nondetect *)

Well ID:5W8B Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.050 ppb	Ln Maximum:	-2.996
Mean:	0.050 ppb	Ln Mean:	-2.996
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:18

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Tl Thallium, total

CAS Number: 7440-28-0

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Feb 11 1998

End Date:Oct 26 1998

Well ID:5W8B

Sample Date	Observation	Ln
Feb 11 1998	0.500 ppb	-0.693 (* Nondetect *)
Apr 23 1998	0.500 ppb	-0.693 (* Nondetect *)
Jul 21 1998	0.500 ppb	-0.693 (* Nondetect *)
Oct 26 1998	0.500 ppb	-0.693 (* Nondetect *)

Well ID:5W8B Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.500 ppb	Ln Minimum:	-0.693
Maximum:	0.500 ppb	Ln Maximum:	-0.693
Mean:	0.500 ppb	Ln Mean:	-0.693
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:18

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Toluen Toluene

CAS Number: 108-88-3

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.100 ppb

Start Date:Feb 11 1998

End Date:Oct 26 1998

Well ID:5W8B

Sample Date	Observation	Ln
Feb 11 1998	0.050 ppb	-2.996 (* Nondetect *)
Apr 23 1998	0.050 ppb	-2.996 (* Nondetect *)
Jul 21 1998	0.050 ppb	-2.996 (* Nondetect *)
Oct 26 1998	0.050 ppb	-2.996 (* Nondetect *)

Well ID:5W8B Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.050 ppb	Ln Maximum:	-2.996
Mean:	0.050 ppb	Ln Mean:	-2.996
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:19

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:TranDCEE trans-1,2-Dichloroethene

CAS Number: 156-60-5

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.100 ppb

Start Date:Feb 11 1998

End Date:Oct 26 1998

Well ID:5W8B

Sample Date	Observation	Ln
Feb 11 1998	0.050 ppb	-2.996 (* Nondetect *)
Apr 23 1998	0.050 ppb	-2.996 (* Nondetect *)
Jul 21 1998	0.050 ppb	-2.996 (* Nondetect *)
Oct 26 1998	0.050 ppb	-2.996 (* Nondetect *)

Well ID:5W8B Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.050 ppb	Ln Maximum:	-2.996
Mean:	0.050 ppb	Ln Mean:	-2.996
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:19

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:VC Vinyl chloride

CAS Number: 75-01-4

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.100 ppb

Start Date:Feb 11 1998

End Date:Oct 26 1998

Well ID:5W8B

Sample Date	Observation	Ln
Feb 11 1998	0.050 ppb	-2.996 (* Nondetect *)
Apr 23 1998	0.050 ppb	-2.996 (* Nondetect *)
Jul 21 1998	0.050 ppb	-2.996 (* Nondetect *)
Oct 26 1998	0.050 ppb	-2.996 (* Nondetect *)

Well ID:5W8B Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.050 ppb	Ln Maximum:	-2.996
Mean:	0.050 ppb	Ln Mean:	-2.996
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:19

Facility:RAAPHWMU5 Haz. Waste Unit 5 - RAAP

Address:

City:Radford
County:MONTGOMERY

ST:VA Zip:

Contact:
Phone:() -

Permit Type:Background

Constituent:Xylene Xylene

CAS Number: 1330-20-7

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.100 ppb

Start Date:Feb 11 1998

End Date:Oct 26 1998

Well ID:5W8B

Sample Date	Observation	Ln
Feb 11 1998	0.050 ppb	-2.996 (* Nondetect *)
Apr 23 1998	0.050 ppb	-2.996 (* Nondetect *)
Jul 21 1998	0.050 ppb	-2.996 (* Nondetect *)
Oct 26 1998	0.050 ppb	-2.996 (* Nondetect *)

Well ID:5W8B Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.050 ppb	Ln Maximum:	-2.996
Mean:	0.050 ppb	Ln Mean:	-2.996
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

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Facility:Haz. Waste Unit 5 - RAAP
Parameter:Beryllium, total(CAS Number:7440-41-7)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 4
Shapiro-Wilk (W): 0.8948
Critical W, $\alpha=0.01$: 0.6870
Mean: 0.375 ppb
Std Dev: 0.126 ppb
DF: 3
Conf. Level (1- α): ~~0.9500~~ 0.9900
Future Samples (k): 1
 $t \left[\begin{matrix} 1 - \alpha \\ - \\ k \end{matrix} \right]$: 4.5407
Kappa: 5.0767
UL: 1.014 ppb
LL: $-\infty$

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:5W10A

<u>Sample Date</u>	<u>Observation</u>
10/26/98	ND<0.200 ppb

Well:5W11A

<u>Sample Date</u>	<u>Observation</u>
10/26/98	1.600 ppb *

Well:5W5B

<u>Sample Date</u>	<u>Observation</u>
10/26/98	ND<0.200 ppb

Well:5W7B

<u>Sample Date</u>	<u>Observation</u>
10/26/98	3.500 ppb *

Well:5W9A

<u>Sample Date</u>	<u>Observation</u>
10/26/98	ND<0.200 ppb

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Facility:Haz. Waste Unit 5 - RAAP
Parameter:Beryllium, total(CAS Number:7440-41-7)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 4
Shapiro-Wilk (W): 0.8948
Critical W, $\alpha=0.01$: 0.6870
Mean: 0.375 ppb
Std Dev: 0.126 ppb
DF: 3
Conf. Level (1- α): ~~0.9500~~ 0.9900
Future Samples (k): 1
 $t \left[\begin{array}{c} 1 - \alpha \\ - \\ k \end{array} \right]$: 4.5407
Kappa: 5.0767
UL: 1.014 ppb
LL: $-\infty$

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:5WC21

<u>Sample Date</u>	<u>Observation</u>
10/26/98	7.100 ppb *

Well:5WC22

<u>Sample Date</u>	<u>Observation</u>
10/26/98	0.200 ppb

Well:5WC23

<u>Sample Date</u>	<u>Observation</u>
10/26/98	ND<0.200 ppb

Well:S5W5

<u>Sample Date</u>	<u>Observation</u>
10/26/98	ND<0.200 ppb

Well:S5W7

<u>Sample Date</u>	<u>Observation</u>
10/26/98	ND<0.200 ppb

Parametric Prediction Interval
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Facility:Haz. Waste Unit 5 - RAAP
Parameter:pH, Field(CAS Number:- -)

TWO-TAILED PARAMETRIC PREDICTION INTERVAL

Observations (n): 4
Shapiro-Wilk (W): 0.9260
Critical W, $\alpha=0.01$: 0.6870
Mean: 4.725 SU
Std Dev: 0.206 SU
DF: 3
Conf. Level (1- α): ~~0.9500~~ 0.9900
Future Samples (k): 1
 $t \left[\frac{1 - \alpha}{2 \cdot k} \right]$: 5.8409
Kappa: 6.5303
UL: 6.071 SU
LL: 3.379 SU

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:5W10A

<u>Sample Date</u>	<u>Observation</u>
10/26/98	7.400 SU *

Well:5W11A

<u>Sample Date</u>	<u>Observation</u>
10/26/98	6.700 SU *

Well:5W5B

<u>Sample Date</u>	<u>Observation</u>
10/26/98	5.800 SU

Well:5W7B

<u>Sample Date</u>	<u>Observation</u>
10/26/98	3.300 SU *

Well:5W9A

<u>Sample Date</u>	<u>Observation</u>
10/26/98	6.800 SU *

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Facility:Haz. Waste Unit 5 - RAAP
Parameter:pH, Field(CAS Number:- -)

TWO-TAILED PARAMETRIC PREDICTION INTERVAL

Observations (n): 4
Shapiro-Wilk (W): 0.9260
Critical W, $\alpha=0.01$: 0.6870
Mean: 4.725 SU
Std Dev: 0.206 SU
DF: 3
Conf. Level (1- α): ~~0.9500~~ 0.9900
Future Samples (k): 1
 $t \left[\frac{1 - \alpha}{2 \cdot k} \right]$: 5.8409
Kappa: 6.5303
UL: 6.071 SU
LL: 3.379 SU

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:5WC21

<u>Sample Date</u>	<u>Observation</u>
10/26/98	3.300 SU *

Well:5WC22

<u>Sample Date</u>	<u>Observation</u>
10/26/98	6.600 SU *

Well:5WC23

<u>Sample Date</u>	<u>Observation</u>
10/26/98	6.700 SU *

Well:S5W5

<u>Sample Date</u>	<u>Observation</u>
10/26/98	6.200 SU *

Well:S5W7

<u>Sample Date</u>	<u>Observation</u>
10/26/98	7.000 SU *

Cohen's Adjustment of Background Data for HWMU5 (1998 Annual Report)

Cohen's adjustment is performed for all parameters with 25%-49 % non-detect data.
Zinc was the only parameter that fit into this category, with 25 % non-detect data.

Cohen's adjustment for Zinc data:

Percentage of non-detects = 25

Zinc data excluding non-detects fits normal distribution. Hence Cohen's adjustment of mean and standard deviation is appropriate.

Mean of background data excluding non-detects (xd) = 12 ug/l
Variance excluding non-detects (Sd2) = 52

$$h=(n-m)/(n)$$

"n" is the Total number of background observations = 4
"m" is the Number of background observations excluding non-detects = 3

$$h= 0.25$$

$$g=(Sd2/(xd-DL)^2)$$

DL is the Detection Limit = 5.00

$$g = 1.06$$

$\lambda(h,g)$ values from table 10.1, Statistical Methods for Groundwater Monitoring, Gibbons, R.D, 1994

$\lambda(0.25,1.06)$ obtained by double linear interpolation based on values for $\lambda(0.2,1.0)$, $\lambda(0.2,2.0)$, $\lambda(0.3,1.0)$, and $\lambda(0.3,2.0) =$

0.4547

$$\begin{aligned} \text{Corrected sample mean (X)} &= xd - (\lambda(h,g) * (xd-DL)) \\ X &= 8.8171 \end{aligned}$$

Corrected sample standard deviation (S) = $(Sd2 + \lambda(h,g)(xd-DL)2)0.5$
 $S = 8.6186$

Upper Prediction Limit (UPL) for one-sided prediction interval for Zinc

$UPL = X + t(n-1,(1-\alpha^*/k)) * S * (1+ (1/n))0.5$

$t(n-1,(1-\alpha^*)/k)$ selected from Table 1.2, Gibbons, R.D., 1994, where

Table 1.2: Critical values of the t-distribution for one-sided prediction intervals. The table gives the critical values of the t-distribution for one-sided prediction intervals. The table is organized by degrees of freedom (n-1) in the rows and by the probability 1-α* in the columns. The critical values are given for α* = 0.05, 0.10, 0.25, 0.50, 1.00, 2.00, 5.00, 10.00, 20.00, 50.00, and 100.00. The critical values are given for n-1 = 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 40, 50, 60, 70, 80, 90, 100, 120, 150, 200, 250, 300, 400, 500, 600, 700, 800, 900, 1000, and ∞.

t* value selected for n=4, k=10 from the table, which is =

5.84

One-side UPL for Zinc = 65.091

Double Interpolation of Lamda

Actual Values

==

॥ ५

Difference

0.05

0.06

 $\lambda(0.2, 1.0)$
$$\lambda(0.2, 2.0)$$
$$= \lambda(0.3, 1.0)$$
 $\lambda(0.3, 2.0)$

0.3447

0.4093

0.5548

0.6547

0.0646

0.0999

0.003876

0.005994

 $\lambda \ 0.2, 1.06)$

0.348576

 $\lambda \ 0.3, 1.06)$

0.560794

$$\lambda(0.25, 1.06)$$

0.4547

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Facility:Haz. Waste Unit 5 - RAAP
Parameter:Barium, total (CAS Number:7440-39-3)

ONE-TAILED UPPER ^{NON-}PARAMETRIC PREDICTION INTERVAL

Observations (n): 4
Conf. Level (1- α): 80.000% 66.000% $\pm$ 10.000%

UL: 126.000 ppb
LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:5W10A

<u>Sample Date</u>	<u>Observation</u>
10/26/98	48.000 ppb

Well:5W11A

<u>Sample Date</u>	<u>Observation</u>
10/26/98	182.000 ppb *

Well:5W5B

<u>Sample Date</u>	<u>Observation</u>
10/26/98	72.000 ppb

Well:5W7B

<u>Sample Date</u>	<u>Observation</u>
10/26/98	33.000 ppb

Well:5W9A

<u>Sample Date</u>	<u>Observation</u>
10/26/98	43.000 ppb

Well:5WC21

<u>Sample Date</u>	<u>Observation</u>
10/26/98	17.000 ppb

Well:5WC22

<u>Sample Date</u>	<u>Observation</u>
10/26/98	25.000 ppb

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Facility: Haz. Waste Unit 5 - RAAP
Parameter: Barium, total (CAS Number: 7440-39-3)

ONE-TAILED UPPER ^{NON-}PARAMETRIC PREDICTION INTERVAL

Observations (n): 4
Conf. Level (1- α): ~~80.000%~~ 66.000% $\pm$ 10.000%

UL: 126.000 ppb
LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well: 5WC23

<u>Sample Date</u>	<u>Observation</u>
10/26/98	23.000 ppb

Well: S5W5

<u>Sample Date</u>	<u>Observation</u>
10/26/98	50.000 ppb

Well: S5W7

<u>Sample Date</u>	<u>Observation</u>
10/26/98	86.000 ppb

Nonparametric Prediction Interval
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Facility:Haz. Waste Unit 5 - RAAP
Parameter:Cadmium, total (CAS Number:7440-43-9)

ONE-TAILED UPPER ^{NON-}PARAMETRIC PREDICTION INTERVAL

Observations (n): 4
Conf. Level (1- α): ~~80.000%~~ 66.000% $\pm$ 10.000%

UL: 0.100 ppb
LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:5W10A

<u>Sample Date</u>	<u>Observation</u>
10/26/98	ND<0.100 ppb

Well:5W11A

<u>Sample Date</u>	<u>Observation</u>
10/26/98	0.500 ppb *

Well:5W5B

<u>Sample Date</u>	<u>Observation</u>
10/26/98	ND<0.100 ppb

Well:5W7B

<u>Sample Date</u>	<u>Observation</u>
10/26/98	1.600 ppb *

Well:5W9A

<u>Sample Date</u>	<u>Observation</u>
10/26/98	0.100 ppb

Well:5WC21

<u>Sample Date</u>	<u>Observation</u>
10/26/98	1.600 ppb *

Well:5WC22

<u>Sample Date</u>	<u>Observation</u>
10/26/98	0.500 ppb *

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Facility:Haz. Waste Unit 5 - RAAP
Parameter:Cadmium, total(CAS Number:7440-43-9)

ONE-TAILED UPPER ^{NOT}PARAMETRIC PREDICTION INTERVAL

Observations (n): 4
Conf. Level (1- α): ~~80.000%~~ 66.000% $\pm$ 10.000%

UL: 0.100 ppb
LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:5WC23

<u>Sample Date</u>	<u>Observation</u>
10/26/98	0.400 ppb *

Well:S5W5

<u>Sample Date</u>	<u>Observation</u>
10/26/98	ND<0.100 ppb

Well:S5W7

<u>Sample Date</u>	<u>Observation</u>
10/26/98	0.300 ppb *

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Facility: Haz. Waste Unit 5 - RAAP
Parameter: Chloroform (CAS Number: 67-66-3)

ONE-TAILED UPPER ^{Non-}PARAMETRIC PREDICTION INTERVAL

Observations (n): 4
Conf. Level (1- α): ~~80.000%~~ 66.000% $\pm$ 10.000%

UL: 0.500 ppb
LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well: 5W10A

<u>Sample Date</u>	<u>Observation</u>
10/26/98	ND<0.300 ppb

Well: 5W11A

<u>Sample Date</u>	<u>Observation</u>
10/26/98	ND<0.300 ppb

Well: 5W5B

<u>Sample Date</u>	<u>Observation</u>
10/26/98	1.500 ppb *

Well: 5W7B

<u>Sample Date</u>	<u>Observation</u>
10/26/98	0.900 ppb *

Well: 5W9A

<u>Sample Date</u>	<u>Observation</u>
10/26/98	0.600 ppb *

Well: 5WC21

<u>Sample Date</u>	<u>Observation</u>
10/26/98	1.300 ppb *

Well: 5WC22

<u>Sample Date</u>	<u>Observation</u>
10/26/98	0.800 ppb *

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Facility:Haz. Waste Unit 5 - RAAP
Parameter:Chloroform(CAS Number:67-66-3)

ONE-TAILED UPPER ^{ND<}PARAMETRIC PREDICTION INTERVAL

Observations (n): 4
Conf. Level (1- α): ~~80.000%~~ 66.000% $\pm$ 10.000%

UL: 0.500 ppb
LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:5WC23

<u>Sample Date</u>	<u>Observation</u>
10/26/98	0.800 ppb *

Well:S5W5

<u>Sample Date</u>	<u>Observation</u>
10/26/98	1.000 ppb *

Well:S5W7

<u>Sample Date</u>	<u>Observation</u>
10/26/98	ND<0.300 ppb

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Facility:Haz. Waste Unit 5 - RAAP
Parameter:Cobalt, total(CAS Number:7440-48-4)

ONE-TAILED UPPER ^{NON-}PARAMETRIC PREDICTION INTERVAL

Observations (n): 4
Conf. Level (1- α): ~~80.000%~~ 66.000% $\pm$ 10.000%

UL: 2.000 ppb
LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:5W10A

<u>Sample Date</u>	<u>Observation</u>
10/26/98	ND<1.000 ppb

Well:5W11A

<u>Sample Date</u>	<u>Observation</u>
10/26/98	18.000 ppb *

Well:5W5B

<u>Sample Date</u>	<u>Observation</u>
10/26/98	1.000 ppb

Well:5W7B

<u>Sample Date</u>	<u>Observation</u>
10/26/98	145.000 ppb *

Well:5W9A

<u>Sample Date</u>	<u>Observation</u>
10/26/98	ND<1.000 ppb

Well:5WC21

<u>Sample Date</u>	<u>Observation</u>
10/26/98	150.000 ppb *

Well:5WC22

<u>Sample Date</u>	<u>Observation</u>
10/26/98	9.000 ppb *

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Facility: Haz. Waste Unit 5 - RAAP
Parameter: Cobalt, total (CAS Number: 7440-48-4)

ONE-TAILED UPPER ^{NON-}PARAMETRIC PREDICTION INTERVAL

Observations (n): 4
Conf. Level (1- α): ~~80.000%~~ 66.000% $\pm$ 10.000%

UL: 2.000 ppb
LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well: 5WC23

<u>Sample Date</u>	<u>Observation</u>
10/26/98	6.000 ppb *

Well: S5W5

<u>Sample Date</u>	<u>Observation</u>
10/26/98	1.000 ppb

Well: S5W7

<u>Sample Date</u>	<u>Observation</u>
10/26/98	2.000 ppb

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Facility: Haz. Waste Unit 5 - RAAP
Parameter: Copper, total (CAS Number: 7440-50-8)

ONE-TAILED UPPER ^{NON-}PARAMETRIC PREDICTION INTERVAL

Observations (n): 4
Conf. Level (1- α): ~~80.000%~~ 66.000% $\pm$ 10.000%

UL: 2.000 ppb
LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well: 5W10A

<u>Sample Date</u>	<u>Observation</u>
10/26/98	2.000 ppb

Well: 5W11A

<u>Sample Date</u>	<u>Observation</u>
10/26/98	30.000 ppb *

Well: 5W5B

<u>Sample Date</u>	<u>Observation</u>
10/26/98	2.000 ppb

Well: 5W7B

<u>Sample Date</u>	<u>Observation</u>
10/26/98	52.000 ppb *

Well: 5W9A

<u>Sample Date</u>	<u>Observation</u>
10/26/98	5.000 ppb *

Well: 5WC21

<u>Sample Date</u>	<u>Observation</u>
10/26/98	24.000 ppb *

Well: 5WC22

<u>Sample Date</u>	<u>Observation</u>
10/26/98	9.000 ppb *

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Facility: Haz. Waste Unit 5 - RAAP
Parameter: Copper, total (CAS Number: 7440-50-8)

ONE-TAILED UPPER ^{NON-}PARAMETRIC PREDICTION INTERVAL

Observations (n): 4
Conf. Level (1- α): ~~80.000%~~ 66.000% ~~± 10.000%~~

UL: 2.000 ppb
LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well: 5WC23

<u>Sample Date</u>	<u>Observation</u>
10/26/98	5.000 ppb *

Well: S5W5

<u>Sample Date</u>	<u>Observation</u>
10/26/98	2.000 ppb

Well: S5W7

<u>Sample Date</u>	<u>Observation</u>
10/26/98	12.000 ppb *

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Facility:Haz. Waste Unit 5 - RAAP
Parameter:Total Organic Carbon(CAS Number:- -)

NON-

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 4
Conf. Level (1- α): ~~80.000%~~ 66.000% $\pm$ 10.000%

UL: 1125.000 ppb
LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:5W10A

<u>Sample Date</u>	<u>Observation</u>
10/26/98	ND<1000.000 ppb

Well:5W11A

<u>Sample Date</u>	<u>Observation</u>
10/26/98	1150.000 ppb *

Well:5W5B

<u>Sample Date</u>	<u>Observation</u>
10/26/98	1025.000 ppb

Well:5W7B

<u>Sample Date</u>	<u>Observation</u>
10/26/98	1025.000 ppb

Well:5W9A

<u>Sample Date</u>	<u>Observation</u>
10/26/98	ND<1000.000 ppb

Well:5WC21

<u>Sample Date</u>	<u>Observation</u>
10/26/98	ND<1000.000 ppb

Well:5WC22

<u>Sample Date</u>	<u>Observation</u>
10/26/98	ND<1000.000 ppb

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Facility: Haz. Waste Unit 5 - RAAP
Parameter: Total Organic Carbon (CAS Number: - -)

ONE-TAILED UPPER ^{NON-}PARAMETRIC PREDICTION INTERVAL

Observations (n): 4
Conf. Level (1- α): ~~80.000%~~ 66.000% $\pm$ 10.000%

UL: 1125.000 ppb

LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well: 5WC23

<u>Sample Date</u>	<u>Observation</u>
10/26/98	ND<1000.000 ppb

Well: S5W5

<u>Sample Date</u>	<u>Observation</u>
10/26/98	ND<1000.000 ppb

Well: S5W7

<u>Sample Date</u>	<u>Observation</u>
10/26/98	ND<1000.000 ppb

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Facility:Haz. Waste Unit 5 - RAAP
Parameter:Total Organic Halogens, Halides(CAS Number:- -)

ONE-TAILED UPPER ^{NON-}PARAMETRIC PREDICTION INTERVAL

Observations (n): 4
Conf. Level (1- α): ~~80.000%~~ 66.000% $\pm$ 10.000%

UL: 13.400 ppb
LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:5W10A

<u>Sample Date</u>	<u>Observation</u>
10/26/98	ND<5.000 ppb

Well:5W11A

<u>Sample Date</u>	<u>Observation</u>
10/26/98	5.500 ppb

Well:5W5B

<u>Sample Date</u>	<u>Observation</u>
10/26/98	8.500 ppb

Well:5W7B

<u>Sample Date</u>	<u>Observation</u>
10/26/98	13.000 ppb

Well:5W9A

<u>Sample Date</u>	<u>Observation</u>
10/26/98	ND<5.000 ppb

Well:5WC21

<u>Sample Date</u>	<u>Observation</u>
10/26/98	14.500 ppb *

Well:5WC22

<u>Sample Date</u>	<u>Observation</u>
10/26/98	ND<5.000 ppb

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Facility:Haz. Waste Unit 5 - RAAP
Parameter:Total Organic Halogens, Halides(CAS Number:- -)

ONE-TAILED UPPER ^{ND<5-}PARAMETRIC PREDICTION INTERVAL

Observations (n): 4
Conf. Level (1- α): ~~80.000%~~ 66.000% $\pm$ 10.000%

UL: 13.400 ppb
LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:5WC23

<u>Sample Date</u>	<u>Observation</u>
10/26/98	ND<5.000 ppb

Well:S5W5

<u>Sample Date</u>	<u>Observation</u>
10/26/98	6.000 ppb

Well:S5W7

<u>Sample Date</u>	<u>Observation</u>
10/26/98	ND<5.000 ppb

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Facility:Haz. Waste Unit 5 - RAAP
Parameter:Specific Conductivity, Field(CAS Number:- -)

ONE-TAILED UPPER ~~NON~~PARAMETRIC PREDICTION INTERVAL

Observations (n): 4
Conf. Level (1- α): ~~80.000%~~ 66.000% $\pm$ 10.000%

UL: 450.000 umhos/cm
LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:5W10A

<u>Sample Date</u>	<u>Observation</u>
10/26/98	1155.000 umhos/cm *

Well:5W11A

<u>Sample Date</u>	<u>Observation</u>
10/26/98	720.000 umhos/cm *

Well:5W5B

<u>Sample Date</u>	<u>Observation</u>
10/26/98	393.000 umhos/cm

Well:5W7B

<u>Sample Date</u>	<u>Observation</u>
10/26/98	1348.000 umhos/cm *

Well:5W9A

<u>Sample Date</u>	<u>Observation</u>
10/26/98	878.000 umhos/cm *

Well:5WC21

<u>Sample Date</u>	<u>Observation</u>
10/26/98	1430.000 umhos/cm *

Well:5WC22

<u>Sample Date</u>	<u>Observation</u>
10/26/98	1165.000 umhos/cm *

Nonparametric Prediction Interval
Report Printed February 18,1999

Page 2

Facility:Haz. Waste Unit 5 - RAAP
Parameter:Specific Conductivity, Field(CAS Number:- -)

ONE-TAILED UPPER ^{NON-}PARAMETRIC PREDICTION INTERVAL

Observations (n): 4
Conf. Level (1- α): ~~80.000%~~ 66.000% $\pm$ 10.000%

UL: 450.000 umhos/cm
LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:5WC23

<u>Sample Date</u>	<u>Observation</u>
10/26/98	1198.000 umhos/cm *

Well:S5W5

<u>Sample Date</u>	<u>Observation</u>
10/26/98	780.000 umhos/cm *

Well:S5W7

<u>Sample Date</u>	<u>Observation</u>
10/26/98	458.000 umhos/cm *

APPENDIX G
HWMU-13 STATISTICAL ANALYSIS RESULTS

Data Set Summary

Report Printed: 02-17-1999 15:40

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:2,4-DNT 2,4-Dinitrotoluene

CAS Number: 121-14-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.080 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	0.040 ppb	-3.219 (* Nondetect *)
May 14 1998	0.040 ppb	-3.219 (* Nondetect *)
Aug 14 1998	0.040 ppb	-3.219 (* Nondetect *)
Nov 23 1998	0.040 ppb	-3.219 (* Nondetect *)

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.040 ppb	Ln Minimum:	-3.219
Maximum:	0.040 ppb	Ln Maximum:	-3.219
Mean:	0.040 ppb	Ln Mean:	-3.219
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	0.040 ppb	-3.219 (* Nondetect *)
May 14 1998	0.040 ppb	-3.219 (* Nondetect *)

Aug 14 1998	0.040 ppb	-3.219 (* Nondetect *)
Nov 23 1998	0.040 ppb	-3.219 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	0.040 ppb	Ln Minimum:	-3.219
Maximum:	0.040 ppb	Ln Maximum:	-3.219
Mean:	0.040 ppb	Ln Mean:	-3.219
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-17-1999 15:40

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:2,6-DNT 2,6-Dinitrotoluene

CAS Number: 606-20-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.080 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	0.040 ppb	-3.219 (* Nondetect *)
May 14 1998	0.040 ppb	-3.219 (* Nondetect *)
Aug 14 1998	0.040 ppb	-3.219 (* Nondetect *)
Nov 23 1998	0.040 ppb	-3.219 (* Nondetect *)

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.040 ppb	Ln Minimum:	-3.219
Maximum:	0.040 ppb	Ln Maximum:	-3.219
Mean:	0.040 ppb	Ln Mean:	-3.219
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	0.040 ppb	-3.219 (* Nondetect *)
May 14 1998	0.040 ppb	-3.219 (* Nondetect *)

Aug 14 1998	0.040 ppb	-3.219 (* Nondetect *)
Nov 23 1998	0.040 ppb	-3.219 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	0.040 ppb	Ln Minimum:	-3.219
Maximum:	0.040 ppb	Ln Maximum:	-3.219
Mean:	0.040 ppb	Ln Mean:	-3.219
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-17-1999 15:40

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Al Aluminum, total

CAS Number: 7429-90-5

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 60.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	2790.000 ppb	7.934
May 14 1998	621.000 ppb	6.431
Aug 14 1998	1380.000 ppb	7.230
Nov 23 1998	6090.000 ppb	8.714

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	621.000 ppb	Ln Minimum:	6.431
Maximum:	6090.000 ppb	Ln Maximum:	8.714
Mean:	2720.250 ppb	Ln Mean:	7.577
Std. Dev.:	2419.587 ppb	Ln Std. Dev.:	0.975

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	2760.000 ppb	7.923
May 14 1998	334.000 ppb	5.811

Aug 14 1998	449.000 ppb	6.107
Nov 23 1998	904.000 ppb	6.807

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND): 0

Minimum:	334.000 ppb	Ln Minimum:	5.811
Maximum:	2760.000 ppb	Ln Maximum:	7.923
Mean:	1111.750 ppb	Ln Mean:	6.662
Std. Dev.:	1126.058 ppb	Ln Std. Dev.:	0.939

Normality Tests

Report Printed: 02-17-1999 15:41

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Al Aluminum, total

CAS Number: 7429-90-5

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 60.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Normality Test on Observations for wells listed below:

Well:13MW1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	621.000	6090.000	2720.250	2419.587
Log:	6.431	8.714	7.577	0.975

Well:13MW2 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	334.000	2760.000	1111.750	1126.058
Log:	5.811	7.923	6.662	0.939

Pooled Statistics

Observations: 8

Statistic	Original Scale	Log Scale
Mean:	1916.000	7.120
Std Dev:	1947.224	1.012
Skewness:	1.314*	0.218
Kurtosis:	0.628	-1.205
Minimum:	334.000	5.811
Maximum:	6090.000	8.714

CV: 1.016 0.142

Shapiro-Wilk Statistics

	Test	5% Critical	1% Critical
Scale	Statistic	Value	Value
Original:	0.8055*	0.8180	0.7490
Log:	0.9561	0.8180	0.7490

* Indicates statistically significant evidence of non-normality.
GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-17-1999 15:41

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:As Arsenic, total

CAS Number: 7440-38-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	0.500 ppb	-0.693 (* Nondetect *)
May 14 1998	0.500 ppb	-0.693 (* Nondetect *)
Aug 14 1998	0.500 ppb	-0.693 (* Nondetect *)
Nov 23 1998	3.000 ppb	1.099

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 75

Minimum:	0.500 ppb	Ln Minimum:	-0.693
Maximum:	3.000 ppb	Ln Maximum:	1.099
Mean:	1.125 ppb	Ln Mean:	-0.245
Std. Dev.:	1.250 ppb	Ln Std. Dev.:	0.896

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	0.500 ppb	-0.693 (* Nondetect *)
May 14 1998	0.500 ppb	-0.693 (* Nondetect *)

Aug 14 1998	0.500 ppb	-0.693 (* Nondetect *)
Nov 23 1998	0.500 ppb	-0.693 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	0.500 ppb	Ln Minimum:	-0.693
Maximum:	0.500 ppb	Ln Maximum:	-0.693
Mean:	0.500 ppb	Ln Mean:	-0.693
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-17-1999 15:42

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:B Boron

CAS Number: 7440-42-8

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 50.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	108.000 ppb	4.682
May 14 1998	84.000 ppb	4.431
Aug 14 1998	144.000 ppb	4.970
Nov 23 1998	86.000 ppb	4.454

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	84.000 ppb	Ln Minimum:	4.431
Maximum:	144.000 ppb	Ln Maximum:	4.970
Mean:	105.500 ppb	Ln Mean:	4.634
Std. Dev.:	27.875 ppb	Ln Std. Dev.:	0.251

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	25.000 ppb	3.219 (* Nondetect *)
May 14 1998	25.000 ppb	3.219 (* Nondetect *)

Aug 14 1998	25.000 ppb	3.219 (* Nondetect *)
Nov 23 1998	25.000 ppb	3.219 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	25.000 ppb	Ln Minimum:	3.219
Maximum:	25.000 ppb	Ln Maximum:	3.219
Mean:	25.000 ppb	Ln Mean:	3.219
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Normality Tests

Report Printed: 02-17-1999 15:44

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:B Boron

CAS Number: 7440-42-8

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 50.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Normality Test on Observations for wells listed below:

Well:13MW1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	84.000	144.000	105.500	27.875
Log:	4.431	4.970	4.634	0.251

Well:13MW2 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	25.000	25.000	25.000	0.000
Log:	3.219	3.219	3.219	0.000

Pooled Statistics

Observations: 8

Statistic	Original Scale	Log Scale
Mean:	65.250	3.927
Std Dev:	46.739	0.774
Skewness:	0.480	0.140
Kurtosis:	-1.200	-1.793
Minimum:	25.000	3.219
Maximum:	144.000	4.970

CV: 0.716 0.197

Shapiro-Wilk Statistics

	Test	5% Critical	1% Critical
	Scale Statistic	Value	Value
Original:	0.8236	0.8180	0.7490
Log:	0.7774*	0.8180	0.7490

* Indicates statistically significant evidence of non-normality.

GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-17-1999 15:45

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Ba Barium, total

CAS Number: 7440-39-3

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 2.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	117.000 ppb	4.762
May 14 1998	98.000 ppb	4.585
Aug 14 1998	107.000 ppb	4.673
Nov 23 1998	255.000 ppb	5.541

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	98.000 ppb	Ln Minimum:	4.585
Maximum:	255.000 ppb	Ln Maximum:	5.541
Mean:	144.250 ppb	Ln Mean:	4.890
Std. Dev.:	74.240 ppb	Ln Std. Dev.:	0.440

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	220.000 ppb	5.394
May 14 1998	159.000 ppb	5.069

Aug 14 1998	151.000 ppb	5.017
Nov 23 1998	172.000 ppb	5.147

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND): 0

Minimum:	151.000 ppb	Ln Minimum:	5.017
Maximum:	220.000 ppb	Ln Maximum:	5.394
Mean:	175.500 ppb	Ln Mean:	5.157
Std. Dev.:	30.903 ppb	Ln Std. Dev.:	0.167

Normality Tests

Report Printed: 02-17-1999 15:45

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Ba Barium, total

CAS Number: 7440-39-3

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 2.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Normality Test on Observations for wells listed below:

Well:13MW1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	98.000	255.000	144.250	74.240
Log:	4.585	5.541	4.890	0.440

Well:13MW2 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	151.000	220.000	175.500	30.903
Log:	5.017	5.394	5.157	0.167

Pooled Statistics

Observations: 8

Statistic	Original Scale	Log Scale
Mean:	159.875	5.024
Std Dev:	55.231	0.339
Skewness:	0.558	0.180
Kurtosis:	-0.880	-1.183
Minimum:	98.000	4.585
Maximum:	255.000	5.541

CV: 0.345 0.068

Shapiro-Wilk Statistics

	Test	5% Critical	1% Critical
	Scale Statistic	Value	Value
Original:	0.9285	0.8180	0.7490
Log:	0.9538	0.8180	0.7490

* Indicates statistically significant evidence of non-normality.
GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-17-1999 15:45

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Ca Calcium, total

CAS Number: 7440-70-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 400.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	92200.000 ppb	11.432
May 14 1998	76200.000 ppb	11.241
Aug 14 1998	88100.000 ppb	11.386
Nov 23 1998	127000.000 ppb	11.752

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	76200.000 ppb	Ln Minimum:	11.241
Maximum:	127000.000 ppb	Ln Maximum:	11.752
Mean:	95875.000 ppb	Ln Mean:	11.453
Std. Dev.:	21831.381 ppb	Ln Std. Dev.:	0.215

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	81800.000 ppb	11.312
May 14 1998	71500.000 ppb	11.177

Aug 14 1998	79700.000 ppb	11.286
Nov 23 1998	77100.000 ppb	11.253

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND): 0

Minimum:	71500.000 ppb	Ln Minimum:	11.177
Maximum:	81800.000 ppb	Ln Maximum:	11.312
Mean:	77525.000 ppb	Ln Mean:	11.257
Std. Dev.:	4452.995 ppb	Ln Std. Dev.:	0.058

Normality Tests

Report Printed: 02-17-1999 15:46

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:
Phone:() -

Permit Type:Background

Constituent:Ca Calcium, total

CAS Number: 7440-70-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 400.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Normality Test on Observations for wells listed below:

Well:13MW1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	76200.000	127000.000	95875.000	21831.381
Log:	11.241	11.752	11.453	0.215

Well:13MW2 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	71500.000	81800.000	77525.000	4452.995
Log:	11.177	11.312	11.257	0.058

Pooled Statistics

Observations: 8

Statistic	Original Scale	Log Scale
Mean:	86700.000	11.355
Std Dev:	17577.420	0.180
Skewness:	1.676*	1.436*
Kurtosis:	1.644	1.102
Minimum:	71500.000	11.177
Maximum:	127000.000	11.752

CV: 0.203 0.016

Shapiro-Wilk Statistics

	Test	5% Critical	1% Critical
Scale	Statistic	Value	Value
Original:	0.7654*	0.8180	0.7490
Log:	0.8286	0.8180	0.7490

* Indicates statistically significant evidence of non-normality.

GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-17-1999 15:46

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Chloride Chloride

CAS Number:16887-00-6

MCL: 0.000 ppm

ACL: 0.000 ppm

Detect Limit: 1000.000 ppm

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	13200.000 ppm	9.488
May 14 1998	22500.000 ppm	10.021
Aug 14 1998	24800.000 ppm	10.119
Nov 23 1998	20900.000 ppm	9.948

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	13200.000 ppm	Ln Minimum:	9.488
Maximum:	24800.000 ppm	Ln Maximum:	10.119
Mean:	20350.000 ppm	Ln Mean:	9.894
Std. Dev.:	5028.253 ppm	Ln Std. Dev.:	0.280

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	2400.000 ppm	7.783
May 14 1998	2800.000 ppm	7.937

Aug 14 1998	2000.000 ppm	7.601
Nov 23 1998	2000.000 ppm	7.601

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND): 0

Minimum:	2000.000 ppm	Ln Minimum:	7.601
Maximum:	2800.000 ppm	Ln Maximum:	7.937
Mean:	2300.000 ppm	Ln Mean:	7.731
Std. Dev.:	382.971 ppm	Ln Std. Dev.:	0.162

Normality Tests

Report Printed: 02-17-1999 15:46

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford

ST:VA Zip:

County:PULASKI

Contact:

Phone:() -

Permit Type:Background

Constituent:Chloride Chloride

CAS Number:16887-00-6

MCL: 0.000 ppm

ACL: 0.000 ppm

Detect Limit: 1000.000 ppm

Start Date:Mar 09 1998

End Date:Nov 23 1998

Normality Test on Observations for wells listed below:

Well:13MW1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	13200.000	24800.000	20350.000	5028.253
Log:	9.488	10.119	9.894	0.280

Well:13MW2 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	2000.000	2800.000	2300.000	382.971
Log:	7.601	7.937	7.731	0.162

Pooled Statistics

Observations: 8

Statistic	Original Scale	Log Scale
Mean:	11325.000	8.812
Std Dev:	10197.304	1.176
Skewness:	0.256	0.043
Kurtosis:	-1.736	-1.894
Minimum:	2000.000	7.601
Maximum:	24800.000	10.119

CV: 0.900 0.133

Shapiro-Wilk Statistics

	Test	5% Critical	1% Critical
Scale	Statistic	Value	Value
Original:	0.7975*	0.8180	0.7490
Log:	0.7840*	0.8180	0.7490

* Indicates statistically significant evidence of non-normality.
GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-17-1999 15:47

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Cond F Specific Conductivity, Field

CAS Number: - -
MCL: 0.000 umhos/cm
ACL: 0.000 umhos/cm
Detect Limit: 1.000 umhos/cm

Start Date:Mar 09 1998
End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	660.000 umhos/cm	6.492
May 14 1998	590.000 umhos/cm	6.380
Aug 14 1998	613.000 umhos/cm	6.418
Nov 23 1998	660.000 umhos/cm	6.492

Well ID:13MW1 Summary Statistics

Observations (N): 4
Nondetects (%ND): 0

Minimum:	590.000 umhos/cm	Ln Minimum:	6.380
Maximum:	660.000 umhos/cm	Ln Maximum:	6.492
Mean:	630.750 umhos/cm	Ln Mean:	6.446
Std. Dev.:	35.056 umhos/cm	Ln Std. Dev.:	0.056

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	568.000 umhos/cm	6.342
May 14 1998	573.000 umhos/cm	6.351

Aug 14 1998	553.000 umhos/cm	6.315
Nov 23 1998	560.000 umhos/cm	6.328

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND): 0

Minimum:	553.000 umhos/cm	Ln Minimum:	6.315
Maximum:	573.000 umhos/cm	Ln Maximum:	6.351
Mean:	563.500 umhos/cm	Ln Mean:	6.334
Std. Dev.:	8.813 umhos/cm	Ln Std. Dev.:	0.016

Normality Tests

Report Printed: 02-17-1999 15:47

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Cond F Specific Conductivity, Field

CAS Number: - -

MCL: 0.000 umhos/cm

ACL: 0.000 umhos/cm

Detect Limit: 1.000 umhos/cm

Start Date:Mar 09 1998

End Date:Nov 23 1998

Normality Test on Observations for wells listed below:

Well:13MW1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	590.000	660.000	630.750	35.056
Log:	6.380	6.492	6.446	0.056

Well:13MW2 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	553.000	573.000	563.500	8.813
Log:	6.315	6.351	6.334	0.016

Pooled Statistics

Observations: 8

Statistic	Original Scale	Log Scale
Mean:	597.125	6.390
Std Dev:	43.036	0.071
Skewness:	0.623	0.579
Kurtosis:	-1.188	-1.222
Minimum:	553.000	6.315
Maximum:	660.000	6.492

CV: 0.072 0.011

Shapiro-Wilk Statistics

	Test	5% Critical	1% Critical
	Scale Statistic	Value	Value
Original:	0.8535	0.8180	0.7490
Log:	0.8633	0.8180	0.7490

* Indicates statistically significant evidence of non-normality.
GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-17-1999 15:47

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Cr Chromium, total

CAS Number: 7440-47-3

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	55.000 ppb	4.007
May 14 1998	6.000 ppb	1.792
Aug 14 1998	9.000 ppb	2.197
Nov 23 1998	112.000 ppb	4.718

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	6.000 ppb	Ln Minimum:	1.792
Maximum:	112.000 ppb	Ln Maximum:	4.718
Mean:	45.500 ppb	Ln Mean:	3.179
Std. Dev.:	49.682 ppb	Ln Std. Dev.:	1.408

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	12.000 ppb	2.485
May 14 1998	7.000 ppb	1.946

Aug 14 1998	17.000 ppb	2.833
Nov 23 1998	20.000 ppb	2.996

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND): 0

Minimum:	7.000 ppb	Ln Minimum:	1.946
Maximum:	20.000 ppb	Ln Maximum:	2.996
Mean:	14.000 ppb	Ln Mean:	2.565
Std. Dev.:	5.715 ppb	Ln Std. Dev.:	0.464

Normality Tests

Report Printed: 02-17-1999 15:47

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Cr Chromium, total

CAS Number: 7440-47-3

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Normality Test on Observations for wells listed below:

Well:13MW1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	6.000	112.000	45.500	49.682
Log:	1.792	4.718	3.179	1.408

Well:13MW2 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	7.000	20.000	14.000	5.715
Log:	1.946	2.996	2.565	0.464

Pooled Statistics

Observations: 8

Statistic	Original Scale	Log Scale
Mean:	29.750	2.872
Std Dev:	36.815	1.024
Skewness:	1.622*	0.759
Kurtosis:	1.184	-0.684
Minimum:	6.000	1.792
Maximum:	112.000	4.718

CV: 1.237 0.357

Shapiro-Wilk Statistics

	Test	5% Critical	1% Critical
	Scale Statistic	Value	Value
Original:	0.7007*	0.8180	0.7490
Log:	0.9078	0.8180	0.7490

* Indicates statistically significant evidence of non-normality.

GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-17-1999 15:48

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Cu Copper, total

CAS Number: 7440-50-8

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	4.000 ppb	1.386
May 14 1998	1.000 ppb	0.000
Aug 14 1998	1.000 ppb	0.000
Nov 23 1998	9.000 ppb	2.197

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	1.000 ppb	Ln Minimum:	0.000
Maximum:	9.000 ppb	Ln Maximum:	2.197
Mean:	3.750 ppb	Ln Mean:	0.896
Std. Dev.:	3.775 ppb	Ln Std. Dev.:	1.086

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	3.000 ppb	1.099
May 14 1998	1.000 ppb	0.000

Aug 14 1998	6.000 ppb	1.792
Nov 23 1998	1.000 ppb	0.000

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND): 0

Minimum:	1.000 ppb	Ln Minimum:	0.000
Maximum:	6.000 ppb	Ln Maximum:	1.792
Mean:	2.750 ppb	Ln Mean:	0.723
Std. Dev.:	2.363 ppb	Ln Std. Dev.:	0.881

Normality Tests

Report Printed: 02-17-1999 15:48

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Cu Copper, total

CAS Number: 7440-50-8

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Normality Test on Observations for wells listed below:

Well:13MW1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	1.000	9.000	3.750	3.775
Log:	0.000	2.197	0.896	1.086

Well:13MW2 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	1.000	6.000	2.750	2.363
Log:	0.000	1.792	0.723	0.881

Pooled Statistics

Observations: 8

Statistic	Original Scale	Log Scale
Mean:	3.250	0.809
Std Dev:	2.964	0.920
Skewness:	0.972	0.337
Kurtosis:	-0.349	-1.526
Minimum:	1.000	0.000
Maximum:	9.000	2.197

CV: 0.912 1.137

Shapiro-Wilk Statistics

	Test	5% Critical	1% Critical
Scale	Statistic	Value	Value
Original:	0.8102*	0.8180	0.7490
Log:	0.8164*	0.8180	0.7490

* Indicates statistically significant evidence of non-normality.
GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-17-1999 15:50

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:
Phone:() -

Permit Type:Background

Constituent:Fe Iron, total

CAS Number: 7439-89-6

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 30.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	3440.000 ppb	8.143
May 14 1998	973.000 ppb	6.880
Aug 14 1998	751.000 ppb	6.621
Nov 23 1998	11800.000 ppb	9.376

Well ID:13MW1 Summary Statistics

Observations (N): 4
Nondetects (%ND): 0

Minimum:	751.000 ppb	Ln Minimum:	6.621
Maximum:	11800.000 ppb	Ln Maximum:	9.376
Mean:	4241.000 ppb	Ln Mean:	7.755
Std. Dev.:	5184.593 ppb	Ln Std. Dev.:	1.269

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	2750.000 ppb	7.919
May 14 1998	557.000 ppb	6.323

Aug 14 1998	558.000 ppb	6.324
Nov 23 1998	936.000 ppb	6.842

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND): 0

Minimum:	557.000 ppb	Ln Minimum:	6.323
Maximum:	2750.000 ppb	Ln Maximum:	7.919
Mean:	1200.250 ppb	Ln Mean:	6.852
Std. Dev.:	1048.461 ppb	Ln Std. Dev.:	0.752

Normality Tests

Report Printed: 02-17-1999 15:50

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Fe Iron, total

CAS Number: 7439-89-6

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 30.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Normality Test on Observations for wells listed below:

Well:13MW1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	751.000	11800.000	4241.000	5184.593
Log:	6.621	9.376	7.755	1.269

Well:13MW2 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	557.000	2750.000	1200.250	1048.461
Log:	6.323	7.919	6.852	0.752

Pooled Statistics

Observations: 8

Statistic	Original Scale	Log Scale
Mean:	2720.625	7.304
Std Dev:	3825.294	1.080
Skewness:	1.937*	0.892
Kurtosis:	2.241	-0.449
Minimum:	557.000	6.323
Maximum:	11800.000	9.376

CV: 1.406 0.148

Shapiro-Wilk Statistics

	Test Scale Statistic	5% Critical Value	1% Critical Value
Original:	0.6353*	0.8180	0.7490
Log:	0.8620	0.8180	0.7490

* Indicates statistically significant evidence of non-normality.
GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-17-1999 15:50

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Flrd Fluoride

CAS Number:16984-48-8

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 100.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	260.000 ppb	5.561
May 14 1998	220.000 ppb	5.394
Aug 14 1998	230.000 ppb	5.438
Nov 23 1998	240.000 ppb	5.481

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	220.000 ppb	Ln Minimum:	5.394
Maximum:	260.000 ppb	Ln Maximum:	5.561
Mean:	237.500 ppb	Ln Mean:	5.468
Std. Dev.:	17.078 ppb	Ln Std. Dev.:	0.071

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	230.000 ppb	5.438
May 14 1998	230.000 ppb	5.438

Aug 14 1998	200.000 ppb	5.298
Nov 23 1998	190.000 ppb	5.247

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND): 0

Minimum:	190.000 ppb	Ln Minimum:	5.247
Maximum:	230.000 ppb	Ln Maximum:	5.438
Mean:	212.500 ppb	Ln Mean:	5.355
Std. Dev.:	20.616 ppb	Ln Std. Dev.:	0.098

Normality Tests

Report Printed: 02-17-1999 15:51

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Flrd Fluoride

CAS Number:16984-48-8

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 100.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Normality Test on Observations for wells listed below:

Well:13MW1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	220.000	260.000	237.500	17.078
Log:	5.394	5.561	5.468	0.071

Well:13MW2 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	190.000	230.000	212.500	20.616
Log:	5.247	5.438	5.355	0.098

Pooled Statistics

Observations: 8

Statistic	Original Scale	Log Scale
Mean:	225.000	5.412
Std Dev:	22.039	0.100
Skewness:	-0.171	-0.351
Kurtosis:	-0.616	-0.640
Minimum:	190.000	5.247
Maximum:	260.000	5.561

CV: 0.098 0.018

Shapiro-Wilk Statistics

	Test Scale Statistic	5% Critical Value	1% Critical Value
Original:	0.9477	0.8180	0.7490
Log:	0.9397	0.8180	0.7490

* Indicates statistically significant evidence of non-normality.
GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-17-1999 15:51

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Mg Magnesium, total

CAS Number: 7439-95-4

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 200.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	29600.000 ppb	10.296
May 14 1998	23400.000 ppb	10.060
Aug 14 1998	25700.000 ppb	10.154
Nov 23 1998	55200.000 ppb	10.919

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	23400.000 ppb	Ln Minimum:	10.060
Maximum:	55200.000 ppb	Ln Maximum:	10.919
Mean:	33475.000 ppb	Ln Mean:	10.357
Std. Dev.:	14707.679 ppb	Ln Std. Dev.:	0.387

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	39000.000 ppb	10.571
May 14 1998	32200.000 ppb	10.380

Aug 14 1998	33800.000 ppb	10.428
Nov 23 1998	34300.000 ppb	10.443

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND): 0

Minimum:	32200.000 ppb	Ln Minimum:	10.380
Maximum:	39000.000 ppb	Ln Maximum:	10.571
Mean:	34825.000 ppb	Ln Mean:	10.456
Std. Dev.:	2923.896 ppb	Ln Std. Dev.:	0.082

Normality Tests

Report Printed: 02-17-1999 15:51

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Mg Magnesium, total

CAS Number: 7439-95-4

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 200.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Normality Test on Observations for wells listed below:

Well:13MW1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	23400.000	55200.000	33475.000	14707.679
Log:	10.060	10.919	10.357	0.387

Well:13MW2 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	32200.000	39000.000	34825.000	2923.896
Log:	10.380	10.571	10.456	0.082

Pooled Statistics

Observations: 8

Statistic	Original Scale	Log Scale
Mean:	34150.000	10.406
Std Dev:	9843.344	0.264
Skewness:	1.200*	0.666
Kurtosis:	0.753	-0.035
Minimum:	23400.000	10.060
Maximum:	55200.000	10.919

CV: 0.288 0.025

Shapiro-Wilk Statistics

	Test	5% Critical	1% Critical
Scale	Statistic	Value	Value
Original:	0.8751	0.8180	0.7490
Log:	0.9474	0.8180	0.7490

* Indicates statistically significant evidence of non-normality.
GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-17-1999 15:52

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Mn Manganese, total

CAS Number: 7439-96-5

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.200 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	48.000 ppb	3.871
May 14 1998	16.400 ppb	2.797
Aug 14 1998	13.000 ppb	2.565
Nov 23 1998	186.000 ppb	5.226

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	13.000 ppb	Ln Minimum:	2.565
Maximum:	186.000 ppb	Ln Maximum:	5.226
Mean:	65.850 ppb	Ln Mean:	3.615
Std. Dev.:	81.636 ppb	Ln Std. Dev.:	1.215

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	54.000 ppb	3.989
May 14 1998	6.900 ppb	1.932

Aug 14 1998	9.000 ppb	2.197
Nov 23 1998	15.000 ppb	2.708

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND): 0

Minimum:	6.900 ppb	Ln Minimum:	1.932
Maximum:	54.000 ppb	Ln Maximum:	3.989
Mean:	21.225 ppb	Ln Mean:	2.706
Std. Dev.:	22.118 ppb	Ln Std. Dev.:	0.914

Normality Tests

Report Printed: 02-17-1999 15:52

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:
Phone:() -

Permit Type:Background

Constituent:Mn Manganese, total

CAS Number: 7439-96-5

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.200 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Normality Test on Observations for wells listed below:

Well:13MW1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	13.000	186.000	65.850	81.636
Log:	2.565	5.226	3.615	1.215

Well:13MW2 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	6.900	54.000	21.225	22.118
Log:	1.932	3.989	2.706	0.914

Pooled Statistics

Observations: 8

Statistic	Original Scale	Log Scale
Mean:	43.537	3.161
Std Dev:	60.289	1.108
Skewness:	1.903*	0.745
Kurtosis:	2.156	-0.586
Minimum:	6.900	1.932
Maximum:	186.000	5.226

CV: 1.385 0.350

Shapiro-Wilk Statistics

	Test	5% Critical	1% Critical
	Scale Statistic	Value	Value
Original:	0.6521*	0.8180	0.7490
Log:	0.9087	0.8180	0.7490

* Indicates statistically significant evidence of non-normality.
GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-17-1999 15:52

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford

ST:VA Zip:

County:PULASKI

Contact:

Phone:() -

Permit Type:Background

Constituent:Na Sodium

CAS Number: 7440-23-5

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 100.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	12700.000 ppb	9.449
May 14 1998	13200.000 ppb	9.488
Aug 14 1998	13100.000 ppb	9.480
Nov 23 1998	11200.000 ppb	9.324

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	11200.000 ppb	Ln Minimum:	9.324
Maximum:	13200.000 ppb	Ln Maximum:	9.488
Mean:	12550.000 ppb	Ln Mean:	9.435
Std. Dev.:	925.563 ppb	Ln Std. Dev.:	0.076

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	1430.000 ppb	7.265
May 14 1998	1510.000 ppb	7.320

Aug 14 1998	1420.000 ppb	7.258
Nov 23 1998	1550.000 ppb	7.346

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND): 0

Minimum:	1420.000 ppb	Ln Minimum:	7.258
Maximum:	1550.000 ppb	Ln Maximum:	7.346
Mean:	1477.500 ppb	Ln Mean:	7.297
Std. Dev.:	62.915 ppb	Ln Std. Dev.:	0.042

Normality Tests

Report Printed: 02-17-1999 15:52

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:
Phone:() -

Permit Type:Background

Constituent:Na Sodium

CAS Number: 7440-23-5

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 100.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Normality Test on Observations for wells listed below:

Well:13MW1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	11200.000	13200.000	12550.000	925.563
Log:	9.324	9.488	9.435	0.076

Well:13MW2 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	1420.000	1550.000	1477.500	62.915
Log:	7.258	7.346	7.297	0.042

Pooled Statistics

Observations: 8

Statistic	Original Scale	Log Scale
Mean:	7013.750	8.366
Std Dev:	5949.579	1.144
Skewness:	0.029	0.004
Kurtosis:	-1.964	-1.991
Minimum:	1420.000	7.258
Maximum:	13200.000	9.488

CV: 0.848 0.137

Shapiro-Wilk Statistics

	Test	5% Critical	1% Critical
Scale	Statistic	Value	Value
Original:	0.7153*	0.8180	0.7490
Log:	0.6997*	0.8180	0.7490

* Indicates statistically significant evidence of non-normality.
GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-17-1999 15:53

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Ni Nickel, total

CAS Number: 7440-02-0

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 15.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	7.500 ppb	2.015 (* Nondetect *)
May 14 1998	7.500 ppb	2.015 (* Nondetect *)
Aug 14 1998	7.500 ppb	2.015 (* Nondetect *)
Nov 23 1998	44.000 ppb	3.784

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 75

Minimum:	7.500 ppb	Ln Minimum:	2.015
Maximum:	44.000 ppb	Ln Maximum:	3.784
Mean:	16.625 ppb	Ln Mean:	2.457
Std. Dev.:	18.250 ppb	Ln Std. Dev.:	0.885

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	7.500 ppb	2.015 (* Nondetect *)
May 14 1998	7.500 ppb	2.015 (* Nondetect *)

Aug 14 1998	7.500 ppb	2.015 (* Nondetect *)
Nov 23 1998	18.000 ppb	2.890

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND): 75

Minimum:	7.500 ppb	Ln Minimum:	2.015
Maximum:	18.000 ppb	Ln Maximum:	2.890
Mean:	10.125 ppb	Ln Mean:	2.234
Std. Dev.:	5.250 ppb	Ln Std. Dev.:	0.438

Data Set Summary

Report Printed: 02-17-1999 15:54

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Nitrate Nitrate

CAS Number:14797-55-8

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 100.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	480.000 ppb	6.174
May 14 1998	360.000 ppb	5.886
Aug 14 1998	440.000 ppb	6.087
Nov 23 1998	560.000 ppb	6.328

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	360.000 ppb	Ln Minimum:	5.886
Maximum:	560.000 ppb	Ln Maximum:	6.328
Mean:	460.000 ppb	Ln Mean:	6.119
Std. Dev.:	83.267 ppb	Ln Std. Dev.:	0.184

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	790.000 ppb	6.672
May 14 1998	380.000 ppb	5.940

Aug 14 1998	640.000 ppb	6.461
Nov 23 1998	600.000 ppb	6.397

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND): 0

Minimum:	380.000 ppb	Ln Minimum:	5.940
Maximum:	790.000 ppb	Ln Maximum:	6.672
Mean:	602.500 ppb	Ln Mean:	6.368
Std. Dev.:	169.386 ppb	Ln Std. Dev.:	0.308

Normality Tests

Report Printed: 02-17-1999 15:54

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:
Phone:() -

Permit Type:Background

Constituent:Nitrate Nitrate

CAS Number:14797-55-8

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 100.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Normality Test on Observations for wells listed below:

Well:13MW1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	360.000	560.000	460.000	83.267
Log:	5.886	6.328	6.119	0.184

Well:13MW2 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	380.000	790.000	602.500	169.386
Log:	5.940	6.672	6.368	0.308

Pooled Statistics

Observations: 8

Statistic	Original Scale	Log Scale
Mean:	531.250	6.243
Std Dev:	145.154	0.270
Skewness:	0.478	0.124
Kurtosis:	-0.755	-1.100
Minimum:	360.000	5.886
Maximum:	790.000	6.672

CV: 0.273 0.043

Shapiro-Wilk Statistics

	Test	5% Critical	1% Critical
Scale	Statistic	Value	Value
Original:	0.9528	0.8180	0.7490
Log:	0.9680	0.8180	0.7490

* Indicates statistically significant evidence of non-normality.

GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-17-1999 15:55

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Pb Lead, total

CAS Number: 7439-92-1

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	2.000 ppb	0.693
May 14 1998	0.500 ppb	-0.693 (* Nondetect *)
Aug 14 1998	0.500 ppb	-0.693 (* Nondetect *)
Nov 23 1998	6.000 ppb	1.792

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 50

Minimum:	0.500 ppb	Ln Minimum:	-0.693
Maximum:	6.000 ppb	Ln Maximum:	1.792
Mean:	2.250 ppb	Ln Mean:	0.275
Std. Dev.:	2.598 ppb	Ln Std. Dev.:	1.204

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	3.000 ppb	1.099
May 14 1998	0.500 ppb	-0.693 (* Nondetect *)

Aug 14 1998	0.500 ppb	-0.693 (* Nondetect *)
Nov 23 1998	1.000 ppb	0.000

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND): 50

Minimum:	0.500 ppb	Ln Minimum:	-0.693
Maximum:	3.000 ppb	Ln Maximum:	1.099
Mean:	1.250 ppb	Ln Mean:	-0.072
Std. Dev.:	1.190 ppb	Ln Std. Dev.:	0.846

Data Set Summary

Report Printed: 02-17-1999 15:57

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Se Selenium, total

CAS Number: 7782-49-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	0.500 ppb	-0.693 (* Nondetect *)
May 14 1998	2.000 ppb	0.693
Aug 14 1998	2.000 ppb	0.693
Nov 23 1998	1.000 ppb	0.000

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 25

Minimum:	0.500 ppb	Ln Minimum:	-0.693
Maximum:	2.000 ppb	Ln Maximum:	0.693
Mean:	1.375 ppb	Ln Mean:	0.173
Std. Dev.:	0.750 ppb	Ln Std. Dev.:	0.664

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	0.500 ppb	-0.693 (* Nondetect *)
May 14 1998	0.500 ppb	-0.693 (* Nondetect *)

Aug 14 1998	0.500 ppb	-0.693 (* Nondetect *)
Nov 23 1998	0.500 ppb	-0.693 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	0.500 ppb	Ln Minimum:	-0.693
Maximum:	0.500 ppb	Ln Maximum:	-0.693
Mean:	0.500 ppb	Ln Mean:	-0.693
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Normality Tests

Report Printed: 02-17-1999 15:57

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:
Phone:() -

Permit Type:Background

Constituent:Se Selenium, total

CAS Number: 7782-49-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Normality Test on Observations for wells listed below:

Well:13MW1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	0.500	2.000	1.375	0.750
Log:	-0.693	0.693	0.173	0.664

Well:13MW2 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	0.500	0.500	0.500	0.000
Log:	-0.693	-0.693	-0.693	0.000

Pooled Statistics

Observations: 8

Statistic	Original Scale	Log Scale
Mean:	0.938	-0.260
Std Dev:	0.678	0.635
Skewness:	0.970	0.801
Kurtosis:	-0.890	-1.162
Minimum:	0.500	-0.693
Maximum:	2.000	0.693

CV: 0.723 -2.443

Shapiro-Wilk Statistics

	Test	5% Critical	1% Critical
Scale	Statistic	Value	Value
Original:	0.6709*	0.8180	0.7490
Log:	0.6928*	0.8180	0.7490

* Indicates statistically significant evidence of non-normality.
GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-17-1999 15:58

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Sulfate Sulfate, total

CAS Number:14808-79-8

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1000.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	73900.000 ppb	11.210
May 14 1998	61500.000 ppb	11.027
Aug 14 1998	64100.000 ppb	11.068
Nov 23 1998	73300.000 ppb	11.202

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	61500.000 ppb	Ln Minimum:	11.027
Maximum:	73900.000 ppb	Ln Maximum:	11.210
Mean:	68200.000 ppb	Ln Mean:	11.127
Std. Dev.:	6329.824 ppb	Ln Std. Dev.:	0.093

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	30300.000 ppb	10.319
May 14 1998	30700.000 ppb	10.332

Aug 14 1998	26900.000 ppb	10.200
Nov 23 1998	27500.000 ppb	10.222

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND): 0

Minimum:	26900.000 ppb	Ln Minimum:	10.200
Maximum:	30700.000 ppb	Ln Maximum:	10.332
Mean:	28850.000 ppb	Ln Mean:	10.268
Std. Dev.:	1927.866 ppb	Ln Std. Dev.:	0.067

Normality Tests

Report Printed: 02-17-1999 15:58

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Sulfate Sulfate, total

CAS Number:14808-79-8

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1000.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Normality Test on Observations for wells listed below:

Well:13MW1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	61500.000	73900.000	68200.000	6329.824
Log:	11.027	11.210	11.127	0.093

Well:13MW2 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	26900.000	30700.000	28850.000	1927.866
Log:	10.200	10.332	10.268	0.067

Pooled Statistics

Observations: 8

Statistic	Original Scale	Log Scale
Mean:	48525.000	10.698
Std Dev:	21474.885	0.465
Skewness:	0.098	0.024
Kurtosis:	-1.846	-1.899
Minimum:	26900.000	10.200
Maximum:	73900.000	11.210

CV: 0.443 0.043

Shapiro-Wilk Statistics

	Test	5% Critical	1% Critical
Scale	Statistic	Value	Value
Original:	0.7917*	0.8180	0.7490
Log:	0.7865*	0.8180	0.7490

* Indicates statistically significant evidence of non-normality.

GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-17-1999 15:58

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:TOC Total Organic Carbon

CAS Number: - -

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1000.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	500.000 ppb	6.215 (* Nondetect *)
May 14 1998	1000.000 ppb	6.908
Aug 14 1998	500.000 ppb	6.215 (* Nondetect *)
Nov 23 1998	500.000 ppb	6.215 (* Nondetect *)

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 75

Minimum:	500.000 ppb	Ln Minimum:	6.215
Maximum:	1000.000 ppb	Ln Maximum:	6.908
Mean:	625.000 ppb	Ln Mean:	6.388
Std. Dev.:	250.000 ppb	Ln Std. Dev.:	0.347

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	500.000 ppb	6.215 (* Nondetect *)
May 14 1998	1000.000 ppb	6.908

Aug 14 1998	500.000 ppb	6.215 (* Nondetect *)
Nov 23 1998	500.000 ppb	6.215 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND): 75

Minimum:	500.000 ppb	Ln Minimum:	6.215
Maximum:	1000.000 ppb	Ln Maximum:	6.908
Mean:	625.000 ppb	Ln Mean:	6.388
Std. Dev.:	250.000 ppb	Ln Std. Dev.:	0.347

Data Set Summary

Report Printed: 02-17-1999 15:59

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:TOX Total Organic Halogens, Halides

CAS Number: - -

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 5.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	7.000 ppb	1.946
May 14 1998	5.500 ppb	1.705
Aug 14 1998	2.500 ppb	0.916 (* Nondetect *)
Nov 23 1998	25.500 ppb	3.239

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 25

Minimum:	2.500 ppb	Ln Minimum:	0.916
Maximum:	25.500 ppb	Ln Maximum:	3.239
Mean:	10.125 ppb	Ln Mean:	1.951
Std. Dev.:	10.419 ppb	Ln Std. Dev.:	0.964

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	2.500 ppb	0.916 (* Nondetect *)
May 14 1998	6.000 ppb	1.792

Aug 14 1998	2.500 ppb	0.916 (* Nondetect *)
Nov 23 1998	7.500 ppb	2.015

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND): 50

Minimum:	2.500 ppb	Ln Minimum:	0.916
Maximum:	7.500 ppb	Ln Maximum:	2.015
Mean:	4.625 ppb	Ln Mean:	1.410
Std. Dev.:	2.529 ppb	Ln Std. Dev.:	0.577

Normality Tests

Report Printed: 02-17-1999 15:59

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:TOX Total Organic Halogens, Halides

CAS Number: - -

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 5.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Normality Test on Observations for wells listed below:

Well:13MW1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	2.500	25.500	10.125	10.419
Log:	0.916	3.239	1.951	0.964

Well:13MW2 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	2.500	7.500	4.625	2.529
Log:	0.916	2.015	1.410	0.577

Pooled Statistics

Observations: 8

Statistic	Original Scale	Log Scale
Mean:	7.375	1.681
Std Dev:	7.610	0.791
Skewness:	1.940*	0.773
Kurtosis:	2.337	-0.102
Minimum:	2.500	0.916
Maximum:	25.500	3.239

CV: 1.032 0.470

Shapiro-Wilk Statistics

	Test	5% Critical	1% Critical
Scale	Statistic	Value	Value
Original:	0.6565*	0.8180	0.7490
Log:	0.8580	0.8180	0.7490

* Indicates statistically significant evidence of non-normality.
GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-17-1999 15:59

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Zn Zinc, total

CAS Number: 7440-66-6

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 5.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	9.000 ppb	2.197
May 14 1998	2.500 ppb	0.916 (* Nondetect *)
Aug 14 1998	2.500 ppb	0.916 (* Nondetect *)
Nov 23 1998	29.000 ppb	3.367

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 50

Minimum:	2.500 ppb	Ln Minimum:	0.916
Maximum:	29.000 ppb	Ln Maximum:	3.367
Mean:	10.750 ppb	Ln Mean:	1.849
Std. Dev.:	12.547 ppb	Ln Std. Dev.:	1.178

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	12.000 ppb	2.485
May 14 1998	2.500 ppb	0.916 (* Nondetect *)

Aug 14 1998	9.000 ppb	2.197
Nov 23 1998	9.000 ppb	2.197

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND): 25

Minimum:	2.500 ppb	Ln Minimum:	0.916
Maximum:	12.000 ppb	Ln Maximum:	2.485
Mean:	8.125 ppb	Ln Mean:	1.949
Std. Dev.:	4.008 ppb	Ln Std. Dev.:	0.702

Normality Tests

Report Printed: 02-17-1999 15:59

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:
Phone:() -

Permit Type:Background

Constituent:Zn Zinc, total

CAS Number: 7440-66-6

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 5.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Normality Test on Observations for wells listed below:

Well:13MW1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	2.500	29.000	10.750	12.547
Log:	0.916	3.367	1.849	1.178

Well:13MW2 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	2.500	12.000	8.125	4.008
Log:	0.916	2.485	1.949	0.702

Pooled Statistics

Observations: 8

Statistic	Original Scale	Log Scale
Mean:	9.438	1.899
Std Dev:	8.736	0.899
Skewness:	1.489*	0.125
Kurtosis:	1.301	-1.107
Minimum:	2.500	0.916
Maximum:	29.000	3.367

CV: 0.926 0.474

Shapiro-Wilk Statistics

	Test	5% Critical	1% Critical
Scale	Statistic	Value	Value
Original:	0.7620*	0.8180	0.7490
Log:	0.8569	0.8180	0.7490

* Indicates statistically significant evidence of non-normality.

GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-17-1999 16:00

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:pH F pH, Field

CAS Number: - -

MCL: 0.000 SU

ACL: 0.000 SU

Detect Limit: 0.100 SU

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	6.700 SU	1.902
May 14 1998	6.300 SU	1.841
Aug 14 1998	6.500 SU	1.872
Nov 23 1998	7.000 SU	1.946

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	6.300 SU	Ln Minimum:	1.841
Maximum:	7.000 SU	Ln Maximum:	1.946
Mean:	6.625 SU	Ln Mean:	1.890
Std. Dev.:	0.299 SU	Ln Std. Dev.:	0.045

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	6.800 SU	1.917
May 14 1998	6.700 SU	1.902

Aug 14 1998	6.700 SU	1.902
Nov 23 1998	7.100 SU	1.960

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND): 0

Minimum:	6.700 SU	Ln Minimum:	1.902
Maximum:	7.100 SU	Ln Maximum:	1.960
Mean:	6.825 SU	Ln Mean:	1.920
Std. Dev.:	0.189 SU	Ln Std. Dev.:	0.027

Normality Tests

Report Printed: 02-17-1999 16:00

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:
Phone:() -

Permit Type:Background

Constituent:pH F pH, Field

CAS Number: - -
MCL: 0.000 SU
ACL: 0.000 SU
Detect Limit: 0.100 SU

Start Date:Mar 09 1998
End Date:Nov 23 1998

Normality Test on Observations for wells listed below:

Well:13MW1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	6.300	7.000	6.625	0.299
Log:	1.841	1.946	1.890	0.045

Well:13MW2 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	6.700	7.100	6.825	0.189
Log:	1.902	1.960	1.920	0.027

Pooled Statistics

Observations: 8

Statistic	Original Scale	Log Scale
Mean:	6.725	1.905
Std Dev:	0.255	0.038
Skewness:	-0.131	-0.203
Kurtosis:	-0.654	-0.618
Minimum:	6.300	1.841
Maximum:	7.100	1.960

CV: 0.038 0.020

Shapiro-Wilk Statistics

	Test	5% Critical	1% Critical
	Statistic	Value	Value
Original:	0.9568	0.8180	0.7490
Log:	0.9552	0.8180	0.7490

* Indicates statistically significant evidence of non-normality.

GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-24-1999 10:29

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:1,1,1Tri 1,1,1-Trichloroethane

CAS Number: 71-55-6

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.300 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	0.150 ppb	-1.897 (* Nondetect *)
May 14 1998	0.150 ppb	-1.897 (* Nondetect *)
Aug 14 1998	0.150 ppb	-1.897 (* Nondetect *)
Nov 23 1998	0.150 ppb	-1.897 (* Nondetect *)

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.150 ppb	Ln Minimum:	-1.897
Maximum:	0.150 ppb	Ln Maximum:	-1.897
Mean:	0.150 ppb	Ln Mean:	-1.897
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	0.150 ppb	-1.897 (* Nondetect *)
May 14 1998	0.150 ppb	-1.897 (* Nondetect *)

Aug 14 1998	0.150 ppb	-1.897 (* Nondetect *)
Nov 23 1998	0.150 ppb	-1.897 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	0.150 ppb	Ln Minimum:	-1.897
Maximum:	0.150 ppb	Ln Maximum:	-1.897
Mean:	0.150 ppb	Ln Mean:	-1.897
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:29

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:1,1-DCEE 1,1-Dichloroethene (-ethylene)

CAS Number: 75-35-4

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.300 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	0.150 ppb	-1.897 (* Nondetect *)
May 14 1998	0.150 ppb	-1.897 (* Nondetect *)
Aug 14 1998	0.150 ppb	-1.897 (* Nondetect *)
Nov 23 1998	0.150 ppb	-1.897 (* Nondetect *)

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.150 ppb	Ln Minimum:	-1.897
Maximum:	0.150 ppb	Ln Maximum:	-1.897
Mean:	0.150 ppb	Ln Mean:	-1.897
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	0.150 ppb	-1.897 (* Nondetect *)
May 14 1998	0.150 ppb	-1.897 (* Nondetect *)

Aug 14 1998	0.150 ppb	-1.897 (* Nondetect *)
Nov 23 1998	0.150 ppb	-1.897 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	0.150 ppb	Ln Minimum:	-1.897
Maximum:	0.150 ppb	Ln Maximum:	-1.897
Mean:	0.150 ppb	Ln Mean:	-1.897
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:30

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:2,4-DNP 2,4-Dinitrophenol

CAS Number: 51-28-5

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 50.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	25.000 ppb	3.219 (* Nondetect *)
May 14 1998	25.000 ppb	3.219 (* Nondetect *)
Aug 14 1998	25.000 ppb	3.219 (* Nondetect *)
Nov 23 1998	25.000 ppb	3.219 (* Nondetect *)

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	25.000 ppb	Ln Minimum:	3.219
Maximum:	25.000 ppb	Ln Maximum:	3.219
Mean:	25.000 ppb	Ln Mean:	3.219
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	25.000 ppb	3.219 (* Nondetect *)
May 14 1998	25.000 ppb	3.219 (* Nondetect *)

Aug 14 1998	25.000 ppb	3.219 (* Nondetect *)
Nov 23 1998	25.000 ppb	3.219 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	25.000 ppb	Ln Minimum:	3.219
Maximum:	25.000 ppb	Ln Maximum:	3.219
Mean:	25.000 ppb	Ln Mean:	3.219
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:30

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:2-NPham 2-Nitrodiphenylamine

CAS Number: - -

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 10.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	5.000 ppb	1.609 (* Nondetect *)
May 14 1998	5.000 ppb	1.609 (* Nondetect *)
Aug 14 1998	5.000 ppb	1.609 (* Nondetect *)
Nov 23 1998	5.000 ppb	1.609 (* Nondetect *)

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	5.000 ppb	Ln Maximum:	1.609
Mean:	5.000 ppb	Ln Mean:	1.609
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	5.000 ppb	1.609 (* Nondetect *)
May 14 1998	5.000 ppb	1.609 (* Nondetect *)

Aug 14 1998	5.000 ppb	1.609 (* Nondetect *)
Nov 23 1998	5.000 ppb	1.609 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	5.000 ppb	Ln Maximum:	1.609
Mean:	5.000 ppb	Ln Mean:	1.609
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:30

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Acetone Acetone

CAS Number: 67-64-1

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 10.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	5.000 ppb	1.609 (* Nondetect *)
May 14 1998	5.000 ppb	1.609 (* Nondetect *)
Aug 14 1998	5.000 ppb	1.609 (* Nondetect *)
Nov 23 1998	5.000 ppb	1.609 (* Nondetect *)

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	5.000 ppb	Ln Maximum:	1.609
Mean:	5.000 ppb	Ln Mean:	1.609
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	5.000 ppb	1.609 (* Nondetect *)
May 14 1998	5.000 ppb	1.609 (* Nondetect *)

Aug 14 1998	5.000 ppb	1.609 (* Nondetect *)
Nov 23 1998	5.000 ppb	1.609 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	5.000 ppb	Ln Maximum:	1.609
Mean:	5.000 ppb	Ln Mean:	1.609
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:30

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:
Phone:() -

Permit Type:Background

Constituent:Ag Silver, total

CAS Number: 7440-22-4

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.200 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	0.100 ppb	-2.303 (* Nondetect *)
May 14 1998	0.100 ppb	-2.303 (* Nondetect *)
Aug 14 1998	0.100 ppb	-2.303 (* Nondetect *)
Nov 23 1998	0.100 ppb	-2.303 (* Nondetect *)

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.100 ppb	Ln Minimum:	-2.303
Maximum:	0.100 ppb	Ln Maximum:	-2.303
Mean:	0.100 ppb	Ln Mean:	-2.303
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	0.100 ppb	-2.303 (* Nondetect *)
May 14 1998	0.100 ppb	-2.303 (* Nondetect *)

Aug 14 1998	0.100 ppb	-2.303 (* Nondetect *)
Nov 23 1998	0.100 ppb	-2.303 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	0.100 ppb	Ln Minimum:	-2.303
Maximum:	0.100 ppb	Ln Maximum:	-2.303
Mean:	0.100 ppb	Ln Mean:	-2.303
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:30

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Ammonia Ammonia

CAS Number: 7664-41-7

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 100.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	50.000 ppb	3.912 (* Nondetect *)
May 14 1998	50.000 ppb	3.912 (* Nondetect *)
Aug 14 1998	50.000 ppb	3.912 (* Nondetect *)
Nov 23 1998	50.000 ppb	3.912 (* Nondetect *)

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	50.000 ppb	Ln Minimum:	3.912
Maximum:	50.000 ppb	Ln Maximum:	3.912
Mean:	50.000 ppb	Ln Mean:	3.912
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	50.000 ppb	3.912 (* Nondetect *)
May 14 1998	50.000 ppb	3.912 (* Nondetect *)

Aug 14 1998	50.000 ppb	3.912 (* Nondetect *)
Nov 23 1998	50.000 ppb	3.912 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	50.000 ppb	Ln Minimum:	3.912
Maximum:	50.000 ppb	Ln Maximum:	3.912
Mean:	50.000 ppb	Ln Mean:	3.912
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:31

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Benzene Benzene

CAS Number: 71-43-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.100 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	0.050 ppb	-2.996 (* Nondetect *)
May 14 1998	0.050 ppb	-2.996 (* Nondetect *)
Aug 14 1998	0.050 ppb	-2.996 (* Nondetect *)
Nov 23 1998	0.050 ppb	-2.996 (* Nondetect *)

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.050 ppb	Ln Maximum:	-2.996
Mean:	0.050 ppb	Ln Mean:	-2.996
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	0.050 ppb	-2.996 (* Nondetect *)
May 14 1998	0.050 ppb	-2.996 (* Nondetect *)

Aug 14 1998	0.050 ppb	-2.996 (* Nondetect *)
Nov 23 1998	0.050 ppb	-2.996 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.050 ppb	Ln Maximum:	-2.996
Mean:	0.050 ppb	Ln Mean:	-2.996
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:31

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:BiEHPth bis (2-Ethylhexyl) Phthalate

CAS Number: 117-81-7

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 10.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	5.000 ppb	1.609 (* Nondetect *)
May 14 1998	5.000 ppb	1.609 (* Nondetect *)
Aug 14 1998	5.000 ppb	1.609 (* Nondetect *)
Nov 23 1998	5.000 ppb	1.609 (* Nondetect *)

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	5.000 ppb	Ln Maximum:	1.609
Mean:	5.000 ppb	Ln Mean:	1.609
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	5.000 ppb	1.609 (* Nondetect *)
May 14 1998	5.000 ppb	1.609 (* Nondetect *)

Aug 14 1998	5.000 ppb	1.609 (* Nondetect *)
Nov 23 1998	5.000 ppb	1.609 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	5.000 ppb	Ln Maximum:	1.609
Mean:	5.000 ppb	Ln Mean:	1.609
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:31

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:BuBenPth Butyl benzyl phthalate

CAS Number: 85-68-7

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 5.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	2.500 ppb	0.916 (* Nondetect *)
May 14 1998	2.500 ppb	0.916 (* Nondetect *)
Aug 14 1998	2.500 ppb	0.916 (* Nondetect *)
Nov 23 1998	2.500 ppb	0.916 (* Nondetect *)

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	2.500 ppb	Ln Minimum:	0.916
Maximum:	2.500 ppb	Ln Maximum:	0.916
Mean:	2.500 ppb	Ln Mean:	0.916
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	2.500 ppb	0.916 (* Nondetect *)
May 14 1998	2.500 ppb	0.916 (* Nondetect *)

Aug 14 1998	2.500 ppb	0.916 (* Nondetect *)
Nov 23 1998	2.500 ppb	0.916 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	2.500 ppb	Ln Minimum:	0.916
Maximum:	2.500 ppb	Ln Maximum:	0.916
Mean:	2.500 ppb	Ln Mean:	0.916
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:31

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Cd Cadmium, total

CAS Number: 7440-43-9

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.100 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	0.050 ppb	-2.996 (* Nondetect *)
May 14 1998	0.050 ppb	-2.996 (* Nondetect *)
Aug 14 1998	0.050 ppb	-2.996 (* Nondetect *)
Nov 23 1998	0.050 ppb	-2.996 (* Nondetect *)

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.050 ppb	Ln Maximum:	-2.996
Mean:	0.050 ppb	Ln Mean:	-2.996
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	0.050 ppb	-2.996 (* Nondetect *)
May 14 1998	0.050 ppb	-2.996 (* Nondetect *)

Aug 14 1998	0.050 ppb	-2.996 (* Nondetect *)
Nov 23 1998	0.050 ppb	-2.996 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.050 ppb	Ln Maximum:	-2.996
Mean:	0.050 ppb	Ln Mean:	-2.996
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:31

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Cyanid Cyanide

CAS Number: 143-33-9

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 10.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	5.000 ppb	1.609 (* Nondetect *)
May 14 1998	5.000 ppb	1.609 (* Nondetect *)
Aug 14 1998	5.000 ppb	1.609 (* Nondetect *)
Nov 23 1998	5.000 ppb	1.609 (* Nondetect *)

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	5.000 ppb	Ln Maximum:	1.609
Mean:	5.000 ppb	Ln Mean:	1.609
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	5.000 ppb	1.609 (* Nondetect *)
May 14 1998	5.000 ppb	1.609 (* Nondetect *)

Aug 14 1998	5.000 ppb	1.609 (* Nondetect *)
Nov 23 1998	5.000 ppb	1.609 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	5.000 ppb	Ln Maximum:	1.609
Mean:	5.000 ppb	Ln Mean:	1.609
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:32

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:DEthEth Diethyl ether

CAS Number: - -

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 10.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	5.000 ppb	1.609 (* Nondetect *)
May 14 1998	5.000 ppb	1.609 (* Nondetect *)
Aug 14 1998	5.000 ppb	1.609 (* Nondetect *)
Nov 23 1998	5.000 ppb	1.609 (* Nondetect *)

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	5.000 ppb	Ln Maximum:	1.609
Mean:	5.000 ppb	Ln Mean:	1.609
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	5.000 ppb	1.609 (* Nondetect *)
May 14 1998	5.000 ppb	1.609 (* Nondetect *)

Aug 14 1998	5.000 ppb	1.609 (* Nondetect *)
Nov 23 1998	5.000 ppb	1.609 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	5.000 ppb	Ln Maximum:	1.609
Mean:	5.000 ppb	Ln Mean:	1.609
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:32

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford

ST:VA Zip:

County:PULASKI

Contact:

Phone:() -

Permit Type:Background

Constituent:DEthGlDn Diethylene glycol dinitrate

CAS Number: - -

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 10.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	5.000 ppb	1.609 (* Nondetect *)
May 14 1998	5.000 ppb	1.609 (* Nondetect *)
Aug 14 1998	5.000 ppb	1.609 (* Nondetect *)

Well ID:13MW1 Summary Statistics

Observations (N): 3

Nondetects (%ND):100

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	5.000 ppb	Ln Maximum:	1.609
Mean:	5.000 ppb	Ln Mean:	1.609
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	5.000 ppb	1.609 (* Nondetect *)
May 14 1998	5.000 ppb	1.609 (* Nondetect *)
Aug 14 1998	5.000 ppb	1.609 (* Nondetect *)

Nov 23 1998

5.000 ppb

1.609 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	5.000 ppb	Ln Maximum:	1.609
Mean:	5.000 ppb	Ln Mean:	1.609
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:32

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:DEthPhth Diethylphthalate

CAS Number: 84-66-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 5.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	2.500 ppb	0.916 (* Nondetect *)
May 14 1998	2.500 ppb	0.916 (* Nondetect *)
Aug 14 1998	2.500 ppb	0.916 (* Nondetect *)
Nov 23 1998	2.500 ppb	0.916 (* Nondetect *)

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	2.500 ppb	Ln Minimum:	0.916
Maximum:	2.500 ppb	Ln Maximum:	0.916
Mean:	2.500 ppb	Ln Mean:	0.916
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	2.500 ppb	0.916 (* Nondetect *)
May 14 1998	2.500 ppb	0.916 (* Nondetect *)

Aug 14 1998	2.500 ppb	0.916 (* Nondetect *)
Nov 23 1998	2.500 ppb	0.916 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	2.500 ppb	Ln Minimum:	0.916
Maximum:	2.500 ppb	Ln Maximum:	0.916
Mean:	2.500 ppb	Ln Mean:	0.916
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:32

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford

ST:VA Zip:

County:PULASKI

Contact:

Phone:() -

Permit Type:Background

Constituent:DMethEth Dimethyl ether

CAS Number: - -

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 10.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	5.000 ppb	1.609 (* Nondetect *)
May 14 1998	5.000 ppb	1.609 (* Nondetect *)
Aug 14 1998	5.000 ppb	1.609 (* Nondetect *)
Nov 23 1998	5.000 ppb	1.609 (* Nondetect *)

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	5.000 ppb	Ln Maximum:	1.609
Mean:	5.000 ppb	Ln Mean:	1.609
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	5.000 ppb	1.609 (* Nondetect *)
May 14 1998	5.000 ppb	1.609 (* Nondetect *)

Aug 14 1998	5.000 ppb	1.609 (* Nondetect *)
Nov 23 1998	5.000 ppb	1.609 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	5.000 ppb	Ln Maximum:	1.609
Mean:	5.000 ppb	Ln Mean:	1.609
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:35

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:DPA Diphenylamine

CAS Number: 122-39-4

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 10.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	5.000 ppb	1.609 (* Nondetect *)
May 14 1998	5.000 ppb	1.609 (* Nondetect *)
Aug 14 1998	5.000 ppb	1.609 (* Nondetect *)
Nov 23 1998	5.000 ppb	1.609 (* Nondetect *)

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	5.000 ppb	Ln Maximum:	1.609
Mean:	5.000 ppb	Ln Mean:	1.609
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	5.000 ppb	1.609 (* Nondetect *)
May 14 1998	5.000 ppb	1.609 (* Nondetect *)

Aug 14 1998	5.000 ppb	1.609 (* Nondetect *)
Nov 23 1998	5.000 ppb	1.609 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	5.000 ppb	Ln Maximum:	1.609
Mean:	5.000 ppb	Ln Mean:	1.609
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:35

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Di-N-Bu Di-n-Butylphthalate

CAS Number: 84-74-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 5.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	2.500 ppb	0.916 (* Nondetect *)
May 14 1998	2.500 ppb	0.916 (* Nondetect *)
Aug 14 1998	2.500 ppb	0.916 (* Nondetect *)
Nov 23 1998	2.500 ppb	0.916 (* Nondetect *)

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	2.500 ppb	Ln Minimum:	0.916
Maximum:	2.500 ppb	Ln Maximum:	0.916
Mean:	2.500 ppb	Ln Mean:	0.916
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	2.500 ppb	0.916 (* Nondetect *)
May 14 1998	2.500 ppb	0.916 (* Nondetect *)

Aug 14 1998	2.500 ppb	0.916 (* Nondetect *)
Nov 23 1998	2.500 ppb	0.916 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	2.500 ppb	Ln Minimum:	0.916
Maximum:	2.500 ppb	Ln Maximum:	0.916
Mean:	2.500 ppb	Ln Mean:	0.916
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:35

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:DiNPadip Di-n-propyladipate

CAS Number: - -

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 10.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	5.000 ppb	1.609 (* Nondetect *)
May 14 1998	5.000 ppb	1.609 (* Nondetect *)
Aug 14 1998	5.000 ppb	1.609 (* Nondetect *)
Nov 23 1998	5.000 ppb	1.609 (* Nondetect *)

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	5.000 ppb	Ln Maximum:	1.609
Mean:	5.000 ppb	Ln Mean:	1.609
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	5.000 ppb	1.609 (* Nondetect *)
May 14 1998	5.000 ppb	1.609 (* Nondetect *)

Aug 14 1998	5.000 ppb	1.609 (* Nondetect *)
Nov 23 1998	5.000 ppb	1.609 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	5.000 ppb	Ln Maximum:	1.609
Mean:	5.000 ppb	Ln Mean:	1.609
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:35

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:EtGlyMEt Ethylene glycol monoethyl ether

CAS Number: 110-80-5

MCL: 0.000 ug/l

ACL: 0.000 ug/l

Detect Limit: 10.000 ug/l

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	5.000 ug/l	1.609 (* Nondetect *)
May 14 1998	5.000 ug/l	1.609 (* Nondetect *)
Aug 14 1998	5.000 ug/l	1.609 (* Nondetect *)
Nov 23 1998	5.000 ug/l	1.609 (* Nondetect *)

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	5.000 ug/l	Ln Minimum:	1.609
Maximum:	5.000 ug/l	Ln Maximum:	1.609
Mean:	5.000 ug/l	Ln Mean:	1.609
Std. Dev.:	0.000 ug/l	Ln Std. Dev.:	0.000

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	5.000 ug/l	1.609 (* Nondetect *)
May 14 1998	5.000 ug/l	1.609 (* Nondetect *)

Aug 14 1998	5.000 ug/l	1.609 (* Nondetect *)
Nov 23 1998	5.000 ug/l	1.609 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	5.000 ug/l	Ln Minimum:	1.609
Maximum:	5.000 ug/l	Ln Maximum:	1.609
Mean:	5.000 ug/l	Ln Mean:	1.609
Std. Dev.:	0.000 ug/l	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:35

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:
Phone:() -

Permit Type:Background

Constituent:Ethanol Ethanol

CAS Number: 64-17-5
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 10.000 ppb

Start Date:Mar 09 1998
End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	5.000 ppb	1.609 (* Nondetect *)
May 14 1998	5.000 ppb	1.609 (* Nondetect *)
Aug 14 1998	5.000 ppb	1.609 (* Nondetect *)
Nov 23 1998	5.000 ppb	1.609 (* Nondetect *)

Well ID:13MW1 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	5.000 ppb	Ln Maximum:	1.609
Mean:	5.000 ppb	Ln Mean:	1.609
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	5.000 ppb	1.609 (* Nondetect *)
May 14 1998	5.000 ppb	1.609 (* Nondetect *)

Aug 14 1998	5.000 ppb	1.609 (* Nondetect *)
Nov 23 1998	5.000 ppb	1.609 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	5.000 ppb	Ln Maximum:	1.609
Mean:	5.000 ppb	Ln Mean:	1.609
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:36

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:HCyclon Homocyclonite

CAS Number: - -

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 10.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	5.000 ppb	1.609 (* Nondetect *)
May 14 1998	5.000 ppb	1.609 (* Nondetect *)
Aug 14 1998	5.000 ppb	1.609 (* Nondetect *)
Nov 23 1998	5.000 ppb	1.609 (* Nondetect *)

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	5.000 ppb	Ln Maximum:	1.609
Mean:	5.000 ppb	Ln Mean:	1.609
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	5.000 ppb	1.609 (* Nondetect *)
May 14 1998	5.000 ppb	1.609 (* Nondetect *)

Aug 14 1998	5.000 ppb	1.609 (* Nondetect *)
Nov 23 1998	5.000 ppb	1.609 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	5.000 ppb	Ln Maximum:	1.609
Mean:	5.000 ppb	Ln Mean:	1.609
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:36

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Hg Mercury

CAS Number: 7439-97-6

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.200 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	0.100 ppb	-2.303 (* Nondetect *)
May 14 1998	0.100 ppb	-2.303 (* Nondetect *)
Aug 14 1998	0.100 ppb	-2.303 (* Nondetect *)
Nov 23 1998	0.100 ppb	-2.303 (* Nondetect *)

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.100 ppb	Ln Minimum:	-2.303
Maximum:	0.100 ppb	Ln Maximum:	-2.303
Mean:	0.100 ppb	Ln Mean:	-2.303
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	0.100 ppb	-2.303 (* Nondetect *)
May 14 1998	0.100 ppb	-2.303 (* Nondetect *)

Aug 14 1998	0.100 ppb	-2.303 (* Nondetect *)
Nov 23 1998	0.100 ppb	-2.303 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	0.100 ppb	Ln Minimum:	-2.303
Maximum:	0.100 ppb	Ln Maximum:	-2.303
Mean:	0.100 ppb	Ln Mean:	-2.303
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:36

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:
Phone:() -

Permit Type:Background

Constituent:N-NSPhen N-Nitrosodiphenylamine

CAS Number: 86-30-6
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 5.000 ppb

Start Date:Mar 09 1998
End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	2.500 ppb	0.916 (* Nondetect *)
May 14 1998	2.500 ppb	0.916 (* Nondetect *)
Aug 14 1998	2.500 ppb	0.916 (* Nondetect *)
Nov 23 1998	2.500 ppb	0.916 (* Nondetect *)

Well ID:13MW1 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	2.500 ppb	Ln Minimum:	0.916
Maximum:	2.500 ppb	Ln Maximum:	0.916
Mean:	2.500 ppb	Ln Mean:	0.916
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	2.500 ppb	0.916 (* Nondetect *)
May 14 1998	2.500 ppb	0.916 (* Nondetect *)

Aug 14 1998	2.500 ppb	0.916 (* Nondetect *)
Nov 23 1998	2.500 ppb	0.916 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	2.500 ppb	Ln Minimum:	0.916
Maximum:	2.500 ppb	Ln Maximum:	0.916
Mean:	2.500 ppb	Ln Mean:	0.916
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:36

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:
Phone:() -

Permit Type:Background

Constituent:NC Nitrocellulose

CAS Number: 9004-70-0

MCL: 0.000 ug/l

ACL: 0.000 ug/l

Detect Limit: 10.000 ug/l

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	5.000 ug/l	1.609 (* Nondetect *)
May 14 1998	5.000 ug/l	1.609 (* Nondetect *)
Aug 14 1998	5.000 ug/l	1.609 (* Nondetect *)

Well ID:13MW1 Summary Statistics

Observations (N): 3

Nondetects (%ND):100

Minimum:	5.000 ug/l	Ln Minimum:	1.609
Maximum:	5.000 ug/l	Ln Maximum:	1.609
Mean:	5.000 ug/l	Ln Mean:	1.609
Std. Dev.:	0.000 ug/l	Ln Std. Dev.:	0.000

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	5.000 ug/l	1.609 (* Nondetect *)
May 14 1998	5.000 ug/l	1.609 (* Nondetect *)
Aug 14 1998	5.000 ug/l	1.609 (* Nondetect *)

Nov 23 1998

5.000 ug/l

1.609 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	5.000 ug/l	Ln Minimum:	1.609
Maximum:	5.000 ug/l	Ln Maximum:	1.609
Mean:	5.000 ug/l	Ln Mean:	1.609
Std. Dev.:	0.000 ug/l	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:36

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:
Phone:() -

Permit Type:Background

Constituent:NGlycerin Nitroglycerin or1,2,3-Propanetriol,trinitrate

CAS Number: 55-63-0
MCL: 0.000 ug/l
ACL: 0.000 ug/l
Detect Limit: 10.000 ug/l

Start Date:Mar 09 1998
End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	5.000 ug/l	1.609 (* Nondetect *)
May 14 1998	5.000 ug/l	1.609 (* Nondetect *)
Aug 14 1998	5.000 ug/l	1.609 (* Nondetect *)
Nov 23 1998	5.000 ug/l	1.609 (* Nondetect *)

Well ID:13MW1 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	5.000 ug/l	Ln Minimum:	1.609
Maximum:	5.000 ug/l	Ln Maximum:	1.609
Mean:	5.000 ug/l	Ln Mean:	1.609
Std. Dev.:	0.000 ug/l	Ln Std. Dev.:	0.000

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	5.000 ug/l	1.609 (* Nondetect *)
May 14 1998	5.000 ug/l	1.609 (* Nondetect *)

Aug 14 1998	5.000 ug/l	1.609 (* Nondetect *)
Nov 23 1998	5.000 ug/l	1.609 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	5.000 ug/l	Ln Minimum:	1.609
Maximum:	5.000 ug/l	Ln Maximum:	1.609
Mean:	5.000 ug/l	Ln Mean:	1.609
Std. Dev.:	0.000 ug/l	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:37

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:NGuanidn Nitroguanidine

CAS Number: 556-88-7

MCL: 0.000 ug/l

ACL: 0.000 ug/l

Detect Limit: 10.000 ug/l

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	5.000 ug/l	1.609 (* Nondetect *)
May 14 1998	5.000 ug/l	1.609 (* Nondetect *)
Aug 14 1998	5.000 ug/l	1.609 (* Nondetect *)
Nov 23 1998	5.000 ug/l	1.609 (* Nondetect *)

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	5.000 ug/l	Ln Minimum:	1.609
Maximum:	5.000 ug/l	Ln Maximum:	1.609
Mean:	5.000 ug/l	Ln Mean:	1.609
Std. Dev.:	0.000 ug/l	Ln Std. Dev.:	0.000

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	5.000 ug/l	1.609 (* Nondetect *)
May 14 1998	5.000 ug/l	1.609 (* Nondetect *)

Aug 14 1998	5.000 ug/l	1.609 (* Nondetect *)
Nov 23 1998	5.000 ug/l	1.609 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
 Nondetects (%ND):100

Minimum:	5.000 ug/l	Ln Minimum:	1.609
Maximum:	5.000 ug/l	Ln Maximum:	1.609
Mean:	5.000 ug/l	Ln Mean:	1.609
Std. Dev.:	0.000 ug/l	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:37

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford

ST:VA Zip:

County:PULASKI

Contact:

Phone:() -

Permit Type:Background

Constituent:Nitrite Nitrite

CAS Number:14797-65-0

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 10.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	5.000 ppb	1.609 (* Nondetect *)
May 14 1998	5.000 ppb	1.609 (* Nondetect *)
Aug 14 1998	5.000 ppb	1.609 (* Nondetect *)
Nov 23 1998	5.000 ppb	1.609 (* Nondetect *)

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	5.000 ppb	Ln Maximum:	1.609
Mean:	5.000 ppb	Ln Mean:	1.609
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	5.000 ppb	1.609 (* Nondetect *)
May 14 1998	5.000 ppb	1.609 (* Nondetect *)

Aug 14 1998	5.000 ppb	1.609 (* Nondetect *)
Nov 23 1998	5.000 ppb	1.609 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	5.000 ppb	Ln Maximum:	1.609
Mean:	5.000 ppb	Ln Mean:	1.609
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:37

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:ONA o-Nitroaniline (2-Nitroaniline)

CAS Number: 88-74-4

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 50.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	25.000 ppb	3.219 (* Nondetect *)
May 14 1998	25.000 ppb	3.219 (* Nondetect *)
Aug 14 1998	25.000 ppb	3.219 (* Nondetect *)
Nov 23 1998	25.000 ppb	3.219 (* Nondetect *)

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	25.000 ppb	Ln Minimum:	3.219
Maximum:	25.000 ppb	Ln Maximum:	3.219
Mean:	25.000 ppb	Ln Mean:	3.219
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	25.000 ppb	3.219 (* Nondetect *)
May 14 1998	25.000 ppb	3.219 (* Nondetect *)

Aug 14 1998	25.000 ppb	3.219 (* Nondetect *)
Nov 23 1998	25.000 ppb	3.219 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	25.000 ppb	Ln Minimum:	3.219
Maximum:	25.000 ppb	Ln Maximum:	3.219
Mean:	25.000 ppb	Ln Mean:	3.219
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:46

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Phenols Phenols, total

CAS Number: 108-95-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 10.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	5.000 ppb	1.609 (* Nondetect *)
May 14 1998	5.000 ppb	1.609 (* Nondetect *)
Aug 14 1998	5.000 ppb	1.609 (* Nondetect *)
Nov 23 1998	5.000 ppb	1.609 (* Nondetect *)

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	5.000 ppb	Ln Maximum:	1.609
Mean:	5.000 ppb	Ln Mean:	1.609
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	5.000 ppb	1.609 (* Nondetect *)
May 14 1998	5.000 ppb	1.609 (* Nondetect *)

Aug 14 1998	5.000 ppb	1.609 (* Nondetect *)
Nov 23 1998	5.000 ppb	1.609 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	5.000 ppb	Ln Maximum:	1.609
Mean:	5.000 ppb	Ln Mean:	1.609
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:46

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:RDX Cyclotrimethylenetrinitramine; cyclonite

CAS Number: 121-82-4

MCL: 0.000 ug/l

ACL: 0.000 ug/l

Detect Limit: 10.000 ug/l

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	5.000 ug/l	1.609 (* Nondetect *)
May 14 1998	5.000 ug/l	1.609 (* Nondetect *)
Aug 14 1998	5.000 ug/l	1.609 (* Nondetect *)
Nov 23 1998	5.000 ug/l	1.609 (* Nondetect *)

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	5.000 ug/l	Ln Minimum:	1.609
Maximum:	5.000 ug/l	Ln Maximum:	1.609
Mean:	5.000 ug/l	Ln Mean:	1.609
Std. Dev.:	0.000 ug/l	Ln Std. Dev.:	0.000

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	5.000 ug/l	1.609 (* Nondetect *)
May 14 1998	5.000 ug/l	1.609 (* Nondetect *)

Aug 14 1998	5.000 ug/l	1.609 (* Nondetect *)
Nov 23 1998	5.000 ug/l	1.609 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	5.000 ug/l	Ln Minimum:	1.609
Maximum:	5.000 ug/l	Ln Maximum:	1.609
Mean:	5.000 ug/l	Ln Mean:	1.609
Std. Dev.:	0.000 ug/l	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:46

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Resorcin Resorcinol or 1,3-Benzenediol

CAS Number: 108-46-3

MCL: 0.000 ug/l

ACL: 0.000 ug/l

Detect Limit: 10.000 ug/l

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	5.000 ug/l	1.609 (* Nondetect *)
May 14 1998	5.000 ug/l	1.609 (* Nondetect *)
Aug 14 1998	5.000 ug/l	1.609 (* Nondetect *)
Nov 23 1998	5.000 ug/l	1.609 (* Nondetect *)

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	5.000 ug/l	Ln Minimum:	1.609
Maximum:	5.000 ug/l	Ln Maximum:	1.609
Mean:	5.000 ug/l	Ln Mean:	1.609
Std. Dev.:	0.000 ug/l	Ln Std. Dev.:	0.000

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	5.000 ug/l	1.609 (* Nondetect *)
May 14 1998	5.000 ug/l	1.609 (* Nondetect *)

Aug 14 1998	5.000 ug/l	1.609 (* Nondetect *)
Nov 23 1998	5.000 ug/l	1.609 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	5.000 ug/l	Ln Minimum:	1.609
Maximum:	5.000 ug/l	Ln Maximum:	1.609
Mean:	5.000 ug/l	Ln Mean:	1.609
Std. Dev.:	0.000 ug/l	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:46

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Sb Antimony, total

CAS Number: 7440-36-0

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 3.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	1.500 ppb	0.405 (* Nondetect *)
May 14 1998	1.500 ppb	0.405 (* Nondetect *)
Aug 14 1998	1.500 ppb	0.405 (* Nondetect *)
Nov 23 1998	1.500 ppb	0.405 (* Nondetect *)

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	1.500 ppb	Ln Minimum:	0.405
Maximum:	1.500 ppb	Ln Maximum:	0.405
Mean:	1.500 ppb	Ln Mean:	0.405
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	1.500 ppb	0.405 (* Nondetect *)
May 14 1998	1.500 ppb	0.405 (* Nondetect *)

Aug 14 1998	1.500 ppb	0.405 (* Nondetect *)
Nov 23 1998	1.500 ppb	0.405 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	1.500 ppb	Ln Minimum:	0.405
Maximum:	1.500 ppb	Ln Maximum:	0.405
Mean:	1.500 ppb	Ln Mean:	0.405
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:47

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:TNT 2,4,6-Trinitrotoluene; alpha-trinitrotoluene

CAS Number: 118-96-7

MCL: 0.000 ug/l

ACL: 0.000 ug/l

Detect Limit: 10.000 ug/l

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	5.000 ug/l	1.609 (* Nondetect *)
May 14 1998	5.000 ug/l	1.609 (* Nondetect *)
Aug 14 1998	5.000 ug/l	1.609 (* Nondetect *)
Nov 23 1998	5.000 ug/l	1.609 (* Nondetect *)

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	5.000 ug/l	Ln Minimum:	1.609
Maximum:	5.000 ug/l	Ln Maximum:	1.609
Mean:	5.000 ug/l	Ln Mean:	1.609
Std. Dev.:	0.000 ug/l	Ln Std. Dev.:	0.000

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	5.000 ug/l	1.609 (* Nondetect *)
May 14 1998	5.000 ug/l	1.609 (* Nondetect *)

Aug 14 1998	5.000 ug/l	1.609 (* Nondetect *)
Nov 23 1998	5.000 ug/l	1.609 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	5.000 ug/l	Ln Minimum:	1.609
Maximum:	5.000 ug/l	Ln Maximum:	1.609
Mean:	5.000 ug/l	Ln Mean:	1.609
Std. Dev.:	0.000 ug/l	Ln Std. Dev.:	0.000

Parametric Prediction Interval
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Facility:Haz. Waste Unit 13 - RAAP
Parameter:Fluoride(CAS Number:16984-48-8)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Shapiro-Wilk (W): 0.9477
Critical W, $\alpha=0.01$: 0.7490
Mean: 225.000 ppb
Std Dev: 22.039 ppb
DF: 7
Conf. Level (1- α): ~~0.9500~~ 0.9900
Future Samples (k): 1
 $t \left[\begin{array}{c} 1 - \alpha \\ - \\ k \end{array} \right]$: 2.9980
Kappa: 3.1798
UL: 295.080 ppb
LL: $-\infty$

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:13MW3

<u>Sample Date</u>	<u>Observation</u>
11/23/98	340.000 ppb *

Well:13MW4

<u>Sample Date</u>	<u>Observation</u>
11/23/98	340.000 ppb *

Well:13MW5

<u>Sample Date</u>	<u>Observation</u>
11/23/98	440.000 ppb *

Well:13MW6

<u>Sample Date</u>	<u>Observation</u>
11/23/98	440.000 ppb *

Well:13MW7

<u>Sample Date</u>	<u>Observation</u>
11/23/98	290.000 ppb

Parametric Prediction Interval
Report Printed February 17,1999

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Facility:Haz. Waste Unit 13 - RAAP
Parameter:Magnesium, total (CAS Number:7439-95-4)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Shapiro-Wilk (W): 0.8751
Critical W, $\alpha=0.01$: 0.7490
Mean: 34150.000 ppb
Std Dev: 9843.345 ppb
DF: 7
Conf. Level (1- α): ~~0.9500~~ 0.9900
Future Samples (k): 1
 $t_{\left[\begin{array}{c} 1 - \alpha \\ - \\ k \end{array} \right]}$: 2.9980
Kappa: 3.1798
UL: 65449.953 ppb
LL: $-\infty$

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:13MW3

<u>Sample Date</u>	<u>Observation</u>
11/23/98	29100.000 ppb

Well:13MW4

<u>Sample Date</u>	<u>Observation</u>
11/23/98	43800.000 ppb

Well:13MW5

<u>Sample Date</u>	<u>Observation</u>
11/23/98	49700.000 ppb

Well:13MW6

<u>Sample Date</u>	<u>Observation</u>
11/23/98	34800.000 ppb

Well:13MW7

<u>Sample Date</u>	<u>Observation</u>
11/23/98	32500.000 ppb

Parametric Prediction Interval
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Facility:Haz. Waste Unit 13 - RAAP
Parameter:Nitrate(CAS Number:14797-55-8)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Shapiro-Wilk (W): 0.9528
Critical W, $\alpha=0.01$: 0.7490
Mean: 531.250 ppb
Std Dev: 145.154 ppb
DF: 7
Conf. Level (1- α): ~~0.9500~~ 0.9900
Future Samples (k): 1
 $t \left[\begin{array}{c} 1 - \alpha \\ - \\ k \end{array} \right]$: 2.9980
Kappa: 3.1798
UL: 992.812 ppb
LL: $-\infty$

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:13MW3

<u>Sample Date</u>	<u>Observation</u>
11/23/98	ND<100.000 ppb

Well:13MW4

<u>Sample Date</u>	<u>Observation</u>
11/23/98	6160.000 ppb *

Well:13MW5

<u>Sample Date</u>	<u>Observation</u>
11/23/98	5450.000 ppb *

Well:13MW6

<u>Sample Date</u>	<u>Observation</u>
11/23/98	750.000 ppb

Well:13MW7

<u>Sample Date</u>	<u>Observation</u>
11/23/98	1190.000 ppb *

Parametric Prediction Interval
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Facility:Haz. Waste Unit 13 - RAAP
Parameter:pH, Field(CAS Number:- -)

TWO-TAILED PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Shapiro-Wilk (W): 0.9568
Critical W, $\alpha=0.01$: 0.7490
Mean: 6.725 SU
Std Dev: 0.255 SU
DF: 7
Conf. Level (1- α): ~~0.9500~~ 0.9900
Future Samples (k): 1
 $t \left[\frac{1 - \alpha}{2 \cdot k} \right]$: 3.4995
Kappa: 3.7118
UL: 7.671 SU
LL: 5.779 SU

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:13MW3

<u>Sample Date</u>	<u>Observation</u>
11/23/98	7.300 SU

Well:13MW4

<u>Sample Date</u>	<u>Observation</u>
11/23/98	7.100 SU

Well:13MW5

<u>Sample Date</u>	<u>Observation</u>
11/23/98	7.000 SU

Well:13MW6

<u>Sample Date</u>	<u>Observation</u>
11/23/98	7.200 SU

Well:13MW7

<u>Sample Date</u>	<u>Observation</u>
11/23/98	7.300 SU

Parametric Prediction Interval
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Facility:Haz. Waste Unit 13 - RAAP
Parameter:Specific Conductivity, Field(CAS Number:- -)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Shapiro-Wilk (W): 0.8535
Critical W, $\alpha=0.01$: 0.7490
Mean: 597.125 umhos/cm
Std Dev: 43.036 umhos/cm
DF: 7
Conf. Level (1- α): ~~0.9500~~ 0.9900
Future Samples (k): 1
 $t \left[\begin{array}{c} 1 - \alpha \\ - \\ k \end{array} \right]$: 2.9980
Kappa: 3.1798
UL: 733.972 umhos/cm
LL: $-\infty$

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:13MW3

<u>Sample Date</u>	<u>Observation</u>
11/23/98	625.000 umhos/cm

Well:13MW4

<u>Sample Date</u>	<u>Observation</u>
11/23/98	625.000 umhos/cm

Well:13MW5

<u>Sample Date</u>	<u>Observation</u>
11/23/98	625.000 umhos/cm

Well:13MW6

<u>Sample Date</u>	<u>Observation</u>
11/23/98	678.000 umhos/cm

Well:13MW7

<u>Sample Date</u>	<u>Observation</u>
11/23/98	613.000 umhos/cm

Nonparametric Prediction Interval

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Facility: Haz. Waste Unit 13 - RAAP
Parameter: Aluminum, total (CAS Number: 7429-90-5)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Conf. Level (1- α): ~~88.890%~~ 90.000% $\pm$ 10.000%

UL: 6090.000 ppb

LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well: 13MW3

<u>Sample Date</u>	<u>Observation</u>
11/23/98	388.000 ppb

Well: 13MW4

<u>Sample Date</u>	<u>Observation</u>
11/23/98	4680.000 ppb

Well: 13MW5

<u>Sample Date</u>	<u>Observation</u>
11/23/98	3600.000 ppb

Well: 13MW6

<u>Sample Date</u>	<u>Observation</u>
11/23/98	991.000 ppb

Well: 13MW7

<u>Sample Date</u>	<u>Observation</u>
11/23/98	243.000 ppb

Nonparametric Prediction Interval
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Facility:Haz. Waste Unit 13 - RAAP
Parameter:Arsenic, total (CAS Number:7440-38-2)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Conf. Level (1- α): ~~88.890%~~ 90.000% $\pm$ 10.000%

UL: 3.000 ppb
LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:13MW3

<u>Sample Date</u>	<u>Observation</u>
11/23/98	2.000 ppb

Well:13MW4

<u>Sample Date</u>	<u>Observation</u>
11/23/98	2.000 ppb

Well:13MW5

<u>Sample Date</u>	<u>Observation</u>
11/23/98	ND<1.000 ppb

Well:13MW6

<u>Sample Date</u>	<u>Observation</u>
11/23/98	ND<1.000 ppb

Well:13MW7

<u>Sample Date</u>	<u>Observation</u>
11/23/98	ND<1.000 ppb

Nonparametric Prediction Interval

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Facility: Haz. Waste Unit 13 - RAAP
Parameter: Boron (CAS Number: 7440-42-8)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Conf. Level (1- α): ~~88.890%~~ 90.000% $\pm$ 10.000%

UL: 144.000 ppb
LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well: 13MW3

<u>Sample Date</u>	<u>Observation</u>
11/23/98	ND<50.000 ppb

Well: 13MW4

<u>Sample Date</u>	<u>Observation</u>
11/23/98	ND<50.000 ppb

Well: 13MW5

<u>Sample Date</u>	<u>Observation</u>
11/23/98	52.000 ppb

Well: 13MW6

<u>Sample Date</u>	<u>Observation</u>
11/23/98	60.000 ppb

Well: 13MW7

<u>Sample Date</u>	<u>Observation</u>
11/23/98	ND<50.000 ppb

Nonparametric Prediction Interval

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Facility:Haz. Waste Unit 13 - RAAP
Parameter:Calcium, total(CAS Number:7440-70-2)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Conf. Level (1- α): ~~88-890%~~ 90.000% $\pm$ 10.000%

UL: 127000.000 ppb

LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:13MW3

<u>Sample Date</u>	<u>Observation</u>
11/23/98	78800.000 ppb

Well:13MW4

<u>Sample Date</u>	<u>Observation</u>
11/23/98	94900.000 ppb

Well:13MW5

<u>Sample Date</u>	<u>Observation</u>
11/23/98	109000.000 ppb

Well:13MW6

<u>Sample Date</u>	<u>Observation</u>
11/23/98	94500.000 ppb

Well:13MW7

<u>Sample Date</u>	<u>Observation</u>
11/23/98	85200.000 ppb

Nonparametric Prediction Interval

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Facility: Haz. Waste Unit 13 - RAAP
Parameter: Chloride (CAS Number: 16887-00-6)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Conf. Level (1- α): ~~88-89%~~ 90.000% ~~10.000%~~

UL: 24800.000 ppm
LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well: 13MW3

<u>Sample Date</u>	<u>Observation</u>
11/23/98	3000.000 ppm

Well: 13MW4

<u>Sample Date</u>	<u>Observation</u>
11/23/98	10500.000 ppm

Well: 13MW5

<u>Sample Date</u>	<u>Observation</u>
11/23/98	10200.000 ppm

Well: 13MW6

<u>Sample Date</u>	<u>Observation</u>
11/23/98	7900.000 ppm

Well: 13MW7

<u>Sample Date</u>	<u>Observation</u>
11/23/98	6000.000 ppm

Nonparametric Prediction Interval
Report Printed February 17,1999

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Facility:Haz. Waste Unit 13 - RAAP
Parameter:Chromium, total(CAS Number:7440-47-3)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Conf. Level (1- α): ~~88.890%~~ 90.000% ~~±10.000%~~

UL: 112.000 ppb
LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:13MW3

<u>Sample Date</u>	<u>Observation</u>
11/23/98	7.000 ppb

Well:13MW4

<u>Sample Date</u>	<u>Observation</u>
11/23/98	46.000 ppb

Well:13MW5

<u>Sample Date</u>	<u>Observation</u>
11/23/98	29.000 ppb

Well:13MW6

<u>Sample Date</u>	<u>Observation</u>
11/23/98	8.000 ppb

Well:13MW7

<u>Sample Date</u>	<u>Observation</u>
11/23/98	4.000 ppb

Nonparametric Prediction Interval

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Facility: Haz. Waste Unit 13 - RAAP
Parameter: Copper, total (CAS Number: 7440-50-8)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Conf. Level (1- α): ~~88.890%~~ 90.000% ~~± 10.000%~~

UL: 9.000 ppb

LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well: 13MW3

<u>Sample Date</u>	<u>Observation</u>
11/23/98	ND < 1.000 ppb

Well: 13MW4

<u>Sample Date</u>	<u>Observation</u>
11/23/98	7.000 ppb

Well: 13MW5

<u>Sample Date</u>	<u>Observation</u>
11/23/98	6.000 ppb

Well: 13MW6

<u>Sample Date</u>	<u>Observation</u>
11/23/98	2.000 ppb

Well: 13MW7

<u>Sample Date</u>	<u>Observation</u>
11/23/98	1.000 ppb

Nonparametric Prediction Interval
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Facility:Haz. Waste Unit 13 - RAAP
Parameter:Iron, total(CAS Number:7439-89-6)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Conf. Level (1- α): ~~88.890%~~ 90.000% $\pm$ 10.000%

UL: 11800.000 ppb
LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:13MW3

<u>Sample Date</u>	<u>Observation</u>
11/23/98	733.000 ppb

Well:13MW4

<u>Sample Date</u>	<u>Observation</u>
11/23/98	6900.000 ppb

Well:13MW5

<u>Sample Date</u>	<u>Observation</u>
11/23/98	5690.000 ppb

Well:13MW6

<u>Sample Date</u>	<u>Observation</u>
11/23/98	1580.000 ppb

Well:13MW7

<u>Sample Date</u>	<u>Observation</u>
11/23/98	557.000 ppb

Nonparametric Prediction Interval

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Facility: Haz. Waste Unit 13 - RAAP
Parameter: Manganese, total (CAS Number: 7439-96-5)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Conf. Level (1- α): ~~88.890%~~ 90.000% $\pm 10.000\%$

UL: 186.000 ppb

LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well: 13MW3

<u>Sample Date</u>	<u>Observation</u>
11/23/98	21.000 ppb

Well: 13MW4

<u>Sample Date</u>	<u>Observation</u>
11/23/98	88.000 ppb

Well: 13MW5

<u>Sample Date</u>	<u>Observation</u>
11/23/98	90.000 ppb

Well: 13MW6

<u>Sample Date</u>	<u>Observation</u>
11/23/98	65.000 ppb

Well: 13MW7

<u>Sample Date</u>	<u>Observation</u>
11/23/98	77.000 ppb

Nonparametric Prediction Interval
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Facility:Haz. Waste Unit 13 - RAAP
Parameter:Nickel, total(CAS Number:7440-02-0)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Conf. Level (1- α): ~~88.890%~~ 90.000% $\pm$ 10.000%

UL: 44.000 ppb
LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:13MW3

<u>Sample Date</u>	<u>Observation</u>
11/23/98	3080.000 ppb *

Well:13MW4

<u>Sample Date</u>	<u>Observation</u>
11/23/98	25.000 ppb

Well:13MW5

<u>Sample Date</u>	<u>Observation</u>
11/23/98	23.000 ppb

Well:13MW6

<u>Sample Date</u>	<u>Observation</u>
11/23/98	21.000 ppb

Well:13MW7

<u>Sample Date</u>	<u>Observation</u>
11/23/98	15.000 ppb

Nonparametric Prediction Interval
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Facility:Haz. Waste Unit 13 - RAAP
Parameter:Lead, total(CAS Number:7439-92-1)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Conf. Level (1- α): ~~88.890%~~ 90.000% $\pm 10.000\%$

UL: 6.000 ppb
LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:13MW3

<u>Sample Date</u>	<u>Observation</u>
11/23/98	4.000 ppb

Well:13MW4

<u>Sample Date</u>	<u>Observation</u>
11/23/98	7.000 ppb *

Well:13MW5

<u>Sample Date</u>	<u>Observation</u>
11/23/98	12.000 ppb *

Well:13MW6

<u>Sample Date</u>	<u>Observation</u>
11/23/98	2.000 ppb

Well:13MW7

<u>Sample Date</u>	<u>Observation</u>
11/23/98	1.000 ppb

Nonparametric Prediction Interval
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Facility:Haz. Waste Unit 13 - RAAP
Parameter:Sodium(CAS Number:7440-23-5)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Conf. Level (1- α): ~~88.890%~~ 90.000% ~~± 10.000%~~

UL: 13200.000 ppb
LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:13MW3

<u>Sample Date</u>	<u>Observation</u>
11/23/98	11700.000 ppb

Well:13MW4

<u>Sample Date</u>	<u>Observation</u>
11/23/98	10300.000 ppb

Well:13MW5

<u>Sample Date</u>	<u>Observation</u>
11/23/98	13500.000 ppb *

Well:13MW6

<u>Sample Date</u>	<u>Observation</u>
11/23/98	7230.000 ppb

Well:13MW7

<u>Sample Date</u>	<u>Observation</u>
11/23/98	8490.000 ppb

Nonparametric Prediction Interval
Report Printed February 17,1999

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Facility:Haz. Waste Unit 13 - RAAP
Parameter:Selenium, total(CAS Number:7782-49-2)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Conf. Level (1- α): ~~88.890%~~ 90.000% $\pm$ 10.000%

UL: 2.000 ppb
LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:13MW3

<u>Sample Date</u>	<u>Observation</u>
11/23/98	ND<1.000 ppb

Well:13MW4

<u>Sample Date</u>	<u>Observation</u>
11/23/98	ND<1.000 ppb

Well:13MW5

<u>Sample Date</u>	<u>Observation</u>
11/23/98	ND<1.000 ppb

Well:13MW6

<u>Sample Date</u>	<u>Observation</u>
11/23/98	ND<1.000 ppb

Well:13MW7

<u>Sample Date</u>	<u>Observation</u>
11/23/98	ND<1.000 ppb

Nonparametric Prediction Interval
Report Printed February 17,1999

Page 1

Facility:Haz. Waste Unit 13 - RAAP
Parameter:Sulfate, total(CAS Number:14808-79-8)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Conf. Level (1- α): ~~88.890%~~ 90.000% $\pm$ 10.000%

UL: 73900.000 ppb
LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:13MW3

<u>Sample Date</u>	<u>Observation</u>
11/23/98	117000.000 ppb *

Well:13MW4

<u>Sample Date</u>	<u>Observation</u>
11/23/98	73800.000 ppb

Well:13MW5

<u>Sample Date</u>	<u>Observation</u>
11/23/98	88900.000 ppb *

Well:13MW6

<u>Sample Date</u>	<u>Observation</u>
11/23/98	132000.000 ppb *

Well:13MW7

<u>Sample Date</u>	<u>Observation</u>
11/23/98	114000.000 ppb *

Nonparametric Prediction Interval

Report Printed February 17,1999

Page 1

Facility:Haz. Waste Unit 13 - RAAP
Parameter:Total Organic Carbon(CAS Number:- -)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Conf. Level (1- α): ~~88.890%~~ 90.000% $\pm$ 10.000%

UL: 1000.000 ppb

LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:13MW3

<u>Sample Date</u>	<u>Observation</u>
11/23/98	ND<1000.000 ppb

Well:13MW4

<u>Sample Date</u>	<u>Observation</u>
11/23/98	ND<1000.000 ppb

Well:13MW5

<u>Sample Date</u>	<u>Observation</u>
11/23/98	ND<1000.000 ppb

Well:13MW6

<u>Sample Date</u>	<u>Observation</u>
11/23/98	ND<1000.000 ppb

Well:13MW7

<u>Sample Date</u>	<u>Observation</u>
11/23/98	ND<1000.000 ppb

Nonparametric Prediction Interval

Report Printed February 17, 1999

Page 1

Facility: Haz. Waste Unit 13 - RAAP

Parameter: Total Organic Halogens, Halides (CAS Number: - -)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Conf. Level (1- α): ~~88.890%~~ 90.000% $\pm$ 10.000%

UL: 25.500 ppb

LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well: 13MW3

<u>Sample Date</u>	<u>Observation</u>
11/23/98	12.500 ppb

Well: 13MW4

<u>Sample Date</u>	<u>Observation</u>
11/23/98	7.000 ppb

Well: 13MW5

<u>Sample Date</u>	<u>Observation</u>
11/23/98	ND<5.000 ppb

Well: 13MW6

<u>Sample Date</u>	<u>Observation</u>
11/23/98	ND<5.000 ppb

Well: 13MW7

<u>Sample Date</u>	<u>Observation</u>
11/23/98	6.000 ppb

Nonparametric Prediction Interval
Report Printed February 17,1999

Page 1

Facility:Haz. Waste Unit 13 - RAAP
Parameter:Zinc, total(CAS Number:7440-66-6)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Conf. Level (1- α): ~~88.890%~~ 90.000% ~~+ 10.000%~~

UL: 29.000 ppb
LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:13MW3

<u>Sample Date</u>	<u>Observation</u>
11/23/98	10.000 ppb

Well:13MW4

<u>Sample Date</u>	<u>Observation</u>
11/23/98	22.000 ppb

Well:13MW5

<u>Sample Date</u>	<u>Observation</u>
11/23/98	22.000 ppb

Well:13MW6

<u>Sample Date</u>	<u>Observation</u>
11/23/98	11.000 ppb

Well:13MW7

<u>Sample Date</u>	<u>Observation</u>
11/23/98	24.000 ppb

Data Set Summary

Report Printed: 02-24-1999 10:47

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:TethG1Dn Triethylene glycol dinitrate

CAS Number: - -

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 10.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	5.000 ppb	1.609 (* Nondetect *)
May 14 1998	5.000 ppb	1.609 (* Nondetect *)
Aug 14 1998	5.000 ppb	1.609 (* Nondetect *)
Nov 23 1998	5.000 ppb	1.609 (* Nondetect *)

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	5.000 ppb	Ln Maximum:	1.609
Mean:	5.000 ppb	Ln Mean:	1.609
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	5.000 ppb	1.609 (* Nondetect *)
May 14 1998	5.000 ppb	1.609 (* Nondetect *)

Aug 14 1998	5.000 ppb	1.609 (* Nondetect *)
Nov 23 1998	5.000 ppb	1.609 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	5.000 ppb	Ln Maximum:	1.609
Mean:	5.000 ppb	Ln Mean:	1.609
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:47

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:
Phone:() -

Permit Type:Background

Constituent:Tetryl Tetryl; N-Methyl-N,2,4,6-tetranitrobenzenamin

CAS Number: 479-45-8

MCL: 0.000 ug/l

ACL: 0.000 ug/l

Detect Limit: 10.000 ug/l

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	5.000 ug/l	1.609 (* Nondetect *)
May 14 1998	5.000 ug/l	1.609 (* Nondetect *)
Aug 14 1998	5.000 ug/l	1.609 (* Nondetect *)
Nov 23 1998	5.000 ug/l	1.609 (* Nondetect *)

Well ID:13MW1 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	5.000 ug/l	Ln Minimum:	1.609
Maximum:	5.000 ug/l	Ln Maximum:	1.609
Mean:	5.000 ug/l	Ln Mean:	1.609
Std. Dev.:	0.000 ug/l	Ln Std. Dev.:	0.000

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	5.000 ug/l	1.609 (* Nondetect *)
May 14 1998	5.000 ug/l	1.609 (* Nondetect *)

Aug 14 1998	5.000 ug/l	1.609 (* Nondetect *)
Nov 23 1998	5.000 ug/l	1.609 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	5.000 ug/l	Ln Minimum:	1.609
Maximum:	5.000 ug/l	Ln Maximum:	1.609
Mean:	5.000 ug/l	Ln Mean:	1.609
Std. Dev.:	0.000 ug/l	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:47

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:TmethTni Trimethyloethane trinitrate

CAS Number: - -

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 10.000 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	5.000 ppb	1.609 (* Nondetect *)
May 14 1998	5.000 ppb	1.609 (* Nondetect *)
Aug 14 1998	5.000 ppb	1.609 (* Nondetect *)
Nov 23 1998	5.000 ppb	1.609 (* Nondetect *)

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	5.000 ppb	Ln Maximum:	1.609
Mean:	5.000 ppb	Ln Mean:	1.609
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	5.000 ppb	1.609 (* Nondetect *)
May 14 1998	5.000 ppb	1.609 (* Nondetect *)

Aug 14 1998	5.000 ppb	1.609 (* Nondetect *)
Nov 23 1998	5.000 ppb	1.609 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	5.000 ppb	Ln Maximum:	1.609
Mean:	5.000 ppb	Ln Mean:	1.609
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:48

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:
Phone: () -

Permit Type:Background

Constituent:Toluen Toluene

CAS Number: 108-88-3
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 0.100 ppb

Start Date:Mar 09 1998
End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	0.050 ppb	-2.996 (* Nondetect *)
May 14 1998	0.050 ppb	-2.996 (* Nondetect *)
Aug 14 1998	0.050 ppb	-2.996 (* Nondetect *)
Nov 23 1998	0.050 ppb	-2.996 (* Nondetect *)

Well ID:13MW1 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.050 ppb	Ln Maximum:	-2.996
Mean:	0.050 ppb	Ln Mean:	-2.996
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	0.050 ppb	-2.996 (* Nondetect *)
May 14 1998	0.050 ppb	-2.996 (* Nondetect *)

Aug 14 1998	0.050 ppb	-2.996 (* Nondetect *)
Nov 23 1998	0.050 ppb	-2.996 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.050 ppb	Ln Maximum:	-2.996
Mean:	0.050 ppb	Ln Mean:	-2.996
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:48

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:VC Vinyl chloride

CAS Number: 75-01-4

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.100 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	0.050 ppb	-2.996 (* Nondetect *)
May 14 1998	0.050 ppb	-2.996 (* Nondetect *)
Aug 14 1998	0.050 ppb	-2.996 (* Nondetect *)
Nov 23 1998	0.050 ppb	-2.996 (* Nondetect *)

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.050 ppb	Ln Maximum:	-2.996
Mean:	0.050 ppb	Ln Mean:	-2.996
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	0.050 ppb	-2.996 (* Nondetect *)
May 14 1998	0.050 ppb	-2.996 (* Nondetect *)

Aug 14 1998	0.050 ppb	-2.996 (* Nondetect *)
Nov 23 1998	0.050 ppb	-2.996 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.050 ppb	Ln Maximum:	-2.996
Mean:	0.050 ppb	Ln Mean:	-2.996
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:48

Facility:RAAPHWMU13 Haz. Waste Unit 13 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Xylene Xylene

CAS Number: 1330-20-7

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.100 ppb

Start Date:Mar 09 1998

End Date:Nov 23 1998

Well ID:13MW1

Sample Date	Observation	Ln
Mar 09 1998	0.050 ppb	-2.996 (* Nondetect *)
May 14 1998	0.050 ppb	-2.996 (* Nondetect *)
Aug 14 1998	0.050 ppb	-2.996 (* Nondetect *)
Nov 23 1998	0.050 ppb	-2.996 (* Nondetect *)

Well ID:13MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.050 ppb	Ln Maximum:	-2.996
Mean:	0.050 ppb	Ln Mean:	-2.996
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:13MW2

Sample Date	Observation	Ln
Mar 09 1998	0.050 ppb	-2.996 (* Nondetect *)
May 14 1998	0.050 ppb	-2.996 (* Nondetect *)

Aug 14 1998	0.050 ppb	-2.996 (* Nondetect *)
Nov 23 1998	0.050 ppb	-2.996 (* Nondetect *)

Well ID:13MW2 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.050 ppb	Ln Maximum:	-2.996
Mean:	0.050 ppb	Ln Mean:	-2.996
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Parametric Prediction Interval
Report Printed February 17,1999

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Facility:Haz. Waste Unit 13 - RAAP
Parameter:Barium, total(CAS Number:7440-39-3)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Shapiro-Wilk (W): 0.9285
Critical W, $\alpha=0.01$: 0.7490
Mean: 159.875 ppb
Std Dev: 55.231 ppb
DF: 7
Conf. Level (1- α): ~~0.9500~~ 0.9900
Future Samples (k): 1
 $t \left[\begin{array}{c} 1 - \alpha \\ - \\ k \end{array} \right]$: 2.9980
Kappa: 3.1798
UL: 335.498 ppb
LL: $-\infty$

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:13MW3

<u>Sample Date</u>	<u>Observation</u>
11/23/98	121.000 ppb

Well:13MW4

<u>Sample Date</u>	<u>Observation</u>
11/23/98	105.000 ppb

Well:13MW5

<u>Sample Date</u>	<u>Observation</u>
11/23/98	136.000 ppb

Well:13MW6

<u>Sample Date</u>	<u>Observation</u>
11/23/98	94.000 ppb

Well:13MW7

<u>Sample Date</u>	<u>Observation</u>
11/23/98	139.000 ppb

V

APPENDIX H
HWMU-16 STATISTICAL ANALYSIS RESULTS

Data Set Summary

Report Printed: 02-15-1999 09:52

Facility:16RAAPHWHU Haz Waste Unit 16 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Detection
Compliance

Constituent:TOC Total Organic Carbon

CAS Number: - -

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1000.000 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	500.000 ppb	6.215 (* Nondetect *)
Apr 30 1998	1025.000 ppb	6.932
Aug 04 1998	500.000 ppb	6.215 (* Nondetect *)
Nov 09 1998	500.000 ppb	6.215 (* Nondetect *)

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 75

Minimum:	500.000 ppb	Ln Minimum:	6.215
Maximum:	1025.000 ppb	Ln Maximum:	6.932
Mean:	631.250 ppb	Ln Mean:	6.394
Std. Dev.:	262.500 ppb	Ln Std. Dev.:	0.359

Data Set Summary

Report Printed: 02-15-1999 09:55

Facility:16RAAPHWU Haz Waste Unit 16 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:~~Detection~~
Compliance

Constituent:TOX Total Organic Halogens, Halides

CAS Number: - -

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 5.000 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	30.000 ppb	3.401
Apr 30 1998	2.500 ppb	0.916 (* Nondetect *)
Aug 04 1998	2.500 ppb	0.916 (* Nondetect *)
Nov 09 1998	14.500 ppb	2.674

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 50

Minimum:	2.500 ppb	Ln Minimum:	0.916
Maximum:	30.000 ppb	Ln Maximum:	3.401
Mean:	12.375 ppb	Ln Mean:	1.977
Std. Dev.:	13.041 ppb	Ln Std. Dev.:	1.260

Normality Tests

Report Printed: 02-15-1999 10:00

Facility:16RAAPHWHU Haz Waste Unit 16 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Detection
Compliance

Constituent:TOX Total Organic Halogens, Halides

CAS Number: - -

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 5.000 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Normality Test on Observations for wells listed below:

Well:16C1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	2.500	30.000	12.375	13.041
Log:	0.916	3.401	1.977	1.260

Pooled Statistics

Observations: 4

Statistic	Original	Log
	Scale	Scale
Mean:	12.375	1.977
Std Dev:	13.041	1.260
Skewness:	0.618	0.162
Kurtosis:	-1.225	-1.787
Minimum:	2.500	0.916
Maximum:	30.000	3.401
CV:	1.054	0.637

Shapiro-Wilk Statistics

	Test	5% Critical	1% Critical
Scale Statistic	Value	Value	
Original:	0.9478	0.7480	0.6870
Log:	0.9216	0.7480	0.6870

* Indicates statistically significant evidence of non-normality.

Data Set Summary

Report Printed: 02-15-1999 09:56

Facility:16RAAPHWHU Haz Waste Unit 16 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:~~Detection~~
Compliance

Constituent:Sb Antimony, total

CAS Number: 7440-36-0

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 3.000 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	1.500 ppb	0.405 (* Nondetect *)
Apr 30 1998	1.500 ppb	0.405 (* Nondetect *)
Aug 04 1998	1.500 ppb	0.405 (* Nondetect *)
Nov 09 1998	1.500 ppb	0.405 (* Nondetect *)

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	1.500 ppb	Ln Minimum:	0.405
Maximum:	1.500 ppb	Ln Maximum:	0.405
Mean:	1.500 ppb	Ln Mean:	0.405
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 09:56

Facility:16RAAPHWMU Haz Waste Unit 16 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:~~Detection~~
Compliance

Constituent:As Arsenic, total

CAS Number: 7440-38-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	0.500 ppb	-0.693 (* Nondetect *)
Apr 30 1998	0.500 ppb	-0.693 (* Nondetect *)
Aug 04 1998	0.500 ppb	-0.693 (* Nondetect *)
Nov 09 1998	0.500 ppb	-0.693 (* Nondetect *)

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.500 ppb	Ln Minimum:	-0.693
Maximum:	0.500 ppb	Ln Maximum:	-0.693
Mean:	0.500 ppb	Ln Mean:	-0.693
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 09:57

Facility:16RAAPHWHU Haz Waste Unit 16 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:~~Detection~~

Compliance

Constituent:Ba Barium, total

CAS Number: 7440-39-3

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 2.000 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	152.000 ppb	5.024
Apr 30 1998	128.000 ppb	4.852
Aug 04 1998	144.000 ppb	4.970
Nov 09 1998	160.000 ppb	5.075

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	128.000 ppb	Ln Minimum:	4.852
Maximum:	160.000 ppb	Ln Maximum:	5.075
Mean:	146.000 ppb	Ln Mean:	4.980
Std. Dev.:	13.663 ppb	Ln Std. Dev.:	0.096

Normality Tests

Report Printed: 02-15-1999 11:33

Facility:16RAAPHWMU Haz Waste Unit 16 ~ RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:

Phone:() -

Permit Type:Background

Constituent:Ba Barium, total

CAS Number: 7440-39-3

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 2.000 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Normality Test on Observations for wells listed below:

Well:16C1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	128.000	160.000	146.000	13.663
Log:	4.852	5.075	4.980	0.096

Pooled Statistics

Observations: 4

Statistic	Original Scale	Log Scale
Mean:	146.000	4.980
Std Dev:	13.663	0.096
Skewness:	-0.435	-0.514
Kurtosis:	-1.154	-1.117
Minimum:	128.000	4.852
Maximum:	160.000	5.075
CV:	0.094	0.019

Shapiro-Wilk Statistics

	Test	5% Critical	1% Critical
Scale	Statistic	Value	Value
Original:	1.0830	0.7480	0.6870
Log:	1.0704	0.7480	0.6870

* Indicates statistically significant evidence of non-normality.

Data Set Summary

Report Printed: 02-15-1999 09:57

Facility:16RAAPHWHU Haz Waste Unit 16 - RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:

Phone:() -

Permit Type:~~Detection~~
Compliance

Constituent:Be Beryllium, total

CAS Number: 7440-41-7

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.200 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	0.100 ppb	-2.303 (* Nondetect *)
Apr 30 1998	0.100 ppb	-2.303 (* Nondetect *)
Aug 04 1998	0.100 ppb	-2.303 (* Nondetect *)
Nov 09 1998	0.100 ppb	-2.303 (* Nondetect *)

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.100 ppb	Ln Minimum:	-2.303
Maximum:	0.100 ppb	Ln Maximum:	-2.303
Mean:	0.100 ppb	Ln Mean:	-2.303
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 10:47

Facility:16RAAPHWHU Haz Waste Unit 16 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:~~Detection~~
Compliance

Constituent:Bromofrm Bromoform

CAS Number: 75-25-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.300 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	0.150 ppb	-1.897 (* Nondetect *)
Apr 30 1998	0.150 ppb	-1.897 (* Nondetect *)
Aug 04 1998	0.150 ppb	-1.897 (* Nondetect *)
Nov 09 1998	0.150 ppb	-1.897 (* Nondetect *)

Well ID:16C1 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	0.150 ppb	Ln Minimum:	-1.897
Maximum:	0.150 ppb	Ln Maximum:	-1.897
Mean:	0.150 ppb	Ln Mean:	-1.897
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 10:47

Facility:16RAAPHWHU Haz Waste Unit 16 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:~~Detection~~
Compliance

Constituent:Cd Cadmium, total

CAS Number: 7440-43-9

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.100 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	0.050 ppb	-2.996 (* Nondetect *)
Apr 30 1998	0.050 ppb	-2.996 (* Nondetect *)
Aug 04 1998	0.050 ppb	-2.996 (* Nondetect *)
Nov 09 1998	0.050 ppb	-2.996 (* Nondetect *)

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.050 ppb	Ln Maximum:	-2.996
Mean:	0.050 ppb	Ln Mean:	-2.996
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 10:48

Facility:16RAAPHWHU Haz Waste Unit 16 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:~~Detection~~
Compliance

Constituent:CCl4 Carbon tetrachloride

CAS Number: 56-23-5

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.200 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	0.100 ppb	-2.303 (* Nondetect *)
Apr 30 1998	0.100 ppb	-2.303 (* Nondetect *)
Aug 04 1998	0.100 ppb	-2.303 (* Nondetect *)
Nov 09 1998	0.100 ppb	-2.303 (* Nondetect *)

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.100 ppb	Ln Minimum:	-2.303
Maximum:	0.100 ppb	Ln Maximum:	-2.303
Mean:	0.100 ppb	Ln Mean:	-2.303
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 10:50

Facility:16RAAPHWHU Haz Waste Unit 16 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:~~Detection~~
Compliance

Constituent:ChlBenz Chlorobenzene

CAS Number: 108-90-7

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.100 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	0.050 ppb	-2.996 (* Nondetect *)
Apr 30 1998	0.050 ppb	-2.996 (* Nondetect *)
Aug 04 1998	0.050 ppb	-2.996 (* Nondetect *)
Nov 09 1998	0.050 ppb	-2.996 (* Nondetect *)

Well ID:16C1 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.050 ppb	Ln Maximum:	-2.996
Mean:	0.050 ppb	Ln Mean:	-2.996
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 10:50

Facility:16RAAPHWU Haz Waste Unit 16 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:~~Detection~~
Compliance

Constituent:ChlMeth Chloromethane

CAS Number: 74-87-3

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.300 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	0.150 ppb	-1.897 (* Nondetect *)
Apr 30 1998	0.150 ppb	-1.897 (* Nondetect *)
Aug 04 1998	0.150 ppb	-1.897 (* Nondetect *)
Nov 09 1998	0.150 ppb	-1.897 (* Nondetect *)

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.150 ppb	Ln Minimum:	-1.897
Maximum:	0.150 ppb	Ln Maximum:	-1.897
Mean:	0.150 ppb	Ln Mean:	-1.897
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 10:51

Facility:16RAAPHWHU Haz Waste Unit 16 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:~~Detection~~
Compliance

Constituent:Cr Chromium, total

CAS Number: 7440-47-3

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	0.500 ppb	-0.693 (* Nondetect *)
Apr 30 1998	0.500 ppb	-0.693 (* Nondetect *)
Aug 04 1998	2.000 ppb	0.693
Nov 09 1998	3.000 ppb	1.099

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 50

Minimum:	0.500 ppb	Ln Minimum:	-0.693
Maximum:	3.000 ppb	Ln Maximum:	1.099
Mean:	1.500 ppb	Ln Mean:	0.101
Std. Dev.:	1.225 ppb	Ln Std. Dev.:	0.932

Normality Tests

Report Printed: 02-15-1999 10:51

Facility:16RAAPHWU Haz Waste Unit 16 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Detection

Compliance

Constituent:Cr Chromium, total

CAS Number: 7440-47-3

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Normality Test on Observations for wells listed below:

Well:16C1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	0.500	3.000	1.500	1.225
Log:	-0.693	1.099	0.101	0.932

Pooled Statistics

Observations: 4

Statistic	Original Scale	Log Scale
Mean:	1.500	0.101
Std Dev:	1.225	0.932
Skewness:	0.314	0.093
Kurtosis:	-1.593	-1.877
Minimum:	0.500	-0.693
Maximum:	3.000	1.099
CV:	0.816	9.197

Shapiro-Wilk Statistics

	Test	5% Critical Value	1% Critical Value
Scale Statistic			
Original:	0.9475	0.7480	0.6870
Log:	0.8979	0.7480	0.6870

* Indicates statistically significant evidence of non-normality.

Data Set Summary

Report Printed: 02-15-1999 10:52

Facility:16RAAPHWMU Haz Waste Unit 16 - RAAP

Address:

City:Radford

ST:VA Zip:

County:PULASKI

Contact:

Phone:() -

Permit Type:~~Detection~~
Compliance

Constituent:Co Cobalt, total

CAS Number: 7440-48-4

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	0.500 ppb	-0.693 (* Nondetect *)
Apr 30 1998	0.500 ppb	-0.693 (* Nondetect *)
Aug 04 1998	0.500 ppb	-0.693 (* Nondetect *)
Nov 09 1998	0.500 ppb	-0.693 (* Nondetect *)

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.500 ppb	Ln Minimum:	-0.693
Maximum:	0.500 ppb	Ln Maximum:	-0.693
Mean:	0.500 ppb	Ln Mean:	-0.693
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 10:53

Facility:16RAAPHWHU Haz Waste Unit 16 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:~~Detection~~
Compliance

Constituent:Cu Copper, total

CAS Number: 7440-50-8

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	0.500 ppb	-0.693 (* Nondetect *)
Apr 30 1998	0.500 ppb	-0.693 (* Nondetect *)
Aug 04 1998	0.500 ppb	-0.693 (* Nondetect *)
Nov 09 1998	0.500 ppb	-0.693 (* Nondetect *)

Well ID:16C1 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	0.500 ppb	Ln Minimum:	-0.693
Maximum:	0.500 ppb	Ln Maximum:	-0.693
Mean:	0.500 ppb	Ln Mean:	-0.693
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 10:54

Facility:16RAAPHWHU Haz Waste Unit 16 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Detection

Compliance

Constituent:Cyanid Cyanide

CAS Number: 143-33-9

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 10.000 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	5.000 ppb	1.609 (* Nondetect *)
Apr 30 1998	5.000 ppb	1.609 (* Nondetect *)
Aug 04 1998	5.000 ppb	1.609 (* Nondetect *)
Nov 09 1998	5.000 ppb	1.609 (* Nondetect *)

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	5.000 ppb	Ln Maximum:	1.609
Mean:	5.000 ppb	Ln Mean:	1.609
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 10:54

Facility:16RAAPHWHU Haz Waste Unit 16 - RAAP

Address:

City:Radford

ST:VA Zip:

County:PULASKI

Contact:

Phone:() -

Permit Type:~~Detection~~
Compliance

Constituent:Di-N-Bu Di-n-Butylphthalate

CAS Number: 84-74-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 5.000 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	2.500 ppb	0.916 (* Nondetect *)
Apr 30 1998	2.500 ppb	0.916 (* Nondetect *)
Aug 04 1998	2.500 ppb	0.916 (* Nondetect *)
Nov 09 1998	2.500 ppb	0.916 (* Nondetect *)

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	2.500 ppb	Ln Minimum:	0.916
Maximum:	2.500 ppb	Ln Maximum:	0.916
Mean:	2.500 ppb	Ln Mean:	0.916
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 10:57

Facility:16RAAPHWNU Haz Waste Unit 16 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:~~Detection~~
Compliance

Constituent:1,4-TCB 1,4-Dichlorobenzene

CAS Number: 106-46-7

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.100 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	0.050 ppb	-2.996 (* Nondetect *)
Apr 30 1998	0.050 ppb	-2.996 (* Nondetect *)
Aug 04 1998	0.050 ppb	-2.996 (* Nondetect *)
Nov 09 1998	0.050 ppb	-2.996 (* Nondetect *)

Well ID:16C1 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.050 ppb	Ln Maximum:	-2.996
Mean:	0.050 ppb	Ln Mean:	-2.996
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 10:58

Facility:16RAAPHWHU Haz Waste Unit 16 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:~~Detection~~
Compliance

Constituent:DC1F1Me Dichlorofluoromethane

CAS Number: 75-43-4

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.300 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	7.000 ppb	1.946
Apr 30 1998	7.100 ppb	1.960
Aug 04 1998	11.400 ppb	2.434
Nov 09 1998	13.900 ppb	2.632

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	7.000 ppb	Ln Minimum:	1.946
Maximum:	13.900 ppb	Ln Maximum:	2.632
Mean:	9.850 ppb	Ln Mean:	2.243
Std. Dev.:	3.391 ppb	Ln Std. Dev.:	0.344

Normality Tests

Report Printed: 02-15-1999 10:59

Facility:16RAAPHWHU Haz Waste Unit 16 - RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:

Phone:() -

Permit Type:Detection

Compliance

Constituent:DC1FlMe Dichlorofluoromethane

CAS Number: 75-43-4

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.300 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Normality Test on Observations for wells listed below:

Well:16C1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	7.000	13.900	9.850	3.391
Log:	1.946	2.632	2.243	0.344

Pooled Statistics

Observations: 4

Statistic	Original	Log
	Scale	Scale
Mean:	9.850	2.243
Std Dev:	3.391	0.344
Skewness:	0.259	0.160
Kurtosis:	-1.662	-1.787
Minimum:	7.000	1.946
Maximum:	13.900	2.632
CV:	0.344	0.154

Shapiro-Wilk Statistics

	Test	5% Critical	1% Critical
Scale Statistic		Value	Value
Original:	0.9503	0.7480	0.6870
Log:	0.9342	0.7480	0.6870

* Indicates statistically significant evidence of non-normality.

Data Set Summary

Report Printed: 02-15-1999 11:00

Facility:16RAAPHWHU Haz Waste Unit 16 - RAAP

Address:

City:Radford

ST:VA Zip:

County:PULASKI

Contact:

Phone:() -

Permit Type:Background

Constituent:1,1DCE 1,1-Dichloroethane

CAS Number: 75-34-3

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.200 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	5.300 ppb	1.668
Apr 30 1998	6.400 ppb	1.856
Aug 04 1998	6.000 ppb	1.792
Nov 09 1998	8.700 ppb	2.163

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	5.300 ppb	Ln Minimum:	1.668
Maximum:	8.700 ppb	Ln Maximum:	2.163
Mean:	6.600 ppb	Ln Mean:	1.870
Std. Dev.:	1.472 ppb	Ln Std. Dev.:	0.211

Normality Tests

Report Printed: 02-15-1999 11:00

Facility:16RAAPHWHU Haz Waste Unit 16 - RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:

Phone:() -

Permit Type:Background

Constituent:1,1DCE 1,1-Dichloroethane

CAS Number: 75-34-3

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.200 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Normality Test on Observations for wells listed below:

Well:16C1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	5.300	8.700	6.600	1.472
Log:	1.668	2.163	1.870	0.211

Pooled Statistics

Observations: 4

Statistic	Original Scale	Log Scale
Mean:	6.600	1.870
Std Dev:	1.472	0.211
Skewness:	0.825	0.681
Kurtosis:	-0.876	-0.944
Minimum:	5.300	1.668
Maximum:	8.700	2.163
CV:	0.223	0.113

Shapiro-Wilk Statistics

	Test Scale Statistic	5% Critical Value	1% Critical Value
Original:	0.9958	0.7480	0.6870
Log:	1.0376	0.7480	0.6870

* Indicates statistically significant evidence of non-normality.

Data Set Summary

Report Printed: 02-15-1999 11:01

Facility:16RAAPHWMU Haz Waste Unit 16 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:1,2DCE 1,2-Dichloroethane

CAS Number: 107-06-2

HCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.100 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	0.050 ppb	-2.996 (* Nondetect *)
Apr 30 1998	0.050 ppb	-2.996 (* Nondetect *)
Aug 04 1998	0.050 ppb	-2.996 (* Nondetect *)
Nov 09 1998	0.050 ppb	-2.996 (* Nondetect *)

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.050 ppb	Ln Maximum:	-2.996
Mean:	0.050 ppb	Ln Mean:	-2.996
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 11:07

Facility:16RAAPHWMU Haz Waste Unit 16 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:2,4-DNT 2,4-Dinitrotoluene

CAS Number: 121-14-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.080 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	0.040 ppb	-3.219 (* Nondetect *)
Apr 30 1998	0.040 ppb	-3.219 (* Nondetect *)
Aug 04 1998	0.040 ppb	-3.219 (* Nondetect *)
Nov 09 1998	0.100 ppb	-2.303

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 75

Minimum:	0.040 ppb	Ln Minimum:	-3.219
Maximum:	0.100 ppb	Ln Maximum:	-2.303
Mean:	0.055 ppb	Ln Mean:	-2.990
Std. Dev.:	0.030 ppb	Ln Std. Dev.:	0.458

Data Set Summary

Report Printed: 02-15-1999 11:10

Facility:16RAAPHWMU Haz Waste Unit 16 - RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:

Phone:() -

Permit Type:Background

Constituent:2,6-DNT 2,6-Dinitrotoluene

CAS Number: 606-20-2

MCL: 0.000 ug/l

ACL: 0.000 ug/l

Detect Limit: 0.080 ug/l

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	0.110 ug/l	-2.207
Apr 30 1998	0.090 ug/l	-2.408
Aug 04 1998	0.040 ug/l	-3.219 (* Nondetect *)
Nov 09 1998	0.100 ug/l	-2.303

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 25

Minimum:	0.040 ug/l	Ln Minimum:	-3.219
Maximum:	0.110 ug/l	Ln Maximum:	-2.207
Mean:	0.085 ug/l	Ln Mean:	-2.534
Std. Dev.:	0.031 ug/l	Ln Std. Dev.:	0.464

Normality Tests

Report Printed: 02-15-1999 11:10

Facility:16RAAPHWNU Haz Waste Unit 16 - RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:

Phone:() -

Permit Type:Background

Constituent:2,6-DNT 2,6-Dinitrotoluene

CAS Number: 606-20-2

MCL: 0.000 ug/l

ACL: 0.000 ug/l

Detect Limit: 0.080 ug/l

Start Date:Feb 26 1998

End Date:Nov 09 1998

Normality Test on Observations for wells listed below:

Well:16C1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	0.040	0.110	0.085	0.031
Log:	-3.219	-2.207	-2.534	0.464

Pooled Statistics

Observations: 4

Statistic	Original	Log
	Scale	Scale
Mean:	0.085	-2.534
Std Dev:	0.031	0.464
Skewness:	-0.922	-1.048*
Kurtosis:	-0.839	-0.749
Minimum:	0.040	-3.219
Maximum:	0.110	-2.207
CV:	0.366	-0.183

Shapiro-Wilk Statistics

	Test	5% Critical	1% Critical
	Scale Statistic	Value	Value
Original:	0.9564	0.7480	0.6870
Log:	0.8829	0.7480	0.6870

* Indicates statistically significant evidence of non-normality.

Data Set Summary

Report Printed: 02-15-1999 11:11

Facility:16RAAPHWMU Haz Waste Unit 16 - RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:

Phone:() -

Permit Type:Background

Constituent:EthBenz Ethylbenzene

CAS Number: 100-41-4

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.100 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	0.050 ppb	-2.996 (* Nondetect *)
Apr 30 1998	0.050 ppb	-2.996 (* Nondetect *)
Aug 04 1998	0.050 ppb	-2.996 (* Nondetect *)
Nov 09 1998	0.050 ppb	-2.996 (* Nondetect *)

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.050 ppb	Ln Maximum:	-2.996
Mean:	0.050 ppb	Ln Mean:	-2.996
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 11:12

Facility:16RAAPHWHU Haz Waste Unit 16 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:678HPCDF 1234678HPCDF

CAS Number: - -

MCL: 0.000 ug/l

ACL: 0.000 ug/l

Detect Limit: 0.062 ug/l

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	0.031 ug/l	-3.474 (* Nondetect *)
Apr 30 1998	0.031 ug/l	-3.474 (* Nondetect *)
Aug 04 1998	0.031 ug/l	-3.474 (* Nondetect *)
Nov 09 1998	0.031 ug/l	-3.474 (* Nondetect *)

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.031 ug/l	Ln Minimum:	-3.474
Maximum:	0.031 ug/l	Ln Maximum:	-3.474
Mean:	0.031 ug/l	Ln Mean:	-3.474
Std. Dev.:	0.000 ug/l	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 11:13

Facility:16RAAPHWMU Haz Waste Unit 16 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:789HPCDF 1234789HPCDF

CAS Number: - -

HCL: 0.000 ug/l

ACL: 0.000 ug/l

Detect Limit: 0.071 ug/l

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	0.036 ug/l	-3.338 (* Nondetect *)
Apr 30 1998	0.036 ug/l	-3.338 (* Nondetect *)
Aug 04 1998	0.036 ug/l	-3.338 (* Nondetect *)
Nov 09 1998	0.036 ug/l	-3.338 (* Nondetect *)

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.036 ug/l	Ln Minimum:	-3.338
Maximum:	0.036 ug/l	Ln Maximum:	-3.338
Mean:	0.036 ug/l	Ln Mean:	-3.338
Std. Dev.:	0.000 ug/l	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 11:13

Facility:16RAAPHWMU Haz Waste Unit 16 - RAAP

Address:

City:Radford

ST:VA Zip:

County:PULASKI

Contact:

Phone:() -

Permit Type:Background

Constituent:478HXCDF 123478-HXCDF

CAS Number: - -

MCL: 0.000 ug/l

ACL: 0.000 ug/l

Detect Limit: 0.040 ug/l

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	0.020 ug/l	-3.912 (* Nondetect *)
Apr 30 1998	0.020 ug/l	-3.912 (* Nondetect *)
Aug 04 1998	0.020 ug/l	-3.912 (* Nondetect *)
Nov 09 1998	0.020 ug/l	-3.912 (* Nondetect *)

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.020 ug/l	Ln Minimum:	-3.912
Maximum:	0.020 ug/l	Ln Maximum:	-3.912
Mean:	0.020 ug/l	Ln Mean:	-3.912
Std. Dev.:	0.000 ug/l	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 11:14

Facility:16RAAPHWHU Haz Waste Unit 16 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:678HXCDF 123678-HXCDF

CAS Number: - -

MCL: 0.000 ug/l

ACL: 0.000 ug/l

Detect Limit: 0.038 ug/l

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	0.019 ug/l	-3.963 (* Nondetect *)
Apr 30 1998	0.019 ug/l	-3.963 (* Nondetect *)
Aug 04 1998	0.019 ug/l	-3.963 (* Nondetect *)
Nov 09 1998	0.019 ug/l	-3.963 (* Nondetect *)

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.019 ug/l	Ln Minimum:	-3.963
Maximum:	0.019 ug/l	Ln Maximum:	-3.963
Mean:	0.019 ug/l	Ln Mean:	-3.963
Std. Dev.:	0.000 ug/l	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 11:14

Facility:16RAAPHWHU Haz Waste Unit 16 - RAAP

Address:

City:Radford

ST:VA Zip:

County:PULASKI

Contact:

Phone:() -

Permit Type:Background

Constituent:789HXCDF 123789-HXCDF

CAS Number: - -

MCL: 0.000 ug/l

ACL: 0.000 ug/l

Detect Limit: 0.042 ug/l

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	0.021 ug/l	-3.863 (* Nondetect *)
Apr 30 1998	0.021 ug/l	-3.863 (* Nondetect *)
Aug 04 1998	0.021 ug/l	-3.863 (* Nondetect *)
Nov 09 1998	0.021 ug/l	-3.863 (* Nondetect *)

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.021 ug/l	Ln Minimum:	-3.863
Maximum:	0.021 ug/l	Ln Maximum:	-3.863
Mean:	0.021 ug/l	Ln Mean:	-3.863
Std. Dev.:	0.000 ug/l	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 11:15

Facility:16RAAPHWHU Haz Waste Unit 16 - RAAP

Address:

City:Radford

ST:VA Zip:

County:PULASKI

Contact:

Phone:() -

Permit Type:Background

Constituent:278HXCDF 234678-HXCDF

CAS Number: - -

MCL: 0.000 ug/l

ACL: 0.000 ug/l

Detect Limit: 0.043 ug/l

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	0.022 ug/l	-3.840 (* Nondetect *)
Apr 30 1998	0.022 ug/l	-3.840 (* Nondetect *)
Aug 04 1998	0.022 ug/l	-3.840 (* Nondetect *)
Nov 09 1998	0.022 ug/l	-3.840 (* Nondetect *)

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.022 ug/l	Ln Minimum:	-3.840
Maximum:	0.022 ug/l	Ln Maximum:	-3.840
Mean:	0.022 ug/l	Ln Mean:	-3.840
Std. Dev.:	0.000 ug/l	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 11:16

Facility:16RAAPHWMU Haz Waste Unit 16 - RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:

Phone:() -

Permit Type:Background

Constituent:Pb Lead, total

CAS Number: 7439-92-1

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	0.500 ppb	-0.693 (* Nondetect *)
Apr 30 1998	0.500 ppb	-0.693 (* Nondetect *)
Aug 04 1998	0.500 ppb	-0.693 (* Nondetect *)
Nov 09 1998	0.500 ppb	-0.693 (* Nondetect *)

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.500 ppb	Ln Minimum:	-0.693
Maximum:	0.500 ppb	Ln Maximum:	-0.693
Mean:	0.500 ppb	Ln Mean:	-0.693
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 11:16

Facility:16RAAPHWHU Haz Waste Unit 16 - RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:

Phone:() -

Permit Type:Background

Constituent:Hg Mercury

CAS Number: 7439-97-6

HCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.200 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	0.100 ppb	-2.303 (* Nondetect *)
Apr 30 1998	0.100 ppb	-2.303 (* Nondetect *)
Aug 04 1998	0.100 ppb	-2.303 (* Nondetect *)
Nov 09 1998	0.100 ppb	-2.303 (* Nondetect *)

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.100 ppb	Ln Minimum:	-2.303
Maximum:	0.100 ppb	Ln Maximum:	-2.303
Mean:	0.100 ppb	Ln Mean:	-2.303
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 11:17

Facility:16RAAPHWHU Haz Waste Unit 16 - RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:

Phone:() -

Permit Type:Background

Constituent:MeEthKe Methyl ethyl ketone (MEK) (2-Butanone)

CAS Number: 78-93-3

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.100 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	0.550 ppb	-0.598 (* Nondetect *)
Apr 30 1998	0.550 ppb	-0.598 (* Nondetect *)
Aug 04 1998	0.550 ppb	-0.598 (* Nondetect *)
Nov 09 1998	0.550 ppb	-0.598 (* Nondetect *)

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.550 ppb	Ln Minimum:	-0.598
Maximum:	0.550 ppb	Ln Maximum:	-0.598
Mean:	0.550 ppb	Ln Mean:	-0.598
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 11:17

Facility:16RAAPHWHU Haz Waste Unit 16 - RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:

Phone:() -

Permit Type:Background

Constituent:Ni Nickel, total

CAS Number: 7440-02-0

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 15.000 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	7.500 ppb	2.015 (* Nondetect *)
Apr 30 1998	7.500 ppb	2.015 (* Nondetect *)
Aug 04 1998	7.500 ppb	2.015 (* Nondetect *)
Nov 09 1998	16.000 ppb	2.773

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 75

Minimum:	7.500 ppb	Ln Minimum:	2.015
Maximum:	16.000 ppb	Ln Maximum:	2.773
Mean:	9.625 ppb	Ln Mean:	2.204
Std. Dev.:	4.250 ppb	Ln Std. Dev.:	0.379

Data Set Summary

Report Printed: 02-15-1999 11:18

Facility:16RAAPHWNU Haz Waste Unit 16 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:OCDF OCDF

CAS Number: - -

MCL: 0.000 ug/l

ACL: 0.000 ug/l

Detect Limit: 0.131 ug/l

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	0.065 ug/l	-2.726 (* Nondetect *)
Apr 30 1998	0.065 ug/l	-2.726 (* Nondetect *)
Aug 04 1998	0.065 ug/l	-2.726 (* Nondetect *)
Nov 09 1998	0.065 ug/l	-2.726 (* Nondetect *)

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.065 ug/l	Ln Minimum:	-2.726
Maximum:	0.065 ug/l	Ln Maximum:	-2.726
Mean:	0.065 ug/l	Ln Mean:	-2.726
Std. Dev.:	0.000 ug/l	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 11:18

Facility:16RAAPHWHU Haz Waste Unit 16 - RAAF

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:

Phone:() -

Permit Type:Background

Constituent:378PCDF 12378-PCDF

CAS Number: - -

MCL: 0.000 ug/l

ACL: 0.000 ug/l

Detect Limit: 0.044 ug/l

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	0.022 ug/l	-3.817 (* Nondetect *)
Apr 30 1998	0.022 ug/l	-3.817 (* Nondetect *)
Aug 04 1998	0.022 ug/l	-3.817 (* Nondetect *)
Nov 09 1998	0.022 ug/l	-3.817 (* Nondetect *)

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.022 ug/l	Ln Minimum:	-3.817
Maximum:	0.022 ug/l	Ln Maximum:	-3.817
Mean:	0.022 ug/l	Ln Mean:	-3.817
Std. Dev.:	0.000 ug/l	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 11:19

Facility:16RAAPHWMU Haz Waste Unit 16 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:478PECDF 23478-PECDF

CAS Number: - -

MCL: 0.000 ug/l

ACL: 0.000 ug/l

Detect Limit: 0.042 ug/l

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	0.021 ug/l	-3.863 (* Nondetect *)
Apr 30 1998	0.021 ug/l	-3.863 (* Nondetect *)
Aug 04 1998	0.021 ug/l	-3.863 (* Nondetect *)
Nov 09 1998	0.021 ug/l	-3.863 (* Nondetect *)

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.021 ug/l	Ln Minimum:	-3.863
Maximum:	0.021 ug/l	Ln Maximum:	-3.863
Mean:	0.021 ug/l	Ln Mean:	-3.863
Std. Dev.:	0.000 ug/l	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 11:19

Facility:16RAAPHWMU Haz Waste Unit 16 - RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:

Phone:() -

Permit Type:Background

Constituent:Se Selenium, total

CAS Number: 7782-49-2

HCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	0.500 ppb	-0.693 (* Nondetect *)
Apr 30 1998	0.500 ppb	-0.693 (* Nondetect *)
Aug 04 1998	0.500 ppb	-0.693 (* Nondetect *)
Nov 09 1998	0.500 ppb	-0.693 (* Nondetect *)

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.500 ppb	Ln Minimum:	-0.693
Maximum:	0.500 ppb	Ln Maximum:	-0.693
Mean:	0.500 ppb	Ln Mean:	-0.693
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 11:19

Facility:16RAAPHWMU Haz Waste Unit 16 - RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:

Phone:() -

Permit Type:Background

Constituent:Ag Silver, total

CAS Number: 7440-22-4

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.200 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	0.100 ppb	-2.303 (* Nondetect *)
Apr 30 1998	0.100 ppb	-2.303 (* Nondetect *)
Aug 04 1998	0.100 ppb	-2.303 (* Nondetect *)
Nov 09 1998	0.100 ppb	-2.303 (* Nondetect *)

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.100 ppb	Ln Minimum:	-2.303
Maximum:	0.100 ppb	Ln Maximum:	-2.303
Mean:	0.100 ppb	Ln Mean:	-2.303
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 11:20

Facility:16RAAPHWHU Haz Waste Unit 16 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:378TCDF 2378-TCDF

CAS Number: - -

MCL: 0.000 ug/l

ACL: 0.000 ug/l

Detect Limit: 0.049 ug/l

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	0.024 ug/l	-3.709 (* Nondetect *)
Apr 30 1998	0.024 ug/l	-3.709 (* Nondetect *)
Aug 04 1998	0.024 ug/l	-3.709 (* Nondetect *)
Nov 09 1998	0.024 ug/l	-3.709 (* Nondetect *)

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.024 ug/l	Ln Minimum:	-3.709
Maximum:	0.024 ug/l	Ln Maximum:	-3.709
Mean:	0.024 ug/l	Ln Mean:	-3.709
Std. Dev.:	0.000 ug/l	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 11:20

Facility:16RAAPHWHU Haz Waste Unit 16 - RAAP

Address:

City:Radford

ST:VA Zip:

County:PULASKI

Contact:

Phone:() -

Permit Type:Background

Constituent:TetCLEth 1,1,2,2-Tetrachloroethane

CAS Number: 79-34-5

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.100 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	0.050 ppb	-2.996 (* Nondetect *)
Apr 30 1998	0.050 ppb	-2.996 (* Nondetect *)
Aug 04 1998	0.050 ppb	-2.996 (* Nondetect *)
Nov 09 1998	0.050 ppb	-2.996 (* Nondetect *)

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.050 ppb	Ln Maximum:	-2.996
Mean:	0.050 ppb	Ln Mean:	-2.996
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 11:21

Facility:16RAAPHWMU Haz Waste Unit 16 - RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:

Phone:() -

Permit Type:Background

Constituent:TetCEthy Tetrachloroethene (-ethylene)

CAS Number: 127-18-4

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.100 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	0.200 ppb	-1.609
Apr 30 1998	0.050 ppb	-2.996 (* Nondetect *)
Aug 04 1998	0.400 ppb	-0.916
Nov 09 1998	0.050 ppb	-2.996 (* Nondetect *)

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 50

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.400 ppb	Ln Maximum:	-0.916
Mean:	0.175 ppb	Ln Mean:	-2.129
Std. Dev.:	0.166 ppb	Ln Std. Dev.:	1.040

Normality Tests

Report Printed: 02-15-1999 11:21

Facility:16RAAPHWHU Haz Waste Unit 16 - RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:

Phone:() -

Permit Type:Background

Constituent:TetCEthy Tetrachloroethene (-ethylene)

CAS Number: 127-18-4

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.100 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Normality Test on Observations for wells listed below:

Well:16C1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	0.050	0.400	0.175	0.166
Log:	-2.996	-0.916	-2.129	1.040

Pooled Statistics

Observations: 4

Statistic	Original	Log
	Scale	Scale
Mean:	0.175	-2.129
Std Dev:	0.166	1.040
Skewness:	0.633	0.214
Kurtosis:	-1.207	-1.720
Minimum:	0.050	-2.996
Maximum:	0.400	-0.916
CV:	0.948	-0.488

Shapiro-Wilk Statistics

	Test	5% Critical	1% Critical
Scale	Statistic	Value	Value
Original:	0.9464	0.7480	0.6870
Log:	0.9334	0.7480	0.6870

* Indicates statistically significant evidence of non-normality.

Data Set Summary

Report Printed: 02-15-1999 11:24

Facility:16RAAPHWHU Haz Waste Unit 16 - RAAP

Address:

City:Radford

ST:VA Zip:

County:PULASKI

Contact:

Phone:() -

Permit Type:Background

Constituent:TranDCEE trans-1,2-Dichloroethene

CAS Number: 156-60-5

HCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.100 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	0.050 ppb	-2.996 (* Nondetect *)
Apr 30 1998	0.050 ppb	-2.996 (* Nondetect *)
Aug 04 1998	0.050 ppb	-2.996 (* Nondetect *)
Nov 09 1998	0.050 ppb	-2.996 (* Nondetect *)

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.050 ppb	Ln Maximum:	-2.996
Mean:	0.050 ppb	Ln Mean:	-2.996
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 11:23

Facility:16RAAPHWHU Haz Waste Unit 16 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Toluen Toluene

CAS Number: 108-88-3

HCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.100 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	0.050 ppb	-2.996 (* Nondetect *)
Apr 30 1998	0.050 ppb	-2.996 (* Nondetect *)
Aug 04 1998	0.050 ppb	-2.996 (* Nondetect *)
Nov 09 1998	0.050 ppb	-2.996 (* Nondetect *)

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.050 ppb	Ln Maximum:	-2.996
Mean:	0.050 ppb	Ln Mean:	-2.996
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 11:23

Facility:16RAAPHWHU Haz Waste Unit 16 - RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:

Phone:() -

Permit Type:Background

Constituent:Tl Thallium, total

CAS Number: 7440-28-0

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	0.500 ppb	-0.693 (* Nondetect *)
Apr 30 1998	0.500 ppb	-0.693 (* Nondetect *)
Aug 04 1998	0.500 ppb	-0.693 (* Nondetect *)
Nov 09 1998	0.500 ppb	-0.693 (* Nondetect *)

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.500 ppb	Ln Minimum:	-0.693
Maximum:	0.500 ppb	Ln Maximum:	-0.693
Mean:	0.500 ppb	Ln Mean:	-0.693
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 09:37

Facility:16RAAPHWHU Haz Waste Unit 16 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:~~Detection~~
Compliance

Constituent:1,1,1Tri 1,1,1-Trichloroethane

CAS Number: 71-55-6

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.300 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	4.900 ppb	1.589
Apr 30 1998	5.900 ppb	1.775
Aug 04 1998	5.600 ppb	1.723
Nov 09 1998	6.700 ppb	1.902

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	4.900 ppb	Ln Minimum:	1.589
Maximum:	6.700 ppb	Ln Maximum:	1.902
Mean:	5.775 ppb	Ln Mean:	1.747
Std. Dev.:	0.746 ppb	Ln Std. Dev.:	0.130

Normality Tests

Report Printed: 02-15-1999 11:25

Facility:16RAAPHWHU Haz Waste Unit 16 - RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:

Phone:() -

Permit Type:Background

Constituent:1,1,1Tri 1,1,1-Trichloroethane

CAS Number: 71-55-6

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.300 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Normality Test on Observations for wells listed below:

Well:16C1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	4.900	6.700	5.775	0.746
Log:	1.589	1.902	1.747	0.130

Pooled Statistics

Observations: 4

Statistic	Original Scale	Log Scale
Mean:	5.775	1.747
Std Dev:	0.746	0.130
Skewness:	0.110	-0.040
Kurtosis:	-1.102	-1.105
Minimum:	4.900	1.589
Maximum:	6.700	1.902
CV:	0.129	0.074

Shapiro-Wilk Statistics

	Test	5% Critical Value	1% Critical Value
Scale Statistic			
Original:	1.1110	0.7480	0.6870
Log:	1.1125	0.7480	0.6870

* Indicates statistically significant evidence of non-normality.

Data Set Summary

Report Printed: 02-15-1999 11:25

Facility:16RAAPHWHU Haz Waste Unit 16 - RAAP

Address:

City:Radford

ST:VA Zip:

County:PULASKI

Contact:

Phone:() -

Permit Type:Background

Constituent:1,1,2Tri 1,1,2-Trichloroethane

CAS Number: 79-00-5

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.500 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	0.250 ppb	-1.386 (* Nondetect *)
Apr 30 1998	0.250 ppb	-1.386 (* Nondetect *)
Aug 04 1998	0.250 ppb	-1.386 (* Nondetect *)
Nov 09 1998	0.250 ppb	-1.386 (* Nondetect *)

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.250 ppb	Ln Minimum:	-1.386
Maximum:	0.250 ppb	Ln Maximum:	-1.386
Mean:	0.250 ppb	Ln Mean:	-1.386
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 11:26

Facility:16RAAPHWHU Haz Waste Unit 16 - RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:

Phone:() -

Permit Type:Background

Constituent:TCE Trichloroethene (-ethylene)

CAS Number: 79-01-6

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.100 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	0.050 ppb	-2.996 (* Nondetect *)
Apr 30 1998	0.050 ppb	-2.996 (* Nondetect *)
Aug 04 1998	0.050 ppb	-2.996 (* Nondetect *)
Nov 09 1998	0.050 ppb	-2.996 (* Nondetect *)

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.050 ppb	Ln Maximum:	-2.996
Mean:	0.050 ppb	Ln Mean:	-2.996
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 11:26

Facility:16RAAPHWHU Haz Waste Unit 16 - RAAP

Address:

City:Radford

ST:VA Zip:

County:PULASKI

Contact:

Phone:() -

Permit Type:Background

Constituent:TC1F1Me Trichlorofluoromethane

CAS Number: 75-69-4

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.500 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	3.800 ppb	1.335
Apr 30 1998	2.800 ppb	1.030
Aug 04 1998	2.500 ppb	0.916
Nov 09 1998	3.500 ppb	1.253

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	2.500 ppb	Ln Minimum:	0.916
Maximum:	3.800 ppb	Ln Maximum:	1.335
Mean:	3.150 ppb	Ln Mean:	1.133
Std. Dev.:	0.603 ppb	Ln Std. Dev.:	0.194

Normality Tests

Report Printed: 02-15-1999 11:27

Facility:16RAAPHWHU Haz Waste Unit 16 - RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:

Phone:() -

Permit Type:Background

Constituent:TCLFINE Trichlorofluoromethane

CAS Number: 75-69-4

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.500 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Normality Test on Observations for wells listed below:

Well:16C1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	2.500	3.800	3.150	0.603
Log:	0.916	1.335	1.133	0.194

Pooled Statistics

Observations: 4

Statistic	Original	Log
	Scale	Scale
Mean:	3.150	1.133
Std Dev:	0.603	0.194
Skewness:	0.000	-0.077
Kurtosis:	-1.697	-1.682
Minimum:	2.500	0.916
Maximum:	3.800	1.335
CV:	0.191	0.171

Shapiro-Wilk Statistics

	Test	5% Critical	1% Critical
Scale	Statistic	Value	Value
Original:	1.0325	0.7480	0.6870
Log:	1.0328	0.7480	0.6870

* Indicates statistically significant evidence of non-normality.

Data Set Summary

Report Printed: 02-15-1999 11:29

Facility:16RAAPHWMU Haz Waste Unit 16 - RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:

Phone:() -

Permit Type:Background

Constituent:Va Vanadium

CAS Number: 7440-62-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 4.000 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	2.000 ppb	0.693 (* Nondetect *)
Apr 30 1998	2.000 ppb	0.693 (* Nondetect *)
Aug 04 1998	2.000 ppb	0.693 (* Nondetect *)
Nov 09 1998	2.000 ppb	0.693 (* Nondetect *)

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	2.000 ppb	Ln Minimum:	0.693
Maximum:	2.000 ppb	Ln Maximum:	0.693
Mean:	2.000 ppb	Ln Mean:	0.693
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 11:29

Facility:16RAAPHWHU Haz Waste Unit 16 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:VC Vinyl chloride

CAS Number: 75-01-4

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.100 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	0.050 ppb	-2.996 (* Nondetect *)
Apr 30 1998	0.050 ppb	-2.996 (* Nondetect *)
Aug 04 1998	0.050 ppb	-2.996 (* Nondetect *)
Nov 09 1998	0.050 ppb	-2.996 (* Nondetect *)

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.050 ppb	Ln Maximum:	-2.996
Mean:	0.050 ppb	Ln Mean:	-2.996
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 11:29

Facility:16RAAPHWHU Haz Waste Unit 16 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Xylene Xylene

CAS Number: 1330-20-7

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.100 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	0.050 ppb	-2.996 (* Nondetect *)
Apr 30 1998	0.050 ppb	-2.996 (* Nondetect *)
Aug 04 1998	0.050 ppb	-2.996 (* Nondetect *)
Nov 09 1998	0.050 ppb	-2.996 (* Nondetect *)

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.050 ppb	Ln Maximum:	-2.996
Mean:	0.050 ppb	Ln Mean:	-2.996
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-15-1999 11:30

Facility:16RAAPHWHU Haz Waste Unit 16 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Zn Zinc, total

CAS Number: 7440-66-6

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 5.000 ppb

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	2.500 ppb	0.916 (* Nondetect *)
Apr 30 1998	2.500 ppb	0.916 (* Nondetect *)
Aug 04 1998	6.000 ppb	1.792
Nov 09 1998	2.500 ppb	0.916 (* Nondetect *)

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 75

Minimum:	2.500 ppb	Ln Minimum:	0.916
Maximum:	6.000 ppb	Ln Maximum:	1.792
Mean:	3.375 ppb	Ln Mean:	1.135
Std. Dev.:	1.750 ppb	Ln Std. Dev.:	0.438

Data Set Summary

Report Printed: 02-15-1999 11:30

Facility:16RAAPHWNU Haz Waste Unit 16 - RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:

Phone:() -

Permit Type:Background

Constituent:pH F pH, Field

CAS Number: - -

MCL: 0.000 SU

ACL: 0.000 SU

Detect Limit: 0.100 SU

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	7.000 SU	1.946
Apr 30 1998	6.100 SU	1.808
Aug 04 1998	6.700 SU	1.902
Nov 09 1998	6.800 SU	1.917

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	6.100 SU	Ln Minimum:	1.808
Maximum:	7.000 SU	Ln Maximum:	1.946
Mean:	6.650 SU	Ln Mean:	1.893
Std. Dev.:	0.387 SU	Ln Std. Dev.:	0.060

Normality Tests

Report Printed: 02-15-1999 11:30

Facility:16RAAPHWHU Haz Waste Unit 16 - RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:

Phone:() -

Permit Type:Background

Constituent:pH F pH, Field

CAS Number: - -

MCL: 0.000 SU

ACL: 0.000 SU

Detect Limit: 0.100 SU

Start Date:Feb 26 1998

End Date:Nov 09 1998

Normality Test on Observations for wells listed below:

Well:16C1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	6.100	7.000	6.650	0.387
Log:	1.808	1.946	1.893	0.060

Pooled Statistics

Observations: 4

Statistic	Original	Log
	Scale	Scale
Mean:	6.650	1.893
Std Dev:	0.387	0.060
Skewness:	-0.795	-0.830
Kurtosis:	-0.886	-0.868
Minimum:	6.100	1.808
Maximum:	7.000	1.946
CV:	0.058	0.031

Shapiro-Wilk Statistics

	Test	5% Critical	1% Critical
Scale	Statistic	Value	Value
Original:	1.0050	0.7480	0.6870
Log:	0.9933	0.7480	0.6870

* Indicates statistically significant evidence of non-normality.

Data Set Summary

Report Printed: 02-15-1999 11:32

Facility:16RAAPHWMU Haz Waste Unit 16 - RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:

Phone:() -

Permit Type:Background

Constituent:Cond F Specific Conductivity, Field

CAS Number: - -

MCL: 0.000 umhos/cm

ACL: 0.000 umhos/cm

Detect Limit: 1.000 umhos/cm

Start Date:Feb 26 1998

End Date:Nov 09 1998

Well ID:16C1

Sample Date	Observation	Ln
Feb 26 1998	613.000 umhos/cm	6.418
Apr 30 1998	533.000 umhos/cm	6.279
Aug 04 1998	530.000 umhos/cm	6.273
Nov 09 1998	533.000 umhos/cm	6.279

Well ID:16C1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	530.000 umhos/cm	Ln Minimum:	6.273
Maximum:	613.000 umhos/cm	Ln Maximum:	6.418
Mean:	552.250 umhos/cm	Ln Mean:	6.312
Std. Dev.:	40.525 umhos/cm	Ln Std. Dev.:	0.071

Normality Tests

Report Printed: 02-15-1999 11:32

Facility:16RAAPHWMU Haz Waste Unit 16 - RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:

Phone:() -

Permit Type:Background

Constituent:Cond F Specific Conductivity, Field

CAS Number: - -

MCL: 0.000 umhos/cm

ACL: 0.000 umhos/cm

Detect Limit: 1.000 umhos/cm

Start Date:Feb 26 1998

End Date:Nov 09 1998

Normality Test on Observations for wells listed below:

Well:16C1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	530.000	613.000	552.250	40.525
Log:	6.273	6.418	6.312	0.071

Pooled Statistics

Observations: 4

Statistic	Original Scale	Log Scale
Mean:	552.250	6.312
Std Dev:	40.525	0.071
Skewness:	1.150*	1.150*
Kurtosis:	-0.670	-0.670
Minimum:	530.000	6.273
Maximum:	613.000	6.418
CV:	0.073	0.011

Shapiro-Wilk Statistics

	Test Statistic	5% Critical Value	1% Critical Value
Original:	0.7438*	0.7480	0.6870
Log:	0.7463*	0.7480	0.6870

* Indicates statistically significant evidence of non-normality.

Parametric Prediction Interval
Report Printed February 17,1999

Page 1

Facility:Haz Waste Unit 16-RAAP
Parameter:Barium, total(CAS Number:7440-39-3)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 4
Shapiro-Wilk (W): 0.9721
~~Critical W, $\alpha=0.01$: 0.6870~~
Mean: 146.000 ppb
Std Dev: 13.663 ppb
DF: 3
Conf. Level (1- α): ~~0.9500~~ 0.99
Future Samples (k): 1
 $t \left[\begin{array}{c} 1 - \alpha \\ - \\ k \end{array} \right]$: 4.5407
Kappa: 5.0767
UL: 215.360 ppb
LL: $-\infty$

Parametric Prediction Interval
Report Printed February 17,1999

Page 1

Facility: Haz Waste Unit 16-RAAP
Parameter: Dichlorodifluoromethane (CAS Number: 75-71-8)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 4
Shapiro-Wilk (W): 0.8652
~~Critical W, $\alpha=0.01$: 0.6870~~
Mean: 9.850 ppb
Std Dev: 3.391 ppb
DF: 3
Conf. Level (1- α): ~~0.9500~~ 0.99
Future Samples (k): 1
 $t_{\left[\begin{array}{c} 1 - \alpha \\ - \\ k \end{array} \right]}$: 4.5407
Kappa: 5.0767
UL: 27.063 ppb
LL: $-\infty$

Parametric Prediction Interval
Report Printed February 17,1999

Page 1

Facility:Haz Waste Unit 16-RAAP
Parameter:1,1-Dichloroethane(CAS Number:75-34-3)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 4
Shapiro-Wilk (W): 0.8888
~~Critical W, $\alpha=0.01$: 0.6870~~
Mean: 6.600 ppb
Std Dev: 1.472 ppb
DF: 3
Conf. Level (1- α): ~~0.9500~~ 0.99
Future Samples (k): 1
 $t \left[\begin{array}{c} 1 - \alpha \\ - \\ k \end{array} \right]$: 4.5407
Kappa: 5.0767
UL: 14.073 ppb
LL: $-\infty$

Parametric Prediction Interval
Report Printed February 17,1999

Page 1

Facility:Haz Waste Unit 16-RAAP
Parameter:1,1,1-Trichloroethane(CAS Number:71-55-6)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 4
Shapiro-Wilk (W): 0.9937
~~Critical W, $\alpha=0.01$: 0.6870~~
Mean: 5.775 ppb
Std Dev: 0.746 ppb
DF: 3
Conf. Level (1- α): ~~0.9500~~ 0.99
Future Samples (k): 1
 $t \left[\begin{array}{c} 1 - \alpha \\ - \\ k \end{array} \right]$: 4.5407
Kappa: 5.0767
UL: 9.560 ppb
LL: $-\infty$

Parametric Prediction Interval
Report Printed February 17,1999

Page 1

Facility:Haz Waste Unit 16-RAAP
Parameter:Trichlorofluoromethane(CAS Number:75-69-4)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 4
Shapiro-Wilk (W): 0.9373
~~Critical W, $\alpha=0.01$: 0.6870~~
Mean: 3.150 ppb
Std Dev: 0.603 ppb
DF: 3
Conf. Level (1- α): ~~0.9500~~ 0.95
Future Samples (k): 1
 $t \left[\begin{array}{c} 1 - \alpha \\ - \\ k \end{array} \right]$: 4.5407
Kappa: 5.0767
UL: 6.210 ppb
LL: $-\infty$

Parametric Prediction Interval
Report Printed February 17,1999

Page 1

Facility:Haz Waste Unit 16-RAAP
Parameter:pH, Field(CAS Number:- -)

TWO-TAILED PARAMETRIC PREDICTION INTERVAL

Observations (n): 4
Shapiro-Wilk (W): 0.8968
~~Critical W, $\alpha=0.01$: 0.6870~~
Mean: 6.650 SU
Std Dev: 0.387 SU
DF: 3
Conf. Level (1- α): ~~0.9500~~ 0.95
Future Samples (k): 1
 $t \left[\frac{1 - \alpha}{2 \cdot k} \right]$: 5.8409
Kappa: 6.5303
UL: 9.179 SU
LL: 4.121 SU

Cohen's Adjustment of Background Data for HWMU16 (1998 Annual Report)

Cohen's adjustment is performed for all parameters with 25%-49 % non-detect data.
Parameter 2,6-dinitrotoluene (2,6-DNT) fits into this category, with 25 % non-detect data.

Cohen's adjustment for 2,6-DNT data:

Percentage of non-detects = 25

2,6-DNT data excluding non-detects fits normal distribution. Hence Cohen's adjustment of mean and standard deviation is appropriate.

Mean of 2,6-DNT background data excluding non-detects (xd) = 0.1 ug/l
Variance excluding non-detects (Sd2) = 1E-04

$h=(n-m)/(n)$

"n" is the Total number of background observations = 4
"m" is the Number of background observations excluding non-detects = 3

$h= 0.25$

$g=(Sd2/(xd-DL)^2)$

DL is the Detection Limit = 0.08

$g = 0.25$

$\lambda(h,g)$ values from table 10.1, Statistical Methods for Groundwater Monitoring, Gibbons, R.D, 1994

$\lambda(0.25,0.25)$ obtained by double linear interpolation based on values for $\lambda(0.2,0.2)$, $\lambda(0.2,0.3)$, $\lambda(0.3,0.2)$, and $\lambda(0.3,0.3) =$

0.3635

Corrected sample mean (X) = $xd - (\lambda(h,g) * (xd-DL))$
X = 0.0927

Corrected sample standard deviation (S) = $(Sd2 + \lambda(h.g)(xd-DL)2)0.5$
 $S = 0.0157$

Upper Prediction Limit (UPL) for one-sided prediction interval for 2,6-DNT

$$UPL = X + t(n-1, (1-\alpha^*)/k) * S * (1 + (1/n))^{0.5}$$

$t(n-1, (1-\alpha^*)/k)$ selected from Table 1.2, Gibbons, R.D., 1994, where

TABLE 1.2 Critical Values of the t-Distribution for One-Sided Prediction Intervals for Normal Distributions	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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"t" value selected by linear interpolation based on "t" values for n=4, k=5, and n=4, k=10 which is = 5.32

One-side UPL for 2,6-DNT = 0.1859

Double Interpolation of Lamda

Actual Values	h, g intervals	Difference
h =	0.05	0.05
g =	0.05	0.05

$\lambda(0.2, 0.2)$	=	0.2703	$\lambda(0.2, 0.25)$	
$\lambda(0.2, 0.3)$	=	0.2819	0.2761	
$\lambda(0.3, 0.2)$	=	0.4422	$\lambda(0.3, 0.25)$	
$\lambda(0.3, 0.3)$	=	0.4595	0.45085	
				$\lambda(0.25, 0.25)$
				0.3635

1998 Annual Statistical Analysis-Non-Parametric Prediction Interval Computations for HWMU16

Non-parametric prediction intervals were computed for HWMU16 for all parameters whose background well (16C-1) data satisfied one of the following two criteria, per DEQ regulations, guidance as well as USEPA guidance:

1. Percentage of non-detects were between 50 and 99,
2. Percentage of non-detects less than 50, but data is not normally distributed in original or log-transformed mode.

Parameters total organic carbon (TOC), total organic halides (TOX), chromium, 2,4-dinitrotoluene (2,4-DNT), nickel, tetrachloroethene, and zinc. Hence non-parametric upper prediction limits (UPL) were computed for those target parameters.

The non-parametric UPL for each of these parameters was set at the maximum background concentration of each of those parameters in background well 16C-1 with,

$n = 4$ (number of background measurements)

$k = 8$ (number of future measurements, based on number of compliance wells (8), number of future events (1), and number of compliance parameters (conservatively set as 1))

Probability that at least one of two samples will be below UPL = 0.698

(From Table 2.1, Gibbons, R.D., 1994)

The required minimum confidence level is 0.95. However, the non-parametric prediction limit cannot be adjusted to achieve that confidence level. Hence the number of confirmation resamples required (following a statistical exceedance) for 0.95 confidence level with $n=4$ and $k=8$ is 5 (Table 2.3, Gibbons, R.D., 1994).

Upper Predictions Limits:

TOC UPL = 1025 $\mu\text{g/l}$

TOX UPL = 30 $\mu\text{g/l}$

Chromium UPL = 3.0 $\mu\text{g/l}$

2,4-DNT UPL = 0.1 $\mu\text{g/l}$

Nickel UPL = 16.0 $\mu\text{g/l}$

Tetrachloroethene UPL = 0.40 $\mu\text{g/l}$

Zinc UPL = 6 $\mu\text{g/l}$

Specific Conductivity UPL = 610 uS/cm

APPENDIX E
HWMU-7 STATISTICAL ANALYSIS RESULTS

Data Set Summary

Report Printed: 02-19-1999 12:22

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:Mr. Arne Olsen
Phone:() -

Permit Type:Background

Constituent:2,4-DNP 2,4-Dinitrophenol

CAS Number: 51-28-5
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 50.000 ppb

Start Date:Feb 16 1998
End Date:Oct 29 1998

Well ID:7W12B

Sample Date	Observation	Ln
Feb 16 1998	25.000 ppb	3.219 (* Nondetect *)
Jun 17 1998	25.000 ppb	3.219 (* Nondetect *)
Jul 27 1998	25.000 ppb	3.219 (* Nondetect *)
Oct 29 1998	25.000 ppb	3.219 (* Nondetect *)

Well ID:7W12B Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	25.000 ppb	Ln Minimum:	3.219
Maximum:	25.000 ppb	Ln Maximum:	3.219
Mean:	25.000 ppb	Ln Mean:	3.219
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-19-1999 12:22

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:Mr. Arne Olsen
Phone:() -

Permit Type:Background

Constituent:2,4-DNT 2,4-Dinitrotoluene

CAS Number: 121-14-2
MCL: 0.000 ug/l
ACL: 0.000 ug/l
Detect Limit: 0.080 ug/l

Start Date:Feb 16 1998
End Date:Oct 29 1998

Well ID:7W12B

Sample Date	Observation	Ln
Feb 16 1998	0.040 ug/l	-3.219 (* Nondetect *)
Jun 17 1998	0.040 ug/l	-3.219 (* Nondetect *)
Jul 27 1998	0.040 ug/l	-3.219 (* Nondetect *)
Oct 29 1998	0.040 ug/l	-3.219 (* Nondetect *)

Well ID:7W12B Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	0.040 ug/l	Ln Minimum:	-3.219
Maximum:	0.040 ug/l	Ln Maximum:	-3.219
Mean:	0.040 ug/l	Ln Mean:	-3.219
Std. Dev.:	0.000 ug/l	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-19-1999 12:22

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:Mr. Arne Olsen
Phone:() -

Permit Type:Background

Constituent:2,6-DNT 2,6-Dinitrotoluene

CAS Number: 606-20-2
MCL: 0.000 ug/l
ACL: 0.000 ug/l
Detect Limit: 0.080 ug/l

Start Date:Feb 16 1998
End Date:Oct 29 1998

Well ID:7W12B

Sample Date	Observation	Ln
Feb 16 1998	0.150 ug/l	-1.897
Jun 17 1998	0.040 ug/l	-3.219 (* Nondetect *)
Jul 27 1998	0.110 ug/l	-2.207
Oct 29 1998	0.040 ug/l	-3.219 (* Nondetect *)

Well ID:7W12B Summary Statistics

Observations (N): 4
Nondetects (%ND): 50

Minimum:	0.040 ug/l	Ln Minimum:	-3.219
Maximum:	0.150 ug/l	Ln Maximum:	-1.897
Mean:	0.085 ug/l	Ln Mean:	-2.636
Std. Dev.:	0.054 ug/l	Ln Std. Dev.:	0.685

Data Set Summary

Report Printed: 02-19-1999 12:23

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:Mr. Arne Olsen
Phone:() -

Permit Type:Background

Constituent:2-NP 2-Nitrophenol

CAS Number: 88-75-5
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 5.000 ppb

Start Date:Feb 16 1998
End Date:Oct 29 1998

Well ID:7W12B

Sample Date	Observation	Ln
Feb 16 1998	2.500 ppb	0.916 (* Nondetect *)
Jun 17 1998	2.500 ppb	0.916 (* Nondetect *)
Jul 27 1998	2.500 ppb	0.916 (* Nondetect *)
Oct 29 1998	2.500 ppb	0.916 (* Nondetect *)

Well ID:7W12B Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	2.500 ppb	Ln Minimum:	0.916
Maximum:	2.500 ppb	Ln Maximum:	0.916
Mean:	2.500 ppb	Ln Mean:	0.916
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-19-1999 12:23

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:Mr. Arne Olsen
Phone:() -

Permit Type:Background

Constituent:2478PECD 23478-PECDF

CAS Number: - -
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 0.061 ppb

Start Date:Feb 16 1998
End Date:Oct 29 1998

Well ID:7W12B

Sample Date	Observation	Ln
Feb 16 1998	0.031 ppb	-3.490 (* Nondetect *)
Jun 17 1998	0.031 ppb	-3.490 (* Nondetect *)
Jul 27 1998	0.031 ppb	-3.490 (* Nondetect *)
Oct 29 1998	0.031 ppb	-3.490 (* Nondetect *)

Well ID:7W12B Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	0.031 ppb	Ln Minimum:	-3.490
Maximum:	0.031 ppb	Ln Maximum:	-3.490
Mean:	0.031 ppb	Ln Mean:	-3.490
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-19-1999 12:23

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:Mr. Arne Olsen
Phone:() -

Permit Type:Background

Constituent:2678HXCD 234678-HXCDF

CAS Number: - -
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 0.053 ppb

Start Date:Feb 16 1998
End Date:Oct 29 1998

Well ID:7W12B

Sample Date	Observation	Ln
Feb 16 1998	0.026 ppb	-3.631 (* Nondetect *)
Jun 17 1998	0.026 ppb	-3.631 (* Nondetect *)
Jul 27 1998	0.026 ppb	-3.631 (* Nondetect *)
Oct 29 1998	0.026 ppb	-3.631 (* Nondetect *)

Well ID:7W12B Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	0.026 ppb	Ln Minimum:	-3.631
Maximum:	0.026 ppb	Ln Maximum:	-3.631
Mean:	0.026 ppb	Ln Mean:	-3.631
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-19-1999 12:23

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:Mr. Arne Olsen
Phone:() -

Permit Type:Background

Constituent:378PECDF 12378-PECDF

CAS Number: - -
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 0.063 ppb

Start Date:Feb 16 1998
End Date:Oct 29 1998

Well ID:7W12B

Sample Date	Observation	Ln
Feb 16 1998	0.032 ppb	-3.458 (* Nondetect *)
Jun 17 1998	0.032 ppb	-3.458 (* Nondetect *)
Jul 27 1998	0.032 ppb	-3.458 (* Nondetect *)
Oct 29 1998	0.032 ppb	-3.458 (* Nondetect *)

Well ID:7W12B Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	0.032 ppb	Ln Minimum:	-3.458
Maximum:	0.032 ppb	Ln Maximum:	-3.458
Mean:	0.032 ppb	Ln Mean:	-3.458
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-19-1999 12:24

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford

ST:VA Zip:

County:PULASKI

Contact:Mr. Arne Olsen

Phone:() -

Permit Type:Background

Constituent:378TCDF 2378-TCDF

CAS Number: - -

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.049 ppb

Start Date:Feb 16 1998

End Date:Oct 29 1998

Well ID:7W12B

Sample Date	Observation	Ln
Feb 16 1998	0.024 ppb	-3.709 (* Nondetect *)
Jun 17 1998	0.024 ppb	-3.709 (* Nondetect *)
Jul 27 1998	0.024 ppb	-3.709 (* Nondetect *)
Oct 29 1998	0.024 ppb	-3.709 (* Nondetect *)

Well ID:7W12B Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.024 ppb	Ln Minimum:	-3.709
Maximum:	0.024 ppb	Ln Maximum:	-3.709
Mean:	0.024 ppb	Ln Mean:	-3.709
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-19-1999 12:24

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:Mr. Arne Olsen
Phone:() -

Permit Type:Background

Constituent:4-NP 4-Nitrophenol

CAS Number: 100-02-7
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 10.000 ppb

Start Date:Feb 16 1998
End Date:Oct 29 1998

Well ID:7W12B

Sample Date	Observation	Ln
Feb 16 1998	5.000 ppb	1.609 (* Nondetect *)
Jun 17 1998	5.000 ppb	1.609 (* Nondetect *)
Jul 27 1998	5.000 ppb	1.609 (* Nondetect *)
Oct 29 1998	5.000 ppb	1.609 (* Nondetect *)

Well ID:7W12B Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	5.000 ppb	Ln Maximum:	1.609
Mean:	5.000 ppb	Ln Mean:	1.609
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-19-1999 12:24

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford

ST:VA Zip:

County:PULASKI

Contact:Mr. Arne Olsen

Phone:() -

Permit Type:Background

Constituent:478HXCDF 123478-HXCDF

CAS Number: - -

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.052 ppb

Start Date:Feb 16 1998

End Date:Oct 29 1998

Well ID:7W12B

Sample Date	Observation	Ln
Feb 16 1998	0.026 ppb	-3.650 (* Nondetect *)
Jun 17 1998	0.026 ppb	-3.650 (* Nondetect *)
Jul 27 1998	0.026 ppb	-3.650 (* Nondetect *)
Oct 29 1998	0.026 ppb	-3.650 (* Nondetect *)

Well ID:7W12B Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.026 ppb	Ln Minimum:	-3.650
Maximum:	0.026 ppb	Ln Maximum:	-3.650
Mean:	0.026 ppb	Ln Mean:	-3.650
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-19-1999 12:24

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford

ST:VA Zip:

County:PULASKI

Contact:Mr. Arne Olsen

Phone:() -

Permit Type:Background

Constituent:678HPCDF 1234678-HPCDF

CAS Number: - -

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.077 ppb

Start Date:Feb 16 1998

End Date:Oct 29 1998

Well ID:7W12B

Sample Date	Observation	Ln
Feb 16 1998	0.038 ppb	-3.257 (* Nondetect *)
Jun 17 1998	0.038 ppb	-3.257 (* Nondetect *)
Jul 27 1998	0.038 ppb	-3.257 (* Nondetect *)
Oct 29 1998	0.038 ppb	-3.257 (* Nondetect *)

Well ID:7W12B Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.038 ppb	Ln Minimum:	-3.257
Maximum:	0.038 ppb	Ln Maximum:	-3.257
Mean:	0.038 ppb	Ln Mean:	-3.257
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-19-1999 12:25

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:Mr. Arne Olsen
Phone:() -

Permit Type:Background

Constituent:678HXCDF 123678-HXCDF

CAS Number: - -
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 0.046 ppb

Start Date:Feb 16 1998
End Date:Oct 29 1998

Well ID:7W12B

Sample Date	Observation	Ln
Feb 16 1998	0.023 ppb	-3.772 (* Nondetect *)
Jun 17 1998	0.023 ppb	-3.772 (* Nondetect *)
Jul 27 1998	0.023 ppb	-3.772 (* Nondetect *)
Oct 29 1998	0.023 ppb	-3.772 (* Nondetect *)

Well ID:7W12B Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	0.023 ppb	Ln Minimum:	-3.772
Maximum:	0.023 ppb	Ln Maximum:	-3.772
Mean:	0.023 ppb	Ln Mean:	-3.772
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-19-1999 12:25

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:Mr. Arne Olsen
Phone:() -

Permit Type:Background

Constituent:789HPCDF 1234789-HPCDF

CAS Number: - -
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 0.097 ppb

Start Date:Feb 16 1998
End Date:Oct 29 1998

Well ID:7W12B

Sample Date	Observation	Ln
Feb 16 1998	0.049 ppb	-3.026 (* Nondetect *)
Jun 17 1998	0.049 ppb	-3.026 (* Nondetect *)
Jul 27 1998	0.049 ppb	-3.026 (* Nondetect *)
Oct 29 1998	0.049 ppb	-3.026 (* Nondetect *)

Well ID:7W12B Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	0.049 ppb	Ln Minimum:	-3.026
Maximum:	0.049 ppb	Ln Maximum:	-3.026
Mean:	0.049 ppb	Ln Mean:	-3.026
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-19-1999 12:25

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:Mr. Arne Olsen
Phone:() -

Permit Type:Background

Constituent:789HXCDF 123789-HXCDF

CAS Number: - -
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 0.057 ppb

Start Date:Feb 16 1998
End Date:Oct 29 1998

Well ID:7W12B

Sample Date	Observation	Ln
Feb 16 1998	0.029 ppb	-3.558 (* Nondetect *)
Jun 17 1998	0.029 ppb	-3.558 (* Nondetect *)
Jul 27 1998	0.029 ppb	-3.558 (* Nondetect *)
Oct 29 1998	0.029 ppb	-3.558 (* Nondetect *)

Well ID:7W12B Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	0.029 ppb	Ln Minimum:	-3.558
Maximum:	0.029 ppb	Ln Maximum:	-3.558
Mean:	0.029 ppb	Ln Mean:	-3.558
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-19-1999 12:26

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford

ST:VA Zip:

County:PULASKI

Contact:Mr. Arne Olsen

Phone:() -

Permit Type:Background

Constituent:Acetone Acetone

CAS Number: 67-64-1

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 10.000 ppb

Start Date:Feb 16 1998

End Date:Oct 29 1998

Well ID:7W12B

Sample Date	Observation	Ln
Feb 16 1998	5.000 ppb	1.609 (* Nondetect *)
Jun 17 1998	5.000 ppb	1.609 (* Nondetect *)
Jul 27 1998	5.000 ppb	1.609 (* Nondetect *)
Oct 29 1998	5.000 ppb	1.609 (* Nondetect *)

Well ID:7W12B Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	5.000 ppb	Ln Maximum:	1.609
Mean:	5.000 ppb	Ln Mean:	1.609
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-19-1999 12:26

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:Mr. Arne Olsen
Phone:() -

Permit Type:Background

Constituent:Ag Silver, total

CAS Number: 7440-22-4

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.200 ppb

Start Date:Feb 16 1998

End Date:Oct 29 1998

Well ID:7W12B

Sample Date	Observation	Ln
Feb 16 1998	0.100 ppb	-2.303 (* Nondetect *)
Jun 17 1998	0.100 ppb	-2.303 (* Nondetect *)
Jul 27 1998	0.100 ppb	-2.303 (* Nondetect *)
Oct 29 1998	0.100 ppb	-2.303 (* Nondetect *)

Well ID:7W12B Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.100 ppb	Ln Minimum:	-2.303
Maximum:	0.100 ppb	Ln Maximum:	-2.303
Mean:	0.100 ppb	Ln Mean:	-2.303
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-19-1999 13:08

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:Mr. Arne Olsen
Phone:() -

Permit Type:Background

Constituent:As Arsenic, total

CAS Number: 7440-38-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Feb 16 1998

End Date:Oct 29 1998

Well ID:7W12B

Sample Date	Observation	Ln
Feb 16 1998	0.500 ppb	-0.693 (* Nondetect *)
Jun 17 1998	1.000 ppb	0.000
Jul 27 1998	0.500 ppb	-0.693 (* Nondetect *)
Oct 29 1998	0.500 ppb	-0.693 (* Nondetect *)

Well ID:7W12B Summary Statistics

Observations (N): 4

Nondetects (%ND): 75

Minimum:	0.500 ppb	Ln Minimum:	-0.693
Maximum:	1.000 ppb	Ln Maximum:	0.000
Mean:	0.625 ppb	Ln Mean:	-0.520
Std. Dev.:	0.250 ppb	Ln Std. Dev.:	0.347

Data Set Summary

Report Printed: 02-19-1999 12:26

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:Mr. Arne Olsen
Phone:() -

Permit Type:Background

Constituent:Ba Barium, total

CAS Number: 7440-39-3

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 2.000 ppb

Start Date:Feb 16 1998

End Date:Oct 29 1998

Well ID:7W12B

Sample Date	Observation	Ln
Feb 16 1998	40.000 ppb	3.689
Jun 17 1998	37.000 ppb	3.611
Jul 27 1998	38.000 ppb	3.638
Oct 29 1998	42.000 ppb	3.738

Well ID:7W12B Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	37.000 ppb	Ln Minimum:	3.611
Maximum:	42.000 ppb	Ln Maximum:	3.738
Mean:	39.250 ppb	Ln Mean:	3.669
Std. Dev.:	2.217 ppb	Ln Std. Dev.:	0.056

Normality Tests

Report Printed: 02-19-1999 12:26

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:Mr. Arne Olsen
Phone:() -

Permit Type:Background

Constituent:Ba Barium, total

CAS Number: 7440-39-3

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 2.000 ppb

Start Date:Feb 16 1998

End Date:Oct 29 1998

Normality Test on Observations for wells listed below:

Well:7W12B Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	37.000	42.000	39.250	2.217
Log:	3.611	3.738	3.669	0.056

Pooled Statistics

Observations: 4

Statistic	Original Scale	Log Scale
Mean:	39.250	3.669
Std Dev:	2.217	0.056
Skewness:	0.278	0.242
Kurtosis:	-1.427	-1.446
Minimum:	37.000	3.611
Maximum:	42.000	3.738
CV:	0.056	0.015

Shapiro-Wilk Statistics

	Test	5% Critical	1% Critical
	Scale Statistic	Value	Value
Original:	0.9643	0.7480	0.6870

Log: 0.9671 0.7480 0.6870

* Indicates statistically significant evidence of non-normality.
GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-19-1999 12:26

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford

ST:VA Zip:

County:PULASKI

Contact:Mr. Arne Olsen

Phone:() -

Permit Type:Background

Constituent:BenzAlch Benzyl Alcohol

CAS Number: 100-51-6

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 10.000 ppb

Start Date:Feb 16 1998

End Date:Oct 29 1998

Well ID:7W12B

Sample Date	Observation	Ln
Feb 16 1998	5.000 ppb	1.609 (* Nondetect *)
Jun 17 1998	5.000 ppb	1.609 (* Nondetect *)
Jul 27 1998	5.000 ppb	1.609 (* Nondetect *)
Oct 29 1998	5.000 ppb	1.609 (* Nondetect *)

Well ID:7W12B Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	5.000 ppb	Ln Maximum:	1.609
Mean:	5.000 ppb	Ln Mean:	1.609
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-19-1999 12:27

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:Mr. Arne Olsen
Phone:() -

Permit Type:Background

Constituent:Benzene Benzene

CAS Number: 71-43-2
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 0.100 ppb

Start Date:Feb 16 1998
End Date:Oct 29 1998

Well ID:7W12B

Sample Date	Observation	Ln
Feb 16 1998	0.050 ppb	-2.996 (* Nondetect *)
Jun 17 1998	0.050 ppb	-2.996 (* Nondetect *)
Jul 27 1998	0.050 ppb	-2.996 (* Nondetect *)
Oct 29 1998	0.050 ppb	-2.996 (* Nondetect *)

Well ID:7W12B Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.050 ppb	Ln Maximum:	-2.996
Mean:	0.050 ppb	Ln Mean:	-2.996
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-19-1999 12:27

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford

ST:VA Zip:

County:PULASKI

Contact:Mr. Arne Olsen

Phone:() -

Permit Type:Background

Constituent:BiEHPhth bis (2-Ethylhexyl) Phthalate

CAS Number: 117-81-7

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 10.000 ppb

Start Date:Feb 16 1998

End Date:Oct 29 1998

Well ID:7W12B

Sample Date	Observation	Ln
Feb 16 1998	5.000 ppb	1.609 (* Nondetect *)
Jun 17 1998	5.000 ppb	1.609 (* Nondetect *)
Jul 27 1998	5.000 ppb	1.609 (* Nondetect *)
Oct 29 1998	9.000 ppb	2.197

Well ID:7W12B Summary Statistics

Observations (N): 4

Nondetects (%ND): 75

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	9.000 ppb	Ln Maximum:	2.197
Mean:	6.000 ppb	Ln Mean:	1.756
Std. Dev.:	2.000 ppb	Ln Std. Dev.:	0.294

Data Set Summary

Report Printed: 02-19-1999 12:27

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford

ST:VA Zip:

County:PULASKI

Contact:Mr. Arne Olsen

Phone:() -

Permit Type:Background

Constituent:BuBenPth Butyl benzyl phthalate

CAS Number: 85-68-7

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 5.000 ppb

Start Date:Feb 16 1998

End Date:Oct 29 1998

Well ID:7W12B

Sample Date	Observation	Ln
Feb 16 1998	2.500 ppb	0.916 (* Nondetect *)
Jun 17 1998	2.500 ppb	0.916 (* Nondetect *)
Jul 27 1998	2.500 ppb	0.916 (* Nondetect *)
Oct 29 1998	2.500 ppb	0.916 (* Nondetect *)

Well ID:7W12B Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	2.500 ppb	Ln Minimum:	0.916
Maximum:	2.500 ppb	Ln Maximum:	0.916
Mean:	2.500 ppb	Ln Mean:	0.916
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-19-1999 12:27

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:Mr. Arne Olsen
Phone:() -

Permit Type:Background

Constituent:Cd Cadmium, total

CAS Number: 7440-43-9

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.100 ppb

Start Date:Feb 16 1998

End Date:Oct 29 1998

Well ID:7W12B

Sample Date	Observation	Ln
Feb 16 1998	0.050 ppb	-2.996 (* Nondetect *)
Jun 17 1998	0.050 ppb	-2.996 (* Nondetect *)
Jul 27 1998	0.050 ppb	-2.996 (* Nondetect *)
Oct 29 1998	0.050 ppb	-2.996 (* Nondetect *)

Well ID:7W12B Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.050 ppb	Ln Maximum:	-2.996
Mean:	0.050 ppb	Ln Mean:	-2.996
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-19-1999 12:28

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:Mr. Arne Olsen
Phone:() -

Permit Type:Background

Constituent:Co Cobalt, total

CAS Number: 7440-48-4
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 1.000 ppb

Start Date:Feb 16 1998
End Date:Oct 29 1998

Well ID:7W12B

Sample Date	Observation	Ln
Feb 16 1998	0.500 ppb	-0.693 (* Nondetect *)
Jun 17 1998	0.500 ppb	-0.693 (* Nondetect *)
Jul 27 1998	0.500 ppb	-0.693 (* Nondetect *)
Oct 29 1998	0.500 ppb	-0.693 (* Nondetect *)

Well ID:7W12B Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	0.500 ppb	Ln Minimum:	-0.693
Maximum:	0.500 ppb	Ln Maximum:	-0.693
Mean:	0.500 ppb	Ln Mean:	-0.693
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-19-1999 12:28

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford

ST:VA Zip:

County:PULASKI

Contact:Mr. Arne Olsen

Phone:() -

Permit Type:Background

Constituent:Cond F Specific Conductivity, Field

CAS Number: - -

MCL: 0.000 umhos/cm

ACL: 0.000 umhos/cm

Detect Limit: 1.000 umhos/cm

Start Date:Feb 16 1998

End Date:Oct 29 1998

Well ID:7W12B

Sample Date	Observation	Ln
Feb 16 1998	643.000 umhos/cm	6.466
Jun 17 1998	677.000 umhos/cm	6.518
Jul 27 1998	703.000 umhos/cm	6.555
Oct 29 1998	785.000 umhos/cm	6.666

Well ID:7W12B Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	643.000 umhos/cm	Ln Minimum:	6.466
Maximum:	785.000 umhos/cm	Ln Maximum:	6.666
Mean:	702.000 umhos/cm	Ln Mean:	6.551
Std. Dev.:	60.542 umhos/cm	Ln Std. Dev.:	0.085

Normality Tests

Report Printed: 02-19-1999 12:28

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:Mr. Arne Olsen
Phone:() -

Permit Type:Background

Constituent:Cond F Specific Conductivity, Field

CAS Number: - -
MCL: 0.000 umhos/cm
ACL: 0.000 umhos/cm
Detect Limit: 1.000 umhos/cm

Start Date:Feb 16 1998
End Date:Oct 29 1998

Normality Test on Observations for wells listed below:

Well:7W12B Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	643.000	785.000	702.000	60.542
Log:	6.466	6.666	6.551	0.085

Pooled Statistics

Observations: 4

Statistic	Original Scale	Log Scale
Mean:	702.000	6.551
Std Dev:	60.542	0.085
Skewness:	0.608	0.538
Kurtosis:	-1.016	-1.047
Minimum:	643.000	6.466
Maximum:	785.000	6.666
CV:	0.086	0.013

Shapiro-Wilk Statistics

Test	5% Critical Value	1% Critical Value
Scale Statistic		
Original:	0.9451	0.6870

Log: 0.9578 0.7480 0.6870

* Indicates statistically significant evidence of non-normality.
GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-19-1999 12:32

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:Mr. Arne Olsen
Phone:() -

Permit Type:Background

Constituent:Cr Chromium, total

CAS Number: 7440-47-3

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Feb 16 1998

End Date:Oct 29 1998

Well ID:7W12B

Sample Date	Observation	Ln
Feb 16 1998	8.000 ppb	2.079
Jun 17 1998	14.000 ppb	2.639
Jul 27 1998	7.000 ppb	1.946
Oct 29 1998	7.000 ppb	1.946

Well ID:7W12B Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	7.000 ppb	Ln Minimum:	1.946
Maximum:	14.000 ppb	Ln Maximum:	2.639
Mean:	9.000 ppb	Ln Mean:	2.153
Std. Dev.:	3.367 ppb	Ln Std. Dev.:	0.330

Normality Tests

Report Printed: 02-19-1999 12:32

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:Mr. Arne Olsen
Phone:() -

Permit Type:Background

Constituent:Cr Chromium, total

CAS Number: 7440-47-3

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Feb 16 1998

End Date:Oct 29 1998

Normality Test on Observations for wells listed below:

Well:7W12B Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	7.000	14.000	9.000	3.367
Log:	1.946	2.639	2.153	0.330

Pooled Statistics

Observations: 4

Statistic	Original Scale	Log Scale
Mean:	9.000	2.153
Std Dev:	3.367	0.330
Skewness:	1.090*	1.036*
Kurtosis:	-0.723	-0.773
Minimum:	7.000	1.946
Maximum:	14.000	2.639
CV:	0.374	0.153

Shapiro-Wilk Statistics

Scale	Test Statistic	5% Critical Value	1% Critical Value
Original:	0.7289*	0.7480	0.6870

Log: 0.7596 0.7480 0.6870

* Indicates statistically significant evidence of non-normality.
GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-19-1999 12:32

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford

ST:VA Zip:

County:PULASKI

Contact:Mr. Arne Olsen

Phone:() -

Permit Type:Background

Constituent:Cu Copper, total

CAS Number: 7440-50-8

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Feb 16 1998

End Date:Oct 29 1998

Well ID:7W12B

Sample Date	Observation	Ln
Feb 16 1998	7.000 ppb	1.946
Jun 17 1998	6.000 ppb	1.792
Jul 27 1998	8.000 ppb	2.079
Oct 29 1998	5.000 ppb	1.609

Well ID:7W12B Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	8.000 ppb	Ln Maximum:	2.079
Mean:	6.500 ppb	Ln Mean:	1.857
Std. Dev.:	1.291 ppb	Ln Std. Dev.:	0.202

Normality Tests

Report Printed: 02-19-1999 12:32

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:Mr. Arne Olsen
Phone:() -

Permit Type:Background

Constituent:Cu Copper, total

CAS Number: 7440-50-8

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Feb 16 1998

End Date:Oct 29 1998

Normality Test on Observations for wells listed below:

Well:7W12B Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	5.000	8.000	6.500	1.291
Log:	1.609	2.079	1.857	0.202

Pooled Statistics

Observations: 4

Statistic	Original Scale	Log Scale
Mean:	6.500	1.857
Std Dev:	1.291	0.202
Skewness:	-0.000	-0.167
Kurtosis:	-1.360	-1.338
Minimum:	5.000	1.609
Maximum:	8.000	2.079
CV:	0.199	0.109

Shapiro-Wilk Statistics

Test	5% Critical Value	1% Critical Value
Scale Statistic		
Original:	0.9940	0.6870

Log: 0.9899 0.7480 0.6870

* Indicates statistically significant evidence of non-normality.
GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-19-1999 12:33

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford

ST:VA Zip:

County:PULASKI

Contact:Mr. Arne Olsen

Phone:() -

Permit Type:Background

Constituent:Cyanide Cyanide, total

CAS Number: 143-33-9

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 10.000 ppb

Start Date:Feb 16 1998

End Date:Oct 29 1998

Well ID:7W12B

Sample Date	Observation	Ln
Feb 16 1998	5.000 ppb	1.609 (* Nondetect *)
Jun 17 1998	5.000 ppb	1.609 (* Nondetect *)
Jul 27 1998	5.000 ppb	1.609 (* Nondetect *)
Oct 29 1998	5.000 ppb	1.609 (* Nondetect *)

Well ID:7W12B Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	5.000 ppb	Ln Maximum:	1.609
Mean:	5.000 ppb	Ln Mean:	1.609
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-19-1999 12:33

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford

ST:VA Zip:

County:PULASKI

Contact:Mr. Arne Olsen

Phone:() -

Permit Type:Background

Constituent:Hg Mercury

CAS Number: 7439-97-6

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.200 ppb

Start Date:Feb 16 1998

End Date:Oct 29 1998

Well ID:7W12B

Sample Date	Observation	Ln
Feb 16 1998	0.100 ppb	-2.303 (* Nondetect *)
Jun 17 1998	0.100 ppb	-2.303 (* Nondetect *)
Jul 27 1998	0.100 ppb	-2.303 (* Nondetect *)
Oct 29 1998	0.100 ppb	-2.303 (* Nondetect *)

Well ID:7W12B Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.100 ppb	Ln Minimum:	-2.303
Maximum:	0.100 ppb	Ln Maximum:	-2.303
Mean:	0.100 ppb	Ln Mean:	-2.303
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-19-1999 12:33

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:Mr. Arne Olsen
Phone:() -

Permit Type:Background

Constituent:Ni Nickel, total

CAS Number: 7440-02-0

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 15.000 ppb

Start Date:Feb 16 1998

End Date:Oct 29 1998

Well ID:7W12B

Sample Date	Observation	Ln
Feb 16 1998	7.500 ppb	2.015 (* Nondetect *)
Jun 17 1998	7.500 ppb	2.015 (* Nondetect *)
Jul 27 1998	7.500 ppb	2.015 (* Nondetect *)
Oct 29 1998	7.500 ppb	2.015 (* Nondetect *)

Well ID:7W12B Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	7.500 ppb	Ln Minimum:	2.015
Maximum:	7.500 ppb	Ln Maximum:	2.015
Mean:	7.500 ppb	Ln Mean:	2.015
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-19-1999 12:33

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford

ST:VA Zip:

County:PULASKI

Contact:Mr. Arne Olsen

Phone:() -

Permit Type:Background

Constituent:OCDF OCDF

CAS Number: - -

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.164 ppb

Start Date:Feb 16 1998

End Date:Oct 29 1998

Well ID:7W12B

Sample Date	Observation	Ln
Feb 16 1998	0.082 ppb	-2.501 (* Nondetect *)
Jun 17 1998	0.082 ppb	-2.501 (* Nondetect *)
Jul 27 1998	0.082 ppb	-2.501 (* Nondetect *)
Oct 29 1998	0.082 ppb	-2.501 (* Nondetect *)

Well ID:7W12B Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.082 ppb	Ln Minimum:	-2.501
Maximum:	0.082 ppb	Ln Maximum:	-2.501
Mean:	0.082 ppb	Ln Mean:	-2.501
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-19-1999 12:34

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford ST:VA Zip:

County:PULASKI

Contact:Mr. Arne Olsen

Phone:() -

Permit Type:Background

Constituent:Pb Lead, total

CAS Number: 7439-92-1

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Feb 16 1998

End Date:Oct 29 1998

Well ID:7W12B

Sample Date	Observation	Ln
Feb 16 1998	1.000 ppb	0.000
Jun 17 1998	0.500 ppb	-0.693 (* Nondetect *)
Jul 27 1998	0.500 ppb	-0.693 (* Nondetect *)
Oct 29 1998	0.500 ppb	-0.693 (* Nondetect *)

Well ID:7W12B Summary Statistics

Observations (N): 4

Nondetects (%ND): 75

Minimum:	0.500 ppb	Ln Minimum:	-0.693
Maximum:	1.000 ppb	Ln Maximum:	0.000
Mean:	0.625 ppb	Ln Mean:	-0.520
Std. Dev.:	0.250 ppb	Ln Std. Dev.:	0.347

Data Set Summary

Report Printed: 02-19-1999 12:34

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford

ST:VA Zip:

County:PULASKI

Contact:Mr. Arne Olsen

Phone:() -

Permit Type:Background

Constituent:Sb Antimony, total

CAS Number: 7440-36-0

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 3.000 ppb

Start Date:Feb 16 1998

End Date:Oct 29 1998

Well ID:7W12B

Sample Date	Observation	Ln
Feb 16 1998	1.500 ppb	0.405 (* Nondetect *)
Jun 17 1998	1.500 ppb	0.405 (* Nondetect *)
Jul 27 1998	1.500 ppb	0.405 (* Nondetect *)
Oct 29 1998	1.500 ppb	0.405 (* Nondetect *)

Well ID:7W12B Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	1.500 ppb	Ln Minimum:	0.405
Maximum:	1.500 ppb	Ln Maximum:	0.405
Mean:	1.500 ppb	Ln Mean:	0.405
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-19-1999 12:34

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford

ST:VA Zip:

County:PULASKI

Contact:Mr. Arne Olsen

Phone:() -

Permit Type:Background

Constituent:Se Selenium, total

CAS Number: 7782-49-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Feb 16 1998

End Date:Oct 29 1998

Well ID:7W12B

Sample Date	Observation	Ln
Feb 16 1998	0.500 ppb	-0.693 (* Nondetect *)
Jun 17 1998	0.500 ppb	-0.693 (* Nondetect *)
Jul 27 1998	1.000 ppb	0.000
Oct 29 1998	0.500 ppb	-0.693 (* Nondetect *)

Well ID:7W12B Summary Statistics

Observations (N): 4

Nondetects (%ND): 75

Minimum:	0.500 ppb	Ln Minimum:	-0.693
Maximum:	1.000 ppb	Ln Maximum:	0.000
Mean:	0.625 ppb	Ln Mean:	-0.520
Std. Dev.:	0.250 ppb	Ln Std. Dev.:	0.347

Data Set Summary

Report Printed: 02-19-1999 12:46

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:Mr. Arne Olsen
Phone:() -

Permit Type:Background

Constituent:TOC Total Organic Carbon

CAS Number: - -
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 1000.000 ppb

Start Date:Feb 16 1998
End Date:Oct 29 1998

Well ID:7W12B

Sample Date	Observation	Ln
Feb 16 1998	1375.000 ppb	7.226
Jun 17 1998	500.000 ppb	6.215 (* Nondetect *)
Jul 27 1998	500.000 ppb	6.215 (* Nondetect *)
Oct 29 1998	500.000 ppb	6.215 (* Nondetect *)

Well ID:7W12B Summary Statistics

Observations (N): 4
Nondetects (%ND): 75

Minimum:	500.000 ppb	Ln Minimum:	6.215
Maximum:	1375.000 ppb	Ln Maximum:	7.226
Mean:	718.750 ppb	Ln Mean:	6.468
Std. Dev.:	437.500 ppb	Ln Std. Dev.:	0.506

Data Set Summary

Report Printed: 02-19-1999 12:47

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:Mr. Arne Olsen
Phone:() -

Permit Type:Background

Constituent:TOX Total Organic Halogens, Halides

CAS Number: - -
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 5.000 ppb

Start Date:Feb 16 1998
End Date:Oct 29 1998

Well ID:7W12B

Sample Date	Observation	Ln
Feb 16 1998	2.500 ppb	0.916 (* Nondetect *)
Jun 17 1998	2.500 ppb	0.916 (* Nondetect *)
Jul 27 1998	2.500 ppb	0.916 (* Nondetect *)
Oct 29 1998	2.500 ppb	0.916 (* Nondetect *)

Well ID:7W12B Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	2.500 ppb	Ln Minimum:	0.916
Maximum:	2.500 ppb	Ln Maximum:	0.916
Mean:	2.500 ppb	Ln Mean:	0.916
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-19-1999 12:47

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford

ST:VA Zip:

County:PULASKI

Contact:Mr. Arne Olsen

Phone:() -

Permit Type:Background

Constituent:Tl Thallium, total

CAS Number: 7440-28-0

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Feb 16 1998

End Date:Oct 29 1998

Well ID:7W12B

Sample Date	Observation	Ln
Feb 16 1998	0.500 ppb	-0.693 (* Nondetect *)
Jun 17 1998	0.500 ppb	-0.693 (* Nondetect *)
Jul 27 1998	0.500 ppb	-0.693 (* Nondetect *)
Oct 29 1998	0.500 ppb	-0.693 (* Nondetect *)

Well ID:7W12B Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.500 ppb	Ln Minimum:	-0.693
Maximum:	0.500 ppb	Ln Maximum:	-0.693
Mean:	0.500 ppb	Ln Mean:	-0.693
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-19-1999 12:47

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford

ST:VA Zip:

County:PULASKI

Contact:Mr. Arne Olsen

Phone:() -

Permit Type:Background

Constituent:Va Vanadium

CAS Number: 7440-62-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 4.000 ppb

Start Date:Feb 16 1998

End Date:Oct 29 1998

Well ID:7W12B

Sample Date	Observation	Ln
Feb 16 1998	2.000 ppb	0.693 (* Nondetect *)
Jun 17 1998	2.000 ppb	0.693 (* Nondetect *)
Jul 27 1998	2.000 ppb	0.693 (* Nondetect *)
Oct 29 1998	2.000 ppb	0.693 (* Nondetect *)

Well ID:7W12B Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	2.000 ppb	Ln Minimum:	0.693
Maximum:	2.000 ppb	Ln Maximum:	0.693
Mean:	2.000 ppb	Ln Mean:	0.693
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-19-1999 12:47

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford

ST:VA Zip:

County:PULASKI

Contact:Mr. Arne Olsen

Phone:() -

Permit Type:Background

Constituent:Zn Zinc, total

CAS Number: 7440-66-6

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 5.000 ppb

Start Date:Feb 16 1998

End Date:Oct 29 1998

Well ID:7W12B

Sample Date	Observation	Ln
Feb 16 1998	17.000 ppb	2.833
Jun 17 1998	8.000 ppb	2.079
Jul 27 1998	32.000 ppb	3.466
Oct 29 1998	16.000 ppb	2.773

Well ID:7W12B Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	8.000 ppb	Ln Minimum:	2.079
Maximum:	32.000 ppb	Ln Maximum:	3.466
Mean:	18.250 ppb	Ln Mean:	2.788
Std. Dev.:	10.012 ppb	Ln Std. Dev.:	0.567

Normality Tests

Report Printed: 02-19-1999 12:47

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:Mr. Arne Olsen
Phone:() -

Permit Type:Background

Constituent:Zn Zinc, total

CAS Number: 7440-66-6
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 5.000 ppb

Start Date:Feb 16 1998
End Date:Oct 29 1998

Normality Test on Observations for wells listed below:

Well:7W12B Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	8.000	32.000	18.250	10.012
Log:	2.079	3.466	2.788	0.567

Pooled Statistics

Observations: 4

Statistic	Original Scale	Log Scale
Mean:	18.250	2.788
Std Dev:	10.012	0.567
Skewness:	0.579	-0.092
Kurtosis:	-0.930	-1.006
Minimum:	8.000	2.079
Maximum:	32.000	3.466
CV:	0.549	0.203

Shapiro-Wilk Statistics

Test	5% Critical Value	1% Critical Value
Scale Statistic		
Original:	0.9229	0.6870

Log: 0.9620 0.7480 0.6870

* Indicates statistically significant evidence of non-normality.
GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-19-1999 12:48

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:Mr. Arne Olsen
Phone:() -

Permit Type:Background

Constituent:pH F pH, Field

CAS Number: - -
MCL: 0.000 SU
ACL: 0.000 SU
Detect Limit: 0.100 SU

Start Date:Feb 16 1998
End Date:Oct 29 1998

Well ID:7W12B

Sample Date	Observation	Ln
Feb 16 1998	7.000 SU	1.946
Jun 17 1998	6.400 SU	1.856
Jul 27 1998	6.700 SU	1.902
Oct 29 1998	6.700 SU	1.902

Well ID:7W12B Summary Statistics

Observations (N): 4
Nondetects (%ND): 0

Minimum:	6.400 SU	Ln Minimum:	1.856
Maximum:	7.000 SU	Ln Maximum:	1.946
Mean:	6.700 SU	Ln Mean:	1.902
Std. Dev.:	0.245 SU	Ln Std. Dev.:	0.037

Normality Tests

Report Printed: 02-19-1999 12:48

Facility:RAAPHMU7 Haz Waste Mgmt Unit7-RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:Mr. Arne Olsen
Phone:() -

Permit Type:Background

Constituent:pH F pH, Field

CAS Number: - -
MCL: 0.000 SU
ACL: 0.000 SU
Detect Limit: 0.100 SU

Start Date:Feb 16 1998
End Date:Oct 29 1998

Normality Test on Observations for wells listed below:

Well:7W12B Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	6.400	7.000	6.700	0.245
Log:	1.856	1.946	1.902	0.037

Pooled Statistics

Observations: 4

Statistic	Original	Log
	Scale	Scale
Mean:	6.700	1.902
Std Dev:	0.245	0.037
Skewness:	0.000	-0.047
Kurtosis:	-1.000	-0.999
Minimum:	6.400	1.856
Maximum:	7.000	1.946
CV:	0.037	0.019

Shapiro-Wilk Statistics

	Test	5% Critical	1% Critical
Scale	Statistic	Value	Value
Original:	0.9445	0.7480	0.6870

Log: 0.9443 0.7480 0.6870

* Indicates statistically significant evidence of non-normality.
GRIT/STAT Version 5.0

1998 Annual Statistical Analysis-Non-Parametric Prediction Interval Computations for HWMU7

Non-parametric prediction intervals were computed for HWMU7 for all parameters whose background well (7W12B) data satisfied one of the following two criteria, per DEQ regulations, guidance as well as USEPA guidance:

1. Percentage of non-detects were between 50 and 99,
2. Percentage of non-detects less than 50, but data is not normally distributed in original or log-transformed mode.

Parameters total organic carbon (TOC), bis(2-ethylhexyl)phthalate, 2,6-DNT, lead, selenium and arsenic satisfied the first criteria above, and chromium satisfied the second criteria. Hence non-parametric upper prediction limits (UPL) were computed for those target parameters.

The non-parametric UPL for each of these parameters was set at the maximum background concentration of each of those parameters in background well 7W12B with,

$n = 4$ (number of background measurements)

$k = 8$ (number of future measurements, based on number of compliance wells (8), number of number of future events (1), and number of compliance parameters (conservatively set as 1))

Probability that at least one of two samples will be below UPL = 0.698

(From Table 2.1, Gibbons, R.D., 1994). Hence the number of confirmation resamples required (following a statistical exceedance) for 0.95 confidence level with $n=4$ and $k=8$ is 5 (Table 2.3, Gibbons, R.D., 1994).

Upper Predictions Limits:

TOC UPL = 1375 $\mu\text{g/l}$

Bis(2-ethylhexyl)phthalate UPL = 10 $\mu\text{g/l}$

2,6-DNT UPL = 0.15 $\mu\text{g/l}$

Lead UPL = 1 $\mu\text{g/l}$

Selenium UPL = 1 $\mu\text{g/l}$

Chromium UPL = 14 $\mu\text{g/l}$

Arsenic UPL = 1 $\mu\text{g/l}$

Parametric Prediction Interval
Report Printed February 19,1999

Page 1

Facility:Haz Waste Mgmt Unit7-RAAP
Parameter:pH, Field(CAS Number:- -)

TWO-TAILED PARAMETRIC PREDICTION INTERVAL

Observations (n): 4
Shapiro-Wilk (W): 0.9445
Critical W, $\alpha=0.01$: 0.6870
Mean: 6.700 SU
Std Dev: 0.245 SU
DF: 3
Conf. Level (1- α): 0.9500
Future Samples (k): 1
 $t_{1-\alpha}$: 5.8409
2-k
Kappa: 6.5303
UL: 8.300 SU
LL: 5.100 SU

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:77WCA

Sample Date 10/29/98 Observation 6.300 SU

Well:7MW5

Sample Date 10/29/98 Observation 6.700 SU

Well:7MW6

Sample Date 10/29/98 Observation 7.100 SU

Well:7S7W13

Sample Date 10/29/98 Observation 7.800 SU

Well:7W10B

Sample Date 10/29/98 Observation 6.300 SU



Parametric Prediction Interval
Report Printed February 19,1999

Page 2

Facility:Haz Waste Mgmt Unit7-RAAP
Parameter:pH, Field(CAS Number:- -)

TWO-TAILED PARAMETRIC PREDICTION INTERVAL

Observations (n): 4
Shapiro-Wilk (W): 0.9445
Critical W, $\alpha=0.01$: 0.6870
Mean: 6.700 SU
Std Dev: 0.245 SU
DF: 3
Conf. Level (1- α): 0.9500
Future Samples (k): 1
 $t_{\left[\frac{1-\alpha}{2 \cdot k} \right]}$: 5.8409
Kappa: 6.5303
UL: 8.300 SU
LL: 5.100 SU

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:7W10C

<u>Sample Date</u>	<u>Observation</u>
10/29/98	6.800 SU

Well:7W11B

<u>Sample Date</u>	<u>Observation</u>
10/29/98	6.100 SU

Well:7W9C

<u>Sample Date</u>	<u>Observation</u>
10/29/98	6.200 SU

Parametric Prediction Interval
Report Printed February 19,1999

Page 1

Facility:Haz Waste Mgmt Unit7-RAAP
Parameter:Barium, total(CAS Number:7440-39-3)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 4
Shapiro-Wilk (W): 0.9643
Critical W, $\alpha=0.01$: 0.6870
Mean: 39.250 ppb
Std Dev: 2.217 ppb
DF: 3
Conf. Level (1- α): 0.9500
Future Samples (k): 1
 $t_{\left[1-\alpha\right]}^{\left[k\right]}$: 4.5407
Kappa: 5.0767
UL: 50.507 ppb
LL: $-\infty$

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:77WCA

<u>Sample Date</u>	<u>Observation</u>
10/29/98	17.000 ppb

Well:7MW5

<u>Sample Date</u>	<u>Observation</u>
10/29/98	34.000 ppb

Well:7MW6

<u>Sample Date</u>	<u>Observation</u>
10/29/98	223.000 ppb *

Well:7S7W13

<u>Sample Date</u>	<u>Observation</u>
10/29/98	18.000 ppb

Well:7W10B

<u>Sample Date</u>	<u>Observation</u>
10/29/98	100.000 ppb *

Parametric Prediction Interval
Report Printed February 19,1999

Page 2

Facility: Haz Waste Mgmt Unit7-RAAP
Parameter: Barium, total(CAS Number:7440-39-3)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 4
Shapiro-Wilk (W): 0.9643
Critical W, $\alpha=0.01$: 0.6870
Mean: 39.250 ppb
Std Dev: 2.217 ppb
DF: 3
Conf. Level (1- α): 0.9500
Future Samples (k): 1
 $t_{\left[\begin{array}{c} 1 - \alpha \\ - \\ k \end{array} \right]}$: 4.5407
Kappa: 5.0767
UL: 50.507 ppb
LL: $-\infty$

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:7W10C

<u>Sample Date</u>	<u>Observation</u>
10/29/98	61.000 ppb *

Well:7W11B

<u>Sample Date</u>	<u>Observation</u>
10/29/98	17.000 ppb

Well:7W9C

<u>Sample Date</u>	<u>Observation</u>
10/29/98	28.000 ppb

Parametric Prediction Interval
Report Printed February 19,1999

Page 1

Facility:Haz Waste Mgmt Unit7-RAAP
Parameter:Copper, total(CAS Number:7440-50-8)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 4
Shapiro-Wilk (W): 0.9940
Critical W, $\alpha=0.01$: 0.6870
Mean: 6.500 ppb
Std Dev: 1.291 ppb
DF: 3
Conf. Level (1- α): 0.9500
Future Samples (k): 1
 $t_{1-\alpha, k}$: 4.5407
Kappa: 5.0767
UL: 13.054 ppb
LL: $-\infty$

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:77WCA

<u>Sample Date</u>	<u>Observation</u>
10/29/98	ND<1.000 ppb

Well:7MW5

<u>Sample Date</u>	<u>Observation</u>
10/29/98	1.000 ppb

Well:7MW6

<u>Sample Date</u>	<u>Observation</u>
10/29/98	4.000 ppb

Well:7S7W13

<u>Sample Date</u>	<u>Observation</u>
10/29/98	ND<1.000 ppb

Well:7W10B

<u>Sample Date</u>	<u>Observation</u>
10/29/98	ND<1.000 ppb

Parametric Prediction Interval
Report Printed February 19,1999

Page 2

Facility:Haz Waste Mgmt Unit7-RAAP
Parameter:Copper, total(CAS Number:7440-50-8)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 4
Shapiro-Wilk (W): 0.9940
Critical W, $\alpha=0.01$: 0.6870
Mean: 6.500 ppb
Std Dev: 1.291 ppb
DF: 3
Conf. Level (1- α): 0.9500
Future Samples (k): 1
 $t_{\left[\begin{array}{c} 1 - \alpha \\ - \\ k \end{array} \right]}$: 4.5407
Kappa: 5.0767
UL: 13.054 ppb
LL: $-\infty$

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:7W10C

<u>Sample Date</u>	<u>Observation</u>
10/29/98	ND<1.000 ppb

Well:7W11B

<u>Sample Date</u>	<u>Observation</u>
10/29/98	4.000 ppb

Well:7W9C

<u>Sample Date</u>	<u>Observation</u>
10/29/98	5.000 ppb

Parametric Prediction Interval
Report Printed February 19,1999

Page 1

Facility:Haz Waste Mgmt Unit7-RAAP
Parameter:Zinc, total(CAS Number:7440-66-6)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 4
Shapiro-Wilk (W): 0.9229
Critical W, $\alpha=0.01$: 0.6870
Mean: 18.250 ppb
Std Dev: 10.013 ppb
DF: 3
Conf. Level (1- α): 0.9500
Future Samples (k): 1
 $t_{\left[1-\alpha\right]}^{\left[k\right]}$: 4.5407
Kappa: 5.0767
UL: 69.080 ppb
LL: $-\infty$

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:77WCA

<u>Sample Date</u>	<u>Observation</u>
10/29/98	19.000 ppb

Well:7MW5

<u>Sample Date</u>	<u>Observation</u>
10/29/98	12.000 ppb

Well:7MW6

<u>Sample Date</u>	<u>Observation</u>
10/29/98	12.000 ppb

Well:7S7W13

<u>Sample Date</u>	<u>Observation</u>
10/29/98	9.000 ppb

Well:7W10B

<u>Sample Date</u>	<u>Observation</u>
10/29/98	ND<5.000 ppb

Parametric Prediction Interval
Report Printed February 19,1999

Page 2

Facility: Haz Waste Mgmt Unit7-RAAP
Parameter: Zinc, total(CAS Number:7440-66-6)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 4
Shapiro-Wilk (W): 0.9229
Critical W, $\alpha=0.01$: 0.6870
Mean: 18.250 ppb
Std Dev: 10.013 ppb
DF: 3
Conf. Level (1- α): 0.9500
Future Samples (k): 1
 $t_{\left[1-\alpha\right]}^{\left[k\right]}$: 4.5407
Kappa: 5.0767
UL: 69.080 ppb
LL: $-\infty$

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:7W10C

<u>Sample Date</u>	<u>Observation</u>
10/29/98	15.000 ppb

Well:7W11B

<u>Sample Date</u>	<u>Observation</u>
10/29/98	ND<5.000 ppb

Well:7W9C

<u>Sample Date</u>	<u>Observation</u>
10/29/98	28.000 ppb

Parametric Prediction Interval
Report Printed February 19,1999

Page 1

Facility:Haz Waste Mgmt Unit7-RAAP
Parameter:Specific Conductivity, Field(CAS Number:- -)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 4
Shapiro-Wilk (W): 0.9451
Critical W, $\alpha=0.01$: 0.6870
Mean: 702.000 umhos/cm
Std Dev: 60.542 umhos/cm
DF: 3
Conf. Level (1- α): 0.9500
Future Samples (k): 1
 $t_{\left[\begin{array}{c} 1 - \alpha \\ - \\ k \end{array} \right]}$: 4.5407
Kappa: 5.0767
UL: 1009.351 umhos/cm
LL: $-\infty$

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:77WCA

<u>Sample Date</u>	<u>Observation</u>
10/29/98	1707.000 umhos/cm *

Well:7MW5

<u>Sample Date</u>	<u>Observation</u>
10/29/98	1043.000 umhos/cm *

Well:7MW6

<u>Sample Date</u>	<u>Observation</u>
10/29/98	1810.000 umhos/cm *

Well:7S7W13

<u>Sample Date</u>	<u>Observation</u>
10/29/98	1680.000 umhos/cm *

Well:7W10B

<u>Sample Date</u>	<u>Observation</u>
10/29/98	1140.000 umhos/cm *

Parametric Prediction Interval
Report Printed February 19,1999

Page 2

Facility:Haz Waste Mgmt Unit7-RAAP
Parameter:Specific Conductivity, Field(CAS Number:- -)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 4
Shapiro-Wilk (W): 0.9451
Critical W, $\alpha=0.01$: 0.6870
Mean: 702.000 umhos/cm
Std Dev: 60.542 umhos/cm
DF: 3
Conf. Level (1- α): 0.9500
Future Samples (k): 1
 $t_{\left[\begin{array}{c} 1 - \alpha \\ - \\ k \end{array} \right]}$: 4.5407
Kappa: 5.0767
UL: 1009.351 umhos/cm
LL: $-\infty$

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:7W10C

<u>Sample Date</u>	<u>Observation</u>
10/29/98	773.000 umhos/cm

Well:7W11B

<u>Sample Date</u>	<u>Observation</u>
10/29/98	1320.000 umhos/cm *

Well:7W9C

<u>Sample Date</u>	<u>Observation</u>
10/29/98	1705.000 umhos/cm *



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11

APPENDIX F

HWMU-10 STATISTICAL ANALYSIS RESULTS

Data Set Summary

Report Printed: 02-17-1999 18:27

Facility:RAAPHMU10 Haz Waste Mgmt Unit10-RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:Mr. Arne Oisen
Phone:() -

Permit Type:Background

Constituent:2,4-DNT 2,4-Dinitrotoluene

CAS Number: 121-14-2
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 0.080 ppb

Start Date:Mar 18 1998
End Date:Dec 07 1998

Well ID:10D4

Sample Date	Observation	Ln
Mar 18 1998	0.040 ppb	-3.219 (* Nondetect *)
May 27 1998	0.040 ppb	-3.219 (* Nondetect *)
Sep 04 1998	0.040 ppb	-3.219 (* Nondetect *)
Dec 07 1998	0.040 ppb	-3.219 (* Nondetect *)

Well ID:10D4 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	0.040 ppb	Ln Minimum:	-3.219
Maximum:	0.040 ppb	Ln Maximum:	-3.219
Mean:	0.040 ppb	Ln Mean:	-3.219
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-17-1999 18:28

Facility:RAAPHNU10 Haz Waste Mgmt Unit10-RAAP

Address:

City:Radford ST:VA Zip:

County:PULASKI

Contact:Mr. Arne Olsen

Phone:() -

Permit Type:Background

Constituent:2,6-DNT 2,6-Dinitrotoluene

CAS Number: 606-20-2

MCL: 0.000 ug/l

ACL: 0.000 ug/l

Detect Limit: 0.080 ug/l

Start Date:Mar 18 1998

End Date:Dec 07 1998

Well ID:10D4

Sample Date	Observation	Ln
Mar 18 1998	0.040 ug/l	-3.219 (* Nondetect *)
May 27 1998	0.040 ug/l	-3.219 (* Nondetect *)
Sep 04 1998	0.040 ug/l	-3.219 (* Nondetect *)
Dec 07 1998	0.040 ug/l	-3.219 (* Nondetect *)

Well ID:10D4 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.040 ug/l	Ln Minimum:	-3.219
Maximum:	0.040 ug/l	Ln Maximum:	-3.219
Mean:	0.040 ug/l	Ln Mean:	-3.219
Std. Dev.:	0.000 ug/l	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-17-1999 18:28

Facility:RAAPHU10 Haz Waste Mgmt Unit10-RAAP

Address:

City:Radford ST:VA Zip:

County:PULASKI

Contact:Mr. Arne Olsen

Phone:() -

Permit Type:Background

Constituent:Ag Silver, total

C&S Number: 7440-22-4

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.200 ppb

Start Date:Mar 18 1998

End Date:Dec 07 1998

Well ID:10D4

Sample Date	Observation	Ln
Mar 18 1998	0.100 ppb	-2.303 (* Nondetect *)
May 27 1998	0.100 ppb	-2.303 (* Nondetect *)
Sep 04 1998	0.100 ppb	-2.303 (* Nondetect *)
Dec 07 1998	0.100 ppb	-2.303 (* Nondetect *)

Well ID:10D4 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.100 ppb	Ln Minimum:	-2.303
Maximum:	0.100 ppb	Ln Maximum:	-2.303
Mean:	0.100 ppb	Ln Mean:	-2.303
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-17-1999 18:28

Facility:RAAPHMU10 Haz Waste Mgmt Unit10-RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:Mr. Arne Olsen
Phone:() -

Permit Type:Background

Constituent:As Arsenic, total

CAS Number: 7440-38-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Mar 18 1998

End Date:Dec 07 1998

Well ID:10D4

Sample Date	Observation	Ln
Mar 18 1998	2.000 ppb	0.693
May 27 1998	0.500 ppb	-0.693 (* Nondetect *)
Sep 04 1998	0.500 ppb	-0.693 (* Nondetect *)
Dec 07 1998	0.500 ppb	-0.693 (* Nondetect *)

Well ID:10D4 Summary Statistics

Observations (N): 4
Nondetects (%ND): 75

Minimum:	0.500 ppb	Ln Minimum:	-0.693
Maximum:	2.000 ppb	Ln Maximum:	0.693
Mean:	0.875 ppb	Ln Mean:	-0.347
Std. Dev.:	0.750 ppb	Ln Std. Dev.:	0.693

Data Set Summary

Report Printed: 02-17-1999 18:28

Facility:RAAPHWU10 Haz Waste Mgmt Unit10-RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:Mr. Arne Olsen
Phone:() -

Permit Type:Background

Constituent:Ba Barium, total

CAS Number: 7440-39-3

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 2.000 ppb

Start Date:Mar 18 1998

End Date:Dec 07 1998

Well ID:10D4

Sample Date	Observation	Ln
Mar 18 1998	129.000 ppb	4.860
May 27 1998	96.000 ppb	4.564
Sep 04 1998	139.000 ppb	4.934
Dec 07 1998	125.000 ppb	4.828

Well ID:10D4 Summary Statistics

Observations (N): 4
Nondetects (%ND): 0

Minimum:	96.000 ppb	Ln Minimum:	4.564
Maximum:	139.000 ppb	Ln Maximum:	4.934
Mean:	122.250 ppb	Ln Mean:	4.797
Std. Dev.:	18.464 ppb	Ln Std. Dev.:	0.161

Normality Tests

Report Printed: 02-17-1999 18:28

Facility:RAAPHMU10 Haz Waste Mgmt Unit10-RAAP

Address:

City:Radford

ST:VA Zip:

County:PULASKI

Contact:Mr. Arne Olsen

Phone:() -

Permit Type:Background

Constituent:Ba Barium, total

CAS Number: 7440-39-3

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 2.000 ppb

Start Date:Mar 18 1998

End Date:Dec 07 1998

Normality Test on Observations for wells listed below:

Well:10D4 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	96.000	139.000	122.250	18.464
Log:	4.564	4.934	4.797	0.161

Pooled Statistics

Observations: 4

Statistic	Original Scale	Log Scale
Mean:	122.250	4.797
Std Dev:	18.464	0.161
Skewness:	-0.799	-0.887
Kurtosis:	-0.875	-0.832
Minimum:	96.000	4.564
Maximum:	139.000	4.934
CV:	0.151	0.034

Shapiro-Wilk Statistics

Test	5% Critical Value	1% Critical Value
Scale Statistic		
Original: 0.8930	0.7480	0.6870

Log: 0.8648 0.7480 0.6870

* Indicates statistically significant evidence of non-normality.

GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-17-1999 18:29

Facility:RAAPHMU10 Haz Waste Mgmt Unit10-RAAP

Address:

City:Radford

ST:VA Zip:

County:PULASKI

Contact:Mr. Arne Olsen

Phone:() -

Permit Type:Background

Constituent:BrCl2Me Bromodichloromethane

CAS Number: 75-27-4

HCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.200 ppb

Start Date:Mar 18 1998

End Date:Dec 07 1998

Well ID:10D4

Sample Date	Observation	Ln
Mar 18 1998	0.100 ppb	-2.303 (* Nondetect *)
May 27 1998	0.100 ppb	-2.303 (* Nondetect *)
Sep 04 1998	0.100 ppb	-2.303 (* Nondetect *)
Dec 07 1998	0.100 ppb	-2.303 (* Nondetect *)

Well ID:10D4 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.100 ppb	Ln Minimum:	-2.303
Maximum:	0.100 ppb	Ln Maximum:	-2.303
Mean:	0.100 ppb	Ln Mean:	-2.303
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-17-1999 18:30

Facility:RAAPHU10 Haz Waste Mgmt Unit10-RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:Mr. Arne Olsen
Phone:() -

Permit Type:Background

Constituent:ChlMeth Chloromethane

CAS Number: 74-87-3
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 0.300 ppb

Start Date:Mar 18 1998
End Date:Dec 07 1998

Well ID:10D4

Sample Date	Observation	Ln
Mar 18 1998	0.150 ppb	-1.897 (* Nondetect *)
May 27 1998	0.150 ppb	-1.897 (* Nondetect *)
Sep 04 1998	0.150 ppb	-1.897 (* Nondetect *)
Dec 07 1998	0.150 ppb	-1.897 (* Nondetect *)

Well ID:10D4 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	0.150 ppb	Ln Minimum:	-1.897
Maximum:	0.150 ppb	Ln Maximum:	-1.897
Mean:	0.150 ppb	Ln Mean:	-1.897
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-17-1999 18:31

Facility:RAAPRMU10 Haz Waste Mgmt Unit10-RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:Mr. Arne Olsen
Phone:() -

Permit Type:Background

Constituent:Chlorofm Chloroform

CAS Number: 67-66-3
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 3.500 ppb

Start Date:Mar 18 1998
End Date:Dec 07 1998

Well ID:10D4

Sample Date	Observation	Ln
Mar 18 1998	1.750 ppb	0.560 (* Nondetect *)
May 27 1998	7.100 ppb	1.960
Sep 04 1998	11.200 ppb	2.416
Dec 07 1998	15.600 ppb	2.747

Well ID:10D4 Summary Statistics

Observations (N): 4
Nondetects (%ND): 25

Minimum:	1.750 ppb	Ln Minimum:	0.560
Maximum:	15.600 ppb	Ln Maximum:	2.747
Mean:	8.913 ppb	Ln Mean:	1.921
Std. Dev.:	5.903 ppb	Ln Std. Dev.:	0.963

Normality Tests

Report Printed: 02-17-1999 18:31

Facility:RAAPHMU10 Haz Waste Mgmt Unit10-RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:Mr. Arne Olsen
Phone:() -

Permit Type:Background

Constituent:Chlorofm Chloroform

CAS Number: 67-66-3
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 3.500 ppb

Start Date:Mar 18 1998
End Date:Dec 07 1998

Normality Test on Observations for wells listed below:

Well:10D4 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	1.750	15.600	8.913	5.903
Log:	0.560	2.747	1.921	0.963

Pooled Statistics

Observations: 4

Statistic	Original	Log
	Scale	Scale
Mean:	8.913	1.921
Std Dev:	5.903	0.963
Skewness:	-0.117	-0.791
Kurtosis:	-1.291	-0.955
Minimum:	1.750	0.560
Maximum:	15.600	2.747
CV:	0.662	0.501

Shapiro-Wilk Statistics

Test	5% Critical	1% Critical
Scale Statistic	Value	Value
Original:	0.9962	0.7480
		0.6870

Log: 0.8969 0.7480 0.6870

* Indicates statistically significant evidence of non-normality.
GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-17-1999 18:31

Facility:RAAPHMU10 Haz Waste Mgmt Unit10-RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:Mr. Arne Olsen
Phone:() -

Permit Type:Background

Constituent:Cond F Specific Conductivity, Field

CAS Number: - -
MCL: 0.000 umhos/cm
ACL: 0.000 umhos/cm
Detect Limit: 1.000 umhos/cm

Start Date:Mar 18 1998
End Date:Dec 07 1998

Well ID:10D4

Sample Date	Observation	Ln
Mar 18 1998	353.000 umhos/cm	5.866
May 27 1998	310.000 umhos/cm	5.737
Sep 04 1998	303.000 umhos/cm	5.714
Dec 07 1998	307.000 umhos/cm	5.727

Well ID:10D4 Summary Statistics

Observations (N): 4
Nondetects (%ND): 0

Minimum:	303.000 umhos/cm	Ln Minimum:	5.714
Maximum:	353.000 umhos/cm	Ln Maximum:	5.866
Mean:	318.250 umhos/cm	Ln Mean:	5.761
Std. Dev.:	23.343 umhos/cm	Ln Std. Dev.:	0.071

Normality Tests

Report Printed: 02-17-1999 18:31

Facility:RAAPHMU10 Haz Waste Mgmt Unit10-RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:Mr. Arne Olsen
Phone:() -

Permit Type:Background

Constituent:Cond F Specific Conductivity, Field

CAS Number: - -
MCL: 0.000 umhos/cm
ACL: 0.000 umhos/cm
Detect Limit: 1.000 umhos/cm

Start Date:Mar 18 1998
End Date:Dec 07 1998

Normality Test on Observations for wells listed below:

Well:10D4 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	303.000	353.000	318.250	23.343
Log:	5.714	5.866	5.761	0.071

Pooled Statistics

Observations: 4

Statistic	Original	Log
	Scale	Scale
Mean:	318.250	5.761
Std Dev:	23.343	0.071
Skewness:	1.102*	1.094*
Kurtosis:	-0.706	-0.711
Minimum:	303.000	5.714
Maximum:	353.000	5.866
CV:	0.073	0.012

Shapiro-Wilk Statistics

Test	5% Critical	1% Critical
Scale Statistic	Value	Value
Original:	0.7435*	0.7480
		0.6870

Log: 0.7514 0.7480 0.6870

* Indicates statistically significant evidence of non-normality.

GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-17-1999 18:31

Facility:RAAPHMU10 Haz Waste Mgmt Unit10-RAAP

Address:

City:Radford

ST:VA Zip:

County:PULASKI

Contact:Mr. Arne Olsen

Phone:() -

Permit Type:Background

Constituent:Cr Chromium, total

CAS Number: 7440-47-3

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Mar 18 1998

End Date:Dec 07 1998

Well ID:10D4

Sample Date	Observation	Ln
Mar 18 1998	16.000 ppb	2.773
May 27 1998	8.000 ppb	2.079
Sep 04 1998	7.000 ppb	1.946
Dec 07 1998	8.000 ppb	2.079

Well ID:10D4 Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	7.000 ppb	Ln Minimum:	1.946
Maximum:	16.000 ppb	Ln Maximum:	2.773
Mean:	9.750 ppb	Ln Mean:	2.219
Std. Dev.:	4.193 ppb	Ln Std. Dev.:	0.374

Normality Tests

Report Printed: 02-17-1999 18:32

Facility:RAAPHMU10 Haz Waste Mgmt Unit10-RAAP

Address:

City:Radford ST:VA Zip:

County:PULASKI

Contact:Mr. Arne Olsen

Phone:() -

Permit Type:Background

Constituent:Cr Chromium, total

CAS Number: 7440-47-3

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Mar 18 1998

End Date:Dec 07 1998

Normality Test on Observations for wells listed below:

Well:10D4 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	7.000	16.000	9.750	4.193
Log:	1.946	2.773	2.219	0.374

Pooled Statistics

Observations: 4

Statistic	Original	Log
	Scale	Scale
Mean:	9.750	2.219
Std Dev:	4.193	0.374
Skewness:	1.110*	1.054*
Kurtosis:	-0.697	-0.731
Minimum:	7.000	1.946
Maximum:	16.000	2.773
CV:	0.430	0.169

Shapiro-Wilk Statistics

Test	5% Critical	1% Critical
Scale Statistic	Value	Value
Original:	0.7252*	0.7480
		0.6870

Log: 0.7684 0.7480 0.6870

* Indicates statistically significant evidence of non-normality.
GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-17-1999 18:32

Facility:RAAPHMU10 Haz Waste Mgmt Unit10-RAAP

Address:

City:Radford

ST:VA Zip:

County:PULASKI

Contact:Mr. Arne Olsen

Phone:() -

Permit Type:Background

Constituent:Cu Copper, total

CAS Number: 7440-50-8

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Mar 18 1998

End Date:Dec 07 1998

Well ID:10D4

Sample Date	Observation	Ln
Mar 18 1998	8.000 ppb	2.079
May 27 1998	2.000 ppb	0.693
Sep 04 1998	2.000 ppb	0.693
Dec 07 1998	0.500 ppb	-0.693 (* Nondetect *)

Well ID:10D4 Summary Statistics

Observations (N): 4

Nondetects (%ND): 25

Minimum:	0.500 ppb	Ln Minimum:	-0.693
Maximum:	8.000 ppb	Ln Maximum:	2.079
Mean:	3.125 ppb	Ln Mean:	0.693
Std. Dev.:	3.326 ppb	Ln Std. Dev.:	1.132

Normality Tests

Report Printed: 02-17-1999 18:32

Facility:RAAPHEMU10 Haz Waste Mgmt Unit10-RAAP

Address:

City:Radford ST:VA Zip:

County:PULASKI

Contact:Mr. Arne Olsen

Phone:() -

Permit Type:Background

Constituent:Cu Copper, total

CAS Number: 7440-50-8

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Mar 18 1998

End Date:Dec 07 1998

Normality Test on Observations for wells listed below:

Well:10D4 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	0.500	8.000	3.125	3.326
Log:	-0.693	2.079	0.693	1.132

Pooled Statistics

Observations: 4

Statistic	Original	Log
	Scale	Scale
Mean:	3.125	0.693
Std Dev:	3.326	1.132
Skewness:	0.993	0.000
Kurtosis:	-0.765	-1.000
Minimum:	0.500	-0.693
Maximum:	8.000	2.079
CV:	1.064	1.633

Shapiro-Wilk Statistics

Test	5% Critical	1% Critical
Scale Statistic	Value	Value
Original:	0.8004	0.7480
		0.6870

Log: 0.9445 0.7480 0.6870

* Indicates statistically significant evidence of non-normality.

GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-17-1999 18:32

Facility:RAAPHMU10 Haz Waste Mgmt Unit10-RAAP

Address:

City:Radford

ST:VA Zip:

County:PULASKI

Contact:Mr. Arne Olsen

Phone:() -

Permit Type:Background

Constituent:Cyanid Cyanide

CAS Number: 143-33-9

HCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 10.000 ppb

Start Date:Mar 18 1998

End Date:Dec 07 1998

Well ID:10D4

Sample Date	Observation	Ln
Mar 18 1998	5.000 ppb	1.609 (* Nondetect *)
May 27 1998	5.000 ppb	1.609 (* Nondetect *)
Sep 04 1998	5.000 ppb	1.609 (* Nondetect *)
Dec 07 1998	5.000 ppb	1.609 (* Nondetect *)

Well ID:10D4 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	5.000 ppb	Ln Maximum:	1.609
Mean:	5.000 ppb	Ln Mean:	1.609
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-17-1999 18:33

Facility:RAAPHMU10 Haz Waste Mgmt Unit10-RAAP

Address:

City:Radford ST:VA Zip:

County:PULASKI

Contact:Mr. Arne Olsen

Phone:() -

Permit Type:Background

Constituent:Di-N-Bu Di-n-Butylphthalate

CAS Number: 84-74-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 5.000 ppb

Start Date:Mar 18 1998

End Date:Dec 07 1998

Well ID:10D4

Sample Date	Observation	Ln
Mar 18 1998	2.500 ppb	0.916 (* Nondetect *)
May 27 1998	2.500 ppb	0.916 (* Nondetect *)
Sep 04 1998	2.500 ppb	0.916 (* Nondetect *)
Dec 07 1998	2.500 ppb	0.916 (* Nondetect *)

Well ID:10D4 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	2.500 ppb	Ln Minimum:	0.916
Maximum:	2.500 ppb	Ln Maximum:	0.916
Mean:	2.500 ppb	Ln Mean:	0.916
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-17-1999 18:33

Facility:RAAPHMU10 Haz Waste Mgmt Unit10-RAAP

Address:

City:Radford ST:VA Zip:

County:PULASKI

Contact:Mr. Arne Olsen

Phone:() -

Permit Type:Background

Constituent:Hg Mercury

CAS Number: 7439-97-6

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.200 ppb

Start Date:Mar 18 1998

End Date:Dec 07 1998

Well ID:10D4

Sample Date	Observation	Ln
Mar 18 1998	0.100 ppb	-2.303 (* Nondetect *)
May 27 1998	0.100 ppb	-2.303 (* Nondetect *)
Sep 04 1998	0.100 ppb	-2.303 (* Nondetect *)
Dec 07 1998	0.100 ppb	-2.303 (* Nondetect *)

Well ID:10D4 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.100 ppb	Ln Minimum:	-2.303
Maximum:	0.100 ppb	Ln Maximum:	-2.303
Mean:	0.100 ppb	Ln Mean:	-2.303
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-17-1999 18:33

Facility:RAAPHMU10 Haz Waste Mgmt Unit10-RAAP

Address:

City:Radford ST:VA Zip:

County:PULASKI

Contact:Mr. Arne Olsen

Phone:() -

Permit Type:Background

Constituent:MeEthKe Methyl ethyl ketone (MEK) (2-Butanone)

CAS Number: 78-93-3

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.100 ppb

Start Date:Mar 18 1998

End Date:Dec 07 1998

Well ID:10D4

Sample Date	Observation	Ln
Mar 18 1998	0.550 ppb	-0.598 (* Nondetect *)
May 27 1998	0.550 ppb	-0.598 (* Nondetect *)
Sep 04 1998	0.550 ppb	-0.598 (* Nondetect *)
Dec 07 1998	0.550 ppb	-0.598 (* Nondetect *)

Well ID:10D4 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.550 ppb	Ln Minimum:	-0.598
Maximum:	0.550 ppb	Ln Maximum:	-0.598
Mean:	0.550 ppb	Ln Mean:	-0.598
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-17-1999 18:34

Facility:RAAPHMU10 Haz Waste Mgmt Unit10-RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:Mr. Arne Olsen
Phone:() -

Permit Type:Background

Constituent:Ni Nickel, total

CAS Number: 7440-02-0

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 15.000 ppb

Start Date:Mar 18 1998

End Date:Dec 07 1998

Well ID:10D4

Sample Date	Observation	Ln
Mar 18 1998	7.500 ppb	2.015 (* Nondetect *)
May 27 1998	7.500 ppb	2.015 (* Nondetect *)
Sep 04 1998	7.500 ppb	2.015 (* Nondetect *)
Dec 07 1998	7.500 ppb	2.015 (* Nondetect *)

Well ID:10D4 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	7.500 ppb	Ln Minimum:	2.015
Maximum:	7.500 ppb	Ln Maximum:	2.015
Mean:	7.500 ppb	Ln Mean:	2.015
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-17-1999 18:34

Facility:RAAPHU10 Haz Waste Mgmt Unit10-RAAP

Address:

City:Radford ST:VA Zip:

County:PULASKI

Contact:Mr. Arne Olsen

Phone:() -

Permit Type:Background

Constituent:Pb Lead, total

CAS Number: 7439-92-1

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Mar 18 1998

End Date:Dec 07 1998

Well ID:10D4

Sample Date	Observation	Ln
Mar 18 1998	7.000 ppb	1.946
May 27 1998	1.000 ppb	0.000
Sep 04 1998	2.000 ppb	0.693
Dec 07 1998	0.500 ppb	-0.693 (* Nondetect *)

Well ID:10D4 Summary Statistics

Observations (N): 4

Nondetects (%ND): 25

Minimum:	0.500 ppb	Ln Minimum:	-0.693
Maximum:	7.000 ppb	Ln Maximum:	1.946
Mean:	2.625 ppb	Ln Mean:	0.486
Std. Dev.:	2.983 ppb	Ln Std. Dev.:	1.126

Normality Tests

Report Printed: 02-17-1999 18:34

Facility:RAAPHMU10 Haz Waste Mgmt Unit10-RAAP

Address:

City:Radford

ST:VA Zip:

County:PULASKI

Contact:Mr. Arne Olsen

Phone:() -

Permit Type:Background

Constituent:Pb Lead, total

CAS Number: 7439-92-1

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Mar 18 1998

End Date:Dec 07 1998

Normality Test on Observations for wells listed below:

Well:10D4 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	0.500	7.000	2.625	2.983
Log:	-0.693	1.946	0.486	1.126

Pooled Statistics

Observations: 4

Statistic	Original	Log
	Scale	Scale
Mean:	2.625	0.486
Std Dev:	2.983	1.126
Skewness:	1.010*	0.367
Kurtosis:	-0.788	-1.192
Minimum:	0.500	-0.693
Maximum:	7.000	1.946
CV:	1.136	2.314

Shapiro-Wilk Statistics

Test	5% Critical	1% Critical
Scale Statistic	Value	Value
Original:	0.8048	0.7480
		0.6870

Log: 0.9798 0.7480 0.6870

* Indicates statistically significant evidence of non-normality.

GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-17-1999 18:34

Facility:RAAPHWU10 Haz Waste Mgmt Unit10-RAAP

Address:

City:Radford

ST:VA Zip:

County:PULASKI

Contact:Mr. Arne Olsen

Phone:() -

Permit Type:Background

Constituent:Se Selenium, total

CAS Number: 7782-49-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Mar 18 1998

End Date:Dec 07 1998

Well ID:10D4

Sample Date	Observation	Ln
Mar 18 1998	0.500 ppb	-0.693 (* Nondetect *)
May 27 1998	0.500 ppb	-0.693 (* Nondetect *)
Sep 04 1998	0.500 ppb	-0.693 (* Nondetect *)
Dec 07 1998	2.000 ppb	0.693

Well ID:10D4 Summary Statistics

Observations (N): 4

Nondetects (%ND): 75

Minimum:	0.500 ppb	Ln Minimum:	-0.693
Maximum:	2.000 ppb	Ln Maximum:	0.693
Mean:	0.875 ppb	Ln Mean:	-0.347
Std. Dev.:	0.750 ppb	Ln Std. Dev.:	0.693

Data Set Summary

Report Printed: 02-17-1999 18:35

Facility:RAAPHU10 Haz Waste Mgmt Unit10-RAAP

Address:

City:Radford

ST:VA Zip:

County:PULASKI

Contact:Mr. Arne Olsen

Phone:() -

Permit Type:Background

Constituent:TCE Trichloroethene (-ethylene)

CAS Number: 79-01-6

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.100 ppb

Start Date:Mar 18 1998

End Date:Dec 07 1998

Well ID:10D4

Sample Date	Observation	Ln
Mar 18 1998	0.050 ppb	-2.996 (* Nondetect *)
May 27 1998	0.050 ppb	-2.996 (* Nondetect *)
Sep 04 1998	0.050 ppb	-2.996 (* Nondetect *)
Dec 07 1998	0.050 ppb	-2.996 (* Nondetect *)

Well ID:10D4 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.050 ppb	Ln Maximum:	-2.996
Mean:	0.050 ppb	Ln Mean:	-2.996
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-17-1999 18:35

Facility:RAAPHMU10 Haz Waste Mgmt Unit10-RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:Mr. Arne Olsen
Phone:() -

Permit Type:Background

Constituent:TCLFMe Trichlorofluoromethane

CAS Number: 75-69-4
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 0.500 ppb

Start Date:Mar 18 1998
End Date:Dec 07 1998

Well ID:10D4

Sample Date	Observation	Ln
Mar 18 1998	0.250 ppb	-1.386 (* Nondetect *)
May 27 1998	0.250 ppb	-1.386 (* Nondetect *)
Sep 04 1998	0.250 ppb	-1.386 (* Nondetect *)
Dec 07 1998	0.250 ppb	-1.386 (* Nondetect *)

Well ID:10D4 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	0.250 ppb	Ln Minimum:	-1.386
Maximum:	0.250 ppb	Ln Maximum:	-1.386
Mean:	0.250 ppb	Ln Mean:	-1.386
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-17-1999 18:35

Facility:RAAPHMU10 Haz Waste Mgmt Unit10-RAAP

Address:

City:Radford ST:VA Zip:

County:PULASKI

Contact:Mr. Arne Olsen

Phone:() -

Permit Type:Background

Constituent:TOC Total Organic Carbon

CAS Number: - -

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1000.000 ppb

Start Date:Mar 18 1998

End Date:Dec 07 1998

Well ID:10D4

Sample Date	Observation	Ln
Mar 18 1998	500.000 ppb	6.215 (* Nondetect *)
May 27 1998	500.000 ppb	6.215 (* Nondetect *)
Sep 04 1998	500.000 ppb	6.215 (* Nondetect *)
Dec 07 1998	500.000 ppb	6.215 (* Nondetect *)

Well ID:10D4 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	500.000 ppb	Ln Minimum:	6.215
Maximum:	500.000 ppb	Ln Maximum:	6.215
Mean:	500.000 ppb	Ln Mean:	6.215
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-17-1999 18:35

Facility:RAAPHMU10 Haz Waste Mgmt Unit10-RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:Mr. Arne Olsen
Phone:() -

Permit Type:Background

Constituent:TOX Total Organic Halogens, Halides

CAS Number: - -
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 5.000 ppb

Start Date:Mar 18 1998
End Date:Dec 07 1998

Well ID:10D4

Sample Date	Observation	Ln
Mar 18 1998	78.000 ppb	4.357
May 27 1998	8.000 ppb	2.079
Sep 04 1998	10.000 ppb	2.303
Dec 07 1998	5.500 ppb	1.705

Well ID:10D4 Summary Statistics

Observations (N): 4
Nondetects (%ND): 0

Minimum:	5.500 ppb	Ln Minimum:	1.705
Maximum:	78.000 ppb	Ln Maximum:	4.357
Mean:	25.375 ppb	Ln Mean:	2.611
Std. Dev.:	35.132 ppb	Ln Std. Dev.:	1.190

Normality Tests

Report Printed: 02-17-1999 18:36

Facility:RAAPHMU10 Haz Waste Mgmt Unit10-RAAP

Address:

City:Radford ST:VA Zip:

County:PULASKI

Contact:Mr. Arne Olsen

Phone:() -

Permit Type:Background

Constituent:TOX Total Organic Halogens, Halides

CAS Number: - -

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 5.000 ppb

Start Date:Mar 18 1998

End Date:Dec 07 1998

Normality Test on Observations for wells listed below:

Well:10D4 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	5.500	78.000	25.375	35.132
Log:	1.705	4.357	2.611	1.190

Pooled Statistics

Observations: 4

Statistic	Original	Log
	Scale	Scale
Mean:	25.375	2.611
Std Dev:	35.132	1.190
Skewness:	1.145*	1.005*
Kurtosis:	-0.674	-0.770
Minimum:	5.500	1.705
Maximum:	78.000	4.357
CV:	1.384	0.456

Shapiro-Wilk Statistics

Test	5% Critical	1% Critical
Scale Statistic	Value	Value
Original:	0.6794*	0.7480
		0.6870

Log: 0.8146 0.7460 0.6870

* Indicates statistically significant evidence of non-normality.

GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-17-1999 18:37

Facility:RAAPHWU10 Haz Waste Mgmt Unit10-RAAP

Address:

City:Radford ST:VA Zip:

County:PULASKI

Contact:Mr. Arne Olsen

Phone:() -

Permit Type:Background

Constituent:Tl Thallium, total

CAS Number: 7440-28-0

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Mar 18 1998

End Date:Dec 07 1998

Well ID:10D4

Sample Date	Observation	Ln
Mar 18 1998	0.500 ppb	-0.693 (* Nondetect *)
May 27 1998	0.500 ppb	-0.693 (* Nondetect *)
Sep 04 1998	0.500 ppb	-0.693 (* Nondetect *)
Dec 07 1998	0.500 ppb	-0.693 (* Nondetect *)

Well ID:10D4 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.500 ppb	Ln Minimum:	-0.693
Maximum:	0.500 ppb	Ln Maximum:	-0.693
Mean:	0.500 ppb	Ln Mean:	-0.693
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-17-1999 18:37

Facility:RAAPHMU10 Haz Waste Mgmt Unit10-RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:Mr. Arne Olsen
Phone:() -

Permit Type:Background

Constituent:TranDCEE trans-1,2-Dichloroethene

CAS Number: 156-60-5
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 0.100 ppb

Start Date:Mar 18 1998
End Date:Dec 07 1998

Well ID:10D4

Sample Date	Observation	Ln
Mar 18 1998	0.050 ppb	-2.996 (* Nondetect *)
May 27 1998	0.050 ppb	-2.996 (* Nondetect *)
Sep 04 1998	0.050 ppb	-2.996 (* Nondetect *)
Dec 07 1998	0.050 ppb	-2.996 (* Nondetect *)

Well ID:10D4 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.050 ppb	Ln Maximum:	-2.996
Mean:	0.050 ppb	Ln Mean:	-2.996
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-17-1999 18:39

Facility:RAAPHU10 Haz Waste Mgmt Unit10-RAAP

Address:

City:Radford

ST:VA Zip:

County:PULASKI

Contact:Mr. Arne Olsen

Phone:() -

Permit Type:Background

Constituent:Xylene Xylene

CAS Number: 1330-20-7

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.100 ppb

Start Date:Mar 18 1998

End Date:Dec 07 1998

Well ID:10D4

Sample Date	Observation	Ln
Mar 18 1998	0.050 ppb	-2.996 (* Nondetect *)
May 27 1998	0.050 ppb	-2.996 (* Nondetect *)
Sep 04 1998	0.050 ppb	-2.996 (* Nondetect *)
Dec 07 1998	0.050 ppb	-2.996 (* Nondetect *)

Well ID:10D4 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.050 ppb	Ln Maximum:	-2.996
Mean:	0.050 ppb	Ln Mean:	-2.996
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-17-1999 18:40

Facility:RAAPHHU10 Haz Waste Mgmt Unit10-RAAP

Address:

City:Radford

ST:VA Zip:

County:PULASKI

Contact:Mr. Arne Oisen

Phone:() -

Permit Type:Background

Constituent:Zn Zinc, total

CAS Number: 7440-66-6

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 5.000 ppb

Start Date:Mar 18 1998

End Date:Dec 07 1998

Well ID:10D4

Sample Date	Observation	Ln
Mar 18 1998	7.000 ppb	1.946
May 27 1998	8.000 ppb	2.079
Sep 04 1998	17.000 ppb	2.833
Dec 07 1998	6.000 ppb	1.792

Well ID:10D4 Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	6.000 ppb	Ln Minimum:	1.792
Maximum:	17.000 ppb	Ln Maximum:	2.833
Mean:	9.500 ppb	Ln Mean:	2.163
Std. Dev.:	5.066 ppb	Ln Std. Dev.:	0.462

Normality Tests

Report Printed: 02-17-1999 18:40

Facility:RAAPHMU10 Haz Waste Mgmt Unit10-RAAP

Address:

City:Radford ST:VA Zip:

County:PULASKI

Contact:Mr. Arne Oisen

Phone:() -

Permit Type:Background

Constituent:Zn Zinc, total

CAS Number: 7440-66-6

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 5.000 ppb

Start Date:Mar 18 1998

End Date:Dec 07 1998

Normality Test on Observations for wells listed below:

Well:10D4 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	6.000	17.000	9.500	5.066
Log:	1.792	2.833	2.163	0.462

Pooled Statistics

Observations: 4

Statistic	Original	Log
	Scale	Scale
Mean:	9.500	2.163
Std Dev:	5.066	0.462
Skewness:	1.066*	0.935
Kurtosis:	-0.734	-0.826
Minimum:	6.000	1.792
Maximum:	17.000	2.833
CV:	0.533	0.214

Shapiro-Wilk Statistics

Test	5% Critical	1% Critical
Scale Statistic	Value	Value
Original:	0.7754	0.7480
		0.6870

Log: 0.8497 0.7480 0.6870

* Indicates statistically significant evidence of non-normality.

GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-17-1999 18:40

Facility:RAAPHMU10 Haz Waste Mgmt Unit10-RAAP

Address:

City:Radford ST:VA Zip:

County:PULASKI

Contact:Mr. Arne Olsen

Phone:() -

Permit Type:Background

Constituent:pH F pH, Field

CAS Number: - -

MCL: 0.000 SU

ACL: 0.000 SU

Detect Limit: 0.100 SU

Start Date:Mar 18 1998

End Date:Dec 07 1998

Well ID:10D4

Sample Date	Observation	Ln
Mar 18 1998	6.500 SU	1.872
May 27 1998	6.100 SU	1.808
Sep 04 1998	6.300 SU	1.841
Dec 07 1998	6.700 SU	1.902

Well ID:10D4 Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	6.100 SU	Ln Minimum:	1.808
Maximum:	6.700 SU	Ln Maximum:	1.902
Mean:	6.400 SU	Ln Mean:	1.856
Std. Dev.:	0.258 SU	Ln Std. Dev.:	0.040

Normality Tests

Report Printed: 02-17-1999 18:40

Facility:RAAPHU10 Haz Waste Mgmt Unit10-RAAP

Address:

City:Radford ST:VA Zip:
County:PULASKI

Contact:Mr. Arne Olsen
Phone:() -

Permit Type:Background

Constituent:pH F pH, Field

CAS Number: - -
HCL: 0.000 SU
ACL: 0.000 SU
Detect Limit: 0.100 SU

Start Date:Mar 18 1998
End Date:Dec 07 1998

Normality Test on Observations for wells listed below:

Well:10D4 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	6.100	6.700	6.400	0.258
Log:	1.808	1.902	1.856	0.040

Pooled Statistics

Observations: 4

Statistic	Original	Log
	Scale	Scale
Mean:	6.400	1.856
Std Dev:	0.258	0.040
Skewness:	-0.000	-0.034
Kurtosis:	-1.360	-1.359
Minimum:	6.100	1.808
Maximum:	6.700	1.902
CV:	0.040	0.022

Shapiro-Wilk Statistics

Test	5% Critical	1% Critical
Scale Statistic	Value	Value
Original:	0.9940	0.7480
		0.6870

Log: 0.9938 0.7480 0.6870

* Indicates statistically significant evidence of non-normality.

GRIT/STAT Version 5.0

Parametric Prediction Interval
Report Printed February 18,1999

Page 1

Facility:Haz Waste Mgmt Unit10-RAAP
Parameter:Barium, total(CAS Number:7440-39-3)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 4
Shapiro-Wilk (W): 0.8930
Critical W, $\alpha=0.01$: 0.6870
Mean: 122.250 ppb
Std Dev: 18.464 ppb
DF: 3
Conf. Level (1- α): ~~0.9500~~ 0.99
Future Samples (k): 1
 $t \left[\begin{array}{c} 1 - \alpha \\ - \\ k \end{array} \right]$: 4.5407
Kappa: 5.0767
UL: 215.985 ppb
LL: $-\infty$

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:1010MW1

<u>Sample Date</u>	<u>Observation</u>
12/07/98	181.000 ppb

Well:10D3

<u>Sample Date</u>	<u>Observation</u>
12/07/98	62.000 ppb

Well:10D3D

<u>Sample Date</u>	<u>Observation</u>
12/07/98	47.000 ppb

Well:10DDH2

<u>Sample Date</u>	<u>Observation</u>
12/07/98	66.000 ppb

Parametric Prediction Interval
Report Printed February 18,1999

Page 1

Facility: Haz Waste Mgmt Unit 10-RAAP
Parameter: Zinc, total (CAS Number: 7440-66-6)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 4
Shapiro-Wilk (W): 0.7754
Critical W, $\alpha=0.01$: 0.6870
Mean: 9.500 ppb
Std Dev: 5.066 ppb
DF: 3
Conf. Level (1- α): 0.9500 ~~0.99~~
Future Samples (k): 1
 $t_{1-\alpha, k}$: 4.5407
Kappa: 5.0767
UL: 35.220 ppb
LL: - ∞

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well: 1010MW1

<u>Sample Date</u>	<u>Observation</u>
12/07/98	9.000 ppb

Well: 10D3

<u>Sample Date</u>	<u>Observation</u>
12/07/98	14.000 ppb

Well: 10D3D

<u>Sample Date</u>	<u>Observation</u>
12/07/98	21.000 ppb

Well: 10DDH2

<u>Sample Date</u>	<u>Observation</u>
12/07/98	6.000 ppb



Parametric Prediction Interval
Report Printed February 18,1999

Page 1

Facility:Haz Waste Mgmt Unit10-RAAP
Parameter:pH, Field(CAS Number:- -)

TWO-TAILED PARAMETRIC PREDICTION INTERVAL

Observations (n): 4
Shapiro-Wilk (W): 0.9940
Critical W, $\alpha=0.01$: 0.6870
Mean: 6.400 SU
Std Dev: 0.258 SU
DF: 3
Conf. Level (1- α): 0.9500
Future Samples (k): 1
 $t \left[\frac{1 - \alpha}{2 \cdot k} \right]$: 5.8409
Kappa: 6.5303
UL: 8.086 SU
LL: 4.714 SU

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:1010MW1

<u>Sample Date</u>	<u>Observation</u>
12/07/98	7.100 SU

Well:10D3

<u>Sample Date</u>	<u>Observation</u>
12/07/98	7.100 SU

Well:10D3D

<u>Sample Date</u>	<u>Observation</u>
12/07/98	7.200 SU

Well:10DDH2

<u>Sample Date</u>	<u>Observation</u>
12/07/98	6.700 SU

1998 Annual Statistical Analysis-Non-Parametric Prediction Interval Computations for HWMU10

Non-parametric prediction intervals were computed for HWMU10 for all parameters whose background well (10D4) data satisfied one of the following two criteria, per DEQ regulations, guidance as well as USEPA guidance:

1. Percentage of non-detects were between 50 and 99,
2. Percentage of non-detects less than 50, but data is not normally distributed in original or log-transformed mode.

Parameters arsenic and selenium satisfied the first criteria above. Parameters specific conductivity, chromium, and total organic halides (TOX). Hence non-parametric upper prediction limits (UPL) were computed for those target parameters.

The non-parametric UPL for each of these parameters was set at the maximum background concentration of each of those parameters in background well 10D4 with,

$n = 4$ (number of background measurements)

$k = 4$ (number of future measurements, based on number of compliance wells (4), number of number of future events (1), and number of compliance parameters (conservatively set as 1))

Probability that at least one of two samples will be below UPL = 0.802

(From Table 2.1, Gibbons, R.D., 1994). Hence the number of confirmation resamples required (following a statistical exceedance) for 0.95 confidence level with $n=4$ and $k=4$ is 4 (Table 2.3, Gibbons, R.D., 1994).

Upper Predictions Limits:

TOX UPL = 78 $\mu\text{g/l}$

Specific Conductivity UPL = 353 $\mu\text{S/cm}$

Arsenic UPL = 2.0 $\mu\text{g/l}$

Chromium UPL = 16 $\mu\text{g/l}$

Selenium UPL = 2 $\mu\text{g/l}$

Cohen's Adjustment of Background Data for HWMU10 (1998 Annual Report)

Cohen's adjustment is performed for all parameters with 25%-49 % non-detected data. Parameterscopper, chloroform and lead fit into this category, each with 25 % non-detected data.

Cohen's adjustment for Chloroform data:

Percentage of non-detecteds = 25

Chloroform data excluding non-detecteds fits normal distribution. Hence Cohen's adjustment of mean and standard deviation is appropriate.

Mean of background data excluding non-detecteds (xd) = 11.3 ug/l
Variance excluding non-detecteds (Sd2) = 18.07

$h=(n-m)/(n)$

"n" is the Total number of background observations = 4
"m" is the Number of background observations excluding non-detecteds = 3

$h= 0.25$

$g=(Sd2/(xd-DL)^2)$

DL is the Detection Limit = 3.50

$g = 0.30$

$\lambda(h,g)$ values from table 10.1, Statistical Methods for Groundwater Monitoring, Gibbons, R.D, 1994

$\lambda(0.25,0.3)$ obtained by linear interpolation based on values for $\lambda(0.2,0.3)$ and $\lambda(0.3,0.3) = 0.3707$

Corrected sample mean (X) = $xd - (\lambda(h,g) * (xd-DL))$
X = 8.4085

Corrected sample standard deviation (S) = $(Sd2 + \lambda(h,g)(xd-DL)2)0.5$
S = 6.3736

Upper Prediction Limit (UPL) for one-sided prediction interval for Chloroform

$$UPL = X + t(n-1,(1-\alpha^*/k)) * S * (1 + (1/n))0.5$$

$t(n-1,(1-\alpha^*)/k)$ selected from Table 1.2, Gibbons, R.D., 1994, where

TABLE 1.2 Critical Values of the t-Distribution for One-Sided Prediction Intervals with k = 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 15, 20, 25, 30, 40, 50, 60, 70, 80, 90, 100	1
--	---

"t" value selected is for n=4, k=5 which was the nearest available for n=4, k=4, which is = 4.54

One-side UPL for Chloroform = 40.76

Single Interpolation

Actual Values	h, g intervals	Difference
$h =$	0.25 0.30	0.05
$g =$	0.25 0.30	0

$\lambda(0.2, 0.3) = 0.2819$
 $\lambda(0.3, 0.3) = 0.4595$

$\lambda \quad 0.25 \quad , \quad 0.30 \quad)$

0.3707

Cohen's Adjustment of Background Data for HWMU10 (1998 Annual Report)

Cohen's adjustment is performed for all parameters with 25%-49 % non-detect data. Parameters chloroform, copper and TOX fit into this category, each with 25 % non-detect data.

Cohen's adjustment for Copper data:

Percentage of non-detects = 25

Copper data excluding non-detects fits normal distribution. Hence Cohen's adjustment of mean and standard deviation is appropriate.

Mean of background data excluding non-detects ($\bar{x}_d$) = 4 ug/l
Variance excluding non-detects (S_d^2) = 12

$$h = (n - m) / (n)$$

"n" is the Total number of background observations = 4
"m" is the Number of background observations excluding non-detects = 3

$$h = 0.25$$

$$g = (S_d^2 / (\bar{x}_d - DL)^2)$$

DL is the Detection Limit = 1.00

$$g = 1.33$$

$\lambda(h, g)$ values from table 10.1, Statistical Methods for Groundwater Monitoring, Gibbons, R.D, 1994

$\lambda(0.25, 1.33)$ obtained by double linear interpolation based on values for $\lambda(0.2, 1.0)$, $\lambda(0.2, 2.0)$, $\lambda(0.3, 1.0)$, and $\lambda(0.3, 2.0) = 0.4769$

$$\text{Corrected sample mean } (X) = \bar{x}_d - (\lambda(h, g) * (\bar{x}_d - DL))$$
$$X = 2.5693$$

Double Interpolation of Lamda

Actual Values	h, g intervals	Difference
h =	0.05	0.05
g =	0.33	0.33

$\lambda(0.2, 1.0)$	=	0.3447	$\lambda(0.2, 1.33)$
$\lambda(0.2, 2.0)$	=	0.4093	0.366018
$\lambda(0.3, 1.0)$	=	0.5548	$\lambda(0.3, 1.33)$
$\lambda(0.3, 2.0)$	=	0.6547	0.587767
			$\lambda(0.25, 1.33)$
			0.4769

Cohen's Adjustment of Background Data for HWMU10 (1998 Annual Report)

Cohen's adjustment is performed for all parameters with 25%-49 % non-detect data.
Parameters chloroform, copper and TOX fit into this category, each with 25 % non-detect data.

Cohen's adjustment for Lead data:

Percentage of non-detects = 25

Lead data excluding non-detects fits normal distribution. Hence Cohen's adjustment of mean and standard deviation is appropriate.

Mean of background data excluding non-detects (xd) = 3.333333 ug/l
Variance excluding non-detects (Sd2) = 10.333

$h=(n-m)/(n)$

"n" is the Total number of background observations = 4
"m" is the Number of background observations excluding non-detects = 3

$h= 0.25$

$g=(Sd2/(xd-DL)^2)$

DL is the Detection Limit = 1.00

$g = 1.90$

$\lambda(h,g)$ values from table 10.1, Statistical Methods for Groundwater Monitoring, Gibbons, R.D, 1994

$\lambda(0.25,1.9)$ obtained by double linear interpolation based on values for $\lambda(0.2,1.0)$, $\lambda(0.2,2.0)$, $\lambda(0.3,1.0)$, and $\lambda(0.3,2.0) = 0.5238$

Corrected sample mean (X) = $xd - (\lambda(h,g) * (xd-DL))$
X = 2.1111

Double Interpolation of Lamda

Actual Values	h, g Intervals		Difference
h =	0.25	0.2	0.3
g =	1.9	1	2
			0.9

$\lambda(0.2, 1.0)$	=	0.3447		$\lambda(0.2, 1.90)$
$\lambda(0.2, 2.0)$	=	0.4093	0.0646	0.40284
$\lambda(0.3, 1.0)$	=	0.5548		$\lambda(0.3, 1.90)$
$\lambda(0.3, 2.0)$	=	0.6547	0.0999	0.64471
				$\lambda(0.25, 1.90)$
				0.5238

Corrected sample standard deviation (S) = (Sd2 + λ(h,g)(xd-DL)2)0.5
S = 3.6311

Upper Prediction Limit (UPL) for one-sided prediction interval for Lead

$$UPL = X + t(n-1, (1-\alpha^*/k)) * S * (1 + (1/n))^{0.5}$$

t(n-1, (1-α*)/k) selected from Table 1.2, Gibbons, R.D., 1994, where

Table 1.2 Critical values of the Student's t-distribution for one-sided prediction intervals. The table gives the critical values of the Student's t-distribution for one-sided prediction intervals. The table is based on the assumption that the data are normally distributed. The table is for the case where the population standard deviation is unknown and the sample size is n. The table is for the case where the population standard deviation is unknown and the sample size is n. The table is for the case where the population standard deviation is unknown and the sample size is n.

t* value selected is for n=4, k=5 which was the nearest available for n=4, k=4, which is = 4.54

One-side UPL for Lead = 20.542

APPENDIX I
HWMU-39 STATISTICAL ANALYSIS RESULTS

Data Set Summary

Report Printed: 02-18-1999 12:45

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone: () -

Permit Type:Background

Constituent:2,4-DNT 2,4-Dinitrotoluene

CAS Number: 121-14-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.080 ppb

Start Date:Mar 23 1998

End Date:Dec 08 1998

Well ID:39MW1

Sample Date	Observation	Ln
Mar 23 1998	0.040 ppb	-3.219 (* Nondetect *)
May 28 1998	0.040 ppb	-3.219 (* Nondetect *)
Sep 02 1998	0.040 ppb	-3.219 (* Nondetect *)
Dec 08 1998	0.040 ppb	-3.219 (* Nondetect *)

Well ID:39MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.040 ppb	Ln Minimum:	-3.219
Maximum:	0.040 ppb	Ln Maximum:	-3.219
Mean:	0.040 ppb	Ln Mean:	-3.219
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:39MW4

Sample Date	Observation	Ln
Mar 23 1998	0.040 ppb	-3.219 (* Nondetect *)
May 28 1998	0.040 ppb	-3.219 (* Nondetect *)

Sep 02 1998	0.040 ppb	-3.219 (* Nondetect *)
Dec 08 1998	0.140 ppb	-1.966

Well ID:39MW4 Summary Statistics

Observations (N): 4
Nondetects (%ND): 75

Minimum:	0.040 ppb	Ln Minimum:	-3.219
Maximum:	0.140 ppb	Ln Maximum:	-1.966
Mean:	0.065 ppb	Ln Mean:	-2.906
Std. Dev.:	0.050 ppb	Ln Std. Dev.:	0.626

Data Set Summary

Report Printed: 02-18-1999 12:45

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:
Phone:() -

Permit Type:Background

Constituent:2,6-DNT 2,6-Dinitrotoluene

CAS Number: 606-20-2
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 0.080 ppb

Start Date:Mar 23 1998
End Date:Dec 08 1998

Well ID:39MW1

Sample Date	Observation	Ln
Mar 23 1998	0.040 ppb	-3.219 (* Nondetect *)
May 28 1998	0.040 ppb	-3.219 (* Nondetect *)
Sep 02 1998	0.040 ppb	-3.219 (* Nondetect *)
Dec 08 1998	0.040 ppb	-3.219 (* Nondetect *)

Well ID:39MW1 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	0.040 ppb	Ln Minimum:	-3.219
Maximum:	0.040 ppb	Ln Maximum:	-3.219
Mean:	0.040 ppb	Ln Mean:	-3.219
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:39MW4

Sample Date	Observation	Ln
Mar 23 1998	0.040 ppb	-3.219 (* Nondetect *)
May 28 1998	0.040 ppb	-3.219 (* Nondetect *)

Sep 02 1998	0.040 ppb	-3.219 (* Nondetect *)
Dec 08 1998	0.110 ppb	-2.207

Well ID:39MW4 Summary Statistics

Observations (N): 4
Nondetects (%ND): 75

Minimum:	0.040 ppb	Ln Minimum:	-3.219
Maximum:	0.110 ppb	Ln Maximum:	-2.207
Mean:	0.057 ppb	Ln Mean:	-2.966
Std. Dev.:	0.035 ppb	Ln Std. Dev.:	0.506

Data Set Summary

Report Printed: 02-18-1999 12:46

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Alpha Alpha emission, total

CAS Number:12587-46-1

MCL: 0.000 pCi/l

ACL: 0.000 pCi/l

Detect Limit: 1.000 pCi/l

Start Date:Mar 23 1998

End Date:Dec 08 1998

Well ID:39MW1

Sample Date	Observation	Ln
Mar 23 1998	0.500 pCi/l	-0.693 (* Nondetect *)
May 28 1998	2.800 pCi/l	1.030
Sep 02 1998	2.400 pCi/l	0.875
Dec 08 1998	0.500 pCi/l	-0.693 (* Nondetect *)

Well ID:39MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 50

Minimum:	0.500 pCi/l	Ln Minimum:	-0.693
Maximum:	2.800 pCi/l	Ln Maximum:	1.030
Mean:	1.550 pCi/l	Ln Mean:	0.130
Std. Dev.:	1.223 pCi/l	Ln Std. Dev.:	0.952

Well ID:39MW4

Sample Date	Observation	Ln
Mar 23 1998	2.300 pCi/l	0.833
May 28 1998	3.300 pCi/l	1.194

Sep 02 1998	7.900 pCi/l	2.067
Dec 08 1998	0.500 pCi/l	-0.693 (* Nondetect *)

Well ID:39MW4 Summary Statistics

Observations (N): 4
Nondetects (%ND): 25

Minimum:	0.500 pCi/l	Ln Minimum:	-0.693
Maximum:	7.900 pCi/l	Ln Maximum:	2.067
Mean:	3.500 pCi/l	Ln Mean:	0.850
Std. Dev.:	3.154 pCi/l	Ln Std. Dev.:	1.152

Normality Tests

Report Printed: 02-18-1999 12:46

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Alpha Alpha emission, total

CAS Number:12587-46-1

MCL: 0.000 pCi/l

ACL: 0.000 pCi/l

Detect Limit: 1.000 pCi/l

Start Date:Mar 23 1998

End Date:Dec 08 1998

Normality Test on Observations for wells listed below:

Well:39MW1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	0.500	2.800	1.550	1.223
Log:	-0.693	1.030	0.130	0.952

Well:39MW4 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	0.500	7.900	3.500	3.154
Log:	-0.693	2.067	0.850	1.152

Pooled Statistics

Observations: 8

Statistic	Original Scale	Log Scale
Mean:	2.525	0.490
Std Dev:	2.448	1.051
Skewness:	1.363*	-0.058
Kurtosis:	1.028	-1.340
Minimum:	0.500	-0.693
Maximum:	7.900	2.067

CV: 0.969 2.146

Shapiro-Wilk Statistics

	Test Scale Statistic	5% Critical Value	1% Critical Value
Original:	0.7942*	0.8180	0.7490
Log:	0.8535	0.8180	0.7490

* Indicates statistically significant evidence of non-normality.
GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-18-1999 12:47

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:
Phone:() -

Permit Type:Background

Constituent:As Arsenic, total

CAS Number: 7440-38-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Mar 23 1998

End Date:Dec 08 1998

Well ID:39MW1

Sample Date	Observation	Ln
Mar 23 1998	0.500 ppb	-0.693 (* Nondetect *)
May 28 1998	0.500 ppb	-0.693 (* Nondetect *)
Sep 02 1998	0.500 ppb	-0.693 (* Nondetect *)
Dec 08 1998	1.000 ppb	0.000

Well ID:39MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 75

Minimum:	0.500 ppb	Ln Minimum:	-0.693
Maximum:	1.000 ppb	Ln Maximum:	0.000
Mean:	0.625 ppb	Ln Mean:	-0.520
Std. Dev.:	0.250 ppb	Ln Std. Dev.:	0.347

Well ID:39MW4

Sample Date	Observation	Ln
Mar 23 1998	2.000 ppb	0.693
May 28 1998	0.500 ppb	-0.693 (* Nondetect *)

Sep 02 1998	4.000 ppb	1.386
Dec 08 1998	3.000 ppb	1.099

Well ID:39MW4 Summary Statistics

Observations (N): 4
Nondetects (%ND): 25

Minimum:	0.500 ppb	Ln Minimum:	-0.693
Maximum:	4.000 ppb	Ln Maximum:	1.386
Mean:	2.375 ppb	Ln Mean:	0.621
Std. Dev.:	1.493 ppb	Ln Std. Dev.:	0.921

Normality Tests

Report Printed: 02-18-1999 12:47

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:As Arsenic, total

CAS Number: 7440-38-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Mar 23 1998

End Date:Dec 08 1998

Normality Test on Observations for wells listed below:

Well:39MW1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	0.500	1.000	0.625	0.250
Log:	-0.693	0.000	-0.520	0.347

Well:39MW4 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	0.500	4.000	2.375	1.493
Log:	-0.693	1.386	0.621	0.921

Pooled Statistics

Observations: 8

Statistic	Original Scale	Log Scale
Mean:	1.500	0.051
Std Dev:	1.363	0.887
Skewness:	0.905	0.471
Kurtosis:	-0.716	-1.476
Minimum:	0.500	-0.693
Maximum:	4.000	1.386

CV: 0.909 17.506

Shapiro-Wilk Statistics

	Test	5% Critical	1% Critical
	Scale Statistic	Value	Value
Original:	0.7871*	0.8180	0.7490
Log:	0.8048*	0.8180	0.7490

* Indicates statistically significant evidence of non-normality.
GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-18-1999 12:47

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Ba Barium, total

CAS Number: 7440-39-3

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 2.000 ppb

Start Date:Mar 23 1998

End Date:Dec 08 1998

Well ID:39MW1

Sample Date	Observation	Ln
Mar 23 1998	49.000 ppb	3.892
May 28 1998	65.000 ppb	4.174
Sep 02 1998	67.000 ppb	4.205
Dec 08 1998	64.000 ppb	4.159

Well ID:39MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	49.000 ppb	Ln Minimum:	3.892
Maximum:	67.000 ppb	Ln Maximum:	4.205
Mean:	61.250 ppb	Ln Mean:	4.107
Std. Dev.:	8.261 ppb	Ln Std. Dev.:	0.145

Well ID:39MW4

Sample Date	Observation	Ln
Mar 23 1998	94.000 ppb	4.543
May 28 1998	78.000 ppb	4.357

Sep 02 1998	175.000 ppb	5.165
Dec 08 1998	170.000 ppb	5.136

Well ID:39MW4 Summary Statistics

Observations (N): 4
Nondetects (%ND): 0

Minimum:	78.000 ppb	Ln Minimum:	4.357
Maximum:	175.000 ppb	Ln Maximum:	5.165
Mean:	129.250 ppb	Ln Mean:	4.800
Std. Dev.:	50.408 ppb	Ln Std. Dev.:	0.412

Normality Tests

Report Printed: 02-18-1999 12:48

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Ba Barium, total

CAS Number: 7440-39-3

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 2.000 ppb

Start Date:Mar 23 1998

End Date:Dec 08 1998

Normality Test on Observations for wells listed below:

Well:39MW1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	49.000	67.000	61.250	8.261
Log:	3.892	4.205	4.107	0.145

Well:39MW4 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	78.000	175.000	129.250	50.408
Log:	4.357	5.165	4.800	0.412

Pooled Statistics

Observations: 8

Statistic	Original Scale	Log Scale
Mean:	95.250	4.454
Std Dev:	49.390	0.468
Skewness:	0.938	0.651
Kurtosis:	-0.839	-0.989
Minimum:	49.000	3.892
Maximum:	175.000	5.165

CV: 0.519 0.105

Shapiro-Wilk Statistics

	Test	5% Critical	1% Critical
	Scale Statistic	Value	Value
Original:	0.7808*	0.8180	0.7490
Log:	0.8673	0.8180	0.7490

* Indicates statistically significant evidence of non-normality.
GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-18-1999 12:49

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:
Phone:() -

Permit Type:Background

Constituent:Be Beryllium, total

CAS Number: 7440-41-7

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.200 ppb

Start Date:Mar 23 1998

End Date:Dec 08 1998

Well ID:39MW1

Sample Date	Observation	Ln
Mar 23 1998	0.100 ppb	-2.303 (* Nondetect *)
May 28 1998	0.100 ppb	-2.303 (* Nondetect *)
Sep 02 1998	0.100 ppb	-2.303 (* Nondetect *)
Dec 08 1998	0.100 ppb	-2.303 (* Nondetect *)

Well ID:39MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.100 ppb	Ln Minimum:	-2.303
Maximum:	0.100 ppb	Ln Maximum:	-2.303
Mean:	0.100 ppb	Ln Mean:	-2.303
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:39MW4

Sample Date	Observation	Ln
Mar 23 1998	0.200 ppb	-1.609
May 28 1998	0.100 ppb	-2.303 (* Nondetect *)

Sep 02 1998	0.400 ppb	-0.916
Dec 08 1998	0.300 ppb	-1.204

Well ID:39MW4 Summary Statistics

Observations (N): 4
Nondetects (%ND): 25

Minimum:	0.100 ppb	Ln Minimum:	-2.303
Maximum:	0.400 ppb	Ln Maximum:	-0.916
Mean:	0.250 ppb	Ln Mean:	-1.508
Std. Dev.:	0.129 ppb	Ln Std. Dev.:	0.601

Data Set Summary

Report Printed: 02-18-1999 12:50

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Beta Beta emission, total

CAS Number:12587-47-2

MCL: 0.000 pCi/l

ACL: 0.000 pCi/l

Detect Limit: 1.000 pCi/l

Start Date:Mar 23 1998

End Date:Dec 08 1998

Well ID:39MW1

Sample Date	Observation	Ln
Mar 23 1998	3.000 pCi/l	1.099
May 28 1998	6.700 pCi/l	1.902
Sep 02 1998	54.000 pCi/l	3.989
Dec 08 1998	0.500 pCi/l	-0.693 (* Nondetect *)

Well ID:39MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 25

Minimum:	0.500 pCi/l	Ln Minimum:	-0.693
Maximum:	54.000 pCi/l	Ln Maximum:	3.989
Mean:	16.050 pCi/l	Ln Mean:	1.574
Std. Dev.:	25.428 pCi/l	Ln Std. Dev.:	1.941

Well ID:39MW4

Sample Date	Observation	Ln
Mar 23 1998	11.600 pCi/l	2.451
May 28 1998	14.200 pCi/l	2.653

Sep 02 1998	19.800 pCi/l	2.986
Dec 08 1998	0.500 pCi/l	-0.693 (* Nondetect *)

Well ID:39MW4 Summary Statistics

Observations (N): 4
Nondetects (%ND): 25

Minimum:	0.500 pCi/l	Ln Minimum:	-0.693
Maximum:	19.800 pCi/l	Ln Maximum:	2.986
Mean:	11.525 pCi/l	Ln Mean:	1.849
Std. Dev.:	8.107 pCi/l	Ln Std. Dev.:	1.709

Sep 02 1998	19.800 pCi/l	2.986
Dec 08 1998	0.500 pCi/l	-0.693 (* Nondetect *)

Well ID:39MW4 Summary Statistics

Observations (N): 4
Nondetects (%ND): 25

Minimum:	0.500 pCi/l	Ln Minimum:	-0.693
Maximum:	19.800 pCi/l	Ln Maximum:	2.986
Mean:	11.525 pCi/l	Ln Mean:	1.849
Std. Dev.:	8.107 pCi/l	Ln Std. Dev.:	1.709

Normality Tests

Report Printed: 02-18-1999 12:50

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Beta Beta emission, total

CAS Number:12587-47-2

MCL: 0.000 pCi/l

ACL: 0.000 pCi/l

Detect Limit: 1.000 pCi/l

Start Date:Mar 23 1998

End Date:Dec 08 1998

Normality Test on Observations for wells listed below:

Well:39MW1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	0.500	54.000	16.050	25.428
Log:	-0.693	3.989	1.574	1.941

Well:39MW4 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	0.500	19.800	11.525	8.107
Log:	-0.693	2.986	1.849	1.709

Pooled Statistics

Observations: 8

Statistic	Original Scale	Log Scale
Mean:	13.788	1.712
Std Dev:	17.639	1.700
Skewness:	1.640*	-0.402
Kurtosis:	1.545	-1.089
Minimum:	0.500	-0.693
Maximum:	54.000	3.989

CV: 1.279 0.993

Shapiro-Wilk Statistics

	Test	5% Critical	1% Critical
Scale	Statistic	Value	Value
Original:	0.7610*	0.8180	0.7490
Log:	0.9141	0.8180	0.7490

* Indicates statistically significant evidence of non-normality.
GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-18-1999 12:51

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Cd Cadmium, total

CAS Number: 7440-43-9

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.100 ppb

Start Date:Mar 23 1998

End Date:Dec 08 1998

Well ID:39MW1

Sample Date	Observation	Ln
Mar 23 1998	0.050 ppb	-2.996 (* Nondetect *)
May 28 1998	0.050 ppb	-2.996 (* Nondetect *)
Sep 02 1998	0.050 ppb	-2.996 (* Nondetect *)
Dec 08 1998	0.050 ppb	-2.996 (* Nondetect *)

Well ID:39MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.050 ppb	Ln Maximum:	-2.996
Mean:	0.050 ppb	Ln Mean:	-2.996
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:39MW4

Sample Date	Observation	Ln
Mar 23 1998	0.050 ppb	-2.996 (* Nondetect *)
May 28 1998	0.050 ppb	-2.996 (* Nondetect *)

Sep 02 1998	0.200 ppb	-1.609
Dec 08 1998	0.050 ppb	-2.996 (* Nondetect *)

Well ID:39MW4 Summary Statistics

Observations (N): 4
Nondetects (%ND): 75

Minimum:	0.050 ppb	Ln Minimum:	-2.996
Maximum:	0.200 ppb	Ln Maximum:	-1.609
Mean:	0.088 ppb	Ln Mean:	-2.649
Std. Dev.:	0.075 ppb	Ln Std. Dev.:	0.693

Data Set Summary

Report Printed: 02-18-1999 12:51

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Chloride Chloride

CAS Number:16887-00-6

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1000.000 ppb

Start Date:Mar 23 1998

End Date:Dec 08 1998

Well ID:39MW1

Sample Date	Observation	Ln
Mar 23 1998	2100.000 ppb	7.650
May 28 1998	2400.000 ppb	7.783
Sep 02 1998	2600.000 ppb	7.863
Dec 08 1998	5700.000 ppb	8.648

Well ID:39MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	2100.000 ppb	Ln Minimum:	7.650
Maximum:	5700.000 ppb	Ln Maximum:	8.648
Mean:	3200.000 ppb	Ln Mean:	7.986
Std. Dev.:	1679.286 ppb	Ln Std. Dev.:	0.450

Well ID:39MW4

Sample Date	Observation	Ln
Mar 23 1998	2400.000 ppb	7.783
May 28 1998	2200.000 ppb	7.696

Sep 02 1998	3300.000 ppb	8.102
Dec 08 1998	4400.000 ppb	8.389

Well ID:39MW4 Summary Statistics

Observations (N): 4
Nondetects (%ND): 0

Minimum:	2200.000 ppb	Ln Minimum:	7.696
Maximum:	4400.000 ppb	Ln Maximum:	8.389
Mean:	3075.000 ppb	Ln Mean:	7.993
Std. Dev.:	1004.573 ppb	Ln Std. Dev.:	0.317

Normality Tests

Report Printed: 02-18-1999 12:51

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Chloride Chloride

CAS Number:16887-00-6

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1000.000 ppb

Start Date:Mar 23 1998

End Date:Dec 08 1998

Normality Test on Observations for wells listed below:

Well:39MW1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	2100.000	5700.000	3200.000	1679.286
Log:	7.650	8.648	7.986	0.450

Well:39MW4 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	2200.000	4400.000	3075.000	1004.573
Log:	7.696	8.389	7.993	0.317

Pooled Statistics

Observations: 8

Statistic	Original Scale	Log Scale
Mean:	3137.500	7.989
Std Dev:	1282.784	0.360
Skewness:	1.154*	0.873
Kurtosis:	-0.090	-0.688
Minimum:	2100.000	7.650
Maximum:	5700.000	8.648

CV: 0.409 0.045

Shapiro-Wilk Statistics

	Test	5% Critical	1% Critical
	Scale Statistic	Value	Value
Original:	0.8038*	0.8180	0.7490
Log:	0.8590	0.8180	0.7490

* Indicates statistically significant evidence of non-normality.
GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-18-1999 12:52

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Coliform Coliform, total

CAS Number: - -

MCL: 0.000 MPN/ml

ACL: 0.000 MPN/ml

Detect Limit: 2.000 MPN/ml

Start Date:Mar 23 1998

End Date:Dec 08 1998

Well ID:39MW1

Sample Date	Observation	Ln
Mar 23 1998	1.000 MPN/ml	0.000 (* Nondetect *)
May 28 1998	30.000 MPN/ml	3.401
Sep 02 1998	30.000 MPN/ml	3.401
Dec 08 1998	1.000 MPN/ml	0.000 (* Nondetect *)

Well ID:39MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 50

Minimum:	1.000 MPN/ml	Ln Minimum:	0.000
Maximum:	30.000 MPN/ml	Ln Maximum:	3.401
Mean:	15.500 MPN/ml	Ln Mean:	1.701
Std. Dev.:	16.743 MPN/ml	Ln Std. Dev.:	1.964

Well ID:39MW4

Sample Date	Observation	Ln
Mar 23 1998	1.000 MPN/ml	0.000 (* Nondetect *)
May 28 1998	9.000 MPN/ml	2.197

Sep 02 1998	30.000 MPN/ml	3.401
Dec 08 1998	1.000 MPN/ml	0.000 (* Nondetect *)

Well ID:39MW4 Summary Statistics

Observations (N): 4
Nondetects (%ND): 50

Minimum:	1.000 MPN/ml	Ln Minimum:	0.000
Maximum:	30.000 MPN/ml	Ln Maximum:	3.401
Mean:	10.250 MPN/ml	Ln Mean:	1.400
Std. Dev.:	13.696 MPN/ml	Ln Std. Dev.:	1.689

Data Set Summary

Report Printed: 02-18-1999 12:52

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Cond F Specific Conductivity, Field

CAS Number: - -

MCL: 0.000 umhos/cm

ACL: 0.000 umhos/cm

Detect Limit: 1.000 umhos/cm

Start Date:Mar 23 1998

End Date:Dec 08 1998

Well ID:39MW1

Sample Date	Observation	Ln
Mar 23 1998	370.000 umhos/cm	5.914
May 28 1998	495.000 umhos/cm	6.205
Sep 02 1998	470.000 umhos/cm	6.153
Dec 08 1998	463.000 umhos/cm	6.138

Well ID:39MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	370.000 umhos/cm	Ln Minimum:	5.914
Maximum:	495.000 umhos/cm	Ln Maximum:	6.205
Mean:	449.500 umhos/cm	Ln Mean:	6.102
Std. Dev.:	54.751 umhos/cm	Ln Std. Dev.:	0.129

Well ID:39MW4

Sample Date	Observation	Ln
Mar 23 1998	560.000 umhos/cm	6.328
May 28 1998	603.000 umhos/cm	6.402

Sep 02 1998	720.000 umhos/cm	6.579
Dec 08 1998	768.000 umhos/cm	6.644

Well ID:39MW4 Summary Statistics

Observations (N): 4
Nondetects (%ND): 0

Minimum:	560.000 umhos/cm	Ln Minimum:	6.328
Maximum:	768.000 umhos/cm	Ln Maximum:	6.644
Mean:	662.750 umhos/cm	Ln Mean:	6.488
Std. Dev.:	97.438 umhos/cm	Ln Std. Dev.:	0.148

Normality Tests

Report Printed: 02-18-1999 12:52

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Cond F Specific Conductivity, Field

CAS Number: - -

MCL: 0.000 umhos/cm

ACL: 0.000 umhos/cm

Detect Limit: 1.000 umhos/cm

Start Date:Mar 23 1998

End Date:Dec 08 1998

Normality Test on Observations for wells listed below:

Well:39MW1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	370.000	495.000	449.500	54.751
Log:	5.914	6.205	6.102	0.129

Well:39MW4 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	560.000	768.000	662.750	97.438
Log:	6.328	6.644	6.488	0.148

Pooled Statistics

Observations: 8

Statistic	Original Scale	Log Scale
Mean:	556.125	6.295
Std Dev:	135.450	0.243
Skewness:	0.362	0.036
Kurtosis:	-1.018	-0.956
Minimum:	370.000	5.914
Maximum:	768.000	6.644

CV: 0.244 0.039

Shapiro-Wilk Statistics

	Test	5% Critical	1% Critical
	Scale Statistic	Value	Value
Original:	0.9485	0.8180	0.7490
Log:	0.9656	0.8180	0.7490

* Indicates statistically significant evidence of non-normality.
GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-18-1999 12:52

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Cr Chromium, total

CAS Number: 7440-47-3

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Mar 23 1998

End Date:Dec 08 1998

Well ID:39MW1

Sample Date	Observation	Ln
Mar 23 1998	2.000 ppb	0.693
May 28 1998	4.000 ppb	1.386
Sep 02 1998	3.000 ppb	1.099
Dec 08 1998	4.000 ppb	1.386

Well ID:39MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	2.000 ppb	Ln Minimum:	0.693
Maximum:	4.000 ppb	Ln Maximum:	1.386
Mean:	3.250 ppb	Ln Mean:	1.141
Std. Dev.:	0.957 ppb	Ln Std. Dev.:	0.328

Well ID:39MW4

Sample Date	Observation	Ln
Mar 23 1998	7.000 ppb	1.946
May 28 1998	4.000 ppb	1.386

Sep 02 1998	25.000 ppb	3.219
Dec 08 1998	71.000 ppb	4.263

Well ID:39MW4 Summary Statistics

Observations (N): 4
Nondetects (%ND): 0

Minimum:	4.000 ppb	Ln Minimum:	1.386
Maximum:	71.000 ppb	Ln Maximum:	4.263
Mean:	26.750 ppb	Ln Mean:	2.703
Std. Dev.:	30.923 ppb	Ln Std. Dev.:	1.292

Normality Tests

Report Printed: 02-18-1999 12:53

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Cr Chromium, total

CAS Number: 7440-47-3

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Mar 23 1998

End Date:Dec 08 1998

Normality Test on Observations for wells listed below:

Well:39MW1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	2.000	4.000	3.250	0.957
Log:	0.693	1.386	1.141	0.328

Well:39MW4 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	4.000	71.000	26.750	30.923
Log:	1.386	4.263	2.703	1.292

Pooled Statistics

Observations: 8

Statistic	Original Scale	Log Scale
Mean:	15.000	1.922
Std Dev:	23.833	1.208
Skewness:	1.897*	1.051*
Kurtosis:	2.031	-0.251
Minimum:	2.000	0.693
Maximum:	71.000	4.263

CV: 1.589 0.628

Shapiro-Wilk Statistics

	Test	5% Critical	1% Critical
	Scale Statistic	Value	Value
Original:	0.6099*	0.8180	0.7490
Log:	0.8401	0.8180	0.7490

* Indicates statistically significant evidence of non-normality.

GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-18-1999 12:57

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Fe Iron, total

CAS Number: 7439-89-6

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Mar 23 1998

End Date:Dec 08 1998

Well ID:39MW1

Sample Date	Observation	Ln
Mar 23 1998	368.000 ppb	5.908
May 28 1998	1160.000 ppb	7.056
Sep 02 1998	154.000 ppb	5.037
Dec 08 1998	141.000 ppb	4.949

Well ID:39MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	141.000 ppb	Ln Minimum:	4.949
Maximum:	1160.000 ppb	Ln Maximum:	7.056
Mean:	455.750 ppb	Ln Mean:	5.737
Std. Dev.:	480.898 ppb	Ln Std. Dev.:	0.980

Well ID:39MW4

Sample Date	Observation	Ln
Mar 23 1998	5420.000 ppb	8.598
May 28 1998	2290.000 ppb	7.736

Sep 02 1998	13800.000 ppb	9.532
Dec 08 1998	7770.000 ppb	8.958

Well ID:39MW4 Summary Statistics

Observations (N): 4
Nondetects (%ND): 0

Minimum:	2290.000 ppb	Ln Minimum:	7.736
Maximum:	13800.000 ppb	Ln Maximum:	9.532
Mean:	7320.000 ppb	Ln Mean:	8.706
Std. Dev.:	4868.395 ppb	Ln Std. Dev.:	0.752

Normality Tests

Report Printed: 02-18-1999 12:57

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Fe Iron, total

CAS Number: 7439-89-6

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Mar 23 1998

End Date:Dec 08 1998

Normality Test on Observations for wells listed below:

Well:39MW1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	141.000	1160.000	455.750	480.898
Log:	4.949	7.056	5.737	0.980

Well:39MW4 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	2290.000	13800.000	7320.000	4868.395
Log:	7.736	9.532	8.706	0.752

Pooled Statistics

Observations: 8

Statistic	Original Scale	Log Scale
Mean:	3887.875	7.222
Std Dev:	4870.222	1.781
Skewness:	1.141*	-0.112
Kurtosis:	0.045	-1.480
Minimum:	141.000	4.949
Maximum:	13800.000	9.532

CV: 1.253 0.247

Shapiro-Wilk Statistics

	Test Scale Statistic	5% Critical Value	1% Critical Value
Original:	0.8132*	0.8180	0.7490
Log:	0.9207	0.8180	0.7490

* Indicates statistically significant evidence of non-normality.
GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-18-1999 12:57

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Flrd Fluoride

CAS Number:16984-48-8

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 100.000 ppb

Start Date:Mar 23 1998

End Date:Dec 08 1998

Well ID:39MW1

Sample Date	Observation	Ln
Mar 23 1998	50.000 ppb	3.912 (* Nondetect *)
May 28 1998	240.000 ppb	5.481
Sep 02 1998	330.000 ppb	5.799
Dec 08 1998	350.000 ppb	5.858

Well ID:39MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 25

Minimum:	50.000 ppb	Ln Minimum:	3.912
Maximum:	350.000 ppb	Ln Maximum:	5.858
Mean:	242.500 ppb	Ln Mean:	5.262
Std. Dev.:	136.961 ppb	Ln Std. Dev.:	0.915

Well ID:39MW4

Sample Date	Observation	Ln
Mar 23 1998	50.000 ppb	3.912 (* Nondetect *)
May 28 1998	50.000 ppb	3.912 (* Nondetect *)

Sep 02 1998	50.000 ppb	3.912 (* Nondetect *)
Dec 08 1998	240.000 ppb	5.481

Well ID:39MW4 Summary Statistics

Observations (N): 4
Nondetects (%ND): 75

Minimum:	50.000 ppb	Ln Minimum:	3.912
Maximum:	240.000 ppb	Ln Maximum:	5.481
Mean:	97.500 ppb	Ln Mean:	4.304
Std. Dev.:	95.000 ppb	Ln Std. Dev.:	0.784

Data Set Summary

Report Printed: 02-18-1999 12:58

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Mn Manganese, total

CAS Number: 7439-96-5

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.200 ppb

Start Date:Mar 23 1998

End Date:Dec 08 1998

Well ID:39MW1

Sample Date	Observation	Ln
Mar 23 1998	4.400 ppb	1.482
May 28 1998	22.000 ppb	3.091
Sep 02 1998	2.500 ppb	0.916
Dec 08 1998	2.600 ppb	0.956

Well ID:39MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	2.500 ppb	Ln Minimum:	0.916
Maximum:	22.000 ppb	Ln Maximum:	3.091
Mean:	7.875 ppb	Ln Mean:	1.611
Std. Dev.:	9.457 ppb	Ln Std. Dev.:	1.020

Well ID:39MW4

Sample Date	Observation	Ln
Mar 23 1998	67.000 ppb	4.205
May 28 1998	42.000 ppb	3.738

Sep 02 1998	599.000 ppb	6.395
Dec 08 1998	631.000 ppb	6.447

Well ID:39MW4 Summary Statistics

Observations (N): 4
Nondetects (%ND): 0

Minimum:	42.000 ppb	Ln Minimum:	3.738
Maximum:	631.000 ppb	Ln Maximum:	6.447
Mean:	334.750 ppb	Ln Mean:	5.196
Std. Dev.:	324.029 ppb	Ln Std. Dev.:	1.428

Normality Tests

Report Printed: 02-18-1999 12:58

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Mn Manganese, total

CAS Number: 7439-96-5

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.200 ppb

Start Date:Mar 23 1998

End Date:Dec 08 1998

Normality Test on Observations for wells listed below:

Well:39MW1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	2.500	22.000	7.875	9.457
Log:	0.916	3.091	1.611	1.020

Well:39MW4 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	42.000	631.000	334.750	324.029
Log:	3.738	6.447	5.196	1.428

Pooled Statistics

Observations: 8

Statistic	Original Scale	Log Scale
Mean:	171.313	3.404
Std Dev:	274.889	2.234
Skewness:	1.136*	0.251
Kurtosis:	-0.672	-1.334
Minimum:	2.500	0.916
Maximum:	631.000	6.447

CV: 1.605 0.656

Shapiro-Wilk Statistics

	Test Scale Statistic	5% Critical Value	1% Critical Value
Original:	0.6384*	0.8180	0.7490
Log:	0.8910	0.8180	0.7490

* Indicates statistically significant evidence of non-normality.
GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-18-1999 12:58

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Na Sodium

CAS Number: 7440-23-5

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 100.000 ppb

Start Date:Mar 23 1998

End Date:Dec 08 1998

Well ID:39MW1

Sample Date	Observation	Ln
Mar 23 1998	3200.000 ppb	8.071
May 28 1998	3680.000 ppb	8.211
Sep 02 1998	4550.000 ppb	8.423
Dec 08 1998	8710.000 ppb	9.072

Well ID:39MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	3200.000 ppb	Ln Minimum:	8.071
Maximum:	8710.000 ppb	Ln Maximum:	9.072
Mean:	5035.000 ppb	Ln Mean:	8.444
Std. Dev.:	2512.907 ppb	Ln Std. Dev.:	0.443

Well ID:39MW4

Sample Date	Observation	Ln
Mar 23 1998	12300.000 ppb	9.417
May 28 1998	11300.000 ppb	9.333

Sep 02 1998	13700.000 ppb	9.525
Dec 08 1998	15800.000 ppb	9.668

Well ID:39MW4 Summary Statistics

Observations (N): 4
Nondetects (%ND): 0

Minimum:	11300.000 ppb	Ln Minimum:	9.333
Maximum:	15800.000 ppb	Ln Maximum:	9.668
Mean:	13275.000 ppb	Ln Mean:	9.486
Std. Dev.:	1950.000 ppb	Ln Std. Dev.:	0.145

Normality Tests

Report Printed: 02-18-1999 12:58

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Na Sodium

CAS Number: 7440-23-5

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 100.000 ppb

Start Date:Mar 23 1998

End Date:Dec 08 1998

Normality Test on Observations for wells listed below:

Well:39MW1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	3200.000	8710.000	5035.000	2512.907
Log:	8.071	9.072	8.444	0.443

Well:39MW4 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	11300.000	15800.000	13275.000	1950.000
Log:	9.333	9.668	9.486	0.145

Pooled Statistics

Observations: 8

Statistic	Original Scale	Log Scale
Mean:	9155.000	8.965
Std Dev:	4871.884	0.635
Skewness:	-0.059	-0.380
Kurtosis:	-1.522	-1.541
Minimum:	3200.000	8.071
Maximum:	15800.000	9.668

CV: 0.532 0.071

Shapiro-Wilk Statistics

	Test	5% Critical	1% Critical
	Scale Statistic	Value	Value
Original:	0.9094	0.8180	0.7490
Log:	0.8740	0.8180	0.7490

* Indicates statistically significant evidence of non-normality.
GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-18-1999 12:59

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Ni Nickel, total

CAS Number: 7440-02-0

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 15.000 ppb

Start Date:Mar 23 1998

End Date:Dec 08 1998

Well ID:39MW1

Sample Date	Observation	Ln
Mar 23 1998	7.500 ppb	2.015 (* Nondetect *)
May 28 1998	7.500 ppb	2.015 (* Nondetect *)
Sep 02 1998	44.000 ppb	3.784
Dec 08 1998	7.500 ppb	2.015 (* Nondetect *)

Well ID:39MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 75

Minimum:	7.500 ppb	Ln Minimum:	2.015
Maximum:	44.000 ppb	Ln Maximum:	3.784
Mean:	16.625 ppb	Ln Mean:	2.457
Std. Dev.:	18.250 ppb	Ln Std. Dev.:	0.885

Well ID:39MW4

Sample Date	Observation	Ln
Mar 23 1998	7.500 ppb	2.015 (* Nondetect *)
May 28 1998	7.500 ppb	2.015 (* Nondetect *)

Sep 02 1998	16.000 ppb	2.773
Dec 08 1998	43.000 ppb	3.761

Well ID:39MW4 Summary Statistics

Observations (N): 4
Nondetects (%ND): 50

Minimum:	7.500 ppb	Ln Minimum:	2.015
Maximum:	43.000 ppb	Ln Maximum:	3.761
Mean:	18.500 ppb	Ln Mean:	2.641
Std. Dev.:	16.818 ppb	Ln Std. Dev.:	0.828

Data Set Summary

Report Printed: 02-18-1999 12:59

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Nitrate Nitrate

CAS Number:14797-55-8

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 100.000 ppb

Start Date:Mar 23 1998

End Date:Dec 08 1998

Well ID:39MW1

Sample Date	Observation	Ln
Mar 23 1998	1430.000 ppb	7.265
May 28 1998	1840.000 ppb	7.518
Sep 02 1998	1400.000 ppb	7.244
Dec 08 1998	1150.000 ppb	7.048

Well ID:39MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	1150.000 ppb	Ln Minimum:	7.048
Maximum:	1840.000 ppb	Ln Maximum:	7.518
Mean:	1455.000 ppb	Ln Mean:	7.269
Std. Dev.:	285.715 ppb	Ln Std. Dev.:	0.193

Well ID:39MW4

Sample Date	Observation	Ln
Mar 23 1998	1360.000 ppb	7.215
May 28 1998	910.000 ppb	6.813

Sep 02 1998	620.000 ppb	6.430
Dec 08 1998	800.000 ppb	6.685

Well ID:39MW4 Summary Statistics

Observations (N): 4
Nondetects (%ND): 0

Minimum:	620.000 ppb	Ln Minimum:	6.430
Maximum:	1360.000 ppb	Ln Maximum:	7.215
Mean:	922.500 ppb	Ln Mean:	6.786
Std. Dev.:	315.212 ppb	Ln Std. Dev.:	0.328

Normality Tests

Report Printed: 02-18-1999 12:59

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:
Phone:() -

Permit Type:Background

Constituent:Nitrate Nitrate

CAS Number:14797-55-8

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 100.000 ppb

Start Date:Mar 23 1998

End Date:Dec 08 1998

Normality Test on Observations for wells listed below:

Well:39MW1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	1150.000	1840.000	1455.000	285.715
Log:	7.048	7.518	7.269	0.193

Well:39MW4 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	620.000	1360.000	922.500	315.212
Log:	6.430	7.215	6.786	0.328

Pooled Statistics

Observations: 8

Statistic	Original Scale	Log Scale
Mean:	1188.750	7.027
Std Dev:	398.226	0.359
Skewness:	0.097	-0.381
Kurtosis:	-0.925	-0.948
Minimum:	620.000	6.430
Maximum:	1840.000	7.518

CV: 0.335 0.051

Shapiro-Wilk Statistics

	Test	5% Critical	1% Critical
Scale	Statistic	Value	Value
Original:	0.9647	0.8180	0.7490
Log:	0.9539	0.8180	0.7490

* Indicates statistically significant evidence of non-normality.
GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-18-1999 13:00

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Pb Lead, total

CAS Number: 7439-92-1

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Mar 23 1998

End Date:Dec 08 1998

Well ID:39MW1

Sample Date	Observation	Ln
Mar 23 1998	0.500 ppb	-0.693 (* Nondetect *)
May 28 1998	0.500 ppb	-0.693 (* Nondetect *)
Sep 02 1998	0.500 ppb	-0.693 (* Nondetect *)
Dec 08 1998	0.500 ppb	-0.693 (* Nondetect *)

Well ID:39MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.500 ppb	Ln Minimum:	-0.693
Maximum:	0.500 ppb	Ln Maximum:	-0.693
Mean:	0.500 ppb	Ln Mean:	-0.693
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:39MW4

Sample Date	Observation	Ln
Mar 23 1998	6.000 ppb	1.792
May 28 1998	2.000 ppb	0.693

Sep 02 1998	24.000 ppb	3.178
Dec 08 1998	7.000 ppb	1.946

Well ID:39MW4 Summary Statistics

Observations (N): 4
Nondetects (%ND): 0

Minimum:	2.000 ppb	Ln Minimum:	0.693
Maximum:	24.000 ppb	Ln Maximum:	3.178
Mean:	9.750 ppb	Ln Mean:	1.902
Std. Dev.:	9.743 ppb	Ln Std. Dev.:	1.017

Data Set Summary

Report Printed: 02-18-1999 13:00

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Ra Radium, total

CAS Number: 7400-14-4

MCL: 0.000 pCi/l

ACL: 0.000 pCi/l

Detect Limit: 1.000 pCi/l

Start Date:Mar 23 1998

End Date:Dec 08 1998

Well ID:39MW1

Sample Date	Observation	Ln
Mar 23 1998	0.500 pCi/l	-0.693 (* Nondetect *)
May 28 1998	0.500 pCi/l	-0.693 (* Nondetect *)
Sep 02 1998	0.500 pCi/l	-0.693 (* Nondetect *)
Dec 08 1998	0.500 pCi/l	-0.693 (* Nondetect *)

Well ID:39MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.500 pCi/l	Ln Minimum:	-0.693
Maximum:	0.500 pCi/l	Ln Maximum:	-0.693
Mean:	0.500 pCi/l	Ln Mean:	-0.693
Std. Dev.:	0.000 pCi/l	Ln Std. Dev.:	0.000

Well ID:39MW4

Sample Date	Observation	Ln
Mar 23 1998	0.500 pCi/l	-0.693 (* Nondetect *)
May 28 1998	0.500 pCi/l	-0.693 (* Nondetect *)

Sep 02 1998	1.900 pCi/l	0.642
Dec 08 1998	0.500 pCi/l	-0.693 (* Nondetect *)

Well ID:39MW4 Summary Statistics

Observations (N): 4
 Nondetects (%ND): 75

Minimum:	0.500 pCi/l	Ln Minimum:	-0.693
Maximum:	1.900 pCi/l	Ln Maximum:	0.642
Mean:	0.850 pCi/l	Ln Mean:	-0.359
Std. Dev.:	0.700 pCi/l	Ln Std. Dev.:	0.668

Data Set Summary

Report Printed: 02-18-1999 13:01

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Sulfate Sulfate, total

CAS Number:14808-79-8

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1000.000 ppb

Start Date:Mar 23 1998

End Date:Dec 08 1998

Well ID:39MW1

Sample Date	Observation	Ln
Mar 23 1998	17100.000 ppb	9.747
May 28 1998	19200.000 ppb	9.863
Sep 02 1998	19200.000 ppb	9.863
Dec 08 1998	20500.000 ppb	9.928

Well ID:39MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	17100.000 ppb	Ln Minimum:	9.747
Maximum:	20500.000 ppb	Ln Maximum:	9.928
Mean:	19000.000 ppb	Ln Mean:	9.850
Std. Dev.:	1407.125 ppb	Ln Std. Dev.:	0.075

Well ID:39MW4

Sample Date	Observation	Ln
Mar 23 1998	71400.000 ppb	11.176
May 28 1998	95700.000 ppb	11.469

Sep 02 1998	98700.000 ppb	11.500
Dec 08 1998	100000.000 ppb	11.513

Well ID:39MW4 Summary Statistics

Observations (N): 4
Nondetects (%ND): 0

Minimum:	71400.000 ppb	Ln Minimum:	11.176
Maximum:	100000.000 ppb	Ln Maximum:	11.513
Mean:	91450.000 ppb	Ln Mean:	11.414
Std. Dev.:	13487.401 ppb	Ln Std. Dev.:	0.160

Data Set Summary

Report Printed: 02-18-1999 13:01

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Se Selenium, total

CAS Number: 7782-49-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Mar 23 1998

End Date:Dec 08 1998

Well ID:39MW1

Sample Date	Observation	Ln
Mar 23 1998	3.000 ppb	1.099
May 28 1998	2.000 ppb	0.693
Sep 02 1998	2.000 ppb	0.693
Dec 08 1998	2.000 ppb	0.693

Well ID:39MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	2.000 ppb	Ln Minimum:	0.693
Maximum:	3.000 ppb	Ln Maximum:	1.099
Mean:	2.250 ppb	Ln Mean:	0.795
Std. Dev.:	0.500 ppb	Ln Std. Dev.:	0.203

Well ID:39MW4

Sample Date	Observation	Ln
Mar 23 1998	0.500 ppb	-0.693 (* Nondetect *)
May 28 1998	0.500 ppb	-0.693 (* Nondetect *)

Sep 02 1998	0.500 ppb	-0.693 (* Nondetect *)
Dec 08 1998	3.000 ppb	1.099

Well ID:39MW4 Summary Statistics

Observations (N): 4
Nondetects (%ND): 75

Minimum:	0.500 ppb	Ln Minimum:	-0.693
Maximum:	3.000 ppb	Ln Maximum:	1.099
Mean:	1.125 ppb	Ln Mean:	-0.245
Std. Dev.:	1.250 ppb	Ln Std. Dev.:	0.896

Normality Tests

Report Printed: 02-18-1999 13:01

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:
Phone:() -

Permit Type:Background

Constituent:Se Selenium, total

CAS Number: 7782-49-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Mar 23 1998

End Date:Dec 08 1998

Normality Test on Observations for wells listed below:

Well:39MW1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	2.000	3.000	2.250	0.500
Log:	0.693	1.099	0.795	0.203

Well:39MW4 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	0.500	3.000	1.125	1.250
Log:	-0.693	1.099	-0.245	0.896

Pooled Statistics

Observations: 8

Statistic	Original Scale	Log Scale
Mean:	1.688	0.275
Std Dev:	1.067	0.819
Skewness:	-0.052	-0.384
Kurtosis:	-1.497	-1.676
Minimum:	0.500	-0.693
Maximum:	3.000	1.099

CV: 0.632 2.981

Shapiro-Wilk Statistics

	Test Scale Statistic	5% Critical Value	1% Critical Value
Original:	0.8259	0.8180	0.7490
Log:	0.7635*	0.8180	0.7490

* Indicates statistically significant evidence of non-normality.
GRIT/STAT Version 5.0

Normality Tests

Report Printed: 02-18-1999 13:01

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Sulfate Sulfate, total

CAS Number:14808-79-8

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1000.000 ppb

Start Date:Mar 23 1998

End Date:Dec 08 1998

Normality Test on Observations for wells listed below:

Well:39MW1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	17100.000	20500.000	19000.000	1407.125
Log:	9.747	9.928	9.850	0.075

Well:39MW4 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	71400.000	100000.000	91450.000	13487.401
Log:	11.176	11.513	11.414	0.160

Pooled Statistics

Observations: 8

Statistic	Original Scale	Log Scale
Mean:	55225.004	10.632
Std Dev:	39730.656	0.844
Skewness:	0.126	0.032
Kurtosis:	-1.868	-1.937
Minimum:	17100.000	9.747
Maximum:	100000.000	11.513

CV: 0.719 0.079

Shapiro-Wilk Statistics

	Test	5% Critical	1% Critical
	Scale Statistic	Value	Value
Original:	0.7579*	0.8180	0.7490
Log:	0.7520*	0.8180	0.7490

* Indicates statistically significant evidence of non-normality.

GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-18-1999 13:02

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:TOC Total Organic Carbon

CAS Number: - -

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1000.000 ppb

Start Date:Mar 23 1998

End Date:Dec 08 1998

Well ID:39MW1

Sample Date	Observation	Ln
Mar 23 1998	1275.000 ppb	7.151
May 28 1998	500.000 ppb	6.215 (* Nondetect *)
Sep 02 1998	500.000 ppb	6.215 (* Nondetect *)
Dec 08 1998	1400.000 ppb	7.244

Well ID:39MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 50

Minimum:	500.000 ppb	Ln Minimum:	6.215
Maximum:	1400.000 ppb	Ln Maximum:	7.244
Mean:	918.750 ppb	Ln Mean:	6.706
Std. Dev.:	486.216 ppb	Ln Std. Dev.:	0.569

Well ID:39MW4

Sample Date	Observation	Ln
Mar 23 1998	1475.000 ppb	7.296
May 28 1998	1200.000 ppb	7.090

Sep 02 1998	1325.000 ppb	7.189
Dec 08 1998	1100.000 ppb	7.003

Well ID:39MW4 Summary Statistics

Observations (N): 4
Nondetects (%ND): 0

Minimum:	1100.000 ppb	Ln Minimum:	7.003
Maximum:	1475.000 ppb	Ln Maximum:	7.296
Mean:	1275.000 ppb	Ln Mean:	7.145
Std. Dev.:	162.019 ppb	Ln Std. Dev.:	0.127

Normality Tests

Report Printed: 02-18-1999 13:02

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:TOC Total Organic Carbon

CAS Number: - -

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1000.000 ppb

Start Date:Mar 23 1998

End Date:Dec 08 1998

Normality Test on Observations for wells listed below:

Well:39MW1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	500.000	1400.000	918.750	486.216
Log:	6.215	7.244	6.706	0.569

Well:39MW4 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	1100.000	1475.000	1275.000	162.019
Log:	7.003	7.296	7.145	0.127

Pooled Statistics

Observations: 8

Statistic	Original Scale	Log Scale
Mean:	1096.875	6.925
Std Dev:	385.782	0.448
Skewness:	-0.864	-1.021*
Kurtosis:	-0.888	-0.774
Minimum:	500.000	6.215
Maximum:	1475.000	7.296

CV: 0.352 0.065

Shapiro-Wilk Statistics

	Test	5% Critical	1% Critical
	Statistic	Value	Value
Original:	0.8094*	0.8180	0.7490
Log:	0.7361*	0.8180	0.7490

* Indicates statistically significant evidence of non-normality.
GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-18-1999 13:02

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:TOX Total Organic Halogens, Halides

CAS Number: - -

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 5.000 ppb

Start Date:Mar 23 1998

End Date:Dec 08 1998

Well ID:39MW1

Sample Date	Observation	Ln
Mar 23 1998	2.500 ppb	0.916 (* Nondetect *)
May 28 1998	2.500 ppb	0.916 (* Nondetect *)
Sep 02 1998	15.500 ppb	2.741
Dec 08 1998	23.000 ppb	3.135

Well ID:39MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 50

Minimum:	2.500 ppb	Ln Minimum:	0.916
Maximum:	23.000 ppb	Ln Maximum:	3.135
Mean:	10.875 ppb	Ln Mean:	1.927
Std. Dev.:	10.144 ppb	Ln Std. Dev.:	1.178

Well ID:39MW4

Sample Date	Observation	Ln
Mar 23 1998	2.500 ppb	0.916 (* Nondetect *)
May 28 1998	2.500 ppb	0.916 (* Nondetect *)

Sep 02 1998	5.000 ppb	1.609
Dec 08 1998	17.000 ppb	2.833

Well ID:39MW4 Summary Statistics

Observations (N): 4
Nondetects (%ND): 50

Minimum:	2.500 ppb	Ln Minimum:	0.916
Maximum:	17.000 ppb	Ln Maximum:	2.833
Mean:	6.750 ppb	Ln Mean:	1.569
Std. Dev.:	6.934 ppb	Ln Std. Dev.:	0.904

Data Set Summary

Report Printed: 02-18-1999 13:03

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Tl Thallium, total

CAS Number: 7440-28-0

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 1.000 ppb

Start Date:Mar 23 1998

End Date:Dec 08 1998

Well ID:39MW1

Sample Date	Observation	Ln
Mar 23 1998	0.500 ppb	-0.693 (* Nondetect *)
May 28 1998	0.500 ppb	-0.693 (* Nondetect *)
Sep 02 1998	0.500 ppb	-0.693 (* Nondetect *)
Dec 08 1998	0.500 ppb	-0.693 (* Nondetect *)

Well ID:39MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.500 ppb	Ln Minimum:	-0.693
Maximum:	0.500 ppb	Ln Maximum:	-0.693
Mean:	0.500 ppb	Ln Mean:	-0.693
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:39MW4

Sample Date	Observation	Ln
Mar 23 1998	0.500 ppb	-0.693 (* Nondetect *)
May 28 1998	0.500 ppb	-0.693 (* Nondetect *)

Sep 02 1998	0.500 ppb	-0.693 (* Nondetect *)
Dec 08 1998	0.500 ppb	-0.693 (* Nondetect *)

Well ID:39MW4 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	0.500 ppb	Ln Minimum:	-0.693
Maximum:	0.500 ppb	Ln Maximum:	-0.693
Mean:	0.500 ppb	Ln Mean:	-0.693
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-18-1999 13:03

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:pH F pH, Field

CAS Number: - -

MCL: 0.000 SU

ACL: 0.000 SU

Detect Limit: 0.100 SU

Start Date:Mar 23 1998

End Date:Dec 08 1998

Well ID:39MW1

Sample Date	Observation	Ln
Mar 23 1998	6.500 SU	1.872
May 28 1998	6.300 SU	1.841
Sep 02 1998	7.000 SU	1.946
Dec 08 1998	6.900 SU	1.932

Well ID:39MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND): 0

Minimum:	6.300 SU	Ln Minimum:	1.841
Maximum:	7.000 SU	Ln Maximum:	1.946
Mean:	6.675 SU	Ln Mean:	1.897
Std. Dev.:	0.330 SU	Ln Std. Dev.:	0.050

Well ID:39MW4

Sample Date	Observation	Ln
Mar 23 1998	6.500 SU	1.872
May 28 1998	6.400 SU	1.856

Sep 02 1998	7.000 SU	1.946
Dec 08 1998	6.900 SU	1.932

Well ID:39MW4 Summary Statistics

Observations (N): 4
Nondetects (%ND): 0

Minimum:	6.400 SU	Ln Minimum:	1.856
Maximum:	7.000 SU	Ln Maximum:	1.946
Mean:	6.700 SU	Ln Mean:	1.901
Std. Dev.:	0.294 SU	Ln Std. Dev.:	0.044

Normality Tests

Report Printed: 02-18-1999 13:03

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone: () -

Permit Type:Background

Constituent:pH F pH, Field

CAS Number: - -

MCL: 0.000 SU

ACL: 0.000 SU

Detect Limit: 0.100 SU

Start Date:Mar 23 1998

End Date:Dec 08 1998

Normality Test on Observations for wells listed below:

Well:39MW1 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	6.300	7.000	6.675	0.330
Log:	1.841	1.946	1.897	0.050

Well:39MW4 Position:Upgradient Observations:4

Scale	Minimum	Maximum	Mean	Std Dev
Original:	6.400	7.000	6.700	0.294
Log:	1.856	1.946	1.901	0.044

Pooled Statistics

Observations: 8

Statistic	Original Scale	Log Scale
Mean:	6.688	1.899
Std Dev:	0.290	0.043
Skewness:	-0.093	-0.110
Kurtosis:	-1.731	-1.717
Minimum:	6.300	1.841
Maximum:	7.000	1.946

CV: 0.043 0.023

Shapiro-Wilk Statistics

	Test	5% Critical	1% Critical
	Scale Statistic	Value	Value
Original:	0.8457	0.8180	0.7490
Log:	0.8470	0.8180	0.7490

* Indicates statistically significant evidence of non-normality.
GRIT/STAT Version 5.0

Data Set Summary

Report Printed: 02-24-1999 10:57

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:2,4,5-TP 2,4,5-Trichlor-phenoxypropionic acid

CAS Number: 93-72-1

MCL: 0.000 ug/l

ACL: 0.000 ug/l

Detect Limit: 1.000 ug/l

Start Date:Mar 23 1998

End Date:Dec 08 1998

Well ID:39MW1

Sample Date	Observation	Ln
Mar 23 1998	0.500 ug/l	-0.693 (* Nondetect *)
May 28 1998	0.500 ug/l	-0.693 (* Nondetect *)
Sep 02 1998	0.500 ug/l	-0.693 (* Nondetect *)
Dec 08 1998	0.500 ug/l	-0.693 (* Nondetect *)

Well ID:39MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.500 ug/l	Ln Minimum:	-0.693
Maximum:	0.500 ug/l	Ln Maximum:	-0.693
Mean:	0.500 ug/l	Ln Mean:	-0.693
Std. Dev.:	0.000 ug/l	Ln Std. Dev.:	0.000

Well ID:39MW4

Sample Date	Observation	Ln
Mar 23 1998	0.500 ug/l	-0.693 (* Nondetect *)
May 28 1998	0.500 ug/l	-0.693 (* Nondetect *)

Sep 02 1998	0.500 ug/l	-0.693 (* Nondetect *)
Dec 08 1998	0.500 ug/l	-0.693 (* Nondetect *)

Well ID:39MW4 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	0.500 ug/l	Ln Minimum:	-0.693
Maximum:	0.500 ug/l	Ln Maximum:	-0.693
Mean:	0.500 ug/l	Ln Mean:	-0.693
Std. Dev.:	0.000 ug/l	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:57

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:2,4D est 2,4-D, salts, esters

CAS Number:

MCL: 0.000 ug/l

ACL: 0.000 ug/l

Detect Limit: 1.000 ug/l

Start Date:Mar 23 1998

End Date:Dec 08 1998

Well ID:39MW1

Sample Date	Observation	Ln
Mar 23 1998	0.500 ug/l	-0.693 (* Nondetect *)
May 28 1998	0.500 ug/l	-0.693 (* Nondetect *)
Sep 02 1998	0.500 ug/l	-0.693 (* Nondetect *)
Dec 08 1998	0.500 ug/l	-0.693 (* Nondetect *)

Well ID:39MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.500 ug/l	Ln Minimum:	-0.693
Maximum:	0.500 ug/l	Ln Maximum:	-0.693
Mean:	0.500 ug/l	Ln Mean:	-0.693
Std. Dev.:	0.000 ug/l	Ln Std. Dev.:	0.000

Well ID:39MW4

Sample Date	Observation	Ln
Mar 23 1998	0.500 ug/l	-0.693 (* Nondetect *)
May 28 1998	0.500 ug/l	-0.693 (* Nondetect *)

Sep 02 1998	0.500 ug/l	-0.693 (* Nondetect *)
Dec 08 1998	0.500 ug/l	-0.693 (* Nondetect *)

Well ID:39MW4 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	0.500 ug/l	Ln Minimum:	-0.693
Maximum:	0.500 ug/l	Ln Maximum:	-0.693
Mean:	0.500 ug/l	Ln Mean:	-0.693
Std. Dev.:	0.000 ug/l	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:57

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Ag Silver, total

CAS Number: 7440-22-4

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.200 ppb

Start Date:Mar 23 1998

End Date:Dec 08 1998

Well ID:39MW1

Sample Date	Observation	Ln
Mar 23 1998	0.100 ppb	-2.303 (* Nondetect *)
May 28 1998	0.100 ppb	-2.303 (* Nondetect *)
Sep 02 1998	0.100 ppb	-2.303 (* Nondetect *)
Dec 08 1998	0.100 ppb	-2.303 (* Nondetect *)

Well ID:39MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.100 ppb	Ln Minimum:	-2.303
Maximum:	0.100 ppb	Ln Maximum:	-2.303
Mean:	0.100 ppb	Ln Mean:	-2.303
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:39MW4

Sample Date	Observation	Ln
Mar 23 1998	0.100 ppb	-2.303 (* Nondetect *)
May 28 1998	0.100 ppb	-2.303 (* Nondetect *)

Sep 02 1998	0.100 ppb	-2.303 (* Nondetect *)
Dec 08 1998	0.100 ppb	-2.303 (* Nondetect *)

Well ID:39MW4 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	0.100 ppb	Ln Minimum:	-2.303
Maximum:	0.100 ppb	Ln Maximum:	-2.303
Mean:	0.100 ppb	Ln Mean:	-2.303
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:57

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:BHC-D BHC, gamma

CAS Number: 58-89-9

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 2.000 ppb

Start Date:Mar 23 1998

End Date:Dec 08 1998

Well ID:39MW1

Sample Date	Observation	Ln
Mar 23 1998	1.000 ppb	0.000 (* Nondetect *)
May 28 1998	1.000 ppb	0.000 (* Nondetect *)
Sep 02 1998	1.000 ppb	0.000 (* Nondetect *)
Dec 08 1998	1.000 ppb	0.000 (* Nondetect *)

Well ID:39MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	1.000 ppb	Ln Minimum:	0.000
Maximum:	1.000 ppb	Ln Maximum:	0.000
Mean:	1.000 ppb	Ln Mean:	0.000
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:39MW4

Sample Date	Observation	Ln
Mar 23 1998	1.000 ppb	0.000 (* Nondetect *)
May 28 1998	1.000 ppb	0.000 (* Nondetect *)

Sep 02 1998	1.000 ppb	0.000 (* Nondetect *)
Dec 08 1998	1.000 ppb	0.000 (* Nondetect *)

Well ID:39MW4 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	1.000 ppb	Ln Minimum:	0.000
Maximum:	1.000 ppb	Ln Maximum:	0.000
Mean:	1.000 ppb	Ln Mean:	0.000
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:58

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:DEthPhth Diethylphthalate

CAS Number: 84-66-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 5.000 ppb

Start Date:Mar 23 1998

End Date:Dec 08 1998

Well ID:39MW1

Sample Date	Observation	Ln
Mar 23 1998	2.500 ppb	0.916 (* Nondetect *)
May 28 1998	2.500 ppb	0.916 (* Nondetect *)
Sep 02 1998	2.500 ppb	0.916 (* Nondetect *)
Dec 08 1998	2.500 ppb	0.916 (* Nondetect *)

Well ID:39MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	2.500 ppb	Ln Minimum:	0.916
Maximum:	2.500 ppb	Ln Maximum:	0.916
Mean:	2.500 ppb	Ln Mean:	0.916
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:39MW4

Sample Date	Observation	Ln
Mar 23 1998	2.500 ppb	0.916 (* Nondetect *)
May 28 1998	2.500 ppb	0.916 (* Nondetect *)

Sep 02 1998	2.500 ppb	0.916 (* Nondetect *)
Dec 08 1998	2.500 ppb	0.916 (* Nondetect *)

Well ID:39MW4 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	2.500 ppb	Ln Minimum:	0.916
Maximum:	2.500 ppb	Ln Maximum:	0.916
Mean:	2.500 ppb	Ln Mean:	0.916
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:58

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Di-N-Bu Di-n-Butylphthalate

CAS Number: 84-74-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 5.000 ppb

Start Date:Mar 23 1998

End Date:Dec 08 1998

Well ID:39MW1

Sample Date	Observation	Ln
Mar 23 1998	2.500 ppb	0.916 (* Nondetect *)
May 28 1998	2.500 ppb	0.916 (* Nondetect *)
Sep 02 1998	2.500 ppb	0.916 (* Nondetect *)
Dec 08 1998	2.500 ppb	0.916 (* Nondetect *)

Well ID:39MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	2.500 ppb	Ln Minimum:	0.916
Maximum:	2.500 ppb	Ln Maximum:	0.916
Mean:	2.500 ppb	Ln Mean:	0.916
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:39MW4

Sample Date	Observation	Ln
Mar 23 1998	2.500 ppb	0.916 (* Nondetect *)
May 28 1998	2.500 ppb	0.916 (* Nondetect *)

Sep 02 1998	2.500 ppb	0.916 (* Nondetect *)
Dec 08 1998	2.500 ppb	0.916 (* Nondetect *)

Well ID:39MW4 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	2.500 ppb	Ln Minimum:	0.916
Maximum:	2.500 ppb	Ln Maximum:	0.916
Mean:	2.500 ppb	Ln Mean:	0.916
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:58

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Endrin Endrin

CAS Number: 72-20-8

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 2.000 ppb

Start Date:Mar 23 1998

End Date:Dec 08 1998

Well ID:39MW1

Sample Date	Observation	Ln
Mar 23 1998	1.000 ppb	0.000 (* Nondetect *)
May 28 1998	1.000 ppb	0.000 (* Nondetect *)
Sep 02 1998	1.000 ppb	0.000 (* Nondetect *)
Dec 08 1998	1.000 ppb	0.000 (* Nondetect *)

Well ID:39MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	1.000 ppb	Ln Minimum:	0.000
Maximum:	1.000 ppb	Ln Maximum:	0.000
Mean:	1.000 ppb	Ln Mean:	0.000
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:39MW4

Sample Date	Observation	Ln
Mar 23 1998	1.000 ppb	0.000 (* Nondetect *)
May 28 1998	1.000 ppb	0.000 (* Nondetect *)

Sep 02 1998	1.000 ppb	0.000 (* Nondetect *)
Dec 08 1998	1.000 ppb	0.000 (* Nondetect *)

Well ID:39MW4 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	1.000 ppb	Ln Minimum:	0.000
Maximum:	1.000 ppb	Ln Maximum:	0.000
Mean:	1.000 ppb	Ln Mean:	0.000
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:58

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Hg Mercury

CAS Number: 7439-97-6

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 0.200 ppb

Start Date:Mar 23 1998

End Date:Dec 08 1998

Well ID:39MW1

Sample Date	Observation	Ln
Mar 23 1998	0.100 ppb	-2.303 (* Nondetect *)
May 28 1998	0.100 ppb	-2.303 (* Nondetect *)
Sep 02 1998	0.100 ppb	-2.303 (* Nondetect *)
Dec 08 1998	0.100 ppb	-2.303 (* Nondetect *)

Well ID:39MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	0.100 ppb	Ln Minimum:	-2.303
Maximum:	0.100 ppb	Ln Maximum:	-2.303
Mean:	0.100 ppb	Ln Mean:	-2.303
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:39MW4

Sample Date	Observation	Ln
Mar 23 1998	0.100 ppb	-2.303 (* Nondetect *)
May 28 1998	0.100 ppb	-2.303 (* Nondetect *)

Sep 02 1998	0.100 ppb	-2.303 (* Nondetect *)
Dec 08 1998	0.100 ppb	-2.303 (* Nondetect *)

Well ID:39MW4 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	0.100 ppb	Ln Minimum:	-2.303
Maximum:	0.100 ppb	Ln Maximum:	-2.303
Mean:	0.100 ppb	Ln Mean:	-2.303
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:58

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Moxchl Methoxychlor

CAS Number: 72-43-5

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 2.000 ppb

Start Date:Mar 23 1998

End Date:Dec 08 1998

Well ID:39MW1

Sample Date	Observation	Ln
Mar 23 1998	1.000 ppb	0.000 (* Nondetect *)
May 28 1998	1.000 ppb	0.000 (* Nondetect *)
Sep 02 1998	1.000 ppb	0.000 (* Nondetect *)
Dec 08 1998	1.000 ppb	0.000 (* Nondetect *)

Well ID:39MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	1.000 ppb	Ln Minimum:	0.000
Maximum:	1.000 ppb	Ln Maximum:	0.000
Mean:	1.000 ppb	Ln Mean:	0.000
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:39MW4

Sample Date	Observation	Ln
Mar 23 1998	1.000 ppb	0.000 (* Nondetect *)
May 28 1998	1.000 ppb	0.000 (* Nondetect *)

Sep 02 1998	1.000 ppb	0.000 (* Nondetect *)
Dec 08 1998	1.000 ppb	0.000 (* Nondetect *)

Well ID:39MW4 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	1.000 ppb	Ln Minimum:	0.000
Maximum:	1.000 ppb	Ln Maximum:	0.000
Mean:	1.000 ppb	Ln Mean:	0.000
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:59

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Phenols Phenols, total

CAS Number: 108-95-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 10.000 ppb

Start Date:Mar 23 1998

End Date:Dec 08 1998

Well ID:39MW1

Sample Date	Observation	Ln
Mar 23 1998	5.000 ppb	1.609 (* Nondetect *)
May 28 1998	5.000 ppb	1.609 (* Nondetect *)
Sep 02 1998	5.000 ppb	1.609 (* Nondetect *)
Dec 08 1998	5.000 ppb	1.609 (* Nondetect *)

Well ID:39MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	5.000 ppb	Ln Maximum:	1.609
Mean:	5.000 ppb	Ln Mean:	1.609
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well

ID:39MW4

Sample Date	Observation	Ln
Mar 23 1998	5.000 ppb	1.609 (* Nondetect *)
May 28 1998	5.000 ppb	1.609 (* Nondetect *)
Sep 02 1998	5.000 ppb	1.609 (* Nondetect *)
Dec 08 1998	5.000 ppb	1.609 (* Nondetect *)

Well ID:39MW4 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	5.000 ppb	Ln Minimum:	1.609
Maximum:	5.000 ppb	Ln Maximum:	1.609
Mean:	5.000 ppb	Ln Mean:	1.609
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:59

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Resorcin Resorcinol or 1,3-Benzenediol

CAS Number: 108-46-3

MCL: 0.000 ug/l

ACL: 0.000 ug/l

Detect Limit: 10.000 ug/l

Start Date:Mar 23 1998

End Date:Dec 08 1998

Well ID:39MW1

Sample Date	Observation	Ln
Mar 23 1998	5.000 ug/l	1.609 (* Nondetect *)
May 28 1998	5.000 ug/l	1.609 (* Nondetect *)
Sep 02 1998	5.000 ug/l	1.609 (* Nondetect *)
Dec 08 1998	5.000 ug/l	1.609 (* Nondetect *)

Well ID:39MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	5.000 ug/l	Ln Minimum:	1.609
Maximum:	5.000 ug/l	Ln Maximum:	1.609
Mean:	5.000 ug/l	Ln Mean:	1.609
Std. Dev.:	0.000 ug/l	Ln Std. Dev.:	0.000

Well ID:39MW4

Sample Date	Observation	Ln
Mar 23 1998	5.000 ug/l	1.609 (* Nondetect *)
May 28 1998	5.000 ug/l	1.609 (* Nondetect *)

Sep 02 1998	5.000 ug/l	1.609 (* Nondetect *)
Dec 08 1998	5.000 ug/l	1.609 (* Nondetect *)

Well ID:39MW4 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	5.000 ug/l	Ln Minimum:	1.609
Maximum:	5.000 ug/l	Ln Maximum:	1.609
Mean:	5.000 ug/l	Ln Mean:	1.609
Std. Dev.:	0.000 ug/l	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:59

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Sb Antimony, total

CAS Number: 7440-36-0

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 60.000 ppb

Start Date:Mar 23 1998

End Date:Dec 08 1998

Well ID:39MW1

Sample Date	Observation	Ln
Mar 23 1998	30.000 ppb	3.401 (* Nondetect *)
May 28 1998	30.000 ppb	3.401 (* Nondetect *)
Sep 02 1998	30.000 ppb	3.401 (* Nondetect *)
Dec 08 1998	30.000 ppb	3.401 (* Nondetect *)

Well ID:39MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	30.000 ppb	Ln Minimum:	3.401
Maximum:	30.000 ppb	Ln Maximum:	3.401
Mean:	30.000 ppb	Ln Mean:	3.401
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:39MW4

Sample Date	Observation	Ln
Mar 23 1998	30.000 ppb	3.401 (* Nondetect *)
May 28 1998	30.000 ppb	3.401 (* Nondetect *)

Sep 02 1998	30.000 ppb	3.401 (* Nondetect *)
Dec 08 1998	30.000 ppb	3.401 (* Nondetect *)

Well ID:39MW4 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	30.000 ppb	Ln Minimum:	3.401
Maximum:	30.000 ppb	Ln Maximum:	3.401
Mean:	30.000 ppb	Ln Mean:	3.401
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Data Set Summary

Report Printed: 02-24-1999 10:59

Facility:RAAPHWMU39 Haz. Waste Unit 39 - RAAP

Address:

City:Radford
County:PULASKI

ST:VA Zip:

Contact:

Phone:() -

Permit Type:Background

Constituent:Toxa Toxaphene

CAS Number: 8001-35-2

MCL: 0.000 ppb

ACL: 0.000 ppb

Detect Limit: 2.000 ppb

Start Date:Mar 23 1998

End Date:Dec 08 1998

Well ID:39MW1

Sample Date	Observation	Ln
Mar 23 1998	1.000 ppb	0.000 (* Nondetect *)
May 28 1998	1.000 ppb	0.000 (* Nondetect *)
Sep 02 1998	1.000 ppb	0.000 (* Nondetect *)
Dec 08 1998	1.000 ppb	0.000 (* Nondetect *)

Well ID:39MW1 Summary Statistics

Observations (N): 4

Nondetects (%ND):100

Minimum:	1.000 ppb	Ln Minimum:	0.000
Maximum:	1.000 ppb	Ln Maximum:	0.000
Mean:	1.000 ppb	Ln Mean:	0.000
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Well ID:39MW4

Sample Date	Observation	Ln
Mar 23 1998	1.000 ppb	0.000 (* Nondetect *)
May 28 1998	1.000 ppb	0.000 (* Nondetect *)

Sep 02 1998	1.000 ppb	0.000 (* Nondetect *)
Dec 08 1998	1.000 ppb	0.000 (* Nondetect *)

Well ID:39MW4 Summary Statistics

Observations (N): 4
Nondetects (%ND):100

Minimum:	1.000 ppb	Ln Minimum:	0.000
Maximum:	1.000 ppb	Ln Maximum:	0.000
Mean:	1.000 ppb	Ln Mean:	0.000
Std. Dev.:	0.000 ppb	Ln Std. Dev.:	0.000

Parametric Prediction Interval
Report Printed February 18,1999

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Facility:Haz. Waste Unit 39 - RAAP
Parameter:Nitrate(CAS Number:14797-55-8)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Shapiro-Wilk (W): 0.9647
Critical W, $\alpha=0.01$: 0.7490

Mean: 1188.750 ppb
Std Dev: 398.226 ppb
DF: 7
Conf. Level (1- α): ~~0.9500~~ 0.9900
Future Samples (k): 1
 $t \left[\begin{array}{c} 1 - \alpha \\ - \\ k \end{array} \right]$: 2.9980
Kappa: 3.1798

UL: 2455.033 ppb
LL: $-\infty$

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:39MW3

<u>Sample Date</u>	<u>Observation</u>
12/08/98	6560.000 ppb *

Well:39MW5

<u>Sample Date</u>	<u>Observation</u>
12/08/98	ND<100.000 ppb

Well:39MW6

<u>Sample Date</u>	<u>Observation</u>
12/08/98	ND<100.000 ppb

Parametric Prediction Interval
Report Printed February 18,1999

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Facility:Haz. Waste Unit 39 - RAAP
Parameter:Sodium(CAS Number:7440-23-5)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Shapiro-Wilk (W): 0.9094
Critical W, $\alpha=0.01$: 0.7490

Mean: 9155.000 ppb
Std Dev: 4871.884 ppb
DF: 7
Conf. Level (1- α): ~~0.9500~~ 0.9900
Future Samples (k): 1
 $t \left[\begin{array}{c} 1 - \alpha \\ - \\ k \end{array} \right]$: 2.9980
Kappa: 3.1798

UL: 24646.658 ppb
LL: $-\infty$

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:39MW3

<u>Sample Date</u>	<u>Observation</u>
12/08/98	27600.000 ppb *

Well:39MW5

<u>Sample Date</u>	<u>Observation</u>
12/08/98	9350.000 ppb

Well:39MW6

<u>Sample Date</u>	<u>Observation</u>
12/08/98	11500.000 ppb

Parametric Prediction Interval
Report Printed February 18,1999

Page 1

Facility:Haz. Waste Unit 39 - RAAP
Parameter:Specific Conductivity, Field(CAS Number:- -)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Shapiro-Wilk (W): 0.9485
Critical W, $\alpha=0.01$: 0.7490
Mean: 556.125 umhos/cm
Std Dev: 135.450 umhos/cm
DF: 7
Conf. Level (1- α): ~~0.9500~~ 0.9900
Future Samples (k): 1
 $t \left[\begin{array}{c} 1 - \alpha \\ k \end{array} \right]$: 2.9980
Kappa: 3.1798
UL: 986.830 umhos/cm
LL: $-\infty$

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:39MW3

<u>Sample Date</u>	<u>Observation</u>
12/08/98	983.000 umhos/cm

Well:39MW5

<u>Sample Date</u>	<u>Observation</u>
12/08/98	768.000 umhos/cm

Well:39MW6

<u>Sample Date</u>	<u>Observation</u>
12/08/98	813.000 umhos/cm

Parametric Prediction Interval
Report Printed February 18,1999

Page 1

Facility:Haz. Waste Unit 39 - RAAP
Parameter:pH, Field(CAS Number:- -)

TWO-TAILED PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Shapiro-Wilk (W): 0.8457
Critical W, $\alpha=0.01$: 0.7490

Mean: 6.688 SU
Std Dev: 0.290 SU
DF: 7
Conf. Level (1- α): ~~0.9500~~ 0.9900
Future Samples (k): 1
 $t \left[\frac{1 - \alpha}{2 \cdot k} \right]$: 3.4995
Kappa: 3.7118

UL: 7.764 SU
LL: 5.611 SU

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:39MW3

<u>Sample Date</u>	<u>Observation</u>
12/08/98	7.000 SU

Well:39MW5

<u>Sample Date</u>	<u>Observation</u>
12/08/98	6.900 SU

Well:39MW6

<u>Sample Date</u>	<u>Observation</u>
12/08/98	7.000 SU

Cohen's Adjustment of Background Data for HWMU39 (1998 Annual Report)

Cohen's adjustment is performed for all parameters with 25%-49 % non-detect data.
Parameter selenium fits into this category, with 37.5 % non-detect data.

Cohen's adjustment for Selenium data:

Percentage of non-detects = 37.5

Selenium data excluding non-detects fits normal distribution. Hence Cohen's adjustment of mean and standard deviation is appropriate.

Mean of background data excluding non-detects ($\bar{x}_d$) = 2.4 ug/l
Variance excluding non-detects (Sd^2) = 0.3

$$h = (n - m) / (n)$$

"n" is the Total number of background observations = 8
"m" is the Number of background observations excluding non-detects = 5

$$h = 0.375$$

$$g = (Sd^2 / (x_d - DL)^2)$$

DL is the Detection Limit = 1.00

$$g = 0.15$$

$\lambda(h, g)$ values from table 10.1, Statistical Methods for Groundwater Monitoring, Gibbons, R.D, 1994

$\lambda(0.375, 0.15)$ obtained by double linear interpolation based on values for $\lambda(0.3, 0.1)$, $\lambda(0.3, 0.2)$, $\lambda(0.4, 0.1)$, and $\lambda(0.4, 0.2) = 0.5851$

$$\text{Corrected sample mean } (X) = x_d - (\lambda(h, g) * (x_d - DL))$$
$$X = 1.5809$$

Corrected sample standard deviation (S) = $(Sd2 + \lambda(h,g)(xd-DL)2)0.5$
S = 1.2028

Upper Prediction Limit (UPL) for one-sided prediction interval for Selenium

$$UPL = X + t(n-1,(1-\alpha^*/k)) * S * (1 + (1/n))0.5$$

$t(n-1,(1-\alpha^*)/k)$ selected from Table 1.2, Gibbons, R.D., 1994, where

TABLE 1.2. Critical Values of the Student's t-Distribution for One-Sided Prediction Intervals
TABLE 1.2. Critical Values of the Student's t-Distribution for One-Sided Prediction Intervals
TABLE 1.2. Critical Values of the Student's t-Distribution for One-Sided Prediction Intervals

t* value selected is for n=4, k=5 which was the nearest available for n=4, k=3, which is = 4.54

One-side UPL for Selenium = 7.6863

Double Interpolation of Lamda

Actual Values	h, g Interpolate	Difference
h =	0.375	0.075
g =	0.15	0.05

$\lambda(0.3, 0.1)$	=	0.4233	λ	0.3 , 0.15)
$\lambda(0.3, 0.2)$	=	0.4422		0.43275
			0.0189	0.00945
$\lambda(0.4, 0.1)$	=	0.6234	λ	0.4 , 0.15)
$\lambda(0.4, 0.2)$	=	0.6483		0.63585
			0.0249	0.01245
				$\lambda(0.38 , 0.15)$
				0.5851

Nonparametric Prediction Interval
Report Printed February 18,1999

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Facility: Haz. Waste Unit 39 - RAAP
Parameter: 2,4-Dinitrotoluene (CAS Number: 121-14-2)

Non-

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Conf. Level (1- α): ~~88-89%~~ 93.000% $\pm$ 10.000%

UL: 0.140 ppb
LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well: 39MW3

<u>Sample Date</u>	<u>Observation</u>
12/08/98	ND<0.080 ppb

Well: 39MW5

<u>Sample Date</u>	<u>Observation</u>
12/08/98	ND<0.080 ppb

Well: 39MW6

<u>Sample Date</u>	<u>Observation</u>
12/08/98	ND<0.080 ppb

Nonparametric Prediction Interval

Report Printed February 18, 1999

Page 1

Facility: Haz. Waste Unit 39 - RAAP

Parameter: 2,6-Dinitrotoluene (CAS Number: 606-20-2)

ONE-TAILED UPPER ~~CONF-~~PARAMETRIC PREDICTION INTERVAL

Observations (n): 8

Conf. Level (1- α): ~~88.890%~~ 93.000% $\pm$ 10.000%

UL: 0.110 ppb

LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well: 39MW3

<u>Sample Date</u>	<u>Observation</u>
12/08/98	ND<0.080 ppb

Well: 39MW5

<u>Sample Date</u>	<u>Observation</u>
12/08/98	ND<0.080 ppb

Well: 39MW6

<u>Sample Date</u>	<u>Observation</u>
12/08/98	ND<0.080 ppb

Nonparametric Prediction Interval
Report Printed February 18,1999

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Facility:Haz. Waste Unit 39 - RAAP
Parameter:Alpha emission, total(CAS Number:12587-46-1)

ONE-TAILED UPPER ~~NON-~~PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Conf. Level (1- α): ~~88.890%~~ 93.000% $\pm$ 10.000%

UL: 7.900 pCi/l
LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:39MW3

<u>Sample Date</u>	<u>Observation</u>
12/08/98	ND<1.000 pCi/l

Well:39MW5

<u>Sample Date</u>	<u>Observation</u>
12/08/98	ND<1.000 pCi/l

Well:39MW6

<u>Sample Date</u>	<u>Observation</u>
12/08/98	ND<1.000 pCi/l

Nonparametric Prediction Interval
Report Printed February 18,1999

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Facility:Haz. Waste Unit 39 - RAAP
Parameter:Arsenic, total (CAS Number:7440-38-2)

ONE-TAILED UPPER ^{NOX-}PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Conf. Level (1- α): 88.890% 93.000% $\pm$ 10.000%

UL: 4.000 ppb
LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:39MW3

<u>Sample Date</u>	<u>Observation</u>
12/08/98	2.000 ppb

Well:39MW5

<u>Sample Date</u>	<u>Observation</u>
12/08/98	3.000 ppb

Well:39MW6

<u>Sample Date</u>	<u>Observation</u>
12/08/98	5.000 ppb *

Nonparametric Prediction Interval

Report Printed February 18, 1999

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Facility: Haz. Waste Unit 39 - RAAP
Parameter: Barium, total (CAS Number: 7440-39-3)

ONE-TAILED UPPER ~~NON~~PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Conf. Level (1- α): ~~88.890%~~ 93.000% $\pm$ 10.000%

UL: 175.000 ppb

LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well: 39MW3

<u>Sample Date</u>	<u>Observation</u>
12/08/98	112.000 ppb

Well: 39MW5

<u>Sample Date</u>	<u>Observation</u>
12/08/98	719.000 ppb *

Well: 39MW6

<u>Sample Date</u>	<u>Observation</u>
12/08/98	409.000 ppb *

Nonparametric Prediction Interval
Report Printed February 18,1999

Page 1

Facility:Haz. Waste Unit 39 - RAAP
Parameter:Beryllium, total (CAS Number:7440-41-7)

ONE-TAILED UPPER ~~Non-~~PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Conf. Level (1- α): ~~88.890%~~ 93.000% $\pm$ 10.000%

UL: 0.400 ppb
LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:39MW3

<u>Sample Date</u>	<u>Observation</u>
12/08/98	ND<0.200 ppb

Well:39MW5

<u>Sample Date</u>	<u>Observation</u>
12/08/98	1.700 ppb *

Well:39MW6

<u>Sample Date</u>	<u>Observation</u>
12/08/98	ND<0.200 ppb

Nonparametric Prediction Interval
Report Printed February 18,1999

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Facility: Haz. Waste Unit 39 - RAAP
Parameter: Beta emission, total (CAS Number: 12587-47-2)

ONE-TAILED UPPER ~~NON~~PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Conf. Level (1- α): ~~88.890%~~ 93.000% $\pm$ 10.000%

UL: 54.000 pCi/l
LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well: 39MW3

<u>Sample Date</u>	<u>Observation</u>
12/08/98	ND<1.000 pCi/l

Well: 39MW5

<u>Sample Date</u>	<u>Observation</u>
12/08/98	ND<1.000 pCi/l

Well: 39MW6

<u>Sample Date</u>	<u>Observation</u>
12/08/98	ND<1.000 pCi/l

Nonparametric Prediction Interval
Report Printed February 18,1999

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Facility: Haz. Waste Unit 39 - RAAP
Parameter: Cadmium, total (CAS Number: 7440-43-9)

ONE-TAILED UPPER ^{NOI}PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Conf. Level (1- α): ~~88.890%~~ 93.000% ~~10.000%~~

UL: 0.200 ppb
LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well: 39MW3

<u>Sample Date</u>	<u>Observation</u>
12/08/98	ND<0.100 ppb

Well: 39MW5

<u>Sample Date</u>	<u>Observation</u>
12/08/98	0.600 ppb *

Well: 39MW6

<u>Sample Date</u>	<u>Observation</u>
12/08/98	0.200 ppb

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Facility:Haz. Waste Unit 39 - RAAP
Parameter:Chloride(CAS Number:16887-00-6)

ONE-TAILED UPPER ^{NON-}PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Conf. Level (1- α): ~~88.890%~~ 93.000% $\pm$ 10.000%

UL: 5700.000 ppb
LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:39MW3

<u>Sample Date</u>	<u>Observation</u>
12/08/98	8100.000 ppb *

Well:39MW5

<u>Sample Date</u>	<u>Observation</u>
12/08/98	6700.000 ppb *

Well:39MW6

<u>Sample Date</u>	<u>Observation</u>
12/08/98	11900.000 ppb *

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Facility:Haz. Waste Unit 39 - RAAP
Parameter:Coliform, total(CAS Number:- -)

ONE-TAILED UPPER ^{NON-}PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Conf. Level (1- α): ~~88.890%~~ 93.000% $\pm$ 10.000%

UL: 30.000 MPN/ml
LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:39MW3

<u>Sample Date</u>	<u>Observation</u>
12/08/98	ND<2.000 MPN/ml

Well:39MW5

<u>Sample Date</u>	<u>Observation</u>
12/08/98	ND<2.000 MPN/ml

Well:39MW6

<u>Sample Date</u>	<u>Observation</u>
12/08/98	ND<2.000 MPN/ml

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Facility: Haz. Waste Unit 39 - RAAP
Parameter: Chromium, total (CAS Number: 7440-47-3)

ONE-TAILED UPPER ^{50%}PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Conf. Level (1- α): ~~88.890%~~ 93.000% $\pm$ 10.000%

UL: 71.000 ppb

LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well: 39MW3

<u>Sample Date</u>	<u>Observation</u>
12/08/98	9.000 ppb

Well: 39MW5

<u>Sample Date</u>	<u>Observation</u>
12/08/98	42.000 ppb

Well: 39MW6

<u>Sample Date</u>	<u>Observation</u>
12/08/98	7.000 ppb

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Facility:Haz. Waste Unit 39 - RAAP
Parameter:Iron, total(CAS Number:7439-89-6)

ONE-TAILED UPPER ~~NON-~~PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Conf. Level (1- α): ~~88.890%~~ 93.000% $\pm$ 10.000%

UL: 13800.000 ppb
LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:39MW3

<u>Sample Date</u>	<u>Observation</u>
12/08/98	4320.000 ppb

Well:39MW5

<u>Sample Date</u>	<u>Observation</u>
12/08/98	153000.000 ppb *

Well:39MW6

<u>Sample Date</u>	<u>Observation</u>
12/08/98	4210.000 ppb

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Facility: Haz. Waste Unit 39 - RAAP
Parameter: Fluoride (CAS Number: 16984-48-8)

ONE-TAILED UPPER ~~NON~~PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Conf. Level (1- α): ~~88.890%~~ 93.000% $\pm$ 10.000%

UL: 350.000 ppb
LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well: 39MW3

<u>Sample Date</u>	<u>Observation</u>
12/08/98	ND<100.000 ppb

Well: 39MW5

<u>Sample Date</u>	<u>Observation</u>
12/08/98	740.000 ppb *

Well: 39MW6

<u>Sample Date</u>	<u>Observation</u>
12/08/98	530.000 ppb *

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Facility:Haz. Waste Unit 39 - RAAP
Parameter:Manganese, total (CAS Number:7439-96-5)

ONE-TAILED UPPER ^{NON-}PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Conf. Level (1- α): ~~88.890%~~ 93.000% $\pm$ 10.000%

UL: 631.000 ppb
LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:39MW3

<u>Sample Date</u>	<u>Observation</u>
12/08/98	134.000 ppb

Well:39MW5

<u>Sample Date</u>	<u>Observation</u>
12/08/98	1920.000 ppb *

Well:39MW6

<u>Sample Date</u>	<u>Observation</u>
12/08/98	239.000 ppb

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Facility:Haz. Waste Unit 39 - RAAP
Parameter:Nickel, total(CAS Number:7440-02-0)

ONE-TAILED UPPER ^{NON-}PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Conf. Level (1- α): ~~88.890%~~ 93.000% $\pm$ 10.000%

UL: 44.000 ppb
LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:39MW3

<u>Sample Date</u>	<u>Observation</u>
12/08/98	37.000 ppb

Well:39MW5

<u>Sample Date</u>	<u>Observation</u>
12/08/98	127.000 ppb *

Well:39MW6

<u>Sample Date</u>	<u>Observation</u>
12/08/98	51.000 ppb *

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Facility:Haz. Waste Unit 39 - RAAP
Parameter:Lead, total (CAS Number:7439-92-1)

ONE-TAILED UPPER ^{Box-Cox}PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Conf. Level (1- α): ~~88.890%~~ 93.000% $\pm$ 10.000%

UL: 24.000 ppb
LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:39MW3

<u>Sample Date</u>	<u>Observation</u>
12/08/98	3.000 ppb

Well:39MW5

<u>Sample Date</u>	<u>Observation</u>
12/08/98	104.000 ppb *

Well:39MW6

<u>Sample Date</u>	<u>Observation</u>
12/08/98	2.000 ppb

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Facility: Haz. Waste Unit 39 - RAAP
Parameter: Radium, total (CAS Number: 7400-14-4)

ONE-TAILED UPPER ^{NON-}PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Conf. Level (1- α): ~~88.890%~~ 93.000% $\pm$ 10.000%

UL: 1.900 pCi/l
LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well: 39MW3

<u>Sample Date</u>	<u>Observation</u>
12/08/98	ND < 1.000 pCi/l

Well: 39MW5

<u>Sample Date</u>	<u>Observation</u>
12/08/98	ND < 1.000 pCi/l

Well: 39MW6

<u>Sample Date</u>	<u>Observation</u>
12/08/98	ND < 1.000 pCi/l

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Facility: Haz. Waste Unit 39 - RAAP

Parameter: Sulfate, total (CAS Number: 14808-79-8)

~~CONF-~~

ONE-TAILED UPPER ~~PARAMETRIC~~ PREDICTION INTERVAL

Observations (n): 8

Conf. Level (1- α): ~~88.890%~~ 93.000% $\pm$ 10.000%

UL: 100000.000 ppb

LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well: 39MW3

<u>Sample Date</u>	<u>Observation</u>
12/08/98	138000.000 ppb *

Well: 39MW5

<u>Sample Date</u>	<u>Observation</u>
12/08/98	45500.000 ppb

Well: 39MW6

<u>Sample Date</u>	<u>Observation</u>
12/08/98	23400.000 ppb

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Facility:Haz. Waste Unit 39 - RAAP
Parameter:Total Organic Carbon(CAS Number:- -)

ONE-TAILED UPPER ^{NOX-}PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Conf. Level (1- α): ~~88.890%~~ 93.000% $\pm$ 10.000%

UL: 1475.000 ppb

LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well:39MW3

<u>Sample Date</u>	<u>Observation</u>
12/08/98	ND<1000.000 ppb

Well:39MW5

<u>Sample Date</u>	<u>Observation</u>
12/08/98	1250.000 ppb

Well:39MW6

<u>Sample Date</u>	<u>Observation</u>
12/08/98	3650.000 ppb *

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Facility: Haz. Waste Unit 39 - RAAP

Parameter: Total Organic Halogens, Halides (CAS Number: - -)

ONE-TAILED UPPER ^{NON-}PARAMETRIC PREDICTION INTERVAL

Observations (n): 8
Conf. Level (1- α): ~~88.890%~~ 93.000% $\pm$ 10.000%

UL: 23.000 ppb

LL: 0.000

BACKGROUND TO COMPLIANCE WELL COMPARISON

Well: 39MW3

<u>Sample Date</u>	<u>Observation</u>
12/08/98	ND<5.000 ppb

Well: 39MW5

<u>Sample Date</u>	<u>Observation</u>
12/08/98	ND<5.000 ppb

Well: 39MW6

<u>Sample Date</u>	<u>Observation</u>
12/08/98	ND<5.000 ppb
