

Appendices for SWMU

31 RFI Report

Final

April 2007

Appendix A

Lithologic Boring Logs, Water
Quality Parameters, and
Groundwater Contour Maps

CONTRACTOR: <u>CT & E</u>		PARSONS ENGINEERING-SCIENCE, INC. DRILLING RECORD		BORING NO.: <u>31MW1</u>	
GEOLOGIST: <u>BACHOVCHIN/GLENNIE</u>				LOCATION: <u>SWMU 31</u> <u>UPGRADIENT OF LAGOONS</u>	
DRILLING METHOD: <u>HSA</u>				WEATHER: <u>COLD, 35° F</u>	
DTW FROM TOC: <u>42 FT (FROM SURFACE)</u>				DATE/TIME START: <u>12/15/94 1500</u>	
DATE/TIME: <u>12/16/94 1600</u>		PROJECT NAME: <u>RAAP</u>		DATE/TIME FINISH: <u>12/16/94 1630</u>	
		CLIENT: <u>US AEC</u>			
		PROJECT NO.: <u>722843</u>			

DEPTH (FT)	SAMPLE ID	RECOVERY %	BLOW COUNT	PID (ppm)	READING AT	SAMPLE TYPE	USCS	LITHOLOGY/REMARKS	LITHOLOGIC COLUMN	WELL COMPLETION	DEPTH (FT)
1								SILT AND CLAY, DARK BROWN		TOC 1715.04' 1.6' STICK UP 	1
2											2
3											3
4											4
5											5
6	1	50	5.5	0.0	HS	SS	ML				6
7			5.5			5'-7'					7
8											8
9											9
10											10
11											11
12											12
13											13
14											14
15											15
16											16
17											SAND, SOME SILT, PINK-ORANGE, GRAVEL
18	2	50	7,	7.9	SS	SS	SM	18			
19			100/5			17'-19'		19			
20	3	25	100/6	4.3	SS	SS		AUGER REFUSAL DUE TO GRAVEL, SWITCHED TO AIR ROTARY DRILLING AT 20 FEET		GROUT TO SURFACE 	20
21											21
22											22
23											23
24											24
25											25
26	*						GM/SM				26
27											27
28											28
29											29
30								SAND AND GRAVEL, SOME SILT, LIGHT GRAY CUTTINGS		GROUT TO SURFACE 	30

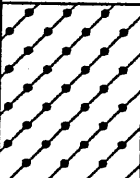
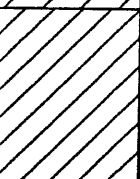
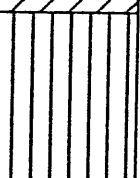
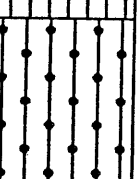
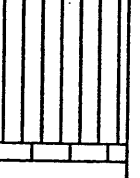
HSA = HOLLOW STEM AUGER CAL = CALIBRATION USCS = UNIFIED SOIL CLASS. SYS.	SS = SPLIT SPOON A = AUGER CUTTINGS * = LAB SAMPLE	BH = BORE HOLE GS = GRAB SAMPLE ∇ = WATER LEVEL	COMMENTS: 4 INCH ID PVC, SCH 40 0.01 INCH SLOT SCREEN
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CONTRACTOR: <u>CT & E</u> GEOLOGIST: <u>BACHOVCHIN/GLENNIE</u> DRILLING METHOD: <u>HSA</u> DTW FROM TOC: <u>42 FT (FROM SURFACE)</u> DATE/TIME: <u>12/16/94 1600</u>	PARSONS ENGINEERING-SCIENCE, INC. DRILLING RECORD	BORING NO: <u>31MW1</u> LOCATION: <u>SMMU 31</u> <u>UPGRADIENT OF LAGOONS</u> WEATHER: <u>COLD, 35° F</u> DATE/TIME START: <u>12/15/94 1500</u> DATE/TIME FINISH: <u>12/16/94 1630</u>
PROJECT NAME: <u>RAAP</u> CLIENT: <u>US AEC</u> PROJECT NO.: <u>722843</u>		

DEPTH (FT)	SAMPLE ID	RECOVERY %	BLOW COUNT	PID (ppm)	READING AT	SAMPLE TYPE	USCS	LITHOLOGY/REMARKS	LITHOLOGIC COLUMN	WELL COMPLETION	DEPTH (FT)
31								SAND, BECOMING WEATHERED, CUTTINGS CHANGE COLOR TO GREEN-BROWN AT 35 FEET			31
32											32
33											33
34											34
35											35
36	*					GM/SM					36
37											37
38										38	
39										39	
40								LIMESTONE, GRAY, WEATHERED			40
41											41
42											42
43											43
44											44
45						LMSN	WET AT 45 FEET				45
46											46
47										47	
48								DRILLING RATE (1 FOOT/2 MINUTES)			48
49											49
50								END OF BORING AT 50 FEET			50
51											51
52											52
53											53
54											54
55											55
56											56
57											57
58											58
59											59
60											60

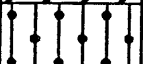
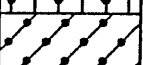
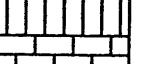
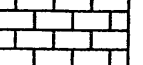
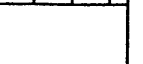
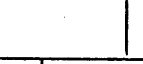
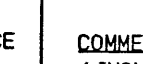
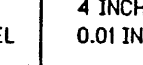
HSA = HOLLOW STEM AUGER CAL = CALIBRATION USCS = UNIFIED SOIL CLASS. SYS.	SS = SPLIT SPOON A = AUGER CUTTINGS * = LAB SAMPLE	BH = BORE HOLE GS = GRAB SAMPLE ▽ = WATER LEVEL	COMMENTS: 4 INCH ID PVC, SCH 40 0.01 INCH SLOT SCREEN
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CONTRACTOR: CT & E	PARSONS ENGINEERING-SCIENCE, INC. DRILLING RECORD	BORING NO: 31MW2
GEOLOGIST: BACHOVCHIN/GLENNIE		LOCATION: SWMU 31 NEAR EAST LAGOON
DRILLING METHOD: HSA		WEATHER: SHOWERS, 35° F
DTW FROM TOC: 25 FT	PROJECT NAME: RAAP	DATE/TIME START: 12/14/94 0920
DATE/TIME: 12/14/94 1530	CLIENT: US AEC	DATE/TIME FINISH: 12/14/94 1100
	PROJECT NO.: 722843	

DEPTH (FT)	SAMPLE ID	RECOVERY %	BLOW COUNT	PID (ppm)	READING AT	SAMPLE TYPE	USCS	LITHOLOGY/REMARKS	LITHOLOGIC COLUMN	WELL COMPLETION	DEPTH (FT)
1							SM	SAND AND SILT, DARK BROWN		TOC 1699.05' 1.5' STICK UP ↑ GROUT TO SURFACE ↓ BENTONITE SEAL TOP OF SAND PACK AT 16.5', SCREEN FROM 18.5' TO 28.5'	1
2											2
3											3
4											4
5											5
6	1	70	3,3 6,7	1.9	HS	SS 5'-7'	CL	CLAY, SOME SILT, BROWN			6
7											7
8											8
9											9
10											10
11	2*	90	5,7 6,9	4.4	HS	SS 10'-12'	ML	SILT, SOME SAND, LITTLE CLAY, BROWN-GRAY			11
12											12
13											13
14											14
15											15
16	3	25	12,11 10,9	2.8	HS	SS 15'-17'	GM/SM	SAND AND SILT, DARK BROWN, LIMESTONE PEBBLES			16
17											17
18											18
19											19
20											20
21	4*	10	6,4 4,2	2.8	HS	SS 20'-22'		SILT, SOME CLAY, DARK BROWN-GRAY			21
22											22
23											23
24							ML				24
25								WET AT 25 FEET			25
26	5	10	6,13 11,10	5.0	HS	SS 25'-27'					26
27											27
28											28
29							LM/SN	LIMESTONE, GRAY, WEATHERED			29
30								END OF BORING AT 28.5 FEET			30
31											31
32											32
33											33
34											34
35											35

HSA = HOLLOW STEM AUGER CAL = CALIBRATION USCS = UNIFIED SOIL CLASS. SYS.	SS = SPLIT SPOON A = AUGER CUTTINGS * = LAB SAMPLE	BH = BORE HOLE GS = GRAB SAMPLE HS = HEADSPACE ∇ = WATER LEVEL	COMMENTS: 4 INCH ID PVC, SCH 40 0.01 INCH SLOT SCREEN
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CONTRACTOR: CT & E	PARSONS ENGINEERING-SCIENCE, INC. DRILLING RECORD	BORING NO: 31MW3
GEOLOGIST: BACHOVCHIN/GLENNIE		LOCATION: SWMU 31 MIDDLE LAGOON
DRILLING METHOD: HSA		WEATHER: SHOWERS, 35° F
DTW FROM TOC: 23.18 FT	PROJECT NAME: RAAP	DATE/TIME START: 12/14/94 1330
DATE/TIME: 12/15/94 0820	CLIENT: US AEC	DATE/TIME FINISH: 12/14/94 1700
	PROJECT NO.: 722843	

DEPTH (FT)	SAMPLE ID	RECOVERY %	BLOW COUNT	PID (ppm)	READING AT	SAMPLE TYPE	USCS	LITHOLOGY/REMARKS	LITHOLOGIC COLUMN	WELL COMPLETION	DEPTH (FT)
1								SILT, SOME SAND, LITTLE CLAY, MICACEOUS, DARK BROWN		TOC 1698.8' 1.6' STICK UP ↑ GROUT TO SURFACE ↓ BENTONITE SEAL ↓ TOP OF SAND PACK AT 18.6', SCREEN FROM 20.6' TO 30.6' ↓	1
2							SM				2
3	1	90	NA	8.1	HS	MOSS SPOON	GM	SILT, GRAVEL, GRAY			3
4											4
5								SAND AND SILT, BROWN, MICACEOUS, GRAVEL			5
6											6
7											7
8	2*	50	NA	4.1	HS	MOSS SPOON	GM/SM	STAINING AT 9-10 FEET			8
9											9
10											10
11								SILT, SOME SAND, LITTLE CLAY, BROWN, MICACEOUS, GRAVEL, LIMESTONE PEBBLES			11
12	3	50	NA	9.5	HS	MOSS SPOON	GM/ML				12
13											13
14											14
15											15
16											16
17	4*	5	NA	11.1	HS	MOSS SPOON					17
18											18
19											19
20											20
21											21
22											22
23											23
24											24
25											25
26	5	65	10,11 20,27	12.3	HS	SS 25'-27'	ML	SILT, SOME CLAY, BROWN, WET			26
27											27
28	6	5	100/2				LM/SN	LIMESTONE, GRAY, WEATHERED			28
29											29
30											30
31								END OF BORING AT 30.6 FEET			31
32											32
33											33
34											34
35											35

HSA = HOLLOW STEM AUGER
 CAL = CALIBRATION
 USCS = UNIFIED SOIL CLASS. SYS.

SS = SPLIT SPOON BH = BORE HOLE HS = HEADSPACE
 A = AUGER CUTTINGS GS = GRAB SAMPLE
 * = LAB SAMPLE ∇ = WATER LEVEL

COMMENTS:
 4 INCH ID PVC, SCH 40
 0.01 INCH SLOT SCREEN

CONTRACTOR: CT & E	PARSONS ENGINEERING-SCIENCE, INC. DRILLING RECORD	BORING NO: 31MW4
GEOLOGIST: BACHOVCHIN/GLENNIE		LOCATION: SWMU 31 WEST LAGOON
DRILLING METHOD: HSA/AIR ROTARY		WEATHER: SHOWERS, 40' F
DTW FROM TOC: 23.8 FT	PROJECT NAME: RAAP	DATE/TIME START: 12/15/94 0840
DATE/TIME: 12/15/94 1320	CLIENT: US AEC	DATE/TIME FINISH: 12/15/94 1200
	PROJECT NO.: 722843	

DEPTH (FT)	SAMPLE ID	RECOVERY %	BLOW COUNT	PTD (ppm)	READING AT	SAMPLE TYPE	USCS	LITHOLOGY/REMARKS	LITHOLOGIC COLUMN	WELL COMPLETION	DEPTH (FT)
1								SILT, SOME CLAY, LITTLE SAND, DARK BROWN			1
2											2
3							ML				3
4											4
5											5
6	1	80	5,8	0.8	HS	SS					6
7			7,7			5'-7'					7
8								SILT AND CLAY, BROWN, MUCH GRAVEL			8
9											9
10											10
11	2*	75	37,8	1.8	HS	SS	GM/ML				11
12			8,7			10'-12'					12
13											13
14											14
15											15
16	3	80	11,5	1.9	HS	SS					16
17			6,5			15'-17'					17
18											18
19											19
20											20
21	4*	5	11,10	3.3	HS	SS					21
22			28,34			20'-22'					22
23							GM	GRAVEL, SOME SILT, GRAY			23
24								AUGER REFUSAL AT 25 FEET, SWITCHED TO AIR ROTARY			24
25											25
26	5	5	100/5	0.0	SS	SS	LMSN	WET AT 25 FEET			26
27						25'-27'		LIMESTONE, GRAY, WEATHERED			27
28											28
29											29
30											30
31								END OF BORING AT 30 FEET			31
32											32
33											33
34											34
35											35

HSA = HOLLOW STEM AUGER CAL = CALIBRATION USCS = UNIFIED SOIL CLASS. SYS.	SS = SPLIT SPOON A = AUGER CUTTINGS * = LAB SAMPLE	BH = BORE HOLE GS = GRAB SAMPLE ∇ = WATER LEVEL	COMMENTS: 4 INCH ID PVC, SCH 40 0.01 INCH SLOT SCREEN
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FIELD DATA FORM

Page 1 of 1

Project Name:	COAL ASH SETTLING LAGOON SEDIMENT SAMPLING	Proj. #:	18284.001
Site Name:	RADFORD ARMY AMMUNITION PLANT	Task #:	
City:	RADFORD	State:	VA
		Zip:	24141
		Date:	7/9/02

Field Team Leader: UNK

Field Team Safety Coordinator: UNK

Field Crew: DSB, CDD

Arrival/Departure Times: 1335 - 1419

Station ID #: 3ISE7

Weather: Clear Cloudy Rain Other

Photos: Y N Roll No./Exposure No.: _____

Wind Conditions (Speed/Direction): 0 78-92°F

FIELD DATA

Water Depth: 4.0 ft. Tide: Ebb Flood Low Slack High Slack Other LAGOON
PID: --- ppm Redox Potential: --- mV pH: --- units Temp.: --- °C

SAMPLE #1

Sample ID#: _____

Sample Time: _____ hrs.

PD: 40" ft. * CR: 36" ft. *

Sample Collection Method: Ponar Vibracore Auger

QA/QC Samples: NA Field Dup. ID# _____

Total # Bottles Filled: _____

MS/MSD ID# _____ E/B ID# _____

Sampling Equipment Deconned or Replaced: Y N

Sample Preservation: Ice NO₃ H₂SO₄ N/A

SAMPLE #2

Sample ID#: _____

Sample Time: _____ hrs.

PD: _____ ft. * CR: _____ ft. *

Sample Collection Method: Ponar Vibracore Auger

QA/QC Samples: NA Field Dup. ID# _____

Total # Bottles Filled: _____

MS/MSD ID# _____ E/B ID# _____

Sampling Equipment Deconned or Replaced: Y N

Sample Preservation: Ice NO₃ H₂SO₄ N/A

DGPS DATA

Operator: N/A

QA Date: N/A

File Name: _____

GPS Serial #: _____

Northing: _____ ft.

Datum: Y N Other _____

Easting: _____ ft.

Proj.: Y N Other _____

PDOP: _____

Coordinate Units: US Survey Feet Y N Other _____

COMMENTS / NOTES

2-TRIES - 2' REC.
MOVED 6'-N - 1'-TRY ~ 3'6" CR

Preparer's Initial: UNK

* PD-Penetration Depth/CR-Core Recovery

SEE ATTACHMENT 1
LOW DIAGRAM



FIELD DATA FORM

Page 1 of 1

Project Name: COAL ASH SETTLING LAGOON SEDIMENT SAMPLING			Proj. #: 18284.001
Site Name: RADFORD ARMY AMMUNITION PLANT			Task #: -
City: RADFORD	State: VA	Zip: 24141	Date: 7/9/02

Field Team Leader: RMK Field Team Safety Coordinator: RMK
Field Crew: CD, DJB Arrival/Departure Times: 1430-1615
Station ID #: 31 SE 8 Weather: Clear Cloudy Rain Other 78-92°F
Photos: Y N Roll No./Exposure No.: Wind Conditions (Speed/Direction): 0

FIELD DATA

Water Depth: 3.5' ft. Tide: Ebb Flood Low Slack High Slack Other LAGOON
PID: ppm Redox Potential: mV pH: units Temp.: °C

SAMPLE #1

Sample ID#: ~~31 SE 8~~ Sample Time: hrs.
PD: 0.5 ft. * CR: 0.5 ft. *
Sample Collection Method: Ponar ~~Vibracore~~ Auger QA/QC Samples: NA Field Dup. ID#
Total # Bottles Filled: MS/MSD ID# E/B ID#
Sampling Equipment Deconned or Replaced: Y N Sample Preservation: Ice NO₃ H₂SO₄ N/A

SAMPLE #2

Sample ID#: Sample Time: hrs.
PD: ft. * CR: ft. *
Sample Collection Method: Ponar Vibracore Auger QA/QC Samples: NA Field Dup. ID#
Total # Bottles Filled: MS/MSD ID# E/B ID#
Sampling Equipment Deconned or Replaced: Y N Sample Preservation: Ice NO₃ H₂SO₄ N/A

DGPS DATA

Operator: N/A QA Date: N/A
File Name: GPS Serial #: X
Northing: ft. Datum: Y N Other
Easting: ft. Proj.: Y N Other
PDOP: Coordinate Units: US Survey Feet Y N Other

COMMENTS / NOTES

USED 2" S/S SPLITSPIN HAND AUGER
COLLECTED 0"-6" SURFACE SEDIMENT
SAMPLE - ~ 12 CORES REQUIRED TO
OBTAIN VOL. REQUIREMENT.

SEE ATTACHMENT 1
of ~~12~~ 50W ~~DIAGRAM~~

* PD-Penetration Depth/CR-Core Recovery

Preparer's Initial: RMK



FIELD DATA FORM

Page 1 of 1

Project Name:	COAL ASH SETTLING LAGOON SEDIMENT SAMPLING	Proj. #:	18284.001
Site Name:	RADFORD ARMY AMMUNITION PLANT	Task #:	
City:	RADFORD	State:	VA
		Zip:	24141
		Date:	7/9/02

Field Team Leader: RMC

Field Team Safety Coordinator: RMC

Field Crew: CDD, DJB

Arrival/Departure Times: 0930 - 1130 78-92°F

Station ID #: 31SEQ

Weather: Clear Cloudy Rain Other

Photos: Y N Roll No./Exposure No.: _____

Wind Conditions (Speed/Direction): 0-2 mph - W

FIELD DATA

Water Depth: 4.7 ft. Tide: Ebb Flood Low Slack High Slack Other LAGOON
PID: N/A ppm Redox Potential: N/A mV pH: N/A units Temp.: N/A °C

SAMPLE #1

Sample ID#: _____

Sample Time: _____ hrs.

PD: 3'8" ft. * CR: 3.8 ft. *

Sample Collection Method: Ponar Vibracore Auger

QA/QC Samples: NA Field Dup. ID# _____

Total # Bottles Filled: _____

MS/MSD ID# _____ E/B ID# _____

Sampling Equipment Deconned or Replaced: (Y) N

Sample Preservation: Ice NO₃ H₂SO₄ N/A

SAMPLE #2

Sample ID#: _____

Sample Time: _____ hrs.

PD: _____ ft. * CR: _____ ft. *

Sample Collection Method: Ponar Vibracore Auger

QA/QC Samples: NA Field Dup. ID# _____

Total # Bottles Filled: _____

MS/MSD ID# _____ E/B ID# _____

Sampling Equipment Deconned or Replaced: Y N

Sample Preservation: Ice NO₃ H₂SO₄ N/A

DGPS DATA

Operator: N/A

QA Date: N/A

File Name: _____

GPS Serial #: _____

Northing: _____ ft.

Datum: Y N Other _____

Easting: _____ ft.

Proj.: Y N Other _____

PDOP: _____

Coordinate Units: US Survey Feet Y N Other _____

COMMENTS / NOTES

4-TRIES

2- WATER TOO DEEP

1- PIPE BROKE

4th try - RECOVERED 3.8'

* PD-Penetration Depth/CR-Core Recovery

Preparer's Initial: RMC

SEE ATTACHMENT I
of SOLW



FIELD DATA FORM

Page 1 of 2

Project Name:	COAL ASH SETTLING LAGOON SEDIMENT SAMPLING	Proj. #:	18284.001
Site Name:	RADFORD ARMY AMMUNITION PLANT	Task #:	—
City:	RADFORD	State:	VA
		Zip:	24141
		Date:	7/9/02

Field Team Leader: RMK

Field Team Safety Coordinator: RMK

Field Crew: CDP, DSB

Arrival/Departure Times: 1301-1305

Station ID #: 31SE10(Dup)

Weather: Clear Cloudy Rain: 70-92°F Other: —

Photos: Y N Roll No./Exposure No.: —

Wind Conditions (Speed/Direction): 0-5 mph

FIELD DATA

Water Depth: 3.0 ft. Tide: Ebb Flood Low Slack High Slack Other LAGOON
PID: — ppm Redox Potential: — mV pH: — units Temp.: — °C

SAMPLE #1

Sample ID#: —

Sample Time: — hrs.

PD: 6'0" ft. * CR: 4'2" ft. *

Sample Collection Method: Ponar Vibracore Auger

QA/QC Samples: NA Field Dup. ID# —

Total # Bottles Filled: —

MS/MSD ID# — E/B ID# —

Sampling Equipment Deconned or Replaced: Y N

Sample Preservation: Ice NO₃ H₂SO₄ N/A

SAMPLE #2

Sample ID#: —

Sample Time: — hrs.

PD: — ft. * CR: — ft. *

Sample Collection Method: Ponar Vibracore Auger

QA/QC Samples: NA Field Dup. ID# —

Total # Bottles Filled: —

MS/MSD ID# — E/B ID# —

Sampling Equipment Deconned or Replaced: Y N

Sample Preservation: Ice NO₃ H₂SO₄ N/A

DGPS DATA

Operator: N/A

QA Date: N/A

File Name: —

GPS Serial #: —

Northing: — ft.

Datum: X N Other —

Easting: — ft.

Proj.: Y N Other —

PDOP: —

Coordinate Units: US Survey Feet Y N Other —

COMMENTS / NOTES

only 1 try

SEE ATTACHMENT 1
SOW DIAGRAM

* PD-Penetration Depth/CR-Core Recovery

Preparer's Initial: RMK



FIELD DATA FORM

Page 2 of 2

Project Name:	COAL ASH SETTLING LAGOON SEDIMENT SAMPLING	Proj. #:	18284.001
Site Name:	RADFORD ARMY AMMUNITION PLANT	Task #:	<u> </u>
City:	RADFORD	State:	VA
		Zip:	24141
		Date:	7/9/02

Field Team Leader:	<u>RW</u>	Field Team Safety Coordinator:	<u>RW</u>
Field Crew:	<u>CAN DJB</u>	Arrival/Departure Times:	<u>1225-1230</u>
Station ID #:	<u>315E10</u>	Weather:	Clear ☒ Cloudy ☐ Rain <u>78-92°F</u> Other <u> </u>
Photos:	Y ☐ N ☐	Roll No./Exposure No.:	<u> </u>
		Wind Conditions (Speed/Direction):	<u>N/A</u>

FIELD DATA

Water Depth:	<u>2'9"</u> ft.	Tide:	<u>Ebb</u>	Flood	☐	Low Slack	☐	High Slack	☐	Other	<u>LAGOON</u>
PID:	<u> </u> ppm	Redox Potential:	<u> </u> mV	pH:	<u> </u> units	Temp.:	<u> </u> °C				

SAMPLE #1

Sample ID#:	<u> </u>	Sample Time:	<u> </u> hrs.
		PD:	<u>7'3"</u> ft. *
		CR:	<u>5'4"</u> ft. *
Sample Collection Method:	Ponar <u>Vibracore</u> Auger	QA/QC Samples:	NA
		Field Dup. ID#	<u> </u>
Total # Bottles Filled:	<u> </u>	MS/MSD ID#	<u> </u>
		E/B ID#	<u> </u>
Sampling Equipment Deconned or Replaced:	<u>Y</u> N ☐	Sample Preservation:	Ice ☐ NO ₃ ☐ H ₂ SO ₄ ☐ N/A ☐

SAMPLE #2

Sample ID#:	<u> </u>	Sample Time:	<u> </u> hrs.
		PD:	<u> </u> ft. *
		CR:	<u> </u> ft. *
Sample Collection Method:	Ponar Vibracore Auger	QA/QC Samples:	NA
		Field Dup. ID#	<u> </u>
Total # Bottles Filled:	<u> </u>	MS/MSD ID#	<u> </u>
		E/B ID#	<u> </u>
Sampling Equipment Deconned or Replaced:	Y ☐ N ☐	Sample Preservation:	Ice ☐ NO ₃ ☐ H ₂ SO ₄ ☐ N/A ☐

DGPS DATA

Operator:	<u>N/A</u>	QA Date:	<u>N/A</u>
File Name:	<u> </u>	GPS Serial #:	<u> </u>
Northing:	<u> </u> ft.	Datum:	<u>Y</u> ☐ N ☐ Other <u> </u>
Easting:	<u> </u> ft.	Proj.:	<u>Y</u> ☐ N ☐ Other <u> </u>
PDOP:	<u> </u>	Coordinate Units:	US Survey Feet <u>Y</u> ☐ N ☐ Other <u> </u>

COMMENTS / NOTES

only 1 try

SEE ATTACHMENT 1 of ~~500~~

DIAGRAM of SOW

* PD-Penetration Depth/CR-Core Recovery

Preparer's Initial: RW



FIELD DATA FORM

Page 1 of 1

Project Name: COAL ASH SETTLING LAGOON SEDIMENT SAMPLING			Proj. #: 18284.001
Site Name: RADFORD ARMY AMMUNITION PLANT			Task #: —
City: RADFORD	State: VA	Zip: 24141	Date: 7/10/02

Field Team Leader: <u>RMK</u>	Field Team Safety Coordinator: <u>RMK</u>
Field Crew: <u>CDP, DJB</u>	Arrival/Departure Times: <u>0840-1020</u>
Station ID #: <u>315E11</u>	Weather: Clear <u>Cloudy</u> Rain <u>78-85°F</u> Other <u>—</u>
Photos: Y N Roll No./Exposure No.: <u>—</u>	Wind Conditions (Speed/Direction): <u>0</u>

FIELD DATA

Water Depth: <u>4'8"-4'4"</u> ft.	Tide: Ebb Flood Low Slack High Slack Other <u>LAGOON (2)</u>
PID: <u>—</u> ppm	Redox Potential: <u>—</u> mV pH: <u>—</u> units Temp.: <u>—</u> °C

SAMPLE #1

Sample ID#: <u>—</u>	Sample Time: <u>—</u> hrs.
Sample Collection Method: Ponar <u>Vibracore</u> Auger	PD: <u>4'2"</u> ft. * CR: <u>3'4"</u> ft. *
Total # Bottles Filled: <u>—</u>	QA/QC Samples: NA Field Dup. ID# <u>—</u>
Sampling Equipment Deconned or Replaced: <u>Y</u> N	MS/MSD ID# <u>—</u> E/B ID# <u>—</u>
	Sample Preservation: Ice NO ₃ H ₂ SO ₄ N/A

SAMPLE #2

Sample ID#: <u>—</u>	Sample Time: <u>—</u> hrs.
Sample Collection Method: Ponar Vibracore Auger	PD: <u>—</u> ft. * CR: <u>—</u> ft. *
Total # Bottles Filled: <u>—</u>	QA/QC Samples: NA Field Dup. ID# <u>—</u>
Sampling Equipment Deconned or Replaced: Y N	MS/MSD ID# <u>—</u> E/B ID# <u>—</u>
	Sample Preservation: Ice NO ₃ H ₂ SO ₄ N/A

DGPS DATA

Operator: <u>N/A</u>	QA Date: <u>N/A</u>
File Name: <u>—</u>	GPS Serial #: <u>—</u>
Northing: <u>—</u> ft.	Datum: <u>—</u> N Other <u>—</u>
Easting: <u>—</u> ft.	Proj.: <u>Y</u> N Other <u>—</u>
PDOP: <u>—</u>	Coordinate Units: US Survey Feet <u>Y</u> N Other <u>—</u>

COMMENTS / NOTES

Empty
TRY 1 - 2' CR - ~~MS~~ TRY AGAIN
" 2 - 3.0' CR - PULLED TO CHK SUBSTRATE - SAVED
" 3 - 1.5' CR - ~~MS~~ FINE - ~15' OUT
" 4 - 3'4" CR - CAPPED & SAMPLED
FINISHED LOCATION RE: 41. TOWNS
MS/MSD

SEE ATTACHMENT 1
of SOW

* PD-Penetration Depth/CR-Core Recovery

Preparer's Initial: RMK



FIELD DATA FORM

Page 1 of 1

Project Name: COAL ASH SETTLING LAGOON SEDIMENT SAMPLING			Proj. #: 18284.001
Site Name: RADFORD ARMY AMMUNITION PLANT			Task #: <u> </u>
City: RADFORD	State: VA	Zip: 24141	Date: <u>7/10/02</u>

Field Team Leader: RMK Field Team Safety Coordinator: RMK
Field Crew: COO, DJB Arrival/Departure Times: 1025-1130
Station ID #: 31SE12 Weather: Clear Cloudy Rain X Other
Photos: Y N Roll No./Exposure No.: Wind Conditions (Speed/Direction): 0-2 mph W

FIELD DATA
Water Depth: 2' 10" - 3' 0" ft. Tide: Ebb Flood Low Slack High Slack Other LAGOON
PID: ppm Redox Potential: mV pH: units Temp.: °C

SAMPLE #1
Sample ID#: Sample Time: hrs.
PD: 4' 5" ft. * CR: 3' 8" ft. *
Sample Collection Method: Ponar Vibracore Auger QA/QC Samples: NA Field Dup. ID#
Total # Bottles Filled: MS/MSD ID# E/B ID#
Sampling Equipment Deconned or Replaced: (Y) N Sample Preservation: Ice NO₃ H₂SO₄ N/A

SAMPLE #2
Sample ID#: Sample Time: hrs.
PD: ft. * CR: ft. *
Sample Collection Method: Ponar Vibracore Auger QA/QC Samples: NA Field Dup. ID#
Total # Bottles Filled: MS/MSD ID# E/B ID#
Sampling Equipment Deconned or Replaced: Y N Sample Preservation: Ice NO₃ H₂SO₄ N/A

DGPS DATA
Operator: N/A QA Date: N/A
File Name: GPS Serial #:
Northing: ft. Datum: Y N Other
Easting: ft. Proj.: Y N Other
PDOP: Coordinate Units: US Survey Feet Y N Other

COMMENTS / NOTES
Try 1 - 1.0' CR/PD
" 2 - 3' 4" CR/PD
moved 15' W
Try 3 - PD = 4' 5" / CR - 3' 8"
OK PER M. THOMAS

* PD-Penetration Depth/CR-Core Recovery

Preparer's Initial: RMK

SEE ATTACHMENT 1
of SOW.



NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS
3450 Schuylkill Road, Spring City, PA 19475

rev:11/99

FIELD DATA FORM

Page 1 of 1

Project Name:	COAL ASH SETTLING LAGOON SEDIMENT SAMPLING	Proj. #:	18284.001
Site Name:	RADFORD ARMY AMMUNITION PLANT	Task #:	_____
City:	RADFORD	State:	VA
		Zip:	24141
		Date:	7/10/02

Field Team Leader: Rmk

Field Team Safety Coordinator: Rmk

Field Crew: CDP DJB

Arrival/Departure Times: 1330-1545

Station ID #: '31SE13

Weather: Clear Cloudy Rain Other _____

Photos: Y (N) Roll No./Exposure No.: _____

Wind Conditions (Speed/Direction): 8-10 THUNDER/LIGHT

FIELD DATA

Water Depth: N/A ft. Tide: Ebb Flood Low Slack High Slack Other LAGOON
PID: _____ ppm Redox Potential: _____ mV pH: _____ units Temp.: _____ °C

SAMPLE #1

Sample ID#: _____

Sample Time: _____ hrs.

PD: 7'10" ft. * CR: 4'11" ft. *

Sample Collection Method: Ponar Vibracore Auger

QA/QC Samples: NA Field Dup. ID# _____

Total # Bottles Filled: _____

MS/MSD ID# _____ E/B ID# _____

Sampling Equipment Deconned or Replaced: (Y) N

Sample Preservation: Ice NO₃ H₂SO₄ N/A

SAMPLE #2

Sample ID#: _____

Sample Time: _____ hrs.

PD: _____ ft. * CR: _____ ft. *

Sample Collection Method: Ponar Vibracore Auger

QA/QC Samples: NA Field Dup. ID# _____

Total # Bottles Filled: _____

MS/MSD ID# _____ E/B ID# _____

Sampling Equipment Deconned or Replaced: Y N

Sample Preservation: Ice NO₃ H₂SO₄ N/A

DGPS DATA

Operator: N/A

QA Date: N/A

File Name: _____

GPS Serial #: _____

Northing: _____ ft.

Datum: Y N Other _____

Easting: _____ ft.

Proj.: Y N Other _____

PDOP: _____

Coordinate Units: US Survey Feet Y N Other _____

COMMENTS / NOTES

STARTED RAINING UPON ARRIVAL @
PRIMARY LAGOON (~1330-1500)
STARTED SAMPLING ~1515.
RECOVERED 2 CORES

* PD-Penetration Depth/CR-Core Recovery

Preparer's Initial: Rmk

See Attachment 1
of Sow



FIELD DATA FORM

Page 1 of 1

Project Name:	COAL ASH SETTLING LAGOON SEDIMENT SAMPLING	Proj. #:	18284.001
Site Name:	RADFORD ARMY AMMUNITION PLANT	Task #:	
City:	RADFORD	State:	VA
		Zip:	24141
Date:	7/1/02		

Field Team Leader: RMK

Field Team Safety Coordinator: RMK

Field Crew: COB DJB

Arrival/Departure Times: 1545-1630

Station ID #: 31SE14

Weather: Clear Cloudy Rain 85°F Other

Photos: Y N Roll No./Exposure No.:

Wind Conditions (Speed/Direction): 0-5 mph

FIELD DATA

Water Depth: N/A ft. Tide: Ebb Flood Low Slack High Slack Other LAGOON
PID: ppm Redox Potential: mV pH: units Temp.: °C

SAMPLE #1

Sample ID#:

Sample Time: hrs.

PD: 9'8" ft. * CR: 7'9" ft. *

Sample Collection Method: Ponar Vibracore Auger

QA/QC Samples: NA Field Dup. ID#

Total # Bottles Filled:

MS/MSD ID# E/B ID#

Sampling Equipment Deconned or Replaced: Y N

Sample Preservation: Ice NO₃ H₂SO₄ N/A

SAMPLE #2

Sample ID#:

Sample Time: hrs.

PD: ft. * CR: ft. *

Sample Collection Method: Ponar Vibracore Auger

QA/QC Samples: NA Field Dup. ID#

Total # Bottles Filled:

MS/MSD ID# E/B ID#

Sampling Equipment Deconned or Replaced: Y N

Sample Preservation: Ice NO₃ H₂SO₄ N/A

DGPS DATA

Operator: N/A

QA Date: N/A

File Name:

GPS Serial #:

Northing: ft.

Datum: Y N Other

Easting: ft.

Proj.: Y N Other

PDOP:

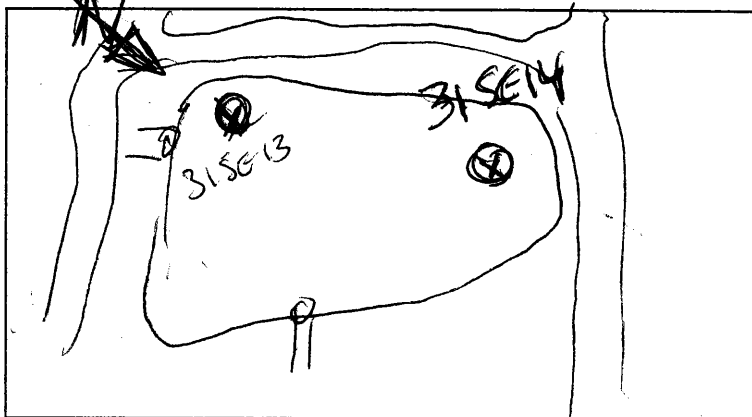
Coordinate Units: US Survey Feet Y N Other

COMMENTS / NOTES

FIELD CHANGE of SAMPLE LOCATION,
DUE to WATER DEPTHS - HAD TO
USE PORTABLE VC Sys. - REQ OPERATED
SYSTEM FROM PLUMBING SHEET IN
SEDIMENT LEVEL - (~-0.3')
RECOVERED 2 CORES.

* PD-Penetration Depth/CR-Core Recovery

Preparer's Initial: RM



GROUNDWATER SAMPLING FORM

SAMPLING EVENT DESCRIPTION

Site: SWMU 31

Monitoring Well ID: 31MW01

Well Depth (ft.BTOC) 52.19

DTW Prior to Purging: 35.41

Well Casing Diameter (in.) 4

Start Time (purging): 1014

CHECK
ONE

X

Groundwater Sampling

DO Decay Monitoring

Sampling Date: 7/11/02

Sample Time: 1050

Sampling Devices: MP-10 controller

QED 1.75" bladder pump (Teflon bladder)

FIELD PARAMETERS

TIME hh/mm	pH std. unit	Temp. deg. C	DO mg/l	ORP mv	Sp. Cond. uS/cm	Turb. ntu	TDS ft. btoc	DTW liters	Purge Rate ml/min
Stab. Criteria	+/- 0.1 unit	+/- 3 %	+/- 10 %	+/- 10 mv	+/- 3 %	+/- 10 %	< 0.3'		100-250 ml/min.
10:18	6.91	14.1	11.18	277	0.910	2.9	0.42	NR	NR
10:25	7.19	15.1	8.55	248	0.661	1.8	0.42	NR	NR
10:30	7.24	16.1	8.14	229	0.658	1.4	0.42	NR	NR
10:35	7.26	16.3	8.31	225	0.656	1.4	0.42	NR	NR
10:40	7.25	16.4	8.21	225	0.653	1.8	0.42	NR	NR
10:45	7.30	16.5	8.16	220	0.653	1.7	0.42	NR	NR
10:50	7.28	16.6	8.18	222	0.652	1.8	0.42	NR	NR

COMMENTS: NR=No reading.

MONITORING WELL PURGE FORM

Well: 31MW1 Date Started: 4/6/98 Date Completed: 4/6/98

Location: SWMU31

Well diameter (in) 4

Borehole diameter (in) 8

Filter pack length (ft) 12

ESTIMATED RECOVERY RATE _____

Est. Total Depth (ft) 52.40

Est. depth to water (ft) 34.43

Est. water column height (ft) 17.97

Est. extraction volume (gal) _____

Height of stickup (ft) _____

Actual total depth (ft) 52.48

Actual depth to water (ft) 34.21

Actual water column height (ft) 18.27

Actual extraction volume (gal) _____

EXTRACTION VOLUME FACTORS

Extraction Volume Factors (A,B)	Borehole Diam.= 8 inches	Borehole Diam.= 10 inches	Borehole Diam.= 12 inches
Well Diameter = 2 in	0.5, 0.8	0.5, 1.5	0.5, 2.6
Well Diameter = 4 in	2.0, 0.6	2.0, 1.3	2.0, 2.4
Well Diameter = 6 in	NA	4.4, 1.0	4.4, 4.0

3 TIMES WELL VOLUME (GAL) = A x (water column height) + B x (filter pack length)¹

Analytical Parameters	Required Sample Volume	Sample	Duplicate
TCL VOCs	3 -40-ml amber glass vials		
	2-1-liter glass bottles		
	2 1-liter glass bottles		

¹extraction volume (gal) = $3 \times [\Xi r_w^2 H_{WL} + 0.3 \Xi (r_b^2 - r_w^2) H_{FP}] \times 7.48 \text{ gal/ft}^3$

STABILIZATION DATA

[illegible]

31MW2

MONITORING WELL PURGE FORM

Well: 31MW2Date Started: 4/1/98Date Completed: 4/1/98Location: SWMU31Well diameter (in) 4Borehole diameter (in) 8Filter pack length (ft) 12.0

ESTIMATED RECOVERY RATE _____

Est. Total Depth (ft) MT 30.37 28.5Est. depth to water (ft) MT 24.21 25.82Est. water column height (ft) MT 6.16 2.68Est. extraction volume (gal) 12.56

Height of stickup (ft) _____

Actual total depth (ft) 30.37Actual depth to water (ft) 24.21Actual water column height (ft) 6.16Actual extraction volume (gal) 21.6

EXTRACTION VOLUME FACTORS

Extraction Volume Factors (A,B)	Borehole Diam.= 8 inches	Borehole Diam.= 10 inches	Borehole Diam.= 12 inches
Well Diameter = 2 in	0.5, 0.8	0.5, 1.5	0.5, 2.6
Well Diameter = 4 in	2.0, 0.6	2.0, 1.3	2.0, 2.4
Well Diameter = 6 in	NA	4.4, 1.0	4.4, 4.0

3 TIMES WELL VOLUME (GAL) = $A \times (\text{water column height}) + B \times (\text{filter pack length})^1$

$$= 2.0(6.16) + 0.6(12)$$

$$= 19.52$$

Approx. 17 bails

Analytical Parameters	Required Sample Volume	Sample	Duplicate
TCL VOCs	3 -40-ml amber glass vials		
	2-1-liter glass bottles		
	2 1-liter glass bottles		

¹extraction volume (gal) = $3 \times [\pi r_w^2 H_{WL} + 0.3 \pi (r_b^2 - r_w^2) H_{FP}] \times 7.48 \text{ gal/ft}^3$

[illegible]

MONITORING WELL PURGE FORM

Well: 31 MW3 Date Started: 1 APRIL 1998 Date Completed: 1 APRIL 1998

Location:

SWMV 31

Well diameter (in) 4.0

Borehole diameter (in) 8

Filter pack length (ft) 12.0

Total Depth (ft) ~~32.44~~ 32.43

Est. depth to water (ft) ~~22.60~~ 25.04

Est. water column height (ft) ~~9.84~~ 7.39

Est. extraction volume (gal) ~~26.88~~ 21.98

ESTIMATED RECOVERY RATE _____

Height of stickup (ft) _____

Actual total depth (ft) 32.44

Actual depth to water (ft) 22.60

Actual water column height (ft) 9.84

Actual extraction volume (gal) 26.88

EXTRACTION VOLUME FACTORS

Extraction Volume Factors (A,B)	Borehole Diam.= 8 inches	Borehole Diam.= 10 inches	Borehole Diam.= 12 inches
Well Diameter = 2 in	0.5, 0.8	0.5, 1.5	0.5, 2.6
Well Diameter = 4 in	2.0, 0.6	2.0, 1.3	2.0, 2.4
Well Diameter = 6 in	NA	4.4, 1.0	4.4, 4.0

3 TIMES WELL VOLUME (GAL) = A x (water column height) + B x (filter pack length)¹

$$(2.0)7.39 + (0.6)12 = 21.98$$

$$(2.0)9.84 + (0.6)12 = 26.88$$

Analytical Parameters	Required Sample Volume	Sample	Duplicate
TCL VOCs	3 -40-ml amber glass vials		
	2-1-liter glass bottles		
	2 1-liter glass bottles		

¹extraction volume (gal) = $3 \times [\pi r_w^2 H_{WL} + 0.3 \pi (r_b^2 - r_w^2) H_{FP}] \times 7.48 \text{ gal/ft}^3$

[illegible]

MONITORING WELL PURGE FORM

Well: 31MW4 Date Started: 4/6/98 Date Completed: 4/6/98

Location: SWMU31

Well diameter (in) 4

Borehole diameter (in) 8

Filter pack length (ft) 12

Est. Total Depth (ft) 30.45

Est. depth to water (ft) 24.92

Est. water column height (ft) 5.53

Est. extraction volume (gal) _____

ESTIMATED RECOVERY RATE _____

Height of stickup (ft) _____

Actual total depth (ft) 30.42

Actual depth to water (ft) 24.36

Actual water column height (ft) 6.06

Actual extraction volume (gal) _____

EXTRACTION VOLUME FACTORS

Extraction Volume Factors (A,B)	Borehole Diam.= 8 inches	Borehole Diam.= 10 inches	Borehole Diam.= 12 inches
Well Diameter = 2 in	0.5, 0.8	0.5, 1.5	0.5, 2.6
Well Diameter = 4 in	2.0, 0.6	2.0, 1.3	2.0, 2.4
Well Diameter = 6 in	NA	4.4, 1.0	4.4, 4.0

3 TIMES WELL VOLUME (GAL) = A x (water column height) + B x (filter pack length)¹

Analytical Parameters	Required Sample Volume	Sample	Duplicate
TCL VOCs	3 -40-ml amber glass vials		
	2-1-liter glass bottles		
	2 1-liter glass bottles		

¹extraction volume (gal) = $3 \times [\pi r_w^2 H_{WL} + 0.3 \pi (r_b^2 - r_w^2) H_{FP}] \times 7.48 \text{ gal/ft}^3$

PID reading of purge water 0.6 ppm

 $45/cm$

0.5 L/min

[illegible]

Outfall 024
February 2003

[illegible]

Outfall 024
February 2005

[illegible]

Outfall 024
December 2005

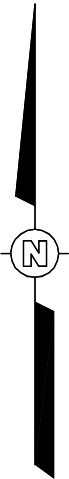
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January 2006

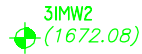
[illegible]

File: C:\snyder_B\Anne Roadboch\FIGURE B47.dwg
XREF Files: IMAGE Files:
Plot Date/Time: Jun 26, 2007 - 4:33pm
Plotted By: william.snyder

OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Pittsburgh, PA	B. Snyder	B. Squire	W. Barner	FIGURE B47



LEGEND:



3IMW2
(1672.08)

ALLUVIAL MONITORING WELL
(GROUNDWATER ELEVATION IN FEET MSL)



3IMW1
(1678.96)

BEDROCK MONITORING WELL
(GROUNDWATER ELEVATION IN FEET MSL)



3IMW4
(1673.23)

WELL SCREEN ACROSS
UNCONSOLIDATED/BEDROCK INTERFACE
(GROUNDWATER ELEVATION IN FEET MSL)



1680

GROUNDWATER CONTOUR
(INTERVAL = 2.0 FEET)
DASHED WHERE INFERRED



GROUNDWATER FLOW DIRECTION



RIVER FLOW DIRECTION

NGVD, 1929

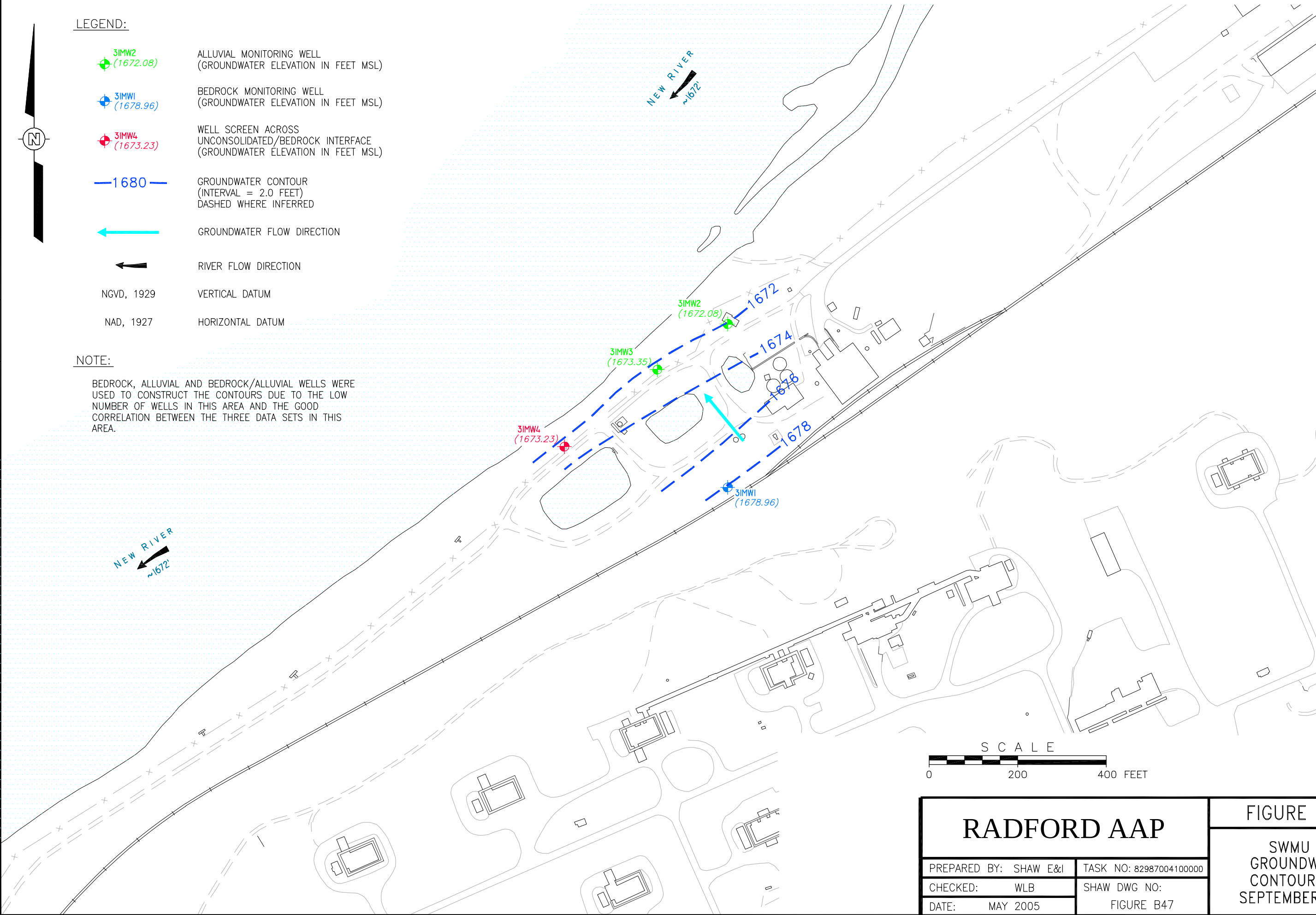
VERTICAL DATUM

NAD, 1927

HORIZONTAL DATUM

NOTE:

BEDROCK, ALLUVIAL AND BEDROCK/ALLUVIAL WELLS WERE
USED TO CONSTRUCT THE CONTOURS DUE TO THE LOW
NUMBER OF WELLS IN THIS AREA AND THE GOOD
CORRELATION BETWEEN THE THREE DATA SETS IN THIS
AREA.



RADFORD AAP

PREPARED BY: SHAW E&I

TASK NO: 82987004100000

CHECKED: WLB

SHAW DWG NO:

DATE: MAY 2005

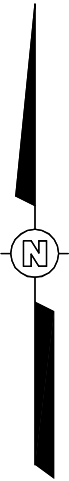
FIGURE B47

FIGURE B47

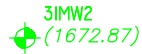
SWMU 31
GROUNDWATER
CONTOUR MAP
SEPTEMBER 2002

File: C:\snyder_B\Anne Roadboch\FIGURE B48.dwg
XREF Files: IMAGE Files:
Plot Date/Time: Jun 26, 2007 - 4:35pm
Plotted By: william.snyder

OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Pittsburgh, PA	B. Snyder	B. Squire	W. Barner	FIGURE B48



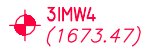
LEGEND:



3IMW2
(1672.87)
ALLUVIAL MONITORING WELL
(GROUNDWATER ELEVATION IN FEET MSL)



3IMW1
(1679.97)
BEDROCK MONITORING WELL
(GROUNDWATER ELEVATION IN FEET MSL)



3IMW4
(1673.47)
WELL SCREEN ACROSS
UNCONSOLIDATED/BEDROCK INTERFACE
(GROUNDWATER ELEVATION IN FEET MSL)



—1680—
GROUNDWATER CONTOUR
(INTERVAL = 2.0 FEET)
DASHED WHERE INFERRED



GROUNDWATER FLOW DIRECTION



RIVER FLOW DIRECTION

NGVD, 1929

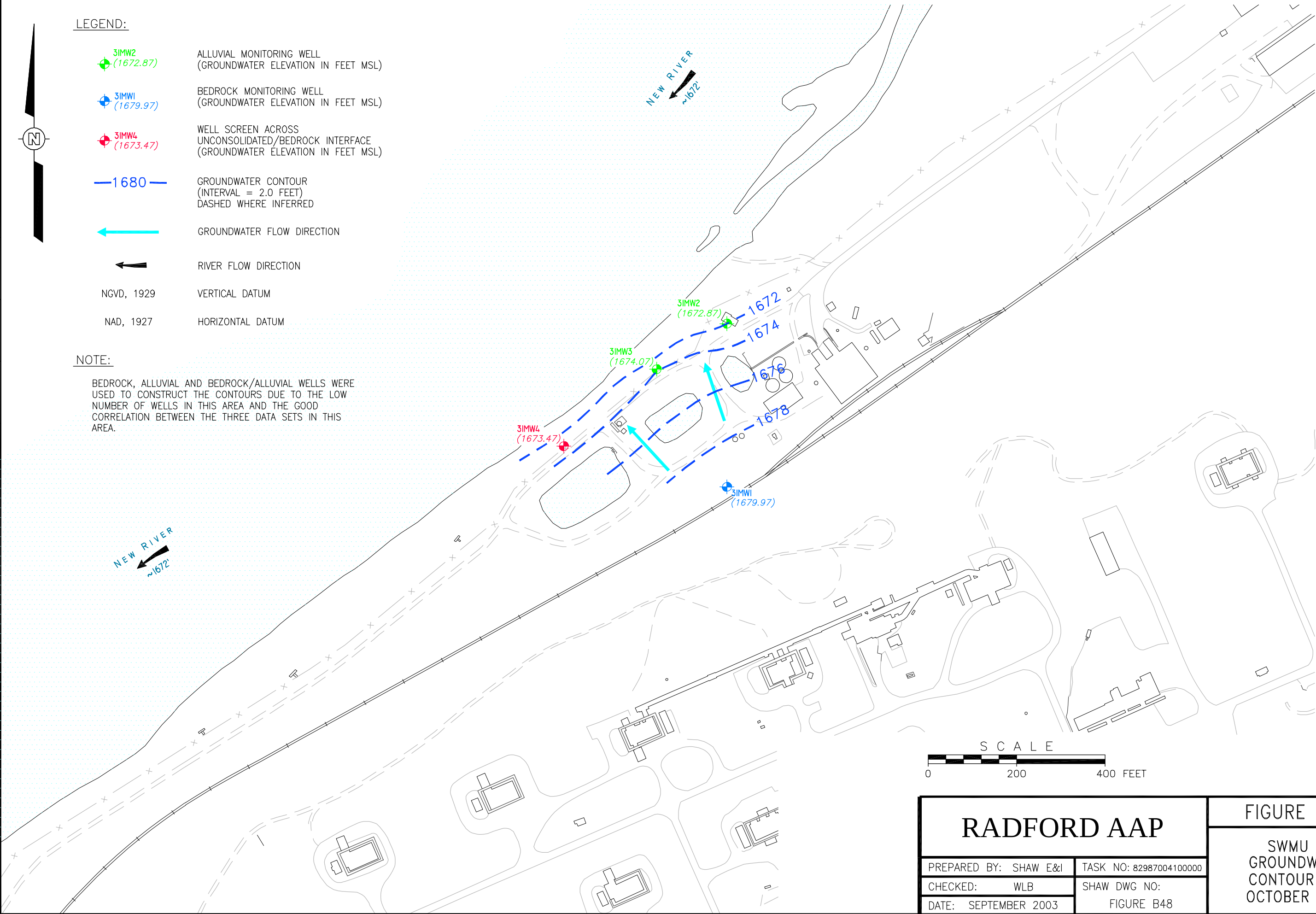
VERTICAL DATUM

NAD, 1927

HORIZONTAL DATUM

NOTE:

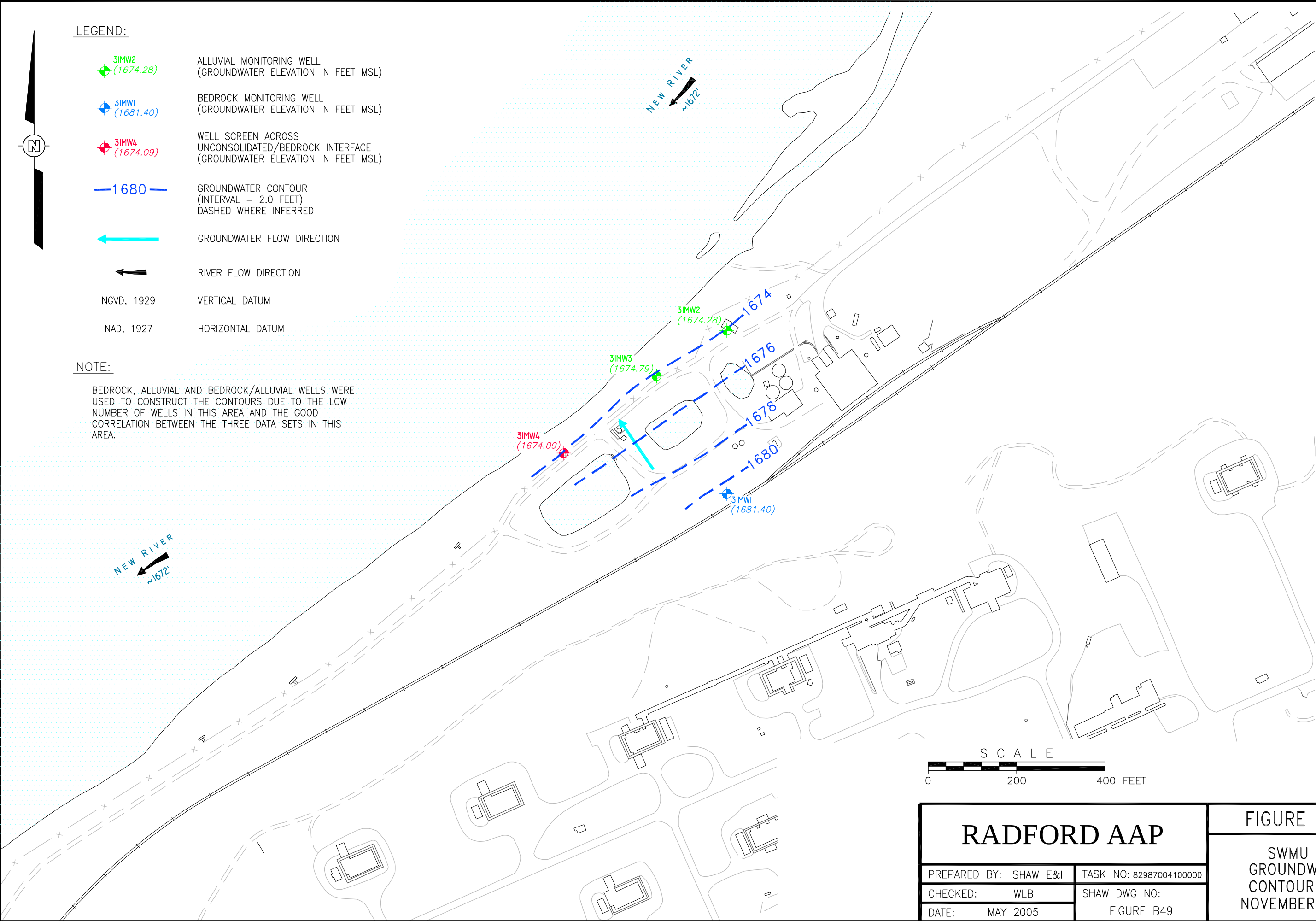
BEDROCK, ALLUVIAL AND BEDROCK/ALLUVIAL WELLS WERE USED TO CONSTRUCT THE CONTOURS DUE TO THE LOW NUMBER OF WELLS IN THIS AREA AND THE GOOD CORRELATION BETWEEN THE THREE DATA SETS IN THIS AREA.



RADFORD AAP		FIGURE B48
PREPARED BY: SHAW E&I	TASK NO: 82987004100000	SWMU 31 GROUNDWATER CONTOUR MAP OCTOBER 2002
CHECKED: WLB	SHAW DWG NO:	
DATE: SEPTEMBER 2003	FIGURE B48	

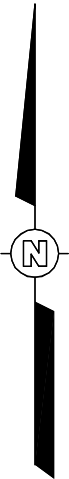
File: C:\snyder_B\Anne Roadboch\FIGURE B49.dwg
XREF Files: IMAGE Files:
Plot Date/Time: Jun 26, 2007 - 4:37pm
Plotted By: william.snyder

OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Pittsburgh, PA	B. Snyder	B. Squire	W. Barner	FIGURE B49



File: C:\snyder_B\Anne Roadboch\FIGURE B50.dwg
XREF Files: IMAGE Files:
Plot Date/Time: Jun 26, 2007 - 4:35pm
Plotted By: william.snyder

OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Pittsburgh, PA	B. Snyder	B. Squire	W. Barner	FIGURE B50



LEGEND:

3IMW2
(1672.80)

ALLUVIAL MONITORING WELL
(GROUNDWATER ELEVATION IN FEET MSL)

3IMWI
(1680.51)

BEDROCK MONITORING WELL
(GROUNDWATER ELEVATION IN FEET MSL)

3IMW4
(1673.71)

WELL SCREEN ACROSS
UNCONSOLIDATED/BEDROCK INTERFACE
(GROUNDWATER ELEVATION IN FEET MSL)

—1680—

GROUNDWATER CONTOUR
(INTERVAL = 2.0 FEET)
DASHED WHERE INFERRED



GROUNDWATER FLOW DIRECTION



RIVER FLOW DIRECTION

NGVD, 1929

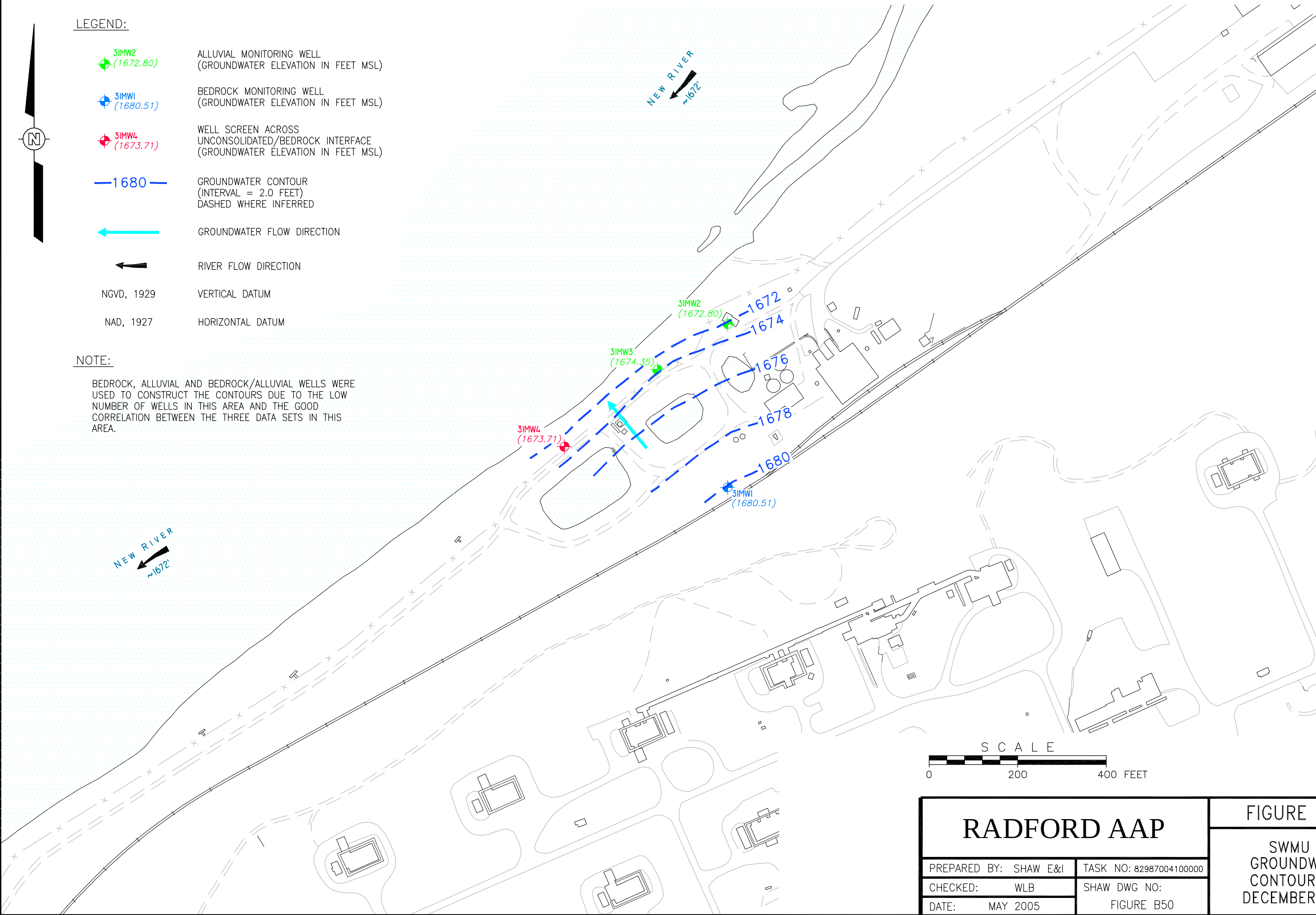
VERTICAL DATUM

NAD, 1927

HORIZONTAL DATUM

NOTE:

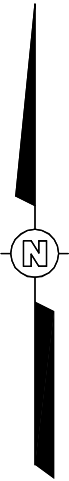
BEDROCK, ALLUVIAL AND BEDROCK/ALLUVIAL WELLS WERE
USED TO CONSTRUCT THE CONTOURS DUE TO THE LOW
NUMBER OF WELLS IN THIS AREA AND THE GOOD
CORRELATION BETWEEN THE THREE DATA SETS IN THIS
AREA.



RADFORD AAP		FIGURE B50 SWMU 31 GROUNDWATER CONTOUR MAP DECEMBER 2002
PREPARED BY: SHAW E&I	TASK NO: 82987004100000	
CHECKED: WLB	SHAW DWG NO:	
DATE: MAY 2005	FIGURE B50	

File: C:\snyder_B\Anne Roadboch\FIGURE B51.dwg
XREF Files: IMAGE Files:
Plot Date/Time: Jun 26, 2007 - 4:40pm
Plotted By: william.snyder

OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Pittsburgh, PA	B. Snyder	B. Squire	W. Barner	FIGURE B51



LEGEND:

3IMW2
(1673.92)

ALLUVIAL MONITORING WELL
(GROUNDWATER ELEVATION IN FEET MSL)

3IMW1
(1681.92)

BEDROCK MONITORING WELL
(GROUNDWATER ELEVATION IN FEET MSL)

3IMW4
(1673.79)

WELL SCREEN ACROSS
UNCONSOLIDATED/BEDROCK INTERFACE
(GROUNDWATER ELEVATION IN FEET MSL)

—1680—

GROUNDWATER CONTOUR
(INTERVAL = 2.0 FEET)
DASHED WHERE INFERRED



GROUNDWATER FLOW DIRECTION



RIVER FLOW DIRECTION

NGVD, 1929

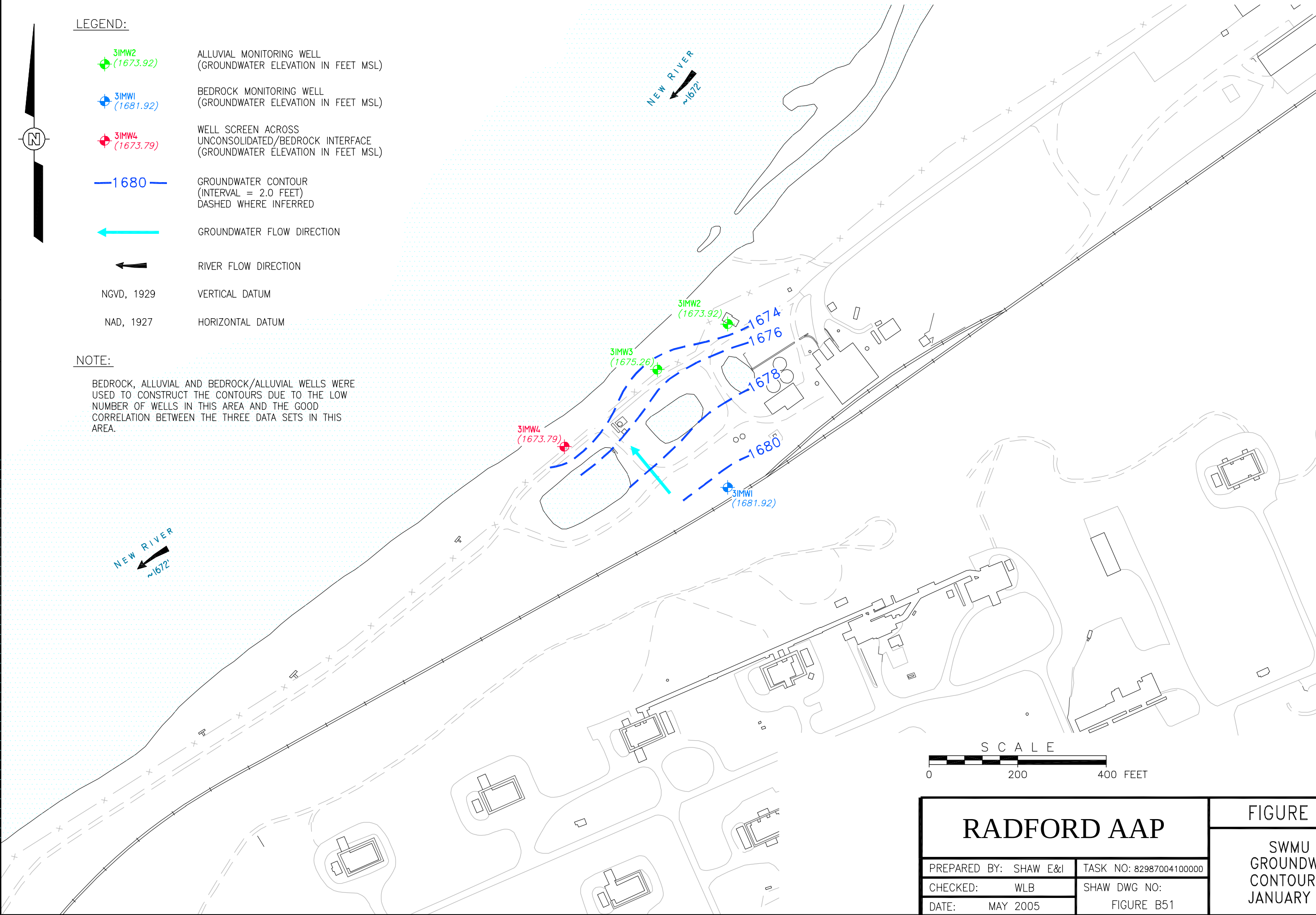
VERTICAL DATUM

NAD, 1927

HORIZONTAL DATUM

NOTE:

BEDROCK, ALLUVIAL AND BEDROCK/ALLUVIAL WELLS WERE
USED TO CONSTRUCT THE CONTOURS DUE TO THE LOW
NUMBER OF WELLS IN THIS AREA AND THE GOOD
CORRELATION BETWEEN THE THREE DATA SETS IN THIS
AREA.



RADFORD AAP

PREPARED BY: SHAW E&I

TASK NO: 82987004100000

CHECKED: WLB

SHAW DWG NO:

DATE: MAY 2005

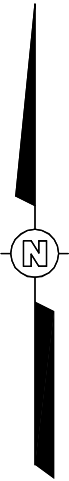
FIGURE B51

FIGURE B51

SWMU 31
GROUNDWATER
CONTOUR MAP
JANUARY 2003

File: C:\snyder_B\Anne Roadboch\FIGURE B52.dwg
XREF Files: IMAGE Files:
Plot Date/Time: Jun 26, 2007 - 4:41pm
Plotted By: william.snyder

OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Pittsburgh, PA	B. Snyder	B. Squire	W. Barner	FIGURE B52



LEGEND:

3IMW2
(1673.08)

ALLUVIAL MONITORING WELL
(GROUNDWATER ELEVATION IN FEET MSL)

3IMWI
(1680.62)

BEDROCK MONITORING WELL
(GROUNDWATER ELEVATION IN FEET MSL)

3IMW4
(1673.90)

WELL SCREEN ACROSS
UNCONSOLIDATED/BEDROCK INTERFACE
(GROUNDWATER ELEVATION IN FEET MSL)

—1680—

GROUNDWATER CONTOUR
(INTERVAL = 2.0 FEET)
DASHED WHERE INFERRED



GROUNDWATER FLOW DIRECTION



RIVER FLOW DIRECTION

NGVD, 1929

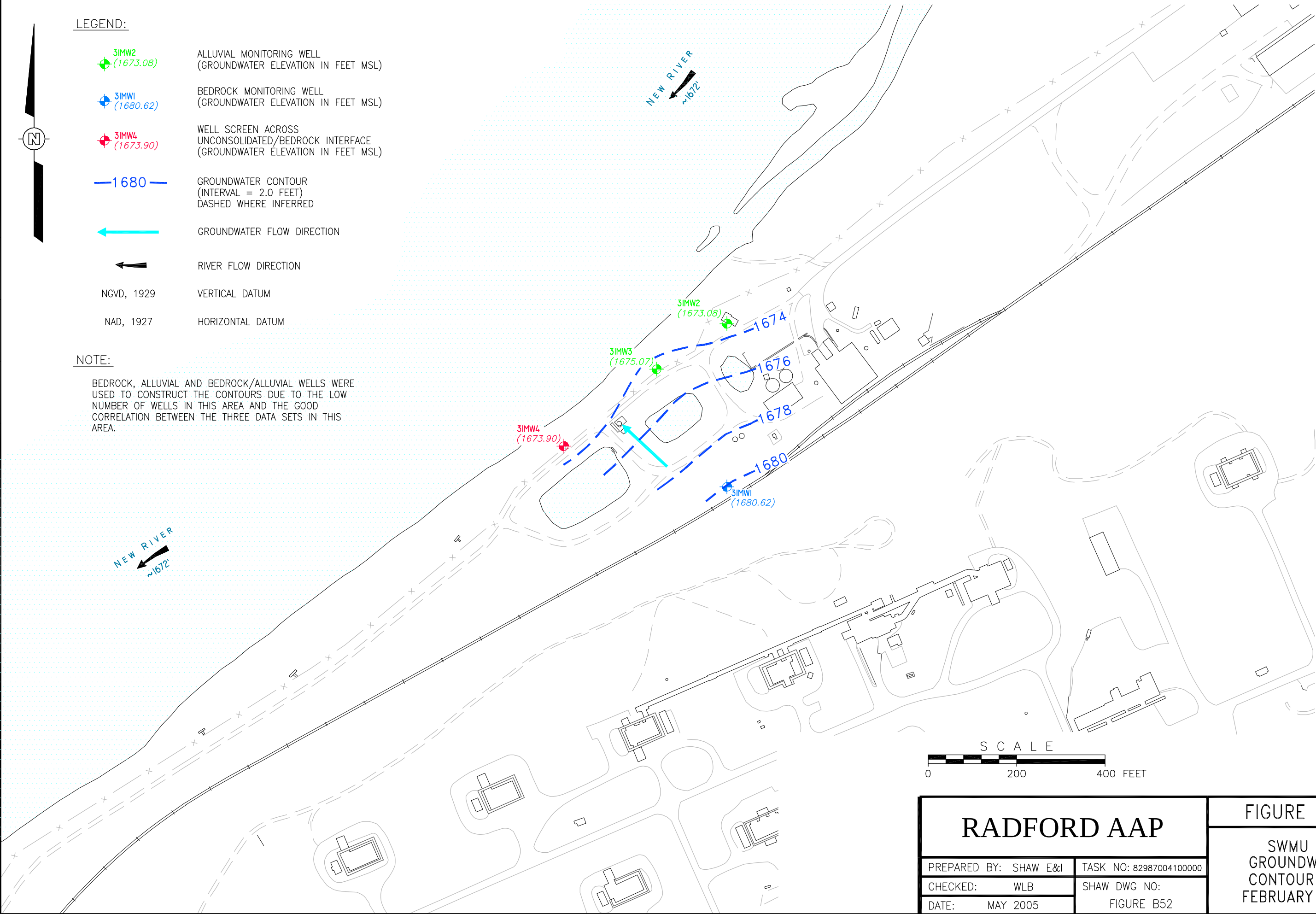
VERTICAL DATUM

NAD, 1927

HORIZONTAL DATUM

NOTE:

BEDROCK, ALLUVIAL AND BEDROCK/ALLUVIAL WELLS WERE
USED TO CONSTRUCT THE CONTOURS DUE TO THE LOW
NUMBER OF WELLS IN THIS AREA AND THE GOOD
CORRELATION BETWEEN THE THREE DATA SETS IN THIS
AREA.



RADFORD AAP

PREPARED BY: SHAW E&I

TASK NO: 82987004100000

CHECKED: WLB

SHAW DWG NO:

DATE: MAY 2005

FIGURE B52

FIGURE B52

SWMU 31
GROUNDWATER
CONTOUR MAP
FEBRUARY 2003

File: O:\CAD Standards\Shaw\Formats\Shaw Layouts-draft-ps.dwg
Plot Date/Time: Jun 26, 2007 - 4:44pm
Plotted By: william.snyder

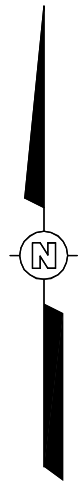
OFFICE
Pittsburgh, PA

DRAWN BY
B. Snyder

CHECKED BY
B. Squire

APPROVED BY
W. Barner

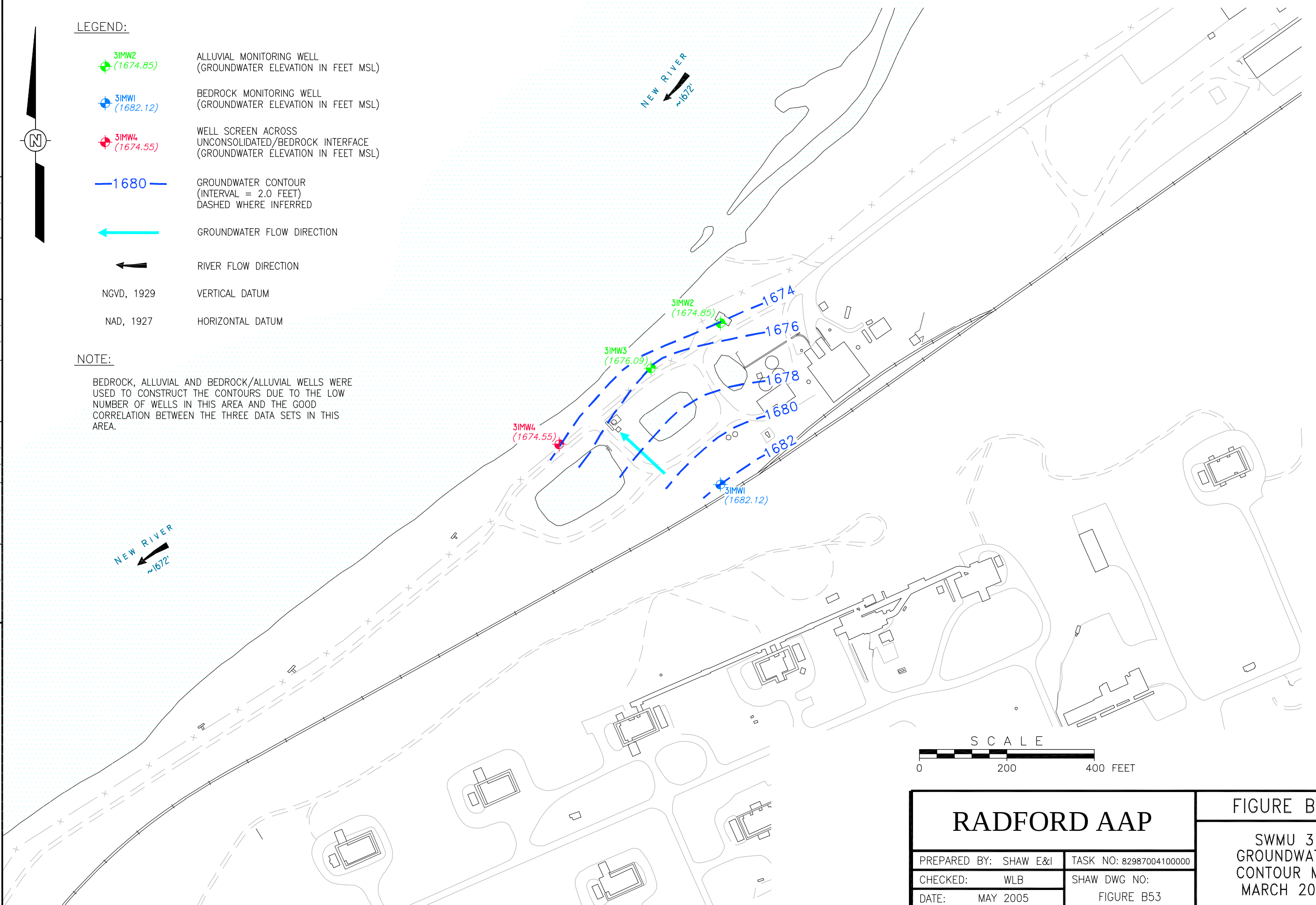
DRAWING NUMBER
FIGURE B53



- LEGEND:
- 3IMW2 (1674.85) ALLUVIAL MONITORING WELL (GROUNDWATER ELEVATION IN FEET MSL)
 - 3IMW1 (1682.12) BEDROCK MONITORING WELL (GROUNDWATER ELEVATION IN FEET MSL)
 - 3IMW4 (1674.55) WELL SCREEN ACROSS UNCONSOLIDATED/BEDROCK INTERFACE (GROUNDWATER ELEVATION IN FEET MSL)
 - 1680— GROUNDWATER CONTOUR (INTERVAL = 2.0 FEET) DASHED WHERE INFERRED
 - ← GROUNDWATER FLOW DIRECTION
 - ← RIVER FLOW DIRECTION
 - NGVD, 1929 VERTICAL DATUM
 - NAD, 1927 HORIZONTAL DATUM

NOTE:

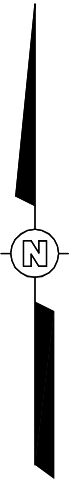
BEDROCK, ALLUVIAL AND BEDROCK/ALLUVIAL WELLS WERE USED TO CONSTRUCT THE CONTOURS DUE TO THE LOW NUMBER OF WELLS IN THIS AREA AND THE GOOD CORRELATION BETWEEN THE THREE DATA SETS IN THIS AREA.



RADFORD AAP		FIGURE B53
PREPARED BY: SHAW E&I	TASK NO: 82987004100000	SWMU 31 GROUNDWATER CONTOUR MAP MARCH 2003
CHECKED: WLB	SHAW DWG NO:	
DATE: MAY 2005	FIGURE B53	

File: C:\snyder_B\Anne Roadboch\FIGURE B54.dwg
XREF Files: IMAGE Files:
Plot Date/Time: Jun 26, 2007 - 4:45pm
Plotted By: william.snyder

OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER	FIGURE
Pittsburgh, PA	B. Snyder	B. Squire	W. Barner	10/17/03	B54



LEGEND:

3IMW2
(1674.17)

ALLUVIAL MONITORING WELL
(GROUNDWATER ELEVATION IN FEET MSL)

3IMW1
(1681.09)

BEDROCK MONITORING WELL
(GROUNDWATER ELEVATION IN FEET MSL)

3IMW4
(1673.96)

WELL SCREEN ACROSS
UNCONSOLIDATED/BEDROCK INTERFACE
(GROUNDWATER ELEVATION IN FEET MSL)

—1680—

GROUNDWATER CONTOUR
(INTERVAL = 2.0 FEET)
DASHED WHERE INFERRED



GROUNDWATER FLOW DIRECTION



RIVER FLOW DIRECTION

NGVD, 1929

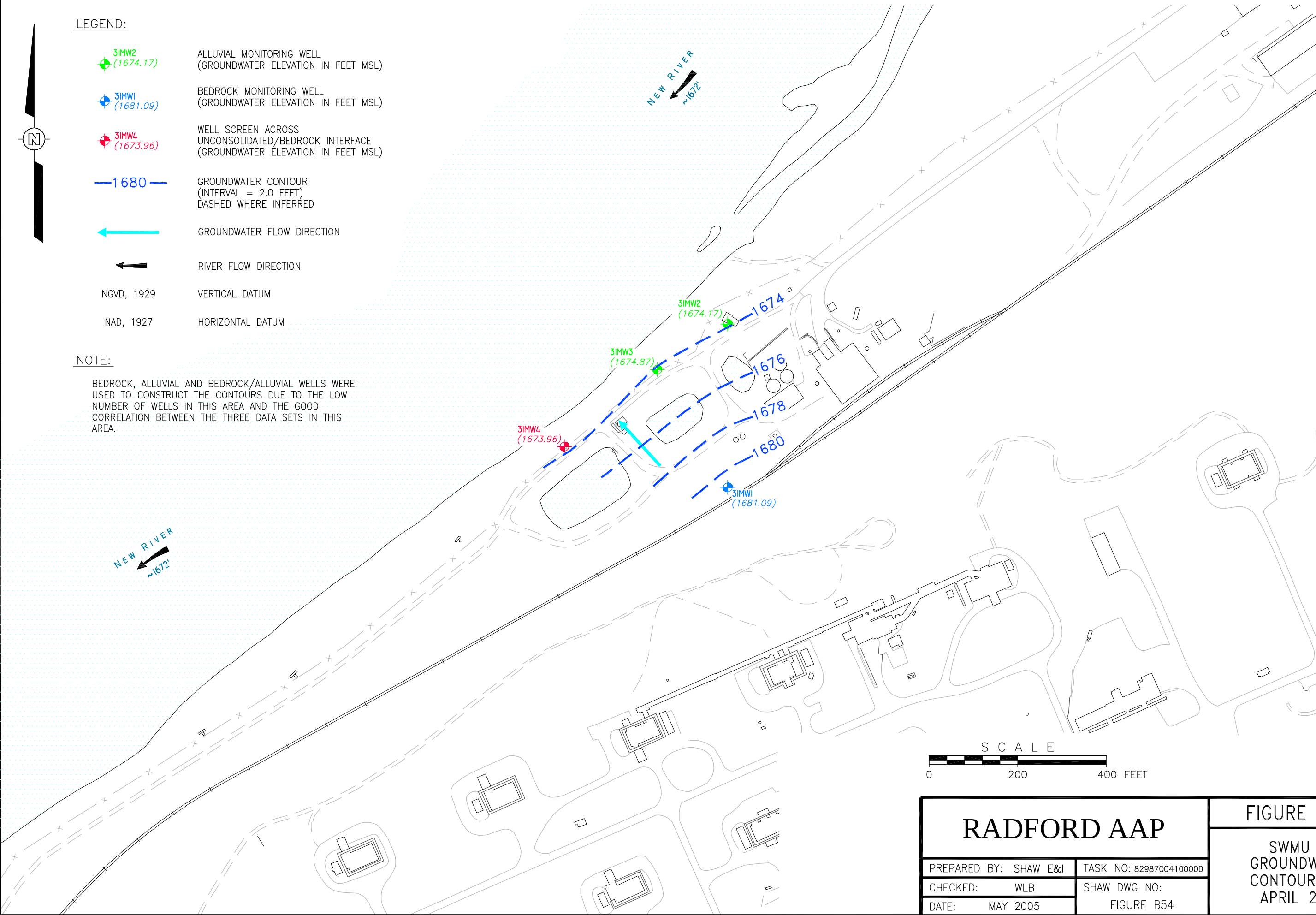
VERTICAL DATUM

NAD, 1927

HORIZONTAL DATUM

NOTE:

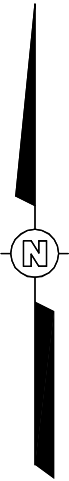
BEDROCK, ALLUVIAL AND BEDROCK/ALLUVIAL WELLS WERE
USED TO CONSTRUCT THE CONTOURS DUE TO THE LOW
NUMBER OF WELLS IN THIS AREA AND THE GOOD
CORRELATION BETWEEN THE THREE DATA SETS IN THIS
AREA.



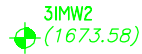
RADFORD AAP		FIGURE B54
		SWMU 31 GROUNDWATER CONTOUR MAP APRIL 2003
PREPARED BY: SHAW E&I	TASK NO: 82987004100000	
CHECKED: WLB	SHAW DWG NO:	
DATE: MAY 2005	FIGURE B54	

File: C:\snyder_B\Anne Roadboch\FIGURE B55.dwg
XREF Files: IMAGE Files:
Plot Date/Time: Jun 26, 2007 - 4:47pm
Plotted By: william.snyder

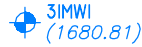
OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Pittsburgh, PA	B. Snyder	B. Squire	W. Barner	FIGURE B55



LEGEND:



ALLUVIAL MONITORING WELL
(GROUNDWATER ELEVATION IN FEET MSL)



BEDROCK MONITORING WELL
(GROUNDWATER ELEVATION IN FEET MSL)



WELL SCREEN ACROSS
UNCONSOLIDATED/BEDROCK INTERFACE
(GROUNDWATER ELEVATION IN FEET MSL)



GROUNDWATER CONTOUR
(INTERVAL = 2.0 FEET)
DASHED WHERE INFERRED



GROUNDWATER FLOW DIRECTION



RIVER FLOW DIRECTION

NGVD, 1929

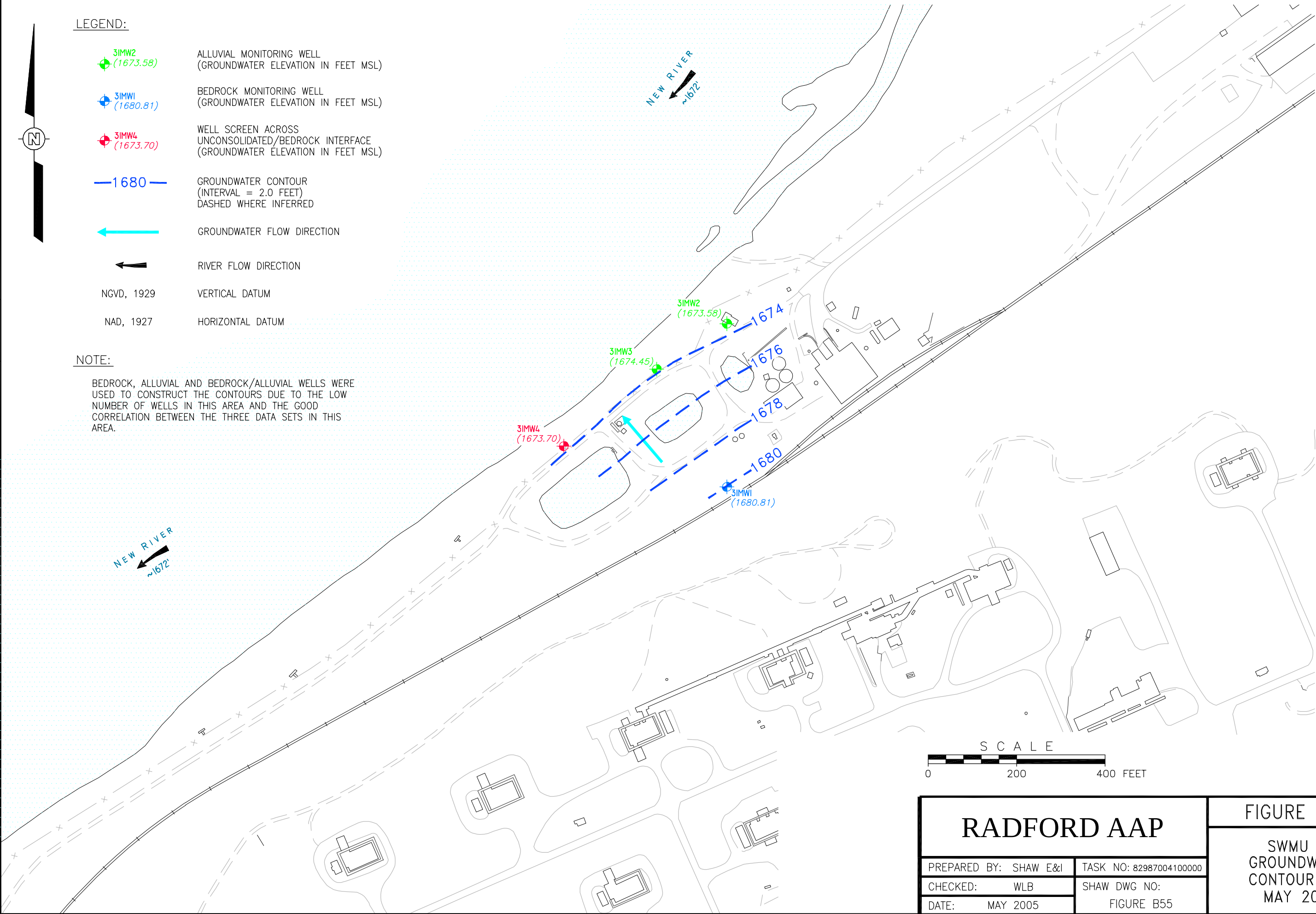
VERTICAL DATUM

NAD, 1927

HORIZONTAL DATUM

NOTE:

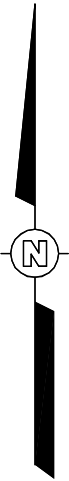
BEDROCK, ALLUVIAL AND BEDROCK/ALLUVIAL WELLS WERE
USED TO CONSTRUCT THE CONTOURS DUE TO THE LOW
NUMBER OF WELLS IN THIS AREA AND THE GOOD
CORRELATION BETWEEN THE THREE DATA SETS IN THIS
AREA.



RADFORD AAP		FIGURE B55
		SWMU 31 GROUNDWATER CONTOUR MAP MAY 2003
PREPARED BY: SHAW E&I	TASK NO: 82987004100000	
CHECKED: WLB	SHAW DWG NO:	
DATE: MAY 2005	FIGURE B55	

File: C:\snyder_B\Anne Roadboch\FIGURE B56.dwg
XREF Files: IMAGE Files:
Plot Date/Time: Jun 26, 2007 - 4:45pm
Plotted By: william.snyder

OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Pittsburgh, PA	B. Snyder	B. Squire	W. Barner	FIGURE B56



LEGEND:

3IMW2
(1676.72)

ALLUVIAL MONITORING WELL
(GROUNDWATER ELEVATION IN FEET MSL)

3IMWI
(1682.43)

BEDROCK MONITORING WELL
(GROUNDWATER ELEVATION IN FEET MSL)

3IMW4
(1675.40)

WELL SCREEN ACROSS
UNCONSOLIDATED/BEDROCK INTERFACE
(GROUNDWATER ELEVATION IN FEET MSL)

—1680—

GROUNDWATER CONTOUR
(INTERVAL = 2.0 FEET)
DASHED WHERE INFERRED



GROUNDWATER FLOW DIRECTION



RIVER FLOW DIRECTION

NGVD, 1929

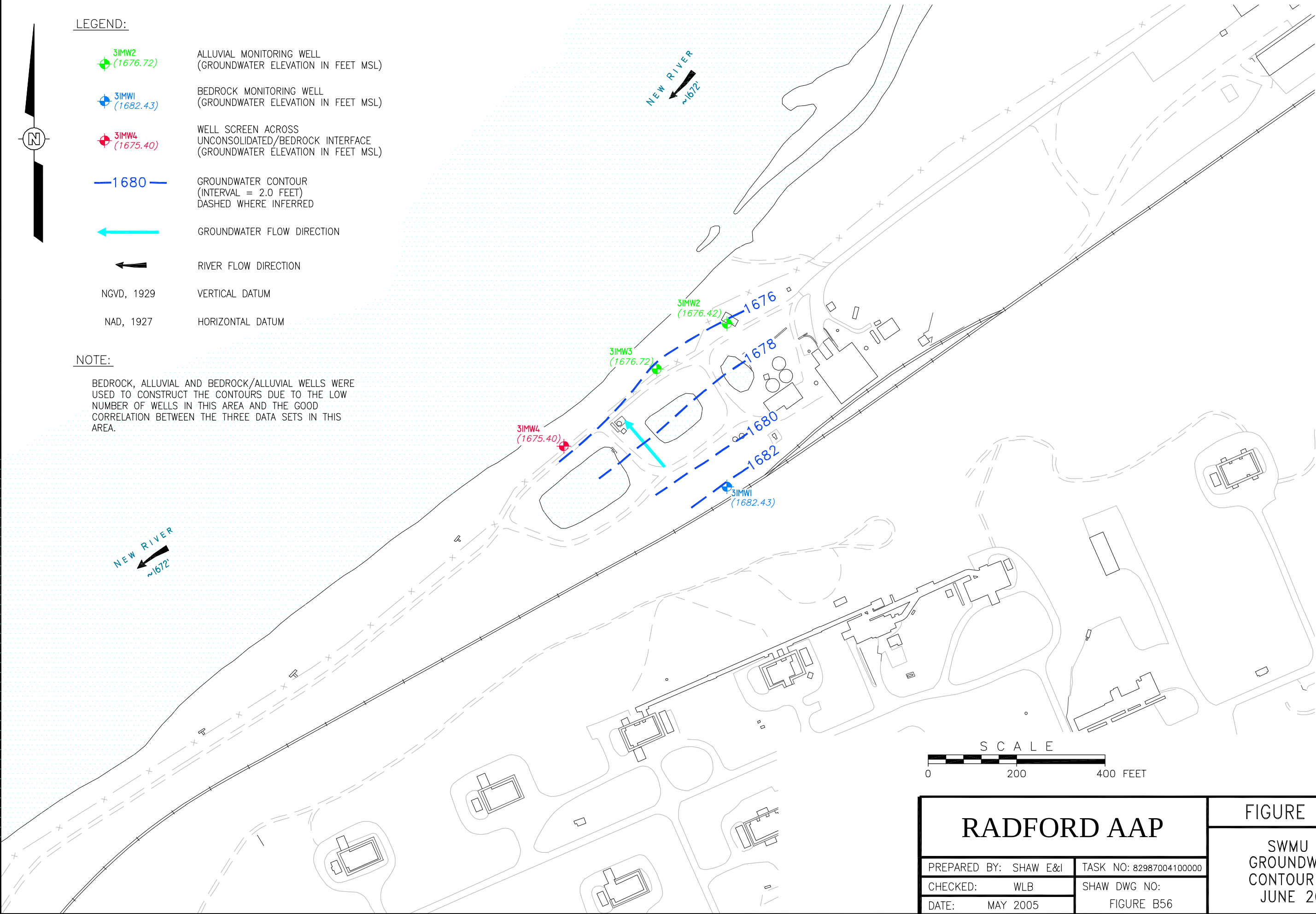
VERTICAL DATUM

NAD, 1927

HORIZONTAL DATUM

NOTE:

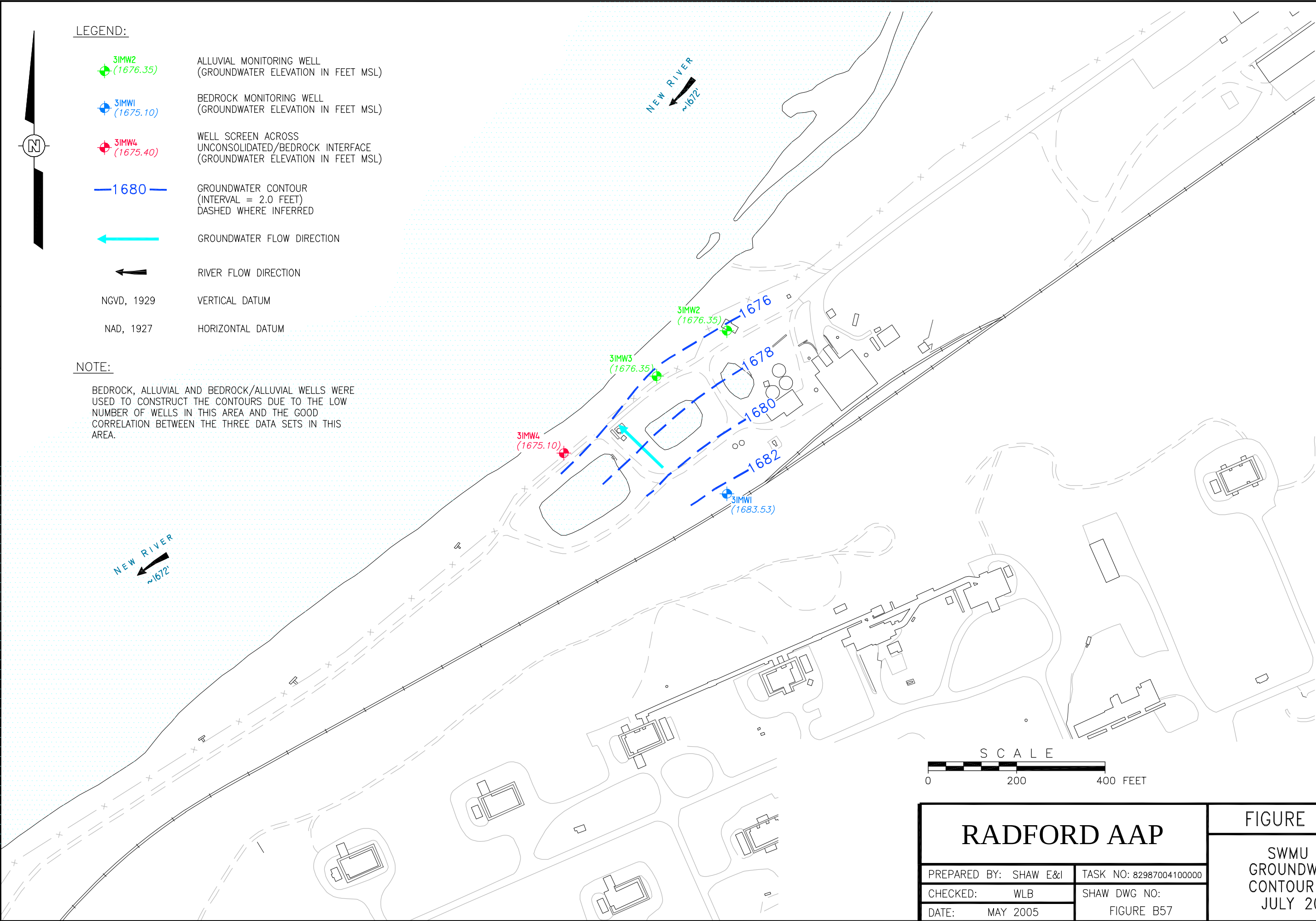
BEDROCK, ALLUVIAL AND BEDROCK/ALLUVIAL WELLS WERE
USED TO CONSTRUCT THE CONTOURS DUE TO THE LOW
NUMBER OF WELLS IN THIS AREA AND THE GOOD
CORRELATION BETWEEN THE THREE DATA SETS IN THIS
AREA.



RADFORD AAP		FIGURE B56
		SWMU 31 GROUNDWATER CONTOUR MAP JUNE 2003
PREPARED BY: SHAW E&I	TASK NO: 82987004100000	
CHECKED: WLB	SHAW DWG NO:	
DATE: MAY 2005	FIGURE B56	

File: C:\snyder_B\Anne Roadboch\FIGURE B57.dwg
XREF Files: IMAGE Files:
Plot Date/Time: Jun 26, 2007 - 4:49pm
Plotted By: william.snyder

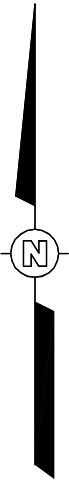
OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Pittsburgh, PA	B. Snyder	B. Squire	W. Barner	FIGURE B57



RADFORD AAP		FIGURE B57
		SWMU 31 GROUNDWATER CONTOUR MAP JULY 2003
PREPARED BY: SHAW E&I	TASK NO: 82987004100000	
CHECKED: WLB	SHAW DWG NO:	
DATE: MAY 2005	FIGURE B57	

File: C:\snyder_B\Anne Roadboch\FIGURE B58.dwg
XREF Files: IMAGE Files:
Plot Date/Time: Jun 26, 2007 - 4:51pm
Plotted By: william.snyder

OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Pittsburgh, PA	B. Snyder	B. Squire	W. Barner	FIGURE B58



LEGEND:

3IMW2
(1675.60)

ALLUVIAL MONITORING WELL
(GROUNDWATER ELEVATION IN FEET MSL)

3IMW1
(1682.77)

BEDROCK MONITORING WELL
(GROUNDWATER ELEVATION IN FEET MSL)

3IMW4
(1674.66)

WELL SCREEN ACROSS
UNCONSOLIDATED/BEDROCK INTERFACE
(GROUNDWATER ELEVATION IN FEET MSL)

—1680—

GROUNDWATER CONTOUR
(INTERVAL = 2.0 FEET)
DASHED WHERE INFERRED



GROUNDWATER FLOW DIRECTION



RIVER FLOW DIRECTION

NGVD, 1929

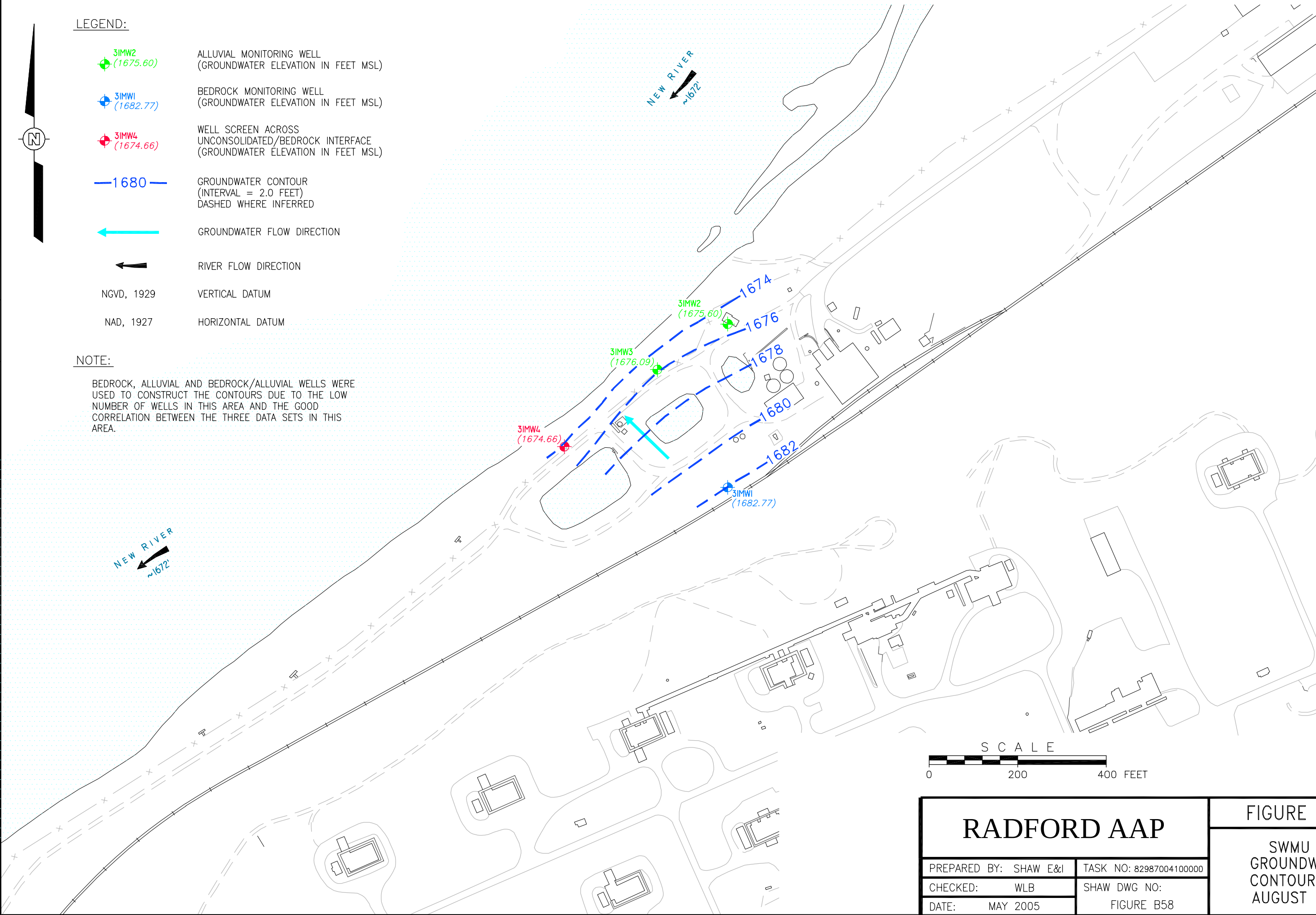
VERTICAL DATUM

NAD, 1927

HORIZONTAL DATUM

NOTE:

BEDROCK, ALLUVIAL AND BEDROCK/ALLUVIAL WELLS WERE
USED TO CONSTRUCT THE CONTOURS DUE TO THE LOW
NUMBER OF WELLS IN THIS AREA AND THE GOOD
CORRELATION BETWEEN THE THREE DATA SETS IN THIS
AREA.



RADFORD AAP

PREPARED BY: SHAW E&I

TASK NO: 82987004100000

CHECKED: WLB

SHAW DWG NO:

DATE: MAY 2005

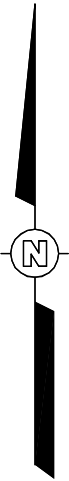
FIGURE B58

FIGURE B58

SWMU 31
GROUNDWATER
CONTOUR MAP
AUGUST 2003

File: C:\snyder_B\Anne Roadboch\FIGURE B59.dwg
XREF Files: IMAGE Files:
Plot Date/Time: Jun 26, 2007 - 4:52pm
Plotted By: william.snyder

OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Pittsburgh, PA	B. Snyder	B. Squire	W. Barner	FIGURE B59



LEGEND:

3IMW2
(1673.76)

ALLUVIAL MONITORING WELL
(GROUNDWATER ELEVATION IN FEET MSL)

3IMW1
(1681.54)

BEDROCK MONITORING WELL
(GROUNDWATER ELEVATION IN FEET MSL)

3IMW4
(1673.93)

WELL SCREEN ACROSS
UNCONSOLIDATED/BEDROCK INTERFACE
(GROUNDWATER ELEVATION IN FEET MSL)

—1680—

GROUNDWATER CONTOUR
(INTERVAL = 2.0 FEET)
DASHED WHERE INFERRED



GROUNDWATER FLOW DIRECTION



RIVER FLOW DIRECTION

NGVD, 1929

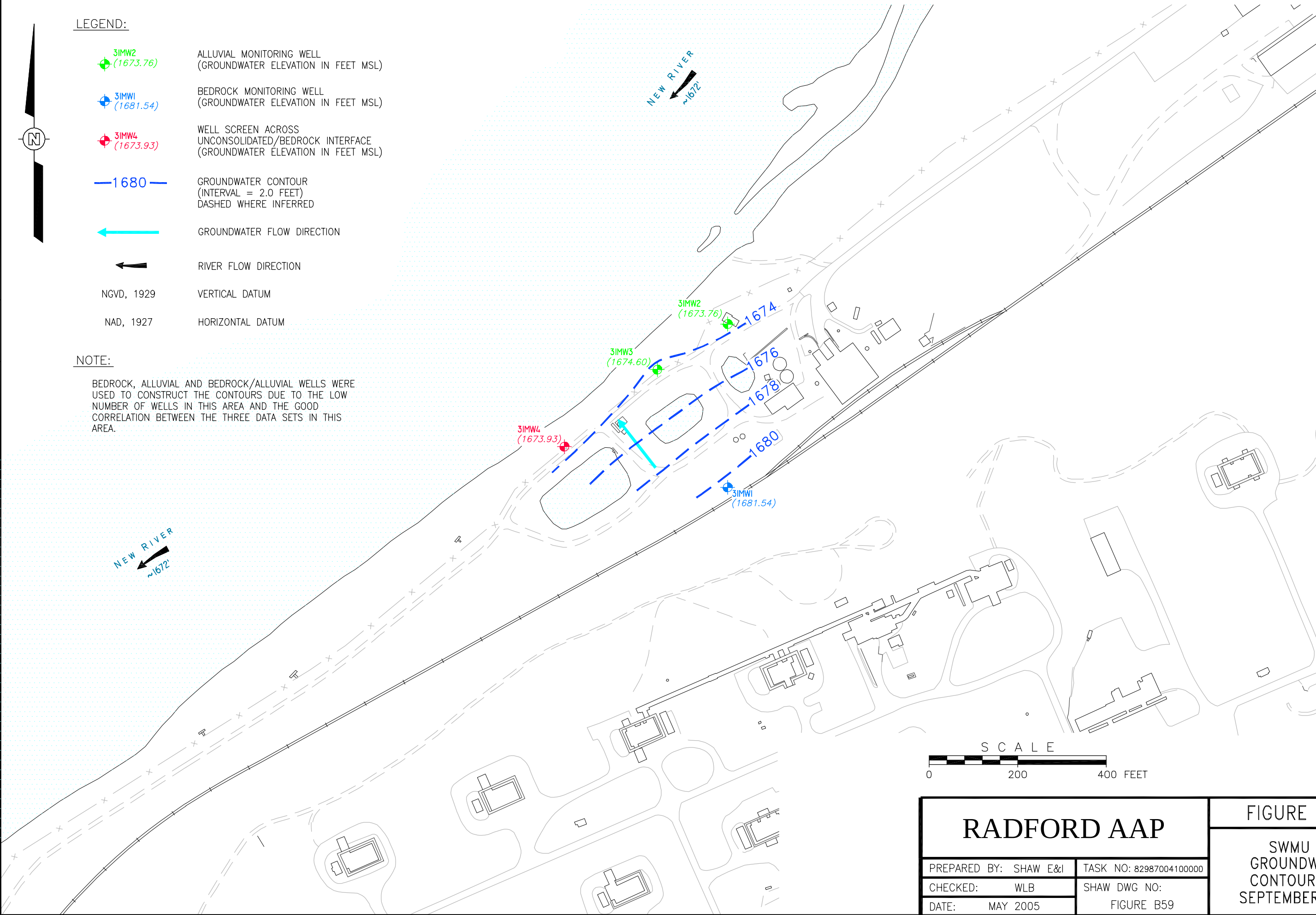
VERTICAL DATUM

NAD, 1927

HORIZONTAL DATUM

NOTE:

BEDROCK, ALLUVIAL AND BEDROCK/ALLUVIAL WELLS WERE
USED TO CONSTRUCT THE CONTOURS DUE TO THE LOW
NUMBER OF WELLS IN THIS AREA AND THE GOOD
CORRELATION BETWEEN THE THREE DATA SETS IN THIS
AREA.



RADFORD AAP

PREPARED BY: SHAW E&I

TASK NO: 82987004100000

CHECKED: WLB

SHAW DWG NO:

DATE: MAY 2005

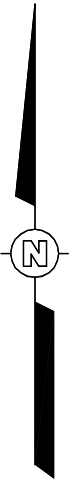
FIGURE B59

FIGURE B59

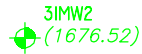
SWMU 31
GROUNDWATER
CONTOUR MAP
SEPTEMBER 2003

File: C:\snyder_B\Anne Roadboch\FIGURE B60.dwg
XREF Files: IMAGE Files:
Plot Date/Time: Jun 26, 2007 - 4:54pm
Plotted By: william.snyder

OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Pittsburgh, PA	B. Snyder	B. Squire	W. Barner	FIGURE B60

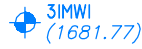


LEGEND:



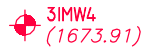
3IMW2
(1676.52)

ALLUVIAL MONITORING WELL
(GROUNDWATER ELEVATION IN FEET MSL)



3IMW1
(1681.77)

BEDROCK MONITORING WELL
(GROUNDWATER ELEVATION IN FEET MSL)



3IMW4
(1673.91)

WELL SCREEN ACROSS
UNCONSOLIDATED/BEDROCK INTERFACE
(GROUNDWATER ELEVATION IN FEET MSL)



1680

GROUNDWATER CONTOUR
(INTERVAL = 2.0 FEET)
DASHED WHERE INFERRED



GROUNDWATER FLOW DIRECTION



RIVER FLOW DIRECTION

NGVD, 1929

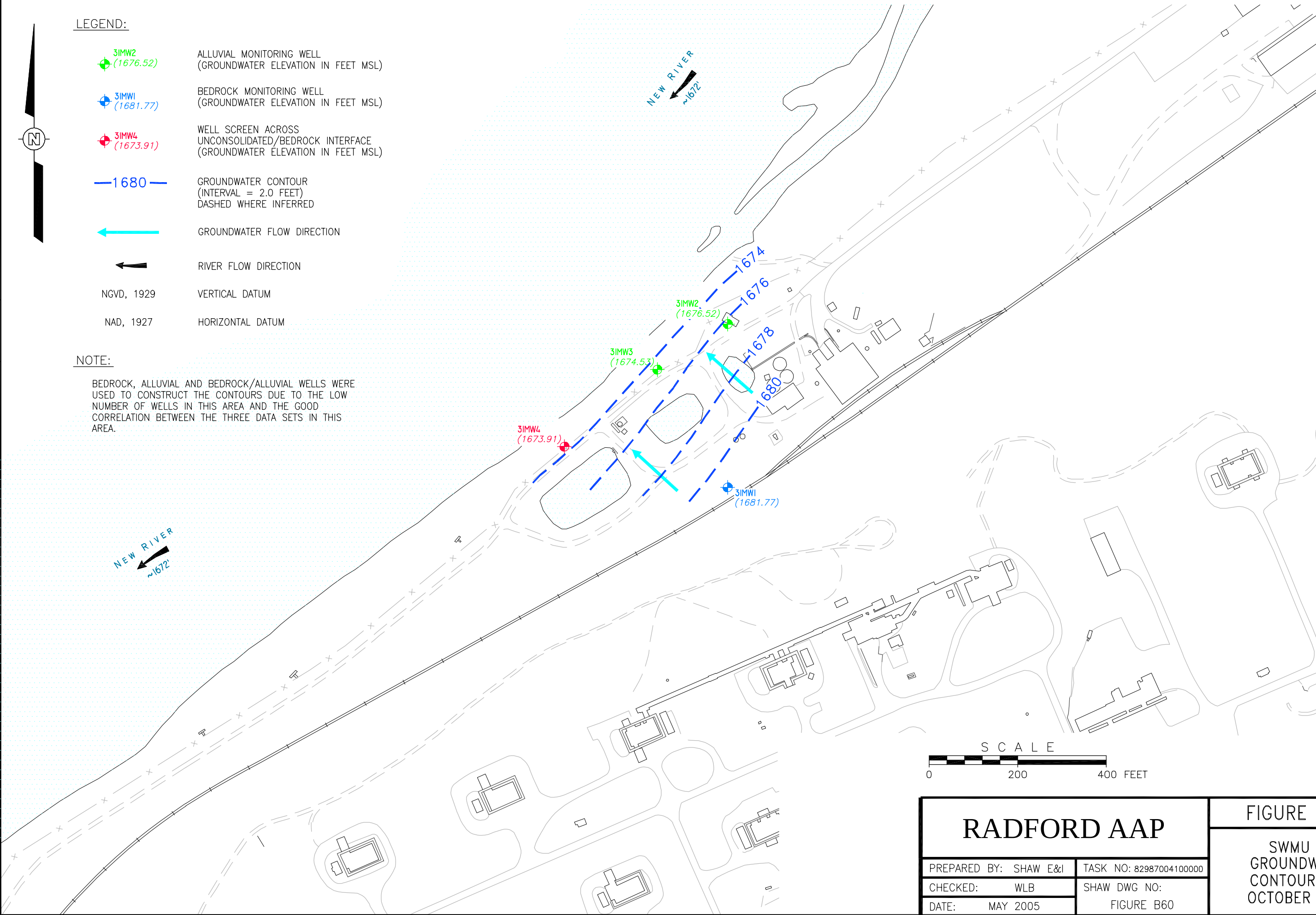
VERTICAL DATUM

NAD, 1927

HORIZONTAL DATUM

NOTE:

BEDROCK, ALLUVIAL AND BEDROCK/ALLUVIAL WELLS WERE
USED TO CONSTRUCT THE CONTOURS DUE TO THE LOW
NUMBER OF WELLS IN THIS AREA AND THE GOOD
CORRELATION BETWEEN THE THREE DATA SETS IN THIS
AREA.



RADFORD AAP		FIGURE B60
PREPARED BY: SHAW E&I	TASK NO: 82987004100000	SWMU 31 GROUNDWATER CONTOUR MAP OCTOBER 2003
CHECKED: WLB	SHAW DWG NO:	
DATE: MAY 2005	FIGURE B60	

Appendix B

Sample Location Coordinates and Elevations

Appendix B
2002 RFI/RI Sample Location Coordinates and Elevations

Site ID	Northing	Easting	Elevation
Bag Loading Area			
BLASB01	283759.34	1368917.41	2084.76
BLASB02	283502.61	1368951.35	2084.35
BLASB03	283341.75	1369107.91	2084.86
BLASD01	283903.51	1369209.54	2073.65
BLASD02	283115.70	1368168.26	2072.20
BLASW/SD04	283971.07	1367733.04	2003.67
BLASW/SD05	284400.83	1368617.19	1994.87
BLASS01	283735.43	1368904.58	2087.90
BLASS02	283747.77	1368919.86	2085.32
BLASS03	283723.57	1369027.29	2088.47
BLASS04	283732.33	1368791.41	2086.38
BLASS05	283590.26	1368532.63	2086.33
BLASS06	283353.92	1368682.97	2086.15
BLASS07	283109.21	1368757.63	2082.85
BLASS08	283247.04	1369015.59	2068.37
BLASS09	283468.23	1369148.14	2086.32
BLASS10	283521.12	1369131.36	2085.47
BLASS11	283651.84	1369055.02	2081.54
BLATR01	283784.45	1368843.33	2084.80
BLATR02	283690.21	1369522.45	2076.28
BLATR03	283241.96	1369122.06	2084.10
Building Debris Disposal Trench			
DTSB46	284166.38	1371883.27	1960.03
DTSB47	284128.88	1371950.70	1958.73
DTSW/SD05	284005.92	1372244.52	1952.75
DTSW/SD06	284086.19	1372031.44	1954.19
DTSW/SD07	284096.56	1371844.27	1953.76
DTSW/SD08	284144.86	1371572.38	1956.36
DTSW/SD09	284186.47	1371237.62	1958.86
DTSW/SD10	283930.50	1372438.79	1948.05
Igniter Assembly Area			
IASB06	286793.22	1366464.42	2127.94
IASB07	286836.19	1366537.77	2127.80
IASB08	286844.39	1366540.86	2128.29
IASB09	286836.85	1366552.22	2122.26
IASB10	286914.21	1366737.27	2124.12
IASB11	286979.25	1366847.43	2120.85
IASB12	287192.44	1367238.81	2121.22
IASB13	286025.74	1367290.50	2112.37
IASB14	286028.60	1367313.30	2107.72
IASB15	286008.67	1367303.03	2108.68
IASD04	287910.37	1367497.94	2114.74
IASD05	287657.23	1367299.29	2118.76
IASD06	287170.01	1367537.44	2108.59
IASD07	286025.18	1367841.73	2080.95

Appendix B
2002 RFI/RI Sample Location Coordinates and Elevations

Site ID	Northing	Easting	Elevation
IASD08	286514.15	1366312.47	2105.73
IASD09	286338.22	1366718.88	2122.81
IASD10	285779.61	1367016.88	2111.93
IASD11	286747.03	1366543.95	2126.90
IASD12	286943.25	1366899.46	2119.96
IASS01	286917.34	1366709.66	2123.41
IASS02	286897.08	1366725.28	2121.09
IASS03	286988.86	1366823.72	2121.87
IASS04	286947.80	1366843.37	2123.94
IASS05	286894.43	1367088.92	2126.78
IATR01	287823.59	1367495.93	2122.32
IATR02	287109.19	1366902.82	2126.63
IATR03	286905.87	1366899.75	2128.09
IATR04	287025.14	1367291.87	2121.66
IATR05	286459.03	1367090.96	2118.92
IATR06	286083.39	1367320.73	2109.75
IATR07	286161.33	1367703.26	2093.21
IATR08	285414.85	1366624.76	2081.53
Northern Burning Ground			
NBGSB11	288870.45	1368833.53	2154.81
NBGSB12	288871.04	1368826.40	2118.54
NBGSB13	288885.28	1368831.82	2128.63
NBGSB14	288893.22	1368805.31	2115.73
NBGSB15	288922.64	1368810.35	2110.33
NBGSB16	288859.88	1368801.27	2135.99
NBGSB17	288818.07	1368645.78	2130.78
NBGSB18	288797.04	1368646.91	2122.95
NBGSB19	288801.32	1368670.82	2130.48
NBGSD01	289003.59	1368849.12	2101.81
Rail Yard			
RYSB08	286615.43	1368757.30	2041.52
RYSB09	284542.93	1367320.88	2033.13
RYSD01	286830.09	1369221.73	2030.06
RYSW/SD03	286473.61	1369453.72	2013.26
RYSW/SD04	286368.75	1369597.05	2016.95
RYSW/SD05	286264.79	1369793.40	2002.11
RYSD06	284899.91	1370631.43	1971.93
RYSD07	285279.54	1368461.72	2039.99
RYSD08	284683.05	1368403.52	2003.63
RYSD09	284540.72	1367223.66	2035.61
RYSD10	284362.09	1366945.98	2037.34
RYSW/SD12	284208.69	1367255.84	2013.41
RYSW/SD13	283950.73	1367533.00	2007.47
RYSS01	285974.05	1368568.78	2045.32
RYSS02	285178.41	1368053.61	2047.59
RYSS03	284855.42	1368029.77	2041.99

Appendix B
2002 RFI/RI Sample Location Coordinates and Elevations

Site ID	Northing	Easting	Elevation
RYSS04	286911.05	1369352.62	2048.07
RYSS05	286849.89	1369465.50	2048.13
RYSS06	286296.66	1368624.47	2043.12
RYSS07	286140.09	1369021.93	2054.61
RYSS08	286142.52	1368914.54	2047.75
RYSS09	285772.89	1368473.07	2043.17
RYSS10	285630.88	1368573.94	2039.95
RYSS11	285640.85	1368771.27	2042.85
RYSS12	285400.47	1368530.00	2043.83
RYSS13	285181.89	1367961.93	2045.67
RYSS14	284630.09	1367511.38	2039.10
RYSS15	284796.18	1367441.78	2046.45
RYSS16	284074.95	1366562.65	2065.39
RYSW02	286579.33	1369337.92	2020.67
RYSW15	284877.53	1368094.86	2049.27
RYTR01	286633.00	1369318.92	2044.84
RYTR02	285973.88	1369088.62	2046.17
RYTR03	284670.93	1367814.54	2048.24
Western Burning Ground			
WGBSB22	284851.29	1366227.70	2059.31
WGBSB23	284790.45	1366222.56	2047.80
WGBSB24	284961.73	1366250.12	2051.85
WGBSB25	284935.45	1366172.97	2042.82
WBGSW/SD07	284894.86	1365981.81	2035.08
WBGSW/SD08	284475.46	1366635.69	2031.46
WBGSW/SD09	284307.45	1366821.35	2023.52
WBGSW/SD10	284671.29	1366304.58	2033.71
WBGSD11	284645.80	1366262.78	2041.21
WBGSD12	284767.63	1366126.27	2038.34
WBGSW/SD13	284429.37	1366592.28	2027.15
WBGSW/SD14	283749.40	1367174.17	2013.71
WBGSW/SD15	284590.53	1365617.15	2043.91
SWMU 31			
31SB5	319274.11	1397144.57	1696.65
31SE07	319082.44	1396997.74	1678.92
31SE08	319195.52	1397149.85	1687.90
31SE09	319115.09	1397190.57	1685.51
31SE10	319032.18	1397061.01	1685.90
31SE11	319259.24	1397221.85	1684.85
31SE12	319285.59	1397386.15	1686.62
31SE13	319336.53	1397453.76	1693.18
31SE14	319395.27	1397412.05	1692.46
31SW10	319032.18	1397061.01	1685.90
31SW12	319285.59	1397386.15	1686.62
31SW14	319375.01	1397477.91	1693.98
SWMU 39			

Appendix B
2002 RFI/RI Sample Location Coordinates and Elevations

Site ID	Northing	Easting	Elevation
39SS08	321302.51	1403422.04	1700.60
39SS07	321268.19	1403446.59	1701.35
39SB05	321280.53	1403572.97	1695.95
39SS10	321191.31	1403579.29	1701.35
39SB06	321168.54	1403484.18	1697.50
39SS12	321132.53	1403758.27	1700.54
39SS09	321359.21	1403646.31	1701.70
39SS11	321111.42	1403466.10	1698.86
SWMU 48			
48SB08	319794.89	1409321.52	1821.46
48SB09	319798.39	1409276.73	1818.62
48SB10	319883.83	1409354.18	1829.80
SWMU 49			
49SB02	319580.55	1409695.49	1822.51
49SS01	319564.90	1409729.76	1826.82
SWMU 50			
50SB04	319589.68	1409465.00	1817.07
50SB05	319535.10	1409565.65	1817.72
50SS01	319720.75	1409575.01	1817.54
50SS02	319594.60	1409300.53	1813.66
50SS03	319490.84	1409427.01	1814.32
SWMU 58			
58SB04	320598.06	1404050.91	1771.09
58SS04	320789.00	1404151.25	1736.95
SWMU 59			
59SB01	319758.86	1409727.32	1822.39
59SS03	319836.99	1409715.36	1826.83
59SS04	319833.15	1409669.00	1827.62
59SS05	319657.37	1409707.51	1822.70
Building 4343			
B43SB34	318498.04	1399103.57	1810.50
B43SB35	318221.52	1399079.40	1832.03
B43SS01	318172.98	1399050.16	1831.32
B43SS02	318551.51	1399055.04	1807.16
B43SS03	318560.34	1399094.03	1810.54
Former Lead Furnace Area			
LFSB12	313403.07	1404006.95	1885.30
LFSB13	313283.58	1403971.45	1875.13
LFSB14	313268.78	1404005.57	1888.08
LFSB15	313253.86	1403925.02	1875.74
LFSB16	313298.16	1403964.35	1871.75
LFSB17	313320.86	1403964.67	1872.85
LFSS01	313377.33	1403978.38	1875.17
LFSS02	313309.24	1404015.18	1888.10
LFSS03	313242.30	1403943.03	1880.75

Appendix C

Quality Assurance/Quality Control

Appendix C-1

Analytical Services and Procedures

ANALYTICAL SERVICES AND PROCEDURES

ANALYTICAL SERVICES

The analytical services for the field investigation program were provided by the following USACE-validated laboratories:

- DataChem Laboratories (DCL), Salt Lake City, UT. DCL used USEPA-SW846, 3rd ed., Test Methods for Evaluating Solid Waste, Update III (USEPA, 1996e) methodologies in providing analytical support for this project for every parameter except dioxins/furans, total petroleum hydrocarbons (TPH), grain size, and total organic halides (TOX). These parameters were subcontracted by DCL. DCL used Standard Methods for the Examination of Water and Wastewater, 18th Edition (APHA, 1992) for hardness and USEPA Methods for Chemical Analysis of Water and Wastes (MCAWW) (USEPA, 1983) for perchlorate and chemical oxygen demand (COD).
- Southwest Laboratory of Oklahoma, Inc. (SWOK), Broken Arrow, OK. SWOK used USEPA-SW846, 3rd ed., Test Methods for Evaluating Solid Waste, Update III (USEPA, 1996e) methodologies in providing analytical support for dioxins/furans.
- Mountain States Analytical, Inc. (MSAI), Salt Lake City, UT. MSAI used USEPA-SW846, 3rd ed., Test Methods for Evaluating Solid Waste, Update III (USEPA, 1996e) methodologies in providing analytical support for TOX and used USEPA's Office of Water methodology (USEPA, 1999c) in providing analytical support for TPH.
- Applied Geotechnical Engineering Consultants, Inc. (AGEC), Sandy, UT. AGEC used American Society for Testing and Materials (ASTM) (ASTM, 1991) in providing support for grain size analysis.

ANALYTICAL PROCEDURES

Analytical protocols used were in accordance with USEPA-approved methods for the analysis of environmental (i.e., organic, inorganic, and physical parameters) and waste characterization samples. The methodologies for environmental samples are summarized in **Table C-1** and for waste characterization samples in **Table C-2**. A brief discussion of the methodologies is presented in the following sections below.

Organics

Target compound list (TCL) VOCs, TCL SVOCs, TCL pesticides, TCL polychlorinated biphenyls (PCBs), herbicides, explosives, including nitroglycerin (NG) and pentaerythritol tetranitrate (PETN), polynuclear aromatic hydrocarbons (PAHs), dioxins/furans, and total petroleum hydrocarbons (TPH) were analyzed using USEPA-approved methodologies. The laboratory procedures and methodologies for organic compounds are summarized below.

TCL VOCs. Samples were analyzed for TCL VOCs using USEPA SW-846 Method 5030B/8260B for aqueous samples and USEPA SW-846 5035B/8260B for solid matrices using purge and trap technology. Soil samples were collected using an EnCore sampling device and subsequently sent to the laboratory for analysis. No sodium bisulfate was added to the soils due to the possibility of effervescence and ketone formation. An inert gas is bubbled through a mixture of reagent water and 5 gram soil sample or through a 25 mL aqueous sample contained

Table C-1
Summary of Analytical Methods for Environmental Samples

Parameter	Matrix	Analytical Method
TCL VOCs	Aqueous	USEPA SW-846 5030B/8260B
	Solid	USEPA SW-846 5035B/8260B
TCL SVOCs	Aqueous	USEPA SW-846 3510C/8270C
	Solid	USEPA SW-846 3550C/8270C
TCL Pesticides	Aqueous	USEPA SW-846 3510C/8081A
	Solid	USEPA SW-846 3550C/8081A
TCL PCBs	Aqueous	USEPA SW-846 3510C/8082
	Solid	USEPA SW-846 3550C/8082
Herbicides	Aqueous	USEPA SW-846 8151A
	Solid	USEPA SW-846 8151A
Explosives	Aqueous	USEPA SW-846 8330
	Solid	USEPA SW-846 8330
Nitroglycerin	Aqueous	USEPA SW-846 8332
	Solid	USEPA SW-846 8332
PETN	Aqueous	USEPA SW-846 8332
	Solid	USEPA SW-846 8332
Polynuclear Aromatic Hydrocarbons	Aqueous	USEPA SW-846 3510C/8270C SIM
	Solid	USEPA SW-846 3550C/8270C SIM
Total Petroleum Hydrocarbons	Solid	USEPA 1664
TAL Metals	Aqueous	USEPA SW-846 3015A/6010B; 3010(Mod.)/6020; and 7470A
	Solid	USEPA SW-846 3051A/6010B; ILM05.0 Draft/6020; 7471A
TAL Dissolved Metals	Aqueous	USEPA SW-846 3015A/6010B; 3010(Mod.)/6020; and 7470A
Dioxins/Furans	Aqueous	USEPA SW-846 8290
	Solid	USEPA SW-846 8290
Perchlorate	Aqueous	USEPA 314.0
pH	Solid	USEPA SW-846 9045C
Grain Size	Solid	ASTM Method D-422
Hardness	Aqueous	SM 2340B (Calc.)
Total Organic Carbon	Aqueous	USEPA SW-846 9060A
	Solid	USEPA Lloyd Kahn
Total Organic Halides	Aqueous	USEPA SW-846 9020B
Asbestos	Solid	USEPA 600/R-93/116

Table C-2
Summary of Analytical Methods for Waste Characterization Samples

Parameter	Matrix	Analytical Method
TCLP VOCs	Aqueous	USEPA SW-846 1311/5030B/8260B
	Solid	USEPA SW-846 1311/5030B//8260B
TCLP SVOCs	Aqueous	USEPA SW-846 1311/3510C/8270C
	Solid	USEPA SW-846 1311/3550C/8270C
TCLP Metals	Aqueous	USEPA SW-846 1311/3015A/6010B/7470A
	Solid	USEPA SW-846 1311/3015A/6010B/7471A
TCLP Pesticides	Aqueous	USEPA SW-846 1311/3510C/8081A
	Solid	USEPA SW-846 1311/3550C/8081A
TCL PCBs	Aqueous	USEPA SW-846 3510C/8082
	Solid	USEPA SW-846 3550C/8082
Chemical Oxygen Demand	Aqueous	USEPA 410.4
Corrosivity as pH	Aqueous	USEPA SW-846 9040B
	Solid	USEPA SW-846 9045C
Reactive Cyanide	Aqueous	USEPA SW-846 Chapter 7.3.3
	Solid	USEPA SW-846 Chapter 7.3.3
Reactive Sulfide	Aqueous	USEPA SW-846 Chapter 7.3.4
	Solid	USEPA SW-846 Chapter 7.3.4
Ignitability	Aqueous	USEPA SW-846 1010
	Solid	USEPA SW-846 Chapter 7.1.2.2

in a specifically designed purging chamber at 40°C for solid and ambient temperature for water. The vapor was swept through a sorbent column where the purgeable compounds were trapped. After purging was completed for both solid and aqueous samples, the sorbent column was heated and backflushed with the inert gas to desorb the purgeable compounds onto a gas chromatograph programmed to separate the purgeable compounds, which are then detected with a mass spectrometer.

TCL SVOCs/PAHs. Samples were analyzed for TCL SVOCs/PAHs using USEPA SW-846 Method 8270C. The use of selective ion monitoring (SIM) using USEPA SW-846 Method 8270C SIM was employed for PAH analysis to achieve lower quantitation and detection limits in order to meet screening criteria. Solid samples were extracted using soxhlet according to USEPA SW-846 Method 3550C and aqueous samples were extracted using a continuous liquid-liquid extraction technique according to USEPA SW-846 Method 3510C. The extract was injected into a gas chromatograph programmed to separate the compounds, which are then detected with a mass spectrometer.

TCL Pesticides/PCBs. Samples were analyzed for TCL pesticides using USEPA SW-846 Method 8081A and for TCL PCBs using USEPA SW-846 Method 8082. Aqueous and solid samples were prepared for analysis using extraction techniques. Solid samples were extracted

using soxhlet method USEPA SW-846 Method 3550C for samples. Aqueous samples were extracted using a continuous liquid-liquid extraction technique by USEPA SW-846 Method 3510C. The extract was injected onto a gas chromatography programmed to separate the compounds, which are then detected with an electronic capture device (ECD). Sulfur cleanups were employed to aid in the quantification based upon the matrix interferences. Sample concentrations were confirmed on dissimilar columns.

Herbicides. Samples were analyzed for herbicides according to USEPA SW-846 Method 8151A. Aqueous and solid samples were extracted with diethyl ether and then esterified with diazomethane. The derivatives are determined by gas chromatography with an electron capture detector (GC/ECD). The results were reported as acid equivalents. Sample concentrations were confirmed on dissimilar columns.

Explosives. Samples were analyzed for explosives using USEPA SW-846 Method 8330. Aqueous samples of low concentration were extracted by a salting-out extraction procedure with acetonitrile and sodium chloride. The small volume of acetonitrile that remained undissolved above the salt water was drawn off and transferred to a smaller volumetric flask. It was back extracted by vigorous stirring with a specific volume of salt water. After equilibration, the phases were allowed to separate and the small volume of acetonitrile residing in the narrow neck of the volumetric flask was removed. The concentrated extract was diluted with reagent grade water, and an aliquot is separated on a C-18 reverse phase column. The wavelength was set at 254 nanometers and confirmed on a cyanide reverse column. Solid samples were extracted using acetonitrile in an ultrasonic bath, then filtered and chromatographed similarly to aqueous samples. Sample concentrations were confirmed on dissimilar columns.

NG/PETN. Samples were analyzed for NG/PETN using USEPA SW-846 Method 8332. Solid samples were extracted with acetonitrile in an ultrasonic bath, then filtered and mixed with a calcium chloride solution. Aqueous samples were extracted according to USEPA SW-846 Method 8330, using a double salting-out procedure with acetonitrile. The extract is mixed with calcium chloride just prior to analysis. The concentration was quantified using an isocratic HPLC system equipped with a column heater and UV detector. Sample concentrations were confirmed on dissimilar columns.

Dioxins/furans. Samples were analyzed for dioxin/furans using USEPA SW-846 Method 8290. The analytical method used high-resolution gas chromatography and high-resolution mass spectrometry (HRGC/HRMS) on purified sample extracts. This method is specific for the analysis of 2,3,7,8-tetrachlorinated dibenzofuran (2,3,7,8-TCDD), substituted penta-, hexa-, hepta- and octachlorinated dibenzo-p-dioxins and substituted penta-, hexa-, hepta- and octachlorinated dibenzofurans in water and solid samples. The extracts were injected onto a high-resolution gas chromatograph programmed to separate the compounds, which are then detected with a high-resolution mass spectrometer as confirmation.

TPH. Samples were analyzed for solids for TPH-Hexane Extractable Material (HEM) using USEPA Method 1664. A representative portion of soil sample was acidified and chemically dried with acidified sodium sulfate. The HEM was extracted with n-hexane using a sonication method. The n-hexane is then filtered into a pre-weighed vessel and evaporated. The vessel was desiccated and weighed. The HEM was re-dissolved in n-hexane. Silica gel was added to the HEM, shaken, filtered, and evaporated for silica gel treated-HEM determination.

Inorganics

Target analyte list (TAL) metals, mercury, cyanide, and hardness were analyzed using USEPA SW-846 methodologies. Perchlorate was analyzed using USEPA MCAWW methodologies. The laboratory procedures for inorganic compounds are summarized below.

TAL Metals/Hardness. TAL metals and hardness were analyzed using a combination of the following methodologies: inductively coupled plasma (ICP), ICP/ mass spectroscopy (MS), and cold vapor atomic absorption (CVAA). Trace metals were analyzed using USEPA SW-846 Methods 3015A/6010B and 3010(Mod.)/6020 for aqueous samples and Methods ILM05.0 Draft/6020 and 3051A/6010B for solid samples. Total hardness was calculated from the calcium and magnesium concentrations using Standard Method 2340B. The ICP method involved the simultaneous or sequential multi-element determination of trace elements in solution. The basis of the method is the measurement of atomic emission by optical spectrometry. Samples were nebulized and the aerosol that was produced was transported to the plasma torch where excitation occurs. Characteristic atomic-line emission spectra are produced by a radio-frequency ICP. A background correction technique was utilized to compensate for variable background contribution for the determination of trace elements.

Mercury was analyzed using CVAA according to USEPA SW-846 Method 7470A for aqueous samples and Method 7471A for solid samples. A sample aliquot was initially digested with nitric acid to free combined mercury. The mercury was then reduced to its elemental state and aerated from the solution into a closed system. The mercury vapor was passed through a cell positioned in the path of the mercury light source and the measured abundance was proportional to the concentration of mercury in the sample.

Perchlorate. Perchlorate was analyzed using ion chromatographic method USEPA MCAWW Method 314.0 for aqueous samples. Perchlorate was measured by the peak height or area generated from the sample elution through an anion separator column with a conductivity detector.

Waste Characterization

Samples collected to characterize investigative-derived materials were analyzed for hazardous waste characteristics using USEPA-approved methodologies., including toxicity characteristic leachate procedure (TCLP) VOCs, TCLP SVOCs, TCLP metals, TCLP pesticides, TCL PCBs, chemical oxygen demand (COD), corrosivity as pH, reactive cyanide, reactive sulfide, and ignitability. The laboratory procedures and methodologies are summarized below.

TCLP Extraction. Soil samples collected for material characterization were extracted using the USEPA SW-846 Method 1311. The final liquid extract was separated from the solid material and combined with the initial liquid phase (if applicable). The sample TCLP extract was then treated as an aqueous sample for analysis for VOCs, SVOCs, pesticides, and metals.

Reactivity. Reactivity comprises of reactive sulfide and reactive cyanide. Reactive sulfide was analyzed in aqueous and solid samples using USEPA SW-846 Method Chapter 7.3.4. This procedure was a colorimetric determination. Sulfide reacted with dimethyl-p-phenylenediamine in the presence of ferric chloride to produce methylene blue. Reactive cyanide was analyzed in aqueous and solid samples using USEPA SW-846 Method Chapter 7.3.3.

Ignitability. Ignitability was analyzed using USEPA SW-846 Method 1010 for aqueous samples and USEPA SW-846 Method Chapter 7.1.2.2 for solid samples. A sample was heated at a slow, constant rate with continual stirring. A small flame was directed into the cup at regular

intervals with simultaneous interruption of stirring. The flash point was the lowest temperature at which application of the test flame ignited the vapor above the sample.

Corrosivity as pH. Corrosivity as pH was analyzed using USEPA SW-846 Method 9040B for aqueous samples and Method 9045C for solid samples. A sample pH was directly measured electrometrically using either a glass electrode in combination with a reference potential or a combination electrode. For solids, samples were mixed 1:1 with reagent water prior to measurement.

COD. COD was analyzed using USEPA MCAWW Method 410.4. A sample was heated under acidic conditions at a slow, constant rate in an oven or block digester in the presence of dichromate at 150°C for two hours. The COD was measured at 600 nm spectrophotometrically.

Physical Analyses

Grain size. Grain size distribution was determined using ASTM Method D-422 for solid samples. A No. 200 sieve was used to separate particles larger than 75 micrometer (µm) from the soil, while the distribution of particles smaller than 75 µm was determined by a sedimentation process, using a hydrometer to secure the necessary data.

TOC. Samples were analyzed for TOC using the USEPA Kahn Method for solid samples. Samples were subjected to either a catalytic combustion or wet chemical oxidation to convert the organic carbon in the sample to carbon dioxide. The carbon dioxide formed was then measured directly by an infrared detector or converted to methane and measured by a flame ionization detector. The amount of carbon dioxide or methane produced was directly proportional to the concentration of carbonaceous material.

TOX. Aqueous samples were analyzed for TOX using USEPA SW-846 Method 9020B. Samples were passed through a conditioned column containing activated carbon, which adsorbs the organohalides. The activated carbon was then combusted to convert the organohalides to hydrogen halide, which was trapped and titrated electrolytically using a microcoulometric detector.

pH. Samples were analyzed for pH using USEPA SW-846 Method 9045C for solid samples. A sample pH was directly measured electrometrically using either a glass electrode in combination with a reference potential or a combination electrode. For solids, samples are mixed 1:1 with reagent water prior to measurement.

Asbestos. Samples were analyzed for asbestos using method USEPA 600/R-93/116. Samples were ground to insure homogeneity. A polarizing light microscope equipped with 10x and 16x objectives and a 10x eyepiece was used for the analysis. If present, asbestos identities were confirmed with the appropriate refractive index liquids applying dispersion staining techniques. The area percentages of asbestos and other fibrous constituents were estimated microscopically by a visual examination of the fibers with an aspect ratio of 3:1 or greater. For the purposes of the reports generated, fiberglass was defined as fibrous glass with parallel sides and mineral wool was defined as fibrous glass with nonparallel sides.

Appendix C-2

Quality Assurance/Quality Control Evaluation

QUALITY ASSURANCE/QUALITY CONTROL EVALUATION

An independent Quality Assurance Project Plan Addendum (QAPA) was developed as part of MWP Addendum 009 (IT, 2002). The QAPA was implemented through the integration of well-defined quality control elements for activities associated with the task assignment. The quality control criteria defined for sampling and analysis activities were developed in conjunction with specifications contained in USACE EM200-1-3, *Requirements for the Preparation of Sampling and Analysis Plans*, (USACE, 2001) as well as the *USACE Shell Guidance for Analytical Chemistry* (USACE, 2001).

Table C-3 outlines the data quality indicators as to their definitions, project goals, sampling and analytical assessments. Data quality was assessed through the evaluation of sampling activities and field measurements associated with the chemical analytical data in order to assess the reliability of the chemical analyses and the accuracy and precision of information acquired from the laboratory.

Table C-3
RFI Data Quality Indicators

Data Quality Indicator	Definition	Goal	Sampling Assessment	Analytical Assessment
Precision	Quantitative measure of the variability of a group of measurements in comparison to the average value	Low relative percent difference	Duplicate samples	MS/MSD or lab sample duplicate; Field sample duplicate
Accuracy	Bias in a measurement system	Low bias	Blank contamination	Analysis spike results (LCS, MS)
Representativeness	Degree to which the measured results accurately reflect the medium being sampled	100%	Holding times, blanks, associated documentation	Inferred from accuracy, precision, and completeness evaluation
Completeness	Percentage of measurements which are judged to be usable	98±2%	Records review	Data validation
Comparability	Qualitative parameter expressing the confidence with which one data set can be compared with another	High	Work plans, quality documents	Analytical methods
Sensitivity	Quantitative measure of the level of detection and quantitation.	High	Review of analytical method or procedures and instrumentation	Analysis of MDL studies and practical quantitation limits per analytical method and matrix

Review of Documentation

The following documentation was required by the field investigation program in order to provide a quality assessment of data collected during routine investigative activities:

- **Field Logbooks:** Hardback logbooks with numbered pages were used to log daily activities, and data collected during the course of field activities. Designated logbooks were also used to record calibration records and equipment maintenance as they were performed. Entries into field logbooks were evaluated for completeness and accuracy.
- **Field Parameter Forms:** Documentation of collected samples was provided to the laboratory on parameter forms developed by Shaw specifically for USACE investigations. Field Parameter Forms were electronically generated based on information recorded in field logbooks and were completed at the time of shipment to be included with the Chain-of-Custody for every sample, including QC samples. The completed forms contained the required information for encoding chemical data into ERIS database.
- **Chain-of-Custody:** Samples were collected and relinquished under stringent Chain-of-Custody protocols as specified in the project QA plan. A review of the Chain-of-Custodies identified transcription errors that were corrected by drawing a single line through the incorrect information and subsequently correct information was supplied, dated, and initialed.
- **Sample Tracking Table:** Documentation of collected samples was recorded in an electronic sample tracking table on a daily basis. Field entries included the field sample identification, sample depth (where applicable), date collected, chain of custody and/or field parameter form number, and laboratory analyses requested.

Sampling activities were performed in compliance with standard operating procedures (SOPs) and each individual performing sampling was aware of the requisite protocols for collection of environmental samples. A copy of the 2002 RFI field audit report performed by the Shaw Project QA Manager is presented as **Appendix C-3**. There were no significant non-conformances found during the audit.

Data Reporting

Data packages were provided to Shaw in CLP-like deliverables with electronic data deliverable files from the laboratory. Detected target compound values above the reporting limit and within the acceptable calibration range were reported as determined to no more than three significant figures. Target analytes detected below the lower calibration standard or reporting limit and above the method detection limit were reported as estimated values. Appropriate data qualifiers were applied during validation process and recorded in an electronic database.

Data Reduction and Validation

Data validation determines the acceptability or unacceptability of the data quality based on a set of pre-defined criteria. Data validation is defined as the systematic process for reviewing a data package against a set of criteria to provide assurance that the data is adequate for its intended uses. These criteria depend upon the type(s) of data involved and the purpose for which data are collected. The intended use of the data and the associated acceptance criteria for data quality was identified before the data collection effort began. Both the organic and inorganic chemical

data (except for the waste characterization) were validated. The data were validated in accordance with MWP QAP requirements (URS, 2003), USACE Shell requirements (USACE, 2001), method-specific criteria from USEPA-SW846, Third Edition, Test Methods for Evaluating Solid Waste, Update III (USEPA, 1996e), and laboratory SOPs. The data qualifier scheme was consistent with USEPA Region III conventions using the USEPA Region III Modifications to National Functional Guidelines for Inorganic Data Review (USEPA, 1993b), USEPA Region III Modifications to the National Functional Guidelines for Organic Data Review Multi-media, Multi-concentration (USEPA, 1994c), and the USEPA Region III Dioxin/Furan Data Validation Guidance (USEPA, 1999d) as appropriate.

Data packages were validated to ensure compliance with specified analytical, Quality Assurance/Quality Control (QA/QC) requirements, data reduction procedures, data reporting requirements, and required accuracy, precision, and completeness criteria. This includes (as applicable), but is not limited to:

- Sample preservation and holding times;
- Instrument performance check;
- Calibration (initial and continuing);
- Blanks (calibration, preparatory, rinse, trip);
- Matrix spike and spike duplicate recoveries;
- Laboratory and field sample duplicate pairs;
- Surrogate spike recoveries;
- Laboratory control samples;
- Interference check sample (for metals);
- Serial dilution (for metals);
- Internal standards and retention times (for GC/GC/MS/IC); and,
- Quantitative verification.

Results were assessed for accuracy and precision of laboratory analysis to identify the limitations and quantity of data. The data validation reports are contained on a CD located at the back of this report. The quality of the data collected in support of the sampling activity was considered acceptable, unless qualified rejected “R” during the validation process. Samples qualified “B” for blank contamination were considered non-detect at the MRL or level of blank contamination, whichever was greater. Samples qualified “J”, “UJ”, “L”, “UL”, or “K” were considered acceptable as estimated.

Data Review

Data obtained from both the laboratory and data validation were reviewed by the Shaw Project Chemist to assess whether the project-specific data quality objectives, as defined in the associated QAP, were met.

Data Quality Objectives

Data quality objectives were developed concurrently with the Work Plan to ensure: (1) the reliability of field sampling, chemical analyses, and physical analyses; (2) the collection of sufficient data; (3) the quality of data generated was acceptable for its intended use; and (4) valid assumptions could be inferred from the data. Attainment of data quality objectives was assessed through evaluation of data collected using the following data quality indicators:

- **Precision** - a quantitative measure of the variability of a group of measurements in comparison to the average value;
- **Accuracy** - the bias in a measurement system;
- **Representativeness** - the degree to which the measured results accurately reflect the medium being sampled. Representativeness will be assessed based on accuracy, precision, and completeness;
- **Completeness** - the percentage of measurements which are judged to be useable;
- **Comparability** - defined as a qualitative parameter expressing the confidence with which one data set can be compared with another; and,
- **Sensitivity** - describes the method detection, quantitation, and reporting limits. It also may be expressed as the slope of the analytical curve (intensity verses concentration).

Data quality was assessed through the evaluation of sampling activities and field measurements associated with the chemical data in order to verify the reliability of the chemical analyses and the accuracy and precision of information acquired from the laboratory.

Precision. Method or laboratory precision performed by the laboratory was evaluated during the validation process. Overall sampling or field precision was evaluated during the data review process. Precision is measured by calculating and evaluating the relative percent difference (RPD) between the results of field or laboratory duplicates. The RPD is calculated by the following equation:

$$\text{RPD (\%)} = \frac{|XA - XB|}{XM * 100}$$

Where:

XA and XB are duplicate analyses, and

XM is the mean value $[(XA + XB)/2]$ of the duplicate analyses.

The RPD was calculated for those analytes which were detected at levels exceeding the method detection limits in both samples of the duplicate pair. Analytes that were qualified because of blank contamination (B-qualified) or were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Analytical results were qualified as estimated (J) for RPDs exceeding criteria for both the sample and its duplicate pair.

Laboratory duplicate sample determinations were used to demonstrate acceptable method precision by the laboratory at the time of analysis and evaluated. Laboratory precision was performed either on the sample and its duplicate pair or the matrix spike and its spike duplicate

pair. Duplicate analyses were performed to generate data in order to assess the long-term precision of the analytical method on various matrices. RPDs must be within established control limits. Field duplicates were collected site-wide during the RFI on a 10% frequency per matrix to identify the cumulative precision of the sampling and analytical process, which includes the homogenization of soil and sediment samples. Field precision control criterion was established at 35% RPD for the soil samples.

- **SWMU 31 Laboratory Duplicate Analysis.** Laboratory duplicate pairs or laboratory spiked duplicate pairs were evaluated for SWMU 31. Laboratory duplicate pairs or laboratory spiked duplicate pairs were evaluated. Laboratory duplicate pairs or laboratory spiked duplicate pairs were within specified precision criteria for each parameter and/or compound except for endrin aldehyde, acetone, hexachlorocyclopentadiene, 2,4-D, 2,4,5-TP, 2,4-DB, dichlorprop, dicamba, dinoseb, aluminum, chromium, magnesium, nickel, antimony, arsenic, cadmium, lead, thallium, iron, selenium. Selenium was outside due to low sample concentrations; therefore, no qualifiers were applied based upon this outlier. The spiked sample concentration was greater than four times the spike added for iron and aluminum; therefore, no qualifiers were applied based upon these outliers. Analytical results for remaining compounds were qualified as estimated for RPDs exceeding criteria for where the associated compounds were detected and no qualifier were non-detected. While these parameters were qualified estimated due to the high RPDs, the data was still considered useable, the precision data quality goal was met, and the qualified data did not impact the data quality for the RFI. Further discussion may be found in the data validation reports located on a CD at the back of this report.
- **SWMU 31 Field Duplicate Analysis.** Field precision frequency was conducted on a site-wide basis. Field duplicate pair 31SE10B and TMSE10B were collected during field sampling activities at SWMU 31. Every compound was within specified field precision criteria for each parameter and/or compound except for calcium, magnesium, dibenzofuran, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, 1,2,3,4,6,7,8-HPCDF, OCDF, Total HXCDD, Total HXCDF, and Total HPCDF. The high RPDs for these compounds resulted primarily from low PAH and dioxin sample concentrations and given matrix effects. The noted compounds were qualified estimated "J" for the sample and its duplicate pair. While these parameters were qualified estimated due to the high RPDs, the data was still considered useable, the precision data quality goal was met, and the qualified data did not impact the data quality for the RFI.

Accuracy. Accuracy is the measure of bias in a system. The accuracy of the results is measured by percent recovery (%R). Laboratory analytical accuracy was assessed through the use of laboratory blanks (method and instrument), rinse blanks, trip blanks, laboratory control samples (LCSs), and matrix spikes (MSs). Laboratory analytical accuracy was reviewed during the validation of data. Sampling accuracy was assessed by evaluating blank contamination and the impact of contaminant contributions originating from non-point sources, such as field sampling equipment decontamination procedures, or laboratory contamination. QC samples evaluated for this assessment included equipment blanks and laboratory method or preparatory blanks. The data validation qualifiers would be applied for analytical non-conformances as outlined in the

USEPA Region III validation guidance. For non-spiked samples, accuracy was measured by the following equation:

$$\%R = \frac{\text{test value}}{\text{true value}} * 100$$

For spiked samples, accuracy was measured by the following equation:

$$\%R = \frac{\text{test value} - \text{spiked value}}{\text{true value}} * 100$$

Method and calibration blanks, laboratory control samples, matrix spikes, rinse blanks, and trip blanks discussion follows. Method blanks, laboratory control samples, matrix spikes, rinse blanks and trip blanks were evaluated.

Method and Calibration Blanks. A method blank is a volume of analyte-free water or soil that is processed through the entire analytical scheme (i.e., extraction, digestion, concentration, and analysis) as with the actual samples. Method blanks monitor potential laboratory-induced contamination. Results were qualified “B” for blank contamination by the laboratory and/or through the data validation process. In accordance with USEPA Region III data validation guidelines, reported sample results were considered "non-detect" and qualified with the letter "B" if the detected sample concentration was within 5 times (10 times for common laboratory contaminants: methylene chloride, acetone, 2-butanone, OCDD/OCDF, and common phthalate esters) the concentration in the associated method blank. The method blank contamination assessment was evaluated during the data validation process and may be found in the data validation reports located on a CD at the back of this report. Method blanks were calculated and compared against the same matrix environmental samples on a batch specific basis. No unit conversions were necessary for method blanks since they were treated in the same manner as the samples. Calibration blanks were also compared against the environmental samples for select parameters. Calibration blanks are aqueous samples and were reported in µg/L or mg/L units. Performing blank assessments for solid matrix samples, action levels were calculated and expressed in soil units µg/kg or mg/kg from the given aqueous rinse blank concentrations to be compared against actual solid sample concentrations. This conversion is dependent upon the method performed, sample amounts used, and final digestate or extract volumes used during the analytical analysis. Action levels were based upon 100% solids and 1x dilution factor and adjusted for each sample as appropriate.

- **SWMU 31 Method and Calibration Blank Analysis.** Method and calibration blanks were within specified criteria for each parameter and/or compound except for methoxychlor, TOC, silver, antimony, arsenic, cadmium, manganese, magnesium, vanadium, lead, nickel, selenium, thallium, zinc, calcium, methylene chloride, bis(2-ethylhexyl)phthalate, di-n-butylphthalate, naphthalene, 1,2,3,4,6,7,8-HpCDD, OCDD, 1,2,3,4,6,7,8-HpCDF, and Total HpCDD. Select samples were qualified “B” for

selenium, silver, antimony, cadmium, lead, thallium, methoxychlor, TOC, methylene chloride, bis(2-ethylhexyl)phthalate, and naphthalene. The compounds were considered non-detect at the MRL or level of contamination, whichever was greater. While these noted parameters were qualified "B" due to the blank contamination, the data was still considered useable, the accuracy data quality goal was met, and the qualified data did not impact the data quality for the RFI. For each of the other noted analytes, the samples were either non-detect for that compound or greater than the blank action level; therefore, no qualifiers were applied.

Laboratory control samples. The LCSs were analyzed to assess general method performance by the ability of the laboratory to successfully recover the target analytes from a control matrix. The LCS is similar in composition to the method blank. For aqueous analyses, spiked analyte-free reagent water was used. For soil analyses, a purified solid matrix (e.g., sand, sodium sulfate, or other purified solid) was used. The LCSs were spiked with single-component target analytes before it is carried through the preparation, cleanup, and determinative procedures. LCSs were performed at a rate of one per preparation batch per matrix. When samples were not subjected to a separate preparatory procedure (i.e., purge and trap VOC analyses, or aqueous Hg analysis), the CCV may have been used as the LCS, provided the CCV acceptance limits were used for evaluation.

- **SWMU 31 Laboratory Control Sample Analysis.** The results of the LCS were evaluated, in conjunction with other QC information during the data validation process to ascertain the acceptability of the data generated for that batch of samples. LCSs were within specified criteria for each parameter and/or compound except for 2-butanone, 2-hexanone, acetone, cis-1,3-dichloropropene, trans-1,3-dichloropropene, 4-amino-2,6-dinitrotoluene, hexachlorocyclopentadiene, dicamba, and 2,4,5-TP. Compounds, 2-hexanone, cis-1,3-dichloropropene, trans-1,3-dichloropropene, 4-amino-2,6-dinitrotoluene, hexachlorocyclopentadiene, and 2,4,5-TP were non-detect; therefore, no qualifiers were applied based upon these outliers (high %Rs). Acetone, 2-butanone, and dicamba were qualified for select samples based upon these outliers. While LCS recoveries were outside criteria, the data was still considered useable, the accuracy data quality goal was met, and the qualified data did not impact the data quality for the RFI. Further details may be found in the data validation reports located on a CD at the back of this report.

Matrix spikes. The MS was used to assess the performance of the method as applied to a particular project matrix. An MS is an environmental sample to which known concentrations of certain target analytes have been added before sample manipulation from the preparation, cleanup, and determinative procedures have been implemented. The original field sample was mixed or shaken to ensure homogeneous fractions when allowed by the method. MSs were performed at a rate of one per preparation batch or 5% whichever was more frequent per matrix. The results of the MS are evaluated, in conjunction with other QC information during the validation process to assess the effect of the matrix on the bias of the analysis.

- **SWMU 31 Matrix Spike and Matrix Spike Duplicate Analysis.** Matrix spikes and matrix spike duplicates were within specified criteria for each parameter and/or compound except for endrin aldehyde, 2,4,5-T, 2,4-DB, dicamba, dichlorprop, dinoseb, chromium, antimony, mercury, silver, iron, aluminum, zinc, 1,2-dibromo-3-chloropropene, 1,2-dibromoethane, bromoform, chlorobenzene, dibromochloromethane,

styrene, trichloroethene, cis-1,3-dichloropropene, and trans-1,3-dichloropropene, ethylbenzene, cis-1,2-dichloroethene, cis-1,3-dichloropropene, m&p-xylene, trans-1,2-dichloroethene, hexachlorocyclopentadiene, 4-chloroaniline, delta-BHC, 2-methylnaphthalene, and OCDD. Compounds hexachlorocyclopentadiene, 4-chloroaniline, endrin aldehyde, delta-BHC, 2,4,5-T, 2,4-DB, dicamba, dichlorprop, dinoseb, zinc, antimony, mercury, chromium, silver, 1,2-dibromo-3-chloropropane, 1,2-dibromoethane, bromoform, chlorobenzene, dibromochloromethane, styrene, trichloroethene, cis-1,3-dichloropropene, trans-1,3-dichloropropene ethylbenzene, cis-1,2-dichloroethene, cis-1,3-dichloropropene, m&p-xylene, and trans-1,2-dichloroethene, 2-methylnaphthalene were qualified for select samples based upon these outliers. For aluminum, iron, and OCDD, the sample concentrations were greater than four times the spike added, therefore no qualifiers were applied based upon these outliers. While qualification was applied due to high or low MS or MSD recoveries, the data was still considered useable, the accuracy data quality goal was met, and the qualified data did not impact the data quality for the RFI. Further details may be found in the data validation reports located on a CD at the back of this report.

Rinse blanks. The blank contamination assessment was performed to assess the impact of contaminant contributions originating from non-point sources, such as field sampling equipment decontamination procedures. Rinse blanks are intended to identify cross-contamination between samples as a result of sampling equipment decontamination procedures. Rinse blanks were collected by pouring the required volume of deionized, organic-free water over the equipment and collecting the water in the appropriate sample containers. Rinse blanks were performed at a rate of one per 20 samples collected or 5% per matrix per sampling technique. The rinse blank results were evaluated to ascertain the efficiency of decontamination and assess the potential for cross-contamination. Rinse blanks were analyzed for the analytes of concern for the RFI. In accordance with USEPA Region III data validation guidelines, the detected concentration in the sample was qualified “B” for blank contamination and was considered non-detect if the sample concentration was within five times (10 times for common laboratory contaminants such as acetone, 2-butanone, methylene chloride, OCDD/OCDF, and phthalate esters) the concentration in the associated equipment blank. Rinse blanks are aqueous samples and were reported in µg/L or mg/L units. Performing blank assessments for solid matrix samples, action levels were calculated and expressed in soil units µg/kg or mg/kg from the given aqueous rinse blank concentrations to be compared against actual solid sample concentrations. This conversion is dependent upon the method performed, sample amounts used, and final digestate or extract volumes used during the analytical analysis. Action levels were based upon 100% solids and 1x dilution factor and adjusted for each sample as appropriate.

- **SWMU 31 Rinse Blank Analysis.** Soil rinse blanks included samples 061102R, 061902R1, 071002R2, and 072502RB. The maximum concentration from these rinse blanks was used for this assessment. The soil rinse blanks included samples 071002R1 and 071002R2 for dioxin/furans. Rinse blanks were within specified criteria for each parameter and/or compound except for OCDD, 1,3,5-trinitrobenzene, 2-nitrotoluene, 4-nitrotoluene, PETN, nitroglycerine, 2,4-DB, MCP, antimony, beryllium, cadmium, lead, calcium, chromium, iron, manganese, sodium, naphthalene, 2-methylnaphthalene, acenaphthene, 4,4'-DDE, 4,4'-DDT, lindane, phenol, benzyl alcohol, 2-methylphenol, 4-methylphenol, benzoic acid, diethylphthalate, di-n-butylphthalate, butylbenzylphthalate,

bis(2-ethylhexyl)phthalate, acetone, carbon disulfide, methylene chloride, chloroform, carbon tetrachloride, bromodichloromethane, 4-methyl-2-pentanone, toluene, and m&p-xylene. Select samples were qualified “B” as applicable and were considered non-detect at the MRL or level of contamination, whichever was greater. While these parameters were qualified “B” due to the blank contamination, the data was still considered useable, the accuracy data quality goal was met, and the qualified data did not impact the data quality for the RFI. A discussion of the blank results is provided within each validation report (located on a CD at the back of this report).

Trip blanks. Trip blanks were prepared by the project contract laboratory and accompanied the aqueous samples requiring VOC analysis. The trip blanks were analyzed for the VOC analytes of concern for the groundwater and surface water samples for the RFI. One trip blank per cooler was transported per day with the aqueous VOC samples to the laboratory for each day of shipment to limit the number of project trip blanks. The trip blanks were prepared by pouring the required volume of de-ionized, organic-free water into appropriate sample containers in the laboratory. The trip blank results were used to assess the potential incidental contamination due to sample transport before, during, and after field operations (i.e., exposure to air) and/or contamination due to the sample container. Trip blanks are aqueous samples and were reported in µg/L. In accordance with USEPA Region III data validation guidelines, the detected concentration in the sample was considered a “non-detect” (i.e., qualified “B” for blank contamination) and was excluded from consideration if the sample concentration was within five times (10 times for common laboratory contaminants such as acetone, 2-butanone, and methylene chloride) the concentration in the associated trip blank.

- **SWMU 31 Trip Blank Analysis.** Aqueous trip blanks included samples 070902T, 071002T, 071102T, and 071602T. The trip blanks were analyzed for TCL VOCs and were evaluated against their associated aqueous sample(s). Each of the trip blanks contained trace amounts of carbon disulfide and methylene chloride. Trip blank 071002T also contained trace amount of chloroform. Select samples were qualified “B” as applicable and were considered non-detect at the MRL or level of contamination, whichever was greater. While these parameters were qualified “B” due to the blank contamination, the data was still considered useable, the accuracy data quality goal was met, and the qualified data did not impact the data quality for the RFI. A discussion of the blank results is provided within each validation report (located on a CD at the back of this report). **Table C-4** indicates those data that are “B” flagged due to both field and laboratory blank contamination and should be considered non-detect. Those compounds that were detected in both the blanks and the associated samples below the USEPA guidance blank action levels are listed.

Completeness. Completeness is a measure of the amount of information that must be collected during the field investigation to allow for successful achievement of the objectives. An adequate amount and type of data must be collected for conclusions to be valid. Missing data may reduce the precision of estimates or introduce bias, thus lowering the confidence level of the conclusions. While completeness has been historically presented as a percentage of the data that is considered usable, this does not take into account critical sample locations or critical analytical parameters.

Table C-4
SWMU 31 B-Qualified Data Summary

Field ID	Analyte	Result	Lab Qual.	Units
31SE9B	Bis(2-ethylhexyl)phthalate	20	J	ug/kg
31SE10B	4-Methylphenol	24	J	ug/kg
31SE10B	Bis(2-ethylhexyl)phthalate	54	J	ug/kg
31SE7B	Bis(2-ethylhexyl)phthalate	30	J	ug/kg
31SE8A	2-Methylphenol	24	J	ug/kg
31SE8A	4-Methylphenol	48	J	ug/kg
31SE8A	Bis(2-ethylhexyl)phthalate	200	J	ug/kg
TMSE10B	4-Methylphenol	9	J	ug/kg
TMSE10B	Bis(2-ethylhexyl)phthalate	40	J	ug/kg
31SE9B	2-Methylnaphthalene	2.8		ug/kg
31SE9B	Naphthalene	2.3	B*	ug/kg
31SE10B	Acenaphthene	10		ug/kg
31SE7B	2-Methylnaphthalene	1.3	J	ug/kg
31SE7B	Naphthalene	2.7	B*	ug/kg
31SE8A	Acenaphthene	20		ug/kg
TMSE10B	Acenaphthene	3.1		ug/kg
31SE10B	4,4'-DDT	0.979		ug/kg
31SE10B	Methoxychlor	1.45	B*	ug/kg
TMSE10B	4,4'-DDT	0.907		ug/kg
TMSE10B	Methoxychlor	2.1	B*	ug/kg
31SE9B	Total Organic Carbon	750	B*	mg/kg
TMSE10B	Acetone	34		ug/kg
31SE9B	Cadmium	0.073	B**	mg/kg
31SB05A	Silver	0.59	B**	mg/kg
31SB05B	Silver	0.92	B**	mg/kg
31SB05C	Silver	0.68	B**	mg/kg
31SB05C	Acetone	42		ug/kg
31SB05A	Antimony	0.35	B**	mg/kg
31SB05A	Selenium	0.46	B**	mg/kg
31SB05C	Antimony	0.26	B**	mg/kg
31SW10	Bis(2-ethylhexyl)phthalate	11	B*	ug/L
31SW12	Bis(2-ethylhexyl)phthalate	5.1	B*	ug/L
31SW14	Bis(2-ethylhexyl)phthalate	7.3	B*	ug/L
31SW10	Naphthalene	0.031	JB*	ug/L
31SW12	Naphthalene	0.029	JB*	ug/L
31SW14	Naphthalene	0.022	JB*	ug/L
31SW10	Silver	7.3	B**	ug/L
31SW12	Silver	7.3	B**	ug/L
31SW14	Silver	6.3	B**	ug/L
31SW10	Carbon Disulfide	0.075	J	ug/L
31SW10	Methylene Chloride	0.11	J	ug/L
31SW14	Methylene Chloride	0.078	J	ug/L
31SW10	Antimony	1.1	B**	ug/L
31SW10	Cadmium	0.13	B**	ug/L

Table C-4
SWMU 31 B-Qualified Data Summary, Continued

Field ID	Analyte	Result	Lab Qual.	Units
31SW10	Thallium	0.14	B**	ug/L
31SW12	Antimony	0.72	B**	ug/L
31SW12	Cadmium	0.095	B**	ug/L
31SW12	Lead	0.52	B**	ug/L
31SW12	Thallium	0.076	B**	ug/L
31SW14	Antimony	0.58	B**	ug/L
31SW14	Cadmium	0.15	B**	ug/L
31SW14	Thallium	0.11	B**	ug/L
31SE11A	Acenaphthene	50		ug/L
31SE11B	Acenaphthene	21		ug/L
31SE12B	Acenaphthene	14		ug/L
31SE13A	2-Methylnaphthalene	5.7	J	ug/kg
31SE13A	Naphthalene	11		ug/kg
31SE13B	2-Methylnaphthalene	1.1	J	ug/kg
31SE13B	Naphthalene	1.5	J	ug/kg
31SE14B	Acenaphthene	8.3		ug/kg
31SE14C	Acenaphthene	2.9		ug/kg
31SE11A	4-Methylphenol	110	J	ug/kg
31SE11A	Bis(2-ethylhexyl)phthalate	310	J	ug/kg
31SE11B	2-Methylphenol	140	J	ug/kg
31SE11B	4-Methylphenol	230	J	ug/kg
31SE11B	Benzoic acid	540	J	ug/kg
31SE11B	Bis(2-ethylhexyl)phthalate	300	J	ug/kg
31SE12B	2-Methylphenol	61	J	ug/kg
31SE12B	4-Methylphenol	110	J	ug/kg
31SE12B	Benzoic acid	340	J	ug/kg
31SE12B	Bis(2-ethylhexyl)phthalate	260	J	ug/kg
31SE13A	Benzoic acid	1200	J	ug/kg
31SE13A	Bis(2-ethylhexyl)phthalate	500	J	ug/kg
31SE13B	Bis(2-ethylhexyl)phthalate	130	J	ug/kg
31SE14B	2-Methylphenol	17	J	ug/kg
31SE14B	4-Methylphenol	19	J	ug/kg
31SE14B	Benzoic acid	340	J	ug/kg
31SE14B	Bis(2-ethylhexyl)phthalate	350	J	ug/kg
31SE14B	Butylbenzylphthalate	23	J	ug/kg
31SE14C	2-Methylphenol	11	J	ug/kg
31SE14C	Bis(2-ethylhexyl)phthalate	260		ug/kg
31SE11B	2,4-DB	107	J	ug/kg
31SE11B	Acetone	120		ug/kg
31SE11A	Chromium	37		mg/kg
31SE11A	Sodium	230	B**	mg/kg
31SE11A	Antimony	3.5	B**	mg/kg
31SE11B	Antimony	0.73	B**	mg/kg
31SE11B	Cadmium	0.25	B**	mg/kg

Table C-4
SWMU 31 B-Qualified Data Summary, Continued

Field ID	Analyte	Result	Lab Qual.	Units
31SE13A	Selenium	2.3	B**	mg/kg
31SE14C	Antimony	0.47	B**	mg/kg
31SE14C	Selenium	0.64	B**	mg/kg
31MW01	Silver (Dissolved)	7.3	B**	ug/L
31MW04	Silver (Dissolved)	6.8	B**	ug/L
31MW3	Silver (Dissolved)	7.8	B**	ug/L
31MW01	Silver	6.8	B**	ug/L
31MW04	Silver	5.7	B**	ug/L
31MW3	Silver	6.3	B**	ug/L
31MW01	Bis(2-ethylhexyl)phthalate	4.4	JB*	ug/L
31MW04	Bis(2-ethylhexyl)phthalate	7.4	B*	ug/L
31MW3	Bis(2-ethylhexyl)phthalate	4.5	JB*	ug/L
31MW01	Naphthalene	0.03	JB*	ug/L
31MW04	Naphthalene	0.028	JB*	ug/L
31MW3	2-Methylnaphthalene	0.061		ug/L
31MW3	Acenaphthene	0.038	J	ug/L
31MW3	Naphthalene	0.062	B*	ug/L
31MW01	Carbon Disulfide	0.091	J	ug/L
31MW04	Carbon Disulfide	0.2	J	ug/L
31MW3	Carbon Disulfide	0.17	J	ug/L
31MW01	Nitroglycerine	0.42	J	ug/L
31MW01	Cadmium	0.069	B**	ug/L
31MW01	Lead	1.1	B**	ug/L
31MW04	Antimony	0.54	B**	ug/L
31MW04	Lead	0.52	B**	ug/L
31MW04	Selenium	0.44	B**	ug/L
31MW3	Antimony	0.4	B**	ug/L
31MW3	Cadmium	0.1	B**	ug/L
31MW01	Cadmium	0.082	B**	ug/L
31MW01	Lead	0.94	B**	ug/L
31MW01	Selenium	0.55	B**	ug/L
31MW04	Antimony	0.48	B**	ug/L
31MW04	Lead	0.46	B**	ug/L
31MW04	Selenium	0.47	B**	ug/L
31MW3	Antimony	0.42	B**	ug/L
31MW3	Lead	0.45	B**	ug/L

B* = the analyte or compound has been detected in the laboratory blank(s) and/or associated field sample.

B** = Value <MRL and >MDL. Reported value may be biased (estimated).

J = Value <MRL and >MDL. Reported value may be biased (estimated).

The amount and type of data that may be lost due to sampling or analytical error cannot be predicted or evaluated in advance. The importance of lost or suspect data will be evaluated in terms of the sample location, analytical parameter, nature of the problem, decision to be made, and the consequence of an erroneous decision. Critical locations or parameters for which data is found to be inadequate will either be re-sampled and re-analyzed or the data will be appropriately qualified based on the decision of the project QA manager. The completeness goal percentage of usable data is set at 98±2%.

Sampling completeness was assessed through evaluation of the total number of samples proposed for collection in the work plan versus the actual number of samples collected and analyzed. Analytical completeness was assessed by comparing the number of useable data points collected to the total number of data points generated. Completeness is calculated using the following equations:

$$\% \text{ Sampling Completeness} = \frac{\text{No. of actual samples collected}}{\text{No. of proposed samples}}$$

$$\% \text{ Analytical Completeness} = \frac{\text{No. of usable data}}{\text{No. of requested analyses}}$$

For the purposes of this report, unusable data are defined to include rejected data points (“R” qualifier). No data points were rejected through the validation process.

- SWMU 31 Completeness Analysis.** Eleven sediment samples, one surface soil sample, two subsurface soil samples, three surface water samples, and three groundwater samples were proposed for collection at SWMU 31 in MWP Addendum 12 (IT, 2002a). The field duplicate and rinse blanks were collected on a site-wide basis. Soil, groundwater, and surface water samples were collected and analyzed for the parameters specified in the Work Plan. The resulting sampling completeness quotient is 100% and meets pre-defined goals.

The overall analytical percent completeness was assessed by parameter group for the samples collected. Analysis of the groundwater and soil samples resulted in the generation of 3299 out of 3301 data points deemed to be useable, resulting in an overall analytical completeness quotient of 99.9%. For the soil and sediment samples, the percent completeness was 100% with 2150 out of 2150 data points deemed to be useable. For the groundwater samples, the percent completeness was 99.9% with 1,149 out of 1,151 data points deemed to be useable. For groundwater sample 31MW01, antimony was rejected due to grossly exceeding %D between the total and dissolved fractions. It is believed that this will have no impact on the RFI with the given data set. For samples 31SB05A, 31SE11B, and 31SE13B where the 2,3,7,8-TCDF confirmation was >25%D, the lower of the two values was reported as estimated “J” and the higher value rejected “R”. Since the lower of the two values was able to be reported as estimated in this case, there was no impact with the given data set. The groundwater samples will be evaluated under separate groundwater RFI report. There was no impact with the given data set for

the soil and sediment samples. The overall completeness percentages met the pre-defined goal of 98±2% for the sampling event.

Representativeness. Representativeness is a measure of the degree to which the measured results accurately reflect the medium being sampled. It is a qualitative parameter that is addressed through the proper design of the sampling program in terms of sample location, number of samples, and actual material collected as a “sample” of the whole.

Sampling protocols were developed to assure that samples collected are representative of the media. Field handling protocols (e.g., storage, handling in the field, and shipping) were designed to protect the representativeness of the collected samples. Proper field documentation and QC inspections were used to establish that protocols were followed and that sample identification and integrity was maintained and met pre-defined goals.

Comparability. Comparability is the confidence with which one data set can be compared to another. Comparability was controlled through the use of SOPs that have been developed to standardize the collection of measurements and samples and approved analytical technique with defined QC criteria. USEPA-approved methodologies were used in providing laboratory analytical support for this project. Laboratory SOPs were developed from these methods. Consistent and proper calibration of equipment throughout the field exercises, as described in the MQAP and QAPA, will assist in the comparability of measurements. Field documentation and QA audits were used to establish that protocols for sampling and measurement follow appropriate SOPs and met pre-defined goals.

Sensitivity (quantitation, reporting, and detection limits). The term sensitivity is used broadly to describe the method detection, quantitation, and reporting limits established to meet project-specific data quality objectives; and not limited to the definition which describes the capability of a method or instrument to discriminate between measurement responses. The method detection limits (MDLs) and the practical quantitation limits (PQLs) published within USEPA methods are based upon a reagent water matrix, and are not necessarily reflective of typical sample matrices; therefore, care was taken in establishing limits for laboratory analysis. Methods were selected based upon their sensitivity, technological, and economical considerations while keeping the screening values and available methodology in mind and were sufficient in meeting the given levels of concern (LOCs). Each target compound for every sample was reported at a specific method reporting limit (MRL). The target analytes detected above the MDL, but less than the MRL, were reported as estimated values “J”. Target analytes detected above the upper calibration standard were diluted and analyzed within established calibration windows.

The MQLs and MDLs were compared at the onset of the project. The MDL is the minimum concentration of an analyte that can be measured and reported with a 99% confidence that the analyte is above zero and is identified from the analysis of a sample in a given matrix containing the analyte. The MDLs are derived by the method based upon 40 CFR Chapter 136 Appendix B. The MDL established using this procedure was used to assess the importance of the measurement of a future sample. The laboratory MDLs derived were less than the MQLs. The laboratory has statistically derived MDLs below the MQLs. The MDL values are different and change periodically because each MDL is laboratory, instrument, analyst, matrix, and method specific.

MQLs are the values at which the laboratory has demonstrated the ability to reliably quantitate the target value of an analyte for the method performed. MQLs are based upon the lowest

calibration standard used for the initial calibration curve or the lowest verification standard performed. Data is calculated over a linear range. The highest concentration of the standards is truncated until linearity is achieved (minimum of three concentration levels must remain). The resulting highest concentration within the linear range represents the upper quantitation limit.

The laboratory used a MRL for each sample. The MRL is the USACE term for sample quantitation limit (USACE, 2001). The reporting limit is the threshold value below which the laboratory reports non-detected values as “U,” “ND,” or “<” and will vary for each sample based upon dilution, sample volumes, percent moistures (for solids), and the method performed. Positive values found in blanks (method, rinse, trip) above the MDL were reported. Positive results below the MRL and above the MDL were reported as estimated “J” for both inorganics and organics. The units for aqueous samples were µg/L and for solid samples were mg/kg, µg/kg, or ng/kg.

- **SWMU 31 Sensitivity Analysis.** The method sensitivities were adequate to meet the data quality objectives for the soil and sediment samples. Some of the target compounds did not have the sensitivity with the given methodology to meet the LOCs due to available USEPA method limitations when compared to the low risk-based and screening values.

For the surface water and groundwater samples, compounds 1,1,2,2-tetrachloroethane, 1,1,2-trichloroethane, trichloroethene, vinyl chloride, benzo(a)pyrene, dibenz(a,h)anthracene, 3,3'-dichlorobenzidine, 4,6-dinitro-2-methylphenol, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, bis(2-chloroethyl)ether, dibenz(a,h)anthracene, hexachlorobenzene, indeno(1,2,3-cd)pyrene, n-nitrosodi-n-propylamine, pentachlorophenol, aldrin, toxaphene, PCB-1221, PCB-1232, MCPA, MCPP, and arsenic had MDLs greater than the given tap water RBCs was less than the MDL. Pentachlorophenol had a MDL greater than the given MCL. Each of the noted compounds were non-detect at SWMU 31.

Comparing the subsurface soil samples against the soil screening levels (SSLs), compounds 1,1,2-trichloroethane, trichloroethene, vinyl chloride, cis-1,3-dichloropropene, trans-1,3-dichloropropene, nitrobenzene, dinoseb, MCPA, MCPP, and arsenic had MDLs greater than the given SSLs for select samples. Comparing against the residential RBCs, MCPP, MCPA, and vinyl chloride had MDLs greater than the given residential RBCs for select samples. Comparing against the industrial RBCs, MCPA and MCPP had MDLs greater than the given industrial RBCs for select samples.

Comparing the sediment samples against the soil screening levels (SSLs), compounds 1,1,2,2-tetrachloroethane, 1,1,2-trichloroethane, 1,2-dichloroethane, bromodichloromethane, chloroform, dibromochloromethane, trichloroethene, vinyl chloride, cis-1,3-dichloropropene, trans-1,3-dichloropropene, 1,4-dichlorobenzene, 3,3'-dichlorobenzidine, 4,6-dinitro-2-methylphenol, 4-nitrophenol, bis(2-chloroethyl)ether, bis(2-chloroisopropyl)ether, hexachlorobenzene, n-nitrosodi-n-propylamine, nitrobenzene, 1,3-dinitrobenzene, nitrobenzene, MCPA, MCPP, arsenic, cadmium, and mercury had MDLs greater than the given SSLs for select samples. Comparing against the residential RBCs, 4,6-dinitro-2-methylphenol, n-nitrosodi-n-propylamine, MCPP, MCPA, vinyl chloride, and arsenic had MDLs greater than the given residential RBCs for

select samples. Comparing against the industrial RBCs, MCPA and arsenic had MDLs greater than the given industrial RBCs for select samples.

Some of the samples had higher sensitivities due to sample dilutions, sample volume adjustments, and/or moisture factors, as applicable. Though an uncertainty may be present with these sensitivity gaps between the SSLs/RBCs/MCLs and MDLs for these compounds, it is unlikely that they present an impact to the decisions regarding the RFI.

Levels of Concern

An integral part of the identification of DQOs is the establishment of LOCs. These levels were compared with analytical method reporting limits prior to analytical method selection to ensure the method was capable of addressing project DQOs, preclude occurrence of false negative issues, and assess best available technology limitations. Although LOCs selected as potential concerns may not necessarily reflect RFI-specific objectives, they were developed to ensure that the chosen analytical methods have detection limits sensitive enough to achieve compliance with appropriate site-specific screening levels or other specified criteria for soil and groundwater. The comparisons between the LOCs and method MDLs are noted in the preceding sensitivity section. The LOCs for the SWMU 31 are based on soil and tap water applicable or relevant and appropriate requirements (ARARs) and To-Be-Considered Guidance (TBG). The soil TBC guidance includes:

- Facility-Wide Background inorganic concentrations (IT, 2001).
- USEPA Region III risk based concentrations (October, 2006).

The groundwater and surface water TBC guidance includes:

- USEPA Region III tap water risk based concentrations (October, 2006).
- USEPA Drinking Water Standards and Health Advisories Maximum Contaminant Levels (Winter, 2004)

Appendix C-3

2002 RFI Field Audit Report

TO: Jeff Parks, Project Manager
Tim Leahy, Field Operation Leader
Mark Thomas, Task Manager

FROM: Eric Malarek, Project QA Manager

DATE: March 24, 2003

SUBJECT: Radford Army Ammunition Plant, VA Field Audit

The purpose of this memorandum is to report on field activities audited in support of the Radford Army Ammunition Plant (RFAAP) RCRA Facility Investigation on July 11, 2002. Field activities were audited against procedures specified in the *Draft QAP Document* (May, 1997), *Draft Final Work Plan Addendum 009, SWMU 31 and Horseshoe Area Groundwater Study* (February, 2002), and *Draft Final Work Plan Addendum 012, SWMU 39, SWMU 48, SWMU 49, SWMU 50, SWMU 58, SWMU 59, AOC-FLFA, AOC-Building 4343, and New River Unit* (February, 2002). These procedures have been grouped into the following broad categories: project management, documentation and sample management, equipment calibration, field QA/QC, sample management/groundwater sampling, sample management/surface water sampling, and decontamination. The annotated audit checklist with specific observations and/or comments is attached for your information.

Audit findings were discussed with the field team members at the close of the field audit. The Field Operation Leader effectively organized project activities to achieve project objectives. The sampling team was cognizant of proper procedures and protocols for the documentation, QA/QC, groundwater, surface water, and decontamination activities. There were no significant non-conformances found during the audit. Recommendations included that for documentation that unused rows have single-line cross out for chain of custody. In general, field activities associated with the audited work phase were compliant with work plan specifications.

Attachment

RADFORD ARMY AMMUNITION PLANT FIELD AUDIT

The purpose of this audit was to verify that field activities were performed in accordance with standard operating procedures designed to control sample management activities. Areas evaluated as part of the audit are categorized into the following sections:

AREAS EVALUATED:

- Project Management
- Documentation and Sample Management
- Equipment Calibration
- Field QA/QC
- Sample Management/Groundwater Sampling
- Sample Management/Surface Water Sampling
- Decontamination

Personnel interviewed and present during the audit included:

Mark Thomas, Task Manager
Tim Leahy, Field Operation Leader
Dave Kateley, Field Sampler
Jack Choynowski, Field Sampler
Curt Tucker, Field Sampler

RADFORD ARMY AMMUNITION PLANT FIELD AUDIT
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I. PROJECT MANAGEMENT

QUESTION	YES	NO	COMMENT
1. Have changes been made to the project organization?	√		Additional Samplers: Jack Choynowski and Curt Tucker
2. Did project personnel appear to be qualified for assigned tasks?	√		
3. Were project activities managed and coordinated in a manner consistent with achieving project goals?	√		

RADFORD ARMY AMMUNITION PLANT FIELD AUDIT

II. DOCUMENTATION AND SAMPLE MANAGEMENT

QUESTION	YES	NO	COMMENT
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Work Plans

1. Were copies of the following documents on-site and available for inspection? Health and Safety Plan Sampling and Analysis Plan Quality Assurance Project Plan Ref.: Draft QAP Document (June, 2001), Draft Final Work Plan Addendum 009, SWMU 31 and Horseshoe Area Groundwater Study (February, 2002), and Draft Final Work Plan Addendum 012, SWMU 39, SWMU 48, SWMU 49, SWMU 50, SWMU 58, SWMU 59, AOC-FLFA, AOC-Building 4343, and New River Unit (February, 2002).	√ √ √		URS/Dames and Moore Master Work Plan was used.
2. Were copies of the following records on-site and available for inspection? Well and excavation permits Boring log forms Well completion diagrams Well development forms COC/FPF forms	√ NA NA NA √		Permits included: Area Entry Permit and Hot Work Permit both dated 7/8/02 to 7/12/02.

Logbook

1. Is the field logbook weather proof?	√		
2. Were entries made in indelible ink?	√		
3. Are the pages consecutively numbered?	√		
4. Were changes made with single-line cross out and initialed and dated?	√		
5. Were the following items included? Project name Sample location Sampler's signature and date Time and date of sample collection Sample ID Analysis name Associated QC samples Observations Field measurements	√ √ √ √ √ √ √ √ √		NRU Surface Water/Sediment Sampling Logbook dated 06/02 was checked
5. Are H&S training records available for project staff?	√		Everyone's training records were available and up to date.
6. Were Daily CQC-Forms Completed and submitted to USACE in accordance with QAPP specifications?	NA		

NA = Not Applicable

RADFORD ARMY AMMUNITION PLANT FIELD AUDIT

QUESTION	YES	NO	COMMENT
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Chain of Custody (COC)

1. Were entries made in indelible ink?	√		COC #024149 reviewed.
2. Are the COC numbered?	√		
3. Were changes made with single-line cross out and initialed and dated?	√		
4. Are the unused rows have a single-line cross out drawn through and initialed and dated?		√	Recommend that unused rows have single-line cross out drawn through.
5. Were the following items included? Project name and number Contact name and phone number Field Sample # or ID Time and date of sample collection Matrix Requested Analysis/Method Numbers Number of containers (totaled) Preservatives Associated QC samples Sampler's signature and date Field measurements	√ √ √ √ √ √ √ √ √ √ √ √		7/10/02 MS/MSD Noted. Depths Noted.

Field Parameter Forms (FPF)

1. Were entries made in indelible ink?	NA		FPF forms completed on the computer. FPF #348 was checked.
2. Are the FPF consecutively numbered?	NA		
3. Were changes made with single-line cross out and initialed and dated?	NA		
4. Are the unused rows have a single-line cross out drawn through and initialed and dated?	NA		
5. Were the following items included? Project name and number Contact name and phone number Matrix High concentration / high hazard Installation site, code, and area File name (CSO, CGW, CSW, CSE, CQC) Site type (GRAB, RNSW, WELL, BORE, ...) Site ID Field sample number Time and date of sample collection Sampling technique (S, U, T, G, C, E, P, ...) Requested Analysis Sample container and number (totaled) Preservatives Associated QC samples Sampler's initials and date Field measurements and observations	√ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √ √		FPFs were uploaded at the end of the day, then e-mailed or sent on disk to the lab. CSO BORE 58SB04 58SB04D 7/10/02 @10:50 Grab Depths 20"-24"

NA = Not Applicable

RADFORD ARMY AMMUNITION PLANT FIELD AUDIT

QUESTION	YES	NO	COMMENT
Records			
1. Were copies of drilling certificates available?	NA		
2. Were copies of excavation permits available?	NA		
3. Were copies of pertinent permits available?	√		See work plans Section Question #2
4. Were copies of personnel OSHA certificates and sample preservative MSDS available?	√		
Sampling Labeling			
1. Was the sampling identification convention consistent with the QAPP?	√		Sample 31SE14B checked.
2. Did the sample label contain the following information? Site name Sample identification Sample collection time and date Sample preservative Sampler's initial Analysis	 √ √ √ √	√	Site name built into Site ID. 31SE14B 7/10/02 @17:00
3. Were entries made in indelible ink?	√		
4. Was the label covered with a clear tape?	√		
Sample Packaging			
1. Are sample containers tightly sealed and placed in an upright position?	√		
2. Is the cooler lined with garbage bag?	NA		Not Required
3. Are glass sample containers wrapped in bubble wrap or closed cell foam sheets?	√		
4. Is the ice double bagged and temperature blank included?	√		
5. Is the proper documentation placed in a waterproof bag and enclosed in the lid of the cooler?	√		Not attached to lid.
6. Is the cooler sealed tightly with a signed custody seal and then with clear packing tape?	√		
7. Is the cooler shipping documentation marked next day priority?	√		
Equipment Calibration and Maintenance			
1. Was a calibration logbook maintained?	√		Calibrated with mfg. cal soln. (expiration 11/29/03) on 7/11/02 @8:15
2. Were the following parameters recorded in the logbook? pH Specific conductance dissolved oxygen PID readings Oxidation/Reduction Potential Turbidity	 √ √ NA √ NA √		Serial Number #SN003002 also recorded.

NA = Not Applicable

RADFORD ARMY AMMUNITION PLANT FIELD AUDIT

III. EQUIPMENT CALIBRATION

QUESTION	YES	NO	COMMENT
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PID/FID TVA

1. Was the PID calibrated prior to use?	√		Calibrated with Isobutylene on 7/11/02
2. Were procedures consistent with manufacturer's specifications?	√		Horiba Isobutylene read 101 and 100 (TV=100)
3. Were other calibrations performed?	√		See Water Quality Parameters

Water Quality Parameters

1. Were the parameters calibrated at least once?	√		Calibrated with mfg. cal soln (expiration 11/29/03) on 7/11/02 @8:15
2. What was the procedure?	√		AutoCal procedure used.
3. Were standards fresh?	√		
4. Were the following standards used? pH- buffer 4 and slope Conductivity- KCl D.O. – water Depth – air Salinity – KCl Redox - quinhydrone or transofer? Turbidity - NTU	√ √ NA NA NA NA √		pH read 4.00 (TV=4.00) Turbidity read 0.1 (TV=0.0)

Immunoassay Dtech Test Kits

1. Was the Detehtor meter calibrated prior to use?	NA		
2. Were procedures consistent with manufacturer's specifications?	NA		
3. Were other calibrations performed?	NA		

NA = Not Applicable
TV = True Value

RADFORD ARMY AMMUNITION PLANT FIELD AUDIT
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IV. FIELD QA/QC

QUESTION	YES	NO	COMMENT
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Field QC Samples			
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1. Have field quality control samples been collected?			
Duplicate samples (10% frequency per matrix)	√		
Rinse blanks (5% frequency per matrix per sampling technique)	√		
Trip blanks: (1 per shipping container for aqueous. VOC samples only)	√		
Source water	√		Source water Tested prior.
Field blanks	NA		
2. Were project activities adequately documented?	√		

NA = Not Applicable

RADFORD ARMY AMMUNITION PLANT FIELD AUDIT

V. SAMPLE MANAGEMENT/GROUNDWATER SAMPLING

QUESTION	YES	NO	COMMENT
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General

1. Were groundwater samples collected from the least contaminated progressing to the most contaminated?	√		Upgradient samples were collected first.
2. Were sampling teams established?	√		Mark Thomas, Dave Kateley, Curt Tucker, and Jack Choynowski
3. Were PID readings taken for wells with VOC having a potential of being present?	√		
3. Were water depth and level taken prior to purging? (See Page 2)	√		
4. How were EV calculated?	NA		

$$EV = (\pi R_w h_w) * 0.0043 \text{ gal/in}^3$$

Where: R_w = radius of well casing in inches

h_w = water depth inches

Well Purging

1. Were the following steps used for bailers? Use a clean lanyard Calculate EV After 1EV measure stabilization parameters Record on form Continue purging Collect stabilization measurements Sample well	NA NA NA NA NA NA NA		
2. Were the following steps used for pumps? Lower pump slowly into well Attach umbilical cord to protective casing Lower water level probe into well behind pump until it touches water Begin pumping at lowest setting (above screen for evacuation and at screen interval for sampling) Gradually increase rate until pumping rate matches recharge rate Monitor stabilization parameters	√ √ √ √ √ √ √		Tubing & Wire Raised the probe up 5' to a 10' Screening Interval Recharge rate ≈ @ 0.5 L/min.

NA = Not Applicable

RADFORD ARMY AMMUNITION PLANT FIELD AUDIT

QUESTION	YES	NO	COMMENT
Well Sampling			
1. Were samples collected using either a bailer or pump? If low flow, rate $\leq$ recharge rate	√		Submersible pump was used.
2. Were samples collected in the following order? VOC, SVOC, Metals, etc.	√		
3. Were appropriate containers and preservations used? VOC – 3x 40 mL HCl to pH<2; Teflon septum, zero headspace SVOC – 2x 1 L amber glass; Teflon cap Pest/PCBs – 2x 1 L amber glass; Teflon cap Herbicides – 2x 1 L amber glass; Teflon cap Explosives – 2x 1 L amber glass; Teflon cap PAHs – 2x 1 L amber glass; Teflon cap Dioxin/Furans – 2x 1 L amber glass; Teflon cap Metals/Hardness – 1 L HDPE HNO ₃ to pH<2 pH – 1x 250 mL HDPE or glass Perchlorate – 1x 250 mL HDPE or glass TOC – 3x 40 mL HCl or H ₂ SO ₄ to pH<2; Teflon septum, zero headspace TCLP VOC – 3x 40 mL HCl to pH<2; Teflon septum, zero headspace TCLP SVOC – 1x 1 L amber glass TCLP Pests – 1x 1 L amber glass TCLP Metals – 1 L HDPE or glass Ignitability: 1x – 1 L HDPE or glass Reactive Sulfide: 1x – 1 L HDPE or glass Reactive Cyanide: 1x – 1 L HDPE or glass Corrosivity as pH: 1x – 250 mL HDPE or glass COD: 1x – 250 mL HCl or H ₂ SO ₄ to pH<2 glass TOX: 1x – 250 mL H ₂ SO ₄ to pH<2 glass	√ √ √ √ √ √ √ √ NA √ NA √ √ NA NA NA NA NA NA NA NA NA NA √		
4. Were acid/caustic preservations checked with pH paper and documented?	NA		Sample bottles pre-preserved
5. Were the following quality control samples collected? Duplicates rinse blanks trip blanks splits matrix spikes matrix spike duplicate	√ √ √ NA √ √		
6. Were the proper sample packaging and documentation activities performed?	√		

NA = Not Applicable

RADFORD ARMY AMMUNITION PLANT FIELD AUDIT

QUESTION	YES	NO	COMMENT
Water Level and Well-Depth Measurement			
1. Were the following steps used for depth to water?			
Remove water level indicator and turn on sounder	√		
Test check battery and sensitivity scale	√		
Establish benchmark	√		
Slowly lower probe into well	√		
Lower until meter buzzes	√		
Adjust until the exact depth is obtained	√		
Record the depth to near .01 inch	√		
2. Were the following steps used for well depth?			
Lower cable until slack is noted in the cable	√		
Slowly raise/lower cable until well bottom is "felt"	√		
Record the depth	√		
3. Was the probe decontaminated after use?	√		
4. Were the following measurements recorded?			
Top of casing elevation	√		
Depth to water level	√		

RADFORD ARMY AMMUNITION PLANT FIELD AUDIT

VI. SAMPLE MANAGEMENT/SURFACE WATER SAMPLING

QUESTION	YES	NO	COMMENT
General			
1. Were sampling teams established?	√		Tim Leahy
Surface Water Sampling			
1. Were samples collected directly using the sample container?	√		
2. Were PID readings taken for surface sites with VOC having a potential of being present?	√		PID tip got wet & wasn't reading properly due to moisture.
3. Were samples collected in the following order? VOC, SVOC, Metals, etc.	√		Only VOCs, hardness and perchlorate were sampled.
4. Were acid/caustic preservations added after collection and checked with pH paper and documented?	NA		Sample bottles pre-preserved
5. Were appropriate containers and preservations used? VOC – 3x 40 mL HCl to pH<2; Teflon septum, zero headspace SVOC – 2x 1 L amber glass; Teflon cap Pest/PCBs – 2x 1 L amber glass; Teflon cap Herbicides – 2x 1 L amber glass; Teflon cap Explosives – 2x 1 L amber glass; Teflon cap PAHs – 2x 1 L amber glass; Teflon cap Dioxin/Furans – 2x 1 L amber glass; Teflon cap Metals/Hardness – 1 L HDPE HNO3 to pH<2 PH – 1x 250 mL HDPE or glass Perchlorate – 1x 250 mL HDPE or glass TOC – 3x 40 mL HCl or H2SO4 to pH<2; Teflon septum, zero headspace TOX: 1x – 250 mL H2SO4 to pH<2 glass	√ NA NA NA NA NA NA √ NA √ NA NA		RYSW03 RYSW15: The sample was collected with bottle tied to stick due to confined space. No entry made.
6. Were the following quality control samples collected? Duplicates rinse blanks trip blanks splits matrix spikes/matrix spike duplicate	√ √ √ NA √		
7. Were the proper sample packaging and documentation activities performed?	√		See Documentation Section

NA = Not Applicable

RADFORD ARMY AMMUNITION PLANT FIELD AUDIT

VII. DECONTAMINATION

QUESTION	YES	NO	COMMENT
General			
1. Was a decontamination pad established?	√		
2. Was personnel decontamination required?		√	
Solid Material Samplers			
1. Were the following steps used?			
Scrub with non-phosphate detergent	NA		
Rinse off detergent with approved water	NA		
Rinse with DI water	NA		
Wrap sampler with aluminum foil or clean plastic sheeting or zip-lock bag	NA		
Proper disposal of decontamination solutions	NA		
2. Was all of the equipment properly decontaminated?	NA		
Aqueous Samplers			
1. Were the following steps used?			
a) Scrub with non-phosphate detergent	√		Dedicated tubing used.
b) Calculate volume of pump plus tubing and pump for 10 gallons or 3 volumes of non-phosphate detergent (submersible pump only)	NA		
c) Rinse off detergent with approved water	√		Source Water used.
d) Rinse pump tubing interior by at least 10 gal. of approved water (submersible pump only)	NA		Dedicated tubing used.
e) Rinse with DI water	√		
f) Rinse with nitric acid (metals only) then DIUF rinse	√		
g) Rinse with methanol (VOCs only) then DIUF rinse	√		
h) Wrap sampler with aluminum foil or clean plastic sheeting	√		Plastic Bags used.
i) Proper disposal of decontamination solutions			
2. Were the water quality probes decontaminated to manufacturer specifications or at least triple rinsed with DIUF?	√		Same as #1
3. Was all of the equipment properly decontaminated?	√		

NA = Not Applicable

Appendix D

Contaminant Fate and Transport

CONTAMINANT FATE AND TRANSPORT

D.1 TRANSFORMATION AND FATE OF CONTAMINANTS

When contaminants are exposed to the environment, the potential for transformations of the chemical exists. The endpoint of the transformation process is referenced as the “fate” of the chemical. The ultimate "fate" refers to the expected final state that an element, compound, or group of compounds will achieve following release to the environment. The fate processes for organic contaminants may include sorption, volatilization, hydrolysis, and abiotic and biotic degradation, while the fate processes for inorganic contaminants may include ion exchange, chemical speciation, and oxidation/reduction. These fate processes dictate how contaminants will be transported in the environment. Contaminants can be transported with little attenuation or retardation due to these fate processes, or they can be delayed or transformed so that little migration occurs. Various fate processes, as well as the properties that may affect the fate of contaminants, are discussed below.

D.1.1 Contaminant Properties Affecting Fate

The physical and chemical properties of contaminants play a large role in determining their fate after release to the environment. The following section provides a discussion of several of these key properties.

D.1.1.1 Specific Gravity

Specific gravity is the ratio of the density of a compound to the density of water. It is a measure of the tendency of a compound to float (specific gravity <1) or sink (specific gravity >1) in water. Contaminants that are immiscible in water can exist as separate phase liquids and are referred to as Light Non-Aqueous Phase Liquids (LNAPLs) if their specific gravity is less than one, or Dense Non-Aqueous Phase Liquids (DNAPLs) if their specific gravity is greater than one.

D.1.1.2 Water Solubility

The solubility of a compound in water is the maximum or saturated concentration of the compound in pure water at a specific temperature. Compounds with high solubility in water tend to remain in the aqueous phase and not partition to soil or sediment, are less likely to volatilize from water, and are generally more likely to biodegrade. Conversely, compounds with low water solubilities tend to partition to soil or sediment, volatilize more readily from water, and are less likely to be biodegradable. The solubility of inorganic chemicals varies widely from insoluble to greater than 100,000 mg/L, depending on temperature, pH, ORP, and the concentrations of dissolved constituents such as humic and fulvic acids.

D.1.1.3 Vapor Pressure

Vapor pressure is a property of a chemical in its pure state, which indicates how readily it will volatilize to the atmosphere. Volatilization from water is dependent upon vapor pressure and Henry's Law Constant. Vapor pressures for chemicals in their pure states range from 0.001 to 760 mm mercury (mm Hg) for liquids to less than 10^{-10} mm Hg for solids.

D.1.1.4 Henry's Law Constant

The Henry's Law Constant of a compound is essentially the air/water partition coefficient. In dimensional form, the Henry's Law Constant is the ratio of the vapor pressure to the water

solubility (in $\text{atm}\cdot\text{m}^3/\text{mole}$). The Henry's Law Constant indicates how a chemical will partition between air and water at equilibrium, and can be used to calculate the rate of volatilization of a chemical from water.

D.1.1.5 Organic Carbon/Water Partition Coefficient

The organic carbon/water partition coefficient (K_{oc}) is a measure of the tendency for a chemical to be sorbed to the organic fraction of soil and sediment. Normal K_{oc} values range from 1 to 10^7 L/kg, with higher values indicating greater sorption potential by the soil and lower values indicating high leaching capabilities for the contaminants from the waste source into surface runoff and groundwater.

D.1.1.6 Octanol/Water Partition Coefficient

The octanol/water partition coefficient (K_{ow}) is a measure of the distribution of a compound at equilibrium between n-octanol and water. The octanol/water partition coefficient, K_{ow} , gives an indication of how a compound will preferentially distribute into a solvent or water, and is a measure of how hydrophobic a compound is. A chemical with a high K_{ow} is hydrophobic and may be relatively immobile in an aqueous system (e.g., contaminant sorbs to soil particles), but may be mobilized in the presence of an organic solvent.

D.1.2 Fate of Organic Contaminants

D.1.2.1 Sorption

Sorption and desorption are two major mechanisms affecting the fate of contaminants in the subsurface. Sorption includes both adsorption and absorption. Adsorption is defined as the accumulation occurring at an interface, while absorption is the partitioning between two phases (Knox et al., 1993).

Sorption is the process by which a compound is retained onto a solid particle rather than remaining dissolved in solution. The sorption of contaminants to the soil matrix is an important factor affecting their transport in terrestrial environments. The sorption of contaminants to suspended sediments and bottom sediment is an important factor affecting chemical transport in aquatic environments.

In general, sorption reactions may be classified as either sorbent or solvent-motivated. Sorbent-motivated sorption occurs when an attraction between the sorbent (subsurface material) and the solute (contaminant), and the contaminant accumulates at the surface due to the affinity of the surface for the contaminant. An example of sorbent-motivated sorption would be a highly polar or ionizable contaminant interaction with the cation exchange sites of clay minerals. This type of sorption typically occurs with inorganics and is more commonly referred to as ion exchange. Solvent-motivated sorption occurs when the contaminant is hydrophobic, such as nonpolar organics, which prefer nonpolar phases to the polar water phase. Hydrophobic contaminants will accumulate at an interface or partition into a nonpolar phase (e.g., associate with the organic content of the subsurface medium) rather than partition into the water phase. The sorption of most neutral organic constituents falls into the category of hydrophobic, or solvent-motivated sorption (Knox et al., 1993). The best indicators of the partitioning of a compound between soil and water are the organic carbon/water partition coefficient (K_{oc}), the soil/water distribution coefficient (K_d), the octanol/water partition coefficient (K_{ow}), and the retardation factor (R).

For nonionic organic chemicals and aquifer materials, sorption is largely controlled by the clay and organic carbon content of the soil. The distribution of an organic chemical between water

and a specific soil matrix is characterized by the organic carbon/water partition coefficient, K_{oc} . This coefficient, which is based on the specific organic carbon content of the soil, is typically measured empirically using a linear adsorption isotherm where the partitioning between the two phases is determined by the following equation (Olsen and Davis, 1990):

$$K_d = \frac{C_s}{C_w} \quad \text{Equation 1}$$

where:

- K_d = Soil/water distribution coefficient (L/kg)
- C_s = Mass of the solute on the solid phase per unit mass of the solid phase (mg/kg)
- C_w = Mass of the solute per unit volume of solution (mg/L)

The soil/water distribution coefficient, K_d , obtained from the above equation is then normalized to correct for variations in the organic carbon content of differing soil matrices to calculate K_{oc} :

$$K_{oc} = \frac{K_d}{f_{oc}} \quad \text{Equation 2}$$

where:

- K_{oc} = Organic carbon/water partition coefficient (L/kg)
- K_d = Soil/water distribution coefficient (L/kg)
- f_{oc} = Fraction of organic carbon in the soil

The normalization of the adsorption coefficient to ascertain K_{oc} correlates well with other adsorption coefficient estimation methods which use other properties of the chemical such as water solubility or octanol/water partitioning (Callahan et al., 1979).

If the empirical K_d or K_{oc} value for the chemical is not available, the most widely accepted method of estimating the organic carbon/water partition coefficient involves the octanol/water partition coefficient, K_{ow} . The octanol/water partition coefficient, K_{ow} , has been correlated to water solubility, the organic carbon/water partition coefficient, and bioconcentration factors for aquatic life and represents the extent of partitioning by a chemical between organic and aqueous phases (Lyman et al., 1990). The relationship between K_{oc} and K_{ow} is expressed as a regression equation:

$$\log K_{oc} = a \log K_{ow} + b \quad \text{Equation 3}$$

where a and b are constants derived from specific data sets which represent differing classes of chemicals such as pesticides, aromatic compounds, and chlorinated hydrocarbons. Chemicals with low K_{ow} (i.e., less than 10 L/kg) are considered relatively hydrophilic and tend to have high water solubilities and small K_{oc} values. Conversely, hydrophobic compounds typically have K_{ow} values greater than 10^4 L/kg (Lyman et al., 1990). In general, the more hydrophobic a contaminant is, the more likely the contaminant will be sorbed to soil.

From Equation 1, when C_s is equal to zero, K_d also equals zero. Under this condition, no adsorption or retardation of the chemical occurs. This implies that the contaminant moves at the same velocity as the groundwater and in this case, the contaminant is termed a conservative or nonreactive solute. However, the velocity of the contaminant front can be substantially different for solutes that are adsorbed within the soil matrix. The retardation factor is defined as the ratio of the groundwater flow velocity to the contaminant front velocity:

$$R = 1 + \rho_b \frac{K_d}{n_e} \quad \text{Equation 4}$$

where:

- R = Retardation factor (dimensionless)
- θ_b = Bulk density of the soil (g/mL)
- K_d = Distribution coefficient (mL/g)
- n_e = Effective porosity of the soil (dimensionless)

The retardation factor indicates the extent of retardation of contaminant migration in groundwater due to adsorption. A retardation factor of 1.0 indicates that the contaminant has little tendency to bind to soils and, hence, moves freely in the groundwater. By contrast, the larger the R, the greater the tendency for a contaminant to bind to the soil matrix and the slower it will move in the groundwater. The retardation factor cannot fall below 1.0.

Other factors which affect the adsorption of chemicals to the soil matrix include temperature, pH of the soil and water, particle size distribution, and surface area of solids. The value of the distribution coefficient K_d usually decreases with increasing temperature because adsorption is an exothermic process. Neutral and slightly polarized organic compounds are somewhat affected by pH. Chemicals that tend to ionize are significantly affected by pH (Lyman et al., 1990). When the pH of the groundwater is approximately 1.0 to 1.5 units above the negative log of the acid dissociation constant (pK_a), adsorption becomes significant. A comparison of the pK_a of an organic acid with the pH of the groundwater indicates the potential importance of the dissociation of the organic compound in determining the degree of partitioning. The size of affected soil particles also plays a role in a contaminant's sorption characteristics. Particles of small size, such as particles of fine silt or clay, will have a greater tendency to adsorb chemicals.

D.1.2.2 Volatilization

Volatilization is a process whereby a compound changes state from the aqueous phase to the vapor phase. Compounds that do not adsorb onto soil/sediment or dissolve in water have the greatest tendency to volatilize. The volatility of a compound can be evaluated from its K_{oc} and by assessing its Henry's Law Constant. The value of K_{oc} indicates the degree of sorption of a compound to soil/sediment. A compound with a high K_{oc} value will have a reduced volatility because the compound sorbs extensively to the soil/sediment surface. The Henry's Law Constant can be considered the partition coefficient of the contaminant between the aqueous phase and the gas phase. A Henry's Law Constant of greater than 10^{-3} atm-m³/mol indicates a high volatility, and a Henry's Law Constant of less than 10^{-5} atm-m³/mol indicates a low volatility. **Table D-1** provides a rough outline of relative volatility of a solute according to its Henry's Law Constant.

Table D-1
Volatility of Compounds Based on Henry's Law Constants

Volatility	Henry's Law Constant
Volatilization is very slow, at a rate controlled by slow diffusion through air	$< 10^{-5} \text{ atm-m}^3/\text{mol}$
Volatilization is not rapid but significant	$10^{-5} \text{ atm-m}^3/\text{mol}$ to $10^{-3} \text{ atm-m}^3/\text{mol}$
Volatilization is rapid	$> 10^{-3} \text{ atm-m}^3/\text{mol}$

The Henry's Law Constant is related to other physical properties of the compound, the most important of which are vapor pressure and water solubility. Compounds exhibiting high vapor pressures and low water solubilities tend to have high volatilization rates. In fact, in the absence of literature values, Henry's Law Constants can be estimated from the following equation (Olsen and Davis, 1990):

$$H = \frac{(V_p)(MW)(16.04)}{(WS)(T)} \quad \text{Equation 5}$$

where:

- V_p = Vapor pressure of the chemical (mm Hg)
- MW = Molecular weight of the chemical (g/mol)
- WS = Solubility in water (mg/L)
- T = Temperature ($^{\circ}\text{K}$)
- H = Henry's Law Constant ([mg/L]/[mg/L])

From this equation, it is evident that the volatilization of a compound to air will depend on its vapor pressure, water solubility, and temperature. Other important factors affecting volatilization include wind speed, the depth of the aquifer, and the geology of the unsaturated zone.

D.1.2.3 Hydrolysis

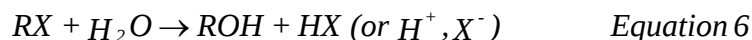
Hydrolysis is the reaction of a compound with water. It usually involves the introduction of a hydroxyl (-OH) group into an organic compound, usually at a point of unbalanced charge distribution (Cherry et al., 1983). The hydrolysis reaction can displace halogens, and may be catalyzed by the presence of acids, bases, or metal ions. Therefore, the rate of hydrolysis is pH and metal-ion concentration dependent. Surface effects also may affect the rate of hydrolysis. Halogenated aliphatics are susceptible to hydrolysis, with reactions proceeding most rapidly for monohalogenated compounds, and much more slowly as the number of halogen ions increases (Fetter, 1993).

Hydrolysis applies to a limited number of chemicals. These contain hydrolyzable groups, such as esters, aliphatic halogens, amides, carbamates, and phosphate esters (Howard, 1991). Compounds that are not susceptible include: alkanes, alkenes, aldehydes, amines, and carboxy-containing compounds (Olsen and Davis, 1990).

D.1.2.4 Abiotic Degradation

Abiotic degradation is the chemical degradation of compounds without the assistance of biological activities. In the natural environment, the most common abiotic degradation processes are hydrolysis and hydroxyl radical reactions. Other abiotic degradation processes include direct photolysis, dehydrohalogenation, and oxidation.

Hydrolysis, as mentioned above, is a chemical reaction in which compounds react with water molecules in the environment, resulting in the introduction of a hydroxyl group (-OH) and the loss of a leaving group (-X), typically a halogen.



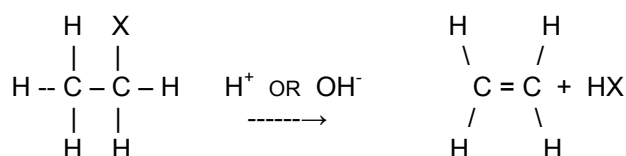
These reactions are catalyzed mainly by hydronium (H_3O^+) and/or hydroxyl ions (OH^-). Therefore, as mentioned above, hydrolysis reactions are pH dependent. Selected metals may also catalyze a hydrolysis reaction (Olsen and Davis, 1990).

Hydroxyl radical reactions are reactions with hydroxyl radicals photochemically generated from sunlight. These reactions may occur mostly in the atmosphere and to a lesser degree in surface water. Once the free radicals are formed, they will react with organic molecules to form an intermediate organic-free radical, which usually reacts further with other compounds. For most chemicals in the atmosphere, reaction with photochemically-generated hydroxyl radicals is the most common degradation process. For many chemicals, experimental reaction rate constants for reactions involving hydroxyl radicals are available in the scientific literature and are used to calculate an estimated half-life by assuming an average hydroxyl radical concentrations of 5×10^5 molecules/cm³ in non-smog conditions (Howard, 1991).

Occasionally, other reactions besides hydroxyl radical reactions occur in the atmosphere such as ozone oxidation and direct photolysis. Direct photolysis is a photochemical alteration of the compound as a result of the compound absorbing direct sunlight. The possibility of direct photolysis in air or water can be partially assessed by examining the UV spectrum of the chemical. If the chemical does not absorb sunlight at wavelengths greater than 290 nm, the chemical cannot directly photolyze.

Dehydrohalogenation is an elimination reaction in which an alkyl derivative will eliminate HX to form an alkene, where X is commonly a halogen, hydroxyl radical, or ester group:

Equation 7



D.1.2.5 Biotic Degradation

Biodegradation is the process in which the chemical degradation of a compound is assisted by soil microorganisms (e.g., fungi, bacteria). Reactions include oxidation, reduction, hydrolysis, and sometimes rearrangement of the molecule. Though biodegradation may occur very slowly for some compounds, the eventual mineralization of almost every organic compound in the

terrestrial and aquatic environment can be attributed to biodegradation (Alexander, 1978). A typical range of half lives for different degradation rates are summarized in **Table D-2**.

Rates of biotic degradation depend on many factors. Microorganisms require a carbon source (e.g., organic matter), an electron acceptor (e.g., oxygen, nitrate), nutrients (e.g., nitrogen, phosphorus), and various trace elements in order to maintain existing cells and produce new cells. Many environmental factors can also serve to limit the occurrence of microbial metabolism in the subsurface. These factors include pH, temperature, toxics, substrate concentration, and the presence of microbes. Most bacteria find the optimum pH range to be 6.5 to 7.5 and are not able to survive at pH values greater than 9.5 or below 4.0 (Knox et al., 1993). Microbial activity generally increases with increasing temperature. The presence of certain compounds may also be toxic to microorganisms. Heavy metals, acids, bases, or high concentrations of the substrate can serve to limit microbial activity. Finally, for biotic degradation to occur in the subsurface, microbes capable of metabolizing (or cometabolizing) the substrate must be present.

Table D-2
Rate of Biodegradation Based on Half Lives

Biodegradation Rate	Approximate Biodegradation Half-Life
Fast	1 day to 7 days
Moderately Fast	7 days to 4 weeks
Slow	4 weeks to 6 months
Resistant	6 months to 1 year

Complete biotic degradation of organic chemicals by microorganisms, utilizing enzymes to facilitate degradation, ultimately produces microbial cells, water, and carbon dioxide, which eventually lead to mineralization of the compound. Whether or not a chemical is transformed by enzymes depends on the configuration alignment of the enzyme with the organic chemical during the reaction. If an ideal configuration of the enzyme with organic chemicals occurs, the reaction will occur. Persistent chemicals have less favorable alignments, and non-reacting or recalcitrant chemicals fail to bond or produce favorable alignments.

Biotic degradation can be either aerobic or anaerobic. An aerobic reaction occurs in the presence of oxygen. Aerobic reactions occur in oxygen-rich environments such as surface soil (i.e., 0 to 6 inches bgs) and upper layers of sediment. An aerobic reaction is usually an oxidation reaction. An anaerobic reaction occurs in the absence of oxygen. Anaerobic reactions occur in such places as the saturated zone in terrestrial environments and the bottom layer of sediment in aquatic environments. Because of the lack of oxygen in these environments, an anaerobic reaction usually favors dehydrohalogenation reactions or reductive reactions.

D.1.3 Fate of Inorganic Contaminants

D.1.3.1 Ion Exchange

Metals in soil are generally immobile, particularly under neutral or alkaline conditions, and tend to sorb to soil particles. As described in *Section D.1.2.1*, sorption can be considered as either

sorbent- or solvent-motivated. Solvent-motivated sorption (partitioning) typically occurs for nonpolar, hydrophobic organic chemicals in groundwater by accumulation occurring on the organic content of the media. Ion exchange is sorbent-motivated sorption and occurs for inorganic chemicals due to an affinity of the solid surface for the compound. Typically, the sorbent surface contains a charge deficiency and requires the accumulation of ions near the solid/liquid interface to neutralize the surface charge. In subsurface media, the mineral fraction most commonly involved in ion exchange is the clay fraction (Knox et al., 1993). Ion exchange occurs when the sorbent charge deficiency can be neutralized more efficiently by ions in solution than by those ions currently adsorbed. For example, if sodium ions (monovalent) have accumulated and calcium ions (divalent) suddenly appear, the excess surface charge can be more efficiently neutralized by the calcium ions than by sodium. Thus, the sodium ions will desorb, the calcium ions will adsorb, and an exchange of ions occurs. The cation exchange capacity of a given aquifer material indicates the probable type and amount of clay minerals present, and can be used as an indication of the ability of a soil to attenuate cations found in the groundwater (Makeig, 1982).

D.1.3.2 Chemical Speciation

Most inorganic chemicals occur in more than one ionic form, or species, in soils and groundwater. These species, which form as a result of hydrolysis, oxidation/reduction, and complexation reactions, may have different valences and mobilities in groundwater due to different affinities for adsorption and different solubility controls. Simple ionic species often combine with ligands to form ionic or neutral-charge aqueous complexes. The major inorganic ligands in groundwater are generally Cl^- , HCO_3^{2-} , CO_2 , and SO_4^{2-} , and in some cases, NH_3 , NO_3^- and F^- (Cherry et al., 1983). Environmental conditions which affect speciation of inorganic chemicals include pH, redox potential, and inorganic ligands.

D.1.3.3 Oxidation/Reduction

Oxidation and reduction ("redox") refers to the transfer of electrons and the resultant species change of ions or compounds. Oxidation is the loss of electrons, while reduction is the gain of electrons. Redox processes are important because they can cause changes in the mobility of many inorganic compounds. The ability of a redox reaction to occur is a function of the redox potential. The redox potential is defined in terms of the negative logarithm of the free-electron activity and is referred to as pE. The redox potential can also be expressed in terms of volts (E_h). Low values of pE indicate high electron activity and favor electron-rich species (reduced). High values of pE indicate low electron activity and favor electron-poor species (oxidized).

D.2 TRANSPORT OF CONTAMINANTS

Contaminant transport refers to the mechanisms and rates of migration of contaminants away from the source area. Migration pathways often include air, water, soil, and the interfaces between the phases of the contaminant (i.e., solid, liquid, or gas). Mechanisms controlling the movement of contaminants include advection, dispersion, diffusion, volatilization, and sorption. These mechanisms are dictated by the physical and chemical nature of the environmental media and their interaction with the potential COCs. Water pathways include surface water, storm water runoff, groundwater, infiltration/percolation, and precipitation. The air pathways include uptake into the atmosphere and deposition from it either in a dry or wet form. The soil pathways include sediment and soil transported by erosion or by site activities such as construction and movement through the vadose zone as soil gas. Transport across an interface is primarily due to

partitioning. The degree of partitioning will depend on the volatility, solubility, and sorptive capacity of the phases. The primary transport mechanism across the water-air and soil-air interfaces are volatilization and sorption, while transport across the soil-water interface is controlled by sorption/desorption and dissolution (solubilization).

D.2.1 Advection

Contaminant transport by advection occurs when the contaminant is moved in and with the bulk flow of either water or the atmosphere. The primary advective transport pathway at Building 4343 is migration into surface water.

D.2.2 Diffusion

Transport by diffusion is the result of a concentration gradient in the contaminant plume or the soil gas within the vadose zone. The rate of diffusion is expressed by the diffusivity coefficient, which is affected by temperature, pressure, density, and soil porosity. Diffusion in soil is strongly dependent on the effective porosity of the soil. Residual clays have high porosity but low effective (interconnected) porosity. Transport due to diffusion in clays is usually minimal.

D.2.3 Volatilization

Volatilization occurs when a liquid changes its phase to a gas. This is primarily a mechanism for organic contaminants migrating from the soil or surface water to the air. Volatilization is a mass transfer process that is limited by a compound's solubility in water, molecular weight, vapor pressure, K_{oc} value, and by the local temperature.

D.2.4 Sorption

As discussed previously, sorption is a general term used in place of the specific terms absorption or adsorption. Adsorption describes the process whereby a contaminant is bound to the surface of a medium, whereas absorption occurs when the contaminant is bound within the medium. The distinction between the two is not always relevant, but the fact that a contaminant has been sorbed indicates that it has been bound to its new medium and will be transported with this new medium. This transport mechanism may be significant when a high concentration of suspended solids is found in water samples.

Desorption is the release (leaching) of a contaminant from the sorbent phase.

Sorption/desorption is a primary mechanism of transport for water and soil pathways. In a water-soil environment, soil is the adsorbent and the contaminants are the adsorbates.

Sorption/desorption of organic and inorganic compounds within soil-water systems is assessed by several physical and chemical properties of both the compound and the soil or sediment (*Section D.1.2.1*).

Appendix E

Human Health Risk Assessment Tables and Statistical Comparison Results

Appendix E-1

Human Health Risk Assessment Tables

Table E-1
Occurrence, Distribution and Selection of Chemicals of Potential Concern at SWMU 31
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Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (3) (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (4)
Surface Soil	N/A	TCDD-TEQ-MAX	3.18E-07	8.38E-06	mg/kg	31SB05A	2/2	N/A	8.38E-06	N/A	0.0000043C	N/A	N/A	Yes	ASL
	N/A	TCDD-TEQ-RME	2.66E-07	8.37E-06	mg/kg	31SB05A	2/2	N/A	8.37E-06	N/A	0.0000043C	N/A	N/A	Yes	ASL
	35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.000007732	0.0001914	mg/kg	31SB05A	2/2	N/A	0.0001914	N/A	N/A	N/A	N/A	No	TEQ
	67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.00000965J	0.00003759	mg/kg	31SB05A	2/2	N/A	0.00003759	N/A	N/A	N/A	N/A	No	TEQ
	55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.0000025	0.0000025	mg/kg	31SB05A	1/2	N/A	0.0000025	N/A	N/A	N/A	N/A	No	TEQ
	39227-28-6	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.000004049	0.000004049	mg/kg	31SB05A	1/2	N/A	0.000004049	N/A	N/A	N/A	N/A	No	TEQ
	70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.000000221J	0.000008597J	mg/kg	31SB05A	2/2	N/A	0.000008597	N/A	N/A	N/A	N/A	No	TEQ
	57653-85-7	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.00000135	0.000006711	mg/kg	31SB05A	2/2	N/A	0.000006711	N/A	N/A	N/A	N/A	No	TEQ
	57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.000001235	0.000001235	mg/kg	31SB05A	1/2	N/A	0.000001235	N/A	N/A	N/A	N/A	No	TEQ
	19408-74-3	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.000000384	0.000008482	mg/kg	31SB05A	2/2	N/A	0.000008482	N/A	N/A	N/A	N/A	No	TEQ
	40321-76-4	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.000001633	0.000001633	mg/kg	31SB05A	1/2	N/A	0.000001633	N/A	N/A	N/A	N/A	No	TEQ
	57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.000000559	0.000000559	mg/kg	31SB05A	1/2	N/A	0.000000559	N/A	N/A	N/A	N/A	No	TEQ
	51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.00000074J	0.00000074J	mg/kg	31SB05A	1/2	N/A	0.00000074	N/A	N/A	N/A	N/A	No	TEQ
	55-63-0	Nitroglycerin	0.42	0.42	mg/kg	31SB05A	1/2	0.3450-0.3450	0.42	N/A	130 N	N/A	N/A	No	BSL
	37871-00-4	Total Heptachlorodibenzo-p-dioxin	0.00001403	0.0004542	mg/kg	31SB05A	2/2	N/A	0.0004542	N/A	N/A	N/A	N/A	No	TEQ
	38998-75-3	Total Heptachlorodibenzofuran	0.00004009	0.00004009	mg/kg	31SB05A	1/2	N/A	0.00004009	N/A	N/A	N/A	N/A	No	TEQ
	34465-46-8	Total Hexachlorodibenzo-p-dioxin	0.000001455	0.00007931	mg/kg	31SB05A	2/2	N/A	0.00007931	N/A	N/A	N/A	N/A	No	TEQ
	55684-94-1	Total Hexachlorodibenzofuran	0.000000976	0.00005343	mg/kg	31SB05A	2/2	N/A	0.00005343	N/A	N/A	N/A	N/A	No	TEQ
	36088-22-9	Total Pentachlorodibenzo-p-dioxin	0.00000194	0.00000194	mg/kg	31SB05A	1/2	N/A	0.00000194	N/A	N/A	N/A	N/A	No	TEQ
	30402-15-4	Total Pentachlorodibenzofuran	0.000000092	0.00001304	mg/kg	31SB05A	2/2	N/A	0.00001304	N/A	N/A	N/A	N/A	No	TEQ
	41903-57-5	Total Tetrachlorodibenzo-p-dioxin	0.000002084	0.000002084	mg/kg	31SB05A	1/2	N/A	0.000002084	N/A	N/A	N/A	N/A	No	TEQ
	30402-14-3	Total Tetrachlorodibenzofuran	0.000000085	0.000005142	mg/kg	31SB05A	2/2	N/A	0.000005142	N/A	N/A	N/A	N/A	No	TEQ
	60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.000001572	0.000001572	mg/kg	31SB05A	1/2	N/A	0.000001572	N/A	N/A	N/A	N/A	No	TEQ
	57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.000000678	0.000000678	mg/kg	31SB05A	1/2	N/A	0.000000678	N/A	N/A	N/A	N/A	No	TEQ
	1746-01-6	2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.000000713J	0.000000713J	mg/kg	31SB05A	1/2	N/A	0.000000713	N/A	N/A	N/A	N/A	No	TEQ
	3268-87-9	Octachlorodibenzodioxin	0.0005389	0.001851	mg/kg	31SB05A	2/2	N/A	0.001851	N/A	N/A	N/A	N/A	No	TEQ
	7429-90-5	Aluminum	7210	15500	mg/kg	31SB05B	2/2	N/A	15500	4.00E+04	N/A	N/A	N/A	Yes	NTX
	7440-36-0	Antimony	5.86E-01L	5.86E-01L	mg/kg	31SB05B	1/1	N/A	5.86E-01L	N/A	3.12N	N/A	N/A	No	BSL
	7440-38-2	Arsenic	1.07	5.9	mg/kg	31SB05A	2/2	N/A	5.9	1.58E+01	0.4258C	N/A	N/A	Yes	ASL
	7440-39-3	Barium	90.4	96.4	mg/kg	31SB05B	2/2	N/A	96.4	2.09E+02	547.5000N	N/A	N/A	No	BSL
	7440-41-7	Beryllium	0.634	0.735	mg/kg	31SB05B	2/2	N/A	0.735	1.02E+00	15.6429N	N/A	N/A	No	BSL
	7440-43-9	Cadmium	0.083J	0.462J	mg/kg	31SB05A	2/2	N/A	0.462	6.90E-01	3.9107N	N/A	N/A	No	BSL
	7440-70-2	Calcium	1960	56700	mg/kg	31SB05A	2/2	N/A	56700	N/A	N/A	1000000	RDA	No	BSL
	7440-47-3	Chromium	15.8	28.2	mg/kg	31SB05B	2/2	N/A	28.2	6.53E+01	23.4643N	N/A	N/A	Yes	ASL
	7440-48-4	Cobalt	7.69	17.8	mg/kg	31SB05B	2/2	N/A	17.8	7.23E+01	N/A	N/A	N/A	Yes	NTX
	7440-50-8	Copper	17.1	17.7	mg/kg	31SB05B	2/2	N/A	17.7	5.35E+01	312.8571N	N/A	N/A	No	BSL
	7439-89-6	Iron	9580J	27800J	mg/kg	31SB05B	2/2	N/A	27800	5.10E+04	2,346.4286N	N/A	N/A	Yes	ASL
	7439-92-1	Lead	14.6J	28J	mg/kg	31SB05A	2/2	N/A	28	2.68E+01	N/A	400	USEPA	No	BSL
	7439-95-4	Magnesium	4650	25000	mg/kg	31SB05A	2/2	N/A	25000	N/A	N/A	1000000	RDA	No	BSL
	7439-96-5	Manganese	203J	495J	mg/kg	31SB05B	2/2	N/A	495	2.54E+03	156.4286N	N/A	N/A	Yes	ASL
	7439-97-6	Mercury (Inorganic)	0.035L	0.121L	mg/kg	31SB05A	2/2	N/A	0.121	1.30E-01	2.346N	N/A	N/A	No	BSL
	7440-02-0	Nickel	11.5	14.8	mg/kg	31SB05B	2/2	N/A	14.8	6.28E+01	156.4286N	N/A	N/A	No	BSL
	7440-09-7	Potassium	938	2120	mg/kg	31SB05B	2/2	N/A	2120	N/A	N/A	1000000	RDA	No	BSL
	7440-23-5	Sodium	29.8	77.5	mg/kg	31SB05A	2/2	N/A	77.5	N/A	N/A	1000000	RDA	No	BSL
	7440-28-0	Thallium	0.23J	0.34J	mg/kg	31SB05A	2/2	N/A	0.34	2.11E+00	0.5475N	N/A	N/A	No	BSL
	7440-62-2	Vanadium	22	47.5	mg/kg	31SB05B	2/2	N/A	47.5	1.08E+02	7.821N	N/A	N/A	Yes	ASL

Table E-1
Occurrence, Distribution and Selection of Chemicals of Potential Concern at SWMU 31
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Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (3) (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (4)
Surface Soil	7440-66-6	Zinc	60.2J	98.5J	mg/kg	31SB05A	2/2	N/A	98.5	2.02E+02	2,300N	N/A	N/A	No	BSL
	72-54-8	4,4'-DDD	0.000698J	0.000698J	mg/kg	31SB05A	1/2	0.0008-0.0008	0.000698	N/A	2.6614C	N/A	N/A	No	BSL
	72-55-9	4,4'-DDE	0.00226	0.00226	mg/kg	31SB05A	1/2	0.0008-0.0008	0.00226	N/A	1.8786C	N/A	N/A	No	BSL
	50-29-3	4,4'-DDT	0.0133	0.0133	mg/kg	31SB05A	1/2	0.0008-0.0008	0.0133	N/A	1.8786C	N/A	N/A	No	BSL
	33213-65-9	Endosulfan II	0.00228	0.00228	mg/kg	31SB05A	1/2	0.0008-0.0008	0.00228	N/A	46.9286N	N/A	N/A	No	BSL
	1031-07-8	Endosulfan sulfate	0.000893	0.000893	mg/kg	31SB05A	1/2	0.0008-0.0008	0.000893	N/A	46.9286N	N/A	N/A	No	BSL
	7421-93-4	Endrin aldehyde	0.00179L	0.00179L	mg/kg	31SB05A	1/2	0.0008-0.0008	0.00179	N/A	2.3464N	N/A	N/A	No	BSL
	72-43-5	Methoxychlor	0.00765	0.00765	mg/kg	31SB05A	1/2	0.0008-0.0008	0.00765	N/A	39.1071N	N/A	N/A	No	BSL
	11097-69-1	Aroclor 1254	0.0931	0.0931	mg/kg	31SB05A	1/2	0.0383-0.0383	0.0931	N/A	0.156N	N/A	N/A	No	BSL

- (1) Maximum concentration used for screening.
- (2) N/A - Refer to supporting information for background discussion.
Background values derived from site-specific statistical analysis. See text for supporting information.
- (3) Screening toxicity values from USEPA Region 3 RBC Table (October 2006) and are based on a risk level of 1.0E-06 and a hazard index of 1.0.
See text for derivation of Nutrient RDAs.
- (4) Rationale Codes Selection Reason:
- Deletion Reason:

No Toxicity Information (NTX)
Above Screening Levels (ASL)
Below Screening and/or ARAR/TBC Level (BSL)

Definitions:

N/A = Not Applicable or Not Available
SQL = Sample Quantitation Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
J = Estimated Value
C = Carcinogenic
N = Non-Carcinogenic
RDA = Recommended Daily Allowance
TEQ = While some individual chlorinated dioxin and furan constituents may exceed their toxicity values, dioxins and furans will be analyzed by the toxicity

Table E-2
Comparison of Maximum Detection Limits of Non-Detected Compounds to Screening Criteria - SWMU 31
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Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (3) (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	Above Screening Value (Y/N)
Surface Soil	72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran			mg/kg		0/2	2.5E-07-2.5E-07	2.50E-07	N/A	N/A	N/A	N/A	NTX
	99-35-4	1,3,5-Trinitrobenzene			mg/kg		0/2	0.1000-0.1000	0.1	N/A	234.6429N	N/A	N/A	No
	99-65-0	1,3-Dinitrobenzene			mg/kg		0/2	0.1000-0.1000	0.1	N/A	0.7821N	N/A	N/A	No
	118-96-7	2,4,6-Trinitrotoluene			mg/kg		0/2	0.2000-0.2000	0.2	N/A	21.2909C	N/A	N/A	No
	35572-78-2	2-amino-4,6-Dinitrotoluene			mg/kg		0/2	0.2000-0.2000	0.2	N/A	16N	N/A	N/A	No
	88-72-2	2-Nitrotoluene			mg/kg		0/2	0.4000-0.4000	0.4	N/A	2.8C	N/A	N/A	No
	99-08-1	3-Nitrotoluene			mg/kg		0/2	0.4000-0.4000	0.4	N/A	N/A	N/A	N/A	NTX
	19406-51-0	4-amino-2,6-Dinitrotoluene			mg/kg		0/2	0.2000-0.2000	0.2	N/A	16N	N/A	N/A	No
	99-99-0	4-Nitrotoluene			mg/kg		0/2	0.4000-0.4000	0.4	N/A	N/A	N/A	N/A	NTX
	156-59-2	cis-1,2-Dichloroethene			mg/kg		0/2	0.0046-0.0055	0.0055	N/A	78N	N/A	N/A	No
	121-82-4	Cyclonite			mg/kg		0/2	0.2000-0.2000	0.2	N/A	5.8066C	N/A	N/A	No
	2691-41-0	HMX			mg/kg		0/2	0.2000-0.2000	0.2	N/A	391.0714N	N/A	N/A	No
	N/A	m+p-Xylenes			mg/kg		0/2	0.0092-0.0110	0.011	N/A	1,600N	N/A	N/A	No
	95-47-6	o-Xylene			mg/kg		0/2	0.0046-0.0055	0.0055	N/A	1,600N	N/A	N/A	No
	78-11-5	Pentaerythritol tetranitrate			mg/kg		0/2	0.3330-0.3450	0.345	N/A	N/A	N/A	N/A	NTX
	479-45-8	Tetryl			mg/kg		0/2	0.2000-0.2000	0.2	N/A	78.2143N	N/A	N/A	No
	156-60-5	trans-1,2-Dichloroethene			mg/kg		0/2	0.0046-0.0055	0.0055	N/A	156.4286N	N/A	N/A	No
	93-76-5	2,4,5-T			mg/kg		0/2	0.1150-1.1100	1.11	N/A	78.2143N	N/A	N/A	No
	93-72-1	2,4,5-TP (Silvex)			mg/kg		0/2	0.1150-1.1100	1.11	N/A	62.5714N	N/A	N/A	No
	94-75-7	2,4-D			mg/kg		0/2	0.2300-2.2200	2.22	N/A	78.2143N	N/A	N/A	No
	94-82-6	2,4-DB			mg/kg		0/2	1.1500-11.1000	11.1	N/A	62.5714N	N/A	N/A	No
	309-00-2	Aldrin			mg/kg		0/2	0.0007-0.0008	0.0008	N/A	0.0376C	N/A	N/A	No
	319-84-6	alpha-BHC			mg/kg		0/2	0.0007-0.0008	0.0008	N/A	0.1014C	N/A	N/A	No
	5103-71-9	alpha-Chlordane			mg/kg		0/2	0.0007-0.0008	0.0008	N/A	1.8249C	N/A	N/A	No
	319-85-7	beta-BHC			mg/kg		0/2	0.0007-0.0008	0.0008	N/A	0.3548C	N/A	N/A	No
	75-99-0	Dalapon			mg/kg		0/2	1.1500-11.1000	11.1	N/A	234.6429N	N/A	N/A	No
	319-86-8	delta-BHC			mg/kg		0/2	0.0007-0.0008	0.0008	N/A	0.4913C	N/A	N/A	No
	1918-00-9	Dicamba			mg/kg		0/2	0.2300-2.2200	2.22	N/A	234.6429N	N/A	N/A	No
	120-36-5	Dichloroprop			mg/kg		0/2	0.2300-2.2200	2.22	N/A	N/A	N/A	N/A	NTX
	60-57-1	Dieldrin			mg/kg		0/2	0.0007-0.0008	0.0008	N/A	0.0399C	N/A	N/A	No
	959-98-8	Endosulfan I			mg/kg		0/2	0.0007-0.0008	0.0008	N/A	46.9286N	N/A	N/A	No
	72-20-8	Endrin			mg/kg		0/2	0.0007-0.0008	0.0008	N/A	2.3464N	N/A	N/A	No
	53494-70-5	Endrin ketone			mg/kg		0/2	0.0007-0.0008	0.0008	N/A	2.3464N	N/A	N/A	No
	58-89-9	gamma-BHC (Lindane)			mg/kg		0/2	0.0007-0.0008	0.0008	N/A	0.4913C	N/A	N/A	No
	5103-74-2	gamma-Chlordane			mg/kg		0/2	0.0007-0.0008	0.0008	N/A	1.8249C	N/A	N/A	No
	76-44-8	Heptachlor			mg/kg		0/2	0.0007-0.0008	0.0008	N/A	0.1419C	N/A	N/A	No
	1024-57-3	Heptachlor epoxide			mg/kg		0/2	0.0007-0.0008	0.0008	N/A	0.0702C	N/A	N/A	No
	94-74-6	MCPA			mg/kg		0/4	115.0000-1,110.0000	1,110	N/A	3.9107N	N/A	N/A	Yes
	93-65-2	MCPP			mg/kg		0/2	115.0000-1,110.0000	1,110	N/A	7.8214N	N/A	N/A	Yes
	8001-35-2	Toxaphene			mg/kg		0/2	0.0370-0.0383	0.0383	N/A	0.5807C	N/A	N/A	No
	12674-11-2	Aroclor 1016			mg/kg		0/2	0.0370-0.0383	0.0383	N/A	0.55N	N/A	N/A	No
	11104-28-2	Aroclor 1221			mg/kg		0/2	0.0740-0.0768	0.0768	N/A	0.3194C	N/A	N/A	No
	11141-16-5	Aroclor 1232			mg/kg		0/2	0.0370-0.0383	0.0383	N/A	0.3194C	N/A	N/A	No
	53469-21-9	Aroclor 1242			mg/kg		0/2	0.0370-0.0383	0.0383	N/A	0.3194C	N/A	N/A	No
	12672-29-6	Aroclor 1248			mg/kg		0/2	0.0370-0.0383	0.0383	N/A	0.3194C	N/A	N/A	No
	11096-82-5	Aroclor 1260			mg/kg		0/2	0.0370-0.0383	0.0383	N/A	0.3194C	N/A	N/A	No
	121-14-2	2,4-Dinitrotoluene			mg/kg		0/2	0.2000-0.2000	0.2	N/A	0.0939N	N/A	N/A	Yes

Table E-2
Comparison of Maximum Detection Limits of Non-Detected Compounds to Screening Criteria - SWMU 31
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Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (3) (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	Above Screening Value (Y/N)
Surface Soil	606-20-2	2,6-Dinitrotoluene			mg/kg		0/2	0.2000-0.2000	0.2	N/A	0.0939N	N/A	N/A	Yes
	88-85-7	2-sec-butyl-4,6-dinitrophenol			mg/kg		0/2	0.2300-2.2200	2.22	N/A	7.8214N	N/A	N/A	No
	98-95-3	Nitrobenzene			mg/kg		0/2	0.2000-0.2000	0.2	N/A	3.9107N	N/A	N/A	No
	71-55-6	1,1,1-Trichloroethane			mg/kg		0/2	0.0046-0.0055	0.0055	N/A	2,190.0000N	N/A	N/A	No
	79-34-5	1,1,2,2-Tetrachloroethane			mg/kg		0/2	0.0046-0.0055	0.0055	N/A	3.1936C	N/A	N/A	No
	79-00-5	1,1,2-Trichloroethane			mg/kg		0/2	0.0046-0.0055	0.0055	N/A	11.2057C	N/A	N/A	No
	75-34-3	1,1-Dichloroethane			mg/kg		0/2	0.0046-0.0055	0.0055	N/A	1,600N	N/A	N/A	No
	75-35-4	1,1-Dichloroethene			mg/kg		0/2	0.0046-0.0055	0.0055	N/A	391.0714N	N/A	N/A	No
	107-06-2	1,2-Dichloroethane			mg/kg		0/2	0.0046-0.0055	0.0055	N/A	7.0190C	N/A	N/A	No
	78-87-5	1,2-Dichloropropane			mg/kg		0/2	0.0046-0.0055	0.0055	N/A	9.3930C	N/A	N/A	No
	78-93-3	2-Butanone			mg/kg		0/2	0.0046-0.0055	0.0055	N/A	4,692.8571N	N/A	N/A	No
	591-78-6	2-Hexanone			mg/kg		0/2	0.0046-0.0055	0.0055	N/A	N/A	N/A	N/A	NTX
	108-10-1	4-Methyl-2-pentanone			mg/kg		0/2	0.0046-0.0055	0.0055	N/A	N/A	N/A	N/A	NTX
	67-64-1	Acetone			mg/kg		0/2	0.0046-0.0055	0.0055	N/A	7,039.3000N	N/A	N/A	No
	71-43-2	Benzene			mg/kg		0/2	0.0046-0.0055	0.0055	N/A	11.6132C	N/A	N/A	No
	75-27-4	Bromodichloromethane			mg/kg		0/2	0.0046-0.0055	0.0055	N/A	10.3020C	N/A	N/A	No
	74-83-9	Bromomethane			mg/kg		0/2	0.0046-0.0055	0.0055	N/A	10.9500N	N/A	N/A	No
	75-15-0	Carbon disulfide			mg/kg		0/2	0.0046-0.0055	0.0055	N/A	782.1429N	N/A	N/A	No
	56-23-5	Carbon tetrachloride			mg/kg		0/2	0.0046-0.0055	0.0055	N/A	4.9133C	N/A	N/A	No
	108-90-7	Chlorobenzene			mg/kg		0/2	0.0046-0.0055	0.0055	N/A	156.4286N	N/A	N/A	No
	75-00-3	Chloroethane			mg/kg		0/2	0.0046-0.0055	0.0055	N/A	220.2504C	N/A	N/A	No
	74-87-3	Chloromethane			mg/kg		0/2	0.0046-0.0055	0.0055	N/A	N/A	N/A	N/A	NTX
	10061-01-5	cis-1,3-Dichloro-1-propene			mg/kg		0/2	0.0046-0.0055	0.0055	N/A	6.3873C	N/A	N/A	No
	124-48-1	Dibromochloromethane			mg/kg		0/2	0.0046-0.0055	0.0055	N/A	7.6039C	N/A	N/A	No
	100-41-4	Ethylbenzene			mg/kg		0/2	0.0046-0.0055	0.0055	N/A	782.1429N	N/A	N/A	No
	75-09-2	Methylene chloride			mg/kg		0/2	0.0046-0.0055	0.0055	N/A	85.1635C	N/A	N/A	No
	100-42-5	Styrene			mg/kg		0/2	0.0046-0.0055	0.0055	N/A	1,564.2857N	N/A	N/A	No
	127-18-4	Tetrachloroethene			mg/kg		0/2	0.0046-0.0055	0.0055	N/A	1.2C	N/A	N/A	No
	108-88-3	Toluene			mg/kg		0/2	0.0046-0.0055	0.0055	N/A	1,564.2857N	N/A	N/A	No
	10061-02-6	trans-1,3-Dichloropropene			mg/kg		0/2	0.0046-0.0055	0.0055	N/A	6.3873C	N/A	N/A	No
	75-25-2	Tribromomethane			mg/kg		0/2	0.0046-0.0055	0.0055	N/A	80.8514C	N/A	N/A	No
	79-01-6	Trichloroethene			mg/kg		0/2	0.0046-0.0055	0.0055	N/A	1.5968C	N/A	N/A	No
	7782-49-2	Selenium			mg/kg		0/1	1.15E+00-1.15E+00	1.15	3.21	5.11E+02N	N/A	N/A	No
	7440-22-4	Silver			mg/kg		0/2	5.90E-01-9.20E-01	0.92	0.559	5.11E+02N	N/A	N/A	No
	67-66-3	Chloroform			mg/kg		0/2	0.0046-0.0055	0.0055	N/A	78N	N/A	N/A	No
	75-01-4	Vinyl Chloride			mg/kg		0/2	0.0046-0.0055	0.0055	N/A	0.0900C	N/A	N/A	No

- (1) Maximum concentration used for screening.
- (2) N/A - Refer to supporting information for background discussion.
Background values derived from site-specific statistical analysis. See text for supporting information.
- (3) Screening toxicity values from USEPA Region 3 RBC Table (October 2006) and are based on a risk level of 1.0E-06 and a hazard index of 1.0.
See text for derivation of Nutrient RDAs.

Definitions: N/A = Not Applicable or Not Available
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogenic
N = Non-Carcinogenic
RDA = Recommended Daily Allowance
NTX = No Toxicity Value

Table E-3
Occurrence, Distribution and Selection of Chemicals of Potential Concern at SWMU 31
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Scenario Timeframe: Current
Medium: Soil
Exposure Medium: Total Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (3) (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (4)
Total Soil	N/A	TCDD-TEQ-MAX	0.0000003175	0.000008375	mg/kg	31SB05A	3/3	N/A	0.000008375	N/A	0.0000043C	N/A	N/A	Yes	ASL
	N/A	TCDD-TEQ-RME	0.0000002664	0.00000837	mg/kg	31SB05A	3/3	N/A	0.00000837	N/A	0.0000043C	N/A	N/A	Yes	ASL
	35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.000007732	0.0001914	mg/kg	31SB05A	3/3	N/A	0.0001914	N/A	N/A	N/A	N/A	No	TEQ
	67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.00000965J	0.00003759	mg/kg	31SB05A	3/3	N/A	0.00003759	N/A	N/A	N/A	N/A	No	TEQ
	55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.0000025	0.0000025	mg/kg	31SB05A	1/3	N/A	0.0000025	N/A	N/A	N/A	N/A	No	TEQ
	39227-28-6	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.00000116	0.000004049	mg/kg	31SB05A	2/3	N/A	0.000004049	N/A	N/A	N/A	N/A	No	TEQ
	70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	0.000000221J	0.000008597J	mg/kg	31SB05A	3/3	N/A	0.000008597	N/A	N/A	N/A	N/A	No	TEQ
	57653-85-7	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.00000135	0.000006711	mg/kg	31SB05A	3/3	N/A	0.000006711	N/A	N/A	N/A	N/A	No	TEQ
	57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	0.000001235	0.000001235	mg/kg	31SB05A	1/3	N/A	0.000001235	N/A	N/A	N/A	N/A	No	TEQ
	19408-74-3	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.000000381	0.000008482	mg/kg	31SB05A	3/3	N/A	0.000008482	N/A	N/A	N/A	N/A	No	TEQ
	40321-76-4	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.000001633	0.000001633	mg/kg	31SB05A	1/3	N/A	0.000001633	N/A	N/A	N/A	N/A	No	TEQ
	57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	0.000000559	0.000000559	mg/kg	31SB05A	1/3	N/A	0.000000559	N/A	N/A	N/A	N/A	No	TEQ
	51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	0.00000074J	0.00000074J	mg/kg	31SB05A	1/3	N/A	0.00000074	N/A	N/A	N/A	N/A	No	TEQ
	55-63-0	Nitroglycerin	0.42	0.42	mg/kg	31SB05A	1/3	0.3450-0.3470	0.42	N/A	130N	N/A	N/A	No	BSL
	37871-00-4	Total Heptachlorodibenzo-p-dioxin	0.00001403	0.0004542	mg/kg	31SB05A	3/3	N/A	0.0004542	N/A	N/A	N/A	N/A	No	TEQ
	38998-75-3	Total Heptachlorodibenzofuran	0.000001112	0.00004009	mg/kg	31SB05A	2/3	N/A	0.00004009	N/A	N/A	N/A	N/A	No	TEQ
	34465-46-8	Total Hexachlorodibenzo-p-dioxin	0.000001292	0.00007931	mg/kg	31SB05A	3/3	N/A	0.00007931	N/A	N/A	N/A	N/A	No	TEQ
	55684-94-1	Total Hexachlorodibenzofuran	0.000000976	0.00005343	mg/kg	31SB05A	3/3	N/A	0.00005343	N/A	N/A	N/A	N/A	No	TEQ
	36088-22-9	Total Pentachlorodibenzo-p-dioxin	0.00000194	0.00000194	mg/kg	31SB05A	1/3	N/A	0.00000194	N/A	N/A	N/A	N/A	No	TEQ
	30402-15-4	Total Pentachlorodibenzofuran	0.000000092	0.00001304	mg/kg	31SB05A	2/3	N/A	0.00001304	N/A	N/A	N/A	N/A	No	TEQ
	41903-57-5	Total Tetrachlorodibenzo-p-dioxin	0.000002084	0.000002084	mg/kg	31SB05A	1/3	N/A	0.000002084	N/A	N/A	N/A	N/A	No	TEQ
	30402-14-3	Total Tetrachlorodibenzofuran	0.000000085	0.000005142	mg/kg	31SB05A	2/3	N/A	0.000005142	N/A	N/A	N/A	N/A	No	TEQ
	60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	0.000001572	0.000001572	mg/kg	31SB05A	1/3	N/A	0.000001572	N/A	N/A	N/A	N/A	No	TEQ
	57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	0.000000678	0.000000678	mg/kg	31SB05A	1/3	N/A	0.000000678	N/A	N/A	N/A	N/A	No	TEQ
	1746-01-6	2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.000000713J	0.000000713J	mg/kg	31SB05A	1/3	N/A	0.000000713	N/A	N/A	N/A	N/A	No	TEQ
	3268-87-9	Octachlorodibenzodioxin	0.0005389	0.001851	mg/kg	31SB05A	3/3	N/A	0.001851	N/A	N/A	N/A	N/A	No	TEQ
	39001-02-0	Octachlorodibenzofuran	0.000003453	0.0001276	mg/kg	31SB05A	3/3	N/A	0.0001276	N/A	N/A	N/A	N/A	No	TEQ
	7429-90-5	Aluminum	7210	17000	mg/kg	31SB05C	3/3	N/A	17000	4.00E+04	N/A	N/A	N/A	Yes	NTX
	7440-36-0	Antimony	5.86E-01L	5.86E-01L	mg/kg	31SB05B	1/2	1.96E+01-1.96E+01	5.86E-01L	N/A	3.12N	N/A	N/A	No	BSL
	7440-38-2	Arsenic	0.807	5.9	mg/kg	31SB05A	3/4	2.5000-2.5000	5.9	1.58E+01	0.4258C	N/A	N/A	Yes	ASL
	7440-39-3	Barium	90.4	134	mg/kg	31MW3A10	4/4	N/A	134	2.09E+02	547.5000N	N/A	N/A	No	BSL
	7440-41-7	Beryllium	0.634	0.947	mg/kg	31MW3A10	4/4	N/A	0.947	1.02E+00	15.6429N	N/A	N/A	No	BSL
	7440-43-9	Cadmium	0.083J	0.462J	mg/kg	31SB05A	3/4	1.2000-1.2000	0.462	6.90E-01	3.9107N	N/A	N/A	No	BSL
	7440-70-2	Calcium	1960	56700	mg/kg	31SB05A	3/3	N/A	56700	N/A	N/A	1000000	RDA	No	BSL
	7440-47-3	Chromium	15.8	29.7	mg/kg	31SB05C	4/4	N/A	29.7	6.53E+01	23.4643N	N/A	N/A	Yes	ASL
	7440-48-4	Cobalt	7.69	18.5	mg/kg	31SB05C	3/3	N/A	18.5	7.23E+01	N/A	N/A	N/A	Yes	NTX
	7440-50-8	Copper	17.1	18.2	mg/kg	31SB05C	3/3	N/A	18.2	5.35E+01	312.8571N	N/A	N/A	No	BSL
	7439-89-6	Iron	9580J	28400J	mg/kg	31SB05C	3/3	N/A	28400	5.10E+04	2,346.4286N	N/A	N/A	Yes	ASL
	7439-92-1	Lead	14.6J	28J	mg/kg	31SB05A	4/4	N/A	28	2.68E+01	N/A	400	USEPA	No	BSL
	7439-95-4	Magnesium	4650	25000	mg/kg	31SB05A	3/3	N/A	25000	N/A	N/A	1000000	RDA	No	BSL
	7439-96-5	Manganese	203J	495J	mg/kg	31SB05B	3/3	N/A	495	2.54E+03	156.4286N	N/A	N/A	Yes	ASL
	7439-97-6	Mercury (Inorganic)	0.027L	0.155	mg/kg	31MW3A10	4/4	N/A	0.155	1.30E-01	2.346N	N/A	N/A	No	BSL
	7440-02-0	Nickel	11.5	15.6	mg/kg	31SB05C	4/4	N/A	15.6	6.28E+01	156.4286N	N/A	N/A	No	BSL
	7440-09-7	Potassium	938	2200	mg/kg	31SB05C	3/3	N/A	2200	N/A	N/A	1000000	RDA	No	BSL

Table E-3
Occurrence, Distribution and Selection of Chemicals of Potential Concern at SWMU 31
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Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (3) (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (4)
Total Soil	7440-23-5	Sodium	29.8	77.5	mg/kg	31SB05A	3/3	N/A	77.5	N/A	N/A	1000000	RDA	No	BSL
	7440-28-0	Thallium	0.23J	0.34J	mg/kg	31SB05A	3/4	34.3000-34.3000	0.34	2.11E+00	0.5475N	N/A	N/A	No	BSL
	7440-62-2	Vanadium	22	49.2	mg/kg	31SB05C	3/3	N/A	49.2	1.08E+02	7.821N	N/A	N/A	Yes	ASL
	7440-66-6	Zinc	60.2J	98.5J	mg/kg	31SB05A	3/3	N/A	98.5	2.02E+02	2,300N	N/A	N/A	No	BSL
	72-54-8	4,4'-DDD	0.000307J	0.000698J	mg/kg	31SB05A	2/3	0.0008-0.0008	0.000698	N/A	2.6614C	N/A	N/A	No	BSL
	72-55-9	4,4'-DDE	0.00226	0.00226	mg/kg	31SB05A	1/3	0.0008-0.0008	0.00226	N/A	1.8786C	N/A	N/A	No	BSL
	50-29-3	4,4'-DDT	0.0133	0.0133	mg/kg	31SB05A	1/3	0.0008-0.0008	0.0133	N/A	1.8786C	N/A	N/A	No	BSL
	33213-65-9	Endosulfan II	0.00228	0.00228	mg/kg	31SB05A	1/3	0.0008-0.0008	0.00228	N/A	46.9286N	N/A	N/A	No	BSL
	1031-07-8	Endosulfan sulfate	0.000893	0.000893	mg/kg	31SB05A	1/3	0.0008-0.0008	0.000893	N/A	46.9286N	N/A	N/A	No	BSL
	72-20-8	Endrin	0.000271J	0.000271J	mg/kg	31SB05C	1/3	0.0007-0.0008	0.000271	N/A	2.3464N	N/A	N/A	No	BSL
	7421-93-4	Endrin aldehyde	0.00179L	0.00179L	mg/kg	31SB05A	1/3	0.0008-0.0008	0.00179	N/A	2.3464N	N/A	N/A	No	BSL
	72-43-5	Methoxychlor	0.000889	0.00765	mg/kg	31SB05A	2/3	0.0008-0.0008	0.00765	N/A	39.1071N	N/A	N/A	No	BSL
	11097-69-1	Aroclor 1254	0.0931	0.0931	mg/kg	31SB05A	1/3	0.0383-0.0385	0.0931	N/A	0.156N	N/A	N/A	No	BSL

- (1) Maximum concentration used for screening.
(2) N/A - Refer to supporting information for background discussion.
Background values derived from site-specific statistical analysis. See text for supporting information.
(3) Screening toxicity values from USEPA Region 3 RBC Table (October 2006) and are based on a risk level of 1.0E-06 and a hazard index of 1.0.
See text for derivation of Nutrient RDAs.
(4) Rationale Codes Selection Reason:

No Toxicity Information (NTX)
Above Screening Levels (ASL)

Deletion Reason:

Below Screening and/or ARAR/TBC Level (BSL)
No Toxicity Value (NTX)

Definitions:

N/A = Not Applicable or Not Available
SQL = Sample Quantitation Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
J = Estimated Value
C = Carcinogenic
N = Non-Carcinogenic
RDA = Recommended Daily Allowance
TEQ =While some individual chlorinated dioxin and furan constituents may exceed their toxicity values, dioxins and furans will be analyzed by the toxicity

Table E-4
Comparison of Maximum Detection Limits of Non-Detected Compounds to Screening Criteria - SWMU 31
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Scenario Timeframe: Current
Medium: Soil
Exposure Medium: Total Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (3) (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	Above Screening Value (Y/N)
Total Soil	72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran			mg/kg		0/3	2.5E-07-2.5E-07	2.50E-07	N/A	N/A	N/A	N/A	NTX
	99-35-4	1,3,5-Trinitrobenzene			mg/kg		0/3	0.1000-0.1000	0.1	N/A	234.6429N	N/A	N/A	No
	99-65-0	1,3-Dinitrobenzene			mg/kg		0/3	0.1000-0.1000	0.1	N/A	0.7821N	N/A	N/A	No
	118-96-7	2,4,6-Trinitrotoluene			mg/kg		0/3	0.2000-0.2000	0.2	N/A	21.2909C	N/A	N/A	No
	35572-78-2	2-amino-4,6-Dinitrotoluene			mg/kg		0/3	0.2000-0.2000	0.2	N/A	16N	N/A	N/A	No
	88-72-2	2-Nitrotoluene			mg/kg		0/3	0.4000-0.4000	0.4	N/A	2.8C	N/A	N/A	No
	99-08-1	3-Nitrotoluene			mg/kg		0/3	0.4000-0.4000	0.4	N/A	N/A	N/A	N/A	NTX
	19406-51-0	4-amino-2,6-Dinitrotoluene			mg/kg		0/3	0.2000-0.2000	0.2	N/A	16N	N/A	N/A	No
	99-99-0	4-Nitrotoluene			mg/kg		0/3	0.4000-0.4000	0.4	N/A	N/A	N/A	N/A	NTX
	156-59-2	cis-1,2-Dichloroethene			mg/kg		0/3	0.0046-0.0055	0.0055	N/A	78N	N/A	N/A	No
	121-82-4	Cyclonite			mg/kg		0/3	0.2000-0.2000	0.2	N/A	5.8066C	N/A	N/A	No
	2691-41-0	HMX			mg/kg		0/3	0.2000-0.2000	0.2	N/A	391.0714N	N/A	N/A	No
	ICF87	m+p-Xylenes			mg/kg		0/3	0.0092-0.0110	0.011	N/A	1,600N	N/A	N/A	No
	95-47-6	o-Xylene			mg/kg		0/3	0.0046-0.0055	0.0055	N/A	1,600N	N/A	N/A	No
	78-11-5	Pentaerythritol tetranitrate			mg/kg		0/3	0.3330-0.3470	0.347	N/A	N/A	N/A	N/A	NTX
	479-45-8	Tetryl			mg/kg		0/3	0.2000-0.2000	0.2	N/A	78.2143N	N/A	N/A	No
	156-60-5	trans-1,2-Dichloroethene			mg/kg		0/3	0.0046-0.0055	0.0055	N/A	156.4286N	N/A	N/A	No
	93-76-5	2,4,5-T			mg/kg		0/3	0.1150-1.1100	1.11	N/A	78.2143N	N/A	N/A	No
	93-72-1	2,4,5-TP (Silvex)			mg/kg		0/3	0.1150-1.1100	1.11	N/A	62.5714N	N/A	N/A	No
	94-75-7	2,4-D			mg/kg		0/3	0.2300-2.2200	2.22	N/A	78.2143N	N/A	N/A	No
	94-82-6	2,4-DB			mg/kg		0/3	1.1500-11.1000	11.1	N/A	62.5714N	N/A	N/A	No
	309-00-2	Aldrin			mg/kg		0/3	0.0007-0.0008	0.0008	N/A	0.0376C	N/A	N/A	No
	319-84-6	alpha-BHC			mg/kg		0/3	0.0007-0.0008	0.0008	N/A	0.1014C	N/A	N/A	No
	5103-71-9	alpha-Chlordane			mg/kg		0/3	0.0007-0.0008	0.0008	N/A	1.8249C	N/A	N/A	No
	319-85-7	beta-BHC			mg/kg		0/3	0.0007-0.0008	0.0008	N/A	0.3548C	N/A	N/A	No
	75-99-0	Dalapon			mg/kg		0/3	1.1500-11.1000	11.1	N/A	234.6429N	N/A	N/A	No
	319-86-8	delta-BHC			mg/kg		0/3	0.0007-0.0008	0.0008	N/A	0.4913C	N/A	N/A	No
	1918-00-9	Dicamba			mg/kg		0/3	0.2300-2.2200	2.22	N/A	234.6429N	N/A	N/A	No
	120-36-5	Dichloroprop			mg/kg		0/3	0.2300-2.2200	2.22	N/A	N/A	N/A	N/A	NTX
	60-57-1	Dieldrin			mg/kg		0/3	0.0007-0.0008	0.0008	N/A	0.0399C	N/A	N/A	No
	959-98-8	Endosulfan I			mg/kg		0/3	0.0007-0.0008	0.0008	N/A	46.9286N	N/A	N/A	No
	53494-70-5	Endrin ketone			mg/kg		0/3	0.0007-0.0008	0.0008	N/A	2.3464N	N/A	N/A	No
	58-89-9	gamma-BHC (Lindane)			mg/kg		0/3	0.0007-0.0008	0.0008	N/A	0.4913C	N/A	N/A	No
	5103-74-2	gamma-Chlordane			mg/kg		0/3	0.0007-0.0008	0.0008	N/A	1.8249C	N/A	N/A	No
	76-44-8	Heptachlor			mg/kg		0/3	0.0007-0.0008	0.0008	N/A	0.1419C	N/A	N/A	No
	1024-57-3	Heptachlor epoxide			mg/kg		0/3	0.0007-0.0008	0.0008	N/A	0.0702C	N/A	N/A	No
	94-74-6	MCPA			mg/kg		0/6	115.0000-1,110.0000	1110	N/A	3.9107N	N/A	N/A	Yes
	93-65-2	MCPP			mg/kg		0/3	115.0000-1,110.0000	1110	N/A	7.8214N	N/A	N/A	Yes
	8001-35-2	Toxaphene			mg/kg		0/3	0.0370-0.0385	0.0385	N/A	0.5807C	N/A	N/A	No
	12674-11-2	Aroclor 1016			mg/kg		0/3	0.0370-0.0385	0.0385	N/A	0.55N	N/A	N/A	No
	11104-28-2	Aroclor 1221			mg/kg		0/3	0.0740-0.0772	0.0772	N/A	0.3194C	N/A	N/A	No
	11141-16-5	Aroclor 1232			mg/kg		0/3	0.0370-0.0385	0.0385	N/A	0.3194C	N/A	N/A	No
	53469-21-9	Aroclor 1242			mg/kg		0/3	0.0370-0.0385	0.0385	N/A	0.3194C	N/A	N/A	No
	12672-29-6	Aroclor 1248			mg/kg		0/3	0.0370-0.0385	0.0385	N/A	0.3194C	N/A	N/A	No

Table E-4
Comparison of Maximum Detection Limits of Non-Detected Compounds to Screening Criteria - SWMU 31
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Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (3) (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	Above Screening Value (Y/N)
Total Soil	11096-82-5	Aroclor 1260			mg/kg		0/3	0.0370-0.0385	0.0385	N/A	0.3194C	N/A	N/A	No
	121-14-2	2,4-Dinitrotoluene			mg/kg		0/3	0.2000-0.2000	0.2	N/A	0.0939N	N/A	N/A	Yes
	606-20-2	2,6-Dinitrotoluene			mg/kg		0/3	0.2000-0.2000	0.2	N/A	0.0939N	N/A	N/A	Yes
	88-85-7	2-sec-butyl-4,6-dinitrophenol			mg/kg		0/3	0.2300-2.2200	2.22	N/A	7.8214N	N/A	N/A	No
	98-95-3	Nitrobenzene			mg/kg		0/3	0.2000-0.2000	0.2	N/A	3.9107N	N/A	N/A	No
	71-55-6	1,1,1-Trichloroethane			mg/kg		0/3	0.0046-0.0055	0.0055	N/A	2,190.0000N	N/A	N/A	No
	79-34-5	1,1,2,2-Tetrachloroethane			mg/kg		0/3	0.0046-0.0055	0.0055	N/A	3.1936C	N/A	N/A	No
	79-00-5	1,1,2-Trichloroethane			mg/kg		0/3	0.0046-0.0055	0.0055	N/A	11.2057C	N/A	N/A	No
	75-34-3	1,1-Dichloroethane			mg/kg		0/3	0.0046-0.0055	0.0055	N/A	1,600N	N/A	N/A	No
	75-35-4	1,1-Dichloroethene			mg/kg		0/3	0.0046-0.0055	0.0055	N/A	391.0714N	N/A	N/A	No
	107-06-2	1,2-Dichloroethane			mg/kg		0/3	0.0046-0.0055	0.0055	N/A	7.0190C	N/A	N/A	No
	78-87-5	1,2-Dichloropropane			mg/kg		0/3	0.0046-0.0055	0.0055	N/A	9.3930C	N/A	N/A	No
	78-93-3	2-Butanone			mg/kg		0/3	0.0046-0.0055	0.0055	N/A	4,692.8571N	N/A	N/A	No
	591-78-6	2-Hexanone			mg/kg		0/3	0.0046-0.0055	0.0055	N/A	N/A	N/A	N/A	NTX
	108-10-1	4-Methyl-2-pentanone			mg/kg		0/3	0.0046-0.0055	0.0055	N/A	N/A	N/A	N/A	NTX
	71-43-2	Benzene			mg/kg		0/3	0.0046-0.0055	0.0055	N/A	11.6132C	N/A	N/A	No
	75-27-4	Bromodichloromethane			mg/kg		0/3	0.0046-0.0055	0.0055	N/A	10.3020C	N/A	N/A	No
	74-83-9	Bromomethane			mg/kg		0/3	0.0046-0.0055	0.0055	N/A	10.9500N	N/A	N/A	No
	75-15-0	Carbon disulfide			mg/kg		0/3	0.0046-0.0055	0.0055	N/A	782.1429N	N/A	N/A	No
	56-23-5	Carbon tetrachloride			mg/kg		0/3	0.0046-0.0055	0.0055	N/A	4.9133C	N/A	N/A	No
	108-90-7	Chlorobenzene			mg/kg		0/3	0.0046-0.0055	0.0055	N/A	156.4286N	N/A	N/A	No
	75-00-3	Chloroethane			mg/kg		0/3	0.0046-0.0055	0.0055	N/A	220.2504C	N/A	N/A	No
	74-87-3	Chloromethane			mg/kg		0/3	0.0046-0.0055	0.0055	N/A	N/A	N/A	N/A	NTX
	10061-01-5	cis-1,3-Dichloro-1-propene			mg/kg		0/3	0.0046-0.0055	0.0055	N/A	6.3873C	N/A	N/A	No
	124-48-1	Dibromochloromethane			mg/kg		0/3	0.0046-0.0055	0.0055	N/A	7.6039C	N/A	N/A	No
	100-41-4	Ethylbenzene			mg/kg		0/3	0.0046-0.0055	0.0055	N/A	782.1429N	N/A	N/A	No
	75-09-2	Methylene chloride			mg/kg		0/3	0.0046-0.0055	0.0055	N/A	85.1635C	N/A	N/A	No
	100-42-5	Styrene			mg/kg		0/3	0.0046-0.0055	0.0055	N/A	1,564.2857N	N/A	N/A	No
	127-18-4	Tetrachloroethene			mg/kg		0/3	0.0046-0.0055	0.0055	N/A	1.2C	N/A	N/A	No
	108-88-3	Toluene			mg/kg		0/3	0.0046-0.0055	0.0055	N/A	1,564.2857N	N/A	N/A	No
	10061-02-6	trans-1,3-Dichloropropene			mg/kg		0/3	0.0046-0.0055	0.0055	N/A	6.3873C	N/A	N/A	No
	75-25-2	Tribromomethane			mg/kg		0/3	0.0046-0.0055	0.0055	N/A	80.8514C	N/A	N/A	No
	79-01-6	Trichloroethene			mg/kg		0/3	0.0046-0.0055	0.0055	N/A	1.5968C	N/A	N/A	No
	7782-49-2	Selenium			mg/kg		0/3	4.49E-01-1.16E+00	1.16	N/A	5.11E+02N	N/A	N/A	No
	7440-22-4	Silver			mg/kg		0/3	1.20E-02-9.20E-01	0.92	N/A	5.11E+02N	N/A	N/A	No
	67-64-1	Acetone			mg/kg		0/3	4.60E-03-4.20E-02	0.042	N/A	9.20E+04N	N/A	N/A	No
	67-66-3	Chloroform			mg/kg		0/3	0.0046-0.0055	0.0055	N/A	78N	N/A	N/A	No
	75-01-4	Vinyl Chloride			mg/kg		0/3	0.0046-0.0055	0.0055	N/A	0.0900C	N/A	N/A	No

- (1) Maximum concentration used for screening.
- (2) N/A - Refer to supporting information for background discussion.
Background values derived from site-specific statistical analysis. See text for supporting information.
- (3) Screening toxicity values from USEPA Region 3 RBC Table (October 2006) and are based on a risk level of 1.0E-06 and a hazard index of 1.0.
See text for derivation of Nutrient RDAs.

Definitions: N/A = Not Applicable or Not Available

COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/
To Be Considered
J = Estimated Value
C = Carcinogenic
N = Non-Carcinogenic
RDA = Recommended Daily Allowance
NTX = No Toxicity Value

Table E-5
Occurrence, Distribution, and Selection of Chemicals of Potential Concern at SWMU 31
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Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (3) (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (4)
Sediment	N/A	TCDD-TEQ-RME	3.83E-06	3.83E-06	mg/kg	31SE11B	1/1	N/A	3.83E-06	N/A	4.26E-05 C	N/A	N/A	No	BSL
	N/A	TCDD-TEQ-MAX	3.88E-06	3.88E-06	mg/kg	31SE11B	1/1	N/A	3.88E-06	N/A	4.26E-05 C	N/A	N/A	No	TEQ-RME
	35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	8.91E-05	8.91E-05	mg/kg	31SE11B	1/1	N/A	8.91E-05	N/A	N/A	N/A	N/A	No	TEQ
	67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	1.47E-05	1.47E-05	mg/kg	31SE11B	1/1	N/A	1.47E-05	N/A	N/A	N/A	N/A	No	TEQ
	55673-89-7	1,2,3,4,7,8-Heptachlorodibenzofuran	1.21E-06	1.21E-06	mg/kg	31SE11B	1/1	N/A	1.21E-06	N/A	N/A	N/A	N/A	No	TEQ
	39227-28-6	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	1.96E-06	1.96E-06	mg/kg	31SE11B	1/1	N/A	1.96E-06	N/A	N/A	N/A	N/A	No	TEQ
	70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	5.04E-06J	5.04E-06J	mg/kg	31SE11B	1/1	N/A	5.04E-06	N/A	N/A	N/A	N/A	No	TEQ
	57653-85-7	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	3.58E-06	3.58E-06	mg/kg	31SE11B	1/1	N/A	3.58E-06	N/A	N/A	N/A	N/A	No	TEQ
	57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	4.72E-07	4.72E-07	mg/kg	31SE11B	1/1	N/A	4.72E-07	N/A	N/A	N/A	N/A	No	TEQ
	19408-74-3	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	4.11E-06	4.11E-06	mg/kg	31SE11B	1/1	N/A	4.11E-06	N/A	N/A	N/A	N/A	No	TEQ
	40321-76-4	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	7.95E-07	7.95E-07	mg/kg	31SE11B	1/1	N/A	7.95E-07	N/A	N/A	N/A	N/A	No	TEQ
	57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	2.25E-07	2.25E-07	mg/kg	31SE11B	1/1	N/A	2.25E-07	N/A	N/A	N/A	N/A	No	TEQ
	51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	3.42E-07J	3.42E-07J	mg/kg	31SE11B	1/1	N/A	3.42E-07	N/A	N/A	N/A	N/A	No	TEQ
	37871-00-4	Total Heptachlorodibenzo-p-dioxin	1.53E-04	1.53E-04	mg/kg	31SE11B	1/1	N/A	1.53E-04	N/A	N/A	N/A	N/A	No	TEQ
	38998-75-3	Total Heptachlorodibenzofuran	4.71E-05	4.71E-05	mg/kg	31SE11B	1/1	N/A	4.71E-05	N/A	N/A	N/A	N/A	No	TEQ
	34465-46-8	Total Hexachlorodibenzo-p-dioxin	2.43E-05	2.43E-05	mg/kg	31SE11B	1/1	N/A	2.43E-05	N/A	N/A	N/A	N/A	No	TEQ
	55684-94-1	Total Hexachlorodibenzofuran	2.44E-05	2.44E-05	mg/kg	31SE11B	1/1	N/A	2.44E-05	N/A	N/A	N/A	N/A	No	TEQ
	36088-22-9	Total Pentachlorodibenzo-p-dioxin	7.95E-07	7.95E-07	mg/kg	31SE11B	1/1	N/A	7.95E-07	N/A	N/A	N/A	N/A	No	TEQ
	30402-15-4	Total Pentachlorodibenzofuran	4.78E-06	4.78E-06	mg/kg	31SE11B	1/1	N/A	4.78E-06	N/A	N/A	N/A	N/A	No	TEQ
	41903-57-5	Total Tetrachlorodibenzo-p-dioxin	4.09E-07	4.09E-07	mg/kg	31SE11B	1/1	N/A	4.09E-07	N/A	N/A	N/A	N/A	No	TEQ
	30402-14-3	Total Tetrachlorodibenzofuran	3.83E-06	3.83E-06	mg/kg	31SE11B	1/1	N/A	3.83E-06	N/A	N/A	N/A	N/A	No	TEQ
	60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	7.94E-07	7.94E-07	mg/kg	31SE11B	1/1	N/A	7.94E-07	N/A	N/A	N/A	N/A	No	TEQ
	57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	2.94E-07	2.94E-07	mg/kg	31SE11B	1/1	N/A	2.94E-07	N/A	N/A	N/A	N/A	No	TEQ
	3268-87-9	Octachlorodibenzodioxin	1.43E-03	1.43E-03	mg/kg	31SE11B	1/1	N/A	1.43E-03	N/A	N/A	N/A	N/A	No	TEQ
	39001-02-0	Octachlorodibenzofuran	4.18E-05	4.18E-05	mg/kg	31SE11B	1/1	N/A	4.18E-05	N/A	N/A	N/A	N/A	No	TEQ
	7429-90-5	Aluminum	1.91E+04	1.08E+05	mg/kg	31SL1-2	7/7	N/A	1.08E+05	N/A	N/A	N/A	N/A	Yes	NTX
	7440-36-0	Antimony	5.63E+00J	5.63E+00J	mg/kg	31SL3-2	1/5	1.06E+00-6.60E+00	5.63E+00	N/A	3.13E+01 N	N/A	N/A	No	BSL
	7440-38-2	Arsenic	2.74E+00J	1.25E+01	mg/kg	31SE13A	6/7	7.90E+00-7.90E+00	1.25E+01	N/A	4.26E+00 C	N/A	N/A	Yes	ASL
	7440-39-3	Barium	9.11E+01L	1.50E+02	mg/kg	31SE13A	7/7	N/A	1.50E+02	N/A	5.48E+03 N	N/A	N/A	No	BSL
	7440-41-7	Beryllium	9.50E-01J	1.80E+00J	mg/kg	31SL2-2	6/7	1.30E+00-1.30E+00	1.80E+00	N/A	1.56E+02 N	N/A	N/A	No	BSL
	7440-43-9	Cadmium	1.90E-01J	9.65E-01K	mg/kg	31SL3-2	2/6	6.62E-01-1.45E+00	9.65E-01	N/A	3.9E+01 N	N/A	N/A	No	BSL
	7440-70-2	Calcium	1.70E+03	4.48E+03J	mg/kg	31SL3-2	7/7	N/A	4.48E+03	N/A	N/A	1.00E+06	Nutrient RDA	No	BSL
	7440-47-3	Chromium	2.32E+01J	5.66E+01	mg/kg	31SE13A	6/6	N/A	5.66E+01	N/A	2.3E+02 N	N/A	N/A	No	BSL
	7440-48-4	Cobalt	6.20E+00L	1.80E+01J	mg/kg	31SE13A	7/7	N/A	1.80E+01	N/A	N/A	N/A	N/A	Yes	NTX
	7440-50-8	Copper	2.99E+01	5.00E+01	mg/kg	31SE13A	4/4	N/A	5.00E+01	N/A	3.13E+03 N	N/A	N/A	No	BSL
	7439-89-6	Iron	1.76E+04	2.83E+04	mg/kg	31SE13A	7/7	N/A	2.83E+04	N/A	2.35E+04 N	N/A	N/A	Yes	ASL
	7439-92-1	Lead	1.42E+01	9.82E+01	mg/kg	31SE13A	7/7	N/A	9.82E+01	N/A	N/A	4.00E+02	US EPA	No	BSL
	7439-95-4	Magnesium	2.08E+03J	3.59E+03	mg/kg	31SE13A	7/7	N/A	3.59E+03	N/A	N/A	1.00E+06	Nutrient RDA	No	BSL
	7439-96-5	Manganese	2.21E+02	8.11E+02	mg/kg	31SL3-2	7/7	N/A	8.11E+02	N/A	1.56E+03 N	N/A	N/A	No	BSL
	7439-97-6	Mercury	8.70E-02J	5.30E-01J	mg/kg	31SE11A	4/7	9.90E-01-1.30E+00	5.30E-01	N/A	7.82E+00 N	N/A	N/A	No	BSL
	7440-02-0	Nickel	1.65E+01J	3.27E+01J	mg/kg	31SL3-2	7/7	N/A	3.27E+01	N/A	1.56E+03 N	N/A	N/A	No	BSL
	7440-09-7	Potassium	1.21E+03K	1.80E+03J	mg/kg	31SE13A	7/7	N/A	1.80E+03	N/A	N/A	1.00E+06	Nutrient RDA	No	BSL
	7440-23-5	Sodium	1.15E+02	1.80E+02	mg/kg	31SE13A	3/3	N/A	1.80E+02	N/A	N/A	1.00E+06	Nutrient RDA	No	BSL
	7440-28-0	Thallium	2.80E-01J	1.90E+00J	mg/kg	31SE11A	4/7	5.90E+00-7.90E+00	1.90E+00	N/A	5.48E+00 N	N/A	N/A	No	BSL
	7440-62-2	Vanadium	3.38E+01	6.80E+01	mg/kg	31SE13A	7/7	N/A	6.80E+01	N/A	7.82E+01 N	N/A	N/A	No	BSL

Table E-5
Occurrence, Distribution, and Selection of Chemicals of Potential Concern at SWMU 31
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Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (3) (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (4)
Sediment	7440-66-6	Zinc	5.90E+01J	1.95E+02J	mg/kg	31SL3-2	7/7	N/A	1.95E+02	N/A	2.35E+04 N	N/A	N/A	No	BSL
	72-54-8	4,4'-DDD	7.00E-04J	7.00E-04J	mg/kg	31SE11B	1/1	N/A	7.00E-04	N/A	2.66E+01 C	N/A	N/A	No	BSL
	72-55-9	4,4'-DDE	1.76E-03J	1.76E-03J	mg/kg	31SE11B	1/1	N/A	1.76E-03	N/A	1.88E+01 C	N/A	N/A	No	BSL
	72-20-8	Endrin	9.78E-04J	9.78E-04J	mg/kg	31SE11B	1/1	N/A	9.78E-04	N/A	2.35E+01 N	N/A	N/A	No	BSL
	105-67-9	2,4-Dimethylphenol	2.00E-01J	2.00E-01J	mg/kg	31SE11B	1/7	3.50E-01-4.40E+00	2.00E-01	N/A	1.56E+03 N	N/A	N/A	No	BSL
	91-57-6	2-Methylnaphthalene	1.40E-01K	1.30E+00	mg/kg	31SE8A	3/6	3.30E+00-4.40E+00	1.30E+00	N/A	3.13E+02 N	N/A	N/A	No	BSL
	83-32-9	Acenaphthene	2.80E-01	2.80E-01	mg/kg	31SL2-2	1/4	1.10E-02-2.15E-01	2.80E-01	N/A	4.69E+03 N	N/A	N/A	No	BSL
	208-96-8	Acenaphthylene	1.90E-02	4.60E-02	mg/kg	31SE11A	3/7	1.10E-02-5.50E-01	4.60E-02	N/A	2.35E+03 N	N/A	N/A	No	BSL
	120-12-7	Anthracene	1.50E-02	5.90E-02	mg/kg	31SE8A	3/7	1.10E-02-2.80E-02	5.90E-02	N/A	2.35E+04 N	N/A	N/A	No	BSL
	56-55-3	Benzo(a)anthracene	1.40E-02	1.50E-01	mg/kg	31SE8A	4/7	2.10E-02-2.80E-02	1.50E-01	N/A	8.75E+00 C	N/A	N/A	No	BSL
	50-32-8	Benzo(a)pyrene	1.30E-02	8.60E-02	mg/kg	31SE8A	6/7	2.10E-02-2.10E-02	8.60E-02	N/A	8.75E-01 C	N/A	N/A	No	BSL
	205-99-2	Benzo(b)fluoranthene	2.70E-02	1.40E-01	mg/kg	31SE8A	4/7	4.10E-02-5.50E-02	1.40E-01	N/A	8.75E+00 C	N/A	N/A	No	BSL
	191-24-2	Benzo(g,h,i)perylene	9.50E-03J	5.40E-02	mg/kg	31SE8A	4/7	4.10E-02-5.50E-02	5.40E-02	N/A	2.35E+03 N	N/A	N/A	No	BSL
	207-08-9	Benzo(k)fluoranthene	6.60E-03J	4.50E-02	mg/kg	31SL2-2	5/7	2.10E-02-2.15E-02	4.50E-02	N/A	8.75E+01 C	N/A	N/A	No	BSL
	86-74-8	Carbazole	2.00E-02J	7.90E-02J	mg/kg	31SE11B	2/7	1.10E+00-4.40E+00	7.90E-02	N/A	3.19E+02 C	N/A	N/A	No	BSL
	218-01-9	Chrysene	1.90E-02	2.10E-01	mg/kg	31SE8A	5/7	2.10E-02-2.50E-02	2.10E-01	N/A	8.75E+02 C	N/A	N/A	No	BSL
	53-70-3	Dibenz(a,h)anthracene	1.20E-02J	1.90E-02J	mg/kg	31SE8A	2/7	7.20E-04-5.50E-02	1.90E-02	N/A	8.75E-01 C	N/A	N/A	No	BSL
	132-64-9	Dibenzofuran	1.20E-01J	3.00E-01J	mg/kg	31SE11B	2/7	1.10E+00-4.40E+00	3.00E-01	N/A	N/A	N/A	N/A	Yes	NTX
	206-44-0	Fluoranthene	2.60E-02	9.75E-02	mg/kg	31SL3-2	7/7	N/A	9.75E-02	N/A	3.13E+03 N	N/A	N/A	No	BSL
	86-73-7	Fluorene	3.80E-02	8.70E-02	mg/kg	31SE8A	3/7	1.10E-02-5.50E-02	8.70E-02	N/A	3.13E+03 N	N/A	N/A	No	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	1.10E-02	3.10E-02	mg/kg	31SE8A	6/7	3.75E-02-3.75E-02	3.10E-02	N/A	8.75E+00 C	N/A	N/A	No	BSL
	86-30-6	n-Nitrosodiphenylamine	2.30E-01J	2.30E-01J	mg/kg	31SE11B	1/7	3.50E-01-4.40E+00	2.30E-01	N/A	1.30E+03 C	N/A	N/A	No	BSL
	91-20-3	Naphthalene	1.30E-01	6.90E-01	mg/kg	31SE8A	3/6	2.10E-01-2.80E-01	6.90E-01	N/A	1.56E+03 N	N/A	N/A	No	BSL
	98-95-3	Nitrobenzene	1.50E-01J	1.50E-01J	mg/kg	31SE11A	1/7	2.00E-01-4.40E+00	1.50E-01	N/A	3.91E+01 N	N/A	N/A	No	BSL
	85-01-8	Phenanthrene	1.30E-02	7.10E-01	mg/kg	31SE8A	6/7	2.10E-02-2.10E-02	7.10E-01	N/A	2.35E+03 N	N/A	N/A	No	BSL
	129-00-0	Pyrene	3.00E-02	1.50E-01J	mg/kg	31SE8A	7/7	N/A	1.50E-01	N/A	2.35E+03 N	N/A	N/A	No	BSL
	118-96-7	2,4,6-Trinitrotoluene	2.10E-01J	2.10E-01J	mg/kg	31SE11A	1/4	2.00E-01-2.00E-01	2.10E-01	N/A	3.9E+01 N	N/A	N/A	No	BSL

- (1) Maximum concentration used for screening.
- (2) N/A - See text for background discussion.
- (3) Screening toxicity values from USEPA Region 3 RBC Table (October 2006).
Criteria are based on a risk level of 1.0E-06 and a hazard index of 0.1, than adjusted by a factor of 10 for sediment exposures. See text for derivation of Nutrient RDAs.
- (4) Rationale Codes
- Selection Reason: Above Screening Levels (ASL)
No Toxicity Information (NTX)
- Deletion Reason: Below Screening and/or ARAR/TBC Level (BSL)

Definitions:

N/A = Not Applicable or Not Available
SQL = Sample Quantitation Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and
Appropriate Requirement/To Be Considered
RDA = Recommended Daily Allowance
mg/kg = milligrams per kilogram
L = Reported value may be based low
J = Estimated Value
C = Carcinogenic
N = Non-Carcinogenic

Table E-6
Comparison of Maximum Detection Limits of Non-Detected Compounds to Screening Criteria - SWMU 31
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Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (3) (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	Above Screening Value (Y/N)
Sediment (0-2 feet)	72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran			mg/kg		0/1	2.50E-07-2.50E-07	2.50E-07	N/A	N/A	N/A	N/A	NTX
	122-66-7	1,2-Diphenylhydrazine			mg/kg		0/3	3.3000-4.4000	4.4	N/A	7.984C	N/A	N/A	No
	99-35-4	1,3,5-Trinitrobenzene			mg/kg		0/4	0.1000-0.2000	0.2	N/A	234.6429N	N/A	N/A	No
	99-65-0	1,3-Dinitrobenzene			mg/kg		0/4	0.1000-0.2000	0.2	N/A	0.7821N	N/A	N/A	No
	35572-78-2	2-amino-4,6-Dinitrotoluene			mg/kg		0/4	0.2000-0.4000	0.4	N/A	160N	N/A	N/A	No
	88-72-2	2-Nitrotoluene			mg/kg		0/4	0.4000-0.8000	0.8	N/A	0.2777N	N/A	N/A	Yes
	N/A	3&4-Methylphenol			mg/kg		0/3	3.3000-4.4000	4.4	N/A	N/A	N/A	N/A	NTX
	99-08-1	3-Nitrotoluene			mg/kg		0/4	0.4000-0.8000	0.8	N/A	N/A	N/A	N/A	NTX
	19406-51-0	4-amino-2,6-Dinitrotoluene			mg/kg		0/4	0.2000-0.4000	0.4	N/A	160N	N/A	N/A	No
	99-99-0	4-Nitrotoluene			mg/kg		0/4	0.4000-0.8000	0.8	N/A	N/A	N/A	N/A	NTX
	100-51-6	Benzyl alcohol			mg/kg		0/7	0.3500-8.7000	8.7	N/A	2,346.4286N	N/A	N/A	No
	156-59-2	cis-1,2-Dichloroethene			mg/kg		0/1	0.0220-0.0220	0.022	N/A	780N	N/A	N/A	No
	121-82-4	Cyclonite			mg/kg		0/4	0.2000-0.4000	0.4	N/A	58.066C	N/A	N/A	No
	2691-41-0	HMX			mg/kg		0/4	0.2000-0.4000	0.4	N/A	391.0714N	N/A	N/A	No
	ICF87	m+p-Xylenes			mg/kg		0/1	0.0430-0.0430	0.043	N/A	15,642.8571N	N/A	N/A	No
	55-63-0	Nitroglycerin			mg/kg		0/4	0.6360-4.3500	4.35	N/A	1300N	N/A	N/A	No
	95-47-6	o-Xylene			mg/kg		0/1	0.0220-0.0220	0.022	N/A	15,642.8571N	N/A	N/A	No
	78-11-5	Pentaerythritol tetranitrate			mg/kg		0/4	0.6360-4.3500	4.35	N/A	N/A	N/A	N/A	NTX
	110-86-1	Pyridine			mg/kg		0/4	0.3500-2.4000	2.4	N/A	7.8214N	N/A	N/A	No
	479-45-8	Tetryl			mg/kg		0/4	0.2000-0.4000	0.4	N/A	78.2143N	N/A	N/A	No
	156-60-5	trans-1,2-Dichloroethene			mg/kg		0/1	0.0220-0.0220	0.022	N/A	156.4286N	N/A	N/A	No
	1746-01-6	2,3,7,8-Tetrachlorodibenzo-p-dioxin			mg/kg		0/1	1.30E-07-1.30E-07	1.30E-07	N/A	4.30E-05C	N/A	N/A	No
	7440-22-4	Silver			mg/kg		0/7	2.0000-15.0000	15	0.559	39.1071N	N/A	N/A	No
	93-76-5	2,4,5-T			mg/kg		0/1	0.0435-0.0435	0.0435	N/A	78.2143N	N/A	N/A	No
	93-72-1	2,4,5-TP (Silvex)			mg/kg		0/1	0.0435-0.0435	0.0435	N/A	62.5714N	N/A	N/A	No
	94-75-7	2,4-D			mg/kg		0/1	0.0870-0.0870	0.087	N/A	78.2143N	N/A	N/A	No
	309-00-2	Aldrin			mg/kg		0/1	0.0029-0.0029	0.0029	N/A	0.376C	N/A	N/A	No
	319-84-6	alpha-BHC			mg/kg		0/1	0.0029-0.0029	0.0029	N/A	1.014C	N/A	N/A	No
	5103-71-9	alpha-Chlordane			mg/kg		0/1	0.0029-0.0029	0.0029	N/A	18.249C	N/A	N/A	No
	319-85-7	beta-BHC			mg/kg		0/1	0.0029-0.0029	0.0029	N/A	3.548C	N/A	N/A	No
	75-99-0	Dalapon			mg/kg		0/1	0.4350-0.4350	0.435	N/A	234.6429N	N/A	N/A	No
	319-86-8	delta-BHC			mg/kg		0/1	0.0029-0.0029	0.0029	N/A	4.913C	N/A	N/A	No
	1918-00-9	Dicamba			mg/kg		0/1	0.0870-0.0870	0.087	N/A	234.6429N	N/A	N/A	No
	120-36-5	Dichloroprop			mg/kg		0/1	0.0870-0.0870	0.087	N/A	N/A	N/A	N/A	NTX
	60-57-1	Dieldrin			mg/kg		0/1	0.0029-0.0029	0.0029	N/A	0.399C	N/A	N/A	No
	959-98-8	Endosulfan I			mg/kg		0/1	0.0029-0.0029	0.0029	N/A	46.9286N	N/A	N/A	No
	33213-65-9	Endosulfan II			mg/kg		0/1	0.0029-0.0029	0.0029	N/A	46.9286N	N/A	N/A	No
	1031-07-8	Endosulfan sulfate			mg/kg		0/1	0.0029-0.0029	0.0029	N/A	46.9286N	N/A	N/A	No
	7421-93-4	Endrin aldehyde			mg/kg		0/1	0.0029-0.0029	0.0029	N/A	2.3464N	N/A	N/A	No
	53494-70-5	Endrin ketone			mg/kg		0/1	0.0029-0.0029	0.0029	N/A	2.3464N	N/A	N/A	No
	58-89-9	gamma-BHC (Lindane)			mg/kg		0/1	0.0029-0.0029	0.0029	N/A	4.913C	N/A	N/A	No
	5103-74-2	gamma-Chlordane			mg/kg		0/1	0.0029-0.0029	0.0029	N/A	18.249C	N/A	N/A	No
	76-44-8	Heptachlor			mg/kg		0/1	0.0029-0.0029	0.0029	N/A	1.419C	N/A	N/A	No
	1024-57-3	Heptachlor epoxide			mg/kg		0/1	0.0029-0.0029	0.0029	N/A	0.702C	N/A	N/A	No

Table E-6
Comparison of Maximum Detection Limits of Non-Detected Compounds to Screening Criteria - SWMU 31
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Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (3) (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	Above Screening Value (Y/N)
Sediment (0-2 feet)	94-74-6	MCPA			mg/kg		0/1	43.5000-43.5000	43.5	N/A	3.9107N	N/A	N/A	Yes
	93-65-2	MCPD			mg/kg		0/1	43.5000-43.5000	43.5	N/A	7.8214N	N/A	N/A	Yes
	72-43-5	Methoxychlor			mg/kg		0/1	0.0029-0.0029	0.0029	N/A	39.1071N	N/A	N/A	No
	8001-35-2	Toxaphene			mg/kg		0/1	0.1450-0.1450	0.145	N/A	5.807C	N/A	N/A	No
	12674-11-2	Aroclor 1016			mg/kg		0/1	0.1450-0.1450	0.145	N/A	54.750C	N/A	N/A	No
	11104-28-2	Aroclor 1221			mg/kg		0/1	0.2900-0.2900	0.29	N/A	3.194C	N/A	N/A	No
	11141-16-5	Aroclor 1232			mg/kg		0/1	0.1450-0.1450	0.145	N/A	3.194C	N/A	N/A	No
	53469-21-9	Aroclor 1242			mg/kg		0/1	0.1450-0.1450	0.145	N/A	3.194C	N/A	N/A	No
	12672-29-6	Aroclor 1248			mg/kg		0/1	0.1450-0.1450	0.145	N/A	3.194C	N/A	N/A	No
	11097-69-1	Aroclor 1254			mg/kg		0/1	0.1450-0.1450	0.145	N/A	3.194C	N/A	N/A	No
	11096-82-5	Aroclor 1260			mg/kg		0/1	0.1450-0.1450	0.145	N/A	3.194C	N/A	N/A	No
	131-11-3	Dimethylphthalate			mg/kg		0/7	0.3500-4.4000	4.4	N/A	N/A	N/A	N/A	NTX
	120-82-1	1,2,4-Trichlorobenzene			mg/kg		0/7	0.3500-4.4000	4.4	N/A	78.2143N	N/A	N/A	No
	95-50-1	1,2-Dichlorobenzene			mg/kg		0/7	0.3500-4.4000	4.4	N/A	703.9286N	N/A	N/A	No
	541-73-1	1,3-Dichlorobenzene			mg/kg		0/7	0.3500-4.4000	4.4	N/A	234.6429N	N/A	N/A	No
	106-46-7	1,4-Dichlorobenzene			mg/kg		0/7	0.3500-4.4000	4.4	N/A	266.136C	N/A	N/A	No
	95-95-4	2,4,5-Trichlorophenol			mg/kg		0/7	0.3500-11.0000	11	N/A	782.1429N	N/A	N/A	No
	88-06-2	2,4,6-Trichlorophenol			mg/kg		0/7	0.3500-4.4000	4.4	N/A	580.660C	N/A	N/A	No
	120-83-2	2,4-Dichlorophenol			mg/kg		0/7	0.3500-4.4000	4.4	N/A	23.4643N	N/A	N/A	No
	51-28-5	2,4-Dinitrophenol			mg/kg		0/7	1.8000-22.1000	22.1	N/A	15.6429N	N/A	N/A	Yes
	121-14-2	2,4-Dinitrotoluene			mg/kg		0/7	0.2000-4.4000	4.4	N/A	0.0939N	N/A	N/A	Yes
	606-20-2	2,6-Dinitrotoluene			mg/kg		0/7	0.2000-4.4000	4.4	N/A	0.0939N	N/A	N/A	Yes
	91-58-7	2-Chloronaphthalene			mg/kg		0/7	0.3500-4.4000	4.4	N/A	625.7143N	N/A	N/A	No
	95-57-8	2-Chlorophenol			mg/kg		0/7	0.3500-4.4000	4.4	N/A	39.1071N	N/A	N/A	No
	88-74-4	2-Nitroaniline			mg/kg		0/7	0.3500-22.0000	22	N/A	N/A	N/A	N/A	NTX
	88-75-5	2-Nitrophenol			mg/kg		0/7	0.3500-4.4000	4.4	N/A	N/A	N/A	N/A	NTX
	88-85-7	2-sec-butyl-4,6-dinitrophenol			mg/kg		0/1	0.0870-0.0870	0.087	N/A	7.8214N	N/A	N/A	No
	91-94-1	3,3'-Dichlorobenzidine			mg/kg		0/7	0.3500-8.7000	8.7	N/A	14.194C	N/A	N/A	No
	99-09-2	3-Nitroaniline			mg/kg		0/7	0.3500-22.0000	22	N/A	N/A	N/A	N/A	NTX
	534-52-1	4,6-Dinitro-o-cresol			mg/kg		0/7	1.8000-22.0000	22	N/A	0.7821N	N/A	N/A	Yes
	100-01-6	4-Nitroaniline			mg/kg		0/7	0.3500-22.1000	22.1	N/A	N/A	N/A	N/A	NTX
	100-02-7	4-Nitrophenol			mg/kg		0/7	1.8000-22.1000	22.1	N/A	62.5714N	N/A	N/A	No
	111-91-1	bis(2-Chloroethoxy)methane			mg/kg		0/7	0.3500-4.4000	4.4	N/A	N/A	N/A	N/A	NTX
	111-44-4	bis(2-Chloroethyl)ether			mg/kg		0/7	0.3500-4.4000	4.4	N/A	5.807C	N/A	N/A	No
	108-60-1	bis(2-Chloroisopropyl)ether			mg/kg		0/7	0.3500-4.4000	4.4	N/A	91.247C	N/A	N/A	No
	85-68-7	Butyl benzyl phthalate			mg/kg		0/7	0.3500-4.4000	4.4	N/A	1,564.2857N	N/A	N/A	No
	117-84-0	Di-n-octyl phthalate			mg/kg		0/7	0.3500-4.4000	4.4	N/A	312.8571N	N/A	N/A	No
	84-66-2	Diethyl phthalate			mg/kg		0/7	0.3500-4.4000	4.4	N/A	6,257.1429N	N/A	N/A	No
	118-74-1	Hexachlorobenzene			mg/kg		0/7	0.3500-4.4000	4.4	N/A	3.992C	N/A	N/A	Yes
	87-68-3	Hexachlorobutadiene			mg/kg		0/7	0.3500-4.4000	4.4	N/A	81.888C	N/A	N/A	No
	77-47-4	Hexachlorocyclopentadiene			mg/kg		0/7	0.3500-4.4000	4.4	N/A	46.9286N	N/A	N/A	No
	67-72-1	Hexachloroethane			mg/kg		0/7	0.3500-4.4000	4.4	N/A	456.233C	N/A	N/A	No
	78-59-1	Isophorone			mg/kg		0/7	0.3500-4.4000	4.4	N/A	6,723.432C	N/A	N/A	No
	621-64-7	n-Nitroso-di-n-propylamine			mg/kg		0/7	0.3500-4.4000	4.4	N/A	0.912C	N/A	N/A	Yes
	59-50-7	p-Chloro-m-cresol			mg/kg		0/7	0.3500-8.7000	8.7	N/A	N/A	N/A	N/A	NTX
	106-47-8	p-Chloroaniline			mg/kg		0/7	0.3500-8.7000	8.7	N/A	31.2857N	N/A	N/A	No
	87-86-5	Pentachlorophenol			mg/kg		0/7	1.8000-22.0000	22	N/A	53.227C	N/A	N/A	No
	108-95-2	Phenol			mg/kg		0/7	0.3500-4.4000	4.4	N/A	2,346.4286N	N/A	N/A	No

Table E-6
Comparison of Maximum Detection Limits of Non-Detected Compounds to Screening Criteria - SWMU 31
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Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (3) (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	Above Screening Value (Y/N)
Sediment (0-2 feet)	71-55-6	1,1,1-Trichloroethane			mg/kg		0/1	0.0220-0.0220	0.022	N/A	2,190.0000N	N/A	N/A	No
	79-34-5	1,1,2,2-Tetrachloroethane			mg/kg		0/1	0.0220-0.0220	0.022	N/A	31.936C	N/A	N/A	No
	79-00-5	1,1,2-Trichloroethane			mg/kg		0/1	0.0220-0.0220	0.022	N/A	112.057C	N/A	N/A	No
	75-34-3	1,1-Dichloroethane			mg/kg		0/1	0.0220-0.0220	0.022	N/A	782.1429N	N/A	N/A	No
	75-35-4	1,1-Dichloroethene			mg/kg		0/1	0.0220-0.0220	0.022	N/A	391.0714N	N/A	N/A	No
	107-06-2	1,2-Dichloroethane			mg/kg		0/1	0.0220-0.0220	0.022	N/A	70.190C	N/A	N/A	No
	78-87-5	1,2-Dichloropropane			mg/kg		0/1	0.0220-0.0220	0.022	N/A	93.930C	N/A	N/A	No
	78-93-3	2-Butanone			mg/kg		0/1	0.0220-0.0220	0.022	N/A	4,692.8571N	N/A	N/A	No
	591-78-6	2-Hexanone			mg/kg		0/1	0.0220-0.0220	0.022	N/A	N/A	N/A	N/A	NTX
	101-55-3	4-Bromophenyl phenylether			mg/kg		0/7	0.3500-4.4000	4.4	N/A	N/A	N/A	N/A	NTX
	7005-72-3	4-Chlorophenyl phenylether			mg/kg		0/7	0.3500-4.4000	4.4	N/A	N/A	N/A	N/A	NTX
	108-10-1	4-Methyl-2-pentanone			mg/kg		0/1	0.0220-0.0220	0.022	N/A	N/A	N/A	N/A	NTX
	71-43-2	Benzene			mg/kg		0/1	0.0220-0.0220	0.022	N/A	116.132C	N/A	N/A	No
	75-27-4	Bromodichloromethane			mg/kg		0/1	0.0220-0.0220	0.022	N/A	103.020C	N/A	N/A	No
	74-83-9	Bromomethane			mg/kg		0/1	0.0220-0.0220	0.022	N/A	10.9500N	N/A	N/A	No
	75-15-0	Carbon disulfide			mg/kg		0/1	0.0220-0.0220	0.022	N/A	782.1429N	N/A	N/A	No
	56-23-5	Carbon tetrachloride			mg/kg		0/1	0.0220-0.0220	0.022	N/A	49.133C	N/A	N/A	No
	108-90-7	Chlorobenzene			mg/kg		0/1	0.0220-0.0220	0.022	N/A	156.4286N	N/A	N/A	No
	75-00-3	Chloroethane			mg/kg		0/1	0.0220-0.0220	0.022	N/A	2,202.504C	N/A	N/A	No
	67-66-3	Chloroform			mg/kg		0/1	0.0220-0.0220	0.022	N/A	7,821.429C	N/A	N/A	No
	74-87-3	Chloromethane			mg/kg		0/1	0.0220-0.0220	0.022	N/A	N/A	N/A	N/A	NTX
	10061-01-5	cis-1,3-Dichloro-1-propene			mg/kg		0/1	0.0220-0.0220	0.022	N/A	63.873C	N/A	N/A	No
	124-48-1	Dibromochloromethane			mg/kg		0/1	0.0220-0.0220	0.022	N/A	76.039C	N/A	N/A	No
	100-41-4	Ethylbenzene			mg/kg		0/1	0.0220-0.0220	0.022	N/A	782.1429N	N/A	N/A	No
	75-09-2	Methylene chloride			mg/kg		0/1	0.0220-0.0220	0.022	N/A	851.635C	N/A	N/A	No
	100-42-5	Styrene			mg/kg		0/1	0.0220-0.0220	0.022	N/A	1,564.2857N	N/A	N/A	No
	127-18-4	Tetrachloroethene			mg/kg		0/1	0.0220-0.0220	0.022	N/A	319.363C	N/A	N/A	No
	108-88-3	Toluene			mg/kg		0/1	0.0220-0.0220	0.022	N/A	1,564.2857N	N/A	N/A	No
	10061-02-6	trans-1,3-Dichloropropene			mg/kg		0/1	0.0220-0.0220	0.022	N/A	63.873C	N/A	N/A	No
	75-25-2	Tribromomethane			mg/kg		0/1	0.0220-0.0220	0.022	N/A	808.514C	N/A	N/A	No
	79-01-6	Trichloroethene			mg/kg		0/1	0.0220-0.0220	0.022	N/A	15.968C	N/A	N/A	No
	94-82-6	2,4-DB			mg/kg		0/1	N/A	0.107	N/A	62.5714N	N/A	N/A	No
	84-74-2	Di-n-butyl phthalate			mg/kg		0/6	0.3500-4.4	4.4	N/A	1.02E+04N	N/A	N/A	No
	65-85-0	Benzoic Acid			mg/kg		0/5	1.80-22	22	N/A	4.09E+05N	N/A	N/A	No
	7782-49-2	Selenium			mg/kg		0/6	2.12-14.5	14.5	N/A	511N	N/A	N/A	No
	50-29-3	4,4'-DDT			mg/kg		0/2	0.0029-0.0103	0.0103	N/A	18.786C	N/A	N/A	No
	95-48-7	o-Cresol			mg/kg		0/5	1.10-4.40	4.4	N/A	5,110N	N/A	N/A	No
	106-44-5	p-Cresol			mg/kg		0/4	0.0480-1.10	1.10	N/A	511N	N/A	N/A	No
	117-81-7	bis(2-Ethylhexyl) phthalate			mg/kg		0/7	0.200-4.40	4.4	N/A	2,040C	N/A	N/A	No
	75-01-4	Vinyl Chloride			mg/kg		0/1	0.0220-0.0220	0.022	N/A	0.900C	N/A	N/A	No

- (1) Maximum concentration used for screening.
(2) N/A - Refer to supporting information for background discussion.
Background values derived from site-specific statistical analysis. See text for supporting information.
(3) Screening toxicity values from USEPA Region 3 RBC Table (October 2006).
Criteria are based on a risk level of 1.0E-06 and a hazard index of 0.1, than adjusted by a factor of 10 for sediment exposures.
See text for derivation of Nutrient RDAs.

Definitions:
N/A = Not Applicable or Not Available
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
J = Estimated Value
C = Carcinogenic
N = Non-Carcinogenic
RDA = Recommended Daily Allowance
NTX = No Toxicity Value

Table E-7
Occurrence, Distribution, and Selection of Chemicals of Potential Concern at SWMU 31

Scenario Timeframe: Current/Future
Medium: Water
Exposure Medium: Surface Water

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (3) (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (4)
Surface Water	7429-90-5	Aluminum	2.97E-01J	1.32E+01	mg/l	31SW14	6/6	N/A	1.32E+01	N/A	N/A	5.00E-02	SMCL (lower end)	Yes	NTX
	7440-39-3	Barium	1.75E-02L	3.56E-02	mg/l	31SW14	6/6	N/A	3.56E-02	N/A	2.56E+00 N	2.00E+00	MCL	No	BSL
	7440-70-2	Calcium	9.71E+00	1.58E+01	mg/l	31SW14	6/6	N/A	1.58E+01	N/A	N/A	5.00E+02	Nutrient RDA	No	BSL
	7440-47-3	Chromium	4.70E-03J	4.70E-03J	mg/l	31SW14	1/6	1.00E-03 - 1.00E-02	4.70E-03	N/A	1.10E-01 N	1.00E-01	MCL	No	BSL
	7439-89-6	Iron	5.04E-02	1.54E+00	mg/l	31SW14	3/3	N/A	1.54E+00	N/A	1.10E+01 N	3.00E-01	SMCL	No	BSL
	7439-92-1	Lead	2.51E-03	6.01E-03	mg/l	31SW14	2/5	2.00E-03 - 2.00E-03	6.01E-03	N/A	N/A	1.50E-02	TAL	No	BSL
	7439-95-4	Magnesium	3.67E+00J	5.76E+00	mg/l	31SW14	6/6	N/A	5.76E+00	N/A	N/A	1.75E+02	Nutrient RDA	No	BSL
	7439-96-5	Manganese	7.60E-03J	2.63E-01	mg/l	31SW14	4/4	N/A	2.63E-01	N/A	7.30E-01 N	5.00E-02	SMCL	No	BSL
	7439-97-6	Mercury (Inorganic)	8.30E-05J	1.86E-04	mg/l	31SW14	2/6	1.00E-04 - 2.00E-04	1.86E-04	N/A	1.10E-02 N	2.00E-03	MCL	No	BSL
	7440-02-0	Nickel	4.10E-03K	4.10E-03K	mg/l	31SW3	1/6	1.00E-03 - 4.00E-02	4.10E-03	N/A	7.30E-01 N	N/A	N/A	No	BSL
	7440-09-7	Potassium	1.11E+00K	1.90E+00	mg/l	31SW14	6/6	N/A	1.90E+00	N/A	N/A	1.00E+03	Nutrient RDA	No	BSL
	7440-23-5	Sodium	5.70E+00K	1.19E+01	mg/l	31SW10	6/6	N/A	1.19E+01	N/A	N/A	2.00E+01	Nutrient RDA	No	BSL
	7440-66-6	Zinc	3.00E-03J	1.60E-02J	mg/l	31SW14	4/6	2.00E-02 - 2.00E-02	1.60E-02	N/A	1.10E+01 N	5.00E+00	SMCL	No	BSL
	93-72-1	2,4,5-TP (Silvex)	2.90E-05J	2.90E-05J	mg/l	31SW14	1/3	1.00E-04 - 1.00E-04	2.90E-05	N/A	2.92E-01 N	5.00E-02	MCL	No	BSL
	319-84-6	alpha-BHC	8.85E-06J	9.15E-06J	mg/l	31SW14	2/3	2.00E-05 - 2.00E-05	9.15E-06	N/A	1.06E-04 C	N/A	N/A	No	BSL
	319-86-8	delta-BHC	1.42E-05J	1.49E-05J	mg/l	31SW12	2/3	2.00E-05 - 2.00E-05	1.49E-05	N/A	1.06E-04 C	N/A	N/A	No	BSL
	58-89-9	gamma-BHC (Lindane)	7.19E-06J	7.19E-06J	mg/l	31SW14	1/3	2.00E-05 - 2.00E-05	7.19E-06	N/A	5.15E-04 C	2.00E-04	MCL	No	BSL
	1918-00-9	Dicamba	1.54E-04L	1.54E-04L	mg/l	31SW14	1/3	5.00E-04 - 5.00E-04	1.54E-04	N/A	1.10E+00 N	N/A	N/A	No	BSL
	33213-65-9	Endosulfan II	7.60E-05	7.60E-05	mg/l	31SW10	1/3	2.00E-05 - 2.00E-05	7.60E-05	N/A	2.19E-01 N	N/A	N/A	No	BSL
	72-20-8	Endrin	8.34E-05	8.34E-05	mg/l	31SW10	1/3	2.00E-05 - 2.00E-05	8.34E-05	N/A	1.10E-02 N	2.00E-03	MCL	No	BSL
	95-50-1	1,2-Dichlorobenzene	2.50E-04J	2.50E-04J	mg/l	31SW10	1/6	5.00E-03 - 1.00E-02	2.50E-04	N/A	2.68E-01 N	6.00E-01	MCL	No	BSL
	541-73-1	1,3-Dichlorobenzene	2.60E-04J	2.60E-04J	mg/l	31SW10	1/6	5.00E-03 - 1.00E-02	2.60E-04	N/A	1.83E-02 N	N/A	N/A	No	BSL
	106-46-7	1,4-Dichlorobenzene	2.60E-04J	2.60E-04J	mg/l	31SW10	1/6	5.00E-03 - 1.00E-02	2.60E-04	N/A	4.73E-03 C	7.50E-02	MCL	No	BSL
	91-57-6	2-Methylnaphthalene	3.10E-05	3.10E-05J	mg/l	31SW10	1/6	5.00E-05 - 1.00E-02	3.10E-05	N/A	2.43E-02 N	N/A	N/A	No	BSL
	65-85-0	Benzoic Acid	3.40E-03	1.20E-02J	mg/l	31SW10	3/6	5.00E-02 - 5.00E-02	1.20E-02	N/A	1.46E+02 N	N/A	N/A	No	BSL
	85-68-7	Butyl benzyl phthalate	5.00E-04	1.20E-03J	mg/l	31SW10	2/6	5.00E-03 - 1.00E-02	1.20E-03	N/A	3.52E-01 C	N/A	N/A	No	BSL
	84-74-2	Di-n-butyl phthalate	7.40E-04	1.00E-03J	mg/l	31SW1	2/6	5.00E-03 - 1.00E-02	1.00E-03	N/A	3.65E+00 N	N/A	N/A	No	BSL
	84-66-2	Diethyl phthalate	2.00E-03	8.00E-03J	mg/l	31SW3	3/6	5.00E-03 - 5.00E-03	8.00E-03	N/A	2.92E+01 N	N/A	N/A	No	BSL
	87-68-3	Hexachlorobutadiene	2.60E-04	2.60E-04J	mg/l	31SW10	1/6	5.00E-03 - 1.00E-02	2.60E-04	N/A	7.30E-03 N	N/A	N/A	No	BSL
	67-72-1	Hexachloroethane	2.70E-04	2.70E-04J	mg/l	31SW10	1/6	5.00E-03 - 1.00E-02	2.70E-04	N/A	3.68E-02 N	N/A	N/A	No	BSL
	98-95-3	Nitrobenzene	1.00E-04	1.00E-04J	mg/l	31SW10	1/6	2.60E-04 - 1.00E-02	1.00E-04	N/A	3.53E-03 N	N/A	N/A	No	BSL
	129-00-0	Pyrene	2.60E-05	2.60E-05J	mg/l	31SW14	1/6	5.00E-05 - 5.00E-05	2.60E-05	N/A	1.83E-01 N	N/A	N/A	No	BSL
	75-27-4	Bromodichloromethane	1.30E-03	3.60E-03	mg/l	31SW14	3/3	N/A	3.60E-03	N/A	1.70E-03 C	N/A	N/A	Yes	ASL
	124-48-1	Dibromochloromethane	1.70E-04	2.00E-04J	mg/l	31SW14	2/3	1.00E-03 - 1.00E-03	2.00E-04	N/A	1.26E-03 C	N/A	N/A	No	BSL
	67-66-3	Chloroform	1.60E-02	3.00E-02	mg/l	31SW14	3/3	N/A	3.00E-02	N/A	1.55E-03 C	N/A	N/A	Yes	ASL

- (1) Maximum concentration used for screening.
(2) N/A - See text for background discussion.
(3) Screening toxicity values from USEPA Region 3 RBC Table (October 2006). Criteria are based on a risk level of 1.0E-06 and hazard index of 0.1, then adjusted by a factor of 10 for surface water exposures. See text for derivation of Nutrient RDAs.

- (4) Rationale Codes

Selection Reason: No Toxicity Information (NTX)
Above Screening Levels (ASL)

Deletion Reason: Below Screening and/or ARAR/TBC Level (BSL)

Definitions:

N/A = Not Applicable or Not Available
SQL = Sample Quantitation Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
MCL = Federal Maximum Contaminant Level
SMCL = Secondary Maximum Contaminant Level
J = Estimated Value
C = Carcinogenic
N = Non-Carcinogenic
RDA = Recommended Daily Allowance
TAL = Treatment Action Level

Table E-8
Comparison of Maximum Detection Limits of Non-Detected Compounds to Screening Criteria - SWMU 31
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Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (3) (N/C)	Above Screening Value (Y/N)
Surface Water	122-66-7	1,2-Diphenylhydrazine			mg/l		0/3	1.00E-02-1.00E-02	1.00E-02	N/A	8.37E-04 (C)	Yes
	99-35-4	1,3,5-Trinitrobenzene			mg/l		0/3	1.30E-04-1.30E-04	1.30E-04	N/A	1.10E+00 (N)	No
	99-65-0	1,3-Dinitrobenzene			mg/l		0/3	1.30E-04-1.30E-04	1.30E-04	N/A	3.65E-03 (N)	No
	118-96-7	2,4,6-Trinitrotoluene			mg/l		0/3	2.60E-04-2.60E-04	2.60E-04	N/A	1.83E-02 (N)	No
	35572-78-2	2-amino-4,6-Dinitrotoluene			mg/l		0/3	2.60E-04-2.60E-04	2.60E-04	N/A	7.30E-02 (N)	No
	88-72-2	2-Nitrotoluene			mg/l		0/3	5.20E-04-5.20E-04	5.20E-04	N/A	4.59E-04 (C)	Yes
	99-08-1	3-Nitrotoluene			mg/l		0/3	5.20E-04-5.20E-04	5.20E-04	N/A	N/A	NTX
	19406-51-0	4-amino-2,6-Dinitrotoluene			mg/l		0/3	2.60E-04-2.60E-04	2.60E-04	N/A	7.30E-02 (N)	No
	99-99-0	4-Nitrotoluene			mg/l		0/3	5.20E-04-5.20E-04	5.20E-04	N/A	N/A	NTX
	100-51-6	Benzyl alcohol			mg/l		0/6	5.00E-03-2.00E-02	2.00E-02	N/A	1.10E+01 (N)	No
	156-59-2	cis-1,2-Dichloroethene			mg/l		0/3	1.00E-03-1.00E-03	1.00E-03	N/A	6.1E+01 (N)	No
	121-82-4	RDX			mg/l		0/3	2.60E-04-2.60E-04	2.60E-04	N/A	6.09E-03 (C)	No
	2691-41-0	HMX			mg/l		0/3	2.60E-04-2.60E-04	2.60E-04	N/A	1.83E+00 (N)	No
	1CF87	m+p-Xylenes			mg/l		0/3	2.00E-03-2.00E-03	2.00E-03	N/A	2.13E-01 (N)	No
	55-63-0	Nitroglycerin			mg/l		0/3	9.70E-04-9.70E-04	9.70E-04	N/A	6.2E+02 (N)	No
	95-47-6	o-Xylene			mg/l		0/3	1.00E-03-1.00E-03	1.00E-03	N/A	2.13E-01 (N)	No
	78-11-5	PETN			mg/l		0/3	9.70E-04-9.70E-04	9.70E-04	N/A	N/A	NTX
	14797-73-0	Perchlorate			mg/l		0/5	1.00E-03-1.00E-03	1.00E-03	N/A	2.56E-02 (N)	No
	110-86-1	Pyridine			mg/l		0/3	5.00E-03-5.00E-03	5.00E-03	N/A	3.65E-02 (N)	No
	479-45-8	Tetryl			mg/l		0/3	2.60E-04-2.60E-04	2.60E-04	N/A	1.46E-01 (N)	No
	156-60-5	trans-1,2-Dichloroethene			mg/l		0/3	1.00E-03-1.00E-03	1.00E-03	N/A	1.06E-01 (N)	No
	7440-38-2	Arsenic			mg/l		0/6	3.00E-03-6.00E-03	6.00E-03	1.38	4.46E-04 (C)	Yes
	7440-41-7	Beryllium			mg/l		0/6	1.00E-03-5.00E-03	5.00E-03	N/A	7.30E-02 (N)	No
	7440-48-4	Cobalt			mg/l		0/6	1.00E-03-5.00E-02	5.00E-02	3.11	N/A	NTX
	93-76-5	2,4,5-T			mg/l		0/3	1.00E-04-1.00E-04	1.00E-04	N/A	3.65E-01 (N)	No
	94-75-7	2,4-D			mg/l		0/3	5.00E-04-5.00E-04	5.00E-04	N/A	3.65E-01 (N)	No
	94-82-6	2,4-DB			mg/l		0/3	2.00E-03-2.00E-03	2.00E-03	N/A	2.92E-01 (N)	No
	72-54-8	4,4'-DDD			mg/l		0/3	2.00E-05-2.00E-05	2.00E-05	N/A	2.79E-03 (C)	No
	72-55-9	4,4'-DDE			mg/l		0/3	2.00E-05-2.00E-05	2.00E-05	N/A	1.97E-03 (C)	No
	50-29-3	4,4-DDT			mg/l		0/3	2.00E-05-2.00E-05	2.00E-05	N/A	1.97E-03 (C)	No
	309-00-2	Aldrin			mg/l		0/3	2.00E-05-2.00E-05	2.00E-05	N/A	3.94E-05 (C)	No
	5103-71-9	alpha-Chlordane			mg/l		0/3	2.00E-05-2.00E-05	2.00E-05	N/A	1.91E-03 (C)	No
	319-85-7	beta-BHC			mg/l		0/3	2.00E-05-2.00E-05	2.00E-05	N/A	3.72E-04 (C)	No
	75-99-0	Dalapon			mg/l		0/3	2.00E-03-2.00E-03	2.00E-03	N/A	1.10E+00 (N)	No
	120-36-5	Dichloroprop			mg/l		0/3	5.00E-04-5.00E-04	5.00E-04	N/A	N/A	NTX
	60-57-1	Dieldrin			mg/l		0/3	2.00E-05-2.00E-05	2.00E-05	N/A	4.19E-05 (C)	No
	959-98-8	Endosulfan I			mg/l		0/3	2.00E-05-2.00E-05	2.00E-05	N/A	2.19E-01 (N)	No

Table E-8
Comparison of Maximum Detection Limits of Non-Detected Compounds to Screening Criteria - SWMU 31
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Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (3) (N/C)	Above Screening Value (Y/N)
	1031-07-8	Endosulfan sulfate			mg/l		0/3	2.00E-05-2.00E-05	2.00E-05	N/A	2.19E-01 (N)	No
	7421-93-4	Endrin aldehyde			mg/l		0/3	2.00E-05-2.00E-05	2.00E-05	N/A	1.10E-02 (N)	No
	53494-70-5	Endrin ketone			mg/l		0/3	2.00E-05-2.00E-05	2.00E-05	N/A	1.10E-02 (N)	No
	5103-74-2	gamma-Chlordane			mg/l		0/3	2.00E-05-2.00E-05	2.00E-05	N/A	1.91E-03 (C)	No
	76-44-8	Heptachlor			mg/l		0/3	2.00E-05-2.00E-05	2.00E-05	N/A	1.49E-04 (C)	No
	1024-57-3	Heptachlor epoxide			mg/l		0/3	2.00E-05-2.00E-05	2.00E-05	N/A	7.36E-05 (C)	No
	94-74-6	MCPA			mg/l		0/6	1.25E-01-1.25E-01	1.25E-01	N/A	1.83E-02 (N)	Yes
	93-65-2	MCPP			mg/l		0/3	1.25E-01-1.25E-01	1.25E-01	N/A	3.65E-02 (N)	Yes
	72-43-5	Methoxychlor			mg/l		0/3	2.00E-05-2.00E-05	2.00E-05	N/A	1.83E-01 (N)	No
	8001-35-2	Toxaphene			mg/l		0/3	1.00E-03-1.00E-03	1.00E-03	N/A	6.09E-04 (C)	Yes
	12674-11-2	Aroclor 1016			mg/l		0/3	1.00E-04-1.00E-04	1.00E-04	N/A	2.55E-03 (N)	No
	11104-28-2	Aroclor 1221			mg/l		0/3	2.00E-04-2.00E-04	2.00E-04	N/A	3.35E-04 (C)	No
	11141-16-5	Aroclor 1232			mg/l		0/3	1.00E-04-1.00E-04	1.00E-04	N/A	3.35E-04 (C)	No
	53469-21-9	Aroclor 1242			mg/l		0/3	1.00E-04-1.00E-04	1.00E-04	N/A	3.35E-04 (C)	No
	12672-29-6	Aroclor 1248			mg/l		0/3	1.00E-04-1.00E-04	1.00E-04	N/A	3.35E-04 (C)	No
	11097-69-1	Aroclor 1254			mg/l		0/3	1.00E-04-1.00E-04	1.00E-04	N/A	3.35E-04 (C)	No
	11096-82-5	Aroclor 1260			mg/l		0/3	1.00E-04-1.00E-04	1.00E-04	N/A	3.35E-04 (C)	No
	131-11-3	Dimethylphthalate			mg/l		0/6	5.00E-03-1.00E-02	1.00E-02	N/A	N/A	NTX
	120-82-1	1,2,4-Trichlorobenzene			mg/l		0/6	5.00E-03-1.00E-02	1.00E-02	N/A	7.16E-03 (N)	Yes
	95-95-4	2,4,5-Trichlorophenol			mg/l		0/6	5.00E-03-5.00E-02	5.00E-02	N/A	3.65E+00 (N)	No
	88-06-2	2,4,6-Trichlorophenol			mg/l		0/6	5.00E-03-1.00E-02	1.00E-02	N/A	6.09E-02 (C)	No
	120-83-2	2,4-Dichlorophenol			mg/l		0/6	5.00E-03-1.00E-02	1.00E-02	N/A	1.10E-01 (N)	No
	105-67-9	2,4-Dimethylphenol			mg/l		0/6	5.00E-03-1.00E-02	1.00E-02	N/A	7.30E-01 (N)	No
	51-28-5	2,4-Dinitrophenol			mg/l		0/6	2.50E-02-5.00E-02	5.00E-02	N/A	7.30E-02 (N)	No
	121-14-2	2,4-Dinitrotoluene			mg/l		0/6	1.30E-04-1.00E-02	1.00E-02	N/A	7.30E-02 (N)	No
	606-20-2	2,6-Dinitrotoluene			mg/l		0/6	2.60E-04-1.00E-02	1.00E-02	N/A	3.65E-02 (N)	No
	91-58-7	2-Chloronaphthalene			mg/l		0/6	5.00E-03-1.00E-02	1.00E-02	N/A	4.87E-01 (N)	No
	95-57-8	2-Chlorophenol			mg/l		0/6	5.00E-03-1.00E-02	1.00E-02	N/A	3.04E-02 (N)	No
	88-74-4	2-Nitroaniline			mg/l		0/6	5.00E-03-5.00E-02	5.00E-02	N/A	N/A	NTX
	88-75-5	2-Nitrophenol			mg/l		0/6	5.00E-03-1.00E-02	1.00E-02	N/A	N/A	NTX
	88-85-7	2-sec-butyl-4,6-dinitrophenol			mg/l		0/3	5.00E-04-5.00E-04	5.00E-04	N/A	3.65E-02 (N)	No
	91-94-1	3,3'-Dichlorobenzidine			mg/l		0/12	5.00E-03-2.00E-02	2.00E-02	N/A	1.49E-03 (C)	Yes
	99-09-2	3-Nitroaniline			mg/l		0/6	5.00E-03-5.00E-02	5.00E-02	N/A	N/A	NTX
	534-52-1	4,6-Dinitro-o-cresol			mg/l		0/6	2.50E-02-5.00E-02	5.00E-02	N/A	3.65E-03 (N)	Yes
	100-01-6	4-Nitroaniline			mg/l		0/6	5.00E-03-5.00E-02	5.00E-02	N/A	N/A	NTX
	100-02-7	4-Nitrophenol			mg/l		0/6	2.50E-02-5.00E-02	5.00E-02	N/A	N/A	NTX
	83-32-9	Acenaphthene			mg/l		0/6	5.00E-05-1.00E-04	1.00E-04	N/A	3.65E-01 (N)	No
	208-96-8	Acenaphthylene			mg/l		0/6	5.00E-05-1.00E-03	1.00E-03	N/A	3.65E-01 (N)	No
	120-12-7	Anthracene			mg/l		0/6	5.00E-05-5.00E-05	5.00E-05	N/A	1.83E+00 (N)	No
	56-55-3	Benzo(a)anthracene			mg/l		0/6	5.00E-05-5.00E-05	5.00E-05	N/A	9.17E-04 (C)	No

Table E-8
Comparison of Maximum Detection Limits of Non-Detected Compounds to Screening Criteria - SWMU 31
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Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (3) (N/C)	Above Screening Value (Y/N)
	50-32-8	Benzo(a)pyrene			mg/l		0/6	5.00E-05-5.00E-05	5.00E-05	N/A	9.17E-05 (C)	No
	205-99-2	Benzo(b)fluoranthene			mg/l		0/6	5.00E-05-1.00E-04	1.00E-04	N/A	9.17E-04 (C)	No
	191-24-2	Benzo(g,h,i)perylene			mg/l		0/6	5.00E-05-1.00E-04	1.00E-04	N/A	1.83E-01 (N)	No
	207-08-9	Benzo(k)fluoranthene			mg/l		0/6	5.00E-05-5.00E-05	5.00E-05	N/A	9.17E-03 (C)	No
	111-91-1	bis(2-Chloroethoxy)methane			mg/l		0/6	5.00E-03-1.00E-02	1.00E-02	N/A	N/A	NTX
	111-44-4	bis(2-Chloroethyl)ether			mg/l		0/6	5.00E-03-1.00E-02	1.00E-02	N/A	9.59E-05 (C)	Yes
	108-60-1	bis(2-Chloroisopropyl)ether			mg/l		0/6	5.00E-03-1.00E-02	1.00E-02	N/A	2.60E-03 (C)	Yes
	86-74-8	Carbazole			mg/l		0/6	5.00E-03-1.00E-02	1.00E-02	N/A	3.35E-02 (C)	No
	218-01-9	Chrysene			mg/l		0/6	5.00E-05-5.00E-05	5.00E-05	N/A	9.17E-02 (C)	Yes
	117-84-0	Di-n-octyl phthalate			mg/l		0/6	5.00E-03-1.00E-02	1.00E-02	N/A	1.46E+00 (N)	No
	53-70-3	Dibenz(a,h)anthracene			mg/l		0/6	5.00E-05-1.00E-04	1.00E-04	N/A	9.17E-05 (C)	Yes
	132-64-9	Dibenzofuran			mg/l		0/6	5.00E-03-1.00E-02	1.00E-02	N/A	N/A	NTX
	206-44-0	Fluoranthene			mg/l		0/6	5.00E-05-1.00E-04	1.00E-04	N/A	1.46E+00 (N)	No
	86-73-7	Fluorene			mg/l		0/6	5.00E-05-1.00E-04	1.00E-04	N/A	2.43E-01 (N)	No
	118-74-1	Hexachlorobenzene			mg/l		0/6	5.00E-03-1.00E-02	1.00E-02	N/A	4.19E-04 (C)	Yes
	77-47-4	Hexachlorocyclopentadiene			mg/l		0/6	5.00E-03-1.00E-02	1.00E-02	N/A	2.19E-01 (N)	No
	193-39-5	Indeno(1,2,3-cd)pyrene			mg/l		0/6	5.00E-05-5.00E-05	5.00E-05	N/A	9.17E-04 (C)	No
	78-59-1	Isophorone			mg/l		0/6	5.00E-03-1.00E-02	1.00E-02	N/A	7.05E-01 (C)	No
	621-64-7	n-Nitroso-di-n-propylamine			mg/l		0/6	5.00E-03-1.00E-02	1.00E-02	N/A	9.57E-05 (C)	Yes
	86-30-6	n-Nitrosodiphenylamine			mg/l		0/6	5.00E-03-1.00E-02	1.00E-02	N/A	1.37E-01 (C)	No
	95-48-7	o-Cresol			mg/l		0/6	5.00E-03-1.00E-02	1.00E-02	N/A	1.83E+00 (N)	No
	59-50-7	p-Chloro-m-cresol			mg/l		0/6	5.00E-03-2.00E-02	2.00E-02	N/A	N/A	NTX
	106-47-8	p-Chloroaniline			mg/l		0/6	5.00E-03-2.00E-02	2.00E-02	N/A	1.24E-02 (C)	Yes
	106-44-5	p-Cresol			mg/l		0/6	5.00E-03-1.00E-02	1.00E-02	N/A	1.83E-01 (N)	No
	87-86-5	Pentachlorophenol			mg/l		0/6	2.50E-02-5.00E-02	5.00E-02	N/A	5.58E-03 (C)	Yes
	85-01-8	Phenanthrene			mg/l		0/6	5.00E-05-5.00E-05	5.00E-05	N/A	1.83E-01 (N)	No
	108-95-2	Phenol			mg/l		0/6	5.00E-03-1.00E-02	1.00E-02	N/A	1.10E+01 (N)	No
	71-55-6	1,1,1-Trichloroethane			mg/l		0/3	1.00E-03-1.00E-03	1.00E-03	N/A	3.17E+00 (N)	No
	79-34-5	1,1,2,2-Tetrachloroethane			mg/l		0/3	1.00E-03-1.00E-03	1.00E-03	N/A	5.27E-04 (C)	Yes
	79-00-5	1,1,2-Trichloroethane			mg/l		0/3	1.00E-03-1.00E-03	1.00E-03	N/A	1.88E-03 (C)	No
	75-34-3	1,1-Dichloroethane			mg/l		0/3	1.00E-03-1.00E-03	1.00E-03	N/A	8.96E-01 (N)	No
	75-35-4	1,1-Dichloroethene			mg/l		0/3	1.00E-03-1.00E-03	1.00E-03	N/A	3.53E-01 (N)	No
	107-06-2	1,2-Dichloroethane			mg/l		0/3	1.00E-03-1.00E-03	1.00E-03	N/A	1.16E-03 (C)	No
	78-87-5	1,2-Dichloropropane			mg/l		0/3	1.00E-03-1.00E-03	1.00E-03	N/A	1.55E-03 (C)	No
	78-93-3	2-Butanone			mg/l		0/3	4.00E-03-4.00E-03	4.00E-03	N/A	6.97E+00 (N)	No
	591-78-6	2-Hexanone			mg/l		0/3	4.00E-03-4.00E-03	4.00E-03	N/A	N/A	NTX
	101-55-3	4-Bromophenyl phenylether			mg/l		0/6	5.00E-03-1.00E-02	1.00E-02	N/A	N/A	NTX
	7005-72-3	4-Chlorophenyl phenylether			mg/l		0/6	5.00E-03-1.00E-02	1.00E-02	N/A	N/A	NTX
	108-10-1	4-Methyl-2-pentanone			mg/l		0/3	4.00E-03-4.00E-03	4.00E-03	N/A	6.30E+00 (N)	No
	67-64-1	Acetone			mg/l		0/3	4.00E-03-4.00E-03	4.00E-03	N/A	5.48E+00 (N)	No

Table E-8
Comparison of Maximum Detection Limits of Non-Detected Compounds to Screening Criteria - SWMU 31
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Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (3) (N/C)	Above Screening Value (Y/N)
	71-43-2	Benzene			mg/l		0/3	1.00E-03-1.00E-03	1.00E-03	N/A	3.36E-03 (C)	No
	74-83-9	Bromomethane			mg/l		0/3	1.00E-03-1.00E-03	1.00E-03	N/A	8.52E-03 (N)	No
	56-23-5	Carbon tetrachloride			mg/l		0/3	1.00E-03-1.00E-03	1.00E-03	N/A	1.62E-03 (C)	No
	108-90-7	Chlorobenzene			mg/l		0/3	1.00E-03-1.00E-03	1.00E-03	N/A	1.06E-01 (N)	No
	75-00-3	Chloroethane			mg/l		0/3	1.00E-03-1.00E-03	1.00E-03	N/A	3.64E-02 (C)	No
	74-87-3	Chloromethane			mg/l		0/3	1.00E-03-1.00E-03	1.00E-03	N/A	1.90E-01 (N)	No
	10061-01-5	cis-1,3-Dichloro-1-propene			mg/l		0/3	1.00E-03-1.00E-03	1.00E-03	N/A	N/A	NTX
	100-41-4	Ethylbenzene			mg/l		0/3	1.00E-03-1.00E-03	1.00E-03	N/A	1.34E+00 (N)	No
	100-42-5	Styrene			mg/l		0/3	1.00E-03-1.00E-03	1.00E-03	N/A	1.62E+00 (N)	No
	127-18-4	Tetrachloroethene			mg/l		0/3	1.00E-03-1.00E-03	1.00E-03	N/A	1.04E-03 (C)	No
	108-88-3	Toluene			mg/l		0/3	1.00E-03-1.00E-03	1.00E-03	N/A	7.47E-01 (N)	No
	10061-02-6	trans-1,3-Dichloropropene			mg/l		0/3	1.00E-03-1.00E-03	1.00E-03	N/A	N/A	NTX
	75-25-2	Tribromomethane			mg/l		0/3	1.00E-03-1.00E-03	1.00E-03	N/A	8.48E-02 (C)	No
	79-01-6	Trichloroethene			mg/l		0/3	1.00E-03-1.00E-03	1.00E-03	N/A	2.64E-04 (C)	Yes
	75-01-4	Vinyl Chloride			mg/l		0/3	1.00E-03-1.00E-03	1.00E-03	N/A	1.50E-04 (C)	Yes
	7440-36-0	Antimony			mg/l		0/3	5.00E-03-5.00E-03	5.00E-03	N/A	1.46E-02 (N)	No
	7440-43-9	Cadmium			mg/l		0/3	1.00E-03-1.00E-03	1.00E-03	N/A	1.83E-02 (N)	No
	7440-50-8	Copper			mg/l		0/3	2.00E-02-2.00E-02	2.00E-02	N/A	1.46E+00 (N)	No
	7782-49-2	Selenium			mg/l		0/5	4.00E-03-5.00E-03	5.00E-03	N/A	1.83E-01 (N)	No
	7440-22-4	Silver			mg/l		0/3	2.00E-03-2.00E-03	2.00E-03	N/A	1.83E-01 (N)	No
	7440-28-0	Thallium			mg/l		0/3	6.00E-03-6.00E-03	6.00E-03	N/A	2.56E-03 (N)	Yes
	7440-62-2	Vanadium			mg/l		0/5	1.00E-03-5.00E-02	5.00E-02	N/A	3.65E-02 (N)	Yes
	117-81-7	bis(2-Ethylhexyl) phthalate			mg/l		0/3	1.00E-02-1.00E-02	1.00E-02	N/A	4.78E-02 (C)	No
	75-15-0	Carbon disulfide			mg/l		0/2	1.00E-03-1.00E-03	1.00E-03	N/A	1.04E+00 (N)	No
	75-09-2	Methylene chloride			mg/l		0/3	7.80E-05-1.00E-03	1.00E-03	N/A	4.10E-02 (C)	No
	91-20-3	Naphthalene			mg/l		0/3	1.00E-04-1.00E-04	1.00E-04	N/A	6.51E-03 (N)	No

(1) Maximum concentration used for screening.

(2) N/A - Refer to supporting information for background discussion.

Background values derived from site-specific statistical analysis. See text for supporting information.

(3) Screening toxicity values from USEPA Region 3 RBC Table (October 2006). Criteria are based on a risk level of 1.0E-06 and hazard index of 0.1, then adjusted by a factor of 10 for surface water exposures. See text for derivation of Nutrient RDAs.

Definitions:

N/A = Not Applicable or Not Available

COPC = Chemical of Potential Concern

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/
To Be Considered

C = Carcinogenic

N = Non-Carcinogenic

RDA = Recommended Daily Allowance

NTX = No Toxicity Value

Table E-9
Occurrence, Distribution, and Selection of Chemicals of Potential Concern at SWMU 31

Scenario Timeframe: Future
Medium: Water
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Upgradient Well Value (2)	Screening Toxicity Value (3) (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (4)
Groundwater	7429-90-5	Aluminum	1.00E-01 J	2.68E+00	mg/l	31MW3-2	4/4	N/A	2.68E+00	5.74E-01	N/A	5.00E-02	SMCL (lower end)	Yes	NTX
	7440-38-2	Arsenic	9.30E-03 K	9.40E-03 K	mg/l	31MW3-2	2/5	3.00E-03 - 6.00E-03	9.40E-03	ND	4.46E-05 (C)	N/A	N/A	Yes	ASL
	7440-39-3	Barium	1.93E-02 J	5.36E-02 J	mg/l	31MW3-2	5/5	N/A	5.36E-02	2.14E-01	2.56E-01 (N)	2.00E+00	MCL	No	BSL
	7440-41-7	Beryllium	1.10E-03 K	1.30E-03 K	mg/l	31MW4-2	3/5	5.00E-03 - 5.00E-03	1.30E-03	1.30E-03	7.30E-03 (N)	N/A	N/A	No	BSL
	7440-70-2	Calcium	1.81E+01	2.62E+01	mg/l	31MW3	5/5	N/A	2.62E+01	8.86E+01	N/A	5.00E+02	Nutrient RDA	No	BSL
	7440-47-3	Chromium	5.20E-03 J	6.40E-03 J	mg/l	31MW04	2/5	5.70E-03 - 1.14E-02	6.40E-03	8.90E-03	1.10E-02 (N)	1.00E-01	MCL	No	BSL
	7440-48-4	Cobalt	3.60E-03 J	3.80E-03 J	mg/l	31MW2-2	2/5	1.00E-03 - 5.00E-02	3.80E-03	3.60E-03	N/A	N/A	N/A	Yes	NTX
	7440-50-8	Copper	3.60E-02	3.60E-02	mg/l	31MW3	1/5	1.10E-02 - 3.73E-02	3.60E-02	ND	1.46E-01 (N)	N/A	N/A	No	BSL
	7439-89-6	Iron	7.81E-02	7.08E+00	mg/l	31MW2-2	4/4	N/A	7.08E+00	1.31E+00	1.10E+00 (N)	3.00E-01	SMCL	Yes	ASL
	7439-92-1	Lead	1.70E-03 J	6.70E-03	mg/l	31MW3-2	3/4	2.00E-03 - 2.00E-03	6.70E-03	2.70E-03	N/A	1.50E-02	TREATMENT ACTION LEVEL	No	BSL
	7439-95-4	Magnesium	6.60E+00	1.20E+01	mg/l	31MW3-2	5/5	N/A	1.20E+01	5.42E+01	N/A	1.75E+02	Nutrient RDA	No	BSL
	7439-96-5	Manganese	2.00E-03 J	1.83E-01	mg/l	31MW3-2	4/4	N/A	1.83E-01	3.91E-02	7.30E-02 (N)	5.00E-02	SMCL	Yes	ASL
	7440-09-7	Potassium	1.06E+00 K	1.81E+00 J	mg/l	31MW3-2	5/5	N/A	1.81E+00	3.19E+01	N/A	1.00E+03	Nutrient RDA	No	BSL
	7440-23-5	Sodium	1.09E+01	1.19E+01 J	mg/l	31MW3-2	5/5	N/A	1.19E+01	1.76E+01	N/A	2.00E+01	Nutrient RDA	No	BSL
	7440-62-2	Vanadium	1.73E-02 K	1.74E-02 J	mg/l	31MW3-2	2/4	5.00E-02 - 5.00E-02	1.74E-02	ND	3.65E-03 (N)	N/A	N/A	Yes	ASL
	208-96-8	Acenaphthylene	2.70E-05 J	2.70E-05 J	mg/l	31MW3	1/5	5.00E-05 - 1.00E-03	2.70E-05	ND	3.65E-02 (N)	N/A	N/A	No	BSL
	56-55-3	Benzo(a)anthracene	2.20E-05 J	2.20E-05 J	mg/l	31MW2-2	1/5	5.00E-05 - 5.00E-05	2.20E-05	ND	9.17E-05 (C)	N/A	N/A	No	BSL
	50-32-8	Benzo(a)pyrene	2.20E-05 J	6.10E-05 J	mg/l	31MW3-2	2/5	5.00E-05 - 5.00E-05	6.10E-05	ND	9.17E-06 (C)	N/A	N/A	Yes	ASL
	205-99-2	Benzo(b)fluoranthene	2.70E-05 J	6.60E-05 J	mg/l	31MW3-2	2/5	5.00E-05 - 1.00E-04	6.60E-05	ND	9.17E-05 (C)	N/A	N/A	No	BSL
	86-73-7	Fluorene	2.40E-05 J	2.40E-05 J	mg/l	31MW3	1/5	5.00E-05 - 1.00E-04	2.40E-05	ND	2.43E-02 (N)	N/A	N/A	No	BSL
	67-66-3	Chloroform	6.30E-03	1.10E-02	mg/l	31MW04	2/2	N/A	1.10E-02	ND	1.55E-04 (C)	1.00E-01	MCL	Yes	ASL

- (1) Maximum concentration of unfiltered samples used for screening.
- (2) Maximum detect from upgradient groundwater monitoring well (Samples: 31MW01, 31MW1-2, 31MW1-2D).
- (3) Screening toxicity values from USEPA Region 3 RBC Table (October 2006).
Criteria are based on a risk level of 1.0E-06 and a hazard index of 0.1. See text for derivation of nutrient RDAs.
- (4) Rationale Codes
Selection Reason: No Toxicity Information (NTX)
Above Screening Levels (ASL)
Deletion Reason: Below Screening and/or ARAR/TBC Level (BSL)

Definitions:

N/A = Not Applicable or Not Available
SQL = Sample Quantitation Limit
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
MCL = Federal Maximum Contaminant Level
SMCL = Secondary Maximum Contaminant Level
J = Estimated Value
C = Carcinogenic
N = Non-Carcinogenic
RDA = Recommended Daily Allowance

Table E-10
Comparison of Maximum Detection Limits of Non-Detected Compounds to Screening Criteria - SWMU 31
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Scenario Timeframe: Future
Medium: Water
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (3) (N/C)	Above Screening Value? (Yes/No)
Groundwater	72-54-8	4,4-DDD			mg/l		0/2	2.00E-05 - 2.00E-05	2.00E-05	N/A	2.79E-04 (C)	No
	72-55-9	4,4-DDE			mg/l		0/2	2.00E-05 - 2.00E-05	2.00E-05	N/A	1.97E-04 (C)	No
	50-29-3	4,4-DDT			mg/l		0/2	2.00E-05 - 2.00E-05	2.00E-05	N/A	1.97E-04 (C)	No
	122-66-7	1,2-Diphenylhydrazine			mg/l		0/3	1.00E-02 - 1.00E-02	1.00E-02	N/A	8.37E-05 (C)	Yes
	99-35-4	1,3,5-Trinitrobenzene			mg/l		0/2	1.30E-04 - 1.30E-04	1.30E-04	N/A	1.10E-01 (N)	No
	99-65-0	1,3-Dinitrobenzene			mg/l		0/2	1.30E-04 - 1.30E-04	1.30E-04	N/A	3.65E-04 (N)	No
	118-96-7	2,4,6-Trinitrotoluene			mg/l		0/2	2.60E-04 - 2.60E-04	2.60E-04	N/A	1.83E-03 (N)	No
	35572-78-2	2-amino-4,6-Dinitrotoluene			mg/l		0/2	2.60E-04 - 2.60E-04	2.60E-04	N/A	7.3E-03 (N)	No
	88-72-2	2-Nitrotoluene			mg/l		0/2	5.20E-04 - 5.20E-04	5.20E-04	N/A	4.59E-05 (C)	Yes
	N/A	3+4-Methylphenols			mg/l		0/3	1.00E-02 - 1.00E-02	1.00E-02	N/A	1.8E-02 (N)	No
	99-08-1	3-Nitrotoluene			mg/l		0/2	5.20E-04 - 5.20E-04	5.20E-04	N/A	N/A	NTX
	19406-51-0	4-amino-2,6-Dinitrotoluene			mg/l		0/2	2.60E-04 - 2.60E-04	2.60E-04	N/A	7.3E-03 (N)	No
	99-99-0	4-Nitrotoluene			mg/l		0/2	5.20E-04 - 5.20E-04	5.20E-04	N/A	N/A	NTX
	100-51-6	Benzyl alcohol			mg/l		0/5	5.00E-03 - 2.00E-02	2.00E-02	N/A	1.10E+00 (N)	No
	156-59-2	cis-1,2-Dichloroethene			mg/l		0/2	1.00E-03 - 1.00E-03	1.00E-03	N/A	6.1E+00 (N)	No
	121-82-4	Cyclonite			mg/l		0/2	2.60E-04 - 2.60E-04	2.60E-04	N/A	6.09E-04 (C)	No
	2691-41-0	HMX			mg/l		0/2	2.60E-04 - 2.60E-04	2.60E-04	N/A	1.83E-01 (N)	No
	N/A	m+p-Xylenes			mg/l		0/2	2.00E-03 - 2.00E-03	2.00E-03	N/A	2.1E-02 (N)	No
	55-63-0	Nitroglycerin			mg/l		0/2	9.70E-04 - 9.70E-04	9.70E-04	N/A	6.2E+01 (N)	No
	95-47-6	o-Xylene			mg/l		0/2	1.00E-03 - 1.00E-03	1.00E-03	N/A	2.1E-02 (N)	No
	78-11-5	Pentaerythritol tetranitrate			mg/l		0/2	9.70E-04 - 9.70E-04	9.70E-04	N/A	N/A	NTX
	14797-73-0	Perchlorate			mg/l		0/2	1.00E-03 - 1.00E-03	1.00E-03	N/A	2.6E-02 (N)	No
	110-86-1	Pyridine			mg/l		0/2	5.00E-03 - 5.00E-03	5.00E-03	N/A	3.65E-03 (N)	Yes
	479-45-8	Tetryl			mg/l		0/2	2.60E-04 - 2.60E-04	2.60E-04	N/A	1.46E-02 (N)	No
	156-60-5	trans-1,2-Dichloroethene			mg/l		0/2	1.00E-03 - 1.00E-03	1.00E-03	N/A	1.06E-02 (N)	No
	7440-36-0	Antimony			mg/l		0/3	5.00E-03 - 5.00E-03	5.00E-03	N/A	1.46E-03 (N)	Yes
	7440-43-9	Cadmium			mg/l		0/4	1.00E-03 - 2.00E-03	2.00E-03	N/A	1.83E-03 (N)	Yes
	7439-97-6	Mercury (Inorganic)			mg/l		0/5	1.00E-04 - 2.00E-04	2.00E-04	N/A	1.10E-03 (N)	No
	7440-02-0	Nickel			mg/l		0/2	4.00E-02 - 4.00E-02	4.00E-02	N/A	7.30E-02 (N)	No
	7782-49-2	Selenium			mg/l		0/4	4.00E-03 - 5.00E-03	5.00E-03	N/A	1.83E-02 (N)	No
	7440-22-4	Silver			mg/l		0/3	2.00E-03 - 2.00E-03	2.00E-03	N/A	1.83E-02 (N)	No
	7440-28-0	Thallium			mg/l		0/5	2.00E-03 - 6.00E-03	6.00E-03	N/A	2.56E-04 (N)	Yes
	7440-66-6	Zinc			mg/l		0/5	9.90E-03 - 2.66E-02	2.66E-02	N/A	1.10E+00 (N)	No
	93-76-5	2,4,5-T			mg/l		0/2	1.00E-04 - 1.00E-04	1.00E-04	N/A	3.65E-02 (N)	No
	93-72-1	2,4,5-TP (Silvex)			mg/l		0/2	1.00E-04 - 1.00E-04	1.00E-04	N/A	2.92E-02 (N)	No
	94-75-7	2,4-D			mg/l		0/2	5.00E-04 - 5.00E-04	5.00E-04	N/A	3.65E-02 (N)	No
	94-82-6	2,4-DB			mg/l		0/2	2.00E-03 - 2.00E-03	2.00E-03	N/A	2.92E-02 (N)	No
	309-00-2	Aldrin			mg/l		0/2	2.00E-05 - 2.00E-05	2.00E-05	N/A	3.94E-06 (C)	Yes
	319-84-6	alpha-BHC			mg/l		0/2	2.00E-05 - 2.00E-05	2.00E-05	N/A	1.06E-05 (C)	Yes
	5103-71-9	alpha-Chlordane			mg/l		0/2	2.00E-05 - 2.00E-05	2.00E-05	N/A	1.9E-04 (C)	No

Table E-10
Comparison of Maximum Detection Limits of Non-Detected Compounds to Screening Criteria - SWMU 31
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Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (3) (N/C)	Above Screening Value? (Yes/No)
Groundwater	319-85-7	beta-BHC			mg/l		0/2	2.00E-05 - 2.00E-05	2.00E-05	N/A	3.72E-05 (C)	No
	75-99-0	Dalapon			mg/l		0/2	2.00E-03 - 2.00E-03	2.00E-03	N/A	1.10E-01 (N)	No
	319-86-8	delta-BHC			mg/l		0/2	2.00E-05 - 2.00E-05	2.00E-05	N/A	1.06E-05 (C)	Yes
	1918-00-9	Dicamba			mg/l		0/2	5.00E-04 - 5.00E-04	5.00E-04	N/A	1.10E-01 (N)	No
	120-36-5	Dichloroprop			mg/l		0/2	5.00E-04 - 5.00E-04	5.00E-04	N/A	N/A	NTX
	60-57-1	Dieldrin			mg/l		0/2	2.00E-05 - 2.00E-05	2.00E-05	N/A	4.19E-06 (C)	Yes
	959-98-8	Endosulfan I			mg/l		0/2	2.00E-05 - 2.00E-05	2.00E-05	N/A	2.19E-02 (N)	No
	33213-65-9	Endosulfan II			mg/l		0/2	2.00E-05 - 2.00E-05	2.00E-05	N/A	2.19E-02 (N)	No
	1031-07-8	Endosulfan sulfate			mg/l		0/2	2.00E-05 - 2.00E-05	2.00E-05	N/A	2.19E-02 (N)	No
	72-20-8	Endrin			mg/l		0/2	2.00E-05 - 2.00E-05	2.00E-05	N/A	1.10E-03 (N)	No
	7421-93-4	Endrin aldehyde			mg/l		0/2	2.00E-05 - 2.00E-05	2.00E-05	N/A	1.10E-03 (N)	No
	53494-70-5	Endrin ketone			mg/l		0/2	2.00E-05 - 2.00E-05	2.00E-05	N/A	1.10E-03 (N)	No
	58-89-9	gamma-BHC (Lindane)			mg/l		0/2	2.00E-05 - 2.00E-05	2.00E-05	N/A	5.15E-05 (C)	No
	5103-74-2	gamma-Chlordane			mg/l		0/2	2.00E-05 - 2.00E-05	2.00E-05	N/A	1.9E-04 (C)	No
	76-44-8	Heptachlor			mg/l		0/2	2.00E-05 - 2.00E-05	2.00E-05	N/A	1.49E-05 (C)	Yes
	1024-57-3	Heptachlor epoxide			mg/l		0/2	2.00E-05 - 2.00E-05	2.00E-05	N/A	7.36E-06 (C)	Yes
	94-74-6	MCPA			mg/l		0/4	1.25E-01 - 1.25E-01	1.25E-01	N/A	1.83E-03 (N)	Yes
	93-65-2	MCPP			mg/l		0/2	1.25E-01 - 1.25E-01	1.25E-01	N/A	3.65E-03 (N)	Yes
	72-43-5	Methoxychlor			mg/l		0/2	2.00E-05 - 2.00E-05	2.00E-05	N/A	1.83E-02 (N)	No
	8001-35-2	Toxaphene			mg/l		0/2	1.00E-03 - 1.00E-03	1.00E-03	N/A	6.09E-05 (C)	Yes
	12674-11-2	Aroclor 1016			mg/l		0/2	1.00E-04 - 1.00E-04	1.00E-04	N/A	2.55E-04 (N)	No
	11104-28-2	Aroclor 1221			mg/l		0/2	2.00E-04 - 2.00E-04	2.00E-04	N/A	3.35E-05 (C)	Yes
	11141-16-5	Aroclor 1232			mg/l		0/2	1.00E-04 - 1.00E-04	1.00E-04	N/A	3.35E-05 (C)	Yes
	53469-21-9	Aroclor 1242			mg/l		0/2	1.00E-04 - 1.00E-04	1.00E-04	N/A	3.35E-05 (C)	Yes
	12672-29-6	Aroclor 1248			mg/l		0/2	1.00E-04 - 1.00E-04	1.00E-04	N/A	3.35E-05 (C)	Yes
	11097-69-1	Aroclor 1254			mg/l		0/2	1.00E-04 - 1.00E-04	1.00E-04	N/A	3.35E-05 (C)	Yes
	11096-82-5	Aroclor 1260			mg/l		0/2	1.00E-04 - 1.00E-04	1.00E-04	N/A	3.35E-05 (C)	Yes
	131-11-3	Dimethylphthalate			mg/l		0/5	5.00E-03 - 1.00E-02	1.00E-02	N/A	3.65E+01 (N)	No
	120-82-1	1,2,4-Trichlorobenzene			mg/l		0/5	5.00E-03 - 1.00E-02	1.00E-02	N/A	7.16E-04 (N)	Yes
	95-50-1	1,2-Dichlorobenzene			mg/l		0/5	5.00E-03 - 1.00E-02	1.00E-02	N/A	2.68E-02 (N)	No
	541-73-1	1,3-Dichlorobenzene			mg/l		0/5	5.00E-03 - 1.00E-02	1.00E-02	N/A	1.83E-03 (N)	Yes
	106-46-7	1,4-Dichlorobenzene			mg/l		0/5	5.00E-03 - 1.00E-02	1.00E-02	N/A	4.73E-04 (C)	Yes
	95-95-4	2,4,5-Trichlorophenol			mg/l		0/5	5.00E-03 - 5.00E-02	5.00E-02	N/A	3.65E-01 (N)	No
	88-06-2	2,4,6-Trichlorophenol			mg/l		0/5	5.00E-03 - 1.00E-02	1.00E-02	N/A	6.09E-03 (C)	Yes
	120-83-2	2,4-Dichlorophenol			mg/l		0/5	5.00E-03 - 1.00E-02	1.00E-02	N/A	1.10E-02 (N)	No
	105-67-9	2,4-Dimethylphenol			mg/l		0/5	5.00E-03 - 1.00E-02	1.00E-02	N/A	7.30E-02 (N)	No
	51-28-5	2,4-Dinitrophenol			mg/l		0/5	2.50E-02 - 5.00E-02	5.00E-02	N/A	7.30E-03 (N)	Yes
	121-14-2	2,4-Dinitrotoluene			mg/l		0/5	1.30E-04 - 1.00E-02	1.00E-02	N/A	7.30E-03 (N)	Yes
	606-20-2	2,6-Dinitrotoluene			mg/l		0/5	2.60E-04 - 1.00E-02	1.00E-02	N/A	3.65E-03 (N)	Yes
	91-58-7	2-Chloronaphthalene			mg/l		0/5	5.00E-03 - 1.00E-02	1.00E-02	N/A	4.87E-02 (N)	No
	95-57-8	2-Chlorophenol			mg/l		0/5	5.00E-03 - 1.00E-02	1.00E-02	N/A	3.04E-03 (N)	Yes
	91-57-6	2-Methylnaphthalene			mg/l		0/4	5.00E-05 - 1.00E-02	1.00E-02	N/A	2.43E-03 (N)	Yes
	88-74-4	2-Nitroaniline			mg/l		0/5	5.00E-03 - 5.00E-02	5.00E-02	N/A	N/A	NTX

Table E-10
Comparison of Maximum Detection Limits of Non-Detected Compounds to Screening Criteria - SWMU 31
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Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (3) (N/C)	Above Screening Value? (Yes/No)
Groundwater	88-75-5	2-Nitrophenol			mg/l		0/5	5.00E-03 - 1.00E-02	1.00E-02	N/A	N/A	NTX
	88-85-7	2-sec-butyl-4,6-dinitrophenol			mg/l		0/2	5.00E-04 - 5.00E-04	5.00E-04	N/A	3.65E-03 (N)	No
	91-94-1	3,3'-Dichlorobenzidine			mg/l		0/5	5.00E-03 - 2.00E-02	2.00E-02	N/A	1.49E-04 (C)	Yes
	99-09-2	3-Nitroaniline			mg/l		0/5	5.00E-03 - 5.00E-02	5.00E-02	N/A	N/A	NTX
	534-52-1	4,6-Dinitro-o-cresol			mg/l		0/5	2.50E-02 - 5.00E-02	5.00E-02	N/A	3.65E-04 (N)	Yes
	100-01-6	4-Nitroaniline			mg/l		0/5	5.00E-03 - 5.00E-02	5.00E-02	N/A	N/A	NTX
	100-02-7	4-Nitrophenol			mg/l		0/5	2.50E-02 - 5.00E-02	5.00E-02	N/A	N/A	NTX
	83-32-9	Acenaphthene			mg/l		0/4	5.00E-05 - 1.00E-04	1.00E-04	N/A	3.65E-02 (N)	No
	120-12-7	Anthracene			mg/l		0/5	5.00E-05 - 1.00E-04	1.00E-04	N/A	1.83E-01 (N)	No
	191-24-2	Benzo(g,h,i)perylene			mg/l		0/5	5.00E-05 - 1.00E-04	1.00E-04	N/A	1.83E-02 (N)	No
	207-08-9	Benzo(k)fluoranthene			mg/l		0/5	5.00E-05 - 5.00E-05	5.00E-05	N/A	9.17E-04 (C)	No
	65-85-0	Benzoic Acid			mg/l		0/5	2.50E-02 - 5.00E-02	5.00E-02	N/A	1.46E+01 (N)	No
	111-91-1	bis(2-Chloroethoxy)methane			mg/l		0/5	5.00E-03 - 1.00E-02	1.00E-02	N/A	N/A	NTX
	111-44-4	bis(2-Chloroethyl)ether			mg/l		0/5	5.00E-03 - 1.00E-02	1.00E-02	N/A	9.59E-06 (C)	Yes
	108-60-1	bis(2-Chloroisopropyl)ether			mg/l		0/5	5.00E-03 - 1.00E-02	1.00E-02	N/A	2.60E-04 (C)	Yes
	117-81-7	bis(2-Ethylhexyl) phthalate			mg/l		0/3	1.00E-02 - 1.00E-02	1.00E-02	N/A	4.78E-03 (C)	Yes
	85-68-7	Butyl benzyl phthalate			mg/l		0/5	5.00E-03 - 1.00E-02	1.00E-02	N/A	3.52E-02 (C)	No
	86-74-8	Carbazole			mg/l		0/5	5.00E-03 - 1.00E-02	1.00E-02	N/A	3.35E-03 (C)	Yes
	218-01-9	Chrysene			mg/l		0/5	5.00E-05 - 5.00E-05	5.00E-05	N/A	9.17E-03 (C)	No
	84-74-2	Di-n-butyl phthalate			mg/l		0/5	5.00E-03 - 1.00E-02	1.00E-02	N/A	3.65E-01 (N)	No
	117-84-0	Di-n-octyl phthalate			mg/l		0/5	5.00E-03 - 1.00E-02	1.00E-02	N/A	1.46E-01 (N)	No
	53-70-3	Dibenz(a,h)anthracene			mg/l		0/5	5.00E-05 - 1.00E-04	1.00E-04	N/A	9.17E-06 (C)	Yes
	132-64-9	Dibenzofuran			mg/l		0/5	5.00E-03 - 1.00E-02	1.00E-02	N/A	N/A	NTX
	84-66-2	Diethyl phthalate			mg/l		0/5	5.00E-03 - 1.00E-02	1.00E-02	N/A	2.92E+00 (N)	No
	206-44-0	Fluoranthene			mg/l		0/5	5.00E-05 - 1.00E-04	1.00E-04	N/A	1.46E-01 (N)	No
	118-74-1	Hexachlorobenzene			mg/l		0/5	5.00E-03 - 1.00E-02	1.00E-02	N/A	4.19E-05 (C)	Yes
	87-68-3	Hexachlorobutadiene			mg/l		0/5	5.00E-03 - 1.00E-02	1.00E-02	N/A	7.3E-04 (N)	Yes
	77-47-4	Hexachlorocyclopentadiene			mg/l		0/5	5.00E-03 - 1.00E-02	1.00E-02	N/A	2.19E-02 (N)	No
	67-72-1	Hexachloroethane			mg/l		0/5	5.00E-03 - 1.00E-02	1.00E-02	N/A	3.65E-03 (C)	Yes
	193-39-5	Indeno(1,2,3-cd)pyrene			mg/l		0/5	5.00E-05 - 5.00E-05	5.00E-05	N/A	9.17E-05 (C)	No
	78-59-1	Isophorone			mg/l		0/5	5.00E-03 - 1.00E-02	1.00E-02	N/A	7.05E-02 (C)	No
	621-64-7	n-Nitroso-di-n-propylamine			mg/l		0/5	5.00E-03 - 1.00E-02	1.00E-02	N/A	9.57E-06 (C)	Yes
	86-30-6	n-Nitrosodiphenylamine			mg/l		0/5	5.00E-03 - 1.00E-02	1.00E-02	N/A	1.37E-02 (C)	No
	91-20-3	Naphthalene			mg/l		0/3	1.00E-04 - 1.00E-04	1.00E-04	N/A	6.51E-04 (N)	No
	98-95-3	Nitrobenzene			mg/l		0/5	2.60E-04 - 1.00E-02	1.00E-02	N/A	3.53E-04 (N)	Yes
	95-48-7	o-Cresol			mg/l		0/5	5.00E-03 - 1.00E-02	1.00E-02	N/A	1.83E-01 (N)	No
	59-50-7	p-Chloro-m-cresol			mg/l		0/5	5.00E-03 - 2.00E-02	2.00E-02	N/A	N/A	NTX
	106-47-8	p-Chloroaniline			mg/l		0/5	5.00E-03 - 2.00E-02	2.00E-02	N/A	1.24E-03 (C)	Yes
	106-44-5	p-Cresol			mg/l		0/2	5.00E-03 - 5.00E-03	5.00E-03	N/A	1.83E-02 (N)	No
	87-86-5	Pentachlorophenol			mg/l		0/5	2.50E-02 - 5.00E-02	5.00E-02	N/A	5.58E-04 (C)	Yes
	85-01-8	Phenanthrene			mg/l		0/5	5.00E-05 - 5.00E-05	5.00E-05	N/A	1.83E-02 (N)	No
	108-95-2	Phenol			mg/l		0/5	5.00E-03 - 1.00E-02	1.00E-02	N/A	1.10E+00 (N)	No
	129-00-0	Pyrene			mg/l		0/5	5.00E-05 - 5.00E-05	5.00E-05	N/A	1.83E-02 (N)	No

Table E-10
Comparison of Maximum Detection Limits of Non-Detected Compounds to Screening Criteria - SWMU 31
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Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (3) (N/C)	Above Screening Value? (Yes/No)
Groundwater	71-55-6	1,1,1-Trichloroethane			mg/l		0/2	1.00E-03 - 1.00E-03	1.00E-03	N/A	3.17E-01 (N)	No
	79-34-5	1,1,2,2-Tetrachloroethane			mg/l		0/2	1.00E-03 - 1.00E-03	1.00E-03	N/A	5.27E-05 (C)	Yes
	79-00-5	1,1,2-Trichloroethane			mg/l		0/2	1.00E-03 - 1.00E-03	1.00E-03	N/A	1.88E-04 (C)	Yes
	75-34-3	1,1-Dichloroethane			mg/l		0/2	1.00E-03 - 1.00E-03	1.00E-03	N/A	8.96E-02 (N)	No
	75-35-4	1,1-Dichloroethene			mg/l		0/2	1.00E-03 - 1.00E-03	1.00E-03	N/A	3.53E-02 (N)	No
	107-06-2	1,2-Dichloroethane			mg/l		0/2	1.00E-03 - 1.00E-03	1.00E-03	N/A	1.16E-04 (C)	Yes
	78-87-5	1,2-Dichloropropane			mg/l		0/2	1.00E-03 - 1.00E-03	1.00E-03	N/A	1.55E-04 (C)	Yes
	78-93-3	2-Butanone			mg/l		0/2	4.00E-03 - 4.00E-03	4.00E-03	N/A	6.97E-01 (N)	No
	591-78-6	2-Hexanone			mg/l		0/2	4.00E-03 - 4.00E-03	4.00E-03	N/A	N/A	NTX
	101-55-3	4-Bromophenyl phenylether			mg/l		0/5	5.00E-03 - 1.00E-02	1.00E-02	N/A	N/A	NTX
	7005-72-3	4-Chlorophenyl phenylether			mg/l		0/5	5.00E-03 - 1.00E-02	1.00E-02	N/A	N/A	NTX
	108-10-1	4-Methyl-2-pentanone			mg/l		0/2	4.00E-03 - 4.00E-03	4.00E-03	N/A	6.28E-01 (N)	No
	67-64-1	Acetone			mg/l		0/2	4.00E-03 - 4.00E-03	4.00E-03	N/A	5.48E-01 (N)	No
	71-43-2	Benzene			mg/l		0/2	1.00E-03 - 1.00E-03	1.00E-03	N/A	3.36E-04 (C)	Yes
	75-27-4	Bromodichloromethane			mg/l		0/2	1.00E-03 - 1.00E-03	1.00E-03	N/A	1.70E-04 (C)	Yes
	74-83-9	Bromomethane			mg/l		0/2	1.00E-03 - 1.00E-03	1.00E-03	N/A	8.52E-04 (N)	Yes
	75-15-0	Carbon disulfide			mg/l		0/2	1.70E-04 - 2.00E-04	2.00E-04	N/A	1.04E-01 (N)	No
	56-23-5	Carbon tetrachloride			mg/l		0/2	1.00E-03 - 1.00E-03	1.00E-03	N/A	1.62E-04 (C)	Yes
	108-90-7	Chlorobenzene			mg/l		0/2	1.00E-03 - 1.00E-03	1.00E-03	N/A	1.06E-02 (N)	No
	75-00-3	Chloroethane			mg/l		0/2	1.00E-03 - 1.00E-03	1.00E-03	N/A	3.64E-03 (C)	No
	74-87-3	Chloromethane			mg/l		0/2	1.00E-03 - 1.00E-03	1.00E-03	N/A	1.90E-02 (N)	No
	10061-01-5	cis-1,3-Dichloro-1-propene			mg/l		0/2	1.00E-03 - 1.00E-03	1.00E-03	N/A	N/A	NTX
	124-48-1	Dibromochloromethane			mg/l		0/2	1.00E-03 - 1.00E-03	1.00E-03	N/A	1.26E-04 (C)	Yes
	100-41-4	Ethylbenzene			mg/l		0/2	1.00E-03 - 1.00E-03	1.00E-03	N/A	1.34E-01 (N)	No
	75-09-2	Methylene chloride			mg/l		0/2	1.00E-03 - 1.00E-03	1.00E-03	N/A	4.10E-03 (C)	No
	100-42-5	Styrene			mg/l		0/2	1.00E-03 - 1.00E-03	1.00E-03	N/A	1.62E-01 (N)	No
	127-18-4	Tetrachloroethene			mg/l		0/2	1.00E-03 - 1.00E-03	1.00E-03	N/A	1.04E-04 (C)	Yes
	108-88-3	Toluene			mg/l		0/2	1.00E-03 - 1.00E-03	1.00E-03	N/A	7.47E-02 (N)	No
	10061-02-6	trans-1,3-Dichloropropene			mg/l		0/2	1.00E-03 - 1.00E-03	1.00E-03	N/A	N/A	NTX
	75-25-2	Tribromomethane			mg/l		0/2	1.00E-03 - 1.00E-03	1.00E-03	N/A	8.5E-03 (C)	No
	79-01-6	Trichloroethene			mg/l		0/2	1.00E-03 - 1.00E-03	1.00E-03	N/A	2.64E-05 (C)	Yes
	75-01-4	Vinyl Chloride			mg/l		0/2	1.00E-03 - 1.00E-03	1.00E-03	N/A	1.50E-05 (C)	Yes

- (1) Maximum concentration used for screening.
- (2) N/A - Refer to supporting information for background discussion.
Background values derived from site-specific statistical analysis. See text for supporting information.
- (3) Screening toxicity values from USEPA Region 3 RBC Table (October 2006).

Definitions: N/A = Not Applicable or Not Available
COPC = Chemical of Potential Concern
C = Carcinogenic
N = Non-Carcinogenic
NTX = No Toxicity Value

Table E-11
Medium-Specific Exposure Point Concentration Summary for SWMU 31

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Surface Soil (0-2 feet)	TCDD-TEQ-RME	mg/kg	4.00E-06	N/A	8.37E-06	8.37E-06	mg/kg	Max	W-Test(3)
	Aluminum	mg/kg	1.14E+04	N/A	1.55E+04	1.55E+04	mg/kg	Max	W-Test(3)
	Arsenic	mg/kg	3.49E+00	N/A	5.90E+00	5.90E+00	mg/kg	Max	W-Test(3)
	Chromium	mg/kg	2.20E+01	N/A	2.82E+01	2.82E+01	mg/kg	Max	W-Test(3)
	Cobalt	mg/kg	1.27E+01	N/A	1.78E+01	1.78E+01	mg/kg	Max	W-Test(3)
	Iron	mg/kg	1.87E+04	N/A	2.78E+04	2.78E+04	mg/kg	Max	W-Test(3)
	Manganese	mg/kg	3.49E+02	N/A	4.95E+02	4.95E+02	mg/kg	Max	W-Test(3)
	Vanadium	mg/kg	3.48E+01	N/A	4.75E+01	4.75E+01	mg/kg	Max	W-Test(3)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T);

Mean of Normal Data (Mean-N), 95% UCL based on bootstrap statistic (95% UCL-Bst).

N/A - Not Applicable; Not Available.

Distributions: Normal (N); Lognormal/Transformed (T); Undefined/Nonparametric (U).

Test(1) The data were determined to be neither normally or lognormally distributed using Shapiro-Wilks (sample size<=50) or the Shapiro-Francia Calculation (sample size > 50);

Bootstrap Statistic used.

Test(2) The data were determined to be lognormally distributed using Shapiro-Wilks (sample size<=50) or the Shapiro-Francia Calculation (sample size > 50).

Test(3) The 95% UCL was not calculated due to limited number of samples (n<=5); therefore, the maximum detect was used as the EPC.

Test(4) The data were determined to be normally distributed using Shapiro-Wilks (sample size<=50) or the Shapiro-Francia Calculation (sample size > 50).

Test(5) The 95% UCL exceeds the maximum detected concentration; therefore, the maximum detect was used as the EPC.

Table E-12
Medium-Specific Exposure Point Concentration Summary for SWMU 31

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Total Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Total Soil	TCDD-TEQ-RME	mg/kg	3.00E-06	N/A	8.37E-06	8.37E-06	mg/kg	Max	W-Test(3)
	Aluminum	mg/kg	1.32E+04	N/A	1.70E+04	1.70E+04	mg/kg	Max	W-Test(3)
	Arsenic	mg/kg	2.26E+00	N/A	5.90E+00	5.90E+00	mg/kg	Max	W-Test(3)
	Chromium	mg/kg	2.51E+01	N/A	2.97E+01	2.97E+01	mg/kg	Max	W-Test(3)
	Cobalt	mg/kg	1.47E+01	N/A	1.85E+01	1.85E+01	mg/kg	Max	W-Test(3)
	Iron	mg/kg	2.19E+04	N/A	2.84E+04	2.84E+04	mg/kg	Max	W-Test(3)
	Manganese	mg/kg	3.96E+02	N/A	4.95E+02	4.95E+02	mg/kg	Max	W-Test(3)
	Vanadium	mg/kg	3.96E+01	N/A	4.92E+01	4.92E+01	mg/kg	Max	W-Test(3)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T);
Mean of Normal Data (Mean-N).

N/A - Not Applicable; Not Available

"---" - Central Tendency EPC not used.

Test(1) The data were determined to be neither normally or lognormally distributed using Shapiro-Wilks (sample size<=50) or the Shapiro-Francia Calculation (sample size > 50),
and assumed to be lognormal.

Test(2) The data were determined to be lognormally distributed using Shapiro-Wilks (sample size<=50) or the Shapiro-Francia Calculation (sample size > 50).

Test(3) The 95% UCL was not calculated due to limited number of samples (n<=5); therefore, the maximum detect was used as the EPC.

Test(4) The data were determined to be normally distributed using Shapiro-Wilks (sample size<=50) or the Shapiro-Francia Calculation (sample size > 50).

Test(5) The 95% UCL exceeds the maximum detected concentration; therefore, the maximum detect was used as the EPC.

Table E-13
Medium-Specific Exposure Point Concentration Summary for SWMU 31

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Sediment	Aluminum	mg/kg	7.77E+04	1.03E+05 (N)	1.08E+05	1.03E+05	mg/kg	95%UCL-N	W-Test(4)
	Arsenic	mg/kg	6.97E+00	1.22E+01 (T)	1.25E+01	1.22E+01	mg/kg	95%UCL-T	W-Test(2)
	Cobalt	mg/kg	1.35E+01	1.65E+01 (N)	1.80E+01	1.65E+01	mg/kg	95% UCL-N	W-Test (4)
	Dibenzofuran	mg/kg	1.12E+00	1.71E+00 (N)	3.00E-01	3.00E-01	mg/kg	Max	W-Test(5)
	Iron	mg/kg	2.19E+04	2.53E+04 (T)	2.83E+04	2.53E+04	mg/kg	95%UCL-T	W-Test(2)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T);

Mean of Normal Data (Mean-N), 95% UCL based on bootstrap statistic (95% UCL-Bst).

N/A - Not Applicable; Not Available.

Distributions: Normal (N); Lognormal/Transformed (T); Undefined/Nonparametric (U).

Test(1) The data were determined to be neither normally or lognormally distributed using Shapiro-Wilks (sample size<=50) or the Shapiro-Francia Calculation (sample size > 50); Bootstrap Statistic used.

Test(2) The data were determined to be lognormally distributed using Shapiro-Wilks (sample size<=50) or the Shapiro-Francia Calculation (sample size > 50).

Test(3) The 95% UCL was not calculated due to limited number of samples (n<=5); therefore, the maximum detect was used as the EPC.

Test(4) The data were determined to be normally distributed using Shapiro-Wilks (sample size<=50) or the Shapiro-Francia Calculation (sample size > 50).

Test(5) The 95% UCL exceeds the maximum detected concentration; therefore, the maximum detect was used as the EPC.

Table E-14
Medium-Specific Exposure Point Concentration Summary for SWMU 31

Scenario Timeframe: Current/Future
Medium: Water
Exposure Medium: Surface Water

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Surface Water	Aluminum	mg/l	3.93E+00	5.91E+02 (T)	1.32E+01	1.32E+01	mg/l	Max	W-Test(5)
	Bromodichloromethane	mg/l	2.50E-03	N/A	3.60E-03	3.60E-03	mg/l	Max	W-Test(3)
	Chloroform	mg/l	2.27E-02	N/A	3.00E-02	3.00E-02	mg/l	Max	W-Test(3)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T);

Mean of Normal Data (Mean-N), 95% UCL based on bootstrap statistic (95% UCL-Bst).

N/A - Not Applicable; Not Available.

Distributions: Normal (N); Lognormal/Transformed (T); Undefined/Nonparametric (U).

Test(1) The data were determined to be neither normally or lognormally distributed using Shapiro-Wilks (sample size<=50) or the Shapiro-Francia Calculation (sample size > 50); Bootstrap Statistic used.

Test(2) The data were determined to be lognormally distributed using Shapiro-Wilks (sample size<=50) or the Shapiro-Francia Calculation (sample size > 50).

Test(3) The 95% UCL was not calculated due to limited number of samples (n<=5); therefore, the maximum detect was used as the EPC.

Test(4) The data were determined to be normally distributed using Shapiro-Wilks (sample size<=50) or the Shapiro-Francia Calculation (sample size > 50).

Test(5) The 95% UCL exceeds the maximum detected concentration; therefore, the maximum detect was used as the EPC.

Table E-15
Medium-Specific Exposure Point Concentration Summary for SWMU 31

Scenario Timeframe: Current/Future
Medium: Water
Exposure Medium: Groundwater

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Groundwater	Aluminum	mg/l	1.45E+00	N/A	2.68E+00	2.68E+00	mg/l	Max	W-Test(3)
	Arsenic	mg/l	4.94E-03	N/A	9.40E-03	9.40E-03	mg/l	Max	W-Test(5)
	Benzo(a)pyrene	mg/l	3.20E-05	N/A	6.10E-05	6.10E-05	mg/l	Max	W-Test(5)
	Chloroform	mg/l	8.65E-03	N/A	1.10E-02	1.10E-02	mg/l	Max	W-Test(3)
	Cobalt	mg/l	1.16E-02	N/A	3.80E-03	3.80E-03	mg/l	Max	W-Test(5)
	Iron	mg/l	3.65E+00	N/A	7.08E+00	7.08E+00	mg/l	Max	W-Test(3)
	Manganese	mg/l	9.34E-02	N/A	1.83E-01	1.83E-01	mg/l	Max	W-Test(3)
	Vanadium	mg/l	2.12E-02	N/A	1.74E-02	1.74E-02	mg/l	Max	W-Test(3)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T);

Mean of Normal Data (Mean-N), 95% UCL based on bootstrap statistic (95% UCL-Bst).

N/A - Not Applicable; Not Available.

Distributions: Normal (N); Lognormal/Transformed (T); Undefined/Nonparametric (U).

Test(1) The data were determined to be neither normally or lognormally distributed using Shapiro-Wilks (sample size<=50) or the Shapiro-Francia Calculation (sample size > 50);

Bootstrap Statistic used.

Test(2) The data were determined to be lognormally distributed using Shapiro-Wilks (sample size<=50) or the Shapiro-Francia Calculation (sample size > 50).

Test(3) The 95% UCL was not calculated due to limited number of samples (n<=5); therefore, the maximum detect was used as the EPC.

Test(4) The data were determined to be normally distributed using Shapiro-Wilks (sample size<=50) or the Shapiro-Francia Calculation (sample size > 50).

Test(5) The 95% UCL exceeds the maximum detected concentration; therefore, the maximum detect was used as the EPC.

Table E-16
Medium-Specific Exposure Point Concentration Summary -
Inhalation of Groundwater Contaminants in Outdoor Ambient Air
by Industrial and Maintenance Workers at SWMU 31

Medium: Groundwater

Exposure Medium: Air (Outdoor Ambient Air)

Receptor Populations: Industrial and Maintenance Workers

Chemical of Potential Concern	Exposure Point Concentration (Groundwater)	Units	Exposure Medium	Exposure Medium Concentration	Units	Reference for Exposure Medium Calculation
Chloroform	1.10E-02	mg/L	Air	1.63E-05	mg/m ³	ASTM, 1995

Table E-17
Medium-Specific Exposure Point Concentration Summary -
Inhalation of Groundwater Contaminants in Trench Air
by Excavation Worker

For Effective Diffusion Coefficients			For Emission Flux and Concentration in Trench Trench dimensions				
Hv	135	cm	CF1	1.00E-03	L/cm3	Length	8 ft
ACvad	0.25	cm3/cm3	CF2	1.00E+04	cm2/m2		2.44 m
PorVad	0.44	cm3/cm3	CF3	3600	s/hr	Width	3 ft
T	55.7	F	Lgw	19.5	ft		0.91 m
T	286	K	Lgw	594	cm	Depth	15 ft
R	8.20E-05	atm-m3/mol	F	4.5			4.57 m
			ACH	2	hr-1	Width/Depth	0.20

Chemical of Potential Concern	CAS No.	Molecular Weight MWi g/mol	Henry's Law Constant Hi atm-m3/mol	Diffusion Coefficient in Air Dair cm2/s	Concentration of Contaminant in Groundwater Cgw ug/L	Volatilization Factor VF L/m3	Concentration of Contaminant in Trench Ctrench ug/m3	Concentration of Contaminant in Trench Ctrench mg/m3
Chloroform	67-66-3	119.38	3.67E-03	1.04E-01	1.10E+01	1.07E-01	1.18E+00	1.18E-03

Table E-18
Medium-Specific Exposure Point Concentration Summary -
Inhalation of Groundwater Contaminants in Indoor Air (via Vapor Intrusion)
by Industrial Workers and Residents

Medium: Groundwater
Exposure Medium: Air (Indoor Air - Vapor Intrusion)
Receptor Populations: Industrial Workers and Future Residents

Chemical of Potential Concern	Exposure Point Concentration (Groundwater)	Units	Exposure Medium	Exposure Medium Concentration ^a	Units	Reference for Exposure Medium Calculation
Chloroform	1.10E-02	mg/L	Air	2.45E-04	mg/m ³	Johnson & Ettinger, 1991

^a Value from C_{building} term from the Johnson & Ettinger Model (1991).

Table E-19
Medium-Specific Exposure Point Concentration Summary - Inhalation of
Groundwater Contaminants in Shower Air by Adult Residents

Medium: Groundwater Exposure Medium: Air (Shower Air) Receptor Populations: Future Adult Resident

Chemical of Potential Concern	Exposure Point Concentration (Groundwater)	Units	Exposure Medium	Exposure Medium Concentration	Units	Reference for Exposure Medium Calculation
Chloroform	1.10E-02	mg/L	Air	1.73E-02	mg/m ³	Foster and Chrostowski, 1987

Table E-20
Chemical/Physical Parameters Used for the Shower Model^a

Chemical of Potential Concern	Molecular Weight (g/mol)	Henry's Law Constant (atm-m ³ /mol)
Chloroform	119.40	3.66E-03

(a) Values were used to estimate shower room concentrations of VOCs (Foster and Chrostowski, 1987).

Table E-21
Values Used for Daily Intake Calculations- Current and Future Exposures to Surface Soil

Scenario Timeframe:	Current and Future
Medium:	Surface Soil
Exposure Medium:	Surface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Maintenance Worker	Adult	SWMU 31	CS	Chemical Concentration in Soil	See site-specific EPC tables	mg/kg	See site-specific EPC tables	Potential (Lifetime) Average Daily Dose $[(L)ADD_{pool}] \text{ (mg/kg-day)} =$ $\frac{CS \times IR-S \times EF \times ED \times CF1}{BW \times AT \times CF2}$
				IR-S	Ingestion Rate of Soil	100	mg/day	USEPA, 2002	
				EF	Exposure Frequency	50	days/year	(1)	
				ED	Exposure Duration	25	years	USEPA, 2002	
				CF1	Conversion Factor 1	1/10 ⁶	kg/mg	---	
				BW	Body Weight	70	kg	USEPA, 2002	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	25	years	USEPA, 2002	
				CF2	Conversion Factor 2	365	days/year	---	
Dermal Absorption	Maintenance Worker	Adult	SWMU 31	CS	Chemical Concentration in Soil	See site-specific EPC tables	mg/kg	See site-specific EPC tables	Internal (Lifetime) Average Daily Dose $[(L)ADD_{int}] \text{ (mg/kg-day)} =$ $\frac{CS \times SSAF \times DABS \times SA \times EF \times ED \times CF1}{BW \times AT \times CF2}$
				SSAF	Soil to Skin Adherence Factor	0.2	mg/cm ² -day	USEPA, 1997, 2002	
				DABS	Dermal Absorption Factor (Solid)	(2)	--	USEPA, 1995, 2003	
				SA	Skin Surface Area Available for Contact	3,300 (3)	cm ²	USEPA, 1997	
				EF	Exposure Frequency	50	days/year	(1)	
				ED	Exposure Duration	25	years	USEPA, 2002	
				CF1	Conversion Factor 1	1/10 ⁶	kg/mg	---	
				BW	Body Weight	70	kg	USEPA, 2002	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	25	years	USEPA, 2002	
				CF2	Conversion Factor 2	365	days/year	---	

(1) Best professional judgement. Based on site maintenance/inspection activities conducted 1 day/week and assuming 2 weeks on vacation.

(2) Dermal absorption factors are presented in *Section 5.2.3* of the text.

(3) Value derived from data presented in USEPA (1997), averaging across gender and age. It is assumed that head, hands, and forearms are exposed to surface soil.

USEPA, 1995: Assessing Dermal Exposure from Soil Hazardous Waste Management Division. Office of Superfund Programs, Region III, Philadelphia, PA.

USEPA, 1997: Exposure Factors Handbook, Volume I. EPA/600/P-95/002Fa.

USEPA, 2002: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2003: Updated Dermal Exposure Assessment Guidance. Office of Superfund Programs, Region III, Philadelphia, PA.

Table E-22
Values Used for Daily Intake Calculations- Future Exposures to Total Soil
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Scenario Timeframe:	Future
Medium:	Total Soil
Exposure Medium:	Total Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/Model Name
Ingestion	Maintenance Worker	Adult	SWMU 31	CS	Chemical Concentration in Soil	See site-specific EPC tables	mg/kg	See site-specific EPC tables	Potential (Lifetime) Average Daily Dose [(L)ADD _{pot}] (mg/kg-day) = $\frac{CS \times IR-S \times EF \times ED \times CF1}{BW \times AT \times CF2}$
				IR-S	Ingestion Rate of Soil	100	mg/day	USEPA, 2002	
				EF	Exposure Frequency	50	days/year	(1)	
				ED	Exposure Duration	25	years	USEPA, 2002	
				CF1	Conversion Factor 1	1/10 ⁶	kg/mg	---	
				BW	Body Weight	70	kg	USEPA, 2002	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	25	years	USEPA, 2002	
				CF2	Conversion Factor 2	365	days/year	---	
	Excavation Worker	Adult	SWMU 31	CS	Chemical Concentration in Soil	See site-specific EPC tables	mg/kg	See site-specific EPC tables	Potential (Lifetime) Average Daily Dose [(L)ADD _{pot}] (mg/kg-day) = $\frac{CS \times IR-S \times EF \times ED \times CF1}{BW \times AT \times CF2}$
				IR-S	Ingestion Rate of Soil	330	mg/day	USEPA, 2002	
				EF	Exposure Frequency	250	days/year	USEPA, 2002	
				ED	Exposure Duration	1	years	USEPA, 2002	
				CF1	Conversion Factor 1	1/10 ⁶	kg/mg	---	
				BW	Body Weight	70	kg	USEPA, 2002	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	1	years	USEPA, 2002	
				CF2	Conversion Factor 2	365	days/year	---	
	Resident	Adult	SWMU 31	CS	Chemical Concentration in Soil	See site-specific EPC tables	mg/kg	See site-specific EPC tables	Potential (Lifetime) Average Daily Dose [(L)ADD _{pot}] (mg/kg-day) = $\frac{CS \times IR-S \times EF \times ED \times CF1}{BW \times AT \times CF2}$
				IR-S	Ingestion Rate of Soil	100	mg/day	USEPA, 1991a	
				EF	Exposure Frequency	350	days/year	USEPA, 1991a	
				ED	Exposure Duration	30	years	USEPA, 1991a	
				EDc	Exposure Duration (Cancer)	24	years	USEPA, 1991b	
				CF1	Conversion Factor 1	1/10 ⁶	kg/mg	---	
				BW	Body Weight	70	kg	USEPA, 1991a	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 1991a	
				AT-N	Averaging Time (Non-Cancer)	30	years	USEPA, 1991a	
				CF2	Conversion Factor 2	365	days/year	---	
		Child	SWMU 31	CS	Chemical Concentration in Soil	See site-specific EPC tables	mg/kg	See site-specific EPC tables	Potential (Lifetime) Average Daily Dose [(L)ADD _{pot}] (mg/kg-day) = $\frac{CS \times IR-S \times EF \times ED \times CF1}{BW \times AT \times CF2}$
				IR-S	Ingestion Rate of Soil	200	mg/day	USEPA, 1991a	
				EF	Exposure Frequency	350	days/year	USEPA, 1991a	
				ED	Exposure Duration	6	years	USEPA, 1991a	
				CF1	Conversion Factor 1	1/10 ⁶	kg/mg	---	
				BW	Body Weight	15	kg	USEPA, 1991a	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 1991a	
				AT-N	Averaging Time (Non-Cancer)	6	years	USEPA, 1991a	
				CF2	Conversion Factor 2	365	days/year	---	
Dermal Absorption	Maintenance Worker	Adult	SWMU 31	CS	Chemical Concentration in Soil	See site-specific EPC tables	mg/kg	See site-specific EPC tables	Internal (Lifetime) Average Daily Dose [(L)ADD _{int}] (mg/kg-day) = $\frac{CS \times SSAF \times DABS \times SA \times EF \times ED \times CF1}{BW \times AT \times CF2}$
				SSAF	Soil to Skin Adherence Factor	0.2	mg/cm ² -day	USEPA, 1997, 2004	
				DABS	Dermal Absorption Factor (Solid)	(2)	--	USEPA, 1995, 2003	
				SA	Skin Surface Area Available for Contact	3,300 (3)	cm ²	USEPA, 1997	
				EF	Exposure Frequency	50	days/year	(1)	
				ED	Exposure Duration	25	years	USEPA, 2002	
				CF1	Conversion Factor 1	1/10 ⁶	kg/mg	---	
				BW	Body Weight	70	kg	USEPA, 2002	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	25	years	USEPA, 2002	
				CF2	Conversion Factor 2	365	days/year	---	

Table E-22
Values Used for Daily Intake Calculations- Future Exposures to Total Soil
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Scenario Timeframe:	Future
Medium:	Total Soil
Exposure Medium:	Total Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/Model Name
Dermal Absorption (con't)	Excavation Worker	Adult	SWMU 31	CS	Chemical Concentration in Soil	See site-specific EPC tables	mg/kg	See site-specific EPC tables	Internal (Lifetime) Average Daily Dose [(L)ADD _{int}] (mg/kg-day) = $\frac{CS \times SSAF \times DABS \times SA \times EF \times ED \times CF1}{BW \times AT \times CF2}$
				SSAF	Soil to Skin Adherence Factor	0.3	mg/cm ² -day	USEPA, 2002	
				DABS	Dermal Absorption Factor (Solid)	(2)	--	USEPA, 1995, 2003	
				SA	Skin Surface Area Available for Contact	3,300 (3)	cm ²	USEPA, 1997	
				EF	Exposure Frequency	250	days/year	USEPA, 2002	
				ED	Exposure Duration	1	years	USEPA, 2002	
				CF1	Conversion Factor 1	1/10 ⁶	kg/mg	---	
				BW	Body Weight	70	kg	USEPA, 2002	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	1	years	USEPA, 2002	
				CF2	Conversion Factor 2	365	days/year	---	
	Resident	Adult	SWMU 31	CS	Chemical Concentration in Soil	See site-specific EPC tables	mg/kg	See site-specific EPC tables	Internal (Lifetime) Average Daily Dose [(L)ADD _{int}] (mg/kg-day) = $\frac{CS \times SSAF \times DABS \times SA \times EF \times ED \times CF1}{BW \times AT \times CF2}$
				SSAF	Soil to Skin Adherence Factor	0.07	mg/cm ² -day	USEPA, 1997, 2004	
				DABS	Dermal Absorption Factor (Solid)	(2)	--	USEPA, 1995, 2003	
				SA	Skin Surface Area Available for Contact	5,700 (4)	cm ²	USEPA, 1997	
				EF	Exposure Frequency	350	days/year	USEPA, 1991a	
				ED	Exposure Duration	30	years	USEPA, 1991a	
				EDc	Exposure Duration (Cancer)	24	years	USEPA, 1991b	
				CF1	Conversion Factor 1	1/10 ⁶	kg/mg	---	
				BW	Body Weight	70	kg	USEPA, 1991a	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 1991a	
				AT-N	Averaging Time (Non-Cancer)	30	years	USEPA, 1991a	
				CF2	Conversion Factor 2	365	days/year	---	
	Child	Child	SWMU 31	CS	Chemical Concentration in Soil	See site-specific EPC tables	mg/kg	See site-specific EPC tables	Internal (Lifetime) Average Daily Dose [(L)ADD _{int}] (mg/kg-day) = $\frac{CS \times SSAF \times DABS \times SA \times EF \times ED \times CF1}{BW \times AT \times CF2}$
				SSAF	Soil to Skin Adherence Factor	0.2	mg/cm ² -day	USEPA, 1997, 2004	
				DABS	Dermal Absorption Factor (Solid)	(2)	--	USEPA, 1995, 2003	
				SA	Skin Surface Area Available for Contact	2,800 (5)	cm ²	USEPA, 1997	
				EF	Exposure Frequency	350	days/year	USEPA, 1991a	
				ED	Exposure Duration	6	years	USEPA, 1991a	
				CF1	Conversion Factor 1	1/10 ⁶	kg/mg	---	
				BW	Body Weight	15	kg	USEPA, 1991a	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 1991a	
				AT-N	Averaging Time (Non-Cancer)	6	years	USEPA, 1991a	
				CF2	Conversion Factor 2	365	days/year	---	

- (1) Best professional judgement. Based on site maintenance/inspection activities conducted 1 day/week and assuming 2 weeks on vacation.
- (2) Dermal absorption factors are presented in **Section 5.2.3** of the text.
- (3) Value derived from data presented in USEPA (1997), averaging across gender and age. It is assumed that head, hands, and forearms are exposed to soil.
- (4) Value derived from data presented in USEPA (1997), averaging across gender and age. It is assumed that head, hands, forearms, and lower legs are exposed to soil.
- (5) Value derived from data presented in USEPA (1997), averaging across gender and age. It is assumed that head, hands, forearms, lower legs, and feet are exposed to soil.

USEPA, 1991a: Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER 9285.6-03.

USEPA, 1991b: Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part B, Development of Risk-Based Preliminary Remediation Goals). OSWER 9285.7-01B.

USEPA, 1995: Assessing Dermal Exposure from Soil. Hazardous Waste Management Division. Office of Superfund Programs, Region III, Philadelphia, PA.

USEPA, 1997: Exposure Factors Handbook, Volume I. EPA/600/P-95/002Fa.

USEPA, 2003: Updated Dermal Exposure Assessment Guidance. Office of Superfund Programs, Region III, Philadelphia, PA.

USEPA, 2002: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 935.4-24.

USEPA, 2004: Risk Assessment Guidance for Superfund. Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment). Final.

Table E-23
Values Used for Daily Intake Calculations- Current/Future Exposures to Surface Soil- Air

Scenario Timeframe:	Current and Future
Medium:	Surface Soil
Exposure Medium:	Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Maintenance Worker	Adult	Particulates	CS	Chemical Concentration in Soil	See site-specific EPC tables	mg/kg	See site-specific EPC tables	Potential (Lifetime) Average Daily Dose $[(L)ADD_{pot}] \text{ (mg/kg-day)} =$ $\frac{CS \times (1/PEF) \times IN \times EF \times ED \times ET}{BW \times AT \times CF1}$
				PEF	Particulate Emission Factor	6.85E+08	m ³ /kg	Site-Specific PEF	
				IN	Inhalation Rate	2.5	m ³ /h	(1)	
				EF	Exposure Frequency	50	days/year	(2)	
				ED	Exposure Duration	25	years	USEPA, 2002	
				ET	Exposure Time	8	hr/day	USEPA, 2002	
				BW	Body Weight	70	kg	USEPA, 2002	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	25	years	USEPA, 2002	
				CF1	Conversion Factor 1	365	days/year	---	

(1) The hourly inhalation rate was derived by dividing the adult's daily 20 m³/day USEPA (2002) inhalation rate by 8 hours per day.
 (2) Best professional judgement. Based on site maintenance/inspection activities conducted 1day/week and assuming 2 weeks on vacation.

USEPA, 2002: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

Table E-24
Values Used for Daily Intake Calculations- Future Exposures to Total Soil- Air

Scenario Timeframe:	Future
Medium:	Total Soil
Exposure Medium:	Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Maintenance Worker	Adult	Particulates	CS	Chemical Concentration in Soil	See site-specific EPC tables	mg/kg	See site-specific EPC tables	Potential (Lifetime) Average Daily Dose [(L)ADD _{pot}] (mg/kg-day) = $\frac{CS \times (1/PEF) \times IN \times EF \times ED \times ET}{BW \times AT \times CF1}$
				PEF	Particulate Emission Factor	6.85E+08	m ³ /kg	Site-Specific PEF	
				IN	Inhalation Rate	2.5	m ³ /h	(1)	
				EF	Exposure Frequency	50	days/year	(2)	
				ED	Exposure Duration	25	years	USEPA, 2002	
				ET	Exposure Time	8	hr/day	USEPA, 2002	
				BW	Body Weight	70	kg	USEPA, 2002	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	25	years	USEPA, 2002	
				CF1	Conversion Factor 1	365	days/year	---	
	Excavation Worker	Adult	Particulates	CS	Chemical Concentration in Soil	See site-specific EPC tables	mg/kg	See site-specific EPC tables	Potential (Lifetime) Average Daily Dose [(L)ADD _{pot}] (mg/kg-day) = $\frac{CS \times (1/PEF) \times IN \times EF \times ED \times ET}{BW \times AT \times CF1}$
				PEF	Particulate Emission Factor	1.33E+06	m ³ /kg	Site-Specific PEF	
				IN	Inhalation Rate	2.5	m ³ /h	(1)	
				EF	Exposure Frequency	250	days/year	USEPA, 2002	
				ED	Exposure Duration	1	years	USEPA, 2002	
				ET	Exposure Time	8	hr/day	USEPA, 2002	
				BW	Body Weight	70	kg	USEPA, 2002	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	1	years	USEPA, 2002	
				CF1	Conversion Factor 1	365	days/year	---	
	Resident	Adult	Particulates	CS	Chemical Concentration in Soil	See site-specific EPC tables	mg/kg	See site-specific EPC tables	Potential (Lifetime) Average Daily Dose [(L)ADD _{pot}] (mg/kg-day) = $\frac{CS \times (1/PEF) \times IN \times EF \times ED \times ET}{BW \times AT \times CF1}$
				PEF	Particulate Emission Factor	6.85E+08	m ³ /kg	Site-Specific PEF	
				IN	Inhalation Rate	0.83	m ³ /h	(3)	
				EF	Exposure Frequency	350	days/year	USEPA, 1991a	
				ED	Exposure Duration	30	years	USEPA, 1991a	
				EDc	Exposure Duration (Cancer)	24	years	USEPA, 1991b	
				ET	Exposure Time	1	hr/day	(4)	
				BW	Body Weight	70	kg	USEPA, 1991a	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 1991a	
				AT-N	Averaging Time (Non-Cancer)	30	years	USEPA, 1991a	
				CF1	Conversion Factor 1	365	days/year	---	
		Child	Particulates	CS	Chemical Concentration in Soil	See site-specific EPC tables	mg/kg	See site-specific EPC tables	Potential (Lifetime) Average Daily Dose [(L)ADD _{pot}] (mg/kg-day) = $\frac{CS \times (1/PEF) \times IN \times EF \times ED \times ET}{BW \times AT \times CF1}$
				PEF	Particulate Emission Factor	6.85E+08	m ³ /kg	Site-Specific PEF	
				IN	Inhalation Rate	1	m ³ /h	(5)	
				EF	Exposure Frequency	350	days/year	USEPA, 1991a	
				ED	Exposure Duration	6	years	USEPA, 1991a	
				ET	Exposure Time	1	hr/day	(6)	
				BW	Body Weight	15	kg	USEPA, 1991a	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 1991a	
				AT-N	Averaging Time (Non-Cancer)	6	years	USEPA, 1991a	
				CF1	Conversion Factor 1	365	days/year	---	

- (1) The maintenance worker and excavation worker hourly inhalation rate was derived by dividing the adult's daily 20 ¹day USEPA (1991) inhalation rate by 8 hours per day.
- (2) Best professional judgement. Based on site maintenance/inspection activities conducted 1day/week and assuming 2 weeks on vacation.
- (3) The adult resident hourly inhalation rate was derived by dividing the adult daily 20 ¹day USEPA (1991) inhalation rate by 24 hours per day.
- (4) Exposure time is based upon the average time an adult spends outdoors, assuming 1.5 hours/day (USEPA, 1997) with the exception of the three coldest months of the year.
- (5) The child resident hourly inhalation rate was based on light activities (USEPA, 1997).
- (6) Exposure time is based upon the assumption that children (ages 6 years and under) would be accompanied or supervised by an adult during time spent outdoors. Therefore, the exposure time for the child is equivalent to the adult, i.e., an average time of 1.5 hours/day (USEPA, 1997) with the exception of the coldest months of the year.

USEPA, 1991a: Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER 9285.6-03.

USEPA, 1991b: Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part B, Development of Risk-Based Preliminary Remediation Goals). OSWER 9285.7-01B.

USEPA, 1997: Exposure Factors Handbook, Volume I. EPA/600/P-95/002Fa.

USEPA, 2002: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

Table E-31
Chemical/Physical Parameters Used for the Dermal Pathway for Surface Water and Groundwater Exposures

Chemical	Dermal Permeability Coefficient (Kp) (a) (cm/hr)	Tau (hr)	t* (hr)	log K _{ow} (---)	Molecular Weight (g/mol)	B (---)	Dsc (cm ² /hr)
Organics:							
Benzo(a)pyrene	7.0E-01	2.7E+00	1.17E+01	6.1	250	4.3E+00	1.5E-06
Bromodichloromethane	4.6E-03	8.70E-01	2.08E+00	2.09	163.8	2.3E-02	1.9E-07
Chloroform	6.8E-03	4.90E-01	1.18E+00	1.97	119.4	2.9E-02	3.6E-07
Inorganics:							
Aluminum	1.0E-03	NU	NU	NU	NU	NU	NU
Arsenic	1.0E-03	NU	NU	NU	NU	NU	NU
Cobalt	1.0E-03	NU	NU	NU	NU	NU	NU
Iron	1.0E-03	NU	NU	NU	NU	NU	NU
Manganese	1.0E-03	NU	NU	NU	NU	NU	NU
Vanadium	1.0E-03	NU	NU	NU	NU	NU	NU

(a) Permeability coefficients were used to evaluate dermal exposures to water. For organics, permeability coefficients were estimated using molecular weights and log K_{ow}s presented in this table (USEPA, 2004b). Permeability coefficients for inorganics were default values obtained from USEPA (2004b).
 NU = Not used.

Table E-35
Values Used for Daily Intake Calculations
Future Exposures to Home Grown Produce for Residents - SWMU 31

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Home Grown Produce

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/Model Name
Ingestion	Resident	Adult	SWMU 31	CV	Chemical Concentration in Produce	---	mg/kg	(1)	Potential (Lifetime) Average Daily Dose [(L)ADD _{pot}] (mg/kg-day) = $\frac{CV \times ABS \times IR-P \times EF \times ED \times CF1}{BW \times AT \times CF2}$
				ABS	Chemical-Specific	---	unitless	(2)	
				IR-P	Ingestion Rate of Produce	18.6 (3)	g/d	USEPA, 1997	
				EF	Exposure Frequency	350	days/year	USEPA, 1991a, 2003	
				ED	Exposure Duration	30	years	USEPA, 1991a, 2003	
				EDc	Exposure Duration (Cancer)	24	years	USEPA, 1991b	
				CF1	Conversion Factor 1	1/10 ³	mg/μg	---	
				BW	Body Weight	70	kg	USEPA, 1991a, 2003	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 1991a, 2003	
				AT-N	Averaging Time (Non-Cancer)	30	years	USEPA, 1991a, 2003	
				CF2	Conversion Factor 2	365	days/year	---	
	Child	Child	SWMU 31	CV	Chemical Concentration in Produce	---	mg/kg	(1)	Potential (Lifetime) Average Daily Dose [(L)ADD _{pot}] (mg/kg-day) = $\frac{CV \times ABS \times IR-P \times EF \times ED \times CF1}{BW \times AT \times CF2}$
				ABS	Chemical-Specific	---	unitless	(2)	
				IR-P	Ingestion Rate of Produce	18.6 (3)	g/d	USEPA, 1997	
				EF	Exposure Frequency	350	days/year	USEPA, 1991a, 2003	
				ED	Exposure Duration	6	years	USEPA, 1991a, 2003	
				CF1	Conversion Factor 1	1/10 ³	mg/μg	---	
				BW	Body Weight	15	kg	USEPA, 1991a, 2003	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 1991a, 2003	
				AT-N	Averaging Time (Non-Cancer)	6	years	USEPA, 1991a, 2003	
				CF2	Conversion Factor 2	365	days/year	---	

(1) Value is calculated using the equations presented in Section 5.2.3

(2) Chemical-specific values are presented in Table E-37.

(3) Value includes 7.5 g/d of vegetables and 11.1 g/d of fruit. The ingestion rate is based on 95th percentile values for home grown food intake (Table 1-2; USEPA, 1997).

USEPA, 1991a: Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER 9285.6-03.

USEPA, 1991b: Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part B, Development of Risk-Based Preliminary Remediation Goals). OSWER 9285.7-01B.

USEPA, 1997: Exposure Factors Handbook, Volume I. EPA/600/P-95/002Fa.

USEPA 2003: EPA Region 3 Risk-Based Concentration Table: Technical Background Information, Region 3, Philadelphia, PA.

Table E-36
Cancer Toxicity Data - Oral/Dermal

Chemical of Potential Concern	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal (1)	Absorbed Cancer Slope Factor for Dermal (2)		Weight of Evidence/ Cancer Guideline Description	Oral CSF	
	Value	Units		Value	Units		Source	Date (3) (MM/DD/YY)
Organics								
Benzo(a)pyrene	7.3E+00	(mg/kg-day) ⁻¹	100%	7.3E+00	(mg/kg-day) ⁻¹	B2	IRIS	10/14/05:11/1/94
Bromodichloromethane	6E-02	(mg/kg-day) ⁻¹	100%	6.2E-02	(mg/kg-day) ⁻¹	B2	IRIS	9/6/05:3/1/93
Chloroform (4)	N/A	N/A	N/A	N/A	N/A	N/A	IRIS	9/6/05:10/19/01
Dibenzofuran	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TCDD TE	1.5E+05	(mg/kg-day) ⁻¹	100%	1.5E+05	(mg/kg-day) ⁻¹	B2	HEAST	1997
Inorganics								
Aluminum	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Arsenic	1.5E+00	(mg/kg-day) ⁻¹	100%	1.5E+00	(mg/kg-day) ⁻¹	A	IRIS	8/1/05:4/10/98
Chromium (III)	N/A	N/A	N/A	N/A	N/A	D	IRIS	8/1/05:9/3/98
Cobalt	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Iron	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Manganese	N/A	N/A	N/A	N/A	N/A	D	IRIS	8/1/05:12/1/96
Vanadium	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

(1) Source: Risk Assessment Guidance for Superfund Volume 1: Human Health
Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final.
Section 4.2 and Exhibit 4-1.

(2) The equation for deriving the adjusted dermal cancer slope factors are presented in the text.

(3) For IRIS values, the date IRIS was searched and the date of the most recent review are provided.
For HEAST values, the date of HEAST is provided.

(4) A dose of 1E-02 mg/kg (equal to the RfD) can be considered protective against cancer risk.

Definitions: N/A = Not Available
IRIS = Integrated Risk Information System
HEAST= Health Effects Assessment Summary Tables

EPA Group:
A - Human carcinogen
B1 - Probable human carcinogen - indicates that limited human data are available
B2 - Probable human carcinogen - indicates sufficient evidence in animals and
inadequate or no evidence in humans
C - Possible human carcinogen
D - Not classifiable as a human carcinogen
E - Evidence of noncarcinogenicity

Table E-37
Non-Cancer Toxicity Data - Oral/Dermal

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral to Dermal Efficiency for Dermal (1)	Absorbed RfD for Dermal (2)		Primary Target Organ(s)	Combined Uncertainty/ Modifying Factors	RfD/Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Dates of RfD (3): (MM/DD/YY)
Organics										
Benzo(a)pyrene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bromodichloromethane	Chronic	2E-02	mg/kg-day	100%	2.0E-02	mg/kg-day	Kidney	1,000	IRIS	9/6/05:3/1/91
Chloroform	Chronic	1E-02	mg/kg-day	100%	1.0E-02	mg/kg-day	Liver	1,000	IRIS	9/6/05:10/19/01
Dibenzofuran	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TCDD TE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Inorganics										
Aluminum	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Arsenic	Chronic	3E-04	mg/kg-day	100%	3.0E-04	mg/kg-day	Skin, Vascular Effects	3	IRIS	9/6/05:2/1/93
Chromium (III)	Chronic	1.5E+00	mg/kg-day	1.3%	2.0E-02	mg/kg-day	NOAEL	1,000	IRIS	9/6/05:9/3/98
Cobalt	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Iron	Chronic	3E-01	mg/kg-day	100%	3.0E-01	mg/kg-day	Blood, Liver, GI Irritation	1	EPA, 2006; VDEQ, 2006; NCEA	4/7/05:7/8/05
Manganese (non-food)	Chronic	2.0E-02	mg/kg-day	4%	8.0E-04	mg/kg-day	CNS	1	IRIS	9/6/05:5/1/96
Vanadium	Chronic	1E-03	mg/kg-day	2.6%	2.6E-05	mg/kg-day	Kidney	100	EPA, 2006; VDEQ, 2006; NCEA	4/7/05:7/8/05

- (1) Source: Risk Assessment Guidance for Superfund Volume 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. Section 4.2 and Exhibit 4-1.
- (2) The equation used to derive the adjusted dermal RfD is presented in the text.
- (3) For IRIS values, the date IRIS was searched and the date of the most recent review are provided. For NCEA values, the date of the article provided by NCEA is provided.

Definitions:

N/A = Not Available

IRIS = Integrated Risk Information System

NCEA = National Center for Environmental Assessment

PPRTV = Provisional Peer-Reviewed Toxicity Values

EPA, 2006 = EPA Region III October 31, 2006 RBC table.

VDEQ, 2006 = Virginia Department of Environmental Quality, Voluntary Remediation Program, Table 4.1, Non-Cancer Toxicity Data, August 18, 2006.

Table E-38
Cancer Toxicity Data - Inhalation

Chemical of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor		Weight of Evidence/ Cancer Guideline Description	Unit Risk: Inhalation CSF	
	Value	Units	Value	Units		Source	Date (1) (MM/DD/YY)
Organics							
Benzo(a)pyrene	N/A	N/A	3.1E+00	(mg/kg-day) ⁻¹	B2	EPA, 2006; NCEA	4/07/05
Bromodichloromethane	N/A	N/A	N/A	N/A	N/A	EPA, 2006	10/12/06/4/7/06
Chloroform	2.3E-05	(ug/m ³) ⁻¹	8.1E-02	(mg/kg-day) ⁻¹	B2	IRIS	10/14/05:10/19/01
Dibenzofuran	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TCDD TE	4.29E+07	(ug/m ³) ⁻¹	1.50E+05	(mg/kg-day) ⁻¹	B2	HEAST	1997
Inorganics							
Aluminum	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Arsenic	4.3E-03	(ug/m ³) ⁻¹	1.5E+01	(mg/kg-day) ⁻¹	A	IRIS	8/1/05:4/10/98
Chromium (III)	N/A	N/A	N/A	N/A	D	IRIS	8/1/05:9/3/98
Cobalt	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Iron	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Manganese	N/A	N/A	N/A	N/A	D	IRIS	8/1/05:12/1/96
Vanadium	N/A	N/A	N/A	N/A	N/A	N/A	N/A

(1) For IRIS values, the date IRIS was searched and the date of the most recent review are provided.

For HEAST values, the date of HEAST is provided.

(2) Value for polychlorinated biphenyls used.

Definitions:

N/A = Not Available

IRIS = Integrated Risk Information System

HEAST= Health Effects Assessment Summary Tables

EPA, 2006 = EPA Region III October 31, 2006 RBC table.

NCEA = National Center for Environmental Assessment

EPA Group:

A - Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classifiable as a human carcinogen

E - Evidence of noncarcinogenicity

Table E-39
Non-Cancer Toxicity Data - Inhalation

Chemical of Potential Concern	Chronic/ Subchronic	Inhalation RfC		Extrapolated RfD (1)		Primary Target Organ (s)	Combined Uncertainty/ Modifying Factors	RfC:Target Organ(s)	
		Value	Units	Value	Units			Source(s) (2)	Dates of RfD: (MM/DD/YY)
Organics									
Benzo(a)pyrene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bromodichloromethane	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Chloroform	Chronic	5.0E-02	mg/m ³	1.4E-02	mg/kg-day	N/A	N/A	EPA, 2006; NCEA	4/7/2005
Dibenzofuran	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TCDD TE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Inorganics									
Aluminum	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Arsenic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Chromium (III) (3)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cobalt	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Iron	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Manganese	Chronic	5.0E-05	mg/m ³	1.43E-05	mg/kg-day	CNS	1,000	IRIS	8/1/05;12/1/93
Vanadium	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

- (1) The adjusted inhalation RfD was derived from the RfC value assuming a 70 kg adult inhales 20 m³/day as follows: RfD = RfC * (20 m³/day / 70 kg).
- (2) For IRIS values, the date IRIS was searched and the date of the most recent review are provided.
For HEAST values, the date of HEAST is provided.
For NCEA values, the date of the article provided by NCEA is provided.
- (3) No inhalation RfC is available for chromium III.

Definitions: N/A = Not Available

PPRTV = Provisional Peer-Reviewed Toxicity Values

NCEA = National Center for Environmental Assessment

EPA, 2006 = EPA Region III October 31, 2006 RBC table.

Table E-40
Calculation of Cancer Risks
Reasonable Maximum Exposure
Current/Future - Maintenance Worker

Scenario Timeframe: Current/Future
Receptor Population: Maintenance Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk
							Value	Units	Value	Units	
Surface Soil	Surface Soil	SWMU 31	Ingestion	Organics							
				TCDD TE	8.37E-06	mg/kg	5.8E-13	mg/kg-day	1.5E+05	(mg/kg-day) ⁻¹	8.8E-08
				Inorganics							
				Aluminum	1.55E+04	mg/kg	1.1E-03	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Arsenic	5.90E+00	mg/kg	4.1E-07	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	6.2E-07
				Chromium	2.82E+01	mg/kg	2.0E-06	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Cobalt	1.78E+01	mg/kg	1.2E-06	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Iron	2.78E+04	mg/kg	1.9E-03	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Manganese	4.95E+02	mg/kg	3.5E-05	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Vanadium	4.75E+01	mg/kg	3.3E-06	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
			Exp. Route Total								7.1E-07
			Dermal Absorption	Organics							
				TCDD TE	8.37E-06	mg/kg	1.2E-13	mg/kg-day	1.5E+05	(mg/kg-day) ⁻¹	1.7E-08
				Inorganics							
				Aluminum	1.55E+04	mg/kg	7.1E-05	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Arsenic	5.90E+00	mg/kg	8.2E-08	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	1.2E-07
				Chromium	2.82E+01	mg/kg	1.3E-07	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Cobalt	1.78E+01	mg/kg	8.2E-08	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Iron	2.78E+04	mg/kg	1.3E-04	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Manganese	4.95E+02	mg/kg	2.3E-06	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Vanadium	4.75E+01	mg/kg	2.2E-07	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
			Exp. Route Total								1.4E-07
			Exposure Point Total								8.5E-07
			Exposure Media Total								8.5E-07
	Air (Particulates)	SWMU 31	Inhalation	Organics							
				TCDD TE	8.37E-06	mg/kg	1.7E-16	mg/kg-day	1.5E+05	(mg/kg-day) ⁻¹	2.6E-11
				Inorganics							
				Aluminum	1.55E+04	mg/kg	3.2E-07	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Arsenic	5.90E+00	mg/kg	1.2E-10	mg/kg-day	1.5E+01	(mg/kg-day) ⁻¹	1.8E-09
				Chromium	2.82E+01	mg/kg	5.8E-10	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Cobalt	1.78E+01	mg/kg	3.6E-10	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Iron	2.78E+04	mg/kg	5.7E-07	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Manganese	4.95E+02	mg/kg	1.0E-08	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Vanadium	4.75E+01	mg/kg	9.7E-10	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
			Exp. Route Total								1.8E-09
			Exposure Point Total								1.8E-09
			Exposure Media Total								1.8E-09
			Soil Total								8.5E-07

Table E-40
Calculation of Cancer Risks
Reasonable Maximum Exposure
Current/Future - Maintenance Worker

Scenario Timeframe: Current/Future
Receptor Population: Maintenance Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk		
							Value	Units	Value	Units			
Sediment	Sediment	SWMU 31	Ingestion	Organics Dibenzofuran	3.00E-01	mg/kg	2.1E-08	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
				Inorganics Aluminum	1.03E+05	mg/kg	7.2E-03	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
				Arsenic	1.22E+01	mg/kg	8.5E-07	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	1.3E-06		
				Cobalt	1.65E+01	mg/kg	1.2E-06	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
				Iron	2.53E+04	mg/kg	1.8E-03	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
			Exp. Route Total										1.3E-06
			Dermal Absorption	Organics Dibenzofuran	3.00E-01	mg/kg	4.2E-08	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
				Inorganics Aluminum	1.03E+05	mg/kg	1.4E-03	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
				Arsenic	1.22E+01	mg/kg	5.1E-07	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	7.6E-07		
				Cobalt	1.65E+01	mg/kg	6.9E-07	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
				Iron	2.53E+04	mg/kg	3.5E-04	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
			Exp. Route Total										7.6E-07
			Exposure Point Total										2.0E-06
			Exposure Media Total										2.0E-06
			Sediment Total										2.0E-06
Surface Water	Surface Water	SWMU 31	Dermal Absorption	Organics Bromodichloromethane	3.60E+00	µg/L	9.8E-08	mg/kg-day	6.2E-02	(mg/kg-day) ⁻¹	6.1E-09		
				Chloroform	3.00E+01	µg/L	9.1E-07	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
				Inorganics Aluminum	1.32E+04	µg/L	3.0E-05	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
			Exp. Route Total										6.1E-09
			Exposure Point Total										6.1E-09
			Exposure Media Total										6.1E-09
Surface Water Total										6.1E-09			
Groundwater	Air	SWMU 31	Inhalation Ambient Air	Organics Chloroform	1.63E-05	mg/m ³	2.3E-07	mg/kg-day	8.1E-02	(mg/kg-day) ⁻¹	1.8E-08		
				Exp. Route Total									
			Exposure Point Total										1.8E-08
			Exposure Media Total										1.8E-08
Groundwater Total										1.8E-08			
Total of Receptor Risks Across All Media											2.9E-06		

N/A = Not Applicable.

Table E-41
Calculation of Cancer Risks
Reasonable Maximum Exposure
Future - Maintenance Worker

Scenario Timeframe: Future
Receptor Population: Maintenance Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk
							Value	Units	Value	Units	
Total Soil	Total Soil	SWMU 31	Ingestion	Organics							
				TCDD TE	8.37E-06	mg/kg	5.8E-13	mg/kg-day	1.5E+05	(mg/kg-day) ⁻¹	8.8E-08
				Inorganics							
				Aluminum	1.70E+04	mg/kg	1.2E-03	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Arsenic	5.90E+00	mg/kg	4.1E-07	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	6.2E-07
				Chromium	2.97E+01	mg/kg	2.1E-06	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Cobalt	1.85E+01	mg/kg	1.3E-06	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Iron	2.84E+04	mg/kg	2.0E-03	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Manganese	4.95E+02	mg/kg	3.5E-05	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Vanadium	4.92E+01	mg/kg	3.4E-06	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
			Exp. Route Total								7.1E-07
			Dermal Absorption	Organics							
				TCDD TE	8.37E-06	mg/kg	1.2E-13	mg/kg-day	1.5E+05	(mg/kg-day) ⁻¹	1.7E-08
				Inorganics							
				Aluminum	1.70E+04	mg/kg	7.8E-05	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Arsenic	5.90E+00	mg/kg	8.2E-08	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	1.2E-07
				Chromium	2.97E+01	mg/kg	1.4E-07	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Cobalt	1.85E+01	mg/kg	8.5E-08	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Iron	2.84E+04	mg/kg	1.3E-04	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Manganese	4.95E+02	mg/kg	2.3E-06	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Vanadium	4.92E+01	mg/kg	2.3E-07	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
			Exp. Route Total								1.4E-07
		Exposure Point Total									8.5E-07
		Exposure Media Total									8.5E-07
Air (Particulates)	SWMU 31	Inhalation	Organics								
			TCDD TE	8.37E-06	mg/kg	1.7E-16	mg/kg-day	1.5E+05	(mg/kg-day) ⁻¹	2.6E-11	
			Inorganics								
			Aluminum	1.70E+04	mg/kg	3.5E-07	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
			Arsenic	5.90E+00	mg/kg	1.2E-10	mg/kg-day	1.5E+01	(mg/kg-day) ⁻¹	1.8E-09	
			Chromium	2.97E+01	mg/kg	6.1E-10	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
			Cobalt	1.85E+01	mg/kg	3.8E-10	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
			Iron	2.84E+04	mg/kg	5.8E-07	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
			Manganese	4.95E+02	mg/kg	1.0E-08	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
			Vanadium	4.92E+01	mg/kg	1.0E-09	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
		Exp. Route Total								1.8E-09	
		Exposure Point Total									1.8E-09
Exposure Media Total									1.8E-09		
Soil Total									8.5E-07		
							Total of Receptor Risks Across All Media		8.5E-07		

N/A = Not Applicable.

Table E-44
Calculation of Cancer Risks
Reasonable Maximum Exposure
Future - Excavation Worker (1.25 acres)

Scenario Timeframe: Future
Receptor Population: Excavation Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk
							Value	Units	Value	Units	
Total Soil	Total Soil	SWMU 31	Ingestion	Organics							
				TCDD TE	8.37E-06	mg/kg	3.9E-13	mg/kg-day	1.5E+05	(mg/kg-day) ⁻¹	5.8E-08
				Inorganics							
				Aluminum	1.70E+04	mg/kg	7.8E-04	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Arsenic	5.90E+00	mg/kg	2.7E-07	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	4.1E-07
				Chromium	2.97E+01	mg/kg	1.4E-06	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Cobalt	1.85E+01	mg/kg	8.5E-07	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Iron	2.84E+04	mg/kg	1.3E-03	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Manganese	4.95E+02	mg/kg	2.3E-05	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Vanadium	4.92E+01	mg/kg	2.3E-06	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
			Exp. Route Total								4.7E-07
			Dermal Absorption	Organics							
				TCDD TE	8.37E-06	mg/kg	3.5E-14	mg/kg-day	1.5E+05	(mg/kg-day) ⁻¹	5.2E-09
				Inorganics							
				Aluminum	1.70E+04	mg/kg	2.4E-05	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Arsenic	5.90E+00	mg/kg	2.4E-08	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	3.7E-08
				Chromium	2.97E+01	mg/kg	4.1E-08	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Cobalt	1.85E+01	mg/kg	2.6E-08	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Iron	2.84E+04	mg/kg	3.9E-05	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Manganese	4.95E+02	mg/kg	6.9E-07	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Vanadium	4.92E+01	mg/kg	6.8E-08	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
			Exp. Route Total								4.2E-08
		Exposure Point Total									5.1E-07
	Exposure Media Total										5.1E-07
	Air (Particulates)	SWMU 31	Inhalation	Organics							
				TCDD TE	8.37E-06	mg/kg	1.8E-14	mg/kg-day	1.5E+05	(mg/kg-day) ⁻¹	2.6E-09
				Inorganics							
				Aluminum	1.70E+04	mg/kg	3.6E-05	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Arsenic	5.90E+00	mg/kg	1.2E-08	mg/kg-day	1.5E+01	(mg/kg-day) ⁻¹	1.9E-07
				Chromium	2.97E+01	mg/kg	6.2E-08	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Cobalt	1.85E+01	mg/kg	3.9E-08	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Iron	2.84E+04	mg/kg	6.0E-05	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Manganese	4.95E+02	mg/kg	1.0E-06	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Vanadium	4.92E+01	mg/kg	1.0E-07	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
			Exp. Route Total								1.9E-07
		Exposure Point Total									1.9E-07
		Exposure Media Total									1.9E-07
	Soil Total										7.0E-07

Table E-44
Calculation of Cancer Risks
Reasonable Maximum Exposure
Future - Excavation Worker (1.25 acres)

Scenario Timeframe: Future
Receptor Population: Excavation Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk		
							Value	Units	Value	Units			
Sediment	Sediment	SWMU 31	Ingestion	Organics									
				Dibenzofuran	3.00E-01	mg/kg	1.4E-08	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
				Inorganics									
				Aluminum	1.03E+05	mg/kg	4.8E-03	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
				Arsenic	1.22E+01	mg/kg	5.6E-07	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	8.4E-07		
				Cobalt	1.65E+01	mg/kg	7.6E-07	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
				Iron	2.53E+04	mg/kg	1.2E-03	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
				Exp. Route Total									8.4E-07
				Dermal Absorption	Organics								
					Dibenzofuran	3.00E-01	mg/kg	5.8E-07	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
			Inorganics										
			Aluminum		1.03E+05	mg/kg	2.9E-04	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
			Arsenic		1.22E+01	mg/kg	1.0E-07	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	1.5E-07		
				Cobalt	1.65E+01	mg/kg	4.6E-08	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
				Iron	2.53E+04	mg/kg	7.0E-05	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
Exp. Route Total									1.5E-07				
Exposure Point Total								1.0E-06					
Exposure Media Total								1.0E-06					
Sediment Total											1.0E-06		
Surface Water	Surface Water	SWMU 31	Dermal Absorption	Organics									
				Bromodichloromethane	3.60E+00	µg/L	2.0E-08	mg/kg-day	6.2E-02	(mg/kg-day) ⁻¹	1.2E-09		
				Chloroform	3.00E+01	µg/L	1.8E-07	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
				Inorganics									
				Aluminum	1.32E+04	µg/L	6.1E-06	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
			Exp. Route Total									1.2E-09	
			Exposure Point Total								1.2E-09		
Exposure Media Total								1.2E-09					
Surface Water Total											1.2E-09		
Groundwater	Air	SWMU 31	Inhalation (Trench Air)	Organics									
				Chloroform	1.18E-03	mg/m³	1.6E-06	mg/kg-day	8.1E-02	(mg/kg-day) ⁻¹	1.3E-07		
				Exp. Route Total									1.3E-07
			Exposure Point Total								1.3E-07		
Exposure Media Total								1.3E-07					
Groundwater Total											1.3E-07		
Total of Receptor Risks Across All Media											1.8E-06		

N/A = Not Applicable.

Table E-45
Calculation of Cancer Risks
Reasonable Maximum Exposure
Future - Lifetime Adult Resident - On-Site

Scenario Timeframe: Future
Receptor Population: Lifetime Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	
							Value	Units	Value	Units		
Total Soil	Total Soil	SWMU 31	Ingestion	Organics								
				TCDD TE	8.37E-06	mg/kg	1.3E-11	mg/kg-day	1.5E+05	(mg/kg-day) ⁻¹	2.0E-06	
				Inorganics								
				Aluminum	1.70E+04	mg/kg	2.7E-02	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
				Arsenic	5.90E+00	mg/kg	9.2E-06	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	1.4E-05	
				Chromium	2.97E+01	mg/kg	4.6E-05	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
				Cobalt	1.85E+01	mg/kg	3.1E-05	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
				Iron	2.84E+04	mg/kg	4.4E-02	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
				Manganese	4.95E+02	mg/kg	7.7E-04	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
				Vanadium	4.92E+01	mg/kg	7.7E-05	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
			Exp. Route Total								1.6E-05	
			Dermal Absorption	Organics								
				TCDD TE	8.37E-06	mg/kg	1.2E-12	mg/kg-day	1.5E+05	(mg/kg-day) ⁻¹	1.9E-07	
				Inorganics								
				Aluminum	1.70E+04	mg/kg	8.4E-04	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
				Arsenic	5.90E+00	mg/kg	8.7E-07	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	1.3E-06	
				Chromium	2.97E+01	mg/kg	1.5E-06	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
				Cobalt	1.85E+01	mg/kg	1.0E-06	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
				Iron	2.84E+04	mg/kg	1.4E-03	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
				Manganese	4.95E+02	mg/kg	2.4E-05	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
				Vanadium	4.92E+01	mg/kg	2.4E-06	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
			Exp. Route Total								1.5E-06	
		Exposure Point Total									1.7E-05	
		Exposure Media Total									1.7E-05	
Air (Particulates)	SWMU 31	Inhalation	Organics									
			TCDD TE	8.37E-06	mg/kg	1.1E-16	mg/kg-day	1.5E+05	(mg/kg-day) ⁻¹	1.7E-11		
			Inorganics									
			Aluminum	1.70E+04	mg/kg	2.3E-07	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
			Arsenic	5.90E+00	mg/kg	8.1E-11	mg/kg-day	1.5E+01	(mg/kg-day) ⁻¹	1.2E-09		
			Chromium	2.97E+01	mg/kg	4.1E-10	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
			Cobalt	1.85E+01	mg/kg	2.8E-10	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
			Iron	2.84E+04	mg/kg	3.9E-07	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
			Manganese	4.95E+02	mg/kg	6.8E-09	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
			Vanadium	4.92E+01	mg/kg	6.7E-10	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
			Exp. Route Total								1.2E-09	
			Exposure Point Total									1.2E-09
			Exposure Media Total									1.2E-09
Soil Total									1.7E-05			

Table E-45
Calculation of Cancer Risks
Reasonable Maximum Exposure
Future - Lifetime Adult Resident - On-Site

Scenario Timeframe: Future
Receptor Population: Lifetime Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	
					Value	Units	Value	Units	Value	Units		
Sediment	Sediment	SWMU 31	Ingestion	Organics Dibenzofuran	3.00E-01	mg/kg	5.4E-08	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
				Inorganics Aluminum	1.03E+05	mg/kg	1.8E-02	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
				Arsenic	1.22E+01	mg/kg	2.2E-06	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	3.3E-06	
				Cobalt	1.65E+01	mg/kg	3.0E-06	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
				Iron	2.53E+04	mg/kg	4.5E-03	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
			Exp. Route Total							3.3E-06		
			Dermal Absorption	Organics Dibenzofuran	3.00E-01	mg/kg	1.4E-07	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
				Inorganics Aluminum	1.03E+05	mg/kg	9.9E-04	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
				Arsenic	1.22E+01	mg/kg	3.5E-07	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	5.3E-07	
				Cobalt	1.65E+01	mg/kg	4.8E-07	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
				Iron	2.53E+04	mg/kg	2.4E-04	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
			Exp. Route Total							5.3E-07		
			Exposure Point Total								3.8E-06	
			Exposure Media Total								3.8E-06	
			Sediment Total							3.8E-06		
Surface Water	Surface Water	SWMU 31 (Wading)	Dermal Absorption	Organics Bromodichloromethane	3.60E+00	µg/L	1.8E-07	mg/kg-day	6.2E-02	(mg/kg-day) ⁻¹	1.1E-08	
				Chloroform	3.00E+01	µg/L	1.7E-06	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
				Inorganics Aluminum	1.32E+04	µg/L	6.6E-05	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
				Exp. Route Total							1.1E-08	
			Exposure Point Total								1.1E-08	
Exposure Media Total								1.1E-08				
Surface Water Total							1.1E-08					

Table E-45
Calculation of Cancer Risks
Reasonable Maximum Exposure
Future - Lifetime Adult Resident - On-Site

Scenario Timeframe: Future
Receptor Population: Lifetime Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk
							Value	Units	Value	Units	
Groundwater	Groundwater	SWMU 31	Ingestion	Organics							
				Benzo(a)pyrene	6.10E-02	µg/L	9.1E-07	mg/kg-day	7.3E+00	(mg/kg-day) ⁻¹	6.6E-06
				Chloroform	1.10E+01	µg/L	1.6E-04	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Inorganics							
				Aluminum	2.68E+03	µg/L	4.0E-02	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Arsenic	9.40E+00	µg/L	1.4E-04	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	2.1E-04
				Cobalt	3.80E+00	µg/L	5.7E-05	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Iron	7.08E+03	µg/L	1.1E-01	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Manganese	1.83E+02	µg/L	2.7E-03	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Vanadium	1.74E+01	µg/L	2.6E-04	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
		Exp. Route Total							2.2E-04		
		Dermal Adsorption	Organics								
			Benzo(a)pyrene	6.10E-02	µg/L	1.9E-05	mg/kg-day	7.3E+00	(mg/kg-day) ⁻¹	1.4E-04	
			Chloroform	1.10E+01	µg/L	1.5E-05	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
			Inorganics								
			Aluminum	2.68E+03	µg/L	2.3E-04	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
			Arsenic	9.40E+00	µg/L	8.0E-07	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	1.2E-06	
			Cobalt	3.80E+00	µg/L	3.2E-07	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
			Iron	7.08E+03	µg/L	6.0E-04	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
			Manganese	1.83E+02	µg/L	1.6E-05	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
			Vanadium	1.74E+01	µg/L	1.5E-06	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
		Exp. Route Total							1.4E-04		
		Exposure Point Total								3.6E-04	
	Exposure Media Total								3.6E-04		
	Air	SWMU 31	Inhalation (Indoor Air)	Organics							
				Chloroform	2.45E-04	mg/m³	5.5E-05	mg/kg-day	8.1E-02	(mg/kg-day) ⁻¹	4.5E-06
			Exp. Route Total							4.5E-06	
Inhalation (Shower Room)			Organics								
			Chloroform	1.73E-02	mg/m³	7.3E-05	mg/kg-day	8.1E-02	(mg/kg-day) ⁻¹	5.9E-06	
Exp. Route Total									5.9E-06		
Exposure Point Total								1.0E-05			
Exposure Media Total								1.0E-05			
Home Grown Produce	SWMU 31	Ingestion	Inorganics								
			Arsenic	9.40E+00	µg/L	2.2E-07	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	3.2E-07	
		Exp. Route Total							3.2E-07		
Exposure Point Total								3.2E-07			
Exposure Media Total								3.2E-07			
Groundwater Total								3.7E-04			
								Total of Receptor Risks Across All Media	3.9E-04		

N/A = Not Applicable.

Table E-46
Calculation of Cancer Risks
Reasonable Maximum Exposure
Future - Lifetime Adult Resident - On-site

Scenario Timeframe: Future
Receptor Population: Lifetime Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk
							Value	Units	Value	Units	
Surface Water	Surface Water	SWMU 31 (Swimming)	Ingestion	Organics							
				Bromodichloromethane	3.60E+00	µg/L	2.6E-08	mg/kg-day	6.2E-02	(mg/kg-day) ⁻¹	1.6E-09
				Chloroform	3.00E+01	µg/L	2.2E-07	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
			Inorganics								
			Aluminum	1.32E+04	µg/L	7.7E-04	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
			Exp. Route Total								1.6E-09
			Dermal Absorption	Organics							
				Bromodichloromethane	3.60E+00	µg/L	7.3E-08	mg/kg-day	6.2E-02	(mg/kg-day) ⁻¹	4.6E-09
				Chloroform	3.00E+01	µg/L	6.8E-07	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
			Inorganics								
			Aluminum	1.32E+04	µg/L	1.4E-04	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
			Exp. Route Total								4.6E-09
		Exposure Point Total							6.2E-09		
	Exposure Media Total							6.2E-09			
Surface Water Total									6.2E-09		
							Total of Receptor Risks Across All Media		6.2E-09		

N/A = Not Applicable.

Table E-47
Calculation of Cancer Risks
Reasonable Maximum Exposure
Future - Child Resident - On -Site

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk		
							Value	Units	Value	Units			
Total Soil	Total Soil	SWMU 31	Ingestion	Organics									
				TCDD TE	8.37E-06	mg/kg	9.2E-12	mg/kg-day	1.5E+05	(mg/kg-day) ⁻¹	1.4E-06		
				Inorganics									
				Aluminum	1.70E+04	mg/kg	1.9E-02	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
				Arsenic	5.90E+00	mg/kg	6.5E-06	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	9.7E-06		
				Chromium	2.97E+01	mg/kg	3.3E-05	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
				Cobalt	1.85E+01	mg/kg	2.0E-05	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
				Iron	2.84E+04	mg/kg	3.1E-02	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
				Manganese	4.95E+02	mg/kg	5.4E-04	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
				Vanadium	4.92E+01	mg/kg	5.4E-05	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
			Exp. Route Total								1.1E-05		
			Dermal Absorption	Organics									
				TCDD TE	8.37E-06	mg/kg	7.7E-13	mg/kg-day	1.5E+05	(mg/kg-day) ⁻¹	1.2E-07		
				Inorganics									
				Aluminum	1.70E+04	mg/kg	5.2E-04	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
				Arsenic	5.90E+00	mg/kg	5.4E-07	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	8.1E-07		
				Chromium	2.97E+01	mg/kg	9.1E-07	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
				Cobalt	1.85E+01	mg/kg	5.7E-07	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
				Iron	2.84E+04	mg/kg	8.7E-04	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
				Manganese	4.95E+02	mg/kg	1.5E-05	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
				Vanadium	4.92E+01	mg/kg	1.5E-06	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
			Exp. Route Total								9.3E-07		
			Exposure Point Total									1.2E-05	
			Exposure Media Total									1.2E-05	
			Air (Particulates)	SWMU 31	Inhalation	Organics							
						TCDD TE	8.37E-06	mg/kg	6.7E-17	mg/kg-day	1.5E+05	(mg/kg-day) ⁻¹	1.0E-11
						Inorganics							
						Aluminum	1.70E+04	mg/kg	1.4E-07	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
						Arsenic	5.90E+00	mg/kg	4.7E-11	mg/kg-day	1.5E+01	(mg/kg-day) ⁻¹	7.1E-10
						Chromium	2.97E+01	mg/kg	2.4E-10	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
	Cobalt	1.85E+01				mg/kg	1.5E-10	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
	Iron	2.84E+04				mg/kg	2.3E-07	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
	Manganese	4.95E+02				mg/kg	4.0E-09	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
	Vanadium	4.92E+01				mg/kg	3.9E-10	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
	Exp. Route Total								7.2E-10				
	Exposure Point Total										7.2E-10		
	Exposure Media Total										7.2E-10		
Soil Total											1.2E-05		

Table E-47
Calculation of Cancer Risks
Reasonable Maximum Exposure
Future - Child Resident - On -Site

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	
							Value	Units	Value	Units		
Sediment	Sediment	SWMU 31	Ingestion	Organics Dibenzofuran	3.00E-01	mg/kg	3.8E-08	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
				Inorganics Aluminum	1.03E+05	mg/kg	1.3E-02	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
				Arsenic	1.22E+01	mg/kg	1.5E-06	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	2.3E-06	
				Cobalt	1.65E+01	mg/kg	2.1E-06	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
				Iron	2.53E+04	mg/kg	3.2E-03	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
			Exp. Route Total								2.3E-06	
			Dermal Absorption	Organics Dibenzofuran	3.00E-01	mg/kg	1.2E-07	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
				Inorganics Aluminum	1.03E+05	mg/kg	3.6E-04	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
				Arsenic	1.22E+01	mg/kg	1.3E-07	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	1.9E-07	
				Cobalt	1.65E+01	mg/kg	1.7E-07	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
				Iron	2.53E+04	mg/kg	8.9E-05	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
			Exp. Route Total								1.9E-07	
			Exposure Point Total								2.5E-06	
			Exposure Media Total								2.5E-06	
			Sediment Total									2.5E-06
Surface Water	Surface Water	SWMU 31 (Wading)	Dermal Absorption	Organics Bromodichloromethane	3.60E+00	µg/L	5.1E-08	mg/kg-day	6.2E-02	(mg/kg-day) ⁻¹	3.1E-09	
				Chloroform	3.00E+01	µg/L	4.7E-07	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
				Inorganics Aluminum	1.32E+04	µg/L	1.6E-05	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
				Exp. Route Total								3.1E-09
				Exposure Point Total								3.1E-09
		Exposure Media Total								3.1E-09		
Surface Water Total									3.1E-09			

Table E-47
Calculation of Cancer Risks
Reasonable Maximum Exposure
Future - Child Resident - On -Site

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk		
					Value	Units	Value	Units	Value	Units			
Groundwater	Groundwater	SWMU 31	Ingestion	Organics									
				Benzo(a)pyrene	6.10E-02	µg/L	3.3E-07	mg/kg-day	7.3E+00	(mg/kg-day) ⁻¹	2.4E-06		
				Chloroform	1.10E+01	µg/L	6.0E-05	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
				Inorganics									
				Aluminum	2.68E+03	µg/L	1.5E-02	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
				Arsenic	9.40E+00	µg/L	5.2E-05	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	7.7E-05		
				Cobalt	3.80E+00	µg/L	2.1E-05	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
				Iron	7.08E+03	µg/L	3.9E-02	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
				Manganese	1.83E+02	µg/L	1.0E-03	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
				Vanadium	1.74E+01	µg/L	9.5E-05	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
			Exp. Route Total							8.0E-05			
			Dermal Adsorption	Organics									
				Benzo(a)pyrene	6.10E-02	µg/L	7.0E-06	mg/kg-day	7.3E+00	(mg/kg-day) ⁻¹	5.1E-05		
				Chloroform	1.10E+01	µg/L	5.2E-06	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
				Inorganics									
				Aluminum	2.68E+03	µg/L	9.7E-05	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
				Arsenic	9.40E+00	µg/L	3.4E-07	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	5.1E-07		
				Cobalt	3.80E+00	µg/L	1.4E-07	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
				Iron	7.08E+03	µg/L	2.6E-04	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
				Manganese	1.83E+02	µg/L	6.6E-06	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
				Vanadium	1.74E+01	µg/L	6.3E-07	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
			Exp. Route Total							5.2E-05			
			Exposure Point Total									1.3E-04	
			Exposure Media Total									1.3E-04	
			Air	SWMU 31	Inhalation (Indoor Air)	Organics							
						Chloroform	2.45E-04	mg/m³	3.2E-05	mg/kg-day	8.1E-02	(mg/kg-day) ⁻¹	2.6E-06
					Exp. Route Total							2.6E-06	
Exposure Point Total									2.6E-06				
Exposure Media Total									2.6E-06				
Home Grown Produce	SWMU 31	Ingestion	Inorganics										
			Arsenic	9.40E+00	µg/L	1.0E-07	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	1.6E-07			
		Exp. Route Total							1.6E-07				
		Exposure Point Total									1.6E-07		
		Exposure Media Total									1.6E-07		
Groundwater Total									1.3E-04				
						Total of Receptor Risks Across All Media				1.5E-04			

N/A = Not Applicable.

Table E-48
Calculation of Cancer Risks
Reasonable Maximum Exposure
Future - Child Resident - On-Site

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	
							Value	Units	Value	Units		
Surface Water	Surface Water	SWMU 31 (Swimming)	Ingestion	Organics								
				Bromodichloromethane	3.60E+00	µg/L	1.4E-08	mg/kg-day	6.2E-02	(mg/kg-day) ⁻¹	8.7E-10	
				Chloroform	3.00E+01	µg/L	1.2E-07	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
				Inorganics								
			Aluminum	1.32E+04	µg/L	4.1E-04	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
			Exp. Route Total								8.7E-10	
			Dermal Absorption	Organics								
				Bromodichloromethane	3.60E+00	µg/L	2.2E-08	mg/kg-day	6.2E-02	(mg/kg-day) ⁻¹	1.4E-09	
				Chloroform	3.00E+01	µg/L	2.0E-07	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
				Inorganics								
			Aluminum	1.32E+04	µg/L	1.6E-05	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
			Exp. Route Total								1.4E-09	
		Exposure Point Total										2.2E-09
		Exposure Media Total										2.2E-09
Surface Water Total										2.2E-09		
Total of Receptor Risks Across All Media											2.2E-09	

N/A = Not Applicable.

Table E-49
Calculation of Cancer Risks
Reasonable Maximum Exposure
Future - Lifetime Adult Resident - Off-Site

Scenario Timeframe: Future
Receptor Population: Lifetime Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk
							Value	Units	Value	Units	
Groundwater	Groundwater	SWMU 31	Ingestion	Organics							
				Benzo(a)pyrene	6.10E-02	µg/L	9.1E-07	mg/kg-day	7.3E+00	(mg/kg-day) ⁻¹	6.6E-06
				Chloroform	1.10E+01	µg/L	1.6E-04	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Inorganics							
				Aluminum	2.68E+03	µg/L	4.0E-02	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Arsenic	9.40E+00	µg/L	1.4E-04	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	2.1E-04
				Cobalt	3.80E+00	µg/L	5.7E-05	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Iron	7.08E+03	µg/L	1.1E-01	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Manganese	1.83E+02	µg/L	2.7E-03	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Vanadium	1.74E+01	µg/L	2.6E-04	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
			Exp. Route Total								2.2E-04
			Dermal Adsorption	Organics							
				Benzo(a)pyrene	6.10E-02	µg/L	1.9E-05	mg/kg-day	7.3E+00	(mg/kg-day) ⁻¹	1.4E-04
				Chloroform	1.10E+01	µg/L	1.5E-05	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Inorganics							
				Aluminum	2.68E+03	µg/L	2.3E-04	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Arsenic	9.40E+00	µg/L	8.0E-07	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	1.2E-06
				Cobalt	3.80E+00	µg/L	1.9E-07	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Iron	7.08E+03	µg/L	6.0E-04	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Manganese	1.83E+02	µg/L	1.6E-05	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Vanadium	1.74E+01	µg/L	1.5E-06	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
			Exp. Route Total								1.4E-04
		Exposure Point Total									3.6E-04
	Exposure Media Total										3.6E-04
	Air	SWMU 31	Inhalation (Indoor Air)	Organics							
				Chloroform	2.45E-04	mg/m ³	5.5E-05	mg/kg-day	8.1E-02	(mg/kg-day) ⁻¹	4.5E-06
			Exp. Route Total								4.5E-06
			Inhalation (Shower Room)	Organics							
				Chloroform	1.73E-02	mg/m ³	7.3E-05	mg/kg-day	8.1E-02	(mg/kg-day) ⁻¹	5.9E-06
			Exp. Route Total								5.9E-06
		Exposure Point Total									1.0E-05
	Exposure Media Total										1.0E-05
	Home Grown Produce	SWMU 31	Ingestion	Inorganics							
				Arsenic	9.40E+00	µg/L	2.2E-07	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	3.2E-07
		Exp. Route Total									3.2E-07
	Exposure Point Total										3.2E-07
	Exposure Media Total										3.2E-07
Groundwater Total											3.7E-04
Total of Receptor Risks Across All Media											3.7E-04

N/A = Not Applicable.

Table E-50
Calculation of Cancer Risks
Reasonable Maximum Exposure
Future - Child Resident - Off -Site

Scenario Timeframe: Future
Receptor Population: Resident off site
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk		
							Value	Units	Value	Units			
Groundwater	Groundwater	SWMU 31	Ingestion	Organics									
				Benzo(a)pyrene	6.10E-02	µg/L	3.3E-07	mg/kg-day	7.3E+00	(mg/kg-day) ⁻¹	2.4E-06		
				Chloroform	1.10E+01	µg/L	6.0E-05	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
				Inorganics									
				Aluminum	2.68E+03	µg/L	1.5E-02	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
				Arsenic	9.40E+00	µg/L	5.2E-05	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	7.7E-05		
				Cobalt	3.80E+00	µg/L	2.1E-05	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
				Iron	7.08E+03	µg/L	3.9E-02	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
				Manganese	1.83E+02	µg/L	1.0E-03	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
				Vanadium	1.74E+01	µg/L	9.5E-05	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
				Exp. Route Total							8.0E-05		
				Dermal Adsorption	Organics								
			Benzo(a)pyrene		6.10E-02	µg/L	7.0E-06	mg/kg-day	7.3E+00	(mg/kg-day) ⁻¹	5.1E-05		
			Chloroform		1.10E+01	µg/L	5.2E-06	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
			Inorganics										
			Aluminum		2.68E+03	µg/L	9.7E-05	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
			Arsenic		9.40E+00	µg/L	3.4E-07	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	5.1E-07		
			Cobalt		3.80E+00	µg/L	1.4E-07	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
			Iron		7.08E+03	µg/L	2.6E-04	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
			Manganese		1.83E+02	µg/L	6.6E-06	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
			Vanadium		1.74E+01	µg/L	6.3E-07	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
			Exp. Route Total								5.2E-05		
			Exposure Point Total									1.3E-04	
			Exposure Media Total									1.3E-04	
			Air	SWMU 31	Inhalation (Indoor Air)	Organics							
						Chloroform	2.45E-04	mg/m³	3.2E-05	mg/kg-day	8.1E-02	(mg/kg-day) ⁻¹	2.6E-06
					Exp. Route Total								2.6E-06
Exposure Point Total									2.6E-06				
Exposure Media Total									2.6E-06				
Home Grown Produce	SWMU 31	Ingestion			Inorganics								
					Arsenic	9.40E+00	µg/L	1.0E-07	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	1.6E-07	
		Exp. Route Total								1.6E-07			
Exposure Point Total									1.6E-07				
Exposure Media Total									1.6E-07				
Groundwater Total									1.3E-04				
Total of Receptor Risks Across All Media										1.3E-04			

N/A = Not Applicable.

Table E-51
Calculation of Non-cancer Hazards
Reasonable Maximum Exposure
Current/Future - Maintenance Worker - On-Site

Scenario Timeframe: Current/Future
Receptor Population: Maintenance Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
							Value	Units	Value	Units		
Surface Soil	Surface Soil	SWMU 31	Ingestion	Organics								
				TCDD TE	8.37E-06	mg/kg	1.6E-12	mg/kg-day	N/A	mg/kg-day	---	
				Inorganics								
				Aluminum	1.55E+04	mg/kg	3.0E-03	mg/kg-day	N/A	mg/kg-day	---	
				Arsenic	5.90E+00	mg/kg	1.2E-06	mg/kg-day	3.0E-04	mg/kg-day	3.8E-03	
				Chromium	2.82E+01	mg/kg	5.5E-06	mg/kg-day	1.5E+00	mg/kg-day	3.7E-06	
				Cobalt	1.78E+01	mg/kg	3.5E-06	mg/kg-day	N/A	mg/kg-day	---	
				Iron	2.78E+04	mg/kg	5.4E-03	mg/kg-day	3.0E-01	mg/kg-day	1.8E-02	
			Manganese	4.95E+02	mg/kg	9.7E-05	mg/kg-day	2.0E-02	mg/kg-day	4.8E-03		
			Vanadium	4.75E+01	mg/kg	9.3E-06	mg/kg-day	1.0E-03	mg/kg-day	9.3E-03		
			Exp. Route Total							3.6E-02		
			Dermal Absorption	Organics								
				TCDD TE	8.37E-06	mg/kg	3.2E-13	mg/kg-day	N/A	mg/kg-day	---	
				Inorganics								
				Aluminum	1.55E+04	mg/kg	2.0E-04	mg/kg-day	N/A	mg/kg-day	---	
				Arsenic	5.90E+00	mg/kg	2.3E-07	mg/kg-day	3.0E-04	mg/kg-day	7.6E-04	
				Chromium	2.82E+01	mg/kg	3.6E-07	mg/kg-day	2.0E-02	mg/kg-day	1.9E-05	
				Cobalt	1.78E+01	mg/kg	2.3E-07	mg/kg-day	N/A	mg/kg-day	---	
				Iron	2.78E+04	mg/kg	3.6E-04	mg/kg-day	3.0E-01	mg/kg-day	1.2E-03	
			Manganese	4.95E+02	mg/kg	6.4E-06	mg/kg-day	8.0E-04	mg/kg-day	8.0E-03		
			Vanadium	4.75E+01	mg/kg	6.1E-07	mg/kg-day	2.6E-05	mg/kg-day	2.4E-02		
			Exp. Route Total							3.4E-02		
			Exposure Point Total								7.0E-02	
			Exposure Media Total								7.0E-02	
		Air (Particulates)	SWMU 31	Inhalation	Organics							
					TCDD TE	8.37E-06	mg/kg	4.8E-16	mg/kg-day	N/A	mg/kg-day	---
					Inorganics							
					Aluminum	1.55E+04	mg/kg	8.9E-07	mg/kg-day	N/A	mg/kg-day	---
					Arsenic	5.90E+00	mg/kg	3.4E-10	mg/kg-day	N/A	mg/kg-day	---
					Chromium	2.82E+01	mg/kg	1.6E-09	mg/kg-day	N/A	mg/kg-day	---
					Cobalt	1.78E+01	mg/kg	1.0E-09	mg/kg-day	N/A	mg/kg-day	---
Iron	2.78E+04				mg/kg	1.6E-06	mg/kg-day	N/A	mg/kg-day	---		
Manganese	4.95E+02			mg/kg	2.8E-08	mg/kg-day	1.4E-05	mg/kg-day	2.0E-03			
Vanadium	4.75E+01			mg/kg	2.7E-09	mg/kg-day	N/A	mg/kg-day	---			
Exp. Route Total							2.0E-03					
Exposure Point Total								2.0E-03				
Exposure Media Total								2.0E-03				
Soil Total								7.2E-02				

Table E-51
Calculation of Non-cancer Hazards
Reasonable Maximum Exposure
Current/Future - Maintenance Worker - On-Site

Scenario Timeframe: Current/Future
Receptor Population: Maintenance Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-Cancer Hazard Calculations					
							Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
					Value	Units	Value	Units	Value	Units		
Sediment	Sediment	SWMU 31	Ingestion	Organics Dibenzofuran	3.00E-01	mg/kg	5.9E-08	mg/kg-day	N/A	mg/kg-day	---	
				Inorganics Aluminum	1.03E+05	mg/kg	2.0E-02	mg/kg-day	N/A	mg/kg-day	---	
				Arsenic	1.22E+01	mg/kg	2.4E-06	mg/kg-day	3.0E-04	mg/kg-day	8.0E-03	
				Cobalt	1.65E+01	mg/kg	3.2E-06	mg/kg-day	N/A	mg/kg-day	---	
				Iron	2.53E+04	mg/kg	5.0E-03	mg/kg-day	3.0E-01	mg/kg-day	1.7E-02	
				Exp. Route Total							2.4E-02	
			Dermal Absorption	Organics Dibenzofuran	3.00E-01	mg/kg	3.9E-08	mg/kg-day	N/A	mg/kg-day	---	
				Inorganics Aluminum	1.03E+05	mg/kg	4.0E-03	mg/kg-day	N/A	mg/kg-day	---	
				Arsenic	1.22E+01	mg/kg	1.4E-06	mg/kg-day	3.0E-04	mg/kg-day	4.7E-03	
				Cobalt	1.65E+01	mg/kg	1.9E-06	mg/kg-day	N/A	mg/kg-day	---	
				Iron	2.53E+04	mg/kg	9.8E-04	mg/kg-day	3.0E-01	mg/kg-day	3.3E-03	
				Exp. Route Total							8.0E-03	
			Exposure Point Total								3.2E-02	
		Exposure Media Total								3.2E-02		
	Sediment Total								3.2E-02			
Surface Water	Surface Water	SWMU 31	Dermal Absorption	Organics Bromodichloromethane	3.60E+00	µg/l	2.7E-07	mg/kg-day	2.0E-02	mg/kg-day	1.4E-05	
				Chloroform	3.00E+01	µg/l	2.5E-06	mg/kg-day	1.0E-02	mg/kg-day	2.5E-04	
				Inorganics Aluminum	1.32E+04	µg/l	8.5E-05	mg/kg-day	N/A	mg/kg-day	---	
				Exp. Route Total							2.7E-04	
			Exposure Point Total								2.7E-04	
	Exposure Media Total								2.7E-04			
Surface Water Total								2.7E-04				
Groundwater	Air	SWMU 31	Inhalation Ambient Air	Organics Chloroform	1.63E-05	mg/m³	6.4E-07	mg/kg-day	1.4E-02	mg/kg-day	4.6E-05	
				Exp. Route Total							4.6E-05	
			Exposure Point Total								4.6E-05	
	Exposure Media Total								4.6E-05			
Groundwater Total								4.6E-05				
Total of Receptor Hazards Across All Media											1.0E-01	

N/A = Not Applicable.

Table E-52
Calculation of Non-cancer Hazards
Reasonable Maximum Exposure
Future - Maintenance Worker - On-Site

Scenario Timeframe: Future
Receptor Population: Maintenance Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-Cancer Hazard Calculations						
					Value	Units	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient		
							Value	Units	Value	Units			
Total Soil	Total Soil	SWMU 31	Ingestion	Organics TCDD TE	8.37E-06	mg/kg	1.6E-12	mg/kg-day	N/A	mg/kg-day	---		
				Inorganics Aluminum	1.70E+04	mg/kg	3.3E-03	mg/kg-day	N/A	mg/kg-day	---		
				Arsenic	5.90E+00	mg/kg	1.2E-06	mg/kg-day	3.0E-04	mg/kg-day	3.8E-03		
				Chromium	2.97E+01	mg/kg	5.8E-06	mg/kg-day	1.5E+00	mg/kg-day	3.9E-06		
				Cobalt	1.85E+01	mg/kg	3.6E-06	mg/kg-day	N/A	mg/kg-day	---		
				Iron	2.84E+04	mg/kg	5.6E-03	mg/kg-day	3.0E-01	mg/kg-day	1.9E-02		
				Manganese	4.95E+02	mg/kg	9.7E-05	mg/kg-day	2.0E-02	mg/kg-day	4.8E-03		
				Vanadium	4.92E+01	mg/kg	9.6E-06	mg/kg-day	1.0E-03	mg/kg-day	9.6E-03		
				Exp. Route Total									
			Dermal Absorption	Organics TCDD TE	8.37E-06	mg/kg	3.2E-13	mg/kg-day	N/A	mg/kg-day	---		
				Inorganics Aluminum	1.70E+04	mg/kg	2.2E-04	mg/kg-day	N/A	mg/kg-day	---		
				Arsenic	5.90E+00	mg/kg	2.3E-07	mg/kg-day	3.0E-04	mg/kg-day	7.6E-04		
				Chromium	2.97E+01	mg/kg	3.8E-07	mg/kg-day	2.0E-02	mg/kg-day	2.0E-05		
				Cobalt	1.85E+01	mg/kg	2.4E-07	mg/kg-day	N/A	mg/kg-day	---		
				Iron	2.84E+04	mg/kg	3.7E-04	mg/kg-day	3.0E-01	mg/kg-day	1.2E-03		
				Manganese	4.95E+02	mg/kg	6.4E-06	mg/kg-day	8.0E-04	mg/kg-day	8.0E-03		
				Vanadium	4.92E+01	mg/kg	6.4E-07	mg/kg-day	2.6E-05	mg/kg-day	2.4E-02		
				Exp. Route Total									
			Exposure Point Total										7.1E-02
			Exposure Media Total										7.1E-02
			Air (Particulates)	SWMU 31	Inhalation	Organics TCDD TE	8.37E-06	mg/kg	4.8E-16	mg/kg-day	N/A	mg/kg-day	---
						Inorganics Aluminum	1.70E+04	mg/kg	9.7E-07	mg/kg-day	N/A	mg/kg-day	---
						Arsenic	5.90E+00	mg/kg	3.4E-10	mg/kg-day	N/A	mg/kg-day	---
						Chromium	2.97E+01	mg/kg	1.7E-09	mg/kg-day	N/A	mg/kg-day	---
						Cobalt	1.85E+01	mg/kg	1.1E-09	mg/kg-day	N/A	mg/kg-day	---
						Iron	2.84E+04	mg/kg	1.6E-06	mg/kg-day	N/A	mg/kg-day	---
						Manganese	4.95E+02	mg/kg	2.8E-08	mg/kg-day	1.4E-05	mg/kg-day	2.0E-03
Vanadium	4.92E+01	mg/kg				2.8E-09	mg/kg-day	N/A	mg/kg-day	---			
Exp. Route Total										2.0E-03			
Exposure Point Total										2.0E-03			
Exposure Media Total										2.0E-03			
Soil Total										7.3E-02			
					Total of Receptor Hazards Across All Media					7.3E-02			

N/A = Not Applicable.

Table E-55
Calculation of Non-cancer Hazards
Reasonable Maximum Exposure
Future - Excavation Worker - On-Site (1.25 acres)

Scenario Timeframe: Future
Receptor Population: Excavation Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
							Value	Units	Value	Units		
Total Soil	Total Soil	SWMU 31	Ingestion	Organics								
				TCDD TE	8.37E-06	mg/kg	2.7E-11	mg/kg-day	N/A	mg/kg-day	---	
				Inorganics								
				Aluminum	1.70E+04	mg/kg	5.5E-02	mg/kg-day	N/A	mg/kg-day	---	
				Arsenic	5.90E+00	mg/kg	1.9E-05	mg/kg-day	3.0E-04	mg/kg-day	6.4E-02	
				Chromium	2.97E+01	mg/kg	9.6E-05	mg/kg-day	1.5E+00	mg/kg-day	6.4E-05	
				Cobalt	1.85E+01	mg/kg	6.0E-05	mg/kg-day	N/A	mg/kg-day	---	
				Iron	2.84E+04	mg/kg	9.2E-02	mg/kg-day	3.0E-01	mg/kg-day	3.1E-01	
				Manganese	4.95E+02	mg/kg	1.6E-03	mg/kg-day	2.0E-02	mg/kg-day	8.0E-02	
				Vanadium	4.92E+01	mg/kg	1.6E-04	mg/kg-day	1.0E-03	mg/kg-day	1.6E-01	
			Exp. Route Total							6.1E-01		
			Dermal Absorption	Organics								
				TCDD TE	8.37E-06	mg/kg	2.4E-12	mg/kg-day	N/A	mg/kg-day	---	
				Inorganics								
				Aluminum	1.70E+04	mg/kg	1.6E-03	mg/kg-day	N/A	mg/kg-day	---	
				Arsenic	5.90E+00	mg/kg	1.7E-06	mg/kg-day	3.0E-04	mg/kg-day	5.7E-03	
				Chromium	2.97E+01	mg/kg	2.9E-06	mg/kg-day	2.0E-02	mg/kg-day	1.5E-04	
				Cobalt	1.85E+01	mg/kg	1.8E-06	mg/kg-day	N/A	mg/kg-day	---	
				Iron	2.84E+04	mg/kg	2.8E-03	mg/kg-day	3.0E-01	mg/kg-day	9.2E-03	
				Manganese	4.95E+02	mg/kg	4.8E-05	mg/kg-day	8.0E-04	mg/kg-day	6.0E-02	
				Vanadium	4.92E+01	mg/kg	4.8E-06	mg/kg-day	2.6E-05	mg/kg-day	1.8E-01	
			Exp. Route Total							2.6E-01		
		Exposure Point Total						8.7E-01				
		Exposure Media Total						8.7E-01				
		Air (Particulates)	SWMU 31	Inhalation	Organics							
					TCDD TE	8.37E-06	mg/kg	1.2E-12	mg/kg-day	N/A	mg/kg-day	---
					Inorganics							
					Aluminum	1.70E+04	mg/kg	2.5E-03	mg/kg-day	N/A	mg/kg-day	---
					Arsenic	5.90E+00	mg/kg	8.7E-07	mg/kg-day	N/A	mg/kg-day	---
					Chromium	2.97E+01	mg/kg	4.4E-06	mg/kg-day	N/A	mg/kg-day	---
					Cobalt	1.85E+01	mg/kg	2.7E-06	mg/kg-day	N/A	mg/kg-day	---
					Iron	2.84E+04	mg/kg	4.2E-03	mg/kg-day	N/A	mg/kg-day	---
					Manganese	4.95E+02	mg/kg	7.3E-05	mg/kg-day	1.4E-05	mg/kg-day	5.1E+00
					Vanadium	4.92E+01	mg/kg	7.2E-06	mg/kg-day	N/A	mg/kg-day	---
				Exp. Route Total							5.1E+00	
				Exposure Point Total						5.1E+00		
				Exposure Media Total						5.1E+00		
Soil Total						6.0E+00						

Table E-55
Calculation of Non-cancer Hazards
Reasonable Maximum Exposure
Future - Excavation Worker - On-Site (1.25 acres)

Scenario Timeframe: Future
Receptor Population: Excavation Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
							Value	Units	Value	Units		
Sediment	Sediment	SWMU 31	Ingestion	Organics	3.00E-01	mg/kg	9.7E-07	mg/kg-day	N/A	mg/kg-day	---	
				Dibenzofuran								
				Inorganics								
				Aluminum								
				Arsenic								
				Cobalt								
			Iron	2.53E+04	mg/kg	8.2E-02	mg/kg-day	3.0E-01	mg/kg-day	2.7E-01		
			Exp. Route Total							4.0E-01		
			Dermal Absorption	Organics	3.00E-01	mg/kg	1.7E-07	mg/kg-day	N/A	mg/kg-day	---	
				Dibenzofuran								
				Inorganics								
				Aluminum								
				Arsenic								
				Cobalt								
			Iron	2.53E+04	mg/kg	4.9E-03	mg/kg-day	3.0E-01	mg/kg-day	1.6E-02		
			Exp. Route Total							4.0E-02		
		Exposure Point Total										4.4E-01
		Exposure Media Total										4.4E-01
Sediment Total										4.4E-01		
Surface Water	Surface Water	SWMU 31	Dermal Absorption	Organics	3.60E+00	µg/l	1.4E-06	mg/kg-day	2.0E-02	mg/kg-day	6.9E-05	
				Bromodichloromethane								
				Chloroform								
				Inorganics								
				Aluminum								
				Exp. Route Total								
		Exposure Point Total										1.3E-03
		Exposure Media Total										1.3E-03
Surface Water Total										1.3E-03		
Groundwater	Air	SWMU 31	Inhalation (Trench Air)	Organics	1.18E-03	mg/m³	1.2E-04	mg/kg-day	1.4E-02	mg/kg-day	8.2E-03	
				Chloroform								
				Exp. Route Total								
		Exposure Point Total										8.2E-03
		Exposure Media Total										8.2E-03
Groundwater Total										8.2E-03		
Total of Receptor Hazards Across All Media											6.4E+00	

N/A = Not Applicable.

Table E-56
Calculation of Non-cancer Hazards
Reasonable Maximum Exposure
Future - Adult Resident - On-Site

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
Total Soil	Total Soil	SWMU 31	Ingestion	Organics							
				TCDD TE	8.37E-06	mg/kg	1.1E-11	mg/kg-day	N/A	mg/kg-day	---
				Inorganics							
				Aluminum	1.70E+04	mg/kg	2.3E-02	mg/kg-day	N/A	mg/kg-day	---
				Arsenic	5.90E+00	mg/kg	8.1E-06	mg/kg-day	3.0E-04	mg/kg-day	2.7E-02
				Chromium	2.97E+01	mg/kg	4.1E-05	mg/kg-day	1.5E+00	mg/kg-day	2.7E-05
				Cobalt	1.85E+01	mg/kg	2.5E-05	mg/kg-day	N/A	mg/kg-day	---
				Iron	2.84E+04	mg/kg	3.9E-02	mg/kg-day	3.0E-01	mg/kg-day	1.3E-01
				Manganese	4.95E+02	mg/kg	6.8E-04	mg/kg-day	2.0E-02	mg/kg-day	3.4E-02
				Vanadium	4.92E+01	mg/kg	6.7E-05	mg/kg-day	1.0E-03	mg/kg-day	6.7E-02
			Exp. Route Total								2.6E-01
			Dermal Absorption	Organics							
				TCDD TE	8.37E-06	mg/kg	1.4E-12	mg/kg-day	N/A	mg/kg-day	---
				Inorganics							
				Aluminum	1.70E+04	mg/kg	9.3E-04	mg/kg-day	N/A	mg/kg-day	---
				Arsenic	5.90E+00	mg/kg	9.7E-07	mg/kg-day	3.0E-04	mg/kg-day	3.2E-03
				Chromium	2.97E+01	mg/kg	1.6E-06	mg/kg-day	2.0E-02	mg/kg-day	8.3E-05
				Cobalt	1.85E+01	mg/kg	1.0E-06	mg/kg-day	n/A	mg/kg-day	---
				Iron	2.84E+04	mg/kg	1.6E-03	mg/kg-day	3.0E-01	mg/kg-day	5.2E-03
				Manganese	4.95E+02	mg/kg	2.7E-05	mg/kg-day	8.0E-04	mg/kg-day	3.4E-02
				Vanadium	4.92E+01	mg/kg	2.7E-06	mg/kg-day	2.6E-05	mg/kg-day	1.0E-01
			Exp. Route Total								1.5E-01
		Exposure Point Total									4.0E-01
	Exposure Media Total										4.0E-01
Air (Particulates)	SWMU 31	Inhalation	Organics	TCDD TE	8.37E-06	mg/kg	1.4E-16	mg/kg-day	N/A	mg/kg-day	---
				Inorganics							
				Aluminum	1.70E+04	mg/kg	2.8E-07	mg/kg-day	N/A	mg/kg-day	---
				Arsenic	5.90E+00	mg/kg	9.8E-11	mg/kg-day	N/A	mg/kg-day	---
				Chromium	2.97E+01	mg/kg	4.9E-10	mg/kg-day	N/A	mg/kg-day	---
				Cobalt	1.85E+01	mg/kg	3.1E-10	mg/kg-day	N/A	mg/kg-day	---
				Iron	2.84E+04	mg/kg	4.7E-07	mg/kg-day	N/A	mg/kg-day	---
				Manganese	4.95E+02	mg/kg	8.2E-09	mg/kg-day	1.4E-05	mg/kg-day	5.7E-04
				Vanadium	4.92E+01	mg/kg	8.2E-10	mg/kg-day	N/A	mg/kg-day	---
			Exp. Route Total								5.7E-04
		Exposure Point Total									5.7E-04
	Exposure Media Total										5.7E-04
Soil Total											4.0E-01

Table E-56
Calculation of Non-cancer Hazards
Reasonable Maximum Exposure
Future - Adult Resident - On-Site

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units	
Sediment	Sediment	SWMU 31	Ingestion	Organics							
				Dibenzofuran	3.00E-01	mg/kg	4.7E-08	mg/kg-day	N/A	mg/kg-day	---
				Inorganics							
				Aluminum	1.03E+05	mg/kg	1.6E-02	mg/kg-day	N/A	mg/kg-day	---
				Arsenic	1.22E+01	mg/kg	1.9E-06	mg/kg-day	3.0E-04	mg/kg-day	6.4E-03
				Cobalt	1.65E+01	mg/kg	2.6E-06	mg/kg-day	N/A	mg/kg-day	---
				Iron	2.53E+04	mg/kg	4.0E-03	mg/kg-day	3.0E-01	mg/kg-day	1.3E-02
			Exp. Route Total								2.0E-02
			Dermal Absorption	Organics							
				Dibenzofuran	3.00E-01	mg/kg	5.4E-08	mg/kg-day	N/A	mg/kg-day	---
				Inorganics							
				Aluminum	1.03E+05	mg/kg	1.8E-03	mg/kg-day	N/A	mg/kg-day	---
				Arsenic	1.22E+01	mg/kg	6.5E-07	mg/kg-day	3.0E-04	mg/kg-day	2.2E-03
				Cobalt	1.65E+01	mg/kg	8.8E-07	mg/kg-day	n/A	mg/kg-day	---
				Iron	2.53E+04	mg/kg	4.5E-04	mg/kg-day	3.0E-01	mg/kg-day	1.5E-03
			Exp. Route Total								3.7E-03
		Exposure Point Total									2.3E-02
	Exposure Media Total										2.3E-02
Sediment Total											2.3E-02
Surface Water	Surface Water	SWMU 31 (Wading)	Dermal Absorption	Organics							
				Bromodichloromethane	3.60E+00	µg/l	3.8E-07	mg/kg-day	2.0E-02	mg/kg-day	1.9E-05
				Chloroform	3.00E+01	µg/l	3.5E-06	mg/kg-day	1.0E-02	mg/kg-day	3.5E-04
				Inorganics							
				Aluminum	1.32E+04	µg/l	1.2E-04	mg/kg-day	N/A	mg/kg-day	---
			Exp. Route Total								3.7E-04
		Exposure Point Total									3.7E-04
	Exposure Media Total										3.7E-04
Surface Water Total											3.7E-04

Table E-56
Calculation of Non-cancer Hazards
Reasonable Maximum Exposure
Future - Adult Resident - On-Site

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
							Value	Units	Value	Units		
Groundwater	Groundwater	SWMU 31	Ingestion	Organics								
				Benzo(a)pyrene	6.10E-02	µg/L	1.7E-06	mg/kg-day	N/A	mg/kg-day	---	
				Chloroform	1.10E+01	µg/L	3.0E-04	mg/kg-day	1.0E-02	mg/kg-day	3.0E-02	
				Inorganics								
				Aluminum	2.68E+03	µg/L	7.3E-02	mg/kg-day	N/A	mg/kg-day	---	
				Arsenic	9.40E+00	µg/L	2.6E-04	mg/kg-day	3.0E-04	mg/kg-day	8.6E-01	
				Cobalt	3.80E+00	µg/L	1.0E-04	mg/kg-day	N/A	mg/kg-day	---	
				Iron	7.08E+03	µg/L	1.9E-01	mg/kg-day	3.0E-01	mg/kg-day	6.5E-01	
				Manganese	1.83E+02	µg/L	5.0E-03	mg/kg-day	2.0E-02	mg/kg-day	2.5E-01	
				Vanadium	1.74E+01	µg/L	4.8E-04	mg/kg-day	1.0E-03	mg/kg-day	4.8E-01	
			Exp. Route Total							2.3E+00		
			Dermal Adsorption	Organics								
				Benzo(a)pyrene	6.10E-02	µg/L	3.6E-05	mg/kg-day	N/A	mg/kg-day	---	
				Chloroform	1.10E+01	µg/L	2.7E-05	mg/kg-day	1.0E-02	mg/kg-day	2.7E-03	
				Inorganics								
				Aluminum	2.68E+03	µg/l	3.8E-04	mg/kg-day	N/A	mg/kg-day	---	
				Arsenic	9.40E+00	µg/l	1.3E-06	mg/kg-day	3.0E-04	mg/kg-day	4.5E-03	
				Cobalt	3.80E+00	µg/l	5.4E-07	mg/kg-day	n/A	mg/kg-day	---	
				Iron	7.08E+03	µg/l	1.0E-03	mg/kg-day	3.0E-01	mg/kg-day	3.4E-03	
				Manganese	1.83E+02	µg/l	2.6E-05	mg/kg-day	8.0E-04	mg/kg-day	3.3E-02	
				Vanadium	1.74E+01	µg/l	2.5E-06	mg/kg-day	2.6E-05	mg/kg-day	9.6E-02	
			Exp. Route Total							1.4E-01		
		Exposure Point Total									2.4E+00	
	Exposure Media Total									2.4E+00		
	Air	SWMU 31	Inhalation (Indoor Air)	Organics								
				Chloroform	2.45E-04	mg/m³	6.7E-05	mg/kg-day	1.4E-02	mg/kg-day	4.8E-03	
			Exp. Route Total							4.8E-03		
			Inhalation (Shower Room)	Organics								
				Chloroform	1.73E-02	mg/m³	2.1E-04	mg/kg-day	1.4E-02	mg/kg-day	1.5E-02	
			Exp. Route Total							1.5E-02		
			Exposure Point Total									2.0E-02
			Exposure Media Total									2.0E-02
		Home Grown Produce	SWMU 31	Ingestion	Inorganics							
					Arsenic	9.40E+00	µg/L	2.6E-07	mg/kg-day	3.0E-04	(mg/kg-day) ⁻¹	8.7E-04
	Exp. Route Total								8.7E-04			
	Exposure Point Total									8.7E-04		
	Exposure Media Total									8.7E-04		
Groundwater Total									2.4E+00			
Total of Receptor Hazards Across All Media										2.9E+00		

N/A = Not Applicable.

Table E-57
Calculation of Non-cancer Hazards
Reasonable Maximum Exposure
Future - Adult Resident - On-Site

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-Cancer Hazard Calculations					
							Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
					Value	Units	Value	Units	Value	Units		
Surface Water	Surface Water	SWMU 31 (Swimming)	Ingestion	Organics								
				Bromodichloromethane	3.60E+00	µg/L	3.5E-08	mg/kg-day	2.0E-02	mg/kg-day	1.8E-06	
				Chloroform	3.00E+01	µg/L	2.9E-07	mg/kg-day	1.0E-02	mg/kg-day	2.9E-05	
				Inorganics								
				Aluminum	1.32E+04	µg/L	1.3E-04	mg/kg-day	N/A	mg/kg-day	---	
				Exp. Route Total						3.1E-05		
			Dermal Absorption	Organics								
				Bromodichloromethane	3.60E+00	µg/l	1.5E-07	mg/kg-day	2.0E-02	mg/kg-day	7.5E-06	
				Chloroform	3.00E+01	µg/l	1.4E-06	mg/kg-day	1.0E-02	mg/kg-day	1.4E-04	
				Inorganics								
				Aluminum	1.32E+04	µg/l	3.7E-04	mg/kg-day	N/A	mg/kg-day	---	
				Exp. Route Total						1.5E-04		
		Exposure Point Total										1.8E-04
		Exposure Media Total										1.8E-04
Surface Water Total										1.8E-04		
					Total of Receptor Hazards Across All Media					1.8E-04		

N/A = Not Applicable.

Table E-58
Calculation of Non-cancer Hazards
Reasonable Maximum Exposure
Future - Child Resident - On-Site

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units	
Total Soil	Total Soil	SWMU 31	Ingestion	Organics							
				TCDD TE	8.37E-06	mg/kg	1.1E-10	mg/kg-day	N/A	mg/kg-day	---
				Inorganics							
				Aluminum	1.70E+04	mg/kg	2.2E-01	mg/kg-day	N/A	mg/kg-day	---
				Arsenic	5.90E+00	mg/kg	7.5E-05	mg/kg-day	3.0E-04	mg/kg-day	2.5E-01
				Chromium	2.97E+01	mg/kg	3.8E-04	mg/kg-day	1.5E+00	mg/kg-day	2.5E-04
				Cobalt	1.85E+01	mg/kg	2.4E-04	mg/kg-day	N/A	mg/kg-day	---
				Iron	2.84E+04	mg/kg	3.6E-01	mg/kg-day	3.0E-01	mg/kg-day	1.2E+00
				Manganese	4.95E+02	mg/kg	6.3E-03	mg/kg-day	2.0E-02	mg/kg-day	3.2E-01
				Vanadium	4.92E+01	mg/kg	6.3E-04	mg/kg-day	1.0E-03	mg/kg-day	6.3E-01
			Exp. Route Total								2.4E+00
			Dermal Absorption	Organics							
				TCDD TE	8.37E-06	mg/kg	9.0E-12	mg/kg-day	N/A	mg/kg-day	---
				Inorganics							
				Aluminum	1.70E+04	mg/kg	6.1E-03	mg/kg-day	N/A	mg/kg-day	---
				Arsenic	5.90E+00	mg/kg	6.3E-06	mg/kg-day	3.0E-04	mg/kg-day	2.1E-02
				Chromium	2.97E+01	mg/kg	1.1E-05	mg/kg-day	2.0E-02	mg/kg-day	5.5E-04
				Cobalt	1.85E+01	mg/kg	2.0E-05	mg/kg-day	n/A	mg/kg-day	---
				Iron	2.84E+04	mg/kg	1.0E-02	mg/kg-day	3.0E-01	mg/kg-day	3.4E-02
				Manganese	4.95E+02	mg/kg	1.8E-04	mg/kg-day	8.0E-04	mg/kg-day	2.2E-01
				Vanadium	4.92E+01	mg/kg	1.8E-05	mg/kg-day	2.6E-05	mg/kg-day	6.8E-01
			Exp. Route Total								9.5E-01
		Exposure Point Total									3.4E+00
	Exposure Media Total										3.4E+00
	Air (Particulates)	SWMU 31	Inhalation	Aroclor 1248							
				TCDD TE	8.37E-06	mg/kg	7.8E-16	mg/kg-day	N/A	mg/kg-day	---
				Inorganics							
				Aluminum	1.70E+04	mg/kg	1.6E-06	mg/kg-day	N/A	mg/kg-day	---
				Arsenic	5.90E+00	mg/kg	5.5E-10	mg/kg-day	N/A	mg/kg-day	---
				Chromium	2.97E+01	mg/kg	2.8E-09	mg/kg-day	N/A	mg/kg-day	---
				Cobalt	1.85E+01	mg/kg	1.7E-09	mg/kg-day	N/A	mg/kg-day	---
				Iron	2.84E+04	mg/kg	2.7E-06	mg/kg-day	N/A	mg/kg-day	---
				Manganese	4.95E+02	mg/kg	4.6E-08	mg/kg-day	1.4E-05	mg/kg-day	3.2E-03
				Vanadium	4.92E+01	mg/kg	4.6E-09	mg/kg-day	N/A	mg/kg-day	---
			Exp. Route Total								3.2E-03
		Exposure Point Total									3.2E-03
	Exposure Media Total										3.2E-03
Soil Total											3.4E+00

Table E-58
Calculation of Non-cancer Hazards
Reasonable Maximum Exposure
Future - Child Resident - On-Site

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
							Value	Units	Value	Units		
Sediment	Sediment	SWMU 31	Ingestion	Organics	3.00E-01	mg/kg	4.4E-07	mg/kg-day	N/A	mg/kg-day	---	
				Dibenzofuran								
				Inorganics								
				Aluminum								
				Arsenic								
				Cobalt								
				Iron								
			Exp. Route Total									1.8E-01
			Dermal Absorption	Organics	3.00E-01	mg/kg	1.2E-07	mg/kg-day	N/A	mg/kg-day	---	
				Dibenzofuran								
				Inorganics								
				Aluminum								
				Arsenic								
				Cobalt								
				Iron								
			Exp. Route Total									8.4E-03
		Exposure Point Total										1.9E-01
	Exposure Media Total										1.9E-01	
Sediment Total										1.9E-01		
Surface Water	Surface Water	SWMU 31 (wading)	Dermal Absorption	Organics	3.60E+00	µg/l	5.9E-07	mg/kg-day	2.0E-02	mg/kg-day	3.0E-05	
				Bromodichloromethane								
				Chloroform								
				Inorganics								
				Aluminum								
			Exp. Route Total									5.8E-04
	Exposure Point Total										5.8E-04	
Exposure Media Total										5.8E-04		
Surface Water Total										5.8E-04		

Table E-58
Calculation of Non-cancer Hazards
Reasonable Maximum Exposure
Future - Child Resident - On-Site

Scenario Timeframe: Future
 Receptor Population: Resident
 Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units	
Groundwater	Groundwater	SWMU 31	Ingestion	Organics							
				Benzo(a)pyrene	6.10E-02	µg/L	3.9E-06	mg/kg-day	N/A	mg/kg-day	---
				Chloroform	1.10E+01	µg/L	7.0E-04	mg/kg-day	1.0E-02	mg/kg-day	7.0E-02
				Inorganics							
				Aluminum	2.68E+03	µg/L	1.7E-01	mg/kg-day	N/A	mg/kg-day	---
				Arsenic	9.40E+00	µg/L	6.0E-04	mg/kg-day	3.0E-04	mg/kg-day	2.0E+00
				Cobalt	3.80E+00	µg/L	2.4E-04	mg/kg-day	N/A	mg/kg-day	---
				Iron	7.08E+03	µg/L	4.5E-01	mg/kg-day	3.0E-01	mg/kg-day	1.5E+00
				Manganese	1.83E+02	µg/L	1.2E-02	mg/kg-day	2.0E-02	mg/kg-day	5.8E-01
				Vanadium	1.74E+01	µg/L	1.1E-03	mg/kg-day	1.0E-03	mg/kg-day	1.1E+00
			Exp. Route Total								5.3E+00
			Dermal Adsorption	Organics							
				Benzo(a)pyrene	6.10E-02	µg/L	8.2E-05	mg/kg-day	N/A	mg/kg-day	---
				Chloroform	1.10E+01	µg/L	6.1E-05	mg/kg-day	1.0E-02	mg/kg-day	6.1E-03
				Inorganics							
				Aluminum	2.68E+03	µg/l	1.1E-03	mg/kg-day	N/A	mg/kg-day	---
				Arsenic	9.40E+00	µg/l	4.0E-06	mg/kg-day	3.0E-04	mg/kg-day	1.3E-02
				Cobalt	3.80E+00	µg/l	1.6E-06	mg/kg-day	n/A	mg/kg-day	---
				Iron	7.08E+03	µg/l	3.0E-03	mg/kg-day	3.0E-01	mg/kg-day	1.0E-02
				Manganese	1.83E+02	µg/l	7.7E-05	mg/kg-day	8.0E-04	mg/kg-day	9.7E-02
				Vanadium	1.74E+01	µg/l	7.3E-06	mg/kg-day	2.6E-05	mg/kg-day	2.8E-01
			Exp. Route Total								4.1E-01
		Exposure Point Total									5.7E+00
		Exposure Media Total									5.7E+00
	Air	SWMU 31	Inhalation (Indoor Air)	Organics							
				Chloroform	2.45E-04	mg/m³	3.8E-04	mg/kg-day	1.4E-02	mg/kg-day	2.7E-02
		Exp. Route Total									2.7E-02
		Exposure Point Total									2.7E-02
		Exposure Media Total									2.7E-02
	Home Grown Produce	SWMU 31	Ingestion	Inorganics							
				Arsenic	9.40E+00	µg/L	1.2E-06	mg/kg-day	3.0E-04	(mg/kg-day) ⁻¹	4.0E-03
		Exp. Route Total									4.0E-03
		Exposure Point Total									4.0E-03
		Exposure Media Total									4.0E-03
Groundwater Total											5.7E+00
Total of Receptor Hazards Across All Media											9.3E+00

N/A = Not Applicable.

Table E-59
Calculation of Non-cancer Hazards
Reasonable Maximum Exposure
Future - Child Resident - On-Site

Scenario Timeframe: Future
 Receptor Population: Resident
 Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
							Value	Units	Value	Units		
Surface Water	Surface Water	SWMU 31 (Swimming)	Ingestion	Organics								
				Bromodichloromethane	3.60E+00	µg/L	1.6E-07	mg/kg-day	2.0E-02	mg/kg-day	8.2E-06	
				Chloroform	3.00E+01	µg/L	1.4E-06	mg/kg-day	1.0E-02	mg/kg-day	1.4E-04	
				Inorganics								
				Aluminum	1.32E+04	µg/L	4.8E-03	mg/kg-day	N/A	mg/kg-day	---	
			Exp. Route Total									1.5E-04
			Dermal Absorption	Organics								
				Bromodichloromethane	3.60E+00	µg/l	2.6E-07	mg/kg-day	2.0E-02	mg/kg-day	1.3E-05	
				Chloroform	3.00E+01	µg/l	2.4E-06	mg/kg-day	1.0E-02	mg/kg-day	2.4E-04	
				Inorganics								
				Aluminum	1.32E+04	µg/l	1.8E-04	mg/kg-day	N/A	mg/kg-day	---	
			Exp. Route Total									2.5E-04
		Exposure Point Total										4.0E-04
		Exposure Media Total										4.0E-04
Surface Water Total										4.0E-04		
					Total of Receptor Hazards Across All Media					4.0E-04		

N/A = Not Applicable.

Table E-60
Calculation of Non-cancer Hazards
Reasonable Maximum Exposure
Future - Adult Resident - Off-Site

Scenario Timeframe: Future Receptor Population: Resident Receptor Age: Adult															
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-Cancer Hazard Calculations								
					Value	Units	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient				
Groundwater	Groundwater	SWMU 31	Ingestion	Organics											
				Benzo(a)pyrene	6.10E-02	µg/L	1.7E-06	mg/kg-day	N/A	mg/kg-day	---				
				Chloroform	1.10E+01	µg/L	3.0E-04	mg/kg-day	1.0E-02	mg/kg-day	3.0E-02				
				Inorganics											
				Aluminum	2.68E+03	µg/L	7.3E-02	mg/kg-day	N/A	mg/kg-day	---				
				Arsenic	9.40E+00	µg/L	2.6E-04	mg/kg-day	3.0E-04	mg/kg-day	8.6E-01				
				Cobalt	3.80E+00	µg/L	1.0E-04	mg/kg-day	N/A	mg/kg-day	---				
				Iron	7.08E+03	µg/L	1.9E-01	mg/kg-day	3.0E-01	mg/kg-day	6.5E-01				
				Manganese	1.83E+02	µg/L	5.0E-03	mg/kg-day	2.0E-02	mg/kg-day	2.5E-01				
				Vanadium	1.74E+01	µg/L	4.8E-04	mg/kg-day	1.0E-03	mg/kg-day	4.8E-01				
			Exp. Route Total								2.3E+00				
			Dermal Adsorption	Organics											
				Benzo(a)pyrene	6.10E-02	µg/L	3.6E-05	mg/kg-day	N/A	mg/kg-day	---				
				Chloroform	1.10E+01	µg/L	2.7E-05	mg/kg-day	1.0E-02	mg/kg-day	2.7E-03				
				Inorganics											
				Aluminum	2.68E+03	µg/l	3.8E-04	mg/kg-day	N/A	mg/kg-day	---				
				Arsenic	9.40E+00	µg/l	1.3E-06	mg/kg-day	3.0E-04	mg/kg-day	4.5E-03				
				Cobalt	3.80E+00	µg/l	5.4E-07	mg/kg-day	n/A	mg/kg-day	---				
				Iron	7.08E+03	µg/l	1.0E-03	mg/kg-day	3.0E-01	mg/kg-day	3.4E-03				
				Manganese	1.83E+02	µg/l	2.6E-05	mg/kg-day	8.0E-04	mg/kg-day	3.3E-02				
				Vanadium	1.74E+01	µg/l	2.5E-06	mg/kg-day	2.6E-05	mg/kg-day	9.6E-02				
			Exp. Route Total								1.4E-01				
			Exposure Point Total										2.4E+00		
			Exposure Media Total										2.4E+00		
			Air	SWMU 31	Inhalation (Indoor Air)	Organics									
						Chloroform	2.45E-04	mg/m³	6.7E-05	mg/kg-day	1.4E-02	mg/kg-day	4.8E-03		
					Exp. Route Total								4.8E-03		
					Inhalation (Shower Room)	Organics									
						Chloroform	1.73E-02	mg/m³	2.1E-04	mg/kg-day	1.4E-02	mg/kg-day	1.5E-02		
					Exp. Route Total								1.5E-02		
					Exposure Point Total										2.0E-02
					Exposure Media Total										2.0E-02
					Home Grown Produce	SWMU 31	Ingestion	Inorganics							
								Arsenic	9.40E+00	µg/L	2.6E-07	mg/kg-day	3.0E-04	(mg/kg-day) ⁻¹	8.7E-04
			Exp. Route Total										8.7E-04		
			Exposure Point Total										8.7E-04		
			Exposure Media Total										8.7E-04		
Groundwater Total										2.4E+00					
Total of Receptor Hazards Across All Media											2.4E+00				

N/A = Not Applicable.

Table E-61
Calculation of Non-cancer Hazards
Reasonable Maximum Exposure
Future - Child Resident - Off-Site

Scenario Timeframe: Future
Receptor Population: Resident off site
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
							Value	Units	Value	Units		
Groundwater	Groundwater	SWMU 31	Ingestion	Organics								
				Benzo(a)pyrene	6.10E-02	µg/L	3.9E-06	mg/kg-day	N/A	mg/kg-day	---	
				Chloroform	1.10E+01	µg/L	7.0E-04	mg/kg-day	1.0E-02	mg/kg-day	7.0E-02	
				Inorganics								
				Aluminum	2.68E+03	µg/L	1.7E-01	mg/kg-day	N/A	mg/kg-day	---	
				Arsenic	9.40E+00	µg/L	6.0E-04	mg/kg-day	3.0E-04	mg/kg-day	2.0E+00	
				Cobalt	3.80E+00	µg/L	2.4E-04	mg/kg-day	N/A	mg/kg-day	---	
				Iron	7.08E+03	µg/L	4.5E-01	mg/kg-day	3.0E-01	mg/kg-day	1.5E+00	
				Manganese	1.83E+02	µg/L	1.2E-02	mg/kg-day	2.0E-02	mg/kg-day	5.8E-01	
				Vanadium	1.74E+01	µg/L	1.1E-03	mg/kg-day	1.0E-03	mg/kg-day	1.1E+00	
			Exp. Route Total							5.3E+00		
			Dermal Adsorption	Organics								
				Benzo(a)pyrene	6.10E-02	µg/L	8.2E-05	mg/kg-day	N/A	mg/kg-day	---	
				Chloroform	1.10E+01	µg/L	6.1E-05	mg/kg-day	1.0E-02	mg/kg-day	6.1E-03	
				Inorganics								
				Aluminum	2.68E+03	µg/l	1.1E-03	mg/kg-day	N/A	mg/kg-day	---	
				Arsenic	9.40E+00	µg/l	4.0E-06	mg/kg-day	3.0E-04	mg/kg-day	1.3E-02	
				Cobalt	3.80E+00	µg/l	1.6E-06	mg/kg-day	n/A	mg/kg-day	---	
				Iron	7.08E+03	µg/l	3.0E-03	mg/kg-day	3.0E-01	mg/kg-day	1.0E-02	
				Manganese	1.83E+02	µg/l	7.7E-05	mg/kg-day	8.0E-04	mg/kg-day	9.7E-02	
				Vanadium	1.74E+01	µg/l	7.3E-06	mg/kg-day	2.6E-05	mg/kg-day	2.8E-01	
			Exp. Route Total							4.1E-01		
		Exposure Point Total										5.7E+00
	Exposure Media Total										5.7E+00	
	Air	SWMU 31	Inhalation (Indoor Air)	Organics								
				Chloroform	2.45E-04	mg/m³	3.8E-04	mg/kg-day	1.4E-02	mg/kg-day	2.7E-02	
			Exp. Route Total								2.7E-02	
		Exposure Point Total										2.7E-02
		Exposure Media Total										2.7E-02
	Home Grown Produce	SWMU 31	Ingestion	Inorganics								
				Arsenic	9.40E+00	µg/L	1.2E-06	mg/kg-day	3.0E-04	(mg/kg-day) ⁻¹	4.0E-03	
			Exp. Route Total								4.0E-03	
		Exposure Point Total										4.0E-03
	Exposure Media Total										4.0E-03	
Groundwater Total										5.7E+00		
						Total of Receptor Hazards Across All Media					5.7E+00	

N/A = Not Applicable.

Table E-25
Values Used for Daily Intake Calculations - Current/Future Exposures to Surface and Total Soil

Scenario Timeframe:	Current/Future
Medium:	Surface and Total Soil
Exposure Medium:	Surface and Total Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/Model Name
Ingestion	Industrial Worker (Outdoor)	Adult	SWMU 31	CS	Chemical Concentration in Soil	See site-specific EPC tables	mg/kg	See site-specific EPC tables	Potential (Lifetime) Average Daily Dose [(L)ADD _{pot}] (mg/kg-day) = $\frac{CS \times IR-S \times EF \times ED \times CF1}{BW \times AT \times CF2}$
				IR-S	Ingestion Rate of Soil	100	mg/day	USEPA, 2002	
				EF	Exposure Frequency	225	days/year	USEPA, 2002	
				ED	Exposure Duration	25	years	USEPA, 2002	
				CF1	Conversion Factor 1	1/10 ⁶	kg/mg	---	
				BW	Body Weight	70	kg	USEPA, 2002	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	25	years	USEPA, 2002	
				CF2	Conversion Factor 2	365	days/year	---	
Dermal Absorption	Industrial Worker (Outdoor)	Adult	SWMU 31	CS	Chemical Concentration in Soil	See site-specific EPC tables	mg/kg	See site-specific EPC tables	Internal (Lifetime) Average Daily Dose [(L)ADD _{int}] (mg/kg-day) = $\frac{CS \times SSAF \times DABS \times SA \times EF \times ED \times CF1}{BW \times AT \times CF2}$
				SSAF	Soil to Skin Adherence Factor	0.2	mg/cm ² -day	USEPA, 1997, 2002	
				DABS	Dermal Absorption Factor (Solid)	(1)	--	USEPA, 1995, 2003	
				SA	Skin Surface Area Available for Contact	3,300 (2)	cm ²	USEPA, 1997, 2004	
				EF	Exposure Frequency	225	days/year	USEPA, 2002	
				ED	Exposure Duration	25	years	USEPA, 2002	
				CF1	Conversion Factor 1	1/10 ⁶	kg/mg	---	
				BW	Body Weight	70	kg	USEPA, 2002	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	25	years	USEPA, 2002	
				CF2	Conversion Factor 2	365	days/year	---	

(1) Dermal absorption factors are presented in **Section 5.2.3** of the text.

(2) Value derived from data presented in USEPA (1997), averaging across gender and age. It is assumed that head, hands, and forearms are exposed to surface soil.

USEPA, 1995: Assessing Dermal Exposure from Soil Hazardous Waste Management Division. Office of Superfund Programs, Region III, Philadelphia, PA.

USEPA, 1997: Exposure Factors Handbook, Volume I. EPA/600/P-95/002Fa.

USEPA, 2002: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2003: Updated Dermal Exposure Assessment Guidance. Office of Superfund Programs, Region III, Philadelphia, PA.

USEPA, 2004: Risk Assessment Guidance for Superfund. Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment). Final.

Table E-26
Values Used for Daily Intake Calculations - Current/Future Exposures to Surface and Total Soil - Air

Scenario Timeframe:	Current/Future
Medium:	Surface and Total Soil
Exposure Medium:	Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/Model Name
Inhalation	Industrial Worker (Outdoor)	Adult	Particulates	CS	Chemical Concentration in Soil	See site-specific EPC tables	mg/kg	See site-specific EPC tables	Potential (Lifetime) Average Daily Dose $[(L)ADD_{pot}] \text{ (mg/kg-day)} =$ $\frac{CS \times (1/PEF) \times IN \times EF \times ED \times ET}{BW \times AT \times CF1}$
				PEF	Particulate Emission Factor	6.85E+08	m ³ /kg	Site-Specific PEF	
				IN	Inhalation Rate	2.5	m ³ /h	(1)	
				EF	Exposure Frequency	225	days/year	USEPA, 2002	
				ED	Exposure Duration	25	years	USEPA, 2002	
				ET	Exposure Time	8	hr/day	USEPA, 2002	
				BW	Body Weight	70	kg	USEPA, 2002	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	25	years	USEPA, 2002	
				CF1	Conversion Factor 1	365	days/year	---	

(1) The hourly inhalation rate was derived by dividing the worker's daily 20 m³/day USEPA (2002) inhalation rate by 8 hours per day.

USEPA, 2002: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

Table E-27
Values Used for Daily Intake Calculations- Current Exposures to Sediment

Scenario Timeframe:	Current
Medium:	Sediment
Exposure Medium:	Sediment

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Maintenance Worker	Adult	SWMU 31	CS	Chemical Concentration in Sediment	See site-specific EPC tables	mg/kg	See site-specific EPC tables	Potential (Lifetime) Average Daily Dose [(L)ADD _{pot}] (mg/kg-day) = $\frac{CS \times IR-S \times EF \times ED \times CF1}{BW \times AT \times CF2}$
				IR-S	Ingestion Rate of Sediment	100	mg/day	USEPA, 2002	
				EF	Exposure Frequency	50	days/year	(1)	
				ED	Exposure Duration	25	years	USEPA, 2002	
				CF1	Conversion Factor 1	1/10 ⁶	kg/mg	---	
				BW	Body Weight	70	kg	USEPA, 2002	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	25	years	USEPA, 2002	
	Industrial Worker (Outdoor)	Adult	SWMU 31	CF2	Conversion Factor 2	365	days/year	---	
				CS	Chemical Concentration in Sediment	See site-specific EPC tables	mg/kg	See site-specific EPC tables	Potential (Lifetime) Average Daily Dose [(L)ADD _{pot}] (mg/kg-day) = $\frac{CS \times IR-S \times EF \times ED \times CF1}{BW \times AT \times CF2}$
				IR-S	Ingestion Rate of Sediment	100	mg/day	USEPA, 2002	
				EF	Exposure Frequency	225	days/year	USEPA, 2002	
				ED	Exposure Duration	1	years	USEPA, 2002	
				CF1	Conversion Factor 1	1/10 ⁶	kg/mg	---	
				BW	Body Weight	70	kg	USEPA, 2002	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	25	years	USEPA, 2002	
				CF2	Conversion Factor 2	365	days/year	---	
Dermal Absorption	Maintenance Worker	Adult	SWMU 31	CS	Chemical Concentration in Sediment	See site-specific EPC tables	mg/kg	See site-specific EPC tables	Internal (Lifetime) Average Daily Dose [(L)ADD _{int}] (mg/kg-day) = $\frac{CS \times SSAF \times DABS \times SA \times EF \times ED \times CF1}{BW \times AT \times CF2}$
				SSAF	Soil to Skin Adherence Factor	0.6	mg/cm ² -day	USEPA, 1997, 2002	
				DABS	Dermal Absorption Factor (Solid)	(2)	--	USEPA, 1995, 2003	
				SA	Skin Surface Area Available for Contact	3,300 (3)	cm ²	USEPA, 1997, 2002	
				EF	Exposure Frequency	50	days/year	(1)	
				ED	Exposure Duration	25	years	USEPA, 2002	
				CF1	Conversion Factor 1	1/10 ⁶	kg/mg	---	
				BW	Body Weight	70	kg	USEPA, 2002	
	Industrial Worker (Outdoor)	Adult	SWMU 31	AT-C	Averaging Time (Cancer)	70	years	USEPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	25	years	USEPA, 2002	
				CF2	Conversion Factor 2	365	days/year	---	
				CS	Chemical Concentration in Sediment	See site-specific EPC tables	mg/kg	See site-specific EPC tables	Internal (Lifetime) Average Daily Dose [(L)ADD _{int}] (mg/kg-day) = $\frac{CS \times SSAF \times DABS \times SA \times EF \times ED \times CF1}{BW \times AT \times CF2}$
				SSAF	Soil to Skin Adherence Factor	0.6	mg/cm ² -day	USEPA, 2004	
				DABS	Dermal Absorption Factor (Solid)	(2)	--	USEPA, 1995, 2003	
				SA	Skin Surface Area Available for Contact	3,300 (3)	cm ²	USEPA, 1997, 2004	
				EF	Exposure Frequency	225	days/year	USEPA, 2002	
				ED	Exposure Duration	25	years	USEPA, 2002	
				CF1	Conversion Factor 1	1/10 ⁶	kg/mg	---	
				BW	Body Weight	70	kg	USEPA, 2002	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	25	years	USEPA, 2002	
				CF2	Conversion Factor 2	365	days/year	---	

(1) Best professional judgement. Based on site maintenance/inspection activities conducted 1 day/week and assuming 2 weeks on vacation. Assumed sediment exposures were similar to soil exposures.

(2) Dermal absorption factors are presented in **Section 5.2.3** of the text.

(3) Value derived from data presented in USEPA (1997), averaging across gender and age. It is assumed that head, hands, and forearms are exposed to sediment.

USEPA, 1991: Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER 9285.6-03.

USEPA, 1995: Assessing Dermal Exposure from Soil Hazardous Waste Management Division. Office of Superfund Programs, Region III, Philadelphia, PA.

USEPA, 1997: Exposure Factors Handbook, Volume I. EPA/600/P-95/002Fa.

USEPA, 2002: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2003: Updated Dermal Exposure Assessment Guidance. Office of Superfund Programs, Region III, Philadelphia, PA.

USEPA, 2004: Risk Assessment Guidance for Superfund. Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment). Final.

Table E-28
Values Used for Daily Intake Calculations- Future Exposures to Sediment
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Scenario Timeframe:	Future
Medium:	Sediment
Exposure Medium:	Sediment

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/Model Name
Ingestion	Maintenance Worker	Adult	SWMU 31	CS	Chemical Concentration in Sediment	See site-specific EPC tables	mg/kg	See site-specific EPC tables	Potential (Lifetime) Average Daily Dose [(L)ADD _{pool}] (mg/kg-day) = $\frac{CS \times IR-S \times EF \times ED \times CF1}{BW \times AT \times CF2}$
				IR-S	Ingestion Rate of Sediment	100	mg/day	USEPA, 2002	
				EF	Exposure Frequency	50	days/year	(1) USEPA, 2002	
				ED	Exposure Duration	25	years	---	
				CF1	Conversion Factor 1	1/10 ⁶	kg/mg	---	
				BW	Body Weight	70	kg	USEPA, 2002	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	25	years	USEPA, 2002	
				CF2	Conversion Factor 2	365	days/year	---	
	Industrial Worker (Outdoor)	Adult	SWMU 31	CS	Chemical Concentration in Sediment	See site-specific EPC tables	mg/kg	See site-specific EPC tables	Potential (Lifetime) Average Daily Dose [(L)ADD _{pool}] (mg/kg-day) = $\frac{CS \times IR-S \times EF \times ED \times CF1}{BW \times AT \times CF2}$
				IR-S	Ingestion Rate of Sediment	100	mg/day	USEPA, 2002	
				EF	Exposure Frequency	225	days/year	USEPA, 2002	
				ED	Exposure Duration	1	years	USEPA, 2002	
				CF1	Conversion Factor 1	1/10 ⁶	kg/mg	---	
				BW	Body Weight	70	kg	USEPA, 2002	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	25	years	USEPA, 2002	
				CF2	Conversion Factor 2	365	days/year	---	
	Excavation Worker	Adult	SWMU 31	CS	Chemical Concentration in Sediment	See site-specific EPC tables	mg/kg	See site-specific EPC tables	Potential (Lifetime) Average Daily Dose [(L)ADD _{pool}] (mg/kg-day) = $\frac{CS \times IR-S \times EF \times ED \times CF1}{BW \times AT \times CF2}$
				IR-S	Ingestion Rate of Sediment	330	mg/day	USEPA, 2002	
				EF	Exposure Frequency	250	days/year	USEPA, 2002	
				ED	Exposure Duration	1	years	USEPA, 2002	
				CF1	Conversion Factor 1	1/10 ⁶	kg/mg	---	
				BW	Body Weight	70	kg	USEPA, 2002	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	1	years	USEPA, 2002	
				CF2	Conversion Factor 2	365	days/year	---	
	Resident	Adult	SWMU 31 (wading)	CS	Chemical Concentration in Sediment	See site-specific EPC tables	mg/kg	See site-specific EPC tables	Potential (Lifetime) Average Daily Dose [(L)ADD _{pool}] (mg/kg-day) = $\frac{CS \times IR-S \times EF \times ED \times CF1}{BW \times AT \times CF2}$
				IR-S	Ingestion Rate of Sediment	100	mg/day	USEPA, 1991a	
				EF	Exposure Frequency	40	days/year	(2) USEPA, 1991a	
				ED	Exposure Duration	30	years	USEPA, 1991b	
				EDc	Exposure Duration (Cancer)	24	years	---	
				CF1	Conversion Factor 1	1/10 ⁶	kg/mg	---	
				BW	Body Weight	70	kg	USEPA, 1991a	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 1991a	
				AT-N	Averaging Time (Non-Cancer)	30	years	USEPA, 1991a	
				CF2	Conversion Factor 2	365	days/year	---	
		Child	SWMU 31 (wading)	CS	Chemical Concentration in Sediment	See site-specific EPC tables	mg/kg	See site-specific EPC tables	Potential (Lifetime) Average Daily Dose [(L)ADD _{pool}] (mg/kg-day) = $\frac{CS \times IR-S \times EF \times ED \times CF1}{BW \times AT \times CF2}$
				IR-S	Ingestion Rate of Sediment	200	mg/day	USEPA, 1991a	
Dermal Absorption	Maintenance Worker	Adult	SWMU 31	EF	Exposure Frequency	40	days/year	(2) USEPA, 1991a	Internal (Lifetime) Average Daily Dose [(L)ADD _{int}] (mg/kg-day) = $\frac{CS \times SSAF \times DABS \times SA \times EF \times ED \times CF1}{BW \times AT \times CF2}$
				ED	Exposure Duration	6	years	USEPA, 1991a	
				CF1	Conversion Factor 1	1/10 ⁶	kg/mg	---	
				BW	Body Weight	15	kg	USEPA, 1991a	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 1991a	
				AT-N	Averaging Time (Non-Cancer)	6	years	USEPA, 1991a	
				CF2	Conversion Factor 2	365	days/year	---	
				CS	Chemical Concentration in Sediment	See site-specific EPC tables	mg/kg	See site-specific EPC tables	
				SSAF	Soil to Skin Adherence Factor	0.6	mg/cm ² -day	USEPA, 2004	
				DABS	Dermal Absorption Factor (Solid)	(3)	--	USEPA, 1995, 2003	
				SA	Skin Surface Area Available for Contact	3,300 (4)	cm ²	USEPA, 1997, 2002	
				EF	Exposure Frequency	50	days/year	(1) USEPA, 2002	
				ED	Exposure Duration	25	years	---	
				CF1	Conversion Factor 1	1/10 ⁶	kg/mg	---	
				BW	Body Weight	70	kg	USEPA, 2002	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	25	years	USEPA, 2002	
				CF2	Conversion Factor 2	365	days/year	---	

Table E-28
Values Used for Daily Intake Calculations- Future Exposures to Sediment
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Scenario Timeframe:	Future
Medium:	Sediment
Exposure Medium:	Sediment

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/Model Name
Dermal Absorption (cont.)	Industrial Worker (Outdoor)	Adult	SWMU 31	CS	Chemical Concentration in Sediment	See site-specific EPC tables	mg/kg	See site-specific EPC tables	Internal (Lifetime) Average Daily Dose [(L)ADD _{int}] (mg/kg-day) = $\frac{CS \times SSAF \times DABS \times SA \times EF \times ED \times CF1}{BW \times AT \times CF2}$
				SSAF	Soil to Skin Adherence Factor	0.6	mg/cm ² -day	USEPA, 2004	
				DABS	Dermal Absorption Factor (Solid)	(3)	--	USEPA, 1995, 2003	
				SA	Skin Surface Area Available for Contact	3,300 (4)	cm ²	USEPA, 1997, 2004	
				EF	Exposure Frequency	225	days/year	USEPA, 2002	
				ED	Exposure Duration	25	years	USEPA, 2002	
				CF1	Conversion Factor 1	1/10 ⁶	kg/mg	---	
				BW	Body Weight	70	kg	USEPA, 2002	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	25	years	USEPA, 2002	
				CF2	Conversion Factor 2	365	days/year	---	
	Excavation Worker	Adult	SWMU 31	CS	Chemical Concentration in Sediment	See site-specific EPC tables	mg/kg	See site-specific EPC tables	Internal (Lifetime) Average Daily Dose [(L)ADD _{int}] (mg/kg-day) = $\frac{CS \times SSAF \times DABS \times SA \times EF \times ED \times CF1}{BW \times AT \times CF2}$
				SSAF	Soil to Skin Adherence Factor	0.6	mg/cm ² -day	USEPA, 2004	
				DABS	Dermal Absorption Factor (Solid)	(3)	--	USEPA, 1995, 2003	
				SA	Skin Surface Area Available for Contact	3,300 (4)	cm ²	USEPA, 1997	
				EF	Exposure Frequency	250	days/year	USEPA, 2002	
				ED	Exposure Duration	1	years	USEPA, 2002	
				CF1	Conversion Factor 1	1/10 ⁶	kg/mg	---	
				BW	Body Weight	70	kg	USEPA, 2002	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	1	years	USEPA, 2002	
				CF2	Conversion Factor 2	365	days/year	---	
	Resident	Adult	SWMU 31 (wading)	CS	Chemical Concentration in Sediment	See site-specific EPC tables	mg/kg	See site-specific EPC tables	Internal (Lifetime) Average Daily Dose [(L)ADD _{int}] (mg/kg-day) = $\frac{CS \times SSAF \times DABS \times SA \times EF \times ED \times CF1}{BW \times AT \times CF2}$
				SSAF	Soil to Skin Adherence Factor	0.2	mg/cm ² -day	USEPA, 2004	
				DABS	Dermal Absorption Factor (Solid)	(3)	--	USEPA, 1995, 2003	
				SA	Skin Surface Area Available for Contact	5,700 (5)	cm ²	USEPA, 1997	
				EF	Exposure Frequency	40	days/year	(2)	
				ED	Exposure Duration	30	years	USEPA, 1991a	
				EDc	Exposure Duration (Cancer)	24	years	USEPA, 1991b	
				CF1	Conversion Factor 1	1/10 ⁶	kg/mg	---	
				BW	Body Weight	70	kg	USEPA, 1991a	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 1991a	
				AT-N	Averaging Time (Non-Cancer)	30	years	USEPA, 1991a	
				CF2	Conversion Factor 2	365	days/year	---	
		Child	SWMU 31 (wading)	CS	Chemical Concentration in Sediment	See site-specific EPC tables	mg/kg	See site-specific EPC tables	Internal (Lifetime) Average Daily Dose [(L)ADD _{int}] (mg/kg-day) = $\frac{CS \times SSAF \times DABS \times SA \times EF \times ED \times CF1}{BW \times AT \times CF2}$
				SSAF	Soil to Skin Adherence Factor	0.2	mg/cm ² -day	USEPA, 2004	
				DABS	Dermal Absorption Factor (Solid)	(3)	--	USEPA, 1995, 2003	
				SA	Skin Surface Area Available for Contact	2,800 (5)	cm ²	USEPA, 1997	
				EF	Exposure Frequency	40	days/year	(2)	
				ED	Exposure Duration	6	years	USEPA, 1991a	
				CF1	Conversion Factor 1	1/10 ⁶	kg/mg	---	
				BW	Body Weight	15	kg	USEPA, 1991a	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 1991a	
				AT-N	Averaging Time (Non-Cancer)	6	years	USEPA, 1991a	
				CF2	Conversion Factor 2	365	days/year	---	

(1) Best professional judgement. Based on site maintenance/inspection activities conducted 1 day/week and assuming 2 weeks on vacation. Assumed sediment exposures were similar to soil exposures.

(2) The exposure frequency is based on best professional judgment that the time an adult resident would spend wading would be similar to the time spent gardening or doing yard work, approximately 40 events/year (USEPA, 1997). For the child resident, it is assumed that a child under 6 years of age would be accompanied by an adult while wading.

(3) Dermal absorption factors are presented in **Section 5.2.3** of the text.

(4) Value derived from data presented in USEPA (1997), averaging across gender and age. It is assumed that head, hands, and forearms are exposed to sediment.

(5) Value derived from data presented in USEPA (1997), averaging across gender and age. It is assumed that head, face, hands, forearms, lower legs, and feet are exposed to sediment.

USEPA, 1991a: Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER 9285.6-03.

USEPA, 1991b: Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part B, Development of Risk-Based Preliminary Remediation Goals). OSWER 9285.7-01B.

USEPA, 1995: Assessing Dermal Exposure from Soil Hazardous Waste Management Division. Office of Superfund Programs, Region III, Philadelphia, PA.

USEPA, 1997: Exposure Factors Handbook, Volume I. EPA/600/P-95/002Fa.

USEPA, 2002: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2003: Updated Dermal Exposure Assessment Guidance. Office of Superfund Programs, Region III, Philadelphia, PA.

USEPA, 2004: Risk Assessment Guidance for Superfund. Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment). Final.

Table E-29
Values Used for Daily Intake Calculations- Current Exposures to Surface Water

Scenario Timeframe:	Current
Medium:	Surface Water
Exposure Medium:	Surface Water

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Dermal Absorption	Maintenance Worker	Adult	SWMU 31 (Wading)	DA	Dose Absorbed Per Unit Area per Event	(1)	mg/cm ² -event	USEPA, 2004	Internal (Lifetime) Average Daily Dose [(L)ADD _{in}] (mg/kg-day) = $\frac{DA \times SA \times EV \times EF \times ED}{BW \times AT \times CF1}$
				SA	Skin Surface Area Available for Contact	3,300 (2)	cm ²	USEPA, 1997	
				EV	Event Frequency	1	events/day	(3)	
				EF	Exposure Frequency	50	days/year	(4)	
				ED	Exposure Duration	25	years	USEPA, 2002	
				BW	Body Weight	70	kg	USEPA, 2002	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	25	years	USEPA, 2002	
	Industrial Worker (Outdoor)	Adult	SWMU 31 (Wading)	CF1	Conversion Factor 1	365	days/year	---	
				DA	Dose Absorbed Per Unit Area per Event	(1)	mg/cm ² -event	USEPA, 2004	Internal (Lifetime) Average Daily Dose [(L)ADD _{in}] (mg/kg-day) = $\frac{DA \times SA \times EV \times EF \times ED}{BW \times AT \times CF1}$
				SA	Skin Surface Area Available for Contact	3,300 (2)	cm ²	USEPA, 1997, 2004	
				EV	Event Frequency	1	events/day	(6)	
				EF	Exposure Frequency	225	days/year	USEPA, 2002	
				ED	Exposure Duration	25	years	USEPA, 2002	
				BW	Body Weight	70	kg	USEPA, 2002	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	25	years	USEPA, 2002	
				CF1	Conversion Factor 1	365	days/year	---	

(1) Dermal absorption factors are presented in **Section 5.2.3** of the text.

(2) Value derived from data presented in USEPA (1997), averaging across gender and age. It is assumed that head, hands, and forearms are exposed to surface water; the worker's legs and feet would be protected by boots.

(3) Value calculated using the surface water concentrations, the equations presented in **Section 5.2.3**, and the exposure time of 1 hour (ET = 1 hour/day).

(4) Best professional judgement. Based on site maintenance/inspection activities conducted 1 day/week and assuming 2 weeks on vacation.

USEPA, 1997: Exposure Factors Handbook, Volume I. EPA/600/P-95/002Fa.

USEPA, 2002: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2004: Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final.

Table E-30
Values Used for Daily Intake Calculations - Future Exposures to Surface Water
Page 7 of 53

Scenario Timeframe:	Future
Medium:	Surface Water
Exposure Medium:	Surface Water

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/Model Name
Ingestion	Resident	Adult	SWMU 31 (Swimming)	CW	Chemical Concentration in Surface Water	See site-specific EPC tables	mg/l	See site-specific EPC tables	Potential (Lifetime) Average Daily Dose $[(L)ADD_{pot}] \text{ (mg/kg-day)} =$ $\frac{CW \times IR-W \times EF \times ED \times CF1}{BW \times AT \times CF2}$
				IR-W	Ingestion Rate of Surface Water	0.05	liters/day	(1)	
				EF	Exposure Frequency	5	days/year	(2)	
				ED	Exposure Duration	30	years	USEPA, 1991a	
				EDc	Exposure Duration (Cancer)	24	years	USEPA, 1991b	
				CF1	Conversion Factor 1	1/10 ³	mg/μg	---	
				BW	Body Weight	70	kg	USEPA, 1991a	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 1991a	
				AT-N	Averaging Time (Non-Cancer)	30	years	USEPA, 1991a	
				CF2	Conversion Factor 2	365	days/year	---	
		Child	SWMU 31 (Swimming)	CW	Chemical Concentration in Surface Water	See site-specific EPC tables	mg/l	See site-specific EPC tables	Potential (Lifetime) Average Daily Dose $[(L)ADD_{pot}] \text{ (mg/kg-day)} =$ $\frac{CW \times IR-W \times EF \times ED \times CF1}{BW \times AT \times CF2}$
				IR-W	Ingestion Rate of Surface Water	0.05	liters/day	(1)	
				EF	Exposure Frequency	5	days/year	(2)	
				ED	Exposure Duration	6	years	(3)	
				CF1	Conversion Factor 1	1/10 ³	mg/μg	---	
				BW	Body Weight	15	kg	USEPA, 1991a	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 1991a	
				AT-N	Averaging Time (Non-Cancer)	6	years	USEPA, 1991a	
				CF2	Conversion Factor 2	365	days/year	---	
Dermal Absorption	Maintenance Worker	Adult	SWMU 31 (Wading)	DA	Dose Absorbed Per Unit Area per Event	(4)	mg/cm ² -event	USEPA, 2004	Internal (Lifetime) Average Daily Dose $[(L)ADD_{int}] \text{ (mg/kg-day)} =$ $\frac{DA \times SA \times EV \times EF \times ED}{BW \times AT \times CF1}$
				SA	Skin Surface Area Available for Contact	3,300 (5)	cm ²	USEPA, 1997	
				EV	Event Frequency	1	events/day	(6)	
				EF	Exposure Frequency	50	days/year	(7)	
				ED	Exposure Duration	25	years	EPA, 2002	
				BW	Body Weight	70	kg	EPA, 2002	
				AT-C	Averaging Time (Cancer)	70	years	EPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	25	years	EPA, 2002	
				CF1	Conversion Factor 1	365	days/year	---	
	Industrial Worker (Outdoor)	Adult	SWMU 31 (Wading)	DA	Dose Absorbed Per Unit Area per Event	(4)	mg/cm ² -event	USEPA, 2004	Internal (Lifetime) Average Daily Dose $[(L)ADD_{int}] \text{ (mg/kg-day)} =$ $\frac{DA \times SA \times EV \times EF \times ED}{BW \times AT \times CF1}$
				SA	Skin Surface Area Available for Contact	3,300 (5)	cm ²	USEPA, 1997, 2004	
				EV	Event Frequency	1	events/day	(6)	
				EF	Exposure Frequency	225	days/year	USEPA, 2002	
				ED	Exposure Duration	25	years	USEPA, 2002	
				BW	Body Weight	70	kg	USEPA, 2002	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	25	years	USEPA, 2002	
				CF1	Conversion Factor 1	365	days/year	---	
	Excavation Worker	Adult	SWMU 31 (Wading)	DA	Dose Absorbed Per Unit Area per Event	(4)	mg/cm ² -event	USEPA, 2004	Internal (Lifetime) Average Daily Dose $[(L)ADD_{int}] \text{ (mg/kg-day)} =$ $\frac{DA \times SA \times EV \times EF \times ED}{BW \times AT \times CF1}$
				SA	Skin Surface Area Available for Contact	3,300 (5)	cm ²	USEPA, 1997	
				EV	Event Frequency	1	events/day	(6)	
				EF	Exposure Frequency	250	days/year	USEPA, 2002	
				ED	Exposure Duration	1	years	USEPA, 2002	
				BW	Body Weight	70	kg	USEPA, 2002	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	1	years	USEPA, 2002	
				CF1	Conversion Factor 1	365	days/year	---	
	Resident	Adult	SWMU 31 (Swimming)	DA	Dose Absorbed Per Unit Area per Event	(4)	mg/cm ² -event	USEPA, 2004	Internal (Lifetime) Average Daily Dose $[(L)ADD_{int}] \text{ (mg/kg-day)} =$ $\frac{DA \times SA \times EV \times EF \times ED}{BW \times AT \times CF1}$
				SA	Skin Surface Area Available for Contact	18,000 (8)	cm ²	USEPA, 1997	
				EV	Event Frequency	1	events/day	(4)	
				EF	Exposure Frequency	5	days/year	(2)	
				ED	Exposure Duration	30	years	USEPA, 1991a	
				EDc	Exposure Duration (Cancer)	24	years	USEPA, 1991b	
				BW	Body Weight	70	kg	USEPA, 1991a	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 1991a	
				AT-N	Averaging Time (Non-Cancer)	30	years	USEPA, 1991a	
				CF1	Conversion Factor 1	365	days/year	---	

Table E-30
Values Used for Daily Intake Calculations - Future Exposures to Surface Water
Page 8 of 53

Scenario Timeframe:	Future
Medium:	Surface Water
Exposure Medium:	Surface Water

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Dermal Absorption (con't)	Resident (con't)	Adult	SWMU 31 (Wading)	DA	Dose Absorbed Per Unit Area per Event	(4)	mg/cm ² -event	USEPA, 2004	Internal (Lifetime) Average Daily Dose [(L)ADD _{int}] (mg/kg-day) = $\frac{DA \times SA \times EV \times EF \times ED}{DA \times SA \times EV \times EF \times ED}$ BW x AT x CF1
				SA	Skin Surface Area Available for Contact	5,700(9)	cm ²	USEPA, 1997	
				EV	Event Frequency	1	events/day	(4)	
				EF	Exposure Frequency	40	days/year	(10)	
				ED	Exposure Duration	30	years	USEPA, 1991a	
				EDc	Exposure Duration (Cancer)	24	years	USEPA, 1991b	
				BW	Body Weight	70	kg	USEPA, 1991a	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 1991a	
				AT-N	Averaging Time (Non-Cancer)	30	years	USEPA, 1991a	
				CF1	Conversion Factor 1	365	days/year	---	
		Child	SWMU 31 (Swimming)	DA	Dose Absorbed Per Unit Area per Event	(4)	mg/cm ² -event	USEPA, 2004	Internal (Lifetime) Average Daily Dose [(L)ADD _{int}] (mg/kg-day) = $\frac{DA \times SA \times EV \times EF \times ED}{DA \times SA \times EV \times EF \times ED}$ BW x AT x CF1
				SA	Skin Surface Area Available for Contact	6,600 (8)	cm ²	USEPA, 1997	
				EV	Event Frequency	1	events/day	(4)	
				EF	Exposure Frequency	5	days/year	(2)	
				ED	Exposure Duration	6	years	(3)	
				BW	Body Weight	15	kg	USEPA, 1991a	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 1991a	
				AT-N	Averaging Time (Non-Cancer)	6	years	USEPA, 1991a	
				CF1	Conversion Factor 1	365	days/year	---	
			SWMU 31 (Wading)	DA	Dose Absorbed Per Unit Area per Event	(4)	mg/cm ² -event	USEPA, 2004	Internal (Lifetime) Average Daily Dose [(L)ADD _{int}] (mg/kg-day) = $\frac{DA \times SA \times EV \times EF \times ED}{DA \times SA \times EV \times EF \times ED}$ BW x AT x CF1
				SA	Skin Surface Area Available for Contact	1,900 (9)	cm ²	USEPA, 1997	
				EV	Event Frequency	1	events/day	(4)	
				EF	Exposure Frequency	40	days/year	(10)	
				ED	Exposure Duration	6	years	(3)	
				BW	Body Weight	15	kg	USEPA, 1991a	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 1991a	
				AT-N	Averaging Time (Non-Cancer)	6	years	USEPA, 1991a	
				CF1	Conversion Factor 1	365	days/year	---	

- (1) Ingestion rate is based on 0.05 liters/hour (USEPA, 1989) for an exposure time (ET) of 1 hour/day, an average estimate for time spent swimming (USEPA, 1997).
- (2) The exposure frequency and event frequency were based on data presented in USEPA, 1997, assuming that residents would swim at SWMU 31 approximately 1 day/month during the warmer months (i.e., May through September).
- (3) The exposure duration was based on the age range evaluated (i.e., 0 to 6 years of age).
- (4) Dermal absorption factors are presented in **Section 5.2.3** of the text.
- (5) Value derived from data presented in USEPA (1997), averaging across gender and age. It is assumed that head, hands, and forearms are exposed to surface water; the worker's legs and feet would be protected by boots.
- (6) Value calculated using the surface water concentrations, the equations presented in **Section 5.2.3**, and the exposure time of 1 hour (ET = 1 hour/day).
- (7) Best professional judgement. Based on site maintenance/inspection activities conducted 1 day/week and assuming 2 weeks on vacation.
- (8) Value derived from data presented in USEPA (1997, 2002), averaging across gender and age. It is assumed that the total body area is exposed to surface water while swimming.
- (9) Value derived from data presented in USEPA (1997), averaging across gender and age. It is assumed that hands, forearms, lower legs, and feet are exposed to surface water while wading.
- (10) The exposure frequency is based on best professional judgment that the time an adult resident would spend wading would be similar to the time spent gardening or doing yard work, approximately 40 events/year (USEPA, 1997). For the child resident, it is assumed that a child under 6 years of age would be accompanied by an adult while wading.

USEPA, 1989: Risk Assessment Guidance for Superfund. Volume I, Human Health Evaluation Manual (Part A), Interim Final. EPA/540/1-89/002.

USEPA, 1991a: Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER 9285.6-03.

USEPA, 1991b: Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part B, Development of Risk-Based Preliminary Remediation Goals). OSWER 9285.7-01B.

USEPA, 1997: Exposure Factors Handbook, Volume I. EPA/600/P-95/002Fa.

USEPA, 2002: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2004: Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) EPA/540/R/99/005

Table E-32
Values Used for Daily Intake Calculations - Current/Future Exposures to Groundwater, Inhalation
SWMU 31

Scenario Timeframe:	Current/Future
Medium:	Groundwater
Exposure Medium:	Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Maintenance Worker	Adult	SWMU 31	CA	Modeled Ambient Air Concentration	(1)	mg/m ³	(1)	Potential (Lifetime) Average Daily Dose [(L)ADD _{pot}] (mg/kg-day) = $\frac{CA \times IN \times EF \times ED \times ET}{BW \times AT \times CF1}$
				IN	Inhalation Rate	2.5	m ³ /hr	(2)	
				EF	Exposure Frequency	50	days/year	(3)	
				ED	Exposure Duration	25	years	USEPA, 2002	
				ET	Exposure Time (Ambient Air)	8	hr/day	USEPA, 2002	
				BW	Body Weight	70	kg	USEPA, 2002	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	25	years	USEPA, 2002	
				CF1	Conversion Factor 1	365	days/year	---	
	Industrial Worker (Outdoor)	Adult	SWMU 31	CA	Modeled Ambient Air Concentration or Indoor Air Concentration	(1, 2)	mg/m ³	(1, 2)	Potential (Lifetime) Average Daily Dose [(L)ADD _{pot}] (mg/kg-day) = $\frac{CA \times IN \times EF \times ED \times ET}{BW \times AT \times CF1}$
				IN	Inhalation Rate	2.5	m ³ /hr	(3)	
				EF	Exposure Frequency	225	days/year	USEPA, 2002	
				ED	Exposure Duration	25	years	USEPA, 2002	
				ET	Exposure Time (Ambient Air)	8	hr/day	USEPA, 2002	
				BW	Body Weight	70	kg	USEPA, 2002	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	25	years	USEPA, 2002	
				CF1	Conversion Factor 1	365	days/year	---	

(1) Ambient air concentrations were modeled by a volatilization model (ASTM, 1995). A discussion of the model is provided **Section 5.2.3**.

(2) The hourly inhalation rate was derived by dividing the adult's daily 20 ³m³/day USEPA (1991) inhalation rate by 8 hours per day.

(3) Best professional judgement. Based on site maintenance/inspection activities conducted 1 day/week and assuming 2 weeks for vacation.

ASTM, 1995: Standard Guide for Risk-Based Corrective Action at Petroleum Release Sites, ASTM Committee E-50 on Environmental Assessment, Report No. E1739-95, West Conshohocken, Pennsylvania.

USEPA, 1991: Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER 9285.6-03.

USEPA, 2002: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

Table E-33
Values Used for Daily Intake Calculations - Future Exposures to Groundwater
SWMU 31
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Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/Model Name
Ingestion	Industrial Worker (Indoor and Outdoor)	Adult	SWMU 31	CW	Chemical Concentration in Groundwater	See site-specific EPC tables	µg/l	See site-specific EPC tables	Potential (Lifetime) Average Daily Dose [(L)ADD _{pot}] (mg/kg-day) = $\frac{CW \times IR-W \times EF \times ED \times CF1}{BW \times AT \times CF2}$
				IR-W	Ingestion Rate of Groundwater	1	liters/day	USEPA, 1991a	
				EF	Exposure Frequency	225	days/year	USEPA, 2002	
				ED	Exposure Duration	25	years	USEPA, 2002	
				CF1	Conversion Factor 1	1/10 ³	mg/µg	---	
				BW	Body Weight	70	kg	USEPA, 2002	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	25	years	USEPA, 2002	
				CF2	Conversion Factor 2	365	days/year	---	
	Excavation Worker	Adult	SWMU 31	CW	Chemical Concentration in Groundwater	See site-specific EPC tables	µg/l	See site-specific EPC tables	Potential (Lifetime) Average Daily Dose [(L)ADD _{pot}] (mg/kg-day) = $\frac{CW \times IR-W \times EF \times ED \times CF1}{BW \times AT \times CF2}$
				IR-W	Ingestion Rate of Groundwater	0.02	liters/day	(1)	
				EF	Exposure Frequency	250	days/year	(1)	
				ED	Exposure Duration	1	years	(1)	
				CF1	Conversion Factor 1	1/10 ³	mg/µg	---	
				BW	Body Weight	70	kg	USEPA, 2002	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	1	years	(1)	
				CF2	Conversion Factor 2	365	days/year	---	
	Resident	Adult	SWMU 31	CW	Chemical Concentration in Groundwater	See site-specific EPC tables	µg/l	See site-specific EPC tables	Potential (Lifetime) Average Daily Dose [(L)ADD _{pot}] (mg/kg-day) = $\frac{CW \times IR-W \times EF \times ED \times CF1}{BW \times AT \times CF2}$
				IR-W	Ingestion Rate of Groundwater	2	liters/day	USEPA, 1991a, 2003	
				EF	Exposure Frequency	350	days/year	USEPA, 1991a, 2003	
				ED	Exposure Duration	30	years	USEPA, 1991a, 2003	
				EDc	Exposure Duration (Cancer)	24	years	USEPA, 1991b	
				CF1	Conversion Factor 1	1/10 ³	mg/µg	---	
				BW	Body Weight	70	kg	USEPA, 1991a, 2003	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 1991a, 2003	
				AT-N	Averaging Time (Non-Cancer)	30	years	USEPA, 1991a, 2003	
				CF2	Conversion Factor 2	365	days/year	---	
	Resident	Child	SWMU 31	CW	Chemical Concentration in Groundwater	See site-specific EPC tables	µg/l	See site-specific EPC tables	Potential (Lifetime) Average Daily Dose [(L)ADD _{pot}] (mg/kg-day) = $\frac{CW \times IR-W \times EF \times ED \times CF1}{BW \times AT \times CF2}$
				IR-W	Ingestion Rate of Groundwater	1	liters/day	USEPA, 2003	
				EF	Exposure Frequency	350	days/year	USEPA, 1991a, 2003	
				ED	Exposure Duration	6	years	USEPA, 1991a, 2003	
				CF1	Conversion Factor 1	1/10 ³	mg/µg	---	
				BW	Body Weight	15	kg	USEPA, 1991a, 2003	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 1991a, 2003	
				AT-N	Averaging Time (Non-Cancer)	6	years	USEPA, 1991a, 2003	
				CF2	Conversion Factor 2	365	days/year	---	
Dermal Absorption	Excavation Worker	Adult	SWMU 31	DA	Dose Absorbed per Unit Area per Event	--	mg/cm ² -event	(2)	Internal (Lifetime) Average Daily Dose [(L)ADD _{in}] (mg/kg-day) = $\frac{DA \times SA \times EV \times EF \times ED}{BW \times AT \times CF1}$
				SA	Skin Surface Area Available for Contact	3,300	cm ²	USEPA, 2004	
				EV	Event Frequency	1	events/day	(1)	
				EF	Exposure Frequency	250	days/year	(1)	
				ED	Exposure Duration	1	years	(1)	
				BW	Body Weight	70	kg	USEPA, 2002	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	1	years	(1)	
				CF1	Conversion Factor 1	365	days/year	---	

Table E-33
Values Used for Daily Intake Calculations - Future Exposures to Groundwater
SWMU 31
Page 11 of 53

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/Model Name
Dermal Absorption (cont.)	Resident	Adult	SWMU 31	DA	Dose Absorbed per Unit Area per Event	--	mg/cm ² -event	(3)	Internal (Lifetime) Average Daily Dose [(L)ADD _{int}] (mg/kg-day) = $\frac{DA \times SA \times EV \times EF \times ED}{BW \times AT \times CF1}$
				SA	Skin Surface Area Available for Contact	18,000	cm ²	USEPA, 2004	
				EV	Event Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	350	days/year	USEPA, 1991a, 2003	
				ED	Exposure Duration	30	years	USEPA, 1991a, 2003	
				EDc	Exposure Duration (Cancer)	24	years	USEPA, 1991b, 2003	
				BW	Body Weight	70	kg	USEPA, 1991a, 2003	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 1991a, 2003	
				AT-N	Averaging Time (Non-Cancer)	30	years	USEPA, 1991a, 2003	
				CF1	Conversion Factor 1	365	days/year	---	
	Resident	Child	SWMU 31	DA	Dose Absorbed per Unit Area per Event	--	mg/cm ² -event	(4)	Internal (Lifetime) Average Daily Dose [(L)ADD _{int}] (mg/kg-day) = $\frac{DA \times SA \times EV \times EF \times ED}{BW \times AT \times CF1}$
				SA	Skin Surface Area Available for Contact	6,600	cm ²	USEPA, 2004	
				EV	Event Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	350	days/year	USEPA, 1991a, 2003	
				ED	Exposure Duration	6	years	USEPA, 1991a, 2003	
				BW	Body Weight	15	kg	USEPA, 1991a, 2003	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 1991a, 2003	
				AT-N	Averaging Time (Non-Cancer)	6	years	USEPA, 1991a, 2003	
				CF1	Conversion Factor 1	365	days/year	---	

- (1) The construction worker scenario is based on a worker working on a construction project for 250 days per year for 1 year. The worker is assumed to be exposed by inadvertent ingestion, dermal contact, and inhalation. The worker is assumed to be exposed to soil for 4 hours a day and groundwater for 4 hours a day. The ingestion rate of water is assumed to be 0.02 liters per day. This is two orders of magnitude lower than the daily drinking water ingestion rate and is intended to account for splashing and hand-to-mouth contact (VDEQ, 2004).
- (2) Value is calculated using the equations presented in Section 5.2.3 and assuming an exposure time of 4 hours (ET = 4 hr; VDEQ, 2004).
- (3) Value is calculated using the equations presented in Section 5.2.3 and assuming an exposure time of 35 minutes (ET = 0.58 hr; USEPA, 2004). Region III has adopted the high-end shower/bath times presented in RAGs E as default recommendations (USEPA, 2005).
- (4) Value is calculated using the equations presented in Section 5.2.3 and assuming an exposure time of 60 minutes (ET = 1.0 hr; USEPA, 2004). Region III has adopted the high-end shower/bath times presented in RAGs E as default recommendations (USEPA, 2005).

USEPA, 1991a: Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors, Interim Final. OSWER 9285.6-03.

USEPA, 1991b: Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part B, Development of Risk-Based Preliminary Remediation Goals). OSWER 9285.7-01B.

USEPA, 2003: EPA Region 3 Risk-Based Concentration Table: Technical Background Information, Region 3, Philadelphia, PA.

USEPA, 2004: Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment). Final.

USEPA, 2005: EPA Region 3 web site - <http://www.epa.gov/reg3hwmd/risk/human/index.htm>.

VDEQ, 2004: Voluntary Remediation Program Risk Assessment Guidance, Virginia Department of Environmental Quality.

Table E-34
Values Used for Daily Intake Calculations - Future Exposures to Groundwater, Inhalation
SWMU 31

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Industrial Worker (Indoor and Outdoor)	Adult	SWMU 31	CA	Modeled Ambient Air Concentration or Indoor Air Concentration	(1, 2)	mg/m ³	(1, 2)	Potential (Lifetime) Average Daily Dose [(L)ADD _{pot}] (mg/kg-day) = $\frac{CA \times IN \times EF \times ED \times ET}{BW \times AT \times CF1}$
				IN	Inhalation Rate	2.5	m ³ /hr	(3)	
				EF	Exposure Frequency	225	days/year	USEPA, 2002	
				ED	Exposure Duration	25	years	USEPA, 2002	
				ET	Exposure Time (Ambient Air)	8	hr/day	USEPA, 2002	
				BW	Body Weight	70	kg	USEPA, 2002	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	25	years	USEPA, 2002	
				CF1	Conversion Factor 1	365	days/year	---	
	Excavation Worker	Adult	SWMU 31	CA	Modeled Trench Air Concentration	(4)	mg/m ³	(4)	Potential (Lifetime) Average Daily Dose [(L)ADD _{pot}] (mg/kg-day) = $\frac{CA \times IN \times EF \times ED \times ET}{BW \times AT \times CF1}$
				IN	Inhalation Rate	2.5	m ³ /hr	(5)	
				EF	Exposure Frequency	250	days/year	(6)	
				ED	Exposure Duration	1	years	(6)	
				ET	Exposure Time (Trench Air)	4	hr/day	(6)	
				BW	Body Weight	70	kg	USEPA, 2002	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	1	years	USEPA, 2002	
				CF1	Conversion Factor 1	365	days/year	---	
	Resident	Adult	SWMU 31	CA	Indoor Air Concentration or Modeled Shower Room Air Concentration	(2, 7)	mg/m ³	(2, 7)	Potential (Lifetime) Average Daily Dose [(L)ADD _{pot}] (mg/kg-day) = $\frac{CA \times IN \times EF \times ED \times ET}{BW \times AT \times CF1}$
				IN	Inhalation Rate	0.83	m ³ /hr	(8)	
				EF	Exposure Frequency	350	days/year	USEPA, 1991a	
				ED	Exposure Duration	30	years	USEPA, 1991a	
				EDc	Exposure Duration (Cancer)	24	years	USEPA, 1991b	
				ET	Exposure Time (Shower Room Air/Indoor Air)	1.08/24	hr/day	(9); Johnson and Ettinger (1991)	
				BW	Body Weight	70	kg	USEPA, 1991a	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 1991a	
				AT-N	Averaging Time (Non-Cancer)	30	years	USEPA, 1991a	
				CF1	Conversion Factor 1	365	days/year	---	
	Resident	Child	SWMU 31	CA	Modeled Indoor Air Concentration	(2)	mg/m ³	(2)	Potential (Lifetime) Average Daily Dose [(L)ADD _{pot}] (mg/kg-day) = $\frac{CA \times IN \times EF \times ED \times ET}{BW \times AT \times CF1}$
				IN	Inhalation Rate	1	m ³ /hr	(10)	
				EF	Exposure Frequency	350	days/year	USEPA, 1991a	
				ED	Exposure Duration	6	years	USEPA, 1991a	
				ET	Exposure Time (Indoor Air)	24	hr/day	Johnson and Ettinger (1991)	
				BW	Body Weight	15	kg	USEPA, 1991a	
				AT-C	Averaging Time (Cancer)	70	years	USEPA, 1991a	
				AT-N	Averaging Time (Non-Cancer)	6	years	USEPA, 1991a	
				CF1	Conversion Factor 1	365	days/year	---	

- (1) Ambient air concentrations were modeled by a volatilization model (ASTM, 1995). A discussion of the model is provided in **Section 5.2.3**.
(2) Indoor air concentrations were modeled using the Johnson and Ettinger (1991) model. A discussion of the model is provided in **Section 5.3.3**.
(3) The hourly inhalation rate was derived by dividing the adult's daily 20 m³/day USEPA (1991) inhalation rate by 8 hours per day.
(4) Trench air concentrations were modeled by the Trench Model (VDEQ, 2004). A discussion of the model is provided in **Section 5.2.3**.
(5) The construction worker inhalation rate is based on the outdoor worker inhalation rate (i.e., the mean value for heavy activities from Table 5-23; USEPA, 1997).
(6) The default construction scenario is based on a worker working on a construction project for 250 days per year for 1 year. The construction worker is assumed to be exposed to groundwater for 4 hrs a day (VDEQ, 2004).
(7) Shower room air concentrations were modeled using the Foster and Chrostowski (1987) Shower Inhalation Model. Modeled concentrations were calculated in **Section 5.2.3** using data from site-specific EPC tables.
(8) The adult resident hourly inhalation rate was derived by dividing the adult daily 20 m³/day USEPA (1991) inhalation rate by 24 hours per day.
(9) An exposure time of 65 minutes (ET = 1.08 hr) is assumed - 35 minutes spent showering (based on the 95th percentile value for overall showering time; Table 15-21, USEPA 2004) with an additional 30 minutes in the shower room (USEPA, 2004).
Region III has adopted the high-end shower/bath times presented in RAGS E as default recommendations (USEPA, 2005). The exposure time for indoor air exposure to COCs via vapor intrusion is 24 hours/day.
(10) The child resident hourly inhalation rate was based on light activities (USEPA, 1997).

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USEPA, 2005: EPA Region 3 web site - <http://www.epa.gov/reg3hwmd/risk/human/index.htm>.
VDEQ, 2004: Voluntary Remediation Program Risk Assessment Guidance, Virginia Department of Environmental Quality.

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Scenario Timeframe: Current/ Future
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations											
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk							
							Value	Units	Value	Units								
Surface Soil	Surface Soil	SWMU 31	Ingestion	Organics	8.37E-06	mg/kg	2.6E-12	mg/kg-day	1.5E+05	(mg/kg-day) ⁻¹	3.9E-07							
				TCDD TE														
				Inorganics								4.9E-03	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
				Aluminum														
				Arsenic														
				Chromium														
				Cobalt														
				Iron														
				Manganese														
				Vanadium														
			Exp. Route Total									3.2E-06						
			Dermal Absorption	Organics	8.37E-06	mg/kg	5.2E-13	mg/kg-day	1.5E+05	(mg/kg-day) ⁻¹	7.8E-08							
				TCDD TE														
				Inorganics								3.2E-04	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
				Aluminum														
				Arsenic														
				Chromium														
				Cobalt														
				Iron														
				Manganese														
				Vanadium														
			Exp. Route Total									6.7E-07						
			Exposure Point Total										3.8E-06					
			Exposure Media Total										3.8E-06					
			Air (Particulates)	SWMU 31	Inhalation	Organics	8.37E-06	mg/kg	7.7E-16	mg/kg-day	1.5E+05	(mg/kg-day) ⁻¹	1.2E-10					
						TCDD TE												
Inorganics	1.4E-06	mg/kg-day				N/A								(mg/kg-day) ⁻¹	---			
Aluminum																		
Arsenic																		
Chromium																		
Cobalt																		
Iron																		
Manganese																		
Vanadium																		
Exp. Route Total									8.3E-09									
Exposure Point Total										8.3E-09								
Exposure Media Total										8.3E-09								
Soil Total										3.9E-06								
Sediment	Sediment	SWMU 31			Ingestion	Organics	3.00E-01	mg/kg	9.4E-08	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---					
						Dibenzofuran												
			Inorganics	1.03E+05		mg/kg								3.2E-02	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
			Aluminum															
			Arsenic															
			Cobalt															
			Iron															
Exp. Route Total									5.8E-06									

Table E-42
Calculation of Cancer Risks
Reasonable Maximum Exposure
Current/Future - Industrial Worker - On Site
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Scenario Timeframe: Current/ Future
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk
							Value	Units	Value	Units	
Sediment (cont'd)	Sediment (cont'd)	SWMU 31	Dermal Absorption	Organics Dibenzofuran	3.00E-01	mg/kg	1.9E-07	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Inorganics Aluminum	1.03E+05	mg/kg	6.4E-03	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Arsenic	1.22E+01	mg/kg	2.4E-06	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	3.6E-06
				Cobalt	1.65E+01	mg/kg	3.3E-06	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Iron	2.53E+04	mg/kg	1.6E-03	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
		Exp. Route Total								3.6E-06	
		Exposure Point Total								9.4E-06	
	Exposure Media Total									9.4E-06	
Sediment Total							9.4E-06				
Surface Water	Surface Water	SWMU 31	Dermal Absorption	Organics Bromodichloromethane	3.60E+00	µg/L	4.4E-07	mg/kg-day	6.2E-02	(mg/kg-day) ⁻¹	2.7E-08
				Chloroform	3.00E+01	µg/L	4.1E-06	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Inorganics Aluminum	1.32E+04	µg/L	1.4E-04	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
				Exp. Route Total							
		Exposure Point Total								2.7E-08	
	Exposure Media Total									2.7E-08	
Surface Water Total							2.7E-08				
Groundwater	Groundwater	SWMU 31	Inhalation Ambient Air	Organics Chloroform	1.63E-05	mg/m³	1.0E-06	mg/kg-day	8.1E-02	(mg/kg-day) ⁻¹	8.3E-08
				Exp. Route Total							8.3E-08
		Exposure Point Total								8.3E-08	
	Exposure Media Total									8.3E-08	
Groundwater Total							8.3E-08				
Total of Receptor Risks Across All Media											1.3E-05

N/A = Not Applicable.

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Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	
					Value	Units	Value	Units	Value	Units		
Total Soil	Total Soil	SWMU 31	Ingestion	Organics								
				TCDD TE	8.37E-06	mg/kg	2.6E-12	mg/kg-day	1.5E+05	(mg/kg-day) ⁻¹	3.9E-07	
				Inorganics								
				Aluminum	1.70E+04	mg/kg	5.3E-03	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
				Arsenic	5.90E+00	mg/kg	1.9E-06	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	2.8E-06	
				Chromium	2.97E+01	mg/kg	9.3E-06	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
				Cobalt	1.85E+01	mg/kg	5.8E-06	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
				Iron	2.84E+04	mg/kg	8.9E-03	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
				Manganese	4.95E+02	mg/kg	1.6E-04	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
				Vanadium	4.92E+01	mg/kg	1.5E-05	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
				Exp. Route Total							3.2E-06	
				Dermal Absorption	Organics							
			TCDD TE		8.37E-06	mg/kg	5.2E-13	mg/kg-day	1.5E+05	(mg/kg-day) ⁻¹	7.8E-08	
			Inorganics									
			Aluminum		1.70E+04	mg/kg	3.5E-04	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
			Arsenic		5.90E+00	mg/kg	3.9E-07	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	5.9E-07	
			Chromium		2.97E+01	mg/kg	6.2E-07	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
			Cobalt		1.85E+01	mg/kg	3.8E-07	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
			Iron		2.84E+04	mg/kg	5.9E-04	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
			Manganese		4.95E+02	mg/kg	1.0E-05	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
			Vanadium		4.92E+01	mg/kg	1.0E-06	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
			Exp. Route Total								6.7E-07	
			Exposure Point Total								3.8E-06	
			Exposure Media Total							3.8E-06		
		Air (Particulates)	SWMU 31	Inhalation	Organics							
					TCDD TE	8.37E-06	mg/kg	7.7E-16	mg/kg-day	1.5E+05	(mg/kg-day) ⁻¹	1.2E-10
					Inorganics							
					Aluminum	1.70E+04	mg/kg	1.6E-06	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
					Arsenic	5.90E+00	mg/kg	5.4E-10	mg/kg-day	1.5E+01	(mg/kg-day) ⁻¹	8.2E-09
					Chromium	2.97E+01	mg/kg	2.7E-09	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
					Cobalt	1.85E+01	mg/kg	1.7E-09	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
					Iron	2.84E+04	mg/kg	2.6E-06	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---
Manganese	4.95E+02				mg/kg	4.5E-08	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
Vanadium	4.92E+01				mg/kg	4.5E-09	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---		
Exp. Route Total									8.3E-09			
Exposure Point Total									8.3E-09			
Exposure Media Total								8.3E-09				
Soil Total								3.9E-06				

Table E-43
Calculation of Cancer Risks
Reasonable Maximum Exposure
Future - Industrial Worker - On Site
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Scenario Timeframe: Future
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	
					Value	Units	Value	Units	Value	Units		
Groundwater	Groundwater	SWMU 31	Ingestion	Organics								
				Benzo(a)pyrene	6.10E-02	µg/L	1.9E-07	mg/kg-day	7.3E+00	(mg/kg-day) ⁻¹	1.4E-06	
				Chloroform	1.10E+01	µg/L	3.5E-05	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
				Inorganics								
				Aluminum	2.68E+03	µg/L	8.4E-03	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
				Arsenic	9.40E+00	µg/L	3.0E-05	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	4.4E-05	
				Cobalt	3.80E+00	µg/L	1.2E-05	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
				Iron	7.08E+03	µg/L	2.2E-02	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
				Manganese	1.83E+02	µg/L	5.8E-04	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
				Vanadium	1.74E+01	µg/L	5.5E-05	mg/kg-day	N/A	(mg/kg-day) ⁻¹	---	
			Exp. Route Total							4.6E-05		
		Exposure Point Total							4.6E-05			
	Exposure Media Total							4.6E-05				
	Air	SWMU 31	Inhalation	Organics								
				Indoor Air	2.45E-04	mg/m³	1.5E-05	mg/kg-day	8.1E-02	(mg/kg-day) ⁻¹	1.2E-06	
				Exp. Route Total							1.2E-06	
				Exposure Point Total							1.2E-06	
			Exposure Media Total							1.2E-06		
Groundwater Total											4.7E-05	
						Total of Receptor Risks Across All Media					5.1E-05	

N/A = Not Applicable.

Table E-53
Calculation of Non-cancer Hazards
Reasonable Maximum Exposure
Current/Future - Industrial Worker - On Site
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Scenario Timeframe: Current/Future
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
							Value	Units	Value	Units		
Surface Soil	Surface Soil	SWMU 31	Ingestion	Organics								
				TCDD TE	8.37E-06	mg/kg	7.4E-12	mg/kg-day	N/A	mg/kg-day	---	
				Inorganics								
				Aluminum	1.55E+04	mg/kg	1.4E-02	mg/kg-day	N/A	mg/kg-day	---	
				Arsenic	5.90E+00	mg/kg	5.2E-06	mg/kg-day	3.0E-04	mg/kg-day	1.7E-02	
				Chromium	2.82E+01	mg/kg	2.5E-05	mg/kg-day	1.5E+00	mg/kg-day	1.7E-05	
				Cobalt	1.78E+01	mg/kg	1.6E-05	mg/kg-day	N/A	mg/kg-day	---	
				Iron	2.78E+04	mg/kg	2.4E-02	mg/kg-day	3.0E-01	mg/kg-day	8.2E-02	
				Manganese	4.95E+02	mg/kg	4.4E-04	mg/kg-day	2.0E-02	mg/kg-day	2.2E-02	
				Vanadium	4.75E+01	mg/kg	4.2E-05	mg/kg-day	1.0E-03	mg/kg-day	4.2E-02	
			Exp. Route Total							1.6E-01		
			Dermal Absorption	Organics								
				TCDD TE	8.37E-06	mg/kg	1.5E-12	mg/kg-day	N/A	mg/kg-day	---	
				Inorganics								
				Aluminum	1.55E+04	mg/kg	9.0E-04	mg/kg-day	N/A	mg/kg-day	---	
				Arsenic	5.90E+00	mg/kg	1.1E-06	mg/kg-day	3.0E-04	mg/kg-day	3.7E-03	
				Chromium	2.82E+01	mg/kg	1.6E-06	mg/kg-day	2.0E-02	mg/kg-day	8.4E-05	
				Cobalt	1.78E+01	mg/kg	1.0E-06	mg/kg-day	N/A	mg/kg-day	---	
				Iron	2.78E+04	mg/kg	1.6E-03	mg/kg-day	3.0E-01	mg/kg-day	5.4E-03	
				Manganese	4.95E+02	mg/kg	2.9E-05	mg/kg-day	8.0E-04	mg/kg-day	3.6E-02	
				Vanadium	4.75E+01	mg/kg	2.8E-06	mg/kg-day	2.6E-05	mg/kg-day	1.1E-01	
			Exp. Route Total							1.5E-01		
		Exposure Point Total									3.1E-01	
		Exposure Media Total									3.1E-01	
	Air (Particulates)	SWMU 31	Inhalation	Organics								
				TCDD TE	8.37E-06	mg/kg	2.2E-15	mg/kg-day	N/A	mg/kg-day	---	
				Inorganics								
				Aluminum	1.55E+04	mg/kg	4.0E-06	mg/kg-day	N/A	mg/kg-day	---	
				Arsenic	5.90E+00	mg/kg	1.5E-09	mg/kg-day	N/A	mg/kg-day	---	
				Chromium	2.82E+01	mg/kg	7.3E-09	mg/kg-day	N/A	mg/kg-day	---	
				Cobalt	1.78E+01	mg/kg	4.6E-09	mg/kg-day	N/A	mg/kg-day	---	
				Iron	2.78E+04	mg/kg	7.2E-06	mg/kg-day	N/A	mg/kg-day	---	
				Manganese	4.95E+02	mg/kg	1.3E-07	mg/kg-day	1.4E-05	mg/kg-day	8.9E-03	
				Vanadium	4.75E+01	mg/kg	1.2E-08	mg/kg-day	N/A	mg/kg-day	---	
			Exp. Route Total							8.9E-03		
		Exposure Point Total									8.9E-03	
		Exposure Media Total									8.9E-03	
Soil Total									3.2E-01			
Sediment	Sediment	SWMU 31	Ingestion	Organics								
				Dibenzofuran	3.00E-01	mg/kg	2.6E-07	mg/kg-day	N/A	mg/kg-day	---	
				Inorganics								
				Aluminum	1.03E+05	mg/kg	9.1E-02	mg/kg-day	N/A	mg/kg-day	---	
				Arsenic	1.22E+01	mg/kg	1.1E-05	mg/kg-day	3.0E-04	mg/kg-day	3.6E-02	
				Cobalt	1.65E+01	mg/kg	1.5E-05	mg/kg-day	N/A	mg/kg-day	---	
			Iron	2.53E+04	mg/kg	2.2E-02	mg/kg-day	3.0E-01	mg/kg-day	7.4E-02		
Exp. Route Total							1.1E-01					

Table E-53
Calculation of Non-cancer Hazards
Reasonable Maximum Exposure
Current/Future - Industrial Worker - On Site
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Scenario Timeframe: Current/Future
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
							Value	Units	Value	Units		
Sediment (cont'd)	Sediment (cont'd)	SWMU 31	Dermal Absorption	Organics Dibenzofuran	3.00E-01	mg/kg	1.7E-07	mg/kg-day	N/A	mg/kg-day	---	
				Inorganics Aluminum	1.03E+05	mg/kg	1.8E-02	mg/kg-day	N/A	mg/kg-day	---	
				Arsenic	1.22E+01	mg/kg	6.8E-06	mg/kg-day	3.0E-04	mg/kg-day	2.3E-02	
				Cobalt	1.65E+01	mg/kg	9.2E-06	mg/kg-day	N/A	mg/kg-day	---	
				Iron	2.53E+04	mg/kg	4.4E-03	mg/kg-day	3.0E-01	mg/kg-day	1.5E-02	
			Exp. Route Total								3.7E-02	
		Exposure Point Total								1.5E-01		
		Exposure Media Total								1.5E-01		
Sediment Total											1.5E-01	
Surface Water	Surface Water	SWMU 31	Dermal Absorption	Organics Bromodichloromethane	3.60E+00	µg/l	1.2E-06	mg/kg-day	2.0E-02	mg/kg-day	6.2E-05	
				Chloroform	3.00E+01	µg/l	1.1E-05	mg/kg-day	1.0E-02	mg/kg-day	1.1E-03	
				Inorganics Aluminum	1.32E+04	µg/l	3.8E-04	mg/kg-day	N/A	mg/kg-day	---	
			Exp. Route Total								1.2E-03	
		Exposure Point Total								1.2E-03		
		Exposure Media Total								1.2E-03		
Surface Water Total											1.2E-03	
Groundwater	Groundwater	SWMU 31	Inhalation Ambient Air	Organics Chloroform	1.63E-05	mg/m³	2.9E-06	mg/kg-day	1.4E-02	mg/kg-day	2.1E-04	
				Exp. Route Total								2.1E-04
		Exposure Point Total								2.1E-04		
		Exposure Media Total								2.1E-04		
Groundwater Total											2.1E-04	
Total of Receptor Hazards Across All Media											4.7E-01	

N/A = Not Applicable.

Table E-54
Calculation of Non-cancer Hazards
Reasonable Maximum Exposure
Future - Industrial Worker - On Site
Page 19 of 53

Scenario Timeframe: Future
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-Cancer Hazard Calculations						
					Value	Units	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient		
							Value	Units	Value	Units			
Total Soil	Total Soil	SWMU 31	Ingestion	Organics	8.37E-06	mg/kg	7.4E-12	mg/kg-day	N/A	mg/kg-day	---		
				TCDD TE									
				Inorganics									
				Aluminum									
				Arsenic									
				Chromium									
				Cobalt									
				Iron									
				Manganese									
				Vanadium									
			Exp. Route Total						1.7E-01				
			Dermal Absorption	Organics	8.37E-06	mg/kg	1.5E-12	mg/kg-day	N/A	mg/kg-day	---		
				TCDD TE									
				Inorganics									
				Aluminum									
				Arsenic									
				Chromium									
				Cobalt									
				Iron									
				Manganese									
				Vanadium									
			Exp. Route Total						1.6E-01				
			Exposure Point Total										3.2E-01
			Exposure Media Total										3.2E-01
			Air (Particulates)	SWMU 31	Inhalation	Organics	8.37E-06	mg/kg	2.2E-15	mg/kg-day	N/A	mg/kg-day	---
						TCDD TE							
						Inorganics							
						Aluminum							
						Arsenic							
						Chromium							
		Cobalt											
Iron													
Manganese													
Vanadium													
Exp. Route Total						8.9E-03							
Exposure Point Total										8.9E-03			
Exposure Media Total										8.9E-03			
Soil Total										3.3E-01			

Table E-54
Calculation of Non-cancer Hazards
Reasonable Maximum Exposure
Future - Industrial Worker - On Site
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Scenario Timeframe: Future
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-Cancer Hazard Calculations					
					Value	Units	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
							Value	Units	Value	Units		
Groundwater	Groundwater	SWMU 31	Ingestion	Organics								
				Benzo(a)pyrene	6.10E-02	µg/L	5.4E-07	mg/kg-day	N/A	mg/kg-day	---	
				Chloroform	1.10E+01	µg/L	9.7E-05	mg/kg-day	1.0E-02	mg/kg-day	9.7E-03	
				Inorganics								
				Aluminum	2.68E+03	µg/L	2.4E-02	mg/kg-day	N/A	mg/kg-day	---	
				Arsenic	9.40E+00	µg/L	8.3E-05	mg/kg-day	3.0E-04	mg/kg-day	2.8E-01	
				Cobalt	3.80E+00	µg/L	3.3E-05	mg/kg-day	N/A	mg/kg-day	---	
				Iron	7.08E+03	µg/L	6.2E-02	mg/kg-day	3.0E-01	mg/kg-day	2.1E-01	
				Manganese	1.83E+02	µg/L	1.6E-03	mg/kg-day	2.0E-02	mg/kg-day	8.1E-02	
				Vanadium	1.74E+01	µg/L	1.5E-04	mg/kg-day	1.0E-03	mg/kg-day	1.5E-01	
			Exp. Route Total							7.3E-01		
		Exposure Point Total							7.3E-01			
	Exposure Media Total							7.3E-01				
	Air	SWMU 31	Inhalation	Organics								
				Indoor Air								
				Chloroform	2.45E-04	mg/m³	4.3E-05	mg/kg-day	1.4E-02	mg/kg-day	3.1E-03	
			Exp. Route Total							3.1E-03		
		Exposure Point Total							3.1E-03			
	Exposure Media Total							3.1E-03				
Groundwater Total											7.3E-01	
							Total of Receptor Hazards Across All Media					1.1E+00

N/A = Not Applicable.

Table E-62
Summary of Receptor Risks and Hazards for COPCs
Reasonable Maximum Exposure
Current - Maintenance Worker - On Site
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Scenario Timeframe: Current
Receptor Population: Maintenance Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	SWMU 31	TCDD TE	8.8E-08		1.7E-08		1.1E-07	N/A	---		---	---
			Aluminum	---		---		---	N/A	---		---	---
			Arsenic	6.2E-07		1.2E-07		7.4E-07	Skin, Vascular Effects	3.8E-03		7.6E-04	4.6E-03
			Chromium ^a	---		---		---	NOAEL	3.7E-06		1.9E-05	2.2E-05
			Cobalt	---		---		---	N/A	---		---	---
			Iron	---		---		---	Blood, Liver, GI Irritation	1.8E-02		1.2E-03	1.9E-02
			Manganese	---		---		---	CNS	4.8E-03		8.0E-03	1.3E-02
			Vanadium	---		---		---	Kidney	9.3E-03		2.4E-02	3.3E-02
			Chemical Total	7.1E-07		1.4E-07		8.5E-07		0.036		0.034	0.070
		Radionuclide Total											
	Exposure Point Total						8.5E-07					0.070	
	Exposure Media Total						8.5E-07					0.070	
	Air	SWMU 31	TCDD TE		2.6E-11			2.6E-11	N/A		---		---
			Aluminum		---			---	N/A		---		---
			Arsenic		1.8E-09			1.8E-09	N/A		---		---
			Chromium		---			---	N/A		---		---
			Cobalt		---			---	N/A		---		---
Iron				---			---	N/A		---		---	
Manganese				---			---	CNS		2.0E-03		2.0E-03	
Vanadium				---			---	N/A		---		---	
Chemical Total			1.8E-09			1.8E-09			0.0020		0.0020		
Radionuclide Total													
Exposure Point Total						1.8E-09					0.0020		
Exposure Media Total						1.8E-09					0.0020		
Soil Total								8.5E-07					0.072
Sediment	Sediment	SWMU 31	Dibenzofuran	---		---		---	N/A	---		---	---
			Aluminum	---		---		---	N/A	---		---	---
			Arsenic	1.3E-06		7.6E-07		2.0E-06	Skin, Vascular Effects	8.0E-03		4.7E-03	1.3E-02
			Cobalt	---		---		---	N/A	---		---	---
			Iron	---		---		---	Blood, Liver, GI Irritation	1.7E-02		3.3E-03	2.0E-02
			Chemical Total	1.3E-06		7.6E-07		2.0E-06		0.024		0.008	0.032
			Radionuclide Total										
		Exposure Point Total						2.0E-06					0.032
	Exposure Media Total						2.0E-06					0.032	
Sediment Total								2.0E-06				0.032	

Table E-62
Summary of Receptor Risks and Hazards for COPCs
Reasonable Maximum Exposure
Current - Maintenance Worker - On Site
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Scenario Timeframe: Current
 Receptor Population: Maintenance Worker
 Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Surface Water	Surface Water	SWMU 31	Bromodichloromethane Chloroform			6.1E-09 ---		6.1E-09 ---	Kidney Liver			1.4E-05 2.5E-04	1.4E-05 2.5E-04	
			Aluminum				---	N/A				---	---	
			Chemical Total			6.1E-09		6.1E-09				0.00027	0.00027	
			Radionuclide Total											
		Exposure Point Total				6.1E-09						0.00027		
	Exposure Media Total				6.1E-09						0.00027			
Surface Water Total								6.1E-09					0.00027	
Groundwater	Air (Ambient)	SWMU 31	Chloroform		1.8E-08			1.8E-08	N/A			4.6E-05		4.6E-05
			Chemical Total		1.8E-08			1.8E-08				0.000046		0.000046
			Radionuclide Total											
		Exposure Point Total				1.8E-08						0.000046		
	Exposure Media Total				1.8E-08						0.000046			
Groundwater Total								1.8E-08					0.000046	
Receptor Total								2.9E-06					0.10	

Total Risk Across All Media = 2.9E-06

Total Hazard Across All Media = 0.10

(a) The RfD for this chemical is based on NOAEL; no target organ is identified.

CNS = Central Nervous System.

GI = Gastrointestinal.

NOAEL = No Observed Adverse Effect Level.

N/A = Not Available.

Total Skin HI Across All Media =	0.017
Total Vascular Effects HI Across All Media =	0.017
Total NOAEL HI Across All Media =	0.000022
Total Blood HI Across All Media =	0.039
Total Liver HI Across All Media =	0.039
Total GI Irritation HI Across All Media =	0.039
Total CNS HI Across All Media =	0.015
Total Kidney HI Across All Media =	0.033

Table E-63
Summary of Receptor Risks and Hazards for COPCs
Reasonable Maximum Exposure
Future - Maintenance Worker - On Site
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Scenario Timeframe: Future
Receptor Population: Maintenance Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	SWMU 31	TCDD TE	8.8E-08		1.7E-08		1.1E-07	N/A	---		---	---
			Aluminum	---		---		---	N/A	---		---	---
			Arsenic	6.2E-07		1.2E-07		7.4E-07	Skin, Vascular Effects	3.8E-03		7.6E-04	4.6E-03
			Chromium ^a	---		---		---	NOAEL	3.7E-06		1.9E-05	2.2E-05
			Cobalt	---		---		---	N/A	---		---	---
			Iron	---		---		---	Blood, Liver, GI Irritation	1.8E-02		1.2E-03	1.9E-02
			Manganese	---		---		---	CNS	4.8E-03		8.0E-03	1.3E-02
			Vanadium	---		---		---	Kidney	9.3E-03		2.4E-02	3.3E-02
			Chemical Total	7.1E-07		1.4E-07		8.5E-07		0.036		0.034	0.070
		Radionuclide Total											
		Exposure Point Total						8.5E-07					0.070
	Exposure Media Total						8.5E-07					0.070	
	Air	SWMU 31	TCDD TE		2.6E-11			2.6E-11	N/A		---		---
			Aluminum		---			---	N/A		---		---
			Arsenic		1.8E-09			1.8E-09	N/A		---		---
			Chromium		---			---	N/A		---		---
			Cobalt		---			---	N/A		---		---
			Iron		---			---	N/A		---		---
			Manganese		---			---	CNS		2.0E-03		2.0E-03
			Vanadium		---			---	N/A		---		---
			Chemical Total		1.8E-09			1.8E-09			0.0020		0.0020
		Radionuclide Total											
		Exposure Point Total						1.8E-09					0.0020
		Exposure Media Total						1.8E-09					0.0020
Soil Total							8.5E-07				0.072		
Total Soil	Total Soil	SWMU 31	TCDD TE	8.8E-08		1.7E-08		1.1E-07	N/A	---		---	---
			Aluminum	---		---		---	N/A	---		---	---
			Arsenic	6.2E-07		1.2E-07		7.4E-07	Skin, Vascular Effects	3.8E-03		7.6E-04	4.6E-03
			Chromium ^a	---		---		---	NOAEL	3.9E-06		2.0E-05	2.4E-05
			Cobalt	---		---		---	N/A	---		---	---
			Iron	---		---		---	Blood, Liver, GI Irritation	1.9E-02		1.2E-03	2.0E-02
			Manganese	---		---		---	CNS	4.8E-03		8.0E-03	1.3E-02
			Vanadium	---		---		---	Kidney	9.6E-03		2.4E-02	3.4E-02
			Chemical Total	7.1E-07		1.4E-07		8.5E-07		0.037		0.034	0.071
		Radionuclide Total											
		Exposure Point Total						8.5E-07					0.071
	Exposure Media Total						8.5E-07					0.071	

Table E-63
Summary of Receptor Risks and Hazards for COPCs
Reasonable Maximum Exposure
Future - Maintenance Worker - On Site
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Scenario Timeframe: Future
Receptor Population: Maintenance Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Air	SWMU 31	TCDD TE		2.6E-11			2.6E-11	N/A		---		---
			Aluminum		---			---	N/A		---		---
			Arsenic		1.8E-09			1.8E-09	N/A		---		---
			Chromium		---			---	N/A		---		---
			Cobalt		---			---	N/A		---		---
			Iron		---			---	N/A		---		---
			Manganese		---			---	CNS		2.0E-03		2.0E-03
			Vanadium		---			---	N/A		---		---
			Chemical Total		1.8E-09			1.8E-09			0.0020		0.0020
	Radionuclide Total												
		Exposure Point Total						1.8E-09					0.0020
	Exposure Media Total						1.8E-09					0.0020	
Total Soil Total								8.5E-07					0.073
Sediment	Sediment	SWMU 31	Dibenzofuran	---		---		---	N/A	---		---	---
			Aluminum	---		---		---	N/A	---		---	---
			Arsenic	1.3E-06		7.6E-07		2.0E-06	Skin, Vascular Effects	8.0E-03		4.7E-03	1.3E-02
			Cobalt	---		---		---	N/A	---		---	---
			Iron	---		---		---	Blood, Liver, GI Irritation	1.7E-02		3.3E-03	2.0E-02
			Chemical Total	1.3E-06		7.6E-07		2.0E-06		0.024		0.008	0.032
	Radionuclide Total												
		Exposure Point Total						2.0E-06					0.032
	Exposure Media Total						2.0E-06					0.032	
Sediment Total								2.0E-06					0.032
Surface Water	Surface Water	SWMU 31	Bromodichloromethane			6.1E-09		6.1E-09	Kidney			1.4E-05	1.4E-05
			Chloroform			---		---	Liver			2.5E-04	2.5E-04
			Aluminum			---		---	N/A			---	---
			Chemical Total			6.1E-09		6.1E-09				0.00027	0.00027
			Radionuclide Total										
			Exposure Point Total						6.1E-09				
	Exposure Media Total						6.1E-09					0.00027	
Surface Water Total								6.1E-09					0.00027

Table E-63
Summary of Receptor Risks and Hazards for COPCs
Reasonable Maximum Exposure
Future - Maintenance Worker - On Site
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Scenario Timeframe: Future Receptor Population: Maintenance Worker Receptor Age: Adult
--

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air (ambient)	SWMU 31	Chloroform		1.8E-08			1.8E-08	N/A		4.6E-05		4.6E-05
			Chemical Total		1.8E-08			1.8E-08			0.000046		0.000046
			Radionuclide Total										
			Exposure Point Total				1.8E-08					0.000046	
		Exposure Media Total				1.8E-08					0.000046		
		Groundwater Total				1.8E-08					0.000046		
Receptor Total ^b								2.9E-06					0.11

Total Risk Across All Media^b = 2.9E-06

Total Hazard Across All Media^b = 0.11

(a) The RfD for this chemical is based on NOAEL; no target organ is identified.

(b) Since **total soil** represents the more highly contaminated portion of soil (based on hazard), total risk and hazard estimates are conservatively based on this soil data grouping.

CNS = Central Nervous System.

GI = Gastrointestinal.

NOAEL = No Observed Adverse Effect Level.

N/A = Not Available

Total Skin HI Across All Media =	0.017
Total Vascular Effects HI Across All Media =	0.017
Total NOAEL HI Across All Media =	0.000024
Total Blood HI Across All Media =	0.040
Total Liver HI Across All Media =	0.040
Total GI Irritation HI Across All Media =	0.040
Total CNS HI Across All Media =	0.015
Total Kidney HI Across All Media =	0.034

Table E-64
Summary of Receptor Risks and Hazards for COPCs
Reasonable Maximum Exposure
Current - Outdoor Industrial Worker - On Site
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Scenario Timeframe: Current
Receptor Population: Industrial Worker (Outdoor)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	SWMU 31	TCDD TE	3.9E-07		7.8E-08		4.7E-07	N/A	---		---	---
			Aluminum	---		---		---	N/A	---		---	---
			Arsenic	2.8E-06		5.5E-07		3.3E-06	Skin, Vascular Effects	1.7E-02		3.4E-03	2.1E-02
			Chromium ^a	---		---		---	NOAEL	1.7E-05		8.4E-05	1.0E-04
			Cobalt	---		---		---	N/A	---		---	---
			Iron	---		---		---	Blood, Liver, GI Irritation	8.2E-02		5.4E-03	8.7E-02
			Manganese	---		---		---	CNS	2.2E-02		3.6E-02	5.8E-02
			Vanadium	---		---		---	Kidney	4.2E-02		1.1E-01	1.5E-01
			Chemical Total	3.2E-06		6.3E-07		3.8E-06		0.16		0.15	0.31
		Radionuclide Total											
	Exposure Point Total			3.8E-06					0.31				
	Exposure Media Total			3.8E-06					0.31				
	Air	SWMU 31	TCDD TE		1.2E-10		1.2E-10	N/A		---		---	
			Aluminum		---		---	N/A		---		---	
			Arsenic		8.2E-09		8.2E-09	N/A		---		---	
			Chromium		---		---	N/A		---		---	
			Cobalt		---		---	N/A		---		---	
Iron				---		---	N/A		---		---		
Manganese				---		---	CNS		8.9E-03		8.9E-03		
Vanadium				---		---	N/A		---		---		
Chemical Total			8.3E-09		8.3E-09			0.009		0.009			
Radionuclide Total													
Exposure Point Total			8.3E-09					0.009					
Exposure Media Total			8.3E-09					0.009					
Soil Total			3.8E-06					0.32					
Sediment	Sediment	SWMU 31	Dibenzofuran	---		---		---	N/A	---		---	---
			Aluminum	---		---		---	N/A	---		---	---
			Arsenic	5.8E-06		3.4E-06		9.2E-06	Skin, Vascular Effects	3.6E-02		2.1E-02	5.7E-02
			Cobalt	---		---		---	N/A	---		---	---
			Iron	---		---		---	Blood, Liver, GI Irritation	7.4E-02		1.5E-02	8.9E-02
			Chemical Total	5.8E-06		3.4E-06		9.2E-06		0.11		0.04	0.15
			Radionuclide Total										
		Exposure Point Total			9.2E-06					0.15			
	Exposure Media Total			9.2E-06					0.15				
Sediment Total			9.2E-06					0.15					

Table E-64
Summary of Receptor Risks and Hazards for COPCs
Reasonable Maximum Exposure
Current - Outdoor Industrial Worker - On Site
Page 27 of 53

Scenario Timeframe: Current
Receptor Population: Industrial Worker (Outdoor)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	SWMU 31	Bromodichloromethane			2.7E-08		2.7E-08	Kidney Liver			6.2E-05	6.2E-05
			Chloroform			---		---		1.1E-03	1.1E-03		
			Aluminum			---		---	N/A		---	---	
			Chemical Total			2.7E-08		2.7E-08			0.0012	0.0012	
		Radionuclide Total											
		Exposure Point Total						2.7E-08					0.0012
	Exposure Media Total						2.7E-08					0.0012	
Surface Water Total								2.7E-08					0.0012
Groundwater	Air (Ambient)	SWMU 31	Chloroform		8.3E-08			8.3E-08	N/A		2.1E-04		2.1E-04
			Chemical Total		8.3E-08			8.3E-08			0.00021		0.00021
			Radionuclide Total										
			Exposure Point Total						8.3E-08				
	Exposure Media Total						8.3E-08					0.00021	
Groundwater Total								8.3E-08					0.00021
Receptor Total								1.3E-05					0.47

Total Risk Across All Media^b = 1.3E-05

Total Hazard Across All Media^b = 0.47

(a) The RfD for this chemical is based on NOAEL; no target organ is identified.

CNS = Central Nervous System.

GI = Gastrointestinal.

NOAEL = No Observed Adverse Effect Level.

N/A = Not Available

Total Skin HI Across All Media =	0.078
Total Vascular Effects HI Across All Media =	0.078
Total NOAEL HI Across All Media =	0.00010
Total Blood HI Across All Media =	0.18
Total Liver HI Across All Media =	0.18
Total GI Irritation HI Across All Media =	0.18
Total CNS HI Across All Media =	0.067
Total Kidney HI Across All Media =	0.15

Table E-65
Summary of Receptor Risks and Hazards for COPCs
Reasonable Maximum Exposure
Future - Outdoor Industrial Worker - On Site
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Scenario Timeframe: Future
Receptor Population: Industrial Worker (Outdoor)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	SWMU 31	TCDD TE	3.9E-07		7.8E-08		4.7E-07	N/A	---		---	---
			Aluminum	---		---		---	N/A	---		---	---
			Arsenic	2.8E-06		5.5E-07		3.3E-06	Skin, Vascular Effects	1.7E-02		3.4E-03	2.1E-02
			Chromium ^a	---		---		---	NOAEL	1.7E-05		8.4E-05	1.0E-04
			Cobalt	---		---		---	N/A	---		---	---
			Iron	---		---		---	Blood, Liver, GI Irritation	8.2E-02		5.4E-03	8.7E-02
			Manganese	---		---		---	CNS	2.2E-02		3.6E-02	5.8E-02
			Vanadium	---		---		---	Kidney	4.2E-02		1.1E-01	1.5E-01
			Chemical Total	3.2E-06		6.3E-07		3.8E-06		0.16		0.15	0.31
		Radionuclide Total											
		Exposure Point Total						3.8E-06					0.31
	Exposure Media Total						3.8E-06					0.31	
	Air	SWMU 31	TCDD TE		1.2E-10			1.2E-10	N/A		---		---
			Aluminum		---			---	N/A		---		---
			Arsenic		8.2E-09			8.2E-09	N/A		---		---
			Chromium		---			---	N/A		---		---
			Cobalt		---			---	N/A		---		---
			Iron		---			---	N/A		---		---
			Manganese		---			---	CNS		8.9E-03		8.9E-03
			Vanadium		---			---	N/A		---		---
			Chemical Total		8.3E-09			8.3E-09			0.009		0.009
		Radionuclide Total											
		Exposure Point Total						8.3E-09					0.009
	Exposure Media Total						8.3E-09					0.009	
Soil Total							3.8E-06					0.32	
Total Soil	Total Soil	SWMU 31	TCDD TE	3.9E-07		7.8E-08		4.7E-07	N/A	---		---	---
			Aluminum	---		---		---	N/A	---		---	---
			Arsenic	2.8E-06		5.5E-07		3.3E-06	Skin, Vascular Effects	1.7E-02		3.4E-03	2.1E-02
			Chromium ^a	---		---		---	NOAEL	1.7E-05		8.9E-05	1.1E-04
			Cobalt	---		---		---	N/A	---		---	---
			Iron	---		---		---	Blood, Liver, GI Irritation	8.3E-02		5.5E-03	8.9E-02
			Manganese	---		---		---	CNS	2.2E-02		3.6E-02	5.8E-02
			Vanadium	---		---		---	Kidney	4.3E-02		1.1E-01	1.5E-01
			Chemical Total	3.2E-06		6.3E-07		3.8E-06		0.17		0.15	0.32
		Radionuclide Total											
		Exposure Point Total						3.8E-06					0.32
	Exposure Media Total						3.8E-06					0.32	

Table E-65
Summary of Receptor Risks and Hazards for COPCs
Reasonable Maximum Exposure
Future - Outdoor Industrial Worker - On Site
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Scenario Timeframe: Future
Receptor Population: Industrial Worker (Outdoor)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total	
	Air	SWMU 31	TCDD TE		1.2E-10			1.2E-10	N/A		---		---	
			Aluminum		---			---	N/A		---		---	
			Arsenic		8.2E-09			8.2E-09	N/A		---		---	
			Chromium		---			---	N/A		---		---	
			Cobalt		---			---	N/A		---		---	
			Iron		---			---	N/A		---		---	
			Manganese		---			---	CNS		8.9E-03		8.9E-03	
			Vanadium		---			---	N/A		---		---	
			Chemical Total		8.3E-09			8.3E-09			0.009		0.009	
	Radionuclide Total													
		Exposure Point Total						8.3E-09					0.009	
	Exposure Media Total						8.3E-09					0.009		
Total Soil Total									3.8E-06					0.33
Sediment	Sediment	SWMU 31	Dibenzofuran	---		---		---	N/A	---		---	---	
			Aluminum	---		---		---	N/A	---		---	---	
			Arsenic	5.8E-06		3.4E-06		9.2E-06	Skin, Vascular Effects	3.6E-02		2.1E-02	5.7E-02	
			Cobalt	---		---		---	N/A	---		---	---	
			Iron	---		---		---	Blood, Liver, GI Irritation	7.4E-02		1.5E-02	8.9E-02	
			Chemical Total	5.8E-06		3.4E-06		9.2E-06		0.11		0.04	0.15	
			Radionuclide Total											
			Exposure Point Total						9.2E-06					0.15
			Exposure Media Total						9.2E-06					0.15
Sediment Total									9.2E-06					0.15
Surface Water	Surface Water	SWMU 31	Bromodichloromethane			2.7E-08		2.7E-08	Kidney			6.2E-05	6.2E-05	
			Chloroform			---		---	Liver			1.1E-03	1.1E-03	
			Aluminum			---		---	N/A			---	---	
			Chemical Total			2.7E-08		2.7E-08				0.0012	0.0012	
			Radionuclide Total											
			Exposure Point Total						2.7E-08					0.0012
			Exposure Media Total						2.7E-08					0.0012
Surface Water Total									2.7E-08					0.0012

Table E-65
Summary of Receptor Risks and Hazards for COPCs
Reasonable Maximum Exposure
Future - Outdoor Industrial Worker - On Site
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Scenario Timeframe: Future
Receptor Population: Industrial Worker (Outdoor)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	SWMU 31	Benzo(a)pyrene	1.4E-06				1.4E-06	N/A	---			---
			Chloroform	---				---	Liver	9.7E-03			9.7E-03
			Aluminum	---				---	N/A	---			---
			Arsenic	4.4E-05				4.4E-05	Skin, Vascular Effects	2.8E-01			2.8E-01
			Cobalt	---				---	N/A	---			---
			Iron	---				---	Blood, Liver, GI Irritation	2.1E-01			2.1E-01
			Manganese	---				---	CNS	8.1E-02			8.1E-02
			Vanadium	---				---	Kidney	1.5E-01			1.5E-01
			Chemical Total	4.6E-05				4.6E-05		0.73			0.73
		Radionuclide Total											
		Exposure Point Total								4.6E-05			
	Exposure Media Total								4.6E-05				0.73
	Air (Ambient)	SWMU 31	Chloroform		8.3E-08			8.3E-08	N/A		2.1E-04		2.1E-04
			Chemical Total		8.3E-08			8.3E-08			0.00021		0.00021
			Radionuclide Total										
			Exposure Point Total								8.3E-08		
	Exposure Media Total								8.3E-08				0.00021
Groundwater Total									4.6E-05				0.73
Receptor Total ^b									5.9E-05				1.2

Total Risk Across All Media^b = 5.9E-05

Total Hazard Across All Media^b = 1.2

(a) The RfD for this chemical is based on NOAEL; no target organ is identified.

(b) Since **total soil** represents the more highly contaminated portion of soil (based on hazard), total risk and hazard estimates are conservatively based on this soil data grouping.

CNS = Central Nervous System.

GI = Gastrointestinal.

NOAEL = No Observed Adverse Effect Level.

N/A = Not Available

Total Skin HI Across All Media =	0.35
Total Vascular Effects HI Across All Media =	0.35
Total NOAEL HI Across All Media =	0.00011
Total Blood HI Across All Media =	0.39
Total Liver HI Across All Media =	0.40
Total GI Irritation HI Across All Media =	0.39
Total CNS HI Across All Media =	0.15
Total Kidney HI Across All Media =	0.31

Table E-66
Summary of Receptor Risks and Hazards for COPCs
Reasonable Maximum Exposure
Future - Indoor Industrial Worker - On Site

Scenario Timeframe: Future
 Receptor Population: Industrial Worker (Indoor)
 Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Groundwater	Groundwater	SWMU 31	Benzo(a)pyrene	1.4E-06				1.4E-06	N/A	---			---	
			Chloroform	---				---	Liver	9.7E-03			9.7E-03	
			Aluminum	---				---	N/A	---			---	
			Arsenic	4.4E-05				4.4E-05	Skin, Vascular Effects	2.8E-01			2.8E-01	
			Cobalt	---				---	N/A	---			---	
			Iron	---				---	Blood, Liver, GI Irritation	2.1E-01			2.1E-01	
			Manganese	---				---	CNS	8.1E-02			8.1E-02	
			Vanadium	---				---	Kidney	1.5E-01			1.5E-01	
			Chemical Total	4.6E-05				4.6E-05		0.73			0.73	
		Radionuclide Total												
		Exposure Point Total								4.6E-05				0.73
	Exposure Media Total								4.6E-05				0.73	
	Air (Indoor)	SWMU 31	Chloroform		1.2E-06			1.2E-06	N/A		3.1E-03		3.1E-03	
			Chemical Total		1.2E-06			1.2E-06			0.0031		0.0031	
			Radionuclide Total											
			Exposure Point Total								1.2E-06			
		Exposure Media Total								1.2E-06				0.00308
Groundwater Total									4.7E-05				0.73	
Receptor Total									4.7E-05				0.73	

Total Risk Across All Media^b = 4.7E-05

Total Hazard Across All Media^b = 0.73

CNS = Central Nervous System.
 GI = Gastrointestinal.
 NOAEL = No Observed Adverse Effect Level.
 N/A = Not Available

Total Liver HI Across All Media = 0.22
 Total Skin HI Across All Media = 0.28
 Total Vascular Effects HI Across All Media = 0.28
 Total Blood HI Across All Media = 0.21
 Total GI Irritation HI Across All Media = 0.21
 Total CNS HI Across All Media = 0.08
 Total Kidney HI Across All Media = 0.15

Table E-67
Summary of Receptor Risks and Hazards for COPCs
Reasonable Maximum Exposure
Future - Excavation Worker (1.25 acres)
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Scenario Timeframe: Future Receptor Population: Excavation Worker Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Total Soil	Total Soil	SWMU 31	TCDD TE	5.8E-08		5.2E-09		6.3E-08	N/A	---		---	---	
			Aluminum	---		---		---	N/A	---		---	---	
			Arsenic	4.1E-07		3.7E-08		4.4E-07	Skin, Vascular Effects	6.4E-02		5.7E-03	6.9E-02	
			Chromium ^a	---		---		---	NOAEL	6.4E-05		1.5E-04	2.1E-04	
			Cobalt	---		---		---	N/A	---		---	---	
			Iron	---		---		---	Blood, Liver, GI Irritation	3.1E-01		9.2E-03	3.1E-01	
			Manganese	---		---		---	CNS	8.0E-02		6.0E-02	1.4E-01	
			Vanadium	---		---		---	Kidney	1.6E-01		1.8E-01	3.4E-01	
			Chemical Total	4.7E-07		4.2E-08		5.1E-07		0.61		0.26	0.87	
		Radionuclide Total												
		Exposure Point Total							5.1E-07					0.87
	Exposure Media Total							5.1E-07					0.87	
	Air	SWMU 31	TCDD TE		2.6E-09			2.6E-09	N/A		---		---	
			Aluminum		---			---	N/A		---		---	
			Arsenic		1.9E-07			1.9E-07	N/A		---		---	
			Chromium		---			---	N/A		---		---	
			Cobalt		---			---	N/A		---		---	
			Iron		---			---	N/A		---		---	
			Manganese		---			---	CNS		5.1E+00		5.1E+00	
			Vanadium		---			---	N/A		---		---	
			Chemical Total		1.9E-07			1.9E-07			5.1		5.1	
		Radionuclide Total												
		Exposure Point Total							1.9E-07					5.093
		Exposure Media Total							1.9E-07					5.093
Soil Total								7.0E-07					5.96	
Sediment	Sediment	SWMU 31	Dibenzofuran	---		---		----	N/A	---		---	---	
			Aluminum	---		---		---	N/A	---		---	---	
			Arsenic	8.4E-07		1.5E-07		1.0E-06	Skin, Vascular Effects	1.3E-01		2.4E-02	1.5E-01	
			Cobalt	---		---		---	N/A	---		---	---	
			Iron	---		---		---	Blood, Liver, GI Irritation	2.7E-01		1.6E-02	2.9E-01	
			Chemical Total	8.4E-07		1.5E-07		1.0E-06		0.40		0.04	0.44	
	Radionuclide Total													
Exposure Point Total							1.0E-06					0.44		
Exposure Media Total							1.0E-06					0.44		
Sediment Total								1.0E-06					0.44	

Table E-67
Summary of Receptor Risks and Hazards for COPCs
Reasonable Maximum Exposure
Future - Excavation Worker (1.25 acres)
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Scenario Timeframe: Future Receptor Population: Excavation Worker Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	SWMU 31	Bromodichloromethane			1.2E-09 ---		1.2E-09 ---	Kidney Liver			6.9E-05 1.3E-03	6.9E-05 1.3E-03
			Chloroform										
			Aluminum				---	----	N/A			---	---
			Chemical Total			1.2E-09		1.2E-09				0.0013	0.0013
		Radionuclide Total											
	Exposure Point Total				1.2E-09						0.0013		
	Exposure Media Total					1.2E-09					0.0013		
Surface Water Total								1.2E-09					0.0013
Groundwater	Air (Trench)	SWMU 31	Chloroform		1.3E-07			1.3E-07	N/A		8.2E-03		8.2E-03
			Chemical Total		1.3E-07			1.3E-07			0.0082		0.0082
			Radionuclide Total										
		Exposure Point Total					1.3E-07					0.0082	
		Exposure Media Total					1.3E-07					0.0082	
Groundwater Total								1.3E-07				0.0082	
Receptor Total								1.8E-06				6.4	

Total Risk Across All Media = 1.8E-06

Total Hazard Across All Media = 6.4

(a) The RfD for this chemical is based on NOAEL; no target organ is identified.

CNS = Central Nervous System.

GI = Gastrointestinal.

NOAEL = No Observed Adverse Effect Level.

N/A = Not Available

Total Skin HI Across All Media =	0.22
Total Vascular Effects HI Across All Media =	0.22
Total NOAEL HI Across All Media =	0.00021
Total Blood HI Across All Media =	0.60
Total Liver HI Across All Media =	0.60
Total GI Irritation HI Across All Media =	0.60
Total CNS HI Across All Media =	5.23
Total Kidney HI Across All Media =	0.34

Table E-68
Summary of Receptor Risks and Hazards for COPCs
Reasonable Maximum Exposure
Future - Lifetime Resident - On Site
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Scenario Timeframe: Future
Receptor Population: Lifetime Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Total Soil	Total Soil	SWMU 31	TCDD TE	2.0E-06		1.9E-07		2.2E-06	N/A	---		---	---	
			Aluminum	---		---		---	N/A	---		---	---	
			Arsenic	1.4E-05		1.3E-06		1.5E-05	Skin, Vascular Effects	2.7E-02		3.2E-03	3.0E-02	
			Chromium ^a	---		---		---	NOAEL	2.7E-05		8.3E-05	1.1E-04	
			Cobalt	---		---		---	N/A	---		---	---	
			Iron	---		---		---	Blood, Liver, GI Irritation	1.3E-01		5.2E-03	1.3E-01	
			Manganese	---		---		---	CNS	3.4E-02		3.4E-02	6.8E-02	
			Vanadium	---		---		---	Kidney	6.7E-02		1.0E-01	1.7E-01	
			Chemical Total	1.6E-05		1.5E-06		1.7E-05		0.26		0.15	0.40	
		Radionuclide Total												
	Exposure Point Total													0.40
	Exposure Media Total													0.40
	Air	SWMU 31	TCDD TE		1.7E-11			1.7E-11	N/A		---		---	
			Aluminum		---			---	N/A		---		---	
			Arsenic		1.2E-09			1.2E-09	N/A		---		---	
			Chromium		---			---	N/A		---		---	
			Cobalt		---			---	N/A		---		---	
			Iron		---			---	N/A		---		---	
			Manganese		---			---	CNS		5.7E-04		5.7E-04	
			Vanadium		---			---	N/A		---		---	
			Chemical Total		1.2E-09			1.2E-09			0.00057		0.00057	
		Radionuclide Total												
Exposure Point Total													0.00057	
Exposure Media Total													0.00057	
Soil Total													0.40	
Sediment	Sediment	SWMU 31	Dibenzofuran	---		---		---	N/A	---		---	---	
			Aluminum	---		---		---	N/A	---		---	---	
			Arsenic	3.3E-06		5.3E-07		3.8E-06	Skin, Vascular Effects	6.4E-03		2.2E-03	8.5E-03	
			Cobalt	---		---		---	N/A	---		---	---	
			Iron	---		---		---	Blood, Liver, GI Irritation	1.3E-02		1.5E-03	1.5E-02	
			Chemical Total	3.3E-06		5.3E-07		3.8E-06		0.020		0.004	0.023	
			Radionuclide Total											
		Exposure Point Total												
	Exposure Media Total													0.023
Sediment Total													0.023	
Surface Water	Surface Water	SWMU 31 (wading)	Bromodichloromethane			1.1E-08		1.1E-08	Kidney			1.9E-05	1.9E-05	
			Chloroform			---		---	Liver			3.5E-04	3.5E-04	
			Aluminum			---		---	N/A			---	---	
			Chemical Total			1.1E-08		1.1E-08				0.00037	0.00037	
		Radionuclide Total												
Exposure Point Total													0.00037	

Table E-68
Summary of Receptor Risks and Hazards for COPCs
Reasonable Maximum Exposure
Future - Lifetime Resident - On Site
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Scenario Timeframe: Future
Receptor Population: Lifetime Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total	
		SWMU 31 (swimming)	Bromodichloromethane	1.6E-09		4.6E-09		6.2E-09	Kidney Liver	1.8E-06 2.9E-05		7.5E-06 1.4E-04	9.3E-06 1.7E-04	
			Chloroform	---	---	---	---							
			Aluminum	---		---		---	N/A	---	---	---		
			Chemical Total	1.6E-09		4.6E-09		6.2E-09		0.00003		0.00015	0.00018	
		Radionuclide Total												
		Exposure Point Total						6.2E-09				0.00018		
		Exposure Media Total						1.7E-08				0.0005		
		Surface Water Total						1.7E-08				0.0005		
Groundwater	Groundwater	SWMU 31	Benzo(a)pyrene	6.6E-06		1.4E-04		1.5E-04	N/A Liver	---	3.0E-02	---	3.3E-02	
			Chloroform	---	---	---	---							
			Aluminum	---		---		---	N/A	---	---	---		
			Arsenic	2.1E-04		1.2E-06		2.1E-04	Skin, Vascular Effects	8.6E-01	4.5E-03	8.6E-01		
			Cobalt	---		---		---	N/A	---	---	---		
			Iron	---		---		---	Blood, Liver, GI Irritation	6.5E-01	3.4E-03	6.5E-01		
			Manganese	---		---		---	CNS	2.5E-01	3.3E-02	2.8E-01		
			Vanadium	---		---		---	Kidney	4.8E-01	9.6E-02	5.7E-01		
			Chemical Total	2.2E-04		1.4E-04		3.6E-04		2.3		0.14	2.4	
		Radionuclide Total												
		Exposure Point Total						3.6E-04				2.4		
		Exposure Media Total						3.6E-04				2.4		
		Air (Indoor)	SWMU 31	Chloroform		4.5E-06			4.5E-06	N/A		4.8E-03		4.8E-03
				Chemical Total		4.5E-06			4.5E-06					
				Radionuclide Total										
	Exposure Point Total						4.5E-06				0.0048			
	Air (Shower)		SWMU 31	Chloroform		5.9E-06			5.9E-06	N/A		1.5E-02		1.5E-02
				Chemical Total		5.9E-06			5.9E-06					
	Radionuclide Total													
	Exposure Point Total							5.9E-06				0.015		
	Exposure Media Total							1.0E-05				0.020		
		Home Grown Produce	SWMU 31	Arsenic	3.2E-07				3.2E-07	Skin, Vascular Effects	8.7E-04			8.7E-04
				Chemical Total	3.2E-07				3.2E-07					
				Radionuclide Total										
			Exposure Point Total							3.2E-07				0.00087
Exposure Media Total							3.2E-07				0.00087			
Groundwater Total							3.7E-04				2.4			
Receptor Total							3.9E-04				2.9			

Total Risk Across All Media = 3.9E-04

Total Hazard Across All Media = 2.9

(a) The RfD for this chemical is based on NOAEL; no target organ is identified.

CNS = Central Nervous System.

GI = Gastrointestinal.

NOAEL = No Observed Adverse Effect Level.

N/A = Not Available

Total Skin HI Across All Media =	0.90
Total Vascular Effects HI Across All Media =	0.90
Total NOAEL HI Across All Media =	0.00011
Total Blood HI Across All Media =	0.80
Total Liver HI Across All Media =	0.83
Total GI Irritation HI Across All Media =	0.80
Total CNS HI Across All Media =	0.35
Total Kidney HI Across All Media =	0.74

Table E-69
Summary of Receptor Risks and Hazards for COPCs
Reasonable Maximum Exposure
Future - Child Resident - On Site
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Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Total Soil	Total Soil	SWMU 31	TCDD TE	1.4E-06		1.2E-07		1.5E-06	N/A	---		---	---	
			Aluminum	---		---		---	N/A	---		---	---	
			Arsenic	9.7E-06		8.1E-07		1.1E-05	Skin, Vascular Effects	2.5E-01		2.1E-02	2.7E-01	
			Chromium ^a	---		---		---	NOAEL	2.5E-04		5.5E-04	8.0E-04	
			Cobalt	---		---		---	N/A	---		---	---	
			Iron	---		---		---	Blood, Liver, GI Irritation	1.2E+00		3.4E-02	1.2E+00	
			Manganese	---		---		---	CNS	3.2E-01		2.2E-01	5.4E-01	
			Vanadium	---		---		---	Kidney	6.3E-01		6.8E-01	1.3E+00	
			Chemical Total	1.1E-05		9.3E-07		1.2E-05		2.4		0.95	3.4	
			Radionuclide Total											
		Exposure Point Total						1.2E-05					3.4	
	Exposure Media Total						1.2E-05					3.4		
	Air	SWMU 31	TCDD TE		1.0E-11			1.0E-11	N/A		---		---	
			Aluminum		---			---	N/A		---		---	
			Arsenic		7.1E-10			7.1E-10	N/A		---		---	
			Chromium		---			---	N/A		---		---	
			Cobalt		---			---	N/A		---		---	
			Iron		---			---	N/A		---		---	
			Manganese		---			---	CNS		3.2E-03		3.2E-03	
			Vanadium		---			---	N/A		---		---	
			Chemical Total		7.2E-10			7.2E-10			0.0032		0.0032	
			Radionuclide Total											
			Exposure Point Total						7.2E-10					0.0032
			Exposure Media Total						7.2E-10					0.0032
Soil Total							1.2E-05					3.4		
Sediment	Sediment	SWMU 31	Dibenzofuran	---		---		---	N/A	---		---	---	
			Aluminum	---		---		---	N/A	---		---	---	
			Arsenic	2.3E-06		1.9E-07		2.5E-06	Skin, Vascular Effects	5.9E-02		5.0E-03	6.4E-02	
			Cobalt	---		---		---	N/A	---		---	---	
			Iron	---		---		---	Blood, Liver, GI Irritation	1.2E-01		3.5E-03	1.3E-01	
			Chemical Total	2.3E-06		1.9E-07		2.5E-06		0.18		0.008	0.19	
			Radionuclide Total											
		Exposure Point Total						2.5E-06					0.19	
	Exposure Media Total						2.5E-06					0.19		
Sediment Total							2.5E-06					0.19		
Surface Water	Surface Water	SWMU 31 (wading)	Bromodichloromethane			3.1E-09		3.1E-09	Kidney			3.0E-05	3.0E-05	
			Chloroform			---		---	Liver			5.5E-04	5.5E-04	
			Aluminum			---		---	N/A			---	---	
			Chemical Total			3.1E-09		3.1E-09				0.00058	0.00058	
		Radionuclide Total												
Exposure Point Total						3.1E-09						0.00058		

Table E-69
Summary of Receptor Risks and Hazards for COPCs
Reasonable Maximum Exposure
Future - Child Resident - On Site
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Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
		SWMU 31 (swimming)	Bromodichloromethane	8.7E-10		1.4E-09		2.2E-09	Kidney Liver	8.2E-06		1.3E-05	2.1E-05
			Chloroform	---		---		---		1.4E-04		2.4E-04	3.7E-04
			Aluminum	---		---		---	N/A	---		---	---
			Chemical Total	8.7E-10		1.4E-09		2.2E-09		0.0001		0.00025	0.0004
		Radionuclide Total											
		Exposure Point Total				2.2E-09						0.0004	
	Exposure Media Total				5.4E-09						0.0010		
Surface Water Total							5.4E-09					0.0010	
Groundwater	Groundwater	SWMU 31	Benzo(a)pyrene	2.4E-06		5.1E-05		5.4E-05	N/A Liver	---		---	---
			Chloroform	---		---		---		7.0E-02		6.1E-03	7.6E-02
			Aluminum	---		---		---	N/A	---		---	---
			Arsenic	7.7E-05		5.1E-07		7.8E-05	Skin, Vascular Effects	2.0E+00		1.3E-02	2.0E+00
			Cobalt	---		---		---	N/A	---		---	---
			Iron	---		---		---	Blood, Liver, GI Irritation	1.5E+00		1.0E-02	1.5E+00
			Manganese	---		---		---	CNS	5.8E-01		9.7E-02	6.8E-01
			Vanadium	---		---		---	Kidney	1.1E+00		2.8E-01	1.4E+00
			Chemical Total	8.0E-05		5.2E-05		1.3E-04		5.3		0.41	5.7
		Radionuclide Total											
		Exposure Point Total				1.3E-04						5.7	
	Exposure Media Total				1.3E-04						5.7		
	Air (Indoor)	SWMU 31	Chloroform		2.6E-06			2.6E-06	N/A			2.7E-02	2.7E-02
			Chemical Total		2.6E-06			2.6E-06				0.027	0.027
			Radionuclide Total										
		Exposure Point Total				2.6E-06						0.027	
	Exposure Media Total				2.6E-06						0.03		
	Home Grown Produce	SWMU 31	Arsenic	1.6E-07				1.6E-07	Skin, Vascular Effects	4.0E-03			4.0E-03
			Chemical Total	1.6E-07				1.6E-07			0.0040		0.0040
			Radionuclide Total										
		Exposure Point Total				1.6E-07						0.0040	
	Exposure Media Total				1.6E-07						0.0040		
Groundwater Total							1.3E-04					5.7	
Receptor Total							1.5E-04					9.3	

Total Risk Across All Media = 1.5E-04

Total Hazard Across All Media = 9.3

(a) The RfD for this chemical is based on NOAEL; no target organ is identified.

CNS = Central Nervous System.
GI = Gastrointestinal.
NOAEL = No Observed Adverse Effect Level.
N/A = Not Available

Total Skin HI Across All Media =	2.4
Total Vascular Effects HI Across All Media =	2.4
Total NOAEL HI Across All Media =	0.00080
Total Blood HI Across All Media =	2.9
Total Liver HI Across All Media =	3.0
Total GI Irritation HI Across All Media =	2.9
Total CNS HI Across All Media =	1.2
Total Kidney HI Across All Media =	2.7

Table E-70
Summary of Receptor Risks and Hazards for COPCs
Reasonable Maximum Exposure
Future - Lifetime Resident - Off Site

Scenario Timeframe: Future
Receptor Population: Lifetime Resident off site
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Groundwater	Groundwater	SWMU 31	Benzo(a)pyrene	6.6E-06		1.4E-04		1.5E-04	N/A	---		---	---	
			Chloroform	---		---		---	Liver	3.0E-02		2.7E-03	3.3E-02	
			Aluminum	---		---		---	N/A	---		---	---	
			Arsenic	2.1E-04		1.2E-06		2.1E-04	Skin, Vascular Effects	8.6E-01		4.5E-03	8.6E-01	
			Cobalt	---		---		---	N/A	---		---	---	
			Iron	---		---		---	Blood, Liver, GI Irritation	6.5E-01		3.4E-03	6.5E-01	
			Manganese	---		---		---	CNS	2.5E-01		3.3E-02	2.8E-01	
			Vanadium	---		---		---	Kidney	4.8E-01		9.6E-02	5.7E-01	
			Chemical Total	2.2E-04		1.4E-04		3.6E-04		2.3		0.14	2.4	
		Radionuclide Total												
		Exposure Point Total						3.6E-04					2.4	
	Exposure Media Total							3.6E-04					2.4	
	Air	Indoor	SWMU 31	Chloroform		4.5E-06			4.5E-06	N/A		4.8E-03		4.8E-03
				Chemical Total		4.5E-06			4.5E-06			0.0048		0.0048
				Radionuclide Total										
				Exposure Point Total						4.5E-06				0.0048
			Shower	SWMU 31	Chloroform		5.9E-06			5.9E-06	N/A		1.5E-02	
		Chemical Total				5.9E-06			5.9E-06			0.015		0.015
		Radionuclide Total												
		Exposure Point Total							5.9E-06				0.015	
		Exposure Media Total							1.0E-05					0.020
		Home Grown Produce	SWMU 31	Arsenic	3.2E-07				3.2E-07	Skin, Vascular Effects	8.7E-04			8.7E-04
				Chemical Total	3.2E-07				3.2E-07		0.00087			0.00087
				Radionuclide Total										
				Exposure Point Total						3.2E-07				0.00087
			Exposure Media Total							3.2E-07				0.00087
Groundwater Total							3.7E-04					2.4		
Receptor Total							3.7E-04					2.4		

Total Risk Across All Media = 3.7E-04

Total Hazard Across All Media = 2.4

(a) The RfD for this chemical is based on NOAEL; no target organ is identified.

CNS = Central Nervous System.

GI = Gastrointestinal.

NOAEL = No Observed Adverse Effect Level.

N/A = Not Available

Total Skin HI Across All Media =	0.86
Total Vascular Effects HI Across All Media =	0.86
Total Blood HI Across All Media =	0.65
Total Liver HI Across All Media =	0.68
Total GI Irritation HI Across All Media =	0.65
Total CNS HI Across All Media =	0.28
Total Kidney HI Across All Media =	0.57

Table E-71
Summary of Receptor Risks and Hazards for COPCs
Reasonable Maximum Exposure
Future - Child Resident - Off Site

Scenario Timeframe: Future
 Receptor Population: Resident off -site
 Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	SWMU 31	Benzo(a)pyrene	2.4E-06		5.1E-05		5.4E-05	N/A	---		---	---
			Chloroform	---		---		---	Liver	7.0E-02		6.1E-03	7.6E-02
			Aluminum	---		---		---	N/A	---		---	---
			Arsenic	7.7E-05		5.1E-07		7.8E-05	Skin, Vascular Effects	2.0E+00		1.3E-02	2.0E+00
			Cobalt	---		---		---	N/A	---		---	---
			Iron	---		---		---	Blood, Liver, GI Irritation	1.5E+00		1.0E-02	1.5E+00
			Manganese	---		---		---	CNS	5.8E-01		9.7E-02	6.8E-01
			Vanadium	---		---		---	Kidney	1.1E+00		2.8E-01	1.4E+00
			Chemical Total	8.0E-05		5.2E-05		1.3E-04		5.3		0.41	5.7
		Radionuclide Total											
		Exposure Point Total						1.3E-04					5.7
	Exposure Media Total						1.3E-04					5.7	
	Air (Indoor)	SWMU 31	Chloroform		2.6E-06			2.6E-06	N/A		2.7E-02		2.7E-02
			Chemical Total		2.6E-06			2.6E-06			0.027		0.027
			Radionuclide Total										
		Exposure Point Total						2.6E-06					0.027
	Exposure Media Total						2.6E-06					0.03	
	Home Grown Produce	SWMU 31	Arsenic	1.6E-07				1.6E-07	Skin, Vascular Effects	4.0E-03			4.0E-03
			Chemical Total	1.6E-07				1.6E-07		0.0040			0.0040
			Radionuclide Total										
		Exposure Point Total						1.6E-07					0.0040
	Exposure Media Total						1.6E-07					0.0040	
Groundwater Total								1.3E-04				5.7	
Receptor Total								1.3E-04				5.7	

Total Risk Across All Media = 1.3E-04

Total Hazard Across All Media = 5.7

(a) The RfD for this chemical is based on NOAEL; no target organ is identified.

CNS = Central Nervous System.

GI = Gastrointestinal.

NOAEL = No Observed Adverse Effect Level.

N/A = Not Available

Total Skin HI Across All Media =	2.0
Total Vascular Effects HI Across All Media =	2.0
Total Blood HI Across All Media =	1.5
Total Liver HI Across All Media =	1.6
Total GI Irritation HI Across All Media =	1.5
Total CNS HI Across All Media =	0.7
Total Kidney HI Across All Media =	1.4

Table E-72
Risk Assessment Summary
Reasonable Maximum Exposure
Current - Maintenance Worker - On Site

Scenario Timeframe: Current
Receptor Population: Maintenance Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Surface Soil	Surface Soil	SWMU 31												
			Chemical Total				<1.0E-06					<1		
		Radionuclide Total												
		Exposure Point Total						<1.0E-06					<1	
	Exposure Media Total						<1.0E-06					<1		
	Air	SWMU 31												
			Chemical Total				<1.0E-06					<1		
		Radionuclide Total												
		Exposure Point Total						<1.0E-06					<1	
	Exposure Media Total						<1.0E-06					<1		
Soil Total									<1.0E-06					<1
Sediment	Sediment	SWMU 31	Arsenic	1.3E-06		7.6E-07		2.0E-06						
			Chemical Total	1.3E-06		7.6E-07		2.0E-06					<1	
			Radionuclide Total											
		Exposure Point Total						2.0E-06					<1	
	Exposure Media Total						2.0E-06					<1		
Sediment Total									2.0E-06					<1
Surface Water	Surface Water	SWMU 31												
			Chemical Total				<1.0E-06					<1		
		Radionuclide Total												
	Exposure Point Total						<1.0E-06					<1		
Exposure Media Total						<1.0E-06					<1			
Surface Water Total									<1.0E-06					<1
Groundwater	Air (Ambient)	SWMU 31												
			Chemical Total				<1.0E-06					<1		
		Radionuclide Total												
	Exposure Point Total						<1.0E-06					<1		
Exposure Media Total						<1.0E-06					<1			
Groundwater Total									<1.0E-06					<1
Receptor Total									2.0E-06					<1

Total Risk Across All Media = 2.0E-06

Total Hazard Across All Media = <1

Table E-73
Risk Assessment Summary
Reasonable Maximum Exposure
Future - Maintenance Worker - On Site
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Scenario Timeframe: Future
Receptor Population: Maintenance Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	SWMU 31											
			Chemical Total					<1.0E-06					<1
			Radionuclide Total										
			Exposure Point Total					<1.0E-06					<1
			Exposure Media Total					<1.0E-06					<1
	Air	SWMU 31											
			Chemical Total					<1.0E-06					<1
			Radionuclide Total										
			Exposure Point Total					<1.0E-06					<1
			Exposure Media Total					<1.0E-06					<1
	Surface Soil Total							<1.0E-06					<1
Total Soil	Total Soil	SWMU 31											
			Chemical Total					<1.0E-06					<1
			Radionuclide Total										
			Exposure Point Total					<1.0E-06					<1
			Exposure Media Total					<1.0E-06					<1
	Air	SWMU 31											
			Chemical Total					<1.0E-06					<1
			Radionuclide Total										
			Exposure Point Total					<1.0E-06					<1
			Exposure Media Total					<1.0E-06					<1
	Total Soil Total							<1.0E-06					<1
Sediment	Sediment	SWMU 31	Arsenic	1.3E-06		7.6E-07		2.0E-06					
			Chemical Total	1.3E-06		7.6E-07		2.0E-06					<1
			Radionuclide Total										
			Exposure Point Total					2.0E-06					<1
			Exposure Media Total					2.0E-06					<1
	Sediment Total							2.0E-06					<1

Table E-73
Risk Assessment Summary
Reasonable Maximum Exposure
Future - Maintenance Worker - On Site
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Scenario Timeframe: Future
 Receptor Population: Maintenance Worker
 Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	SWMU 31											
			Chemical Total				<1.0E-06					<1	
			Radionuclide Total										
		Exposure Point Total				<1.0E-06					<1		
	Exposure Media Total				<1.0E-06					<1			
Surface Water Total								<1.0E-06					<1
Groundwater	Air (Ambient)	SWMU 31											
			Chemical Total				<1.0E-06					<1	
			Radionuclide Total										
		Exposure Point Total				<1.0E-06					<1		
	Exposure Media Total				<1.0E-06					<1			
Groundwater Total								<1.0E-06					<1
Receptor Total								2.0E-06					<1

Total Risk Across All Media = 2.0E-06

Total Hazard Across All Media = <1

Table E-74
Risk Assessment Summary
Reasonable Maximum Exposure
Current - Outdoor Industrial Worker - On Site

Scenario Timeframe: Current
Receptor Population: Industrial Worker (outdoor)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Surface Soil	Surface Soil	SWMU 31	Arsenic	2.8E-06		5.5E-07		3.3E-06						
			Chemical Total	2.8E-06		5.5E-07		3.3E-06					<1	
			Radionuclide Total											
		Exposure Point Total							3.3E-06					<1
		Exposure Media Total							3.3E-06					<1
	Air	SWMU 31												
			Chemical Total					<1.0E-06					<1	
			Radionuclide Total											
		Exposure Point Total							<1.0E-06					<1
		Exposure Media Total							<1.0E-06					<1
Surface Soil Total									3.3E-06					<1
Sediment	Sediment	SWMU 31	Arsenic	5.8E-06		3.4E-06		9.2E-06						
			Chemical Total	5.8E-06		3.4E-06		9.2E-06					<1	
			Radionuclide Total											
		Exposure Point Total							9.2E-06					<1
		Exposure Media Total							9.2E-06					<1
	Sediment Total									9.2E-06				
Surface Water	Surface Water	SWMU 31												
			Chemical Total					<1.0E-06					<1	
			Radionuclide Total											
		Exposure Point Total							<1.0E-06					<1
	Exposure Media Total							<1.0E-06					<1	
Surface Water Total									<1.0E-06					<1
Groundwater	Air (Ambient)	SWMU 31												
			Chemical Total					<1.0E-06					<1	
			Radionuclide Total											
		Exposure Point Total							<1.0E-06					<1
	Exposure Media Total							<1.0E-06					<1	
Groundwater Total									<1.0E-06					<1
Receptor Total									1.3E-05					<1

Total Risk Across All Media = 1.3E-05

Total Hazard Across All Media = <1

(a) No chemical or target organ HI is equal to or greater than 1.

Table E-75
Risk Assessment Summary
Reasonable Maximum Exposure
Future - Outdoor Industrial Worker - On Site
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Scenario Timeframe: Future Receptor Population: Industrial Worker (Outdoor) Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Surface Soil	Surface Soil	SWMU 31	Arsenic	2.8E-06		5.5E-07		3.3E-06						
			Chemical Total	2.8E-06		5.5E-07		3.3E-06					<1	
			Radionuclide Total											
		Exposure Point Total							3.3E-06					<1
	Exposure Media Total							3.3E-06					<1	
	Air	SWMU 31												
			Chemical Total					<1.0E-06					<1	
			Radionuclide Total											
		Exposure Point Total							<1.0E-06					<1
	Exposure Media Total							<1.0E-06					<1	
Surface Soil Total									3.3E-06					<1
Total Soil	Total Soil	SWMU 31	Arsenic	2.8E-06		5.5E-07		3.3E-06						
			Chemical Total	2.8E-06		5.5E-07		3.3E-06					<1	
			Radionuclide Total											
		Exposure Point Total							3.3E-06					<1
	Exposure Media Total							3.3E-06					<1	
	Air	SWMU 31												
			Chemical Total					<1.0E-06					<1	
			Radionuclide Total											
		Exposure Point Total							<1.0E-06					<1
	Exposure Media Total							<1.0E-06					<1	
Total Soil Total									3.3E-06					<1
Sediment	Sediment	SWMU 31	Arsenic	5.8E-06		3.4E-06		9.2E-06						
			Chemical Total	5.8E-06		3.4E-06		9.2E-06					<1	
			Radionuclide Total											
		Exposure Point Total							9.2E-06					<1
	Exposure Media Total							9.2E-06					<1	
Sediment Total									9.2E-06					<1

Table E-75
Risk Assessment Summary
Reasonable Maximum Exposure
Future - Outdoor Industrial Worker - On Site
Page 45 of 53

Scenario Timeframe: Future Receptor Population: Industrial Worker (Outdoor) Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	SWMU 31											
			Chemical Total				<1.0E-06					<1	
			Radionuclide Total										
		Exposure Point Total				<1.0E-06					<1		
	Exposure Media Total				<1.0E-06					<1			
Surface Water Total								<1.0E-06					<1
Groundwater	Groundwater	SWMU 31	Benzo(a)pyrene	1.4E-06				1.4E-06					
			Arsenic	4.4E-05				4.4E-05					
			Chemical Total	4.6E-05				4.6E-05					<1
			Radionuclide Total										
		Exposure Point Total				4.6E-05					<1		
	Exposure Media Total				4.6E-05					<1			
	Air (Ambient)	SWMU 31											
			Chemical Total					<1.0E-06					<1
			Radionuclide Total										
			Exposure Point Total				<1.0E-06					<1	
Exposure Media Total					<1.0E-06					<1			
Groundwater Total								4.6E-05				<1	
Receptor Total								5.8E-05				1.2 (a)	

Total Risk Across All Media = 5.8E-05

Total Hazard Across All Media = 1.2 (a)

(a) No chemical or target organ HI is equal to or greater than 1.

Table E-76
Risk Assessment Summary
Reasonable Maximum Exposure
Future - Indoor Industrial Worker - On Site

Scenario Timeframe: Future
Receptor Population: Industrial Worker (Indoor)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	SWMU 31	Benzo(a)pyrene	1.4E-06				1.4E-06					
			Arsenic	4.4E-05				4.4E-05					
			Chemical Total	4.6E-05				4.6E-05					<1
			Radionuclide Total										
		Exposure Point Total						4.6E-05					<1
		Exposure Media Total						4.6E-05					<1
	Air (Indoor)	SWMU 31	Chloroform		1.2E-06			1.2E-06					
			Chemical Total		1.2E-06			1.2E-06					<1
			Radionuclide Total										
		Exposure Point Total						1.2E-06					<1
		Exposure Media Total						1.2E-06					<1
		Groundwater Total						4.7E-05					<1
		Receptor Total						4.7E-05					<1

Total Risk Across All Media = 4.7E-05

Total Hazard Across All Media = <1

(a) No chemical or target organ HI is equal to or greater than 1.

Table E-77
Risk Assessment Summary
Reasonable Maximum Exposure
Future - Excavation Worker - 1.25 acres

Scenario Timeframe: Future
 Receptor Population: Excavation Worker
 Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Total Soil	Total Soil	SWMU 31											
			Chemical Total				<1.0E-06					<1	
			Radionuclide Total										
		Exposure Point Total				<1.0E-06			<1				
	Exposure Media Total				<1.0E-06			<1					
	Air	SWMU 31											
			Manganese					CNS		5.1E+00		5.1E+00	
			Chemical Total				<1.0E-06			5.1		5.1	
			Radionuclide Total										
		Exposure Point Total				<1.0E-06			5.1				
	Exposure Media Total				<1.0E-06			5.1					
Soil Total						<1.0E-06			5.1				
Sediment	Sediment	SWMU 31	Arsenic	8.4E-07		1.5E-07		1.0E-06					
			Chemical Total	8.4E-07		1.5E-07		1.0E-06				<1	
			Radionuclide Total										
		Exposure Point Total				1.0E-06			<1				
	Exposure Media Total				1.0E-06			<1					
Sediment Total						1.0E-06			<1				
Surface Water	Surface Water	SWMU 31											
			Chemical Total				<1.0E-06					<1	
			Radionuclide Total										
		Exposure Point Total				<1.0E-06			<1				
	Exposure Media Total				<1.0E-06			<1					
Surface Water Total						<1.0E-06			<1				
Groundwater	Air (Trench)	SWMU 31											
			Chemical Total				<1.0E-06				<1		
			Radionuclide Total										
		Exposure Point Total				<1.0E-06			<1				
	Exposure Media Total				<1.0E-06			<1					
Groundwater Total						<1.0E-06			<1				
Receptor Total						1.0E-06			5.1				

Total Risk Across All Media = 1.0E-06

Total Hazard Across All Media = 5.1

Total CNS HI Across All Media = 5.1

Table E-78
Risk Assessment Summary
Reasonable Maximum Exposure
Future - Lifetime Resident - On Site
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Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Total Soil	Total Soil	SWMU 31	TCDD	2.0E-06		1.9E-07		2.2E-06					
			Arsenic	1.4E-05		1.3E-06		1.5E-05					
			Chemical Total	1.6E-05		1.5E-06		1.7E-05				<1	
			Radionuclide Total										
		Exposure Point Total							1.7E-05				<1
		Exposure Media Total							1.7E-05				<1
	Air	SWMU 31											
			Chemical Total					<1.0E-06				<1	
			Radionuclide Total										
			Exposure Point Total							<1.0E-06			
		Exposure Media Total							<1.0E-06				<1
		Soil Total								1.7E-05			
	Sediment	Sediment	SWMU 31	Arsenic	3.3E-06		5.3E-07		3.8E-06				
Chemical Total				3.3E-06		5.3E-07		3.8E-06				<1	
Radionuclide Total													
Exposure Point Total									3.8E-06				<1
Exposure Media Total							3.8E-06				<1		
Sediment Total								3.8E-06				<1	
Surface Water	Surface Water	SWMU 31 (wading)											
			Chemical Total					<1.0E-06				<1	
			Radionuclide Total										
		Exposure Point Total							<1.0E-06				<1
		SWMU 31 (swimming)											
			Chemical Total					<1.0E-06				<1	
			Radionuclide Total										
		Exposure Point Total							<1.0E-06				<1
Exposure Media Total							<1.0E-06				<1		
Surface Water Total								<1.0E-06				<1	

Table E-78
Risk Assessment Summary
Reasonable Maximum Exposure
Future - Lifetime Resident - On Site
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Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient						
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total		
Groundwater	Groundwater	SWMU 31	Benzo(a)pyrene	6.6E-06		1.4E-04		1.5E-04							
			Arsenic	2.1E-04		1.2E-06		2.1E-04							
			Chemical Total	2.2E-04		1.4E-04		3.6E-04				2.4 (a)			
			Radionuclide Total												
		Exposure Point Total					3.6E-04	2.4 (a)							
		Exposure Media Total			3.6E-04					2.4 (a)					
	Air (Indoor)	SWMU 31	Chloroform		4.5E-06		4.5E-06								
			Chemical Total		4.5E-06		4.5E-06				<1				
			Radionuclide Total												
			Exposure Point Total					4.5E-06	<1						
		Air (Shower)	SWMU 31	Chloroform		5.9E-06		5.9E-06							
				Chemical Total		5.9E-06		5.9E-06				<1			
				Radionuclide Total											
				Exposure Point Total					5.9E-06	<1					
			Exposure Media Total			5.9E-06					<1				
			Home Grown Produce	SWMU 31											
	Chemical Total						<1.0E-06				<1				
	Radionuclide Total														
	Exposure Point Total			<1.0E-06					<1						
	Exposure Media Total			<1.0E-06					<1						
	Groundwater Total			3.7E-04					2.4 (a)						
Receptor Total			3.9E-04					2.4 (a)							

Total Risk Across All Media = 3.9E-04

Total Hazard Across All Media = 2.4 (a)

(a) No chemical or target organ HI is equal to or greater than 1.

Table E-79
Risk Assessment Summary
Reasonable Maximum Exposure
Future - Child Resident - On Site
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Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Total Soil	Total Soil	SWMU 31	TCDD TE	1.4E-06		1.2E-07		1.5E-06	Blood, Liver, GI Irritation Kidney	1.2E+00 6.3E-01		3.4E-02 6.8E-01	1.2E+00 1.3E+00
			Arsenic	9.7E-06		8.1E-07		1.1E-05					
			Iron										
			Vanadium										
			Chemical Total	1.1E-05		9.3E-07		1.2E-05					
		Radionuclide Total											
		Exposure Point Total				1.2E-05					2.6		
		Exposure Media Total				1.2E-05					2.6		
	Air	SWMU 31											
			Chemical Total				<1.0E-06					<1	
			Radionuclide Total										
			Exposure Point Total				<1.0E-06					<1	
			Exposure Media Total				<1.0E-06					<1	
	Soil Total							1.2E-05					2.6
Sediment	Sediment	SWMU 31	Arsenic	2.3E-06		1.9E-07		2.5E-06					
			Chemical Total	2.3E-06		1.9E-07		2.5E-06					<1
			Radionuclide Total										
			Exposure Point Total				2.5E-06					<1	
		Exposure Media Total				2.5E-06					<1		
Sediment Total							2.5E-06					<1	
Surface Water	Surface Water	SWMU 31 (wading)											
			Chemical Total				<1.06E-06					<1	
			Radionuclide Total										
			Exposure Point Total				<1.06E-06					<1	
		SWMU 31 (swimming)											
			Chemical Total				<1.0E-06					<1	
			Radionuclide Total										
			Exposure Point Total				<1.0E-06					<1	
			Exposure Media Total				<1.06E-06					<1	
Surface Water Total							<1.06E-06					<1	

Table E-79
Risk Assessment Summary
Reasonable Maximum Exposure
Future - Child Resident - On Site
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Scenario Timeframe: Future
 Receptor Population: Resident
 Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Groundwater	Groundwater	SWMU 31	Benzo(a)pyrene	2.4E-06		5.1E-05		5.4E-05	Skin, Vascular Effects Blood, Liver, GI Irritation Kidney	2.0E+00 1.5E+00 1.1E+00 4.6		1.3E-02 1.0E-02 2.8E-01 0.31	2.0E+00 1.5E+00 1.4E+00 4.9	
			Arsenic	7.7E-05		5.1E-07		7.8E-05						
			Iron											
			Vanadium											
			Chemical Total	8.0E-05		5.2E-05		1.3E-04						
		Radionuclide Total												
		Exposure Point Total								1.3E-04				4.9
		Exposure Media Total								1.3E-04				4.9
		Air (Indoor)	SWMU 31	Chloroform		2.6E-06			2.6E-06					
				Chemical Total		2.6E-06			2.6E-06					<1
	Radionuclide Total													
	Exposure Point Total								2.6E-06				<1	
	Exposure Media Total								2.6E-06				<1	
	Home Grown Produce	SWMU 31												
			Chemical Total					<1.0E-06					<1	
			Radionuclide Total											
			Exposure Point Total								<1.0E-06			
		Exposure Media Total								<1.0E-06				<1
	Groundwater Total								1.3E-04				4.9	
	Receptor Total								1.5E-04				7.5	

Total Risk Across All Media = 1.5E-04

Total Hazard Across All Media = 7.5

GI = Gastrointestinal.

Total Blood HI Across All Media =	2.8
Total Liver HI Across All Media =	2.8
Total GI Irritation HI Across All Media =	2.8
Total Kidney HI Across All Media =	2.7
Total Skin HI Across All Media =	2.0
Total Vascular Effects HI Across All Media =	2.0

Table E-80
Risk Assessment Summary
Reasonable Maximum Exposure
Future - Lifetime Resident - Off Site

Scenario Timeframe: Future
Receptor Population: Resident off site
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	SWMU 31	Benzo(a)pyrene	6.6E-06		1.4E-04		1.5E-04					
			Arsenic	2.1E-04		1.2E-06		2.1E-04					
			Chemical Total	2.2E-04		1.4E-04		3.6E-04					2.4 (a)
			Radionuclide Total										
			Exposure Point Total					3.6E-04					2.4 (a)
		Exposure Media Total						3.6E-04					2.4 (a)
	Air (Indoor)	SWMU 31	Chloroform		4.5E-06			4.5E-06					
			Chemical Total		4.5E-06			4.5E-06					<1
			Radionuclide Total										
			Exposure Point Total					4.5E-06					<1
		SWMU 31	Chloroform		5.9E-06			5.9E-06					
			Chemical Total		5.9E-06			5.9E-06					<1
			Radionuclide Total										
			Exposure Point Total					5.9E-06					<1
	Air (Shower)	Exposure Media Total						5.9E-06					<1
		Home Grown Produce											
			Chemical Total					<1.0E-06					<1
			Radionuclide Total										
		Exposure Point Total						<1.0E-06					<1
	Exposure Media Total							<1.0E-06					<1
	Groundwater Total							3.7E-04					2.4 (a)
	Receptor Total							3.7E-04					2.4 (a)

Total Risk Across All Media = 3.7E-04

Total Hazard Across All Media = 2.4 (a)

(a) No chemical or target organ HI is equal to or greater than 1.

Table E-81
Risk Assessment Summary
Reasonable Maximum Exposure
Future - Child Resident - Off Site

Scenario Timeframe: Future
 Receptor Population: Resident off site
 Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	SWMU 31	Benzo(a)pyrene	2.4E-06		5.1E-05		5.4E-05	Skin, Vascular Effects Blood, Liver, GI Irritation Kidney	2.0E+00 1.5E+00 1.1E+00 4.6		1.3E-02 1.0E-02 2.8E-01 0.31	2.0E+00 1.5E+00 1.4E+00 4.9
			Arsenic	7.7E-05		5.1E-07		7.8E-05					
			Iron										
			Vanadium										
			Chemical Total	8.0E-05		5.2E-05		1.3E-04					
		Radionuclide Total											
		Exposure Point Total							1.3E-04				
	Exposure Media Total							1.3E-04					4.9
	Air (Indoor)	SWMU 31	Chloroform		2.6E-06			2.6E-06					
			Chemical Total		2.6E-06			2.6E-06					<1
			Radionuclide Total										
		Exposure Point Total							2.6E-06				
	Exposure Media Total							2.6E-06					<1
	Home Grown Produce	SWMU 31											
			Chemical Total					<1.0E-06					<1
			Radionuclide Total										
		Exposure Point Total							<1.0E-06				
	Exposure Media Total							<1.0E-06					<1
Groundwater Total								1.3E-04					4.9
Receptor Total								1.3E-04					4.9

Total Risk Across All Media = 1.3E-04

Total Hazard Across All Media = 4.9

GI = Gastrointestinal.

Total Blood HI Across All Media = 1.5
 Total Liver HI Across All Media = 1.5
 Total GI Irritation HI Across All Media = 1.5
 Total Kidney HI Across All Media = 1.4
 Total Skin HI Across All Media = 2.0
 Total Vascular Effects HI Across All Media = 2.0

Appendix E-2

Statistical Comparison Results

Appendix E-2, Table 1
Statistical Summary Spreadsheet
SWMU 31 and Background

>BG? Compound	Distribution		Sample Size		Test?	Levene's Test (F) Variances Similar?	T-Test Site > Background?	Mann Whitney Site>Background?
	On-site	Background	On-site	Background				
<u>Total Soil</u>								
Aluminum	Normal*	Lognormal	3	79	MWU	===>	===>	No
Arsenic	Lognormal	Lognormal	4	69	MWU	===>	===>	No
Barium	Lognormal*	Neither	4	79	MWU	===>	===>	No
Beryllium	Lognormal*	Neither	4	79	MWU	===>	===>	No
Cadmium	Normal*	Neither	4	79	MWU	===>	===>	No
Calcium	Lognormal*	Lognormal	3	79	MWU	===>	===>	No
Chromium	Normal*	Lognormal	4	79	MWU	===>	===>	No
Cobalt	Normal*	Lognormal	3	79	MWU	===>	===>	No
Copper	Normal*	Lognormal	3	79	MWU	===>	===>	No
Iron	Normal	Normal	3	79	T-test	Yes (0.978)	No (0.801)	---
Lead	Lognormal*	Neither	4	79	MWU	===>	===>	No
Magnesium	Lognormal*	Lognormal	3	79	MWU	===>	===>	No
Manganese	NormalQ	Lognormal	3	79	MWU	===>	===>	No
Mercury	Normal*	Neither	4	79	MWU	===>	===>	No
Nickel	Normal*	Lognormal	4	79	MWU	===>	===>	No
Potassium	Normal*	Lognormal	3	79	MWU	===>	===>	No
Thallium	Neither	Neither	4	79	MWU	===>	===>	No
Vanadium	Normal*	Lognormal	3	79	MWU	===>	===>	No
Zinc	Lognormal*	Lognormal	3	79	MWU	===>	===>	No

X = Site concentrations of this chemical are significantly greater than background concentrations; or chemical was detected onsite but not detected (or not analyzed for) in background samples.

M = Maximum to maximum comparisons were performed because not enough samples were available for statistical comparison.

* or Q = The designation of normal or lognormal data distributions also included datasets that were "close" to their respective categorizations, i.e., within 5 percent of being categorized as normal or lognormal, using one Shapiro-Wilk test criterion. If a dataset passed both normal and lognormal distribution tests, the distribution with the best fit (i.e., the distribution with the value that is closest to the critical value) is selected.

Notes:

Antimony was not detected in any background samples, therefore no comparisons were run.

Selenium, Silver, and Sodium were more than 80% Non-Detects (ND) in background, and Upper Tolerance Limits (UTLs) were not presented in the Facility-Wide Background Study Report (FWBSR), therefore no comparisons were run.

Cadmium had more than 80% NDs in background. However, a UTL was developed in the FWBSR, and therefore a comparison was run.

Thallium had 80% NDs in background, and in the FWBSR a UTL had been developed; therefore a comparison was run.

Arsenic in background: There were 10 samples that were B qualified. These were excluded to be consistent with the data used in the risk assessment.

There were no duplicate samples in the SWMU 31 dataset, so there was no need to average prior to running statistical tests.

There are only two surface soil samples in the SWMU 31 dataset so the distribution of the dataset could not be established. Statistical comparisons of surface soil to background data could not be performed.

Tests for normality were run using the Shapiro-Francia test for sample sizes >50 and the Shapiro-Wilk test for sample sizes <=50.

Appendix E-2, Table 2
Mann-Whitney (General) Results Spreadsheet
SWMU 31 and Background

Chemical	Distribution		Site Samples	Background Samples	Site Rank Sum (a)	W _{.05} (b)	On-site Concentrations > Background Concentrations? (c)	
	On-site	Background	n	m	T		W _{.95}	
Total Soil								
Aluminum	Normal*	Lognormal	3	79	75	58	191	No
Arsenic	Lognormal	Lognormal	4	69	39.5	80	216	No
Barium	Lognormal*	Neither	4	79	96	91	245	No
Beryllium	Lognormal*	Neither	4	79	86	91	245	No
Cadmium	Normal*	Neither	4	79	63	91	245	No
Calcium	Lognormal	Lognormal	3	79	87	58	191	No
Chromium	Normal*	Lognormal	4	79	86	91	245	No
Cobalt	Normal*	Lognormal	3	79	62	58	191	No
Copper	Normal*	Lognormal	3	79	90	58	191	No
Lead	Lognormal*	Neither	4	79	86	91	245	No
Manganese	NormalQ	Lognormal	3	79	39	58	191	No
Magnesium	Lognormal	Lognormal	3	79	83	58	191	No
Mercury	Normal*	Neither	4	79	77	91	245	No
Nickel	Normal*	Lognormal	4	79	106.5	91	245	No
Potassium	Normal*	Lognormal	3	79	81	58	191	No
Thallium	Neither	Neither	4	79	38	91	245	No
Vanadium	Normal*	Lognormal	3	79	65	58	191	No
Zinc	Lognormal	Lognormal	3	79	82	58	191	No

Notes

- * or Q = The designation of normal or lognormal data distributions also included datasets that were "close" to their respective categorization, i.e., within 5 percent of being categorized as normal or lognormal, using the Shapiro-Wilk criterion. If a dataset passed both normal and lognormal distribution tests, the distribution with the best fit (i.e., distribution with the value that is closest to the critical value) is selected.
- (a) Site rank sum calculated in SPSS by Mann-Whitney test.
- (b) For sample sizes <20, the W_{.05} can be obtained from Quantiles of the Mann-Whitney Test Statistic tables in Conover (1998). For sample sizes >20, the W_{.05} must be calculated. The W_{.95} is then calculated from the W_{.05}.
- (c) Onsite concentrations were determined to be greater than background concentrations if the site rank sum (T) exceeded the critical value.

Appendix E-3

Johnson and Ettinger Model Calculations

Appendix E-3
Results from Vapor Intrusion Model at SWMU 31 - Chloroform

DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to
Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES

ENTER

Chemical
CAS No.
(numbers only,
no dashes)

ENTER

Initial
groundwater
conc.,
 C_w
($\mu\text{g/L}$)

Chemical

67663	1.10E+01	Chloroform
-------	----------	------------

MORE
↓

ENTER

Depth
below grade
to bottom
of enclosed
space floor,
 L_F
(cm)

ENTER

Depth
below grade
to water table,
 L_{WT}
(cm)

ENTER

SCS
soil type
directly above
water table

ENTER

Average
soil/
groundwater
temperature,
 T_s
($^{\circ}\text{C}$)

200	594.36	SL	13.7
-----	--------	----	------

ENTER

Average vapor
flow rate into bldg.
(Leave blank to calculate)
 Q_{soil}
(L/m)

5

MORE
↓

ENTER

Vadose zone
SCS
soil type
(used to estimate
soil vapor
permeability)

OR

ENTER

User-defined
vadose zone
soil vapor
permeability,
 k_v
(cm^2)

ENTER
Vadose zone
SCS
soil type

Lookup Soil
Parameters

ENTER
Vadose zone
soil dry
bulk density,
 ρ_b^v
(g/cm^3)

ENTER
Vadose zone
soil total
porosity,
 n^v
(unitless)

ENTER
Vadose zone
soil water-filled
porosity,
 θ_w^v
(cm^3/cm^3)

SL			SL	1.62	0.387	0.103
----	--	--	----	------	-------	-------

MORE
↓

ENTER

Target
risk for
carcinogens,
TR
(unitless)

ENTER

Target hazard
quotient for
noncarcinogens,
THQ
(unitless)

ENTER

Averaging
time for
carcinogens,
 AT_C
(yrs)

ENTER

Averaging
time for
noncarcinogens,
 AT_{NC}
(yrs)

ENTER

Exposure
duration,
ED
(yrs)

ENTER

Exposure
frequency,
EF
(days/yr)

1.0E-06	1	70	30	30	350
---------	---	----	----	----	-----

Used to calculate risk-based
groundwater concentration.

END

Appendix E-3
Results from Vapor Intrusion Model at SWMU 31 - Chloroform

INTERMEDIATE CALCULATIONS SHEET

Source- building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm ³ /cm ³)	Vadose zone effective total fluid saturation, S_{ie} (cm ³ /cm ³)	Vadose zone soil intrinsic permeability, k_i (cm ²)	Vadose zone soil relative air permeability, k_{rg} (cm ²)	Vadose zone soil effective vapor permeability, k_v (cm ²)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm ³ /cm ³)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³)	Floor- wall seam perimeter, X_{crack} (cm)
394.36	0.284	0.184	5.97E-09	0.901	5.38E-09	25.00	0.387	0.067	0.320	4,000

Bldg. ventilation rate, $Q_{building}$ (cm ³ /s)	Area of enclosed space below grade, A_B (cm ²)	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D_v^{eff} (cm ² /s)	Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm ² /s)	Total overall effective diffusion coefficient, D_T^{eff} (cm ² /s)
2.54E+04	1.80E+06	2.22E-04	200	7,516	2.22E-03	9.44E-02	1.77E-04	1.05E-02	1.03E-04	1.41E-03

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (µg/m ³)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm ³ /s)	Crack effective diffusion coefficient, D^{crack} (cm ² /s)	Area of crack, A_{crack} (cm ²)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (µg/m ³)	Unit risk factor, URF (µg/m ³) ⁻¹	Reference conc., RfC (mg/m ³)
394.36	200	1.04E+03	0.10	8.33E+01	1.05E-02	4.00E+02	1.49E+86	2.36E-04	2.45E-01	2.3E-05	NA

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	7.92E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
2.3E-06	NA

MESSAGE SUMMARY BELOW:

END

CHEMICAL PROPERTIES SHEET

ABC

Diffusivity in air, D_a (cm ² /s)	Diffusivity in water, D_w (cm ² /s)	Henry's law constant at reference temperature, H (atm·m ³ /mol)	Henry's law constant reference temperature, T_R (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (°K)	Critical temperature, T_C (°K)	Organic carbon partition coefficient, K_{oc} (cm ³ /g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF (µg/m ³) ⁻¹	Reference conc., RfC (mg/m ³)
1.04E-01	1.00E-05	3.66E-03	25	6,988	334.32	536.40	3.98E+01	7.92E+03	2.3E-05	0.0E+00

END

Appendix F

SLERA Site Reconnaissance
Photographs, Supplemental
SLERA Tables, and Selection of
Screening Concentrations for
the Evaluation of Non-Detected
Constituents

Appendix F-1

SLERA Site Reconnaissance Photographs



Photo 1 - Primary Settling Lagoon. Drinking water plant and boiler in background.



Photo 2 - Secondary Settling Lagoon (looking east).



Photo 3 - Tertiary Settling Lagoon (looking east).



Photo 4 - Primary Settling Lagoon.



Photo 5 - Secondary Settling Lagoon.



Photo 6 - Tertiary Settling Lagoon.

Appendix F-2

SLERA Risk Characterization Tables

TABLE F-1
TIER 1 CHEMICALS OF POTENTIAL CONCERN EEQs AND HAZARD INDICES FOR MEADOW VOLES AT SWMU 31

Hazard Estimate - Tier 1
Meadow Vole

Chemical	Surface Water Exposure Point	Sediment Exposure		Soil Exposure Point	Fish BAF	Aq. Invert. BAF	Terr. Invert. BAF	Plant BAF	Mammal BAF	Bird BAF	PDE Surface Water	PDE Sediment	PDE Soil	PDE Fish	PDE Aq. Invert.	PDE Terr. Invert.	PDE Plants	PDE Mammals	PDE Birds	Total PDE	Chemical-Specific Toxicity Value UF	NOAEL	Adjusted NOAEL	LOAEL	Adjusted LOAEL	Percent Contribution to	Percent Contribution to				
	Concentration	Units	Point Concentration	Units	Concentration	unitless					mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d	EEQ N	mg/kg-d	mg/kg-d	EEQ L	EEQ N	EEQ L		
1,2-Dichlorobenzene	2.50E-04	mg/L		mg/kg	mg/kg	1.58E+02	NA	NA	NA	NA	1.03E-04	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	1.03E-04	4	8.57E+01	2.14E+01	4.80E-06	4.29E+02	1.07E+02	9.61E-07	0.00%	0.00%		
1,3-Dichlorobenzene	2.60E-04	mg/L		mg/kg	mg/kg	1.58E+02	NA	NA	NA	NA	1.07E-04	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	1.07E-04	4	8.57E+01	2.14E+01	5.00E-06	4.29E+02	1.07E+02	9.99E-07	0.00%	0.00%		
1,4-Dichlorobenzene	2.60E-04	mg/L		mg/kg	mg/kg	1.58E+02	NA	NA	NA	NA	1.07E-04	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	1.07E-04	4	8.57E+01	2.14E+01	5.00E-06	4.29E+02	1.07E+02	9.99E-07	0.00%	0.00%		
2,3,7,8-TCDD		mg/L	3.83E-06	mg/kg	mg/kg	NA	5.13E+01	4.21E+01	1.10E-02	2.20E+00	2.20E+00	0.00E+00	0.00E+00	1.18E-07	NA	0.00E+00	0.00E+00	5.42E-08	0.00E+00	0.00E+00	1.72E-07	4	1.00E-06	2.50E-07	6.89E-01	1.00E-05	2.50E-06	6.89E-02	5.09%	1.92%	
4,4'-DDD		mg/L	7.00E-04	mg/kg	mg/kg	NA	1.00E+00	2.88E+01	4.90E-01	4.55E+01	4.55E+01	0.00E+00	0.00E+00	9.85E-06	NA	0.00E+00	0.00E+00	2.01E-04	0.00E+00	0.00E+00	2.11E-04	4	8.00E-01	2.00E-01	1.06E-03	4.00E+00	1.00E+00	2.11E-04	0.01%	0.01%	
4,4'-DDE		mg/L	1.76E-03	mg/kg	mg/kg	NA	1.00E+00	2.47E+01	3.67E-01	1.07E+02	1.07E+02	0.00E+00	0.00E+00	3.19E-05	NA	0.00E+00	0.00E+00	4.87E-04	0.00E+00	0.00E+00	5.19E-04	4	8.00E-01	2.00E-01	2.60E-03	4.00E+00	1.00E+00	5.19E-04	0.02%	0.01%	
4,4'-DDT		mg/L		mg/kg	mg/kg	NA	NA	1.47E+01	2.36E-01	4.87E+00	4.87E+00	0.00E+00	0.00E+00	1.88E-04	NA	NA	0.00E+00	1.85E-03	0.00E+00	0.00E+00	2.04E-03	4	8.00E-01	2.00E-01	1.02E-02	4.00E+00	1.00E+00	2.04E-03	0.08%	0.06%	
Acenaphthene		mg/L	2.80E-01	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	4	1.75E+01	4.38E+00	0.00E+00	3.50E+01	8.75E+00	0.00E+00	0.00%	0.00%		
Acenaphthylene		mg/L	4.60E-02	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	4	1.75E+01	4.38E+00	0.00E+00	3.50E+01	8.75E+00	0.00E+00	0.00%	0.00%		
Anthracene		mg/L	5.90E-02	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	4	1.00E+02	2.50E+01	0.00E+00	5.00E+02	1.25E+02	0.00E+00	0.00%	0.00%		
Aroclor 1254		mg/L		mg/kg	mg/kg	NA	NA	6.52E+01	2.20E-02	1.00E+00	1.00E+00	0.00E+00	0.00E+00	1.31E-03	NA	NA	0.00E+00	1.20E-03	0.00E+00	0.00E+00	2.52E-03	8	1.40E-01	1.75E-02	1.44E-01	6.90E-01	8.63E-02	2.92E-02	1.06%	0.81%	
Benzo(a)anthracene		mg/L	1.50E-01	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	4	1.00E+00	2.50E-01	0.00E+00	1.00E+01	2.50E+00	0.00E+00	0.00%	0.00%		
Benzo(a)pyrene		mg/L	8.60E-02	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	4	1.00E+00	2.50E-01	0.00E+00	1.00E+01	2.50E+00	0.00E+00	0.00%	0.00%		
Benzo(b)fluoranthene		mg/L	1.40E-01	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	4	1.00E+00	2.50E-01	0.00E+00	1.00E+01	2.50E+00	0.00E+00	0.00%	0.00%		
Benzo(g,h,i)perylene		mg/L	5.40E-02	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	4	1.00E+00	2.50E-01	0.00E+00	1.00E+01	2.50E+00	0.00E+00	0.00%	0.00%		
Benzo(k)fluoranthene		mg/L	4.50E-02	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	4	1.00E+00	2.50E-01	0.00E+00	1.00E+01	2.50E+00	0.00E+00	0.00%	0.00%		
alpha-BHC	9.15E-06	mg/L		mg/kg	mg/kg	1.20E+03	NA	NA	NA	NA	3.77E-06	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA	3.77E-06	8	1.40E-02	1.75E-03	2.15E-03	1.40E-01	1.75E-02	2.15E-04	0.02%	0.01%	
delta-BHC	1.49E-05	mg/L		mg/kg	mg/kg	1.20E+03	NA	NA	NA	NA	6.14E-06	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA	6.14E-06	8	1.40E-02	1.75E-03	3.51E-03	1.40E-01	1.75E-02	3.51E-04	0.03%	0.01%	
gamma-BHC (Lindane)	7.19E-06	mg/L		mg/kg	mg/kg	1.20E+03	NA	NA	NA	NA	2.96E-06	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA	2.96E-06	8	1.40E-02	1.75E-03	1.69E-03	1.40E-01	1.75E-02	1.69E-04	0.01%	0.00%	
Chrysene		mg/L	2.10E-01	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	4	1.00E+00	2.50E-01	0.00E+00	1.00E+01	2.50E+00	0.00E+00	0.00%	0.00%		
Dibenz(a,h)anthracene		mg/L	1.90E-02	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	4	1.00E+00	2.50E-01	0.00E+00	1.00E+01	2.50E+00	0.00E+00	0.00%	0.00%		
Endosulfan II	7.60E-05	mg/L		mg/kg	mg/kg	2.28E-03	NA	8.90E+00	3.67E-01	1.00E+00	1.00E+00	3.13E-05	0.00E+00	3.22E-05	0.00E+00	NA	0.00E+00	4.93E-04	0.00E+00	0.00E+00	5.56E-04	4	1.50E-01	3.75E-02	1.48E-02	7.50E-01	1.88E-01	2.97E-03	0.11%	0.08%	
Endosulfan sulfate		mg/L		mg/kg	mg/kg	8.93E-04	NA	1.18E+01	3.05E-01	1.00E+00	1.00E+00	0.00E+00	0.00E+00	1.26E-05	NA	NA	0.00E+00	1.60E-04	0.00E+00	0.00E+00	1.73E-04	4	1.50E-01	3.75E-02	4.61E-03	7.50E-01	1.88E-01	9.21E-04	0.03%	0.03%	
Endrin	8.34E-05	mg/L	9.78E-04	mg/kg	mg/kg	1.05E+04	1.00E+00	NA	NA	NA	3.43E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	3.43E-05	4	9.20E-02	2.30E-02	1.49E-03	9.20E-01	2.30E-01	1.49E-04	0.01%	0.00%	
Endrin aldehyde		mg/L		mg/kg	mg/kg	1.79E-03	NA	NA	7.14E+01	6.51E-02	1.00E+00	0.00E+00	0.00E+00	2.53E-05	NA	NA	0.00E+00	6.85E-05	0.00E+00	0.00E+00	9.38E-05	4	9.20E-02	2.30E-02	4.08E-03	9.20E-01	2.30E-01	4.08E-04	0.03%	0.01%	
Fluoranthene		mg/L	9.75E-02	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	NA	0.00E+00	4	1.25E+01	3.13E+00	0.00E+00	2.50E+01	6.25E+00	0.00E+00	0.00%	0.00%	
Fluorene		mg/L	8.70E-02	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	NA	0.00E+00	4	1.25E+01	3.13E+00	0.00E+00	2.50E+01	6.25E+00	0.00E+00	0.00%	0.00%	
Hexachlorobutadiene	2.60E-04	mg/L		mg/kg	mg/kg	3.92E+03	NA	NA	NA	NA	1.07E-04	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA	1.07E-04	4	2.00E-01	5.00E-02	2.14E-03	1.00E+00	2.50E-01	4.28E-04	0.02%	0.01%	
Hexachloroethane	2.70E-04	mg/L		mg/kg	mg/kg	7.50E+02	NA	NA	NA	NA	1.11E-04	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA	1.11E-04	4	1.00E-01	2.50E-02	4.45E-03	1.50E+00	3.75E-01	2.96E-04	0.03%	0.01%	
Indeno(1,2,3-cd)pyrene		mg/L	3.10E-02	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	NA	0.00E+00	4	1.00E+00	2.50E-01	0.00E+00	1.00E+01	2.50E+00	0.00E+00	0.00%	0.00%	
Methoxychlor		mg/L		mg/kg	mg/kg	NA	NA	5.82E+01	4.20E-01	1.00E+00	1.00E+00	0.00E+00	0.00E+00	1.08E-04	NA	NA	0.00E+00	1.89E-03	0.00E+00	0.00E+00	2.00E-03	4	4.00E+00	1.00E+00	2.00E-03	8.00E+00	2.00E+00	9.99E-04	0.01%	0.03%	
Phenanthrene		mg/L	7.10E-01	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	NA	0.00E+00	4	1.00E+00	2.50E-01	0.00E+00	1.00E+01	2.50E+00	0.00E+00	0.00%	0.00%	
Pyrene	2.60E-05	mg/L	1.50E-01	mg/kg	mg/kg	4.49E+03	1.00E+00	NA	NA	NA	1.07E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	1.07E-05	4	7.50E+00	1.88E+00	5.71E-06	1.25E+01	3.13E+00	3.43E-06	0.00%	0.00%	
Arsenic		mg/L	1.25E+01	mg/kg	mg/kg	5.90E+00	NA	6.90E-01	1.43E-01	3.75E-02	5.69E-03	5.69E-03	0.00E+00	0.00E+00	8.33E-02	NA	0.00E+00	0.00E+00	1.30E-01	0.00E+00	0.00E+00	2.14E-01	4	1.26E-01	3.15E-02	6.78E+00	1.26E+00	3.15E-01	6.78E-01	50.07%	18.88%
Cadmium		mg/L	9.65E-01	mg/kg	mg/kg	NA	7.99E+00	9.70E+00	8.83E-01	4.28E-01	4.28E-01	0.00E+00	0.00E+00	6.52E-03	NA	0.00E+00	0.00E+00	2.40E-01	0.00E+00	0.00E+00	2.46E-01	4	1.00E+00	2.50E-01	9.86E-01	1.00E+01	2.50E+00	9.86E-02	7.28%	2.75%	
Chromium	4.70E-03	mg/L	5.66E+01	mg/kg	mg/kg	2.00E+02	4.70E-01	3.06E-01	4.10E-02	9.55E-02	9.55E-02	1.94E-03	0.00E+00	3.98E-01	0.00E+00	0.00E+00	0.00E+00	6.80E-01	0.00E+00	0.00E+00	1.08E+00	4	2.74E+03	6.84E+02	1.58E-03	1.37E+04	3.42E+03	3.16E-04	0.01%	0.01%	
Copper		mg/L	5.00E+01	mg/kg	mg/kg	NA	5.30E+00	5.15E-01	3.42E-01	6.59E-01	6.59E-01	0.00E+00	0.00E+00	2.50E-01	NA	0.00E+00	0.00E+00	3.56E+00	0.00E+00	0.00E+00	3.81E+00	8	1.17E+01	1.46E+00	2.60E+00	1.51E+01	1.89E+00	2.02E+00	19.24%	56.21%	
Lead	6.01E-03	mg/L	9.82E+01	mg/kg	mg/kg	3.00E+02	6.10E-01	4.23E-01	6.14E-02	1.68E-01	1.68E-01	2.47E-03	0.00E+00	3.95E-01	0.00E+00	0.00E+00	1.01E+00	0.00E+00	0.00E+00	1.41E+00	4	8.00E+00	2.								

TABLE F-2
TIER 2 CHEMICALS OF POTENTIAL ECOLOGICAL CONCERN EEQs AND HAZARD INDICES FOR MEADOW VOLES AT SWMU 31

Hazard Estimate - Tier 2
Meadow Vole

Chemical	Surface Water Exposure Point	Sediment Exposure		Soil Exposure Point	Fish BAF	Aq. Invert. BAF	Terr. Invert. BAF	Plant BAF	Mammal BAF	Bird BAF	PDE Surface Water	PDE Sediment	PDE Soil	PDE Fish	PDE Aq. Invert.	PDE Terr. Invert.	PDE Plants	PDE Mammals	PDE Birds	Total PDE	Chemical-Specific Toxicity Value UF	NOAEL	Adjusted NOAEL	LOAEL	Adjusted LOAEL	Percent Contribution to	Percent Contribution to					
	Concentration	Units	Point Concentration	Units		unitless					mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d	EEQ N	mg/kg-d	mg/kg-d	EEQ L	EEQ N	EEQ L			
1,2-Dichlorobenzene	2.50E-04	mg/L		mg/kg	mg/kg	1.58E+02	NA	NA	NA	NA	3.45E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	3.45E-05	4	8.57E+01	2.14E+01	1.61E-06	4.29E+02	1.07E+02	3.22E-07	0.00%	0.00%			
1,3-Dichlorobenzene	2.60E-04	mg/L		mg/kg	mg/kg	1.58E+02	NA	NA	NA	NA	3.58E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	3.58E-05	4	8.57E+01	2.14E+01	1.67E-06	4.29E+02	1.07E+02	3.35E-07	0.00%	0.00%			
1,4-Dichlorobenzene	2.60E-04	mg/L		mg/kg	mg/kg	1.58E+02	NA	NA	NA	NA	3.58E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	3.58E-05	4	8.57E+01	2.14E+01	1.67E-06	4.29E+02	1.07E+02	3.35E-07	0.00%	0.00%			
2,3,7,8-TCDD		mg/L	3.83E-06	mg/kg	mg/kg	NA	4.67E+00	4.16E+00	3.90E-03	2.20E+00	2.20E+00	0.00E+00	0.00E+00	4.30E-08	NA	0.00E+00	0.00E+00	7.06E-09	0.00E+00	0.00E+00	5.00E-08	4	1.00E-06	2.50E-07	2.00E-01	1.00E-05	2.50E-06	2.00E-02	4.09%	1.53%		
4,4'-DDD		mg/L	7.00E-04	mg/kg	mg/kg	NA	5.00E-01	2.88E+01	4.90E-01	4.55E+01	4.55E+01	0.00E+00	0.00E+00	3.58E-06	NA	0.00E+00	0.00E+00	7.40E-05	0.00E+00	0.00E+00	7.76E-05	4	8.00E-01	2.00E-01	3.88E-04	4.00E+00	1.00E+00	7.76E-05	0.01%	0.01%		
4,4'-DDE		mg/L	1.76E-03	mg/kg	mg/kg	NA	5.00E-01	2.47E+01	3.67E-01	1.07E+02	1.07E+02	0.00E+00	0.00E+00	1.16E-05	NA	0.00E+00	0.00E+00	1.79E-04	0.00E+00	0.00E+00	1.91E-04	4	8.00E-01	2.00E-01	9.54E-04	4.00E+00	1.00E+00	1.91E-04	0.02%	0.01%		
4,4'-DDT		mg/L		mg/kg	mg/kg	NA	NA	1.47E+01	2.36E-01	4.87E+00	4.87E+00	0.00E+00	0.00E+00	6.83E-05	NA	0.00E+00	6.80E-04	0.00E+00	0.00E+00	7.48E-04	4	8.00E-01	2.00E-01	3.74E-03	4.00E+00	1.00E+00	7.48E-04	0.08%	0.06%			
Acenaphthene		mg/L	2.80E-01	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	4	1.75E+01	4.38E+00	0.00E+00	3.50E+01	8.75E+00	0.00E+00	0.00%	0.00%			
Acenaphthylene		mg/L	4.60E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	4	1.75E+01	4.38E+00	0.00E+00	3.50E+01	8.75E+00	0.00E+00	0.00%	0.00%			
Anthracene		mg/L	5.90E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	4	1.00E+02	2.50E+01	0.00E+00	5.00E+02	1.25E+02	0.00E+00	0.00%	0.00%			
Aroclor 1254		mg/L		mg/kg	mg/kg	NA	NA	1.74E+00	3.60E-03	5.00E-01	5.00E-01	0.00E+00	0.00E+00	4.78E-04	NA	NA	0.00E+00	7.25E-05	0.00E+00	0.00E+00	5.51E-04	8	1.40E-01	1.75E-02	3.15E-02	6.90E-01	8.63E-02	6.38E-03	0.64%	0.49%		
Benzo(a)anthracene		mg/L	1.50E-01	mg/kg	mg/kg	NA	NA	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA	0.00E+00	4	1.00E+00	2.50E-01	0.00E+00	1.00E+01	2.50E+00	0.00E+00	0.00%	0.00%			
Benzo(a)pyrene		mg/L	6.28E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	4	1.00E+00	2.50E-01	0.00E+00	1.00E+01	2.50E+00	0.00E+00	0.00%	0.00%			
Benzo(b)fluoranthene		mg/L	1.40E-01	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	4	1.00E+00	2.50E-01	0.00E+00	1.00E+01	2.50E+00	0.00E+00	0.00%	0.00%			
Benzo(g,h,i)perylene		mg/L	5.24E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	4	1.00E+00	2.50E-01	0.00E+00	1.00E+01	2.50E+00	0.00E+00	0.00%	0.00%			
Benzo(k)fluoranthene		mg/L	4.02E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	4	1.00E+00	2.50E-01	0.00E+00	1.00E+01	2.50E+00	0.00E+00	0.00%	0.00%			
alpha-BHC	9.15E-06	mg/L		mg/kg	mg/kg	1.20E+03	NA	NA	NA	NA	1.26E-06	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA	1.26E-06	8	1.40E-02	1.75E-03	7.21E-04	1.40E-01	1.75E-02	7.21E-05	0.01%	0.01%		
delta-BHC	1.49E-05	mg/L		mg/kg	mg/kg	1.20E+03	NA	NA	NA	NA	2.05E-06	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA	2.05E-06	8	1.40E-02	1.75E-03	1.17E-04	1.40E-01	1.75E-02	1.17E-04	0.02%	0.01%		
gamma-BHC (Lindane)	7.19E-06	mg/L		mg/kg	mg/kg	1.20E+03	NA	NA	NA	NA	9.91E-07	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA	9.91E-07	8	1.40E-02	1.75E-03	5.66E-04	1.40E-01	1.75E-02	5.66E-05	0.01%	0.00%		
Chrysene		mg/L	2.10E-01	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	4	1.00E+00	2.50E-01	0.00E+00	1.00E+01	2.50E+00	0.00E+00	0.00%	0.00%			
Dibenz(a,h)anthracene		mg/L	1.90E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	4	1.00E+00	2.50E-01	0.00E+00	1.00E+01	2.50E+00	0.00E+00	0.00%	0.00%			
Endosulfan II	7.60E-05	mg/L		mg/kg	mg/kg	2.28E-03	mg/kg	2.50E+02	NA	3.80E-01	3.67E-01	5.00E-01	5.00E-01	1.05E-05	0.00E+00	1.17E-05	0.00E+00	1.81E-04	0.00E+00	0.00E+00	2.03E-04	4	1.50E-01	3.75E-02	5.42E-03	7.50E-01	1.88E-01	1.08E-03	0.11%	0.08%		
Endosulfan sulfate		mg/L		mg/kg	mg/kg	8.93E-04	mg/kg	NA	NA	5.00E-01	3.05E-01	5.00E-01	5.00E-01	0.00E+00	0.00E+00	4.59E-06	NA	0.00E+00	5.89E-05	0.00E+00	6.34E-05	4	1.50E-01	3.75E-02	1.69E-03	7.50E-01	1.88E-01	3.38E-04	0.03%	0.03%		
Endrin	8.34E-05	mg/L	9.78E-04	mg/kg	mg/kg	1.05E+04	5.00E-01	NA	NA	NA	1.15E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	1.15E-05	4	9.20E-02	2.30E-02	5.00E-04	9.20E-01	2.30E-01	5.00E-05	0.01%	0.00%		
Endrin aldehyde		mg/L		mg/kg	mg/kg	NA	NA	1.79E-03	mg/kg	NA	NA	0.00E+00	0.00E+00	9.19E-06	NA	NA	0.00E+00	2.52E-05	0.00E+00	0.00E+00	3.44E-05	4	9.20E-02	2.30E-02	1.50E-03	9.20E-01	2.30E-01	1.50E-04	0.03%	0.01%		
Fluoranthene		mg/L	8.40E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	4	1.25E+01	3.13E+00	0.00E+00	2.50E+01	6.25E+00	0.00E+00	0.00%	0.00%			
Fluorene		mg/L	8.70E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	4	1.25E+01	3.13E+00	0.00E+00	2.50E+01	6.25E+00	0.00E+00	0.00%	0.00%			
Hexachlorobutadiene	2.60E-04	mg/L		mg/kg	mg/kg	3.47E+03	NA	NA	NA	NA	3.58E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA	3.58E-05	4	2.00E-01	5.00E-02	7.17E-04	1.00E+00	2.50E-01	1.43E-04	0.01%	0.01%		
Hexachloroethane	2.70E-04	mg/L		mg/kg	mg/kg	7.50E+02	NA	NA	NA	NA	3.72E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA	3.72E-05	4	1.00E-01	2.50E-02	1.49E-03	1.50E+00	3.75E-01	9.92E-05	0.03%	0.01%		
Indeno(1,2,3-cd)pyrene		mg/L	2.73E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	NA	0.00E+00	4	1.00E+00	2.50E-01	0.00E+00	1.00E+01	2.50E+00	0.00E+00	0.00%	0.00%		
Methoxychlor		mg/L		mg/kg	mg/kg	NA	NA	2.50E+00	2.00E-02	5.00E-01	5.00E-01	0.00E+00	0.00E+00	3.93E-05	NA	NA	0.00E+00	3.31E-05	0.00E+00	0.00E+00	7.24E-05	4	4.00E+00	1.00E+00	7.24E-05	8.00E+00	2.00E+00	3.62E-05	0.00%	0.00%		
Phenanthrene		mg/L	7.10E-01	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	4	1.00E+00	2.50E-01	0.00E+00	1.00E+01	2.50E+00	0.00E+00	0.00%	0.00%			
Pyrene	2.60E-05	mg/L	1.44E-01	mg/kg	mg/kg	3.49E+03	5.00E-01	NA	NA	NA	3.58E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	3.58E-06	4	7.50E+00	1.88E+00	1.91E-06	1.25E+01	3.13E+00	1.15E-06	0.00%	0.00%		
Arsenic		mg/L	1.22E+01	mg/kg	mg/kg	5.90E+00	mg/kg	NA	1.40E-01	1.43E-01	3.75E-02	5.69E-03	5.69E-03	0.00E+00	0.00E+00	3.03E-02	NA	0.00E+00	0.00E+00	4.79E-02	0.00E+00	0.00E+00	7.82E-02	4	1.26E-01	3.15E-02	2.48E+00	1.26E+00	3.15E-01	2.48E-01	50.76%	18.97%
Cadmium		mg/L	7.90E-01	mg/kg	mg/kg	NA	6.00E-01	9.70E+00	8.83E-01	4.28E-01	4.28E-01	0.00E+00	0.00E+00	2.37E-03	NA	0.00E+00	0.00E+00	8.82E-02	0.00E+00	0.00E+00	9.06E-02	4	1.00E+00	2.50E-01	3.62E-01	1.00E+01	2.50E+00	3.62E-02	7.41%	2.77%		
Chromium	4.64E-03	mg/L	5.21E+01	mg/kg	mg/kg	1.25E+02	1.00E-01	3.06E-01	4.10E-02	9.55E-02	9.55E-02	6.39E-04	0.00E+00	1.45E-01	0.00E+00	0.00E+00	0.00E+00	2.50E-01	0.00E+00	0.00E+00	3.95E-01	4	2.74E+03	6.84E+02	5.78E-04	1.37E+04	3.42E+03	1.16E-04	0.01%	0.01%		
Copper		mg/L	5.00E+01	mg/kg	mg/kg	NA	1.60E+00	5.15E-01	3.42E-01	6.59E-01	6.59E-01	0.00E+00	0.00E+00	9.09E-02	NA	0.00E+00	0.00E+00	1.31E+00	0.00E+00	0.00E+00	1.40E+00	8	1.17E+01	1.46E+00	9.57E-01	1.51E+01	1.89E+00	7.41E-01	19.57%	56.68%		
Lead	6.01E-03	mg/L	7.73E+01	mg/kg	mg/kg	9.00E+01	7.00E-02	4.23E-01	6.14E-02	1.68E-01	1.68E-01	8.28E-04	0.00E+00	1.44E-01	0.00E+00	0.00E+00	3.72E-01	0.00E+00	0.00E+00	5.16E-01	4	8.00E+00	2.00E+00	2.58E-01	8.00E+01	2.00E+01	2.					

TABLE F-3
TIER 1 CHEMICALS OF POTENTIAL CONCERN EEQs AND HAZARD INDICES FOR SHORT-TAILED SHREWS AT SWMU 31

Hazard Estimate - Tier 1
Short-tailed Shrew

Chemical	Surface Water Exposure Point	Sediment Exposure		Soil Exposure Point	Fish BAF	Aq. Invert. BAF	Terr. Invert. BAF	Plant BAF	Mammal BAF	Bird BAF	PDE Surface Water	PDE Sediment	PDE Soil	PDE Fish	PDE Aq. Invert.	PDE Terr. Invert.	PDE Plants	PDE Mammals	PDE Birds	Total PDE	Chemical-Specific Toxicity Value UF	NOAEL	Adjusted NOAEL	LOAEL	Adjusted LOAEL	Percent Contribution to	Percent Contribution to			
	Concentration	Units	Point Concentration	Units		-----unitless-----					mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d	EEQ N	mg/kg-d	mg/kg-d	EEQ L	EEQ N	EEQ L	
1,2-Dichlorobenzene	2.50E-04	mg/L		mg/kg	mg/kg	1.58E+02	NA	NA	NA	NA	6.60E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	6.60E-05	8	8.57E+01	1.07E+01	6.16E-06	4.29E+02	5.36E+01	1.23E-06	0.00%	0.00%	
1,3-Dichlorobenzene	2.60E-04	mg/L		mg/kg	mg/kg	1.58E+02	NA	NA	NA	NA	6.86E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	6.86E-05	8	8.57E+01	1.07E+01	6.41E-06	4.29E+02	5.36E+01	1.28E-06	0.00%	0.00%	
1,4-Dichlorobenzene	2.60E-04	mg/L		mg/kg	mg/kg	1.58E+02	NA	NA	NA	NA	6.86E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	6.86E-05	8	8.57E+01	1.07E+01	6.41E-06	4.29E+02	5.36E+01	1.28E-06	0.00%	0.00%	
2,3,7,8-TCDD		mg/L	3.83E-06	mg/kg	mg/kg	NA	5.13E+01	4.21E+01	1.10E-02	2.20E+00	2.20E+00	0.00E+00	0.00E+00	2.08E-07	NA	0.00E+00	8.46E-05	0.00E+00	0.00E+00	0.00E+00	8.48E-05	8	1.00E-06	1.25E-07	6.78E+02	1.00E-05	1.25E-06	6.78E+01	83.21%	71.77%
4,4'-DDD		mg/L	7.00E-04	mg/kg	mg/kg	NA	1.00E+00	2.88E+01	4.90E-01	4.55E+01	4.55E+01	0.00E+00	0.00E+00	1.73E-05	NA	0.00E+00	4.82E-03	0.00E+00	0.00E+00	0.00E+00	4.84E-03	8	8.00E-01	1.00E-01	4.84E-02	4.00E+00	5.00E-01	9.68E-03	0.01%	0.01%
4,4'-DDE		mg/L	1.76E-03	mg/kg	mg/kg	NA	1.00E+00	2.47E+01	3.67E-01	1.07E+02	1.07E+02	0.00E+00	0.00E+00	5.60E-05	NA	0.00E+00	1.34E-02	0.00E+00	0.00E+00	0.00E+00	1.34E-02	8	8.00E-01	1.00E-01	1.34E-01	4.00E+00	5.00E-01	2.69E-02	0.02%	0.03%
4,4'-DDT		mg/L		mg/kg	mg/kg	NA	NA	1.47E+01	2.36E-01	4.87E+00	4.87E+00	0.00E+00	0.00E+00	3.30E-04	NA	NA	4.71E-02	0.00E+00	0.00E+00	0.00E+00	4.74E-02	8	8.00E-01	1.00E-01	4.74E-01	4.00E+00	5.00E-01	9.48E-02	0.06%	0.10%
Acenaphthene		mg/L	2.80E-01	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.75E+01	2.19E+00	0.00E+00	3.50E+01	4.38E+00	0.00E+00	0.00%	0.00%	
Acenaphthylene		mg/L	4.60E-02	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.75E+01	2.19E+00	0.00E+00	3.50E+01	4.38E+00	0.00E+00	0.00%	0.00%	
Anthracene		mg/L	5.90E-02	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.00E+02	1.25E+01	0.00E+00	5.00E+02	6.25E+01	0.00E+00	0.00%	0.00%	
Aroclor 1254		mg/L		mg/kg	mg/kg	NA	NA	6.52E+01	2.20E-02	1.00E+00	1.00E+00	0.00E+00	0.00E+00	2.31E-03	NA	NA	1.46E+00	0.00E+00	0.00E+00	0.00E+00	1.46E+00	8	1.40E-01	1.75E-02	8.34E+01	6.90E-01	8.63E-02	1.69E+01	10.23%	17.91%
Benzo(a)anthracene		mg/L	1.50E-01	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.00E+00	1.25E-01	0.00E+00	1.00E+01	1.25E+00	0.00E+00	0.00%	0.00%	
Benzo(a)pyrene		mg/L	8.60E-02	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.00E+00	1.25E-01	0.00E+00	1.00E+01	1.25E+00	0.00E+00	0.00%	0.00%	
Benzo(b)fluoranthene		mg/L	1.40E-01	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.00E+00	1.25E-01	0.00E+00	1.00E+01	1.25E+00	0.00E+00	0.00%	0.00%	
Benzo(g,h,i)perylene		mg/L	5.40E-02	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.00E+00	1.25E-01	0.00E+00	1.00E+01	1.25E+00	0.00E+00	0.00%	0.00%	
Benzo(k)fluoranthene		mg/L	4.50E-02	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.00E+00	1.25E-01	0.00E+00	1.00E+01	1.25E+00	0.00E+00	0.00%	0.00%	
alpha-BHC	9.15E-06	mg/L		mg/kg	mg/kg	1.20E+03	NA	NA	NA	NA	2.42E-06	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	2.42E-06	8	1.40E-02	1.75E-03	1.38E-03	1.40E-01	1.75E-02	1.38E-04	0.00%	0.00%	
delta-BHC	1.49E-05	mg/L		mg/kg	mg/kg	1.20E+03	NA	NA	NA	NA	3.93E-06	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	3.93E-06	8	1.40E-02	1.75E-03	2.25E-03	1.40E-01	1.75E-02	2.25E-04	0.00%	0.00%	
gamma-BHC (Lindane)	7.19E-06	mg/L		mg/kg	mg/kg	1.20E+03	NA	NA	NA	NA	1.90E-06	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	1.90E-06	8	1.40E-02	1.75E-03	1.08E-03	1.40E-01	1.75E-02	1.08E-04	0.00%	0.00%	
Chrysene		mg/L	2.10E-01	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.00E+00	1.25E-01	0.00E+00	1.00E+01	1.25E+00	0.00E+00	0.00%	0.00%	
Dibenz(a,h)anthracene		mg/L	1.90E-02	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.00E+00	1.25E-01	0.00E+00	1.00E+01	1.25E+00	0.00E+00	0.00%	0.00%	
Endosulfan II	7.60E-05	mg/L		mg/kg	mg/kg	2.50E+02	NA	8.90E+00	3.67E-01	1.00E+00	1.00E+00	2.01E-05	0.00E+00	5.65E-05	0.00E+00	NA	4.87E-03	0.00E+00	0.00E+00	0.00E+00	4.95E-03	8	1.50E-01	1.88E-02	2.64E-01	7.50E-01	9.38E-02	5.28E-02	0.03%	0.06%
Endosulfan sulfate		mg/L		mg/kg	mg/kg	NA	NA	1.18E+01	3.05E-01	1.00E+00	1.00E+00	0.00E+00	0.00E+00	2.21E-05	NA	NA	2.53E-03	0.00E+00	0.00E+00	0.00E+00	2.55E-03	8	1.50E-01	1.88E-02	1.36E-01	7.50E-01	9.38E-02	2.72E-02	0.02%	0.03%
Endrin	8.34E-05	mg/L	9.78E-04	mg/kg	mg/kg	1.05E+04	1.00E+00	NA	NA	NA	2.20E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	2.20E-05	8	9.20E-02	1.15E-02	1.91E-03	9.20E-01	1.15E-01	1.91E-04	0.00%	0.00%	
Endrin aldehyde		mg/L		mg/kg	mg/kg	NA	NA	7.14E+01	6.51E-02	1.00E+00	1.00E+00	0.00E+00	0.00E+00	4.44E-05	NA	NA	3.07E-02	0.00E+00	0.00E+00	0.00E+00	3.07E-02	8	9.20E-02	1.15E-02	2.67E+00	9.20E-01	1.15E-01	2.67E-01	0.33%	0.28%
Fluoranthene		mg/L	9.75E-02	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.25E+01	1.56E+00	0.00E+00	2.50E+01	3.13E+00	0.00E+00	0.00%	0.00%	
Fluorene		mg/L	8.70E-02	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.25E+01	1.56E+00	0.00E+00	2.50E+01	3.13E+00	0.00E+00	0.00%	0.00%	
Hexachlorobutadiene	2.60E-04	mg/L		mg/kg	mg/kg	3.92E+03	NA	NA	NA	NA	6.86E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	6.86E-05	8	2.00E-01	2.50E-02	2.75E-03	1.00E+00	1.25E-01	5.49E-04	0.00%	0.00%	
Hexachloroethane	2.70E-04	mg/L		mg/kg	mg/kg	7.50E+02	NA	NA	NA	NA	7.13E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	7.13E-05	8	1.00E-01	1.25E-02	5.70E-03	1.50E+00	1.88E-01	3.80E-04	0.00%	0.00%	
Indeno(1,2,3-cd)pyrene		mg/L	3.10E-02	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.00E+00	1.25E-01	0.00E+00	1.00E+01	1.25E+00	0.00E+00	0.00%	0.00%	
Methoxychlor		mg/L		mg/kg	mg/kg	NA	NA	5.82E+01	4.20E-01	1.00E+00	1.00E+00	0.00E+00	0.00E+00	1.90E-04	NA	NA	1.07E-01	0.00E+00	0.00E+00	0.00E+00	1.07E-01	8	4.00E+00	5.00E-01	2.14E-01	8.00E+00	1.00E+00	1.07E-01	0.03%	0.11%
Phenanthrene		mg/L	7.10E-01	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.00E+00	1.25E-01	0.00E+00	1.00E+01	1.25E+00	0.00E+00	0.00%	0.00%	
Pyrene	2.60E-05	mg/L	1.50E-01	mg/kg	mg/kg	4.49E+03	1.00E+00	NA	NA	NA	6.86E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	6.86E-06	8	7.50E+00	9.38E-01	7.32E-06	1.25E+01	1.56E+00	4.39E-06	0.00%	0.00%	
Arsenic		mg/L	1.25E+01	mg/kg	mg/kg	NA	6.90E-01	1.43E-01	3.75E-02	5.69E-03	5.69E-03	0.00E+00	0.00E+00	1.46E-01	NA	0.00E+00	2.03E-01	0.00E+00	0.00E+00	0.00E+00	3.49E-01	8	1.26E-01	1.58E-02	2.22E+01	1.26E+00	1.58E-01	2.22E+00	2.72%	2.35%
Cadmium		mg/L	9.65E-01	mg/kg	mg/kg	NA	7.99E+00	9.70E+00	8.83E-01	4.28E-01	4.28E-01	0.00E+00	0.00E+00	1.15E-02	NA	0.00E+00	1.08E+00	0.00E+00	0.00E+00	1.09E+00	8	1.00E+00	1.25E-01	8.70E+00	1.00E+01	1.25E+00	8.70E-01	1.07%	0.92%	
Chromium	4.70E-03	mg/L	5.66E+01	mg/kg	mg/kg	2.00E+02	4.70E-01	3.06E-01	4.10E-02	9.55E-02	9.55E-02	1.24E-03	0.00E+00	6.99E-01	0.00E+00	0.00E+00	2.07E+00	0.00E+00	0.00E+00	0.00E+00	2.77E+00	8	2.74E+03	3.42E+02	8.10E-03	1.37E+04	1.71E+03	1.62E-03	0.00%	0.00%
Copper		mg/L	5.00E+01	mg/kg	mg/kg	NA	5.30E+00	5.15E-01	3.42E-01	6.59E-01	6.59E-01	0.00E+00	0.00E+00	4.39E-01	NA	0.00E+00	2.19E+00	0.00E+00	0.00E+00	0.00E+00	2.63E+00	8	1.17E+01	1.46E+00	1.80E+00	1.51E+01	1.89E+00	1.39E+00	0.22%	1.47%
Lead	6.01E-03	mg/L	9.82E+01	mg/kg	mg/kg	3.00E+02	6.10E-01	4.23E-01	6.14E-02	1.68E-01	1.68E-01	1.59E-03	0.00E+00	6.94E-01	0.00E+00	0.00E+00	2.84E+00	0.00E+00	0.00E+00	0.00E+00	3.54E+00	8	8.00E+00	1.00E+00	3.54E+00	8.00E+01	1.00E+01	3.54E-01	0.43%	0

TABLE F-4
TIER 2 CHEMICALS OF POTENTIAL ECOLOGICAL CONCERN EEQs AND HAZARD INDICES FOR SHORT-TAILED SHREWS AT SWMU 31

Hazard Estimate - Tier 2
Short-tailed Shrew

Chemical	Surface Water Exposure Point	Sediment Exposure		Soil Exposure Point	Fish BAF	Aq. Invert. BAF	Terr. Invert. BAF	Plant BAF	Mammal BAF	Bird BAF	PDE Surface Water	PDE Sediment	PDE Soil	PDE Fish	PDE Aq. Invert.	PDE Terr. Invert.	PDE Plants	PDE Mammals	PDE Birds	Total PDE	Chemical-Specific Toxicity Value UF	NOAEL	Adjusted NOAEL	LOAEL	Adjusted LOAEL	Percent Contribution to	Percent Contribution to			
	Concentration	Units	Point Concentration	Units	Concentration	unitless					mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d	EEQ N	mg/kg-d	mg/kg-d	EEQ L	EEQ N	EEQ L	
1,2-Dichlorobenzene	2.50E-04	mg/L		mg/kg	mg/kg	1.58E+02	NA	NA	NA	NA	3.83E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	3.83E-05	8	8.57E+01	1.07E+01	3.58E-06	4.29E+02	5.36E+01	7.16E-07	0.00%	0.00%	
1,3-Dichlorobenzene	2.60E-04	mg/L		mg/kg	mg/kg	1.58E+02	NA	NA	NA	NA	3.99E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	3.99E-05	8	8.57E+01	1.07E+01	3.72E-06	4.29E+02	5.36E+01	7.44E-07	0.00%	0.00%	
1,4-Dichlorobenzene	2.60E-04	mg/L		mg/kg	mg/kg	1.58E+02	NA	NA	NA	NA	3.99E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	3.99E-05	8	8.57E+01	1.07E+01	3.72E-06	4.29E+02	5.36E+01	7.44E-07	0.00%	0.00%	
2,3,7,8-TCDD		mg/L	3.83E-06	mg/kg	mg/kg	NA	4.67E+00	4.16E+00	3.90E-03	2.20E+00	2.20E+00	0.00E+00	0.00E+00	1.28E-07	NA	0.00E+00	5.11E-06	0.00E+00	0.00E+00	0.00E+00	5.24E-06	8	1.00E-06	1.25E-07	4.19E+01	1.00E-05	1.25E-06	4.19E+00	59.76%	44.70%
4,4'-DDD		mg/L	7.00E-04	mg/kg	mg/kg	NA	5.00E-01	2.88E+01	4.90E-01	4.55E+01	4.55E+01	0.00E+00	0.00E+00	1.07E-05	NA	0.00E+00	2.95E-03	0.00E+00	0.00E+00	0.00E+00	2.96E-03	8	8.00E-01	1.00E-01	2.96E-02	4.00E+00	5.00E-01	5.91E-03	0.04%	0.06%
4,4'-DDE		mg/L	1.76E-03	mg/kg	mg/kg	NA	5.00E-01	2.47E+01	3.67E-01	1.07E+02	1.07E+02	0.00E+00	0.00E+00	3.47E-05	NA	0.00E+00	8.18E-03	0.00E+00	0.00E+00	0.00E+00	8.21E-03	8	8.00E-01	1.00E-01	8.21E-02	4.00E+00	5.00E-01	1.64E-02	0.12%	0.18%
4,4'-DDT		mg/L		mg/kg	mg/kg	NA	NA	1.47E+01	2.36E-01	4.87E+00	4.87E+00	0.00E+00	0.00E+00	2.04E-04	NA	NA	2.88E-02	0.00E+00	0.00E+00	0.00E+00	2.90E-02	8	8.00E-01	1.00E-01	2.90E-01	4.00E+00	5.00E-01	5.79E-02	0.41%	0.62%
Acenaphthene		mg/L	2.80E-01	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.75E+01	2.19E+00	0.00E+00	3.50E+01	4.38E+00	0.00E+00	0.00%	0.00%	
Acenaphthylene		mg/L	4.60E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.75E+01	2.19E+00	0.00E+00	3.50E+01	4.38E+00	0.00E+00	0.00%	0.00%	
Anthracene		mg/L	5.90E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.00E+02	1.25E+01	0.00E+00	5.00E+02	6.25E+01	0.00E+00	0.00%	0.00%	
Aroclor 1254		mg/L		mg/kg	mg/kg	NA	NA	1.74E+00	3.60E-03	5.00E-01	5.00E-01	0.00E+00	0.00E+00	1.43E-03	NA	NA	2.38E-02	0.00E+00	0.00E+00	0.00E+00	2.52E-02	8	1.40E-01	1.75E-02	1.44E+00	6.90E-01	8.63E-02	2.92E-01	2.06%	3.12%
Benzo(a)anthracene		mg/L	1.50E-01	mg/kg	mg/kg	NA	NA	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA	0.00E+00	8	1.00E+00	1.25E-01	0.00E+00	1.00E+01	1.25E+00	0.00E+00	0.00%	0.00%	
Benzo(a)pyrene		mg/L	6.28E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.00E+00	1.25E-01	0.00E+00	1.00E+01	1.25E+00	0.00E+00	0.00%	0.00%	
Benzo(b)fluoranthene		mg/L	1.40E-01	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.00E+00	1.25E-01	0.00E+00	1.00E+01	1.25E+00	0.00E+00	0.00%	0.00%	
Benzo(g,h,i)perylene		mg/L	5.24E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.00E+00	1.25E-01	0.00E+00	1.00E+01	1.25E+00	0.00E+00	0.00%	0.00%	
Benzo(k)fluoranthene		mg/L	4.02E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.00E+00	1.25E-01	0.00E+00	1.00E+01	1.25E+00	0.00E+00	0.00%	0.00%	
alpha-BHC	9.15E-06	mg/L		mg/kg	mg/kg	1.20E+03	NA	NA	NA	NA	1.40E-06	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	1.40E-06	8	1.40E-02	1.75E-03	8.02E-04	1.40E-01	1.75E-02	8.02E-05	0.00%	0.00%	
delta-BHC	1.49E-05	mg/L		mg/kg	mg/kg	1.20E+03	NA	NA	NA	NA	2.28E-06	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	2.28E-06	8	1.40E-02	1.75E-03	1.31E-03	1.40E-01	1.75E-02	1.31E-04	0.00%	0.00%	
gamma-BHC (Lindane)	7.19E-06	mg/L		mg/kg	mg/kg	1.20E+03	NA	NA	NA	NA	1.10E-06	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	1.10E-06	8	1.40E-02	1.75E-03	6.30E-04	1.40E-01	1.75E-02	6.30E-05	0.00%	0.00%	
Chrysene		mg/L	2.10E-01	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.00E+00	1.25E-01	0.00E+00	1.00E+01	1.25E+00	0.00E+00	0.00%	0.00%	
Dibenz(a,h)anthracene		mg/L	1.90E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.00E+00	1.25E-01	0.00E+00	1.00E+01	1.25E+00	0.00E+00	0.00%	0.00%	
Endosulfan II	7.60E-05	mg/L		mg/kg	mg/kg	2.28E-03	NA	3.80E-01	3.67E-01	5.00E-01	5.00E-01	1.17E-05	0.00E+00	3.50E-05	0.00E+00	NA	1.27E-04	0.00E+00	0.00E+00	0.00E+00	1.74E-04	8	1.50E-01	1.88E-02	9.26E-03	7.50E-01	9.38E-02	1.85E-03	0.01%	0.02%
Endosulfan sulfate		mg/L		mg/kg	mg/kg	8.93E-04	NA	5.00E-01	3.05E-01	5.00E-01	5.00E-01	0.00E+00	0.00E+00	1.37E-05	NA	NA	6.55E-05	0.00E+00	0.00E+00	0.00E+00	7.92E-05	8	1.50E-01	1.88E-02	4.22E-03	7.50E-01	9.38E-02	8.45E-04	0.01%	0.01%
Endrin	8.34E-05	mg/L	9.78E-04	mg/kg	mg/kg	1.05E+04	5.00E-01	NA	NA	NA	1.28E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	1.28E-05	8	9.20E-02	1.15E-02	1.11E-03	9.20E-01	1.15E-01	1.11E-04	0.00%	0.00%	
Endrin aldehyde		mg/L		mg/kg	mg/kg	NA	NA	3.00E+00	6.51E-02	5.00E-01	5.00E-01	0.00E+00	0.00E+00	2.74E-05	NA	NA	7.88E-04	0.00E+00	0.00E+00	0.00E+00	8.15E-04	8	9.20E-02	1.15E-02	7.09E-02	9.20E-01	1.15E-01	7.09E-03	0.10%	0.08%
Fluoranthene		mg/L	8.40E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.25E+01	1.56E+00	0.00E+00	2.50E+01	3.13E+00	0.00E+00	0.00%	0.00%	
Fluorene		mg/L	8.70E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.25E+01	1.56E+00	0.00E+00	2.50E+01	3.13E+00	0.00E+00	0.00%	0.00%	
Hexachlorobutadiene	2.60E-04	mg/L		mg/kg	mg/kg	3.47E+03	NA	NA	NA	NA	3.99E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	3.99E-05	8	2.00E-01	2.50E-02	1.59E-01	1.00E+00	1.25E-01	3.19E-04	0.00%	0.00%	
Hexachloroethane	2.70E-04	mg/L		mg/kg	mg/kg	7.50E+02	NA	NA	NA	NA	4.14E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	4.14E-05	8	1.00E-01	1.25E-02	3.31E-03	1.50E+00	1.88E-01	2.21E-04	0.00%	0.00%	
Indeno(1,2,3-cd)pyrene		mg/L	2.73E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.00E+00	1.25E-01	0.00E+00	1.00E+01	1.25E+00	0.00E+00	0.00%	0.00%	
Methoxychlor		mg/L		mg/kg	mg/kg	NA	NA	2.50E+00	2.00E-02	5.00E-01	5.00E-01	0.00E+00	0.00E+00	1.17E-04	NA	NA	2.81E-03	0.00E+00	0.00E+00	0.00E+00	2.92E-03	8	4.00E+00	5.00E-01	5.84E-03	8.00E+00	1.00E+00	2.92E-03	0.01%	0.03%
Phenanthrene		mg/L	7.10E-01	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.00E+00	1.25E-01	0.00E+00	1.00E+01	1.25E+00	0.00E+00	0.00%	0.00%	
Pyrene	2.60E-05	mg/L	1.44E-01	mg/kg	mg/kg	3.49E+03	5.00E-01	NA	NA	NA	3.99E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	3.99E-06	8	7.50E+00	9.38E-01	4.25E-06	1.25E+01	1.56E+00	2.55E-06	0.00%	0.00%	
Arsenic		mg/L	1.22E+01	mg/kg	mg/kg	5.90E+00	NA	1.43E-01	3.75E-02	5.69E-03	5.69E-03	0.00E+00	0.00E+00	9.05E-02	NA	0.00E+00	1.24E-01	0.00E+00	0.00E+00	0.00E+00	2.14E-01	8	1.26E-01	1.58E-02	1.36E+01	1.26E+00	1.58E-01	1.36E+00	19.43%	14.53%
Cadmium		mg/L	7.90E-01	mg/kg	mg/kg	NA	6.00E-01	9.70E+00	8.83E-01	4.28E-01	4.28E-01	0.00E+00	0.00E+00	7.08E-03	NA	0.00E+00	6.57E-01	0.00E+00	0.00E+00	0.00E+00	6.64E-01	8	1.00E+00	1.25E-01	5.32E+00	1.00E+01	1.25E+00	5.32E-01	7.58%	5.67%
Chromium	4.64E-03	mg/L	5.21E+01	mg/kg	mg/kg	1.25E+02	1.00E-01	3.06E-01	4.10E-02	9.55E-02	9.55E-02	7.11E-04	0.00E+00	4.32E-01	0.00E+00	0.00E+00	1.27E+00	0.00E+00	0.00E+00	0.00E+00	1.70E+00	8	2.74E+03	3.42E+02	4.97E-03	1.37E+04	1.71E+03	9.93E-04	0.01%	0.01%
Copper		mg/L	5.00E+01	mg/kg	mg/kg	NA	1.60E+00	5.15E-01	3.42E-01	6.59E-01	6.59E-01	0.00E+00	0.00E+00	2.71E-01	NA	0.00E+00	1.34E+00	0.00E+00	0.00E+00	0.00E+00	1.61E+00	8	1.17E+01	1.46E+00	1.10E+00	1.51E+01	1.89E+00	8.52E-01	1.57%	9.09%
Lead	6.01E-03	mg/L	7.73E+01	mg/kg	mg/kg	9.00E+01	7.00E-02	4.23E-01	6.14E-02	1.68E-01	1.68E-01	9.22E-04	0.00E+00	4.29E-01	0.00E+00	0.00E+00	1.74E+00	0.00E+00	0.00E+00	0.00E+00	2.17E+00	8	8.00E+00	1.00E+00	2.17E+00	8.00E+01	1.00E+01	2.17E-01	3.09%	2.

TABLE F-5
TIER 1 CHEMICALS OF POTENTIAL CONCERN EEQs AND HAZARD INDICES FOR AMERICAN ROBINS AT SWMU 31

Hazard Estimate - Tier 1
American Robin

Chemical	Surface Water Exposure Point	Sediment Exposure		Soil Exposure Point	Fish BAF	Aq. Invert. BAF	Terr. Invert. BAF	Plant BAF	Mammal BAF	Bird BAF	PDE Surface Water	PDE Sediment	PDE Soil	PDE Fish	PDE Aq. Invert.	PDE Terr. Invert.	PDE Plants	PDE Mammals	PDE Birds	Total PDE	Chemical-Specific Toxicity Value UF	NOAEL	Adjusted NOAEL	LOAEL	Adjusted LOAEL	Percent Contribution to	Percent Contribution to				
	Concentration	Units	Point Concentration	Units	Concentration	unitless					mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d	EEQ N	mg/kg-d	mg/kg-d	EEQ L	EEQ N	EEQ L		
1,2-Dichlorobenzene	2.50E-04	mg/L		mg/kg	mg/kg	1.58E+02	NA	NA	NA	NA	5.12E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	5.12E-05	8	1.61E+01	2.01E+00	2.54E-05	8.05E+01	1.01E+01	5.09E-06	0.00%	0.00%		
1,3-Dichlorobenzene	2.60E-04	mg/L		mg/kg	mg/kg	1.58E+02	NA	NA	NA	NA	5.32E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	5.32E-05	8	1.61E+01	2.01E+00	2.64E-05	8.05E+01	1.01E+01	5.29E-06	0.00%	0.00%		
1,4-Dichlorobenzene	2.60E-04	mg/L		mg/kg	mg/kg	1.58E+02	NA	NA	NA	NA	5.32E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	5.32E-05	8	1.61E+01	2.01E+00	2.64E-05	8.05E+01	1.01E+01	5.29E-06	0.00%	0.00%		
2,3,7,8-TCDD		mg/L	3.83E-06	mg/kg	mg/kg	NA	5.13E+01	4.21E+01	1.10E-02	2.20E+00	2.20E+00	0.00E+00	0.00E+00	1.05E-07	NA	0.00E+00	4.22E-05	1.80E-08	0.00E+00	0.00E+00	4.23E-05	8	1.40E-05	1.75E-06	2.42E+01	1.40E-04	1.75E-05	2.42E+00	11.60%	8.10%	
4,4'-DDD		mg/L	7.00E-04	mg/kg	mg/kg	NA	1.00E+00	2.88E+01	4.90E-01	4.55E+01	4.55E+01	0.00E+00	0.00E+00	8.79E-06	NA	0.00E+00	2.40E-03	6.68E-05	0.00E+00	0.00E+00	2.48E-03	8	2.80E-03	3.50E-04	7.09E+00	2.80E-02	3.50E-03	7.09E-01	3.40%	2.38%	
4,4'-DDE		mg/L	1.76E-03	mg/kg	mg/kg	NA	1.00E+00	2.47E+01	3.67E-01	1.07E+02	1.07E+02	0.00E+00	0.00E+00	2.85E-05	NA	0.00E+00	6.67E-03	1.62E-04	0.00E+00	0.00E+00	6.86E-03	8	2.80E-03	3.50E-04	1.96E+01	2.80E-02	3.50E-03	1.96E+00	9.41%	6.58%	
4,4'-DDT		mg/L		mg/kg	mg/kg	NA	NA	1.47E+01	2.36E-01	4.87E+00	4.87E+00	0.00E+00	0.00E+00	1.68E-04	NA	NA	2.35E-02	6.14E-04	0.00E+00	0.00E+00	2.43E-02	8	2.80E-03	3.50E-04	6.93E+01	2.80E-02	3.50E-03	6.93E+00	33.27%	23.23%	
Acenaphthene		mg/L	2.80E-01	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%		
Acenaphthylene		mg/L	4.60E-02	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%		
Anthracene		mg/L	5.90E-02	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%		
Aroclor 1254		mg/L		mg/kg	mg/kg	NA	NA	6.52E+01	2.20E-02	1.00E+00	1.00E+00	0.00E+00	0.00E+00	1.17E-03	NA	NA	7.27E-01	4.00E-04	0.00E+00	0.00E+00	7.28E-01	8	1.80E-01	2.25E-02	3.24E+01	1.80E+00	2.25E-01	3.24E+00	15.54%	10.85%	
Benzo(a)anthracene		mg/L	1.50E-01	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%		
Benzo(a)pyrene		mg/L	8.60E-02	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%		
Benzo(b)fluoranthene		mg/L	1.40E-01	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%		
Benzo(g,h,i)perylene		mg/L	5.40E-02	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%		
Benzo(k)fluoranthene		mg/L	4.50E-02	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%		
alpha-BHC	9.15E-06	mg/L		mg/kg	mg/kg	1.20E+03	NA	NA	NA	NA	1.87E-06	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	1.87E-06	8	5.60E-01	7.00E-02	2.68E-05	2.25E+00	2.81E-01	6.66E-06	0.00%	0.00%		
delta-BHC	1.49E-05	mg/L		mg/kg	mg/kg	1.20E+03	NA	NA	NA	NA	3.05E-06	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	3.05E-06	8	5.60E-01	7.00E-02	4.36E-05	2.25E+00	2.81E-01	1.08E-05	0.00%	0.00%		
gamma-BHC (Lindane)	7.19E-06	mg/L		mg/kg	mg/kg	1.20E+03	NA	NA	NA	NA	1.47E-06	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	1.47E-06	8	5.60E-01	7.00E-02	2.10E-05	2.25E+00	2.81E-01	5.23E-06	0.00%	0.00%		
Chrysene		mg/L	2.10E-01	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%		
Dibenz(a,h)anthracene		mg/L	1.90E-02	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%		
Endosulfan II	7.60E-05	mg/L		mg/kg	mg/kg	2.28E-03	NA	8.90E+00	3.67E-01	1.00E+00	1.00E+00	1.56E-05	0.00E+00	2.87E-05	0.00E+00	NA	2.43E-03	1.64E-04	0.00E+00	0.00E+00	2.64E-03	8	1.00E+01	1.25E+00	2.11E-03	5.00E+01	6.25E+00	4.22E-04	0.00%	0.00%	
Endosulfan sulfate		mg/L		mg/kg	mg/kg	8.93E-04	NA	1.18E+01	3.05E-01	1.00E+00	1.00E+00	0.00E+00	0.00E+00	1.13E-05	NA	NA	1.26E-03	5.32E-05	0.00E+00	0.00E+00	1.33E-03	8	1.00E+01	1.25E+00	1.06E-03	5.00E+01	6.25E+00	2.12E-04	0.00%	0.00%	
Endrin	8.34E-05	mg/L	9.78E-04	mg/kg	mg/kg	1.05E+04	1.00E+00	NA	NA	NA	1.71E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	1.71E-05	8	3.00E-01	3.75E-02	4.55E-04	1.50E+00	1.88E-01	9.11E-05	0.00%	0.00%		
Endrin aldehyde		mg/L		mg/kg	mg/kg	NA	NA	7.14E+01	6.51E-02	1.00E+00	1.00E+00	0.00E+00	0.00E+00	2.26E-05	NA	NA	1.53E-02	2.28E-05	0.00E+00	0.00E+00	1.53E-02	8	3.00E-01	3.75E-02	4.09E-01	1.50E+00	1.88E-01	8.18E-02	0.20%	0.27%	
Fluoranthene		mg/L	9.75E-02	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%		
Fluorene		mg/L	8.70E-02	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%		
Hexachlorobutadiene	2.60E-04	mg/L		mg/kg	mg/kg	3.92E+03	NA	NA	NA	NA	5.32E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	5.32E-05	8	3.19E+00	3.98E-01	1.34E-04	1.59E+01	1.99E+00	2.68E-05	0.00%	0.00%		
Hexachloroethane	2.70E-04	mg/L		mg/kg	mg/kg	7.50E+02	NA	NA	NA	NA	5.53E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	5.53E-05	8	NA	NA	NA	NA	NA	NA	NA	NA		
Indeno(1,2,3-cd)pyrene		mg/L	3.10E-02	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%		
Methoxychlor		mg/L		mg/kg	mg/kg	NA	NA	5.82E+01	4.20E-01	1.00E+00	1.00E+00	0.00E+00	0.00E+00	9.64E-05	NA	NA	5.33E-02	6.27E-04	0.00E+00	0.00E+00	5.40E-02	8	2.58E+01	3.22E+00	1.68E-02	1.29E+02	1.61E+01	3.35E-03	0.01%	0.01%	
Phenanthrene		mg/L	7.10E-01	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%		
Pyrene	2.60E-05	mg/L	1.50E-01	mg/kg	mg/kg	4.49E+03	1.00E+00	NA	NA	NA	5.32E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	5.32E-06	8	5.53E+02	6.91E+01	7.70E-08	2.77E+03	3.46E+02	1.54E-08	0.00%	0.00%		
Arsenic		mg/L	1.25E+01	mg/kg	mg/kg	5.90E+00	NA	6.90E-01	1.43E-01	3.75E-02	5.69E-03	5.69E-03	0.00E+00	0.00E+00	7.43E-02	NA	0.00E+00	1.01E-01	4.32E-02	0.00E+00	0.00E+00	2.19E-01	8	5.14E+00	6.43E-01	3.40E-01	1.28E+01	1.61E+00	1.36E-01	0.16%	0.46%
Cadmium		mg/L	9.65E-01	mg/kg	mg/kg	NA	7.99E+00	9.70E+00	8.83E-01	4.28E-01	4.28E-01	0.00E+00	0.00E+00	5.82E-03	NA	0.00E+00	5.36E-01	7.97E-02	0.00E+00	0.00E+00	6.22E-01	8	1.45E+00	1.81E-01	3.43E+00	2.00E+01	2.50E+00	2.49E-01	1.65%	0.83%	
Chromium	4.70E-03	mg/L	5.66E+01	mg/kg	mg/kg	2.00E+02	4.70E-01	3.06E-01	4.10E-02	9.55E-02	9.55E-02	9.62E-04	0.00E+00	3.55E-01	0.00E+00	0.00E+00	1.03E+00	2.26E-01	0.00E+00	0.00E+00	1.61E+00	8	2.66E+00	3.33E-01	4.86E+00	2.78E+00	3.48E-01	4.65E+00	2.33%	15.58%	
Copper		mg/L	5.00E+01	mg/kg	mg/kg	NA	5.30E+00	5.15E-01	3.42E-01	6.59E-01	6.59E-01	0.00E+00	0.00E+00	2.23E-01	NA	0.00E+00	1.09E+00	1.18E+00	0.00E+00	0.00E+00	2.50E+00	8	4.70E+01	5.88E+00	4.25E-01	6.20E+01	7.75E+00	3.22E-01	0.20%	1.08%	
Lead	6.01E-03	mg/L	9.82E+01	mg/kg	mg/kg	3.00E+02	6.10E-01	4.23E-01	6.14E-02	1.68E-01	1.68E-01	1.23E-03	0.00E+00	3.53E-01	0.00E+00	0.00E+00	1.42E+00	3.36E-01	0.00E+00	0.00E+00	2.11E+00	8	3.85E+00	4.81E-01	4.38E+00	1.93E+01	2.41E+00	8.75E-01	2.10%	2.93%	
Mercury	1.86E-04																														

TABLE F-6
TIER 2 CHEMICALS OF POTENTIAL ECOLOGICAL CONCERN EEQs AND HAZARD INDICES FOR AMERICAN ROBINS AT SWMU 31

Hazard Estimate - Tier 2
American Robin

Chemical	Surface Water Exposure Point	Sediment Exposure		Soil Exposure Point	Fish BAF	Aq. Invert. BAF	Terr. Invert. BAF	Plant BAF	Mammal BAF	Bird BAF	PDE Surface Water	PDE Sediment	PDE Soil	PDE Fish	PDE Aq. Invert.	PDE Terr. Invert.	PDE Plants	PDE Mammals	PDE Birds	Total PDE	Chemical-Specific Toxicity Value UF	NOAEL	Adjusted NOAEL	LOAEL	Adjusted LOAEL	Percent Contribution to	Percent Contribution to			
	Concentration	Units	Point Concentration	Units		-----unitless-----					mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d	EEQ N	mg/kg-d	mg/kg-d	EEQ L	EEQ N	EEQ L	
1,2-Dichlorobenzene	2.50E-04	mg/L		mg/kg	mg/kg	1.58E+02	NA	NA	NA	NA	3.56E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	3.56E-05	8	1.61E+01	2.01E+00	1.77E-05	8.05E+01	1.01E+01	3.54E-06	0.00%	0.00%	
1,3-Dichlorobenzene	2.60E-04	mg/L		mg/kg	mg/kg	1.58E+02	NA	NA	NA	NA	3.70E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	3.70E-05	8	1.61E+01	2.01E+00	1.84E-05	8.05E+01	1.01E+01	3.68E-06	0.00%	0.00%	
1,4-Dichlorobenzene	2.60E-04	mg/L		mg/kg	mg/kg	1.58E+02	NA	NA	NA	NA	3.70E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	3.70E-05	8	1.61E+01	2.01E+00	1.84E-05	8.05E+01	1.01E+01	3.68E-06	0.00%	0.00%	
2,3,7,8-TCDD		mg/L	3.83E-06	mg/kg	mg/kg	NA	4.67E+00	4.16E+00	3.90E-03	2.20E+00	2.20E+00	0.00E+00	0.00E+00	6.93E-08	NA	0.00E+00	2.74E-06	4.19E-09	0.00E+00	0.00E+00	2.81E-06	8	1.40E-05	1.75E-06	1.61E+00	1.40E-04	1.75E-05	1.61E-01	1.66%	1.18%
4,4'-DDD		mg/L	7.00E-04	mg/kg	mg/kg	NA	5.00E-01	2.88E+01	4.90E-01	4.55E+01	4.55E+01	0.00E+00	0.00E+00	5.78E-06	NA	0.00E+00	1.58E-03	4.39E-05	0.00E+00	0.00E+00	1.63E-03	8	2.80E-03	3.50E-04	4.66E+00	2.80E-02	3.50E-03	4.66E-01	4.81%	3.41%
4,4'-DDE		mg/L	1.76E-03	mg/kg	mg/kg	NA	5.00E-01	2.47E+01	3.67E-01	1.07E+02	1.07E+02	0.00E+00	0.00E+00	1.87E-05	NA	0.00E+00	4.39E-03	1.06E-04	0.00E+00	0.00E+00	4.51E-03	8	2.80E-03	3.50E-04	1.29E+01	2.80E-02	3.50E-03	1.29E+00	13.31%	9.45%
4,4'-DDT		mg/L		mg/kg	mg/kg	NA	NA	1.47E+01	2.36E-01	4.87E+00	4.87E+00	0.00E+00	0.00E+00	1.10E-04	NA	NA	1.54E-02	4.03E-04	0.00E+00	0.00E+00	1.59E-02	8	2.80E-03	3.50E-04	4.55E+01	2.80E-02	3.50E-03	4.55E+00	47.02%	33.39%
Acenaphthene		mg/L	2.80E-01	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%	
Acenaphthylene		mg/L	4.60E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%	
Anthracene		mg/L	5.90E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%	
Aroclor 1254		mg/L		mg/kg	mg/kg	NA	NA	1.74E+00	3.60E-03	5.00E-01	5.00E-01	0.00E+00	0.00E+00	7.71E-04	NA	NA	1.28E-02	4.30E-05	0.00E+00	0.00E+00	1.36E-02	8	1.80E-01	2.25E-02	6.03E-01	1.80E+00	2.25E-01	6.03E-02	0.62%	0.44%
Benzo(a)anthracene		mg/L	1.50E-01	mg/kg	mg/kg	NA	NA	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%	
Benzo(a)pyrene		mg/L	6.28E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%	
Benzo(b)fluoranthene		mg/L	1.40E-01	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%	
Benzo(g,h,i)perylene		mg/L	5.24E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%	
Benzo(k)fluoranthene		mg/L	4.02E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%	
alpha-BHC	9.15E-06	mg/L		mg/kg	mg/kg	1.20E+03	NA	NA	NA	NA	1.30E-06	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA	1.30E-06	8	5.60E-01	7.00E-02	1.86E-05	2.25E+00	2.81E-01	4.63E-06	0.00%	0.00%
delta-BHC	1.49E-05	mg/L		mg/kg	mg/kg	1.20E+03	NA	NA	NA	NA	2.12E-06	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA	2.12E-06	8	5.60E-01	7.00E-02	3.03E-05	2.25E+00	2.81E-01	7.54E-06	0.00%	0.00%
gamma-BHC (Lindane)	7.19E-06	mg/L		mg/kg	mg/kg	1.20E+03	NA	NA	NA	NA	1.02E-06	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA	1.02E-06	8	5.60E-01	7.00E-02	1.46E-05	2.25E+00	2.81E-01	3.64E-06	0.00%	0.00%
Chrysene		mg/L	2.10E-01	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%	
Dibenz(a,h)anthracene		mg/L	1.90E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%	
Endosulfan II	7.60E-05	mg/L		mg/kg	mg/kg	2.28E-03	NA	3.80E-01	3.67E-01	5.00E-01	5.00E-01	1.08E-05	0.00E+00	1.89E-05	0.00E+00	NA	6.81E-05	1.07E-04	0.00E+00	0.00E+00	2.05E-04	8	1.00E+01	1.25E+00	1.64E-04	5.00E+01	6.25E+00	3.28E-05	0.00%	0.00%
Endosulfan sulfate		mg/L		mg/kg	mg/kg	8.93E-04	NA	5.00E-01	3.05E-01	5.00E-01	5.00E-01	0.00E+00	0.00E+00	7.39E-06	NA	NA	3.51E-05	3.49E-05	0.00E+00	0.00E+00	7.74E-05	8	1.00E+01	1.25E+00	6.20E-05	5.00E+01	6.25E+00	1.24E-05	0.00%	0.00%
Endrin	8.34E-05	mg/L	9.78E-04	mg/kg	mg/kg	1.05E+04	5.00E-01	NA	NA	NA	1.19E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	1.19E-05	8	3.00E-01	3.75E-02	3.16E-04	1.50E+00	1.88E-01	6.33E-05	0.00%	0.00%
Endrin aldehyde		mg/L		mg/kg	mg/kg	NA	NA	3.00E+00	6.51E-02	5.00E-01	5.00E-01	0.00E+00	0.00E+00	1.48E-05	NA	NA	4.22E-04	1.50E-05	0.00E+00	0.00E+00	4.52E-04	8	3.00E-01	3.75E-02	1.21E-02	1.50E+00	1.88E-01	2.41E-03	0.01%	0.02%
Fluoranthene		mg/L	8.40E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%	
Fluorene		mg/L	8.70E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%	
Hexachlorobutadiene	2.60E-04	mg/L		mg/kg	mg/kg	3.47E+03	NA	NA	NA	NA	3.70E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA	3.70E-05	8	3.19E+00	3.98E-01	9.29E-05	1.59E+01	1.99E+00	1.86E-05	0.00%	0.00%
Hexachloroethane	2.70E-04	mg/L		mg/kg	mg/kg	7.50E+02	NA	NA	NA	NA	3.84E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA	3.84E-05	8	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene		mg/L	2.73E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Methoxychlor		mg/L		mg/kg	mg/kg	NA	NA	2.50E+00	2.00E-02	5.00E-01	5.00E-01	0.00E+00	0.00E+00	6.33E-05	NA	NA	1.50E-03	1.96E-05	0.00E+00	0.00E+00	1.59E-03	8	2.58E+01	3.22E+00	4.93E-04	1.29E+02	1.61E+01	9.84E-05	0.00%	0.00%
Phenanthrene		mg/L	7.10E-01	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%
Pyrene	2.60E-05	mg/L	1.44E-01	mg/kg	mg/kg	3.49E+03	5.00E-01	NA	NA	NA	3.70E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	3.70E-06	8	5.53E+02	6.91E+01	5.35E-08	2.77E+03	3.46E+02	1.07E-08	0.00%	0.00%
Arsenic		mg/L	1.22E+01	mg/kg	mg/kg	5.90E+00	NA	1.43E-01	3.75E-02	5.69E-03	5.69E-03	0.00E+00	0.00E+00	4.88E-02	NA	0.00E+00	6.65E-02	2.84E-02	0.00E+00	0.00E+00	1.44E-01	8	5.14E+00	6.43E-01	2.24E-01	1.28E+01	1.61E+00	8.96E-02	0.23%	0.66%
Cadmium		mg/L	7.90E-01	mg/kg	mg/kg	NA	6.00E-01	9.70E+00	8.83E-01	4.28E-01	4.28E-01	0.00E+00	0.00E+00	3.83E-03	NA	0.00E+00	3.53E-01	5.24E-02	0.00E+00	0.00E+00	4.09E-01	8	1.45E+00	1.81E-01	2.26E+00	2.00E+01	2.50E+00	1.63E-01	2.33%	1.20%
Chromium	4.64E-03	mg/L	5.21E+01	mg/kg	mg/kg	1.25E+02	1.00E-01	3.06E-01	4.10E-02	9.55E-02	9.55E-02	6.60E-04	0.00E+00	2.33E-01	0.00E+00	0.00E+00	6.79E-01	1.48E-01	0.00E+00	0.00E+00	1.06E+00	8	2.66E+00	3.33E-01	3.19E+00	2.78E+00	3.48E-01	3.05E+00	3.30%	22.39%
Copper		mg/L	5.00E+01	mg/kg	mg/kg	NA	1.60E+00	5.15E-01	3.42E-01	6.59E-01	6.59E-01	0.00E+00	0.00E+00	1.47E-01	NA	0.00E+00	7.17E-01	7.77E-01	0.00E+00	0.00E+00	1.64E+00	8	4.70E+01	5.88E+00	2.79E-01	6.20E+01	7.75E+00	2.12E-01	0.29%	1.55%
Lead	6.01E-03	mg/L	7.73E+01	mg/kg	mg/kg	9.00E+01	7.00E-02	4.23E-01	6.14E-02	1.68E-01	1.68E-01	8.55E-04	0.00E+00	2.32E-01	0.00E+00	0.00E+00	9.31E-01	2.21E-01	0.00E+00	0.00E+00	1.38E+00	8	3.85E+00	4.81E-01	2.88E+00	1.93E+01	2.41E+00	5.75E-01	2.97%	

TABLE F-7
TIER 1 CHEMICALS OF POTENTIAL CONCERN EEQs AND HAZARD INDICES FOR RED-TAILED HAWKS AT SWMU 31

Hazard Estimate - Tier 1 Red-tailed Hawk																															
Chemical	Surface Water Exposure Point	Sediment Exposure		Soil Exposure Point		Fish BAF	Aq. Invert. BAF	Terr. Invert. BAF	Plant BAF	Mammal BAF	Bird BAF	PDE Surface Water	PDE Sediment	PDE Soil	PDE Fish	PDE Aq. Invert.	PDE Terr. Invert.	PDE Plants	PDE Mammals	PDE Birds	Total PDE	Chemical-Specific Toxicity Value UF	NOAEL	Adjusted NOAEL	LOAEL	Adjusted LOAEL	Percent Contribution to	Percent Contribution to			
	Concentration	Units	Point Concentration	Units	Concentration	Units	unitless					mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d	EEQ N	mg/kg-d	mg/kg-d	EEQ L	EEQ N	EEQ L	
1,2-Dichlorobenzene	2.50E-04	mg/L		mg/kg		mg/kg	1.58E+02	NA	NA	NA	NA	1.78E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	1.78E-05	8	1.61E+01	2.01E+00	8.83E-06	8.05E+01	1.01E+01	1.77E-06	0.00%	0.00%	
1,3-Dichlorobenzene	2.60E-04	mg/L		mg/kg		mg/kg	1.58E+02	NA	NA	NA	NA	1.85E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	1.85E-05	8	1.61E+01	2.01E+00	9.18E-06	8.05E+01	1.01E+01	1.84E-06	0.00%	0.00%	
1,4-Dichlorobenzene	2.60E-04	mg/L		mg/kg		mg/kg	1.58E+02	NA	NA	NA	NA	1.85E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	1.85E-05	8	1.61E+01	2.01E+00	9.18E-06	8.05E+01	1.01E+01	1.84E-06	0.00%	0.00%	
2,3,7,8-TCDD		mg/L	3.83E-06	mg/kg	8.37E-06	mg/kg	NA	5.13E+01	4.21E+01	1.10E-02	2.20E+00	2.20E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	9.21E-07	2.91E-07	1.21E-06	8	1.40E-05	1.75E-06	6.93E-01	1.40E-04	1.75E-05	6.93E-02	0.99%	0.90%	
4,4'-DDD		mg/L	7.00E-04	mg/kg	6.98E-04	mg/kg	NA	1.00E+00	2.88E+01	4.90E-01	4.55E+01	4.55E+01	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	1.59E-03	5.02E-04	2.09E-03	8	2.80E-03	3.50E-04	5.97E+00	2.80E-02	3.50E-03	5.97E-01	8.50%	7.72%	
4,4'-DDE		mg/L	1.76E-03	mg/kg	2.26E-03	mg/kg	NA	1.00E+00	2.47E+01	3.67E-01	1.07E+02	1.07E+02	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	1.21E-02	3.83E-03	1.60E-02	8	2.80E-03	3.50E-04	4.56E+01	2.80E-02	3.50E-03	4.56E+00	64.99%	59.02%	
4,4'-DDT		mg/L		mg/kg	1.33E-02	mg/kg	NA	NA	1.47E+01	2.36E-01	4.87E+00	4.87E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA	0.00E+00	3.24E-03	1.02E-03	4.26E-03	8	2.80E-03	3.50E-04	1.22E+01	2.80E-02	3.50E-03	1.22E+00	17.33%	15.74%	
Acenaphthene		mg/L	2.80E-01	mg/kg		mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%		
Acenaphthylene		mg/L	4.60E-02	mg/kg		mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%		
Anthracene		mg/L	5.90E-02	mg/kg		mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%		
Aroclor 1254		mg/L		mg/kg	9.31E-02	mg/kg	NA	NA	6.52E+01	2.20E-02	1.00E+00	1.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA	0.00E+00	0.00E+00	4.66E-03	1.47E-03	6.13E-03	8	1.80E-01	2.25E-02	2.72E-01	1.80E+00	2.25E-01	2.72E-02	0.39%	0.35%
Benzo(a)anthracene		mg/L	1.50E-01	mg/kg		mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%		
Benzo(a)pyrene		mg/L	8.60E-02	mg/kg		mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%		
Benzo(b)fluoranthene		mg/L	1.40E-01	mg/kg		mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%		
Benzo(g,h,i)perylene		mg/L	5.40E-02	mg/kg		mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%		
Benzo(k)fluoranthene		mg/L	4.50E-02	mg/kg		mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%		
alpha-BHC	9.15E-06	mg/L		mg/kg		mg/kg	1.20E+03	NA	NA	NA	NA	6.50E-07	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	6.50E-07	8	5.60E-01	7.00E-02	9.29E-06	2.25E+00	2.81E-01	2.31E-06	0.00%	0.00%	
delta-BHC	1.49E-05	mg/L		mg/kg		mg/kg	1.20E+03	NA	NA	NA	NA	1.06E-06	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	1.06E-06	8	5.60E-01	7.00E-02	1.51E-05	2.25E+00	2.81E-01	3.76E-06	0.00%	0.00%	
gamma-BHC (Lindane)	7.19E-06	mg/L		mg/kg		mg/kg	1.20E+03	NA	NA	NA	NA	5.11E-07	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	5.11E-07	8	5.60E-01	7.00E-02	7.30E-06	2.25E+00	2.81E-01	1.82E-06	0.00%	0.00%	
Chrysene		mg/L	2.10E-01	mg/kg		mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%		
Dibenz(a,h)anthracene		mg/L	1.90E-02	mg/kg		mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%		
Endosulfan II	7.60E-05	mg/L		mg/kg	2.28E-03	mg/kg	2.50E+02	NA	8.90E+00	3.67E-01	1.00E+00	1.00E+00	5.40E-06	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	1.14E-04	3.60E-05	1.55E-04	8	1.00E+01	1.25E+00	1.24E-04	5.00E+01	6.25E+00	2.49E-05	0.00%	0.00%
Endosulfan sulfate		mg/L		mg/kg	8.93E-04	mg/kg	NA	NA	1.18E+01	3.05E-01	1.00E+00	1.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	4.47E-05	1.41E-05	5.88E-05	8	1.00E+01	1.25E+00	4.70E-05	5.00E+01	6.25E+00	9.41E-06	0.00%	0.00%	
Endrin	8.34E-05	mg/L	9.78E-04	mg/kg		mg/kg	1.05E+04	1.00E+00	NA	NA	NA	5.93E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	5.93E-06	8	3.00E-01	3.75E-02	1.58E-04	1.50E+00	1.88E-01	3.16E-05	0.00%	0.00%		
Endrin aldehyde		mg/L		mg/kg	1.79E-03	mg/kg	NA	NA	7.14E+01	6.51E-02	1.00E+00	1.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA	0.00E+00	0.00E+00	8.96E-05	2.83E-05	1.18E-04	8	3.00E-01	3.75E-02	3.14E-03	1.50E+00	1.88E-01	6.28E-04	0.00%	0.01%
Fluoranthene		mg/L	9.75E-02	mg/kg		mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%		
Fluorene		mg/L	8.70E-02	mg/kg		mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%		
Hexachlorobutadiene	2.60E-04	mg/L		mg/kg		mg/kg	3.92E+03	NA	NA	NA	NA	1.85E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	1.85E-05	8	3.19E+00	3.98E-01	4.64E-05	1.59E+01	1.99E+00	9.30E-06	0.00%	0.00%	
Hexachloroethane	2.70E-04	mg/L		mg/kg		mg/kg	7.50E+02	NA	NA	NA	NA	1.92E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	1.92E-05	8	NA	NA	NA	NA	NA	NA	NA	NA	
Indeno(1,2,3-cd)pyrene		mg/L	3.10E-02	mg/kg		mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0	

TABLE F-8
TIER 2 CHEMICALS OF POTENTIAL ECOLOGICAL CONCERN EEQs AND HAZARD INDICES FOR RED -TAILED HAWKS AT SWMU 31

Hazard Estimate - Tier 2
Red-tailed Hawk

Chemical	Surface Water Exposure Point	Sediment Exposure		Soil Exposure Point		Fish BAF	Aq. Invert. BAF	Terr. Invert. BAF	Plant BAF	Mammal BAF	Bird BAF	PDE Surface Water	PDE Sediment	PDE Soil	PDE Fish	PDE Aq. Invert.	PDE Terr. Invert.	PDE Plants	PDE Mammals	PDE Birds	Total PDE	Chemical-Specific Toxicity Value UF	NOAEL	Adjusted NOAEL	LOAEL	Adjusted LOAEL	Percent Contribution to	Percent Contribution to			
	Concentration	Units	Point Concentration	Units	Concentration	Units	-----unitless-----					mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d	EEQ N	mg/kg-d	mg/kg-d	EEQ L	EEQ N	EEQ L	
1,2-Dichlorobenzene	2.50E-04	mg/L		mg/kg		mg/kg	1.58E+02	NA	NA	NA	NA	8.54E-09	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	8.54E-09	8	1.61E+01	2.01E+00	4.24E-09	8.05E+01	1.01E+01	8.49E-10	0.00%	0.00%	
1,3-Dichlorobenzene	2.60E-04	mg/L		mg/kg		mg/kg	1.58E+02	NA	NA	NA	NA	8.88E-09	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	8.88E-09	8	1.61E+01	2.01E+00	4.41E-09	8.05E+01	1.01E+01	8.83E-10	0.00%	0.00%	
1,4-Dichlorobenzene	2.60E-04	mg/L		mg/kg		mg/kg	1.58E+02	NA	NA	NA	NA	8.88E-09	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	8.88E-09	8	1.61E+01	2.01E+00	4.41E-09	8.05E+01	1.01E+01	8.83E-10	0.00%	0.00%	
2,3,7,8-TCDD		mg/L	3.83E-06	mg/kg	8.37E-06	mg/kg	NA	4.67E+00	4.16E+00	3.90E-03	2.20E+00	2.20E+00	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	4.41E-10	1.39E-10	5.80E-10	8	1.40E-05	1.75E-06	3.31E-04	1.40E-04	1.75E-05	3.31E-05	0.99%	0.90%
4,4'-DDD		mg/L	7.00E-04	mg/kg	6.98E-04	mg/kg	NA	5.00E-01	2.88E+01	4.90E-01	4.55E+01	4.55E+01	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	7.60E-07	2.40E-07	1.00E-06	8	2.80E-03	3.50E-04	2.86E-03	2.80E-02	3.50E-03	2.86E-04	8.53%	7.80%
4,4'-DDE		mg/L	1.76E-03	mg/kg	2.26E-03	mg/kg	NA	5.00E-01	2.47E+01	3.67E-01	1.07E+02	1.07E+02	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	5.81E-06	1.83E-06	7.65E-06	8	2.80E-03	3.50E-04	2.18E-02	2.80E-02	3.50E-03	2.18E-03	65.23%	59.59%
4,4'-DDT		mg/L		mg/kg	1.33E-02	mg/kg	NA	NA	1.47E+01	2.36E-01	4.87E+00	4.87E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA	0.00E+00	0.00E+00	1.55E-06	4.89E-07	2.04E-06	8	2.80E-03	3.50E-04	5.82E-03	2.80E-02	3.50E-03	5.82E-04	17.39%	15.89%
Acenaphthene		mg/L	2.80E-01	mg/kg		mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%	
Acenaphthylene		mg/L	4.60E-02	mg/kg		mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%	
Anthracene		mg/L	5.90E-02	mg/kg		mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%	
Aroclor 1254		mg/L		mg/kg	9.31E-02	mg/kg	NA	NA	1.74E+00	3.60E-03	5.00E-01	5.00E-01	0.00E+00	0.00E+00	0.00E+00	NA	NA	0.00E+00	0.00E+00	1.11E-06	3.52E-07	1.47E-06	8	1.80E-01	2.25E-02	6.52E-05	1.80E+00	2.25E-01	6.52E-06	0.19%	0.18%
Benzo(a)anthracene		mg/L	1.50E-01	mg/kg		mg/kg	NA	NA	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%	
Benzo(a)pyrene		mg/L	6.28E-02	mg/kg		mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%	
Benzo(b)fluoranthene		mg/L	1.40E-01	mg/kg		mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%	
Benzo(g,h,i)perylene		mg/L	5.24E-02	mg/kg		mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%	
Benzo(k)fluoranthene		mg/L	4.02E-02	mg/kg		mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%	
alpha-BHC	9.15E-06	mg/L		mg/kg		mg/kg	1.20E+03	NA	NA	NA	NA	3.13E-10	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	3.13E-10	8	5.60E-01	7.00E-02	4.47E-09	2.25E+00	2.81E-01	1.11E-09	0.00%	0.00%	
delta-BHC	1.49E-05	mg/L		mg/kg		mg/kg	1.20E+03	NA	NA	NA	NA	5.09E-10	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	5.09E-10	8	5.60E-01	7.00E-02	7.27E-09	2.25E+00	2.81E-01	1.81E-09	0.00%	0.00%	
gamma-BHC (Lindane)	7.19E-06	mg/L		mg/kg		mg/kg	1.20E+03	NA	NA	NA	NA	2.46E-10	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	2.46E-10	8	5.60E-01	7.00E-02	3.51E-09	2.25E+00	2.81E-01	8.74E-10	0.00%	0.00%	
Chrysene		mg/L	2.10E-01	mg/kg		mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%	
Dibenz(a,h)anthracene		mg/L	1.90E-02	mg/kg		mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%	
Endosulfan II	7.60E-05	mg/L		mg/kg	2.28E-03	mg/kg	2.50E+02	NA	3.80E-01	3.67E-01	5.00E-01	5.00E-01	2.60E-09	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	2.73E-08	8.62E-09	3.85E-08	8	1.00E+01	1.25E+00	3.08E-08	5.00E+01	6.25E+00	6.16E-09	0.00%	0.00%
Endosulfan sulfate		mg/L		mg/kg	8.93E-04	mg/kg	NA	NA	5.00E-01	3.05E-01	5.00E-01	5.00E-01	0.00E+00	0.00E+00	0.00E+00	NA	NA	0.00E+00	0.00E+00	1.07E-08	3.38E-09	1.41E-08	8	1.00E+01	1.25E+00	1.13E-08	5.00E+01	6.25E+00	2.25E-09	0.00%	0.00%
Endrin	8.34E-05	mg/L	9.78E-04	mg/kg		mg/kg	1.05E+04	5.00E-01	NA	NA	NA	2.85E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	2.85E-09	8	3.00E-01	3.75E-02	7.60E-08	1.50E+00	1.88E-01	1.52E-08	0.00%	0.00%	
Endrin aldehyde		mg/L		mg/kg	1.79E-03	mg/kg	NA	NA	3.00E+00	6.51E-02	5.00E-01	5.00E-01	0.00E+00	0.00E+00	0.00E+00	NA	NA	0.00E+00	0.00E+00	2.14E-08	6.77E-09	2.82E-08	8	3.00E-01	3.75E-02	7.52E-07	1.50E+00	1.88E-01	1.50E-07	0.00%	0.00%
Fluoranthene		mg/L	8.40E-02	mg/kg		mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%	
Fluorene		mg/L	8.70E-02	mg/kg		mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%	
Hexachlorobutadiene	2.60E-04	mg/L		mg/kg		mg/kg	3.47E+03	NA	NA	NA	NA	8.88E-09	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	8.88E-09	8	3.19E+00	3.98E-01	2.23E-08	1.59E+01	1.99E+00	4.47E-09	0.00%	0.00%	
Hexachloroethane	2.70E-04	mg/L		mg/kg		mg/kg	7.50E+02	NA	NA	NA	NA	9.23E-09	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	9.23E-09	8	NA	NA	NA	NA	NA	NA	NA	NA	
Indeno(1,2,3-cd)pyrene		mg/L	2.73E-02	mg/kg		mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%	
Methoxychlor		mg/L		mg/kg	7.65E-03	mg/kg	NA	NA	2.50E+00	2.00E-02	5.00E-01	5.00E-01	0.00E+00	0.00E+00	0.00E+00	NA	NA	0.00E+00	0.00E+00	9.16E-08	2.89E-08	1.20E-07	8	2.58E+01	3.22E+00	3.74E-08	1.29E+02	1.61E+01	7.47E-09	0.00%	0.00%
Phenanthrene		mg/L	7.10E-01	mg/kg		mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	5.53E+02	6.91E+01	0.00E+00	2.77E+03	3.46E+02	0.00E+00	0.00%	0.00%	
Pyrene	2.60E-05	mg/L	1.44E-01	mg/kg		mg/kg	3.49E+03	5.00E-01	NA	NA	NA	8.88E-10	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	8.88E-10	8	5.53E+02	6.91E+01	1.29E-11	2.77E+03	3.46E+02	2.57E-12	0.00%	0.00%	
Arsenic		mg/L	1.22E+01	mg/kg	5.90E+00	mg/kg	NA	1.40E-01	1.43E-01	3.75E-02	5.69E-03	5.69E-03	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	8.04E-07	2.54E-07	1.06E-06	8	5.14E+00	6.43E-01	1.65E-06	1.28E+01	1.61E+00	6.59E-07	0.00%	0.02%
Cadmium		mg/L	7.90E-01	mg/kg	4.62E-01	mg/kg	NA	6.00E-01	9.70E+00	8.83E-01	4.28E-01	4.28E-01	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	4.73E-06	1.49E-06	6.22E-06	8	1.45E+00	1.81E-01	3.43E-05	2.00E+01	2.50E+00	2.49E-06	0.10%	0.07%
Chromium	4.64E-03	mg/L	5.21E+01	mg/kg	2.82E+01	mg/kg	1.25E+02	1.00E-01	3.06E-01	4.10E-02	9.55E-02	9.55E-02	1.59E-07	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	6.45E-05	2.04E-05	8.50E-05	8	2.66E+00	3.33E-01	2.56E-04	2.78E+00	3.48E-01	2.45E-04	0.76%	6.67%
Copper		mg/L	5.00E+01	mg/kg	1.77E+01	mg/kg	NA	1.60E+00	5.15E-01	3.42E-01	6.59E-01	6.59E-01	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	0.00E+00	0.00E+00	2.79E-04	8.81E-05	3.67E-04	8	4.70E+01	5.88E+00	6.25E-05	6.20E+01	7.75E+00	4.74E-05	0.19%	1.29%
Lead	6.01E-03	mg/L	7.73E+01	mg/kg	2.80E+01	mg/kg	9.00E+01	7.00E-02	4.23E-01	6.14E-02	1.68E-01	1.68E-01																			

TABLE F-9
TIER 1 CHEMICALS OF POTENTIAL CONCERN EEQs AND HAZARD INDICES FOR RED FOXES AT SWMU 31

Hazard Estimate - Tier 1
Red Fox

Chemical	Surface Water Exposure Point	Sediment Exposure		Soil Exposure Point		Fish BAF	Aq. Invert. BAF	Terr. Invert. BAF	Plant BAF	Mammal BAF	Bird BAF	PDE Surface Water	PDE Sediment	PDE Soil	PDE Fish	PDE Aq. Invert.	PDE Terr. Invert.	PDE Plants	PDE Mammals	PDE Birds	Total PDE	Chemical-Specific Toxicity Value UF	NOAEL	Adjusted NOAEL	LOAEL	Adjusted LOAEL	Percent Contribution to	Percent Contribution to			
	Concentration	Units	Point Concentration	Units	Concentration	Units	unitless					mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d	EEQ N	mg/kg-d	mg/kg-d	EEQ L	EEQ N	EEQ L	
1,2-Dichlorobenzene	2.50E-04	mg/L		mg/kg		mg/kg	1.58E+02	NA	NA	NA	NA	4.83E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	4.83E-05	8	8.57E+01	1.07E+01	4.51E-06	4.29E+02	5.36E+01	9.02E-07	0.00%	0.00%	
1,3-Dichlorobenzene	2.60E-04	mg/L		mg/kg		mg/kg	1.58E+02	NA	NA	NA	NA	5.02E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	5.02E-05	8	8.57E+01	1.07E+01	4.69E-06	4.29E+02	5.36E+01	9.38E-07	0.00%	0.00%	
1,4-Dichlorobenzene	2.60E-04	mg/L		mg/kg		mg/kg	1.58E+02	NA	NA	NA	NA	5.02E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	5.02E-05	8	8.57E+01	1.07E+01	4.69E-06	4.29E+02	5.36E+01	9.38E-07	0.00%	0.00%	
2,3,7,8-TCDD		mg/L	3.83E-06	mg/kg	8.37E-06	mg/kg	NA	5.13E+01	4.21E+01	1.10E-02	2.20E+00	2.20E+00	0.00E+00	0.00E+00	2.70E-08	NA	0.00E+00	1.62E-06	1.80E-09	1.38E-06	2.97E-07	3.33E-06	8	1.00E-06	1.25E-07	2.66E+01	1.00E-05	1.25E-06	2.66E+00	78.54%	58.69%
4,4'-DDD		mg/L	7.00E-04	mg/kg	6.98E-04	mg/kg	NA	1.00E+00	2.88E+01	4.90E-01	4.55E+01	4.55E+01	0.00E+00	0.00E+00	2.25E-06	NA	0.00E+00	9.26E-05	6.71E-06	2.38E-03	5.12E-04	2.99E-03	8	8.00E-01	1.00E-01	2.99E-02	4.00E+00	5.00E-01	5.98E-03	0.09%	0.13%
4,4'-DDE		mg/L	1.76E-03	mg/kg	2.26E-03	mg/kg	NA	1.00E+00	2.47E+01	3.67E-01	1.07E+02	1.07E+02	0.00E+00	0.00E+00	7.28E-06	NA	0.00E+00	2.57E-04	1.62E-05	1.82E-02	3.92E-03	2.24E-02	8	8.00E-01	1.00E-01	2.24E-01	4.00E+00	5.00E-01	4.48E-02	0.66%	0.99%
4,4'-DDT		mg/L		mg/kg	1.33E-02	mg/kg	NA	NA	1.47E+01	2.36E-01	4.87E+00	4.87E+00	0.00E+00	0.00E+00	4.28E-05	NA	NA	9.04E-04	6.16E-05	4.85E-03	1.04E-03	6.90E-03	8	8.00E-01	1.00E-01	6.90E-02	4.00E+00	5.00E-01	1.38E-02	0.20%	0.30%
Acenaphthene		mg/L	2.80E-01	mg/kg		mg/kg	NA	1.00E+00	NA	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.75E+01	2.19E+00	0.00E+00	3.50E+01	4.38E+00	0.00E+00	0.00%	0.00%
Acenaphthylene		mg/L	4.60E-02	mg/kg		mg/kg	NA	1.00E+00	NA	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.75E+01	2.19E+00	0.00E+00	3.50E+01	4.38E+00	0.00E+00	0.00%	0.00%
Anthracene		mg/L	5.90E-02	mg/kg		mg/kg	NA	1.00E+00	NA	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.00E+02	1.25E+01	0.00E+00	5.00E+02	6.25E+01	0.00E+00	0.00%	0.00%
Aroclor 1254		mg/L		mg/kg	9.31E-02	mg/kg	NA	NA	6.52E+01	2.20E-02	1.00E+00	1.00E+00	0.00E+00	0.00E+00	3.00E-04	NA	NA	2.80E-02	4.01E-05	6.97E-03	1.50E-03	3.68E-02	8	1.40E-01	1.75E-02	2.10E+00	6.90E-01	8.63E-02	4.27E-01	6.20%	9.40%
Benzo(a)anthracene		mg/L	1.50E-01	mg/kg		mg/kg	NA	1.00E+00	NA	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.00E+00	1.25E-01	0.00E+00	1.00E+01	1.25E+00	0.00E+00	0.00%	0.00%
Benzo(a)pyrene		mg/L	8.60E-02	mg/kg		mg/kg	NA	1.00E+00	NA	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.00E+00	1.25E-01	0.00E+00	1.00E+01	1.25E+00	0.00E+00	0.00%	0.00%
Benzo(b)fluoranthene		mg/L	1.40E-01	mg/kg		mg/kg	NA	1.00E+00	NA	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.00E+00	1.25E-01	0.00E+00	1.00E+01	1.25E+00	0.00E+00	0.00%	0.00%
Benzo(g,h,i)perylene		mg/L	5.40E-02	mg/kg		mg/kg	NA	1.00E+00	NA	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.00E+00	1.25E-01	0.00E+00	1.00E+01	1.25E+00	0.00E+00	0.00%	0.00%
Benzo(k)fluoranthene		mg/L	4.50E-02	mg/kg		mg/kg	NA	1.00E+00	NA	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.00E+00	1.25E-01	0.00E+00	1.00E+01	1.25E+00	0.00E+00	0.00%	0.00%
alpha-BHC	9.15E-06	mg/L		mg/kg		mg/kg	1.20E+03	NA	NA	NA	NA	NA	1.77E-06	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	1.77E-06	8	1.40E-02	1.75E-03	1.01E-03	1.40E-01	1.75E-02	1.01E-04	0.00%	0.00%
delta-BHC	1.49E-05	mg/L		mg/kg		mg/kg	1.20E+03	NA	NA	NA	NA	NA	2.88E-06	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	2.88E-06	8	1.40E-02	1.75E-03	1.65E-03	1.40E-01	1.75E-02	1.65E-04	0.00%	0.00%
gamma-BHC (Lindane)	7.19E-06	mg/L		mg/kg		mg/kg	1.20E+03	NA	NA	NA	NA	NA	1.39E-06	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	1.39E-06	8	1.40E-02	1.75E-03	7.94E-04	1.40E-01	1.75E-02	7.94E-05	0.00%	0.00%
Chrysene		mg/L	2.10E-01	mg/kg		mg/kg	NA	1.00E+00	NA	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.00E+00	1.25E-01	0.00E+00	1.00E+01	1.25E+00	0.00E+00	0.00%	0.00%
Dibenz(a,h)anthracene		mg/L	1.90E-02	mg/kg		mg/kg	NA	1.00E+00	NA	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.00E+00	1.25E-01	0.00E+00	1.00E+01	1.25E+00	0.00E+00	0.00%	0.00%
Endosulfan II	7.60E-05	mg/L		mg/kg	2.28E-03	mg/kg	2.50E+02	NA	8.90E+00	3.67E-01	1.00E+00	1.00E+00	1.47E-05	0.00E+00	7.34E-06	0.00E+00	NA	9.35E-05	1.64E-05	1.71E-04	3.68E-05	3.40E-04	8	1.50E-01	1.88E-02	1.81E-02	7.50E-01	9.38E-02	3.62E-03	0.05%	0.08%
Endosulfan sulfate		mg/L		mg/kg	8.93E-04	mg/kg	NA	NA	1.18E+01	3.05E-01	1.00E+00	1.00E+00	0.00E+00	0.00E+00	2.88E-06	NA	NA	4.86E-05	5.33E-06	6.69E-05	1.44E-05	1.38E-04	8	1.50E-01	1.88E-02	7.37E-03	7.50E-01	9.38E-02	1.47E-03	0.02%	0.03%
Endrin	8.34E-05	mg/L	9.78E-04	mg/kg		mg/kg	1.05E+04	1.00E+00	NA	NA	NA	NA	1.61E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	1.61E-05	8	9.20E-02	1.15E-02	1.40E-03	9.20E-01	1.15E-01	1.40E-04	0.00%	0.00%
Endrin aldehyde		mg/L		mg/kg	1.79E-03	mg/kg	NA	NA	7.14E+01	6.51E-02	1.00E+00	1.00E+00	0.00E+00	0.00E+00	5.76E-06	NA	NA	5.89E-04	2.28E-06	1.34E-04	2.89E-05	7.60E-04	8	9.20E-02	1.15E-02	6.61E-02	9.20E-01	1.15E-01	6.61E-03	0.19%	0.15%
Fluoranthene		mg/L	9.75E-02	mg/kg		mg/kg	NA	1.00E+00	NA	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.25E+01	1.56E+00	0.00E+00	2.50E+01	3.13E+00	0.00E+00	0.00%	0.00%
Fluorene		mg/L	8.70E-02	mg/kg		mg/kg	NA	1.00E+00	NA	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.25E+01	1.56E+00	0.00E+00	2.50E+01	3.13E+00	0.00E+00	0.00%	0.00%
Hexachlorobutadiene	2.60E-04	mg/L		mg/kg		mg/kg	3.92E+03	NA	NA	NA	NA	NA	5.02E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	5.02E-05	8	2.00E-01	2.50E-02	2.01E-03	1.00E+00	1.25E-01	4.02E-04	0.01%	0.01%
Hexachloroethane	2.70E-04	mg/L		mg/kg		mg/kg	7.50E+02	NA	NA	NA	NA	NA	5.22E-05	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	5.22E-05	8	1.00E-01	1.25E-02	4.17E-03	1.50E+00	1.88E-01	2.78E-04	0.01%	0.01%
Indeno(1,2,3-cd)pyrene		mg/L	3.10E-02	mg/kg		mg/kg	NA	1.00E+00	NA	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.00E+00	1.25E-01	0.00E+00	1.00E+01	1.25E+00	0.00E+00	0.00%	0.00%
Methoxychlor		mg/L		mg/kg	7.65E-03	mg/kg	NA	NA	5.82E+01	4.20E-01	1.00E+00	1.00E+00	0.00E+00	0.00E+00	2.46E-05	NA	NA	2.05E-03	6.30E-05	5.73E-04	1.23E-04	2.84E-03	8	4.00E+00	5.00E-01	5.67E-03	8.00E+00	1.00E+00	2.84E-03	0.02%	0.06%
Phenanthrene		mg/L	7.10E-01	mg/kg		mg/kg	NA	1.00E+00	NA	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.00E+00	1.25E-01	0.00E+00	1.00E+01	1.25E+00	0.00E+00	0.00%	0.00%
Pyrene	2.60E-05	mg/L	1.50E-01	mg/kg		mg/kg	4.49E+03	1.00E+00	NA	NA	NA	NA	5.02E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	5.02E-06	8	7.50E+00	9.38E-01	5.36E-06	1.25E+01	1.56E+00	3.22E-06	0.00%	0.00%
Arsenic		mg/L	1.25E+01	mg/kg	5.90E+00	mg/kg	NA	6.90E-01	1.43E-01	3.75E-02	5.69E-03	5.69E-03	0.00E+00	0.00E+00	1.90E-02	NA	0.00E+00	3.90E-03	4.34E-03	2.52E-03	5.42E-04	3.03E-02	8	1.26E-01	1.58E-02	1.92E+00	1.26E+00	1.58E-01	1.92E-01	5.67%	4.24%
Cadmium		mg/L	9.65E-01	mg/kg	4.62E-01	mg/kg	NA	7.99E+00	9.70E+00	8.83E-01	4.28E-01	4.28E-01	0.00E+00	0.00E+00	1.49E-03	NA	0.00E+00	2.07E-02	7.99E-03	1.48E-02	3.19E-03	4.81E-02	8	1.00E+00	1.25E-01	3.85E-01	1.00E+01	1.25E+00	3.85E-02	1.14%	0.85%
Chromium	4.70E-03	mg/L	5.66E+01	mg/kg	2.82E+01	mg/kg	2.00E+02	4.70E-01	3.06E-01	4.10E-02	9.55E-02	9.55E-02	9.08E-04	0.00E+00	9.08E-02	0.00E+00	0.00E+00	3.98E-02	2.27E-02	2.02E-01	4.34E-02	3.99E-01	8	2.74E+03	3.42E+02	1.17E-03	1.37E+04	1.71E+03	2.33E-04	0.00%	0.01%
Copper		mg/L	5.00E+01	mg/kg	1.77E+01	mg/kg	NA	5.30E+00	5.15E-01	3.42E-01	6.59E-01	6.59E-01	0.00E+00	0.00E+00	5.70E-02	NA	0.00E+00	4.20E-02	1.19E-01	8.73E-01	1.88E-01	1.28E+00	8	1.17E+01	1.46E+00	8.74E-01	1.51E+01	1.89			

TABLE F-10
TIER 2 CHEMICALS OF POTENTIAL CONCERN EEQs AND HAZARD INDICES FOR RED FOXES AT SWMU 31

Hazard Estimate - Tier 2
Red Fox

Chemical	Surface Water Exposure Point	Sediment Exposure		Soil Exposure Point	Fish BAF	Aq. Invert. BAF	Terr. Invert. BAF	Plant BAF	Mammal BAF	Bird BAF	PDE Surface Water	PDE Sediment	PDE Soil	PDE Fish	PDE Aq. Invert.	PDE Terr. Invert.	PDE Plants	PDE Mammals	PDE Birds	Total PDE	Chemical-Specific Toxicity Value UF	NOAEL	Adjusted NOAEL	LOAEL	Adjusted LOAEL	Percent Contribution to	Percent Contribution to			
	Concentration	Units	Point Concentration	Units		-----unitless-----					mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d	EEQ N	mg/kg-d	mg/kg-d	EEQ L	EEQ N	EEQ L	
1,2-Dichlorobenzene	2.50E-04	mg/L		mg/kg	mg/kg	1.58E+02	NA	NA	NA	NA	1.23E-08	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	1.23E-08	8	8.57E+01	1.07E+01	1.15E-09	4.29E+02	5.36E+01	2.30E-10	0.00%	0.00%	
1,3-Dichlorobenzene	2.60E-04	mg/L		mg/kg	mg/kg	1.58E+02	NA	NA	NA	NA	1.28E-08	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	1.28E-08	8	8.57E+01	1.07E+01	1.19E-09	4.29E+02	5.36E+01	2.39E-10	0.00%	0.00%	
1,4-Dichlorobenzene	2.60E-04	mg/L		mg/kg	mg/kg	1.58E+02	NA	NA	NA	NA	1.28E-08	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	1.28E-08	8	8.57E+01	1.07E+01	1.19E-09	4.29E+02	5.36E+01	2.39E-10	0.00%	0.00%	
2,3,7,8-TCDD		mg/L	3.83E-06	mg/kg	mg/kg	NA	4.67E+00	4.16E+00	3.90E-03	2.20E+00	2.20E+00	0.00E+00	0.00E+00	7.08E-12	NA	0.00E+00	4.22E-11	1.68E-13	3.63E-10	7.81E-11	4.90E-10	8	1.00E-06	1.25E-07	3.92E-03	1.00E-05	1.25E-06	3.92E-04	74.16%	50.58%
4,4'-DDD		mg/L	7.00E-04	mg/kg	mg/kg	NA	5.00E-01	2.88E+01	4.90E-01	4.55E+01	4.55E+01	0.00E+00	0.00E+00	5.90E-10	NA	0.00E+00	2.43E-08	1.76E-09	6.25E-07	1.35E-07	7.86E-07	8	8.00E-01	1.00E-01	7.86E-06	4.00E+00	5.00E-01	1.57E-06	0.15%	0.20%
4,4'-DDE		mg/L	1.76E-03	mg/kg	mg/kg	NA	5.00E-01	2.47E+01	3.67E-01	1.07E+02	1.07E+02	0.00E+00	0.00E+00	1.91E-09	NA	0.00E+00	6.76E-08	4.27E-09	4.78E-06	1.03E-06	5.88E-06	8	8.00E-01	1.00E-01	5.88E-05	4.00E+00	5.00E-01	1.18E-05	1.11%	1.52%
4,4'-DDT		mg/L		mg/kg	mg/kg	NA	NA	1.47E+01	2.36E-01	4.87E+00	4.87E+00	0.00E+00	0.00E+00	1.12E-08	NA	2.38E-07	1.62E-08	1.27E-06	2.74E-07	1.81E-06	8	8.00E-01	1.00E-01	1.81E-05	4.00E+00	5.00E-01	3.63E-06	0.34%	0.47%	
Acenaphthene		mg/L	2.80E-01	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.75E+01	2.19E+00	0.00E+00	3.50E+01	4.38E+00	0.00E+00	0.00%	0.00%	
Acenaphthylene		mg/L	4.60E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.75E+01	2.19E+00	0.00E+00	3.50E+01	4.38E+00	0.00E+00	0.00%	0.00%	
Anthracene		mg/L	5.90E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.00E+02	1.25E+01	0.00E+00	5.00E+02	6.25E+01	0.00E+00	0.00%	0.00%	
Aroclor 1254		mg/L		mg/kg	mg/kg	NA	NA	1.74E+00	3.60E-03	5.00E-01	5.00E-01	0.00E+00	0.00E+00	7.87E-08	NA	1.97E-07	1.73E-09	9.16E-07	1.97E-07	1.39E-06	8	1.40E-01	1.75E-02	7.95E-05	6.90E-01	8.63E-02	1.61E-05	1.50%	2.08%	
Benzo(a)anthracene		mg/L	1.50E-01	mg/kg	mg/kg	NA	NA	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA	0.00E+00	8	1.00E+00	1.25E-01	0.00E+00	1.00E+01	1.25E+00	0.00E+00	0.00%	0.00%	
Benzo(a)pyrene		mg/L	6.28E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.00E+00	1.25E-01	0.00E+00	1.00E+01	1.25E+00	0.00E+00	0.00%	0.00%	
Benzo(b)fluoranthene		mg/L	1.40E-01	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.00E+00	1.25E-01	0.00E+00	1.00E+01	1.25E+00	0.00E+00	0.00%	0.00%	
Benzo(g,h,i)perylene		mg/L	5.24E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.00E+00	1.25E-01	0.00E+00	1.00E+01	1.25E+00	0.00E+00	0.00%	0.00%	
Benzo(k)fluoranthene		mg/L	4.02E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.00E+00	1.25E-01	0.00E+00	1.00E+01	1.25E+00	0.00E+00	0.00%	0.00%	
alpha-BHC	9.15E-06	mg/L		mg/kg	mg/kg	1.20E+03	NA	NA	NA	NA	4.50E-10	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	4.50E-10	8	1.40E-02	1.75E-03	2.57E-07	1.40E-01	1.75E-02	2.57E-08	0.00%	0.00%	
delta-BHC	1.49E-05	mg/L		mg/kg	mg/kg	1.20E+03	NA	NA	NA	NA	7.33E-10	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	7.33E-10	8	1.40E-02	1.75E-03	4.19E-07	1.40E-01	1.75E-02	4.19E-08	0.01%	0.01%	
gamma-BHC (Lindane)	7.19E-06	mg/L		mg/kg	mg/kg	1.20E+03	NA	NA	NA	NA	3.54E-10	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	3.54E-10	8	1.40E-02	1.75E-03	2.02E-07	1.40E-01	1.75E-02	2.02E-08	0.00%	0.00%	
Chrysene		mg/L	2.10E-01	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.00E+00	1.25E-01	0.00E+00	1.00E+01	1.25E+00	0.00E+00	0.00%	0.00%	
Dibenz(a,h)anthracene		mg/L	1.90E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.00E+00	1.25E-01	0.00E+00	1.00E+01	1.25E+00	0.00E+00	0.00%	0.00%	
Endosulfan II	7.60E-05	mg/L		mg/kg	mg/kg	2.28E-03	NA	3.80E-01	3.67E-01	5.00E-01	5.00E-01	3.74E-09	0.00E+00	1.93E-09	0.00E+00	NA	1.05E-09	4.31E-09	2.24E-08	4.83E-09	3.83E-08	8	1.50E-01	1.88E-02	2.04E-06	7.50E-01	9.38E-02	4.09E-07	0.04%	0.05%
Endosulfan sulfate		mg/L		mg/kg	mg/kg	8.93E-04	NA	5.00E-01	3.05E-01	5.00E-01	5.00E-01	0.00E+00	0.00E+00	7.55E-10	NA	5.41E-10	1.40E-09	8.79E-09	1.89E-09	1.34E-08	8	1.50E-01	1.88E-02	7.14E-07	7.50E-01	9.38E-02	1.43E-07	0.01%	0.02%	
Endrin	8.34E-05	mg/L	9.78E-04	mg/kg	mg/kg	1.05E+04	5.00E-01	NA	NA	NA	4.10E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	4.10E-09	8	9.20E-02	1.15E-02	3.57E-07	9.20E-01	1.15E-01	3.57E-08	0.01%	0.00%	
Endrin aldehyde		mg/L		mg/kg	mg/kg	NA	NA	3.00E+00	6.51E-02	5.00E-01	5.00E-01	0.00E+00	0.00E+00	1.51E-09	NA	NA	6.51E-09	6.00E-10	1.76E-08	3.80E-09	3.00E-08	8	9.20E-02	1.15E-02	2.61E-06	9.20E-01	1.15E-01	2.61E-07	0.05%	0.03%
Fluoranthene		mg/L	8.40E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.25E+01	1.56E+00	0.00E+00	2.50E+01	3.13E+00	0.00E+00	0.00%	0.00%	
Fluorene		mg/L	8.70E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.25E+01	1.56E+00	0.00E+00	2.50E+01	3.13E+00	0.00E+00	0.00%	0.00%	
Hexachlorobutadiene	2.60E-04	mg/L		mg/kg	mg/kg	3.47E+03	NA	NA	NA	NA	1.28E-08	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	1.28E-08	8	2.00E-01	2.50E-02	5.12E-07	1.00E+00	1.25E-01	1.02E-07	0.01%	0.01%	
Hexachloroethane	2.70E-04	mg/L		mg/kg	mg/kg	7.50E+02	NA	NA	NA	NA	1.33E-08	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	1.33E-08	8	1.00E-01	1.25E-02	1.06E-06	1.50E+00	1.88E-01	7.09E-08	0.02%	0.01%	
Indeno(1,2,3-cd)pyrene		mg/L	2.73E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.00E+00	1.25E-01	0.00E+00	1.00E+01	1.25E+00	0.00E+00	0.00%	0.00%	
Methoxychlor		mg/L		mg/kg	mg/kg	NA	NA	2.50E+00	2.00E-02	5.00E-01	5.00E-01	0.00E+00	0.00E+00	6.47E-09	NA	NA	2.32E-08	7.88E-10	7.53E-08	1.62E-08	1.22E-07	8	4.00E+00	5.00E-01	2.44E-07	8.00E+00	1.00E+00	1.22E-07	0.00%	0.02%
Phenanthrene		mg/L	7.10E-01	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	0.00E+00	0.00E+00	NA	0.00E+00	NA	NA	NA	NA	0.00E+00	8	1.00E+00	1.25E-01	0.00E+00	1.00E+01	1.25E+00	0.00E+00	0.00%	0.00%	
Pyrene	2.60E-05	mg/L	1.44E-01	mg/kg	mg/kg	3.49E+03	5.00E-01	NA	NA	NA	1.28E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA	NA	NA	1.28E-09	8	7.50E+00	9.38E-01	1.36E-09	1.25E+01	1.56E+00	8.19E-10	0.00%	0.00%	
Arsenic		mg/L	1.22E+01	mg/kg	mg/kg	5.90E+00	NA	1.43E-01	3.75E-02	5.69E-03	5.69E-03	0.00E+00	0.00E+00	4.99E-06	NA	0.00E+00	1.02E-06	1.14E-06	6.61E-07	1.42E-07	7.96E-06	8	1.26E-01	1.58E-02	5.05E-04	1.26E+00	1.58E-01	5.05E-05	9.56%	6.52%
Cadmium		mg/L	7.90E-01	mg/kg	mg/kg	NA	6.00E-01	9.70E+00	8.83E-01	4.28E-01	4.28E-01	0.00E+00	0.00E+00	3.91E-07	NA	0.00E+00	5.43E-06	2.10E-06	3.89E-06	8.38E-07	1.26E-05	8	1.00E+00	1.25E-01	1.01E-04	1.00E+01	1.25E+00	1.01E-05	1.91%	1.31%
Chromium	4.64E-03	mg/L	5.21E+01	mg/kg	mg/kg	1.25E+02	1.00E-01	3.06E-01	4.10E-02	9.55E-02	9.55E-02	2.28E-07	0.00E+00	2.38E-05	0.00E+00	0.00E+00	1.05E-05	5.95E-06	5.30E-05	1.14E-05	1.05E-04	8	2.74E+03	3.42E+02	3.07E-07	1.37E+04	1.71E+03	6.13E-08	0.01%	0.01%
Copper		mg/L	5.00E+01	mg/kg	mg/kg	NA	1.60E+00	5.15E-01	3.42E-01	6.59E-01	6.59E-01	0.00E+00	0.00E+00	1.50E-05	NA	0.00E+00	1.10E-05	3.12E-05	2.29E-04	4.94E-05	3.36E-04	8	1.17E+01	1.46E+00	2.30E-04	1.51E+01	1.89E+00	1.78E-04	4.35%	22.97%
Lead	6.01E-03	mg/L	7.73E+01	mg/kg	mg/kg	9.00E+01	7.00E-02	4.23E-01	6.14E-02	1.68E-01	1.68E-01	2.96E-07	0.00E+00	2.37E-05	0.00E+00	0.00E+00	1.43E-05	8.85E-06	9.27E-05	2.00E-05	1.60E-04	8	8.00E+00	1.00E+00	1.60E-04	8.00E+01	1.00E+01	1.60E-05	3.02%	2.06%
Mercury	1.48E-0																													

TABLE F-11
TIER 1 CHEMICALS OF POTENTIAL CONCERN EEQs AND HAZARD INDICES FOR MINKS AT SWMU 31

Hazard Estimate - Tier 1
Mink

Chemical	Surface Water Exposure Point	Sediment Exposure		Soil Exposure Point		Fish BAF	Aq. Invert. BAF	Terr. Invert. BAF	Plant BAF	Mammal BAF	Bird BAF	PDE Surface Water	PDE Sediment	PDE Soil	PDE Fish	PDE Aq. Invert.	PDE Terr. Invert.	PDE Plants	PDE Mammals	PDE Birds	Total PDE	Chemical-Specific Toxicity Value UF	NOAEL	Adjusted NOAEL	LOAEL	Adjusted LOAEL	Percent Contribution to	Percent Contribution to			
	Concentration	Units	Point Concentration	Units	Concentration	Units	unitless					mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d	EEQ N	mg/kg-d	mg/kg-d	EEQ L	EEQ N	EEQ L	
1,2-Dichlorobenzene	2.50E-04	mg/L		mg/kg		mg/kg	1.58E+02	NA	NA	NA	NA	7.27E-05	0.00E+00	0.00E+00	5.14E-03	NA	NA	NA	NA	NA	5.21E-03	8	8.57E+01	1.07E+01	4.86E-04	4.29E+02	5.36E+01	9.72E-05	0.00%	0.00%	
1,3-Dichlorobenzene	2.60E-04	mg/L		mg/kg		mg/kg	1.58E+02	NA	NA	NA	NA	7.56E-05	0.00E+00	0.00E+00	5.34E-03	NA	NA	NA	NA	NA	5.42E-03	8	8.57E+01	1.07E+01	5.06E-04	4.29E+02	5.36E+01	1.01E-04	0.00%	0.00%	
1,4-Dichlorobenzene	2.60E-04	mg/L		mg/kg		mg/kg	1.58E+02	NA	NA	NA	NA	7.56E-05	0.00E+00	0.00E+00	5.34E-03	NA	NA	NA	NA	NA	5.42E-03	8	8.57E+01	1.07E+01	5.06E-04	4.29E+02	5.36E+01	1.01E-04	0.00%	0.00%	
2,3,7,8-TCDD		mg/L	3.83E-06	mg/kg	8.37E-06	mg/kg	NA	5.13E+01	4.21E+01	1.10E-02	2.20E+00	2.20E+00	0.00E+00	1.53E-08	0.00E+00	NA	4.72E-06	0.00E+00	3.31E-09	9.21E-08	9.21E-08	4.92E-06	8	1.00E-06	1.25E-07	3.93E+01	1.00E-05	1.25E-06	3.93E+00	47.76%	37.40%
4,4'-DDD		mg/L	7.00E-04	mg/kg	6.98E-04	mg/kg	NA	1.00E+00	2.88E+01	4.90E-01	4.55E+01	4.55E+01	0.00E+00	2.80E-06	0.00E+00	NA	1.68E-05	0.00E+00	1.23E-05	1.59E-04	1.59E-04	3.49E-04	8	8.00E-01	1.00E-01	3.49E-03	4.00E+00	5.00E-01	6.99E-04	0.00%	0.01%
4,4'-DDE		mg/L	1.76E-03	mg/kg	2.26E-03	mg/kg	NA	1.00E+00	2.47E+01	3.67E-01	1.07E+02	1.07E+02	0.00E+00	7.04E-06	0.00E+00	NA	4.22E-05	0.00E+00	2.98E-05	1.21E-03	1.21E-03	2.51E-03	8	8.00E-01	1.00E-01	2.51E-02	4.00E+00	5.00E-01	5.01E-03	0.03%	0.05%
4,4'-DDT		mg/L		mg/kg	1.33E-02	mg/kg	NA	NA	1.47E+01	2.36E-01	4.87E+00	4.87E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA	0.00E+00	1.13E-04	3.24E-04	3.24E-04	7.60E-04	8	8.00E-01	1.00E-01	7.60E-03	4.00E+00	5.00E-01	1.52E-03	0.01%	0.01%
Acenaphthene		mg/L	2.80E-01	mg/kg		mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	1.12E-03	0.00E+00	NA	6.72E-03	NA	NA	NA	NA	7.84E-03	8	1.75E+01	2.19E+00	3.58E-03	3.50E+01	4.38E+00	1.79E-03	0.00%	0.02%	
Acenaphthylene		mg/L	4.60E-02	mg/kg		mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	1.84E-04	0.00E+00	NA	1.10E-03	NA	NA	NA	NA	1.29E-03	8	1.75E+01	2.19E+00	5.89E-04	3.50E+01	4.38E+00	2.94E-04	0.00%	0.00%	
Anthracene		mg/L	5.90E-02	mg/kg		mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	2.36E-04	0.00E+00	NA	1.42E-03	NA	NA	NA	NA	1.65E-03	8	1.00E+02	1.25E+01	1.32E-04	5.00E+02	6.25E+01	2.64E-05	0.00%	0.00%	
Aroclor 1254		mg/L		mg/kg	9.31E-02	mg/kg	NA	NA	6.52E+01	2.20E-02	1.00E+00	1.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA	0.00E+00	7.37E-05	4.66E-04	4.66E-04	1.00E-03	1	1.40E-01	1.40E-01	7.18E-03	6.90E-01	6.90E-01	1.46E-03	0.01%	0.01%
Benzo(a)anthracene		mg/L	1.50E-01	mg/kg		mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	6.00E-04	0.00E+00	NA	3.60E-03	NA	NA	NA	NA	4.20E-03	8	1.00E+00	1.25E-01	3.36E-02	1.00E+01	1.25E+00	3.36E-03	0.04%	0.03%	
Benzo(a)pyrene		mg/L	8.60E-02	mg/kg		mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	3.44E-04	0.00E+00	NA	2.06E-03	NA	NA	NA	NA	2.41E-03	8	1.00E+00	1.25E-01	1.93E-02	1.00E+01	1.25E+00	1.93E-03	0.02%	0.02%	
Benzo(b)fluoranthene		mg/L	1.40E-01	mg/kg		mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	5.60E-04	0.00E+00	NA	3.36E-03	NA	NA	NA	NA	3.92E-03	8	1.00E+00	1.25E-01	3.14E-02	1.00E+01	1.25E+00	3.14E-03	0.04%	0.03%	
Benzo(g,h,i)perylene		mg/L	5.40E-02	mg/kg		mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	2.16E-04	0.00E+00	NA	1.30E-03	NA	NA	NA	NA	1.51E-03	8	1.00E+00	1.25E-01	1.21E-02	1.00E+01	1.25E+00	1.21E-03	0.01%	0.01%	
Benzo(k)fluoranthene		mg/L	4.50E-02	mg/kg		mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	1.80E-04	0.00E+00	NA	1.08E-03	NA	NA	NA	NA	1.26E-03	8	1.00E+00	1.25E-01	1.01E-02	1.00E+01	1.25E+00	1.01E-03	0.01%	0.01%	
alpha-BHC	9.15E-06	mg/L		mg/kg		mg/kg	1.20E+03	NA	NA	NA	NA	2.66E-06	0.00E+00	0.00E+00	1.43E-03	NA	NA	NA	NA	NA	1.43E-03	1	1.40E-02	1.40E-02	1.02E-01	1.40E-01	1.40E-01	1.02E-02	0.12%	0.10%	
delta-BHC	1.49E-05	mg/L		mg/kg		mg/kg	1.20E+03	NA	NA	NA	NA	4.33E-06	0.00E+00	0.00E+00	2.33E-03	NA	NA	NA	NA	NA	2.33E-03	1	1.40E-02	1.40E-02	1.67E-01	1.40E-01	1.40E-01	1.67E-02	0.20%	0.16%	
gamma-BHC (Lindane)	7.19E-06	mg/L		mg/kg		mg/kg	1.20E+03	NA	NA	NA	NA	2.09E-06	0.00E+00	0.00E+00	1.12E-03	NA	NA	NA	NA	NA	1.13E-03	1	1.40E-02	1.40E-02	8.04E-02	1.40E-01	1.40E-01	8.04E-03	0.10%	0.08%	
Chrysene		mg/L	2.10E-01	mg/kg		mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	8.40E-04	0.00E+00	NA	5.04E-03	NA	NA	NA	NA	5.88E-03	8	1.00E+00	1.25E-01	4.70E-02	1.00E+01	1.25E+00	4.70E-03	0.06%	0.04%	
Dibenz(a,h)anthracene		mg/L	1.90E-02	mg/kg		mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	7.60E-05	0.00E+00	NA	4.56E-04	NA	NA	NA	NA	5.32E-04	8	1.00E+00	1.25E-01	4.26E-03	1.00E+01	1.25E+00	4.26E-04	0.01%	0.00%	
Endosulfan II	7.60E-05	mg/L		mg/kg	2.28E-03	mg/kg	2.50E+02	NA	8.90E+00	3.67E-01	1.00E+00	1.00E+00	2.21E-05	0.00E+00	0.00E+00	2.47E-03	NA	0.00E+00	3.01E-05	1.14E-05	1.14E-05	2.55E-03	8	1.50E-01	1.88E-02	1.36E-01	7.50E-01	9.38E-02	2.71E-02	0.16%	0.26%
Endosulfan sulfate		mg/L		mg/kg	8.93E-04	mg/kg	NA	NA	1.18E+01	3.05E-01	1.00E+00	1.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA	0.00E+00	9.80E-06	4.47E-06	4.47E-06	1.87E-05	8	1.50E-01	1.88E-02	9.99E-04	7.50E-01	9.38E-02	2.00E-04	0.00%	0.00%
Endrin	8.34E-05	mg/L	9.78E-04	mg/kg		mg/kg	1.05E+04	1.00E+00	NA	NA	NA	2.43E-05	3.91E-06	0.00E+00	1.14E-01	2.35E-05	NA	NA	NA	NA	1.14E-01	8	9.20E-02	1.15E-02	9.95E+00	9.20E-01	1.15E-01	9.95E-01	12.07%	9.45%	
Endrin aldehyde		mg/L		mg/kg	1.79E-03	mg/kg	NA	NA	7.14E+01	6.51E-02	1.00E+00	1.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA	0.00E+00	4.20E-06	8.95E-06	8.95E-06	2.21E-05	8	9.20E-02	1.15E-02	1.92E-03	9.20E-01	1.15E-01	1.92E-04	0.00%	0.00%
Fluoranthene		mg/L	9.75E-02	mg/kg		mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	3.90E-04	0.00E+00	NA	2.34E-03	NA	NA	NA	NA	2.73E-03	8	1.25E+01	1.56E+00	1.75E-03	2.50E+01	3.13E+00	8.74E-04	0.00%	0.01%	
Fluorene		mg/L	8.70E-02	mg/kg		mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	3.48E-04	0.00E+00	NA	2.09E-03	NA	NA	NA	NA	2.44E-03	8	1.25E+01	1.56E+00	1.56E-03	2.50E+01	3.13E+00	7.80E-04	0.00%	0.01%	
Hexachlorobutadiene	2.60E-04	mg/L		mg/kg		mg/kg	3.92E+03	NA	NA	NA	NA	7.56E-05	0.00E+00	0.00E+00	1.32E-01	NA	NA	NA	NA	NA	1.32E-01	8	2.00E-01	2.50E-02	5.30E+00	1.00E+00	1.25E+01	1.06E+00	6.43%	10.07%	
Hexachloroethane	2.70E-04	mg/L		mg/kg		mg/kg	7.50E+02	NA	NA	NA	NA	7.85E-05	0.00E+00	0.00E+00	2.63E-02	NA	NA	NA	NA	NA	2.64E-02	8	1.00E-01	1.25E-02	2.11E+00	1.50E+00	1.88E-01	1.41E-01	2.56%	1.34%	
Indeno(1,2,3-cd)pyrene		mg/L	3.10E-02	mg/kg		mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	1.24E-04	0.00E+00	NA	7.44E-04	NA	NA	NA	NA	8.68E-04	8	1.00E+00	1.25E-01	6.94E-03	1.00E+01	1.25E+00	6.94E-04	0.01%	0.01%	
Methoxychlor		mg/L		mg/kg	7.65E-03	mg/kg	NA	NA	5.82E+01	4.20E-01	1.00E+00	1.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA	0.00E+00	1.16E-04	3.83E-05	3.83E-05	1.92E-04	8	4.00E+00	5.00E-01	3.84E-04	8.00E+00	1.00E+00	1.92E-04	0.00%	0.00%
Phenanthrene		mg/L	7.10E-01	mg/kg		mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	2.84E-03	0.00E+00	NA	1.70E-02	NA	NA	NA	NA	1.99E-02	8	1.00E+00	1.25E-01	1.59E-01	1.00E+01	1.25E+00	1.59E-02	0.19%	0.15%	
Pyrene	2.60E-05	mg/L	1.50E-01	mg/kg		mg/kg	4.49E+03	1.00E+00	NA	NA	NA	7.56E-06	6.00E-04	0.00E+00	1.52E-02	3.60E-03	NA	NA	NA	NA	1.94E-02	8	7.50E+00	9.38E-01	2.07E-02	1.25E+01	1.56E+00	1.24E-02	0.03%	0.12%	
Arsenic		mg/L	1.25E+01	mg/kg	5.90E+00	mg/kg	NA	6.90E-01	1.43E-01	3.75E-02	5.69E-03	5.69E-03	0.00E+00	5.00E-02	0.00E+00	NA	2.07E-01	0.00E+00	7.97E-03	1.68E-04	1.68E-04	2.65E-01	8	1.26E-01	1.58E-02	1.68E+01	1.26E+00	1.58E-01	1.68E+00	20.45%	16.01%
Cadmium		mg/L	9.65E-01	mg/kg	4.62E-01	mg/kg	NA	7.99E+00	9.70E+00	8.83E-01	4.28E-01	4.28E-01	0.00E+00	3.86E-03	0.00E+00	NA	1.85E-01	0.00E+00	1.47E-02	9.88E-04	9.88E-04	2.06E-01	8	1.00E+00	1.25E-01	1.64E+00	1.00E+01	1.25E+00	1.64E-01	2.00%	1.56%
Chromium	4.70E-03	mg/L	5.66E+01	mg/kg	2.82E+01	mg/kg	2.00E+02	4.70E-01	3.06E-01	4.10E-02	9.55E-02	9.55E-02	1.37E-03	2.26E-01	0.00E+00	1.22E-01	6.38E-01	0.00E+00	4.16E-02	1.35E-02	1.35E-02	1.06E+00	8	2.74E+03	3.42E+02	3.09E-03	1.37E+04	1.71E+03	6.18E-04	0.00%	0.01%
Copper		mg/L	5.00E+01	mg/kg	1.77E+01	mg/kg	NA	5.30E+00	5.15E-01	3.42E-01	6.59E-01	6.59E-01	0.00E+00	2.00E-01	0.00E+00	NA	6.36E+00	0.00E+00	2.18E-01	5.83E-02	5.83E-02	6.89E+00	1	1.17E+01	1.17E+01	5.89E-01	1.51E+01	1.51E+01	4.57E-01	0.72%	4.34%
Lead	6.01E-03	mg/L	9.82E+01	mg/kg	2.80E+01	mg/kg	3.00E+02																								

TABLE F-12
TIER 2 CHEMICALS OF POTENTIAL ECOLOGICAL CONCERN EEQs AND HAZARD INDICES FOR MINKS AT SWMU 31

Hazard Estimate - Tier 2
Mink

Chemical	Surface Water Exposure Point	Sediment Exposure		Soil Exposure Point	Fish BAF	Aq. Invert. BAF	Terr. Invert. BAF	Plant BAF	Mammal BAF	Bird BAF	PDE Surface Water	PDE Sediment	PDE Soil	PDE Fish	PDE Aq. Invert.	PDE Terr. Invert.	PDE Plants	PDE Mammals	PDE Birds	Total PDE	Chemical-Specific Toxicity Value UF	NOAEL	Adjusted NOAEL	LOAEL	Adjusted LOAEL	Percent Contribution to	Percent Contribution to					
	Concentration	Units	Point Concentration	Units	Concentration	unitless					mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d	EEQ N	mg/kg-d	mg/kg-d	EEQ L	EEQ N	EEQ L			
1,2-Dichlorobenzene	2.50E-04	mg/L		mg/kg	mg/kg	1.58E+02	NA	NA	NA	NA	1.40E-06	0.00E+00	0.00E+00	1.01E-04	NA	NA	NA	NA	NA	1.02E-04	8	8.57E+01	1.07E+01	9.54E-06	4.29E+02	5.36E+01	1.91E-06	0.00%	0.00%			
1,3-Dichlorobenzene	2.60E-04	mg/L		mg/kg	mg/kg	1.58E+02	NA	NA	NA	NA	1.46E-06	0.00E+00	0.00E+00	1.05E-04	NA	NA	NA	NA	NA	1.06E-04	8	8.57E+01	1.07E+01	9.93E-06	4.29E+02	5.36E+01	1.99E-06	0.00%	0.00%			
1,4-Dichlorobenzene	2.60E-04	mg/L		mg/kg	mg/kg	1.58E+02	NA	NA	NA	NA	1.46E-06	0.00E+00	0.00E+00	1.05E-04	NA	NA	NA	NA	NA	1.06E-04	8	8.57E+01	1.07E+01	9.93E-06	4.29E+02	5.36E+01	1.99E-06	0.00%	0.00%			
2,3,7,8-TCDD		mg/L	3.83E-06	mg/kg	mg/kg	NA	4.67E+00	4.16E+00	3.90E-03	2.20E+00	2.20E+00	0.00E+00	3.01E-10	0.00E+00	NA	8.43E-09	0.00E+00	2.31E-11	1.81E-09	1.81E-09	1.24E-08	8	1.00E-06	1.25E-07	9.90E-02	1.00E-05	1.25E-06	9.90E-03	16.43%	12.72%		
4,4'-DDD		mg/L	7.00E-04	mg/kg	mg/kg	NA	5.00E-01	2.88E+01	4.90E-01	4.55E+01	4.55E+01	0.00E+00	5.50E-08	0.00E+00	NA	1.65E-07	0.00E+00	2.42E-07	3.12E-06	3.12E-06	6.70E-06	8	8.00E-01	1.00E-01	6.70E-05	4.00E+00	5.00E-01	1.34E-05	0.01%	0.02%		
4,4'-DDE		mg/L	1.76E-03	mg/kg	mg/kg	NA	5.00E-01	2.47E+01	3.67E-01	1.07E+02	1.07E+02	0.00E+00	1.38E-07	0.00E+00	NA	4.15E-07	0.00E+00	5.86E-07	2.38E-05	2.38E-05	4.88E-05	8	8.00E-01	1.00E-01	4.88E-04	4.00E+00	5.00E-01	9.76E-05	0.08%	0.13%		
4,4'-DDT		mg/L		mg/kg	mg/kg	NA	NA	1.47E+01	2.36E-01	4.87E+00	4.87E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA	0.00E+00	2.22E-06	6.35E-06	6.35E-06	1.49E-05	8	8.00E-01	1.00E-01	1.49E-04	4.00E+00	5.00E-01	2.99E-05	0.02%	0.04%		
Acenaphthene		mg/L	2.80E-01	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	2.20E-05	0.00E+00	NA	6.60E-05	NA	NA	NA	NA	8.80E-05	8	1.75E+01	2.19E+00	4.02E-05	3.50E+01	4.38E+00	2.01E-05	0.01%	0.03%			
Acenaphthylene		mg/L	4.60E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	3.61E-06	0.00E+00	NA	1.08E-05	NA	NA	NA	NA	1.45E-05	8	1.75E+01	2.19E+00	6.61E-06	3.50E+01	4.38E+00	3.30E-06	0.00%	0.00%			
Anthracene		mg/L	5.90E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	4.63E-06	0.00E+00	NA	1.39E-05	NA	NA	NA	NA	1.85E-05	8	1.00E+02	1.25E+01	1.48E-06	5.00E+02	6.25E+01	2.97E-07	0.00%	0.00%			
Aroclor 1254		mg/L		mg/kg	mg/kg	NA	NA	1.74E+00	3.60E-03	5.00E-01	5.00E-01	0.00E+00	0.00E+00	0.00E+00	NA	NA	0.00E+00	2.37E-07	4.57E-06	4.57E-06	9.38E-06	1	1.40E-01	1.40E-01	6.70E-05	6.90E-01	6.90E-01	1.36E-05	0.01%	0.02%		
Benzo(a)anthracene		mg/L	1.50E-01	mg/kg	mg/kg	NA	NA	NA	NA	NA	0.00E+00	1.18E-05	0.00E+00	NA	NA	NA	NA	NA	NA	1.18E-05	8	1.00E+00	1.25E-01	9.43E-05	1.00E+01	1.25E+00	9.43E-06	0.02%	0.01%			
Benzo(a)pyrene		mg/L	6.28E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	4.94E-06	0.00E+00	NA	1.48E-05	NA	NA	NA	NA	1.97E-05	8	1.00E+00	1.25E-01	1.58E-04	1.00E+01	1.25E+00	1.58E-05	0.03%	0.02%			
Benzo(b)fluoranthene		mg/L	1.40E-01	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	1.10E-05	0.00E+00	NA	3.30E-05	NA	NA	NA	NA	4.40E-05	8	1.00E+00	1.25E-01	3.52E-04	1.00E+01	1.25E+00	3.52E-05	0.06%	0.05%			
Benzo(g,h,i)perylene		mg/L	5.24E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	4.11E-06	0.00E+00	NA	1.23E-05	NA	NA	NA	NA	1.65E-05	8	1.00E+00	1.25E-01	1.32E-04	1.00E+01	1.25E+00	1.32E-05	0.02%	0.02%			
Benzo(k)fluoranthene		mg/L	4.02E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	3.15E-06	0.00E+00	NA	9.46E-06	NA	NA	NA	NA	1.26E-05	8	1.00E+00	1.25E-01	1.01E-04	1.00E+01	1.25E+00	1.01E-05	0.02%	0.01%			
alpha-BHC	9.15E-06	mg/L		mg/kg	mg/kg	1.20E+03	NA	NA	NA	NA	5.13E-08	0.00E+00	0.00E+00	2.81E-05	NA	NA	NA	NA	NA	2.81E-05	1	1.40E-02	1.40E-02	2.01E-03	1.40E-01	1.40E-01	2.01E-04	0.33%	0.26%			
delta-BHC	1.49E-05	mg/L		mg/kg	mg/kg	1.20E+03	NA	NA	NA	NA	8.36E-08	0.00E+00	0.00E+00	4.57E-05	NA	NA	NA	NA	NA	4.58E-05	1	1.40E-02	1.40E-02	3.27E-03	1.40E-01	1.40E-01	3.27E-04	0.54%	0.42%			
gamma-BHC (Lindane)	7.19E-06	mg/L		mg/kg	mg/kg	1.20E+03	NA	NA	NA	NA	4.03E-08	0.00E+00	0.00E+00	2.21E-05	NA	NA	NA	NA	NA	2.21E-05	1	1.40E-02	1.40E-02	1.58E-03	1.40E-01	1.40E-01	1.58E-04	0.26%	0.20%			
Chrysene		mg/L	2.10E-01	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	1.65E-05	0.00E+00	NA	4.95E-05	NA	NA	NA	NA	6.60E-05	8	1.00E+00	1.25E-01	5.28E-04	1.00E+01	1.25E+00	5.28E-05	0.09%	0.07%			
Dibenz(a,h)anthracene		mg/L	1.90E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	1.49E-06	0.00E+00	NA	4.48E-06	NA	NA	NA	NA	5.97E-06	8	1.00E+00	1.25E-01	4.78E-05	1.00E+01	1.25E+00	4.78E-06	0.01%	0.01%			
Endosulfan II	7.60E-05	mg/L		mg/kg	mg/kg	2.28E-03	mg/kg	2.50E+02	NA	3.80E-01	3.67E-01	5.00E-01	5.00E-01	4.26E-07	0.00E+00	0.00E+00	4.85E-05	NA	0.00E+00	5.92E-07	1.12E-07	1.12E-07	4.97E-05	8	1.50E-01	1.88E-02	2.65E-03	7.50E-01	9.38E-02	5.31E-04	0.44%	0.68%
Endosulfan sulfate		mg/L		mg/kg	mg/kg	8.93E-04	mg/kg	NA	NA	5.00E-01	3.05E-01	5.00E-01	5.00E-01	0.00E+00	0.00E+00	0.00E+00	NA	NA	0.00E+00	1.92E-07	4.38E-08	4.38E-08	2.80E-07	8	1.50E-01	1.88E-02	1.49E-05	7.50E-01	9.38E-02	2.99E-06	0.00%	0.00%
Endrin	8.34E-05	mg/L	9.78E-04	mg/kg	mg/kg	1.05E+04	5.00E-01	NA	NA	NA	4.68E-07	7.68E-08	0.00E+00	2.25E-03	2.30E-07	NA	NA	NA	NA	2.25E-03	8	9.20E-02	1.15E-02	1.95E-01	9.20E-01	1.15E-01	1.95E-02	32.44%	25.10%			
Endrin aldehyde		mg/L		mg/kg	mg/kg	1.79E-03	mg/kg	NA	NA	3.00E+00	6.51E-02	5.00E-01	5.00E-01	0.00E+00	0.00E+00	0.00E+00	NA	NA	0.00E+00	8.24E-08	8.79E-08	8.79E-08	2.58E-07	8	9.20E-02	1.15E-02	2.24E-05	9.20E-01	1.15E-01	2.24E-06	0.00%	0.00%
Fluoranthene		mg/L	8.40E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	6.59E-06	0.00E+00	NA	1.98E-05	NA	NA	NA	NA	2.64E-05	8	1.25E+01	1.56E+00	1.69E-05	2.50E+01	3.13E+00	8.44E-06	0.00%	0.01%			
Fluorene		mg/L	8.70E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	6.83E-06	0.00E+00	NA	2.05E-05	NA	NA	NA	NA	2.73E-05	8	1.25E+01	1.56E+00	1.75E-05	2.50E+01	3.13E+00	8.75E-06	0.00%	0.01%			
Hexachlorobutadiene	2.60E-04	mg/L		mg/kg	mg/kg	3.47E+03	NA	NA	NA	NA	1.46E-06	0.00E+00	0.00E+00	2.30E-03	NA	NA	NA	NA	NA	2.30E-03	8	2.00E-01	2.50E-02	9.21E-02	1.00E+00	1.25E-01	1.84E-02	15.29%	23.66%			
Hexachloroethane	2.70E-04	mg/L		mg/kg	mg/kg	7.50E+02	NA	NA	NA	NA	1.51E-06	0.00E+00	0.00E+00	5.17E-04	NA	NA	NA	NA	NA	5.18E-04	8	1.00E-01	1.25E-02	4.15E-02	1.50E+00	1.88E-01	2.77E-03	6.89%	3.55%			
Indeno(1,2,3-cd)pyrene		mg/L	2.73E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	2.15E-06	0.00E+00	NA	6.44E-06	NA	NA	NA	NA	8.58E-06	8	1.00E+00	1.25E-01	6.87E-05	1.00E+01	1.25E+00	6.87E-06	0.01%	0.01%			
Methoxychlor		mg/L		mg/kg	mg/kg	NA	NA	2.50E+00	2.00E-02	5.00E-01	5.00E-01	0.00E+00	0.00E+00	0.00E+00	NA	NA	0.00E+00	1.08E-07	3.76E-07	3.76E-07	8.59E-07	8	4.00E+00	5.00E-01	1.72E-06	8.00E+00	1.00E+00	8.59E-07	0.00%	0.00%		
Phenanthrene		mg/L	7.10E-01	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	5.58E-05	0.00E+00	NA	1.67E-04	NA	NA	NA	NA	2.23E-04	8	1.00E+00	1.25E-01	1.78E-03	1.00E+01	1.25E+00	1.78E-04	0.30%	0.23%			
Pyrene	2.60E-05	mg/L	1.44E-01	mg/kg	mg/kg	3.49E+03	5.00E-01	NA	NA	NA	1.46E-07	1.13E-05	0.00E+00	2.32E-04	3.40E-05	NA	NA	NA	NA	2.77E-04	8	7.50E+00	9.38E-01	2.96E-04	1.25E+01	1.56E+00	1.78E-04	0.05%	0.23%			
Arsenic		mg/L	1.22E+01	mg/kg	mg/kg	5.90E+00	mg/kg	NA	1.40E-01	1.43E-01	3.75E-02	5.69E-03	5.69E-03	0.00E+00	9.60E-04	0.00E+00	NA	8.06E-04	0.00E+00	1.56E-04	3.30E-06	3.30E-06	1.93E-03	8	1.26E-01	1.58E-02	1.22E-01	1.26E+00	1.58E-01	1.22E-02	20.34%	15.74%
Cadmium		mg/L	7.90E-01	mg/kg	mg/kg	NA	6.00E-01	9.70E+00	8.83E-01	4.28E-01	4.28E-01	0.00E+00	6.20E-05	0.00E+00	NA	2.23E-04	0.00E+00	2.88E-04	1.94E-05	1.94E-05	6.13E-04	8	1.00E+00	1.25E-01	4.90E-03	1.00E+01	1.25E+00	4.90E-04	0.81%	0.63%		
Chromium	4.64E-03	mg/L	5.21E+01	mg/kg	mg/kg	1.25E+02	1.00E-01	3.06E-01	4.10E-02	9.55E-02	9.55E-02	2.60E-05	4.09E-03	0.00E+00	1.48E-03	2.45E-03	0.00E+00	8.17E-04	2.64E-04	2.64E-04	9.40E-03	8	2.74E+03	3.42E+02	2.75E-05	1.37E+04	1.71E+03	5.49E-06	0.00%	0.01%		
Copper		mg/L	5.00E+01	mg/kg	mg/kg	1.77E+01	mg/kg	NA	1.60E+00	5.15E-01	3.42E-01	6.59E-01	6.59E-01	0.00E+00	3.93E-03	0.00E+00	NA	3.77E-02	0.00E+00	4.28E-03	1.14E-03	1.14E-03	4.82E-02	1	1.17E+01	1.17E+01	4.12E-03	1.51E+01	1.51E+01	3.19E-03	0.68%	4.10%
Lead	6.01E-03	mg/L	7.73E+01	mg/kg	mg/kg	9.00E+01	7.00E-02	4.23E-01	6.14E-02	1.68E-01	1.68E-01	3.37E-05	6.07E-03	0.00E+00	1.38E-03	2.55E-03	0.00E+00	1.21E-03	4.62E-04	4.62E-04	1.22E-02	8										

TABLE F-13
TIER 1 CHEMICALS OF POTENTIAL CONCERN EEQs AND HAZARD INDICES FOR GREAT BLUE HERONS AT SWMU 31

Hazard Estimate - Tier 1
Great Blue Heron

Chemical	Surface Water Exposure Point	Sediment Exposure		Soil Exposure Point	Fish BAF	Aq. Invert. BAF	Terr. Invert. BAF	Plant BAF	Mammal BAF	Bird BAF	PDE Surface Water	PDE Sediment	PDE Soil	PDE Fish	PDE Aq. Invert.	PDE Terr. Invert.	PDE Plants	PDE Mammals	PDE Birds	Total PDE	Chemical-Specific Toxicity Value UF	NOAEL	Adjusted NOAEL	LOAEL	Adjusted LOAEL	Percent Contribution to	Percent Contribution to			
	Concentration	Units	Point Concentration	Units		unitless					mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d	EEQ N	mg/kg-d	mg/kg-d	EEQ L	EEQ N	EEQ L	
1,2-Dichlorobenzene	2.50E-04	mg/L		mg/kg	mg/kg	1.58E+02	NA	NA	NA	NA	1.25E-05	0.00E+00	0.00E+00	1.90E-03	NA	NA	NA	NA	NA	1.91E-03	8	1.61E+01	2.01E+00	9.48E-04	8.05E+01	1.01E+01	1.90E-04	0.01%	0.01%	
1,3-Dichlorobenzene	2.60E-04	mg/L		mg/kg	mg/kg	1.58E+02	NA	NA	NA	NA	1.30E-05	0.00E+00	0.00E+00	1.97E-03	NA	NA	NA	NA	NA	1.98E-03	8	1.61E+01	2.01E+00	9.86E-04	8.05E+01	1.01E+01	1.97E-04	0.01%	0.01%	
1,4-Dichlorobenzene	2.60E-04	mg/L		mg/kg	mg/kg	1.58E+02	NA	NA	NA	NA	1.30E-05	0.00E+00	0.00E+00	1.97E-03	NA	NA	NA	NA	NA	1.98E-03	8	1.61E+01	2.01E+00	9.86E-04	8.05E+01	1.01E+01	1.97E-04	0.01%	0.01%	
2,3,7,8-TCDD		mg/L	3.83E-06	mg/kg	mg/kg	NA	5.13E+01	4.21E+01	1.10E-02	2.20E+00	2.20E+00	0.00E+00	3.83E-09	0.00E+00	NA	3.93E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.97E-07	8	1.40E-05	1.75E-06	2.27E-01	1.40E-04	1.75E-05	2.27E-02	2.47%	1.29%
4,4'-DDD		mg/L	7.00E-04	mg/kg	mg/kg	NA	1.00E+00	2.88E+01	4.90E-01	4.55E+01	4.55E+01	0.00E+00	7.00E-07	0.00E+00	NA	1.40E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.10E-06	8	2.80E-03	3.50E-04	6.00E-03	2.80E-02	3.50E-03	6.00E-04	0.07%	0.03%
4,4'-DDE		mg/L	1.76E-03	mg/kg	mg/kg	NA	1.00E+00	2.47E+01	3.67E-01	1.07E+02	1.07E+02	0.00E+00	1.76E-06	0.00E+00	NA	3.52E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.28E-06	8	2.80E-03	3.50E-04	1.51E-02	2.80E-02	3.50E-03	1.51E-03	0.16%	0.09%
4,4'-DDT		mg/L		mg/kg	mg/kg	NA	NA	1.47E+01	2.36E-01	4.87E+00	4.87E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	2.80E-03	3.50E-04	0.00E+00	2.80E-02	3.50E-03	0.00E+00	0.00%	0.00%
Acenaphthene		mg/L	2.80E-01	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	2.80E-04	0.00E+00	NA	5.60E-04	NA	NA	NA	NA	8.40E-04	8	5.53E+02	6.91E+01	1.22E-05	2.77E+03	3.46E+02	2.43E-06	0.00%	0.00%	
Acenaphthylene		mg/L	4.60E-02	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	4.60E-05	0.00E+00	NA	9.20E-05	NA	NA	NA	NA	1.38E-04	8	5.53E+02	6.91E+01	2.00E-06	2.77E+03	3.46E+02	3.99E-07	0.00%	0.00%	
Anthracene		mg/L	5.90E-02	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	5.90E-05	0.00E+00	NA	1.18E-04	NA	NA	NA	NA	1.77E-04	8	5.53E+02	6.91E+01	2.56E-06	2.77E+03	3.46E+02	5.12E-07	0.00%	0.00%	
Aroclor 1254		mg/L		mg/kg	mg/kg	NA	NA	6.52E+01	2.20E-02	1.00E+00	1.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	1.80E-01	2.25E-02	0.00E+00	1.80E+00	2.25E-01	0.00E+00	0.00%	0.00%
Benzo(a)anthracene		mg/L	1.50E-01	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	1.50E-04	0.00E+00	NA	3.00E-04	NA	NA	NA	NA	4.50E-04	8	5.53E+02	6.91E+01	6.51E-06	2.77E+03	3.46E+02	1.30E-06	0.00%	0.00%	
Benzo(a)pyrene		mg/L	8.60E-02	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	8.60E-05	0.00E+00	NA	1.72E-04	NA	NA	NA	NA	2.58E-04	8	5.53E+02	6.91E+01	3.73E-06	2.77E+03	3.46E+02	7.46E-07	0.00%	0.00%	
Benzo(b)fluoranthene		mg/L	1.40E-01	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	1.40E-04	0.00E+00	NA	2.80E-04	NA	NA	NA	NA	4.20E-04	8	5.53E+02	6.91E+01	6.08E-06	2.77E+03	3.46E+02	1.22E-06	0.00%	0.00%	
Benzo(g,h,i)perylene		mg/L	5.40E-02	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	5.40E-05	0.00E+00	NA	1.08E-04	NA	NA	NA	NA	1.62E-04	8	5.53E+02	6.91E+01	2.34E-06	2.77E+03	3.46E+02	4.69E-07	0.00%	0.00%	
Benzo(k)fluoranthene		mg/L	4.50E-02	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	4.50E-05	0.00E+00	NA	9.00E-05	NA	NA	NA	NA	1.35E-04	8	5.53E+02	6.91E+01	1.95E-06	2.77E+03	3.46E+02	3.91E-07	0.00%	0.00%	
alpha-BHC	9.15E-06	mg/L		mg/kg	mg/kg	1.20E+03	NA	NA	NA	NA	4.58E-07	0.00E+00	0.00E+00	5.28E-04	NA	NA	NA	NA	NA	5.28E-04	8	5.60E-01	7.00E-02	7.55E-03	2.25E+00	2.81E-01	1.88E-03	0.08%	0.11%	
delta-BHC	1.49E-05	mg/L		mg/kg	mg/kg	1.20E+03	NA	NA	NA	NA	7.45E-07	0.00E+00	0.00E+00	8.60E-04	NA	NA	NA	NA	NA	8.60E-04	8	5.60E-01	7.00E-02	1.23E-02	2.25E+00	2.81E-01	3.06E-03	0.13%	0.17%	
gamma-BHC (Lindane)	7.19E-06	mg/L		mg/kg	mg/kg	1.20E+03	NA	NA	NA	NA	3.60E-07	0.00E+00	0.00E+00	4.15E-04	NA	NA	NA	NA	NA	4.15E-04	8	5.60E-01	7.00E-02	5.93E-03	2.25E+00	2.81E-01	1.48E-03	0.06%	0.08%	
Chrysene		mg/L	2.10E-01	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	2.10E-04	0.00E+00	NA	4.20E-04	NA	NA	NA	NA	6.30E-04	8	5.53E+02	6.91E+01	9.11E-06	2.77E+03	3.46E+02	1.82E-06	0.00%	0.00%	
Dibenz(a,h)anthracene		mg/L	1.90E-02	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	1.90E-05	0.00E+00	NA	3.80E-05	NA	NA	NA	NA	5.70E-05	8	5.53E+02	6.91E+01	8.25E-07	2.77E+03	3.46E+02	1.65E-07	0.00%	0.00%	
Endosulfan II	7.60E-05	mg/L		mg/kg	mg/kg	2.50E+02	NA	8.90E+00	3.67E-01	1.00E+00	1.00E+00	3.80E-06	0.00E+00	0.00E+00	9.12E-04	NA	0.00E+00	0.00E+00	0.00E+00	9.16E-04	8	1.00E+01	1.25E+00	7.33E-04	5.00E+01	6.25E+00	1.47E-04	0.01%	0.01%	
Endosulfan sulfate		mg/L		mg/kg	mg/kg	NA	NA	1.18E+01	3.05E-01	1.00E+00	1.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	1.00E+01	1.25E+00	0.00E+00	5.00E+01	6.25E+00	0.00E+00	0.00%	0.00%
Endrin	8.34E-05	mg/L	9.78E-04	mg/kg	mg/kg	1.05E+04	1.00E+00	NA	NA	NA	4.17E-06	9.78E-07	0.00E+00	4.22E-02	1.96E-06	NA	NA	NA	NA	4.22E-02	8	3.00E-01	3.75E-02	1.13E+00	1.50E+00	1.88E-01	2.25E-01	12.25%	12.80%	
Endrin aldehyde		mg/L		mg/kg	mg/kg	NA	NA	7.14E+01	6.51E-02	1.00E+00	1.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	3.00E-01	3.75E-02	0.00E+00	1.50E+00	1.88E-01	0.00E+00	0.00%	0.00%
Fluoranthene		mg/L	9.75E-02	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	9.75E-05	0.00E+00	NA	1.95E-04	NA	NA	NA	NA	2.93E-04	8	5.53E+02	6.91E+01	4.23E-06	2.77E+03	3.46E+02	8.46E-07	0.00%	0.00%	
Fluorene		mg/L	8.70E-02	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	8.70E-05	0.00E+00	NA	1.74E-04	NA	NA	NA	NA	2.61E-04	8	5.53E+02	6.91E+01	3.78E-06	2.77E+03	3.46E+02	7.55E-07	0.00%	0.00%	
Hexachlorobutadiene	2.60E-04	mg/L		mg/kg	mg/kg	3.92E+03	NA	NA	NA	NA	1.30E-05	0.00E+00	0.00E+00	4.89E-02	NA	NA	NA	NA	NA	4.89E-02	8	3.19E+00	3.98E-01	1.23E-01	1.59E+01	1.99E+00	2.46E-02	1.34%	1.40%	
Hexachloroethane	2.70E-04	mg/L		mg/kg	mg/kg	7.50E+02	NA	NA	NA	NA	1.35E-05	0.00E+00	0.00E+00	9.72E-03	NA	NA	NA	NA	NA	9.73E-03	8	NA	NA	NA	NA	NA	NA	NA	NA	
Indeno(1,2,3-cd)pyrene		mg/L	3.10E-02	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	3.10E-05	0.00E+00	NA	6.20E-05	NA	NA	NA	NA	9.30E-05	8	5.53E+02	6.91E+01	1.35E-06	2.77E+03	3.46E+02	2.69E-07	0.00%	0.00%	
Methoxychlor		mg/L		mg/kg	mg/kg	NA	NA	5.82E+01	4.20E-01	1.00E+00	1.00E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	2.58E+01	3.22E+00	0.00E+00	1.29E+02	1.61E+01	0.00E+00	0.00%	0.00%
Phenanthrene		mg/L	7.10E-01	mg/kg	mg/kg	NA	1.00E+00	NA	NA	NA	0.00E+00	7.10E-04	0.00E+00	NA	1.42E-03	NA	NA	NA	NA	2.13E-03	8	5.53E+02	6.91E+01	3.08E-05	2.77E+03	3.46E+02	6.16E-06	0.00%	0.00%	
Pyrene	2.60E-05	mg/L	1.50E-01	mg/kg	mg/kg	4.49E+03	1.00E+00	NA	NA	NA	1.30E-06	1.50E-04	0.00E+00	5.60E-03	3.00E-04	NA	NA	NA	NA	6.05E-03	8	5.53E+02	6.91E+01	8.76E-05	2.77E+03	3.46E+02	1.75E-05	0.00%	0.00%	
Arsenic		mg/L	1.25E+01	mg/kg	mg/kg	NA	6.90E-01	1.43E-01	3.75E-02	5.69E-03	5.69E-03	0.00E+00	1.25E-02	0.00E+00	NA	1.73E-02	0.00E+00	0.00E+00	0.00E+00	2.98E-02	8	5.14E+00	6.43E-01	4.63E-02	1.28E+01	1.61E+00	1.85E-02	0.50%	1.05%	
Cadmium		mg/L	9.65E-01	mg/kg	mg/kg	NA	7.99E+00	9.70E+00	8.83E-01	4.28E-01	4.28E-01	0.00E+00	9.65E-04	0.00E+00	NA	1.54E-02	0.00E+00	0.00E+00	0.00E+00	1.64E-02	8	1.45E+00	1.81E-01	9.04E-02	2.00E+01	2.50E+00	6.55E-03	0.98%	0.37%	
Chromium	4.70E-03	mg/L	5.66E+01	mg/kg	mg/kg	2.00E+02	4.70E-01	3.06E-01	4.10E-02	9.55E-02	9.55E-02	2.35E-04	5.66E-02	0.00E+00	4.51E-02	5.32E-02	0.00E+00	0.00E+00	0.00E+00	1.55E-01	8	2.66E+00	3.33E-01	4.67E-01	2.78E+00	3.48E-01	4.47E-01	5.07%	25.38%	
Copper		mg/L	5.00E+01	mg/kg	mg/kg	NA	5.30E+00	5.15E-01	3.42E-01	6.59E-01	6.59E-01	0.00E+00	5.00E-02	0.00E+00	NA	5.30E-01	0.00E+00	0.00E+00	0.00E+00	5.80E-01	8	4.70E+01	5.88E+00	9.87E-02	6.20E+01	7.75E+00	7.48E-02	1.07%	4.25%	
Lead	6.01E-03	mg/L	9.82E+01	mg/kg	mg/kg	3.00E+02	6.10E-01	4.23E-01	6.14E-02	1.68E-01	1.68E-01	3.01E-04	9.82E-02	0.00E+00	8.65E-02	1.20E-01	0.00E+00	0.00E+00	0.00E+00	3.05E-01	8	3.85E+00	4.81E-01	6.33E-01	1.93E+01	2.41E+00	1.27E-01	6.89%	7.20%	
Mercury	1.86E-04	mg/L	5.30E-01	mg/kg	mg/kg	1.00E+03	2.87E+00	3.30E+01	9.72E-01	1.05E+00																				

TABLE F-14
TIER 2 CHEMICALS OF POTENTIAL ECOLOGICAL CONCERN EEQs AND HAZARD INDICES FOR GREAT BLUE HERONS AT SWMU 31

Hazard Estimate - Tier 2
Great Blue Heron

Chemical	Surface Water Exposure Point	Sediment Exposure		Soil Exposure Point	Fish BAF	Aq. Invert. BAF	Terr. Invert. BAF	Plant BAF	Mammal BAF	Bird BAF	PDE Surface Water	PDE Sediment	PDE Soil	PDE Fish	PDE Aq. Invert.	PDE Terr. Invert.	PDE Plants	PDE Mammals	PDE Birds	Total PDE	Chemical-Specific Toxicity Value UF	NOAEL	Adjusted NOAEL	LOAEL	Adjusted LOAEL	Percent Contribution to	Percent Contribution to			
	Concentration	Units	Point Concentration	Units		-----unitless-----					mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d	mg/kg-d		mg/kg-d	mg/kg-d	EEQ N	mg/kg-d	mg/kg-d	EEQ L	EEQ N	EEQ L	
1,2-Dichlorobenzene	2.50E-04	mg/L		mg/kg	mg/kg	1.58E+02	NA	NA	NA	NA	3.76E-07	0.00E+00	0.00E+00	5.71E-05	NA	NA	NA	NA	NA	5.75E-05	8	1.61E+01	2.01E+00	2.86E-05	8.05E+01	1.01E+01	5.71E-06	0.03%	0.03%	
1,3-Dichlorobenzene	2.60E-04	mg/L		mg/kg	mg/kg	1.58E+02	NA	NA	NA	NA	3.92E-07	0.00E+00	0.00E+00	5.94E-05	NA	NA	NA	NA	NA	5.98E-05	8	1.61E+01	2.01E+00	2.97E-05	8.05E+01	1.01E+01	5.94E-06	0.04%	0.03%	
1,4-Dichlorobenzene	2.60E-04	mg/L		mg/kg	mg/kg	1.58E+02	NA	NA	NA	NA	3.92E-07	0.00E+00	0.00E+00	5.94E-05	NA	NA	NA	NA	NA	5.98E-05	8	1.61E+01	2.01E+00	2.97E-05	8.05E+01	1.01E+01	5.94E-06	0.04%	0.03%	
2,3,7,8-TCDD		mg/L	3.83E-06	mg/kg	mg/kg	NA	4.67E+00	4.16E+00	3.90E-03	2.20E+00	2.20E+00	0.00E+00	1.15E-10	0.00E+00	NA	1.08E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.19E-09	8	1.40E-05	1.75E-06	6.82E-04	1.40E-04	1.75E-05	6.82E-05	0.80%	0.30%
4,4'-DDD		mg/L	7.00E-04	mg/kg	mg/kg	NA	5.00E-01	2.88E+01	4.90E-01	4.55E+01	4.55E+01	0.00E+00	2.11E-08	0.00E+00	NA	2.11E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.22E-08	8	2.80E-03	3.50E-04	1.20E-04	2.80E-02	3.50E-03	1.20E-05	0.14%	0.05%
4,4'-DDE		mg/L	1.76E-03	mg/kg	mg/kg	NA	5.00E-01	2.47E+01	3.67E-01	1.07E+02	1.07E+02	0.00E+00	5.30E-08	0.00E+00	NA	5.30E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.06E-07	8	2.80E-03	3.50E-04	3.03E-04	2.80E-02	3.50E-03	3.03E-05	0.36%	0.13%
4,4'-DDT		mg/L		mg/kg	mg/kg	NA	NA	1.47E+01	2.36E-01	4.87E+00	4.87E+00	0.00E+00	0.00E+00	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	2.80E-03	3.50E-04	0.00E+00	2.80E-02	3.50E-03	0.00E+00	0.00%	0.00%
Acenaphthene		mg/L	2.80E-01	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	8.43E-06	0.00E+00	NA	8.43E-06	NA	NA	NA	NA	1.69E-05	8	5.53E+02	6.91E+01	2.44E-07	2.77E+03	3.46E+02	4.88E-08	0.00%	0.00%	
Acenaphthylene		mg/L	4.60E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	1.39E-06	0.00E+00	NA	1.39E-06	NA	NA	NA	NA	2.77E-06	8	5.53E+02	6.91E+01	4.01E-08	2.77E+03	3.46E+02	8.02E-09	0.00%	0.00%	
Anthracene		mg/L	5.90E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	1.78E-06	0.00E+00	NA	1.78E-06	NA	NA	NA	NA	3.55E-06	8	5.53E+02	6.91E+01	5.14E-08	2.77E+03	3.46E+02	1.03E-08	0.00%	0.00%	
Aroclor 1254		mg/L		mg/kg	mg/kg	NA	NA	1.74E+00	3.60E-03	5.00E-01	5.00E-01	0.00E+00	0.00E+00	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	1.80E-01	2.25E-02	0.00E+00	1.80E+00	2.25E-01	0.00E+00	0.00%	0.00%
Benzo(a)anthracene		mg/L	1.50E-01	mg/kg	mg/kg	NA	NA	NA	NA	NA	0.00E+00	4.52E-06	0.00E+00	NA	NA	NA	NA	NA	NA	4.52E-06	8	5.53E+02	6.91E+01	6.54E-08	2.77E+03	3.46E+02	1.31E-08	0.00%	0.00%	
Benzo(a)pyrene		mg/L	6.28E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	1.89E-06	0.00E+00	NA	1.89E-06	NA	NA	NA	NA	3.78E-06	8	5.53E+02	6.91E+01	5.47E-08	2.77E+03	3.46E+02	1.09E-08	0.00%	0.00%	
Benzo(b)fluoranthene		mg/L	1.40E-01	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	4.22E-06	0.00E+00	NA	4.22E-06	NA	NA	NA	NA	8.43E-06	8	5.53E+02	6.91E+01	1.22E-07	2.77E+03	3.46E+02	2.44E-08	0.00%	0.00%	
Benzo(g,h,i)perylene		mg/L	5.24E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	1.58E-06	0.00E+00	NA	1.58E-06	NA	NA	NA	NA	3.16E-06	8	5.53E+02	6.91E+01	4.56E-08	2.77E+03	3.46E+02	9.13E-09	0.00%	0.00%	
Benzo(k)fluoranthene		mg/L	4.02E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	1.21E-06	0.00E+00	NA	1.21E-06	NA	NA	NA	NA	2.42E-06	8	5.53E+02	6.91E+01	3.50E-08	2.77E+03	3.46E+02	7.00E-09	0.00%	0.00%	
alpha-BHC	9.15E-06	mg/L		mg/kg	mg/kg	1.20E+03	NA	NA	NA	NA	1.38E-08	0.00E+00	0.00E+00	1.59E-05	NA	NA	NA	NA	NA	1.59E-05	8	5.60E-01	7.00E-02	2.27E-04	2.25E+00	2.81E-01	5.66E-05	0.27%	0.25%	
delta-BHC	1.49E-05	mg/L		mg/kg	mg/kg	1.20E+03	NA	NA	NA	NA	2.24E-08	0.00E+00	0.00E+00	2.59E-05	NA	NA	NA	NA	NA	2.59E-05	8	5.60E-01	7.00E-02	3.70E-04	2.25E+00	2.81E-01	9.21E-05	0.44%	0.41%	
gamma-BHC (Lindane)	7.19E-06	mg/L		mg/kg	mg/kg	1.20E+03	NA	NA	NA	NA	1.08E-08	0.00E+00	0.00E+00	1.25E-05	NA	NA	NA	NA	NA	1.25E-05	8	5.60E-01	7.00E-02	1.79E-04	2.25E+00	2.81E-01	4.45E-05	0.21%	0.20%	
Chrysene		mg/L	2.10E-01	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	6.32E-06	0.00E+00	NA	6.32E-06	NA	NA	NA	NA	1.26E-05	8	5.53E+02	6.91E+01	1.83E-07	2.77E+03	3.46E+02	3.66E-08	0.00%	0.00%	
Dibenz(a,h)anthracene		mg/L	1.90E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	5.72E-07	0.00E+00	NA	5.72E-07	NA	NA	NA	NA	1.14E-06	8	5.53E+02	6.91E+01	1.66E-08	2.77E+03	3.46E+02	3.31E-09	0.00%	0.00%	
Endosulfan II	7.60E-05	mg/L		mg/kg	mg/kg	2.28E-03	mg/kg	2.50E+02	NA	3.80E-01	3.67E-01	5.00E-01	5.00E-01	1.14E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.76E-05	8	1.00E+01	1.25E+00	2.21E-05	5.00E+01	6.25E+00	4.41E-06	0.03%	0.02%	
Endosulfan sulfate		mg/L		mg/kg	mg/kg	8.93E-04	mg/kg	NA	NA	5.00E-01	3.05E-01	5.00E-01	5.00E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	1.00E+01	1.25E+00	0.00E+00	5.00E+01	6.25E+00	0.00E+00	0.00%	0.00%	
Endrin	8.34E-05	mg/L	9.78E-04	mg/kg	mg/kg	1.05E+04	5.00E-01	NA	NA	NA	1.26E-07	2.95E-08	0.00E+00	1.27E-03	2.95E-08	NA	NA	NA	NA	1.27E-03	8	3.00E-01	3.75E-02	3.39E-02	1.50E+00	1.88E-01	6.78E-03	40.02%	30.01%	
Endrin aldehyde		mg/L		mg/kg	mg/kg	1.79E-03	mg/kg	NA	NA	3.00E+00	6.51E-02	5.00E-01	5.00E-01	0.00E+00	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	3.00E-01	3.75E-02	0.00E+00	1.50E+00	1.88E-01	0.00E+00	0.00%	0.00%
Fluoranthene		mg/L	8.40E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	2.53E-06	0.00E+00	NA	2.53E-06	NA	NA	NA	NA	5.06E-06	8	5.53E+02	6.91E+01	7.32E-08	2.77E+03	3.46E+02	1.46E-08	0.00%	0.00%	
Fluorene		mg/L	8.70E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	2.62E-06	0.00E+00	NA	2.62E-06	NA	NA	NA	NA	5.24E-06	8	5.53E+02	6.91E+01	7.58E-08	2.77E+03	3.46E+02	1.52E-08	0.00%	0.00%	
Hexachlorobutadiene	2.60E-04	mg/L		mg/kg	mg/kg	3.47E+03	NA	NA	NA	NA	3.92E-07	0.00E+00	0.00E+00	1.30E-03	NA	NA	NA	NA	NA	1.30E-03	8	3.19E+00	3.98E-01	3.27E-03	1.59E+01	1.99E+00	6.55E-04	3.86%	2.90%	
Hexachloroethane	2.70E-04	mg/L		mg/kg	mg/kg	7.50E+02	NA	NA	NA	NA	4.07E-07	0.00E+00	0.00E+00	2.93E-04	NA	NA	NA	NA	NA	2.93E-04	8	NA	NA	NA	NA	NA	NA	NA	NA	
Indeno(1,2,3-cd)pyrene		mg/L	2.73E-02	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	8.23E-07	0.00E+00	NA	8.23E-07	NA	NA	NA	NA	1.65E-06	8	5.53E+02	6.91E+01	2.38E-08	2.77E+03	3.46E+02	4.76E-09	0.00%	0.00%	
Methoxychlor		mg/L		mg/kg	mg/kg	NA	NA	2.50E+00	2.00E-02	5.00E-01	5.00E-01	0.00E+00	0.00E+00	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8	2.58E+01	3.22E+00	0.00E+00	1.29E+02	1.61E+01	0.00E+00	0.00%	0.00%
Phenanthrene		mg/L	7.10E-01	mg/kg	mg/kg	NA	5.00E-01	NA	NA	NA	0.00E+00	2.14E-05	0.00E+00	NA	2.14E-05	NA	NA	NA	NA	4.28E-05	8	5.53E+02	6.91E+01	6.19E-07	2.77E+03	3.46E+02	1.24E-07	0.00%	0.00%	
Pyrene	2.60E-05	mg/L	1.44E-01	mg/kg	mg/kg	3.49E+03	5.00E-01	NA	NA	NA	3.92E-08	4.34E-06	0.00E+00	1.31E-04	4.34E-06	NA	NA	NA	NA	1.40E-04	8	5.53E+02	6.91E+01	2.03E-06	2.77E+03	3.46E+02	4.05E-07	0.00%	0.00%	
Arsenic		mg/L	1.22E+01	mg/kg	mg/kg	5.90E+00	mg/kg	NA	1.40E-01	1.43E-01	3.75E-02	5.69E-03	5.69E-03	0.00E+00	3.68E-04	0.00E+00	NA	1.03E-04	0.00E+00	0.00E+00	0.00E+00	8	5.14E+00	6.43E-01	7.33E-04	1.28E+01	1.61E+00	2.93E-04	0.87%	1.30%
Cadmium		mg/L	7.90E+01	mg/kg	mg/kg	NA	6.00E-01	9.70E+00	8.83E-01	4.28E-01	4.28E-01	0.00E+00	2.38E-05	0.00E+00	NA	2.85E-05	0.00E+00	0.00E+00	0.00E+00	5.23E-05	8	1.45E+00	1.81E-01	2.89E-04	2.00E+01	2.50E+00	2.09E-05	0.34%	0.09%	
Chromium	4.64E-03	mg/L	5.21E+01	mg/kg	mg/kg	1.25E+02	1.00E-01	3.06E-01	4.10E-02	9.55E-02	9.55E-02	6.99E-06	1.57E-03	0.00E+00	8.38E-04	3.14E-04	0.00E+00	0.00E+00	0.00E+00	2.73E-03	8	2.66E+00	3.33E-01	8.20E-03	2.78E+00	3.48E-01	7.85E-03	9.68%	34.72%	
Copper		mg/L	5.00E+01	mg/kg	mg/kg	1.77E+01	mg/kg	NA	1.60E+00	5.15E-01	3.42E-01	6.59E-01	6.59E-01	0.00E+00	1.51E-03	0.00E+00	NA	4.82E-03	0.00E+00	0.00E+00	6.32E-03	8	4.70E+01	5.88E+00	1.08E-03	6.20E+01	7.75E+00	8.16E-04	1.27%	3.61%
Lead	6.01E-03	mg/L	7.73E+01	mg/kg	mg/kg	9.00E+01	7.00E-02	4.23E-01	6.14E-02	1.68E-01	1.68E-01	9.05E-06	2.33E-03	0.00E+00	7.82E-04	3.26E-04	0.00E+00	0.00E+00	0.00E+00	3.44E-03	8	3.85E+00	4.81E-01	7.16E-03	1.93E+01	2.41E+00	1.43E-03	8.45%	6.33%	
Mercury	1.48E-04	mg/L	5.30E-01	mg/kg	mg/kg	1.21E-01	mg/kg	5.50E+02	1.14E+00	4.45E+00	9.72E-																			

Table F-15
Recommended Bioaccumulation/Bioconcentration Factors or Regression Equations Utilized for the Soil-to-Plant Pathway at SWMU 31

Constituent	USEPA (2005) Eco-SSL Uptake Equation ^a	Alternate Regression Equation ^{d, e}	Alternate BAF/BCF	Recommended Tier 1 (Maximum) BAF/BCF	Rationale for Recommended Tier 1 BAF/BCF	Recommended Tier 2 (RME) BAF/BCF	Rationale for Recommended Tier 2 BAF/BCF
2,3,7,8-TCDD TE	-- ^b	Log (BCF)= -0.578(Log[Kow])+1.588 ^d	--	0.011	Travis & Arms K _{ow} Regression Eq.	0.0039	Travis & Arms K _{ow} Regression Eq.
4,4'-DDD	ln (Pc)= 0.7524(ln[soil])-2.5119 ^c	--	--	Regression Eq.	Recommended Equation (USEPA 2005)	Regression Eq.	Recommended Equation (USEPA 2005)
4,4'-DDE	ln (Pc)= 0.7524(ln[soil])-2.5119 ^c	--	--	Regression Eq.	Recommended Equation (USEPA 2005)	Regression Eq.	Recommended Equation (USEPA 2005)
4,4'-DDT	ln (Pc)= 0.7524(ln[soil])-2.5119 ^c	--	--	Regression Eq.	Recommended Equation (USEPA 2005)	Regression Eq.	Recommended Equation (USEPA 2005)
Aroclor 1254	--	Log (BCF)= -0.578(Log[Kow])+1.588 ^d	--	0.022	Travis & Arms K _{ow} Regression Eq.	0.0036	Travis & Arms K _{ow} Regression Eq.
Endosulfan II	--	Log (BCF)= -0.578(Log[Kow])+1.588 ^d	--	0.3673	Travis & Arms K _{ow} Regression Eq.	0.3673	Travis & Arms K _{ow} Regression Eq.
Endosulfan sulfate	--	Log (BCF)= -0.578(Log[Kow])+1.588 ^d	--	0.3048	Travis & Arms K _{ow} Regression Eq.	0.3048	Travis & Arms K _{ow} Regression Eq.
Endrin aldehyde	--	Log (BCF)= -0.578(Log[Kow])+1.588 ^d	--	0.0651	Travis & Arms K _{ow} Regression Eq.	0.0651	Travis & Arms K _{ow} Regression Eq.
Methoxychlor	--	Log (BCF)= -0.578(Log[Kow])+1.588 ^d	--	0.42	Travis & Arms K _{ow} Regression Eq.	0.02	Travis & Arms K _{ow} Regression Eq.
Arsenic	Pc= 0.03752(soil)	--	--	0.03752	Recommended BAF from USEPA (2005)	0.0375	Recommended BAF from USEPA (2005)
Cadmium	ln (Pc)= 0.546(ln[soil])-0.475	--	--	Regression Eq.	Recommended Equation (USEPA 2005)	Regression Eq.	Recommended Equation (USEPA 2005)
Chromium	Pc= 0.041(soil)	--	--	0.041	Recommended BAF from USEPA (2005)	0.041	Recommended BAF from USEPA (2005)
Copper	ln (Pc)= 0.394(ln[soil])+0.668	--	--	Regression Eq.	Recommended Equation (USEPA 2005)	Regression Eq.	Recommended Equation (USEPA 2005)
Lead	ln (Pc)= 0.561(ln[soil])-1.328	--	--	Regression Eq.	Recommended Equation (USEPA 2005)	Regression Eq.	Recommended Equation (USEPA 2005)
Mercury	--	ln (Pc)=0.54(ln[soil])-1.00	--	Regression Eq.	Efroymsen, et al. Regression Equation	Regression Eq.	Efroymsen, et al. Regression Equation
Nickel	ln (Pc)= 0.748(ln[soil])-2.223	--	--	Regression Eq.	Recommended Equation (USEPA 2005)	Regression Eq.	Recommended Equation (USEPA 2005)
Zinc	ln (Pc)= 0.554(ln[soil])+1.575	--	--	Regression Eq.	Recommended Equation (USEPA 2005)	Regression Eq.	Recommended Equation (USEPA 2005)

Notes: Pc (plant tissue concentration [mg/kg d.w.]); soil (concentration in soil [mg/kg d.w.]); BAF/BCF (bioaccumulation/bioconcentration factor); log K_{ow} (octanol/water partition coefficient).

^a USEPA, 2005, Ecological Soil Screening Level Guidance, Soil to Plant Uptake Equations, OSWER Directive 9285.7-55.

^b -- indicates that a BAF/BCF or regression equation is not available or not applicable.

^c regression for DDT, DDD, and DDE combined.

^d for organic chemicals: BAF estimated using Travis and Arms (1988) K_{ow} regression equation, with the the lowest log K_{ow} literature value (Tier 1) or the recommended log K_{ow} from http://www.syrres.com/esc/est_kowdemo.htm (Tier 2).
summarized as follows:

Constituent	Tier 1 Log K _{ow}	Tier 1 Reference	Tier 2 Log K _{ow}
2,3,7,8-TCDD TE	6.15	Montgomery, 1996	6.92
Aroclor 1254	5.61	Montgomery, 1996	6.98
Endosulfan II	3.50	www.syrres.com , 2006	3.50
Endosulfan sulfate	3.64	www.syrres.com , 2006	3.64
Endrin aldehyde	4.80	www.syrres.com , 2006	4.80
Methoxychlor	3.40	Montgomery, 1996	5.67

^e for inorganic chemicals: Efroymsen, R.A., et. al., 2001, Uptake of Inorganic Chemicals from Soil by Plant Leaves: Regressions of Field Data, Environ. Tox. Chem., 20:2561-2571.

Table F-16
Recommended Bioaccumulation/Bioconcentration Factors or Regression Equations Utilized for the Soil-to-Earthworm Pathway at SWMU 31

Constituent	USEPA (2005) Eco-SSL Uptake Equation ^a	Sample, et al. 1998 ^b			Sample et al. 1999 ^c Regression Equation	Recommended Tier 1 (Maximum) BAF/BCF	Rationale for Recommended Tier 1 BAF/BCF	Recommended Tier 2 (RME) BAF/BCF	Rationale for Recommended Tier 2 BAF/BCF
		Median BAF/BCF	90 th Percentile BAF/BCF	Maximum BAF/BCF					
2,3,7,8-TCDD TE	-- ^d	11.011	22.229	42.068	ln (EW)=1.18(ln[soil])+3.53	42.068	Maximum value	Regression Eq.	Chemical-specific Regression Eq.
4,4'-DDD	ln (EW)= 0.6975(ln[soil])+1.1613	--	--	--	--	Regression Eq.	Recommended Equation (USEPA 2005)	Regression Eq.	Recommended Equation (USEPA 2005)
4,4'-DDE	ln (EW)= 0.8804(ln[soil])+2.4771	--	--	--	--	Regression Eq.	Recommended Equation (USEPA 2005)	Regression Eq.	Recommended Equation (USEPA 2005)
4,4'-DDT	ln (EW)= 0.8689(ln[soil])+2.1247	--	--	--	--	Regression Eq.	Recommended Equation (USEPA 2005)	Regression Eq.	Recommended Equation (USEPA 2005)
Aroclor 1254	--	6.667	15.909	65.227	ln (EW)=1.36(ln[soil])+1.41	65.227	Maximum value	Regression Eq.	Chemical-specific Regression Eq.
Endosulfan II	--	--	--	--	--	8.9 ^e	Calculated BAF using USEPA 2005	0.38 ^e	Calculated BAF using USEPA 2005
Endosulfan sulfate	--	--	--	--	--	11.8 ^e	Calculated BAF using USEPA 2005	0.50 ^e	Calculated BAF using USEPA 2005
Endrin aldehyde	--	--	--	--	--	71.4 ^e	Calculated BAF using USEPA 2005	3.0 ^e	Calculated BAF using USEPA 2005
Methoxychlor	--	--	--	--	--	58.2 ^e	Calculated BAF using USEPA 2005	2.5 ^e	Calculated BAF using USEPA 2005
Arsenic	ln (EW)= 0.706(ln[soil])-1.421	--	--	--	--	Regression Eq.	Recommended Equation (USEPA 2005)	Regression Eq.	Recommended Equation (USEPA 2005)
Cadmium	ln (EW)= 0.795(ln[soil])+2.114	--	--	--	--	Regression Eq.	Recommended Equation (USEPA 2005)	Regression Eq.	Recommended Equation (USEPA 2005)
Chromium	(EW)= 0.306(soil)	--	--	--	--	0.306	Recommended BAF (USEPA 2005)	0.306	Recommended BAF (USEPA 2005)
Copper	(EW)= 0.515(soil)	--	--	--	--	0.515	Recommended BAF (USEPA 2005)	0.515	Recommended BAF (USEPA 2005)
Lead	ln (EW)= 0.807(ln[soil])-0.218	--	--	--	--	Regression Eq.	Recommended Equation (USEPA 2005)	Regression Eq.	Recommended Equation (USEPA 2005)
Mercury	--	1.693	20.625	33	ln (EW)=0.33(ln[soil])+0.078	33	Maximum value	Regression Eq.	Chemical-specific Regression Eq.
Nickel	(EW)= 1.059(soil)	--	--	--	--	1.059	Recommended BAF (USEPA 2005)	1.059	Recommended BAF (USEPA 2005)
Zinc	ln (EW)= 0.328(ln[soil])+4.449	--	--	--	--	Regression Eq.	Recommended Equation (USEPA 2005)	Regression Eq.	Recommended Equation (USEPA 2005)

Notes: EW (earthworm tissue concentration [mg/kg d.w.]); soil (concentration in soil [mg/kg d.w.]); BAF/BCF (bioaccumulation/bioconcentration factor); log Kow (octanol/water partition coefficient).

^a USEPA, 2005, Ecological Soil Screening Level Guidance (Eco-SSL), Soil to Earthworm Uptake Equations, OSWER Directive 9285.7-55.

^b Sample, B. E, et. al., 1998. Development and Validation of Bioaccumulation Models for Earthworms, ES/ER/TM-220.

^c Sample, B.E, et. al., 1999, Literature-Derived Bioaccumulation Models for Earthworms: Development and Validation, Environ. Toxicol. Chem., 18:9; pp. 2,110-2,120. (models from Table 3 of publication).

^d -- indicates that a BAF/BCF or regression equation is not available or not applicable.

^e for organic chemicals: USEPA, 2005, Ecological Soil Screening Level Guidance, (Section 3.2.2 and Table 5 in Attachment 4-1).

BAF estimated using the following equation, the recommended log K_{ow} values from http://www.syrres.com/esc/est_kowdemo.htm, and the recommended K_{oc} values from: <http://www.syrres.com/esc/chemfate.htm>.

$$\text{BAF} = \frac{((10^{(0.87 \cdot \log K_{ow} - 2)})) / 0.16}{foc \cdot K_{oc}}$$

Constituent	K _{oc}	Log K _{ow}
Endosulfan II	6,770	3.50
Endosulfan sulfate (Endosulfan II as surrogate)	6,770	3.64
Endrin aldehyde (Endrin as surrogate)	11,420	4.80
Methoxychlor	80,000	5.67

- converted to kg d.w. assuming 16% solids, 84% moisture, (USEPA, 2005, Eco-SSL)
- Minimum Site foc used for Tier I (0.00115) and arithmetic mean of Site foc used for Tier II (0.0272).

Table F-17
Recommended Bioaccumulation/Bioconcentration Factors Utilized for the Soil-to-Small Mammal and Bird Pathways at SWMU 31

Constituent	USEPA (2005) Eco-SSL Uptake Equation ^a	Sample et al., 1998 ^b						Recommended Tier 1 (Maximum) BAF/BCF	Rationale for Recommended Tier 1 BAF/BCF	Recommended Tier 2 (90 th Percentile - RME) BAF/BCF	Rationale for Recommended Tier 2 BAF/BCF
		Insectivore Median BAF/BCF	Herbivore Median BAF/BCF	Omnivore Median BAF/BCF	General ^c Median BAF/BCF	General ^c Maximum BAF/BCF	General ^c 90 th percentile BAF/BCF				
2,3,7,8-TCDD TE	-- ^d	--	1.2857	0.7783	1.07	2.2	2.2	2.2	General maximum value	2.2	General 90th percentile value
4,4'-DDD	$\ln(\text{mam}) = 0.633(\ln(\text{diet})) + 2.3833$ ^e	--	--	--	--	--	--	Regression Eq.	Recommended Regression Eq. (USEPA 2005)	Regression Eq.	Recommended Regression Eq. (USEPA 2005)
4,4'-DDE	$\ln(\text{mam}) = 0.641(\ln(\text{diet})) + 3.6401$	--	--	--	--	--	--	Regression Eq.	Recommended Regression Eq. (USEPA 2005)	Regression Eq.	Recommended Regression Eq. (USEPA 2005)
4,4'-DDT	$\ln(\text{mam}) = 0.7254(\ln(\text{diet})) + 1.1788$	--	--	--	--	--	--	Regression Eq.	Recommended Regression Eq. (USEPA 2005)	Regression Eq.	Recommended Regression Eq. (USEPA 2005)
Aroclor 1254	--	--	--	--	--	--	--	1 ^f	Conservative value for Tier 1 organic	0.5 ^f	Conservative value for Tier 2 organic
Endosulfan II	--	--	--	--	--	--	--	1 ^f	Conservative value for Tier 1 organic	0.5 ^f	Conservative value for Tier 2 organic
Endosulfan sulfate	--	--	--	--	--	--	--	1 ^f	Conservative value for Tier 1 organic	0.5 ^f	Conservative value for Tier 2 organic
Endrin aldehyde	--	--	--	--	--	--	--	1 ^f	Conservative value for Tier 1 organic	0.5 ^f	Conservative value for Tier 2 organic
Methoxychlor	--	--	--	--	--	--	--	1 ^f	Conservative value for Tier 1 organic	0.5 ^f	Conservative value for Tier 2 organic
Arsenic	$\ln(\text{mam}) = 0.8188(\ln(\text{soil})) - 4.8471$	--	--	--	--	--	--	Regression Eq.	Recommended Regression Eq. (USEPA 2005)	Regression Eq.	Recommended Regression Eq. (USEPA 2005)
Cadmium	$\ln(\text{mam}) = 0.4723(\ln(\text{soil})) - 1.2571$	--	--	--	--	--	--	Regression Eq.	Recommended Regression Eq. (USEPA 2005)	Regression Eq.	Recommended Regression Eq. (USEPA 2005)
Chromium	$\ln(\text{mam}) = 0.7338(\ln(\text{soil})) - 1.4599$	--	--	--	--	--	--	Regression Eq.	Recommended Regression Eq. (USEPA 2005)	Regression Eq.	Recommended Regression Eq. (USEPA 2005)
Copper	$\ln(\text{mam}) = 0.144(\ln(\text{soil})) + 2.042$	--	--	--	--	--	--	Regression Eq.	Recommended Regression Eq. (USEPA 2005)	Regression Eq.	Recommended Regression Eq. (USEPA 2005)
Lead	$\ln(\text{mam}) = 0.4422(\ln(\text{soil})) + 0.0761$	--	--	--	--	--	--	Regression Eq.	Recommended Regression Eq. (USEPA 2005)	Regression Eq.	Recommended Regression Eq. (USEPA 2005)
Mercury	--	1.046 ^g	0.0239 ^g	0.0543	0.0543	1.046	0.192	1.046	General maximum value	0.192	General 90th percentile value
Nickel	$\ln(\text{mam}) = 0.4658(\ln(\text{soil})) - 2.462$	--	--	--	--	--	--	Regression Eq.	Recommended Regression Eq. (USEPA 2005)	Regression Eq.	Recommended Regression Eq. (USEPA 2005)
Zinc	$\ln(\text{mam}) = 0.0706(\ln(\text{soil})) + 4.3632$	--	--	--	--	--	--	Regression Eq.	Recommended Regression Eq. (USEPA 2005)	Regression Eq.	Recommended Regression Eq. (USEPA 2005)

Notes: mam (mammal or bird tissue concentration [mg/kg d.w.]); diet (concentration in diet [mg/kg d.w.] assuming 100% earthworm consumption); soil (concentration in soil [mg/kg d.w.]); BAF/BCF (bioaccumulation/bioconcentration factor).

Bird BAF/BCF values were based on the recommended small mammal BAF/BCF values, as bird uptake values are not readily available.

^a USEPA, 2005, Ecological Soil Screening Level Guidance, Soil to Small Mammal Uptake Equations, OSWER Directive 9285.7-55.

^b Sample et al., 1998, Development and Validation of Bioaccumulation Models for Small Mammals, ES/ER/TM-219.

^c General = combination dataset used for insectivore, herbivore, and omnivore receptors to estimate a "general" receptor BAF/BCF value.

^d -- indicates that a BAF/BCF is not available or not applicable.

^e Regression equation based on DDT, DDE, and DDD combined.

^f Known bioaccumulative organics (TCDD and TCDF) have BAFs/BCFs of 1.1 and 0.13 (median) and 2.2 and 0.16 (maximum) from Sample et al. (1998). Conservative BAF/BCF default values of 1 and 0.5 were selected for this organic at the site, as it is not expected to be as bioaccumulative as TCDD/TCDF.

^g Only one BAF/BCF value available for exposure to mercury in soil (median is also 90th percentile value and maximum value).

Table F-18
Recommended Bioaccumulation/Bioconcentration Factors Utilized for the Sediment-to-Aquatic Invertebrate Pathway at SWMU 31

Constituent	Bechtel Jacobs ^a			Other ^b BAF/BCF		Recommended ^c Tier 1 BAF/BCF	Recommended ^d Tier 2 (RME) BAF/BCF	Rationale for Recommended Tier 2 BAF/BCF
	Median BAF/BCF	90th Percentile BAF/BCF	Maximum BAF/BCF	Median BAF/BCF for Soil	90th Percentile BAF/BCF for Soil			
2,3,7,8-TCDD-TE	4.67 ^e	21.9 ^e	51.3 ^e	11	22.2	51.3	4.67	Median PCB BAF/BCF surrogate for TCDD
4,4'-DDD	-- ^f	--	--	--	--	1	0.5	Conservative default
4,4'-DDE	--	--	--	--	--	1	0.5	Conservative default
Acenaphthene	--	--	--	--	--	1	0.5	Conservative default
Acenaphthylene	--	--	--	--	--	1	0.5	Conservative default
Anthracene	--	--	--	--	--	1	0.5	Conservative default
Benzo(a)anthracene	--	--	--	--	--	1	0.5	Conservative default
Benzo(a)pyrene	--	--	--	--	--	1	0.5	Conservative default
Benzo(b)fluoranthene	--	--	--	--	--	1	0.5	Conservative default
Benzo(g,h,i)perylene	--	--	--	--	--	1	0.5	Conservative default
Benzo(k)fluoranthene	--	--	--	--	--	1	0.5	Conservative default
Chrysene	--	--	--	--	--	1	0.5	Conservative default
Dibenz(a,h)anthracene	--	--	--	--	--	1	0.5	Conservative default
Endrin	--	--	--	--	--	1	0.5	Conservative default
Fluoranthene	--	--	--	--	--	1	0.5	Conservative default
Fluorene	--	--	--	--	--	1	0.5	Conservative default
Indeno(1,2,3-cd)pyrene	--	--	--	--	--	1	0.5	Conservative default
Phenanthrene	--	--	--	--	--	1	0.5	Conservative default
Pyrene	--	--	--	--	--	1	0.5	Conservative default
Arsenic	0.143	0.69	4.33	--	--	0.69	0.14	Median sediment BAF/BCF
Cadmium	0.600	7.99	41.55	--	--	7.99	0.6	Median sediment BAF/BCF
Chromium	0.100	0.468	1.101	--	--	0.47	0.1	Median sediment BAF/BCF
Copper	1.556	5.250	23.870	--	--	5.3	1.6	Median sediment BAF/BCF
Lead	0.071	0.607	7.080	--	--	0.61	0.07	Median sediment BAF/BCF
Mercury	1.136	2.868	3.981	--	--	2.87	1.14	Median sediment BAF/BCF
Nickel	0.486	2.32	5.746	--	--	2.32	0.49	Median sediment BAF/BCF
Zinc	1.94	7.53	14.51	--	--	7.5	1.94	Median sediment BAF/BCF

^a Bechtel Jacobs Company LLC, 1998. Biota Sediment Accumulation Factors for Invertebrates:

Review and Recommendations for the Oak Ridge Reservation, BJC/OR-112. (Depurated and nondepurated results used).

^b Other BAFs/BCFs are taken from soil-to-invertebrate BAFs/BCFs (based on field study results only) if no other value was available. The median and 90th percentile values are presented for soil-to-invertebrate uptake from Sample, et. al., 1998, Development and Validation of Bioaccumulation Models for Earthworms, ES/ER/TM-220.

^c The recommended Tier 1 BAF/BCF is selected as the 90th percentile value from Bechtel Jacobs (1998).

If no BAF/BCF was available for a constituent, a default of 1.0 was conservatively assumed for organics, and the geometric mean of the available inorganic 90th percentile values (i.e., 2.1) was used as a surrogate for the inorganics with no BAF/BCF.

^d The recommended Tier 2 BAF/BCF is selected as the median value from Bechtel Jacobs (1998).

If no BAF/BCF was available for a constituent, a default of 0.5 was conservatively assumed for organics, and the geometric mean of the available inorganic median values (i.e., 0.42) was used as a surrogate for the inorganics with no BAF/BCF.

^e Value for PCBs (from Bechtel Jacobs, 1998), used as a surrogate for TCDD, as both of these chlorinated organics are known bioaccumulators with BAF/BCFs suspected to be greater than one.

^f -- indicates that a BAF/BCF is not available.

Notes:

(1) All BAF/BCF values for infauna, unless noted.

(2) Geometric means for 90th percentile and median inorganic BAF/BCFs were calculated using the data provided below from Bechtel (1998):

	<u>90th Percentile</u>	<u>Median</u>
Arsenic	0.69	0.143
Cadmium	7.99	0.6
Chromium	0.468	0.1
Copper	5.25	1.556
Mercury	2.868	1.136
Nickel	2.32	0.486
Lead	0.607	0.071
Zinc	7.527	1.936
Geom. Mean	2.1	0.42

Table F-19
Recommended Bioaccumulation/Bioconcentration Factors Utilized for the
Water-to-Fish Pathway at SWMU 31

Constituent	IAEA ^a (Recommended Value and Range)	Bintin and Devillers ^b	USEPA ^c BCF	USEPA ^d BCF	Recommended Tier 1 (Maximum) BAF/BCF	Recommended Tier 2 (RME) BAF/BCF	Rationale for Recommended Tier 2 BAF/BCF
1,2-Dichlorobenzene	-- ^e	158	--	--	158	158	Only value available
1,3-Dichlorobenzene	--	158	--	--	158	158	Only value available
1,4-Dichlorobenzene	--	158	--	--	158	158	Only value available
alpha-BHC	--	1,202	--	--	1,202	1,202	Only value available
delta-BHC	--	1,202	--	--	1,202	1,202	Only value available
gamma-BHC (Lindane)	--	1,202	--	--	1,202	1,202	Only value available
Endosulfan II	--	250	--	--	250	250	Only value available
Endrin	--	10,546	--	--	10,546	10,546	Only value available
Hexachlorobutadiene	--	3,014	3,915	--	3,915	3,465	Mean of two values
Hexachloroethane	--	750	--	--	750	750	Only value available
Pyrene	--	4,488	2,500	--	4,488	3,494	Mean of two values
Chromium	200 (40-2,000)	--	95	155	200	125	Mean of two lower values
Lead	300 (100-300)	--	0.45	179	300	90	Mean of two lower values
Mercury (Inorganic)	1,000	--	17,650	100	1,000	550	Mean of two lower values
Nickel	100	--	390	50	390	75	Mean of two lower values
Zinc	1,000 (100-3,000)	--	10,295	578	10,295	789	Mean of two lower values

^a International Atomic Energy Agency (IAEA), 1994, *Handbook of Parameter Values for the Protection of Radionuclide Transfer in Temperate Environments*, Technical Reports Series No. 364.

^b Bintin, S. and J. Devillers, 1993, *Nonlinear Dependence of Fish Bioconcentration on n-Octanol/Water Partition Coefficient*, in SAR and QSAR in Environmental Research, Vol. 1, pp. 29-39, Gordon and Breach Science Publishers.

The following regression equation from the reference was used, along with log Kow values from http://www.syrres.com/esc/est_kowdemo.htm:

$$\log \text{BCF} = 0.910 \log \text{Kow} - 1.975 \log (6.8 \times 10^{-7} * \text{Kow} + 1) - 0.786$$

<u>Constituent</u>	<u>Log Kow</u>	<u>Constituent</u>	<u>Log Kow</u>
1,2-Dichlorobenzene	3.28	Endosulfan II	3.50
1,3-Dichlorobenzene	3.28	Endrin	5.45
1,4-Dichlorobenzene	3.28	Hexachlorobutadiene	4.72
alpha-BHC	4.26	Hexachloroethane	4.03
delta-BHC	4.26	Pyrene	4.93
gamma-BHC (Lindane)	4.26		

^c USEPA, 1999, *Screening Level Ecological Risk Assessment Protocol for Hazardous Waste Combustion Facilities*, EPA530-D-99-001A (Peer Review Draft), Appendix C - Media-to-Receptor BCFs (water to fish). Wet weight BCFs converted to dry weight BCFs by multiplying by 5 (fish moisture content = 80%) where appropriate.

^d USEPA, 1989, *Assessing Human Health Risks from Contaminated Fish and Shellfish: A Guidance Manual*, EPA-503/8-89-002.

^e -- indicates that a BAF/BCF is not available.

Table F-20
NOAEL Toxicity Reference Values Used to Derive
Wildlife Toxicity Benchmarks for COPECs at SWMU 31
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COPEC	Mammalian Data				Avian Data			
	Toxicity Value	NOAEL (mg/kg/d)	Test Species	Reference	Toxicity Value	NOAEL (mg/kg/d)	Test Species	Reference
Organics								
1,2-Dichlorobenzene	--	85.7	rat	IRIS (EPA, 2006)	1610 (LD ₅₀)	16.1	northern bobwhite	Based on 1,4-Dichlorobenzene, (USEPA, 2000)
1,3-Dichlorobenzene	--	85.7	rat	Based on 1,2-Dichlorobenzene, IRIS (USEPA, 2006)	1610 (LD ₅₀)	16.1	northern bobwhite	Based on 1,4-Dichlorobenzene, (USEPA, 2000)
1,4-Dichlorobenzene	--	85.7	rat	Based on 1,2-Dichlorobenzene, IRIS (USEPA, 2006)	1610 (LD ₅₀)	16.1	northern bobwhite	USEPA (2000)
2,3,7,8-TCDD	--	0.000001	rat	Sample, et al. (1996)	--	0.000014	ring-necked pheasant	Sample, et al. (1996)
4,4'-DDD	--	0.80	rat	Sample, et al. (1996)	--	0.0028	brown pelican	Sample, et al. (1996)
4,4'-DDE	--	0.80	rat	Sample, et al. (1996)	--	0.0028	brown pelican	Sample, et al. (1996)
4,4'-DDT	--	0.80	rat	Sample, et al. (1996)	--	0.0028	brown pelican	Sample, et al. (1996)
Acenaphthene	--	17.5	mouse	IRIS (EPA, 2006)	--	553	mallard duck	Eisler (1987)
Acenaphthylene	--	17.5	mouse	Based on Acenaphthene, IRIS (EPA, 2006)	--	553	mallard duck	Eisler (1987)
Anthracene	--	100	mouse	IRIS (USEPA, 2006)	--	553	mallard duck	Eisler (1987)
Aroclor 1254	--	0.14	mink	Sample, et al. (1996)	--	0.18	ringed pheasant	Sample, et al. (1996)
Benzo(a)anthracene	--	1	mouse	Based on B(a)P, Sample et al. (1996)	--	553	mallard duck	Based on B(a)P, Eisler (1987)
Benzo(a)pyrene	10 (LOAEL)	1	mouse	Sample, et al. (1996)	--	553	mallard duck	Eisler (1987)
Benzo(b)fluoranthene	--	1	mouse	Based on B(a)P, Sample et al. (1996)	--	553	mallard duck	Based on B(a)P, Eisler (1987)
Benzo(g,h,i)perylene	--	1	mouse	Based on B(a)P, Sample et al. (1996)	--	553	mallard duck	Based on B(a)P, Eisler (1987)
Benzo(k)fluoranthene	--	1	mouse	Based on B(a)P, Sample et al. (1996)	--	553	mallard duck	Based on B(a)P, Eisler (1987)
alpha-BHC	0.14 (LOAEL)	0.014	mink	Based on mixed isomer, Sample, et al. (1996)	--	0.56	Japanese quail	Based on mixed isomer, Sample et al. (1996)
delta-BHC	0.14 (LOAEL)	0.014	mink	Based on mixed isomer, Sample, et al. (1996)	--	0.56	Japanese quail	Based on mixed isomer, Sample et al. (1996)
gamma-BHC (Lindane)	0.14 (LOAEL)	0.014	mink	Based on mixed isomer, Sample, et al. (1996)	--	0.56	Japanese quail	Based on mixed isomer, Sample et al. (1996)
Chrysene	--	1	mouse	Based on B(a)P, Sample et al. (1996)	--	553	mallard duck	Based on B(a)P, Eisler (1987)
Dibenz(a,h)anthracene	--	1	mouse	Based on B(a)P, Sample et al. (1996)	--	553	mallard duck	Based on B(a)P, Eisler (1987)
Endosulfan II	--	0.15	rat	Based on Endosulfan, Sample et al. (1996)	--	10	gray partridge	Based on Endosulfan, Sample et al. (1996)
Endosulfan sulfate	--	0.15	rat	Based on Endosulfan, Sample et al. (1996)	--	10	gray partridge	Based on Endosulfan, Sample et al. (1996)
Endrin	0.92 (LOAEL)	0.092	mouse	Sample et al. (1996)	--	0.3	mallard duck	Sample et al. (1996)
Endrin aldehyde	0.92 (LOAEL)	0.092	mouse	Based on Endrin, Sample et al. (1996)	--	0.3	mallard duck	Based on Endrin, Sample et al. (1996)
Fluoranthene	--	12.5	mouse	IRIS (USEPA, 2006)	--	553	mallard duck	Based on B(a)P, Eisler (1987)
Fluorene	--	12.5	mouse	IRIS (USEPA, 2006)	--	553	mallard duck	Based on B(a)P, Eisler (1987)
Hexachlorobutadiene	--	0.2	rat	USEPA (1999)	--	3.185	Japanese quail	USEPA (1999)
Hexachloroethane	--	0.1	rat	IRIS (EPA, 2006)	NA	NA	NA	--
Indeno(1,2,3-cd)pyrene	--	1	mouse	Based on B(a)P, Sample et al. (1996)	--	553	mallard duck	Eisler (1987)
Methoxychlor	--	4	rat	Sample, et al. (1996)	2,578 (acute)	25.78	Japanese quail	LANL (2005)
Phenanthrene	--	1	mouse	Based on B(a)P, Sample et al. (1996)	--	553	mallard duck	Eisler (1987)
Pyrene	--	7.5	mouse	IRIS (EPA, 2006)	--	553	mallard duck	Eisler (1987)

Table F-20
NOAEL Toxicity Reference Values Used to Derive
Wildlife Toxicity Benchmarks for COPECs at SWMU 31
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COPEC	Mammalian Data				Avian Data			
	Toxicity Value	NOAEL (mg/kg/d)	Test Species	Reference	Toxicity Value	NOAEL (mg/kg/d)	Test Species	Reference
Inorganics								
Arsenic	--	0.126	mouse	Sample, et al. (1996)	--	5.14	mallard duck	Sample, et al. (1996)
Cadmium	--	1	rat	Sample, et al. (1996)	--	1.45	mallard duck	Sample, et al. (1996)
Chromium	--	2737	rat	Sample, et al. (1996)	--	2.66	chicken, black duck, turkey	USEPA (2005)
Copper	--	11.7	mink	Sample, et al. (1996)	--	47	chicks	Sample, et al. (1996)
Lead	--	8	rat	Sample, et al. (1996)	--	3.85	American kestrel	Sample, et al. (1996)
Mercury	--	1	mink	Sample, et al. (1996)	--	0.45	Japanese quail	Sample, et al. (1996)
Nickel	--	40	rat	Sample, et al. (1996)	--	77.4	mallard duck	Sample, et al. (1996)
Zinc	--	160	rat	Sample, et al. (1996)	--	14.5	hens	Sample, et al. (1996)

NA indicates that the information is not available.

As recommended by Wentsel, et. al. (1996), Tri-Service Procedural Guidelines for Ecological Risk Assessments, the following adjustments were made to toxicity data when NOAEL or LOAEL data were not available:

- Subchronic LOAELs were converted to chronic NOAELs by dividing by a factor of 20.
- Chronic NOAELs were converted to chronic LOAELs by multiplying by a factor of 5.0.
- Subchronic NOAELs/LOAELs were converted to chronic NOAELs/LOAELs by dividing by a factor of 10.
- Chronic LOAELs were converted to chronic NOAELs by dividing by a factor of 10.
- LD₅₀ concentrations were converted to chronic NOAELs by dividing by a factor of 100.
- LD₅₀ concentrations were converted to chronic LOAELs by dividing by a factor of 20.

Eisler, 1987, PAH Hazards to Fish, Wildlife, and Invertebrates: A Synoptic Review.

LANL, 2005, Eco Risk Data Base, Release 2.2.

Sample, et al., 1996, Toxicological Benchmarks for Wildlife.

USEPA, 1999, SLERA Protocol for Hazardous Waste Combustion Facilities.

USEPA, 2000, Office of Pesticide Programs (OPP) Environmental Effects Database (EEDB).

USEPA, 2005, Ecological Screening Levels (Eco-SSL).

USEPA, 2006, Integrated Risk Information System (IRIS).

Table F-21
LOAEL Toxicity Reference Values Used to Derive
Wildlife Toxicity Benchmarks for COPECs at SWMU 31
Page 1 of 2

COPEC	Mammalian Data				Avian Data			
	Toxicity Value	LOAEL (mg/kg/d)	Test Species	Reference	Toxicity Value	LOAEL (mg/kg/d)	Test Species	Reference
Organics								
1,2-Dichlorobenzene	85.7 (NOAEL)	428.5	rat	IRIS (EPA, 2006)	1610 (LD ₅₀)	80.5	northern bobwhite	Based on 1,4-Dichlorobenzene, (USEPA, 2000)
1,3-Dichlorobenzene	85.7 (NOAEL)	428.5	rat	Based on 1,2-Dichlorobenzene, IRIS (EPA, 2006)	1610 (LD ₅₀)	80.5	northern bobwhite	Based on 1,4-Dichlorobenzene, (USEPA, 2000)
1,4-Dichlorobenzene	85.7 (NOAEL)	428.5	rat	Based on 1,2-Dichlorobenzene, IRIS (EPA, 2006)	1610 (LD ₅₀)	80.5	northern bobwhite	USEPA (2000)
2,3,7,8-TCDD	--	0.00001	rat	Sample, et al. (1996)	--	0.00014	ring-necked pheasant	Sample, et al. (1996)
4,4'-DDD	--	4.0	rat	Sample, et al. (1996)	--	0.03	brown pelican	Sample, et al. (1996)
4,4'-DDE	--	4.0	rat	Sample, et al. (1996)	--	0.03	brown pelican	Sample, et al. (1996)
4,4'-DDT	--	4.0	rat	Sample, et al. (1996)	--	0.03	brown pelican	Sample, et al. (1996)
Acenaphthene	--	35.0	mouse	IRIS (EPA, 2006)	553 (NOAEL)	2765.0	mallard duck	Eisler (1987)
Acenaphthylene	--	35.0	mouse	Based on Acenaphthene, IRIS (EPA, 2006)	553 (NOAEL)	2765.0	mallard duck	Eisler (1987)
Anthracene	100 (NOAEL)	500	mouse	IRIS (EPA, 2006)	553 (NOAEL)	2765.0	mallard duck	Eisler (1987)
Aroclor 1254	--	0.69	mouse	Sample, et al. (1996)	--	1.8	ring-necked pheasant	Sample, et al. (1996)
Benzo(a)anthracene	--	10.0	mouse	Based on Benzo(a)pyrene, Sample et al. (1996)	553 (NOAEL)	2765.0	mallard duck	Based on B(a)P, Eisler (1987)
Benzo(a)pyrene	--	10.0	mouse	Sample, et al. (1996)	553 (NOAEL)	2765.0	mallard duck	Eisler (1987)
Benzo(b)fluoranthene	--	10.0	mouse	Based on Benzo(a)pyrene, Sample et al. (1996)	553 (NOAEL)	2765.0	mallard duck	Based on B(a)P, Eisler (1987)
Benzo(g,h,i)perylene	--	10.0	mouse	Based on Benzo(a)pyrene, Sample et al. (1996)	553 (NOAEL)	2765.0	mallard duck	Based on B(a)P, Eisler (1987)
Benzo(k)fluoranthene	--	10.0	mouse	Based on Benzo(a)pyrene, Sample et al. (1996)	553 (NOAEL)	2765.0	mallard duck	Based on B(a)P, Eisler (1987)
alpha-BHC	--	0.14	mink	Based on mixed isomer, Sample, et al. (1996)	--	2.25	Japanese quail	Based on mixed isomer, Sample, et al. (1996)
delta-BHC	--	0.14	mink	Based on mixed isomer, Sample, et al. (1996)	--	2.25	Japanese quail	Based on mixed isomer, Sample, et al. (1996)
gamma-BHC (Lindane)	--	0.14	mink	Based on mixed isomer, Sample, et al. (1996)	--	2.25	Japanese quail	Based on mixed isomer, Sample, et al. (1996)
Chrysene	--	10.0	mouse	Based on Benzo(a)pyrene, Sample et al. (1996)	553 (NOAEL)	2765.0	mallard duck	Based on B(a)P, Eisler (1987)
Dibenz(a,h)anthracene	--	10.0	mouse	Based on Benzo(a)pyrene, Sample et al. (1996)	553 (NOAEL)	2765.0	mallard duck	Based on B(a)P, Eisler (1987)
Endosulfan II	0.15 (NOAEL)	0.75	rat	Based on Endosulfan, Sample et al. (1996)	10 (NOAEL)	50	gray partridge	Based on Endosulfan, Sample et al. (1996)
Endosulfan sulfate	0.15 (NOAEL)	0.75	rat	Based on Endosulfan, Sample et al. (1996)	10 (NOAEL)	50	gray partridge	Based on Endosulfan, Sample et al. (1996)
Endrin	--	0.92	mouse	Sample et al. (1996)	0.3 (NOAEL)	1.5	mallard duck	Sample et al. (1996)
Endrin aldehyde	--	0.92	mouse	Based on Endrine, Sample et al. (1996)	0.3 (NOAEL)	1.50	mallard duck	Based on Endrine, Sample et al. (1996)
Fluoranthene	--	25.0	mouse	IRIS (EPA, 2006)	553 (NOAEL)	2765.0	mallard duck	Based on B(a)P, Eisler (1987)
Fluorene	--	25.0	mouse	IRIS (EPA, 2006)	553 (NOAEL)	2765.0	mallard duck	Based on B(a)P, Eisler (1987)
Hexachlorobutadiene	0.2 (NOAEL)	1	rat	USEPA (1999)	3.185 (NOAEL)	15.9	Japanese quail	USEPA (1999)
Hexachloroethane	--	1.5	rat	IRIS (EPA, 2006)	NA	NA	NA	--
Indeno(1,2,3-cd)pyrene	--	10.0	mouse	Based on Benzo(a)pyrene, Sample et al. (1996)	553 (NOAEL)	2765.0	mallard duck	Based on B(a)P, Eisler (1987)
Methoxychlor	--	8	rat	Sample, et al. (1996)	25.78 (NOAEL)	129	Japanese quail	LANL (2005)
Phenanthrene	--	10.0	mouse	Based on Benzo(a)pyrene, Sample et al. (1996)	553 (NOAEL)	2765.0	mallard duck	Based on B(a)P, Eisler (1987)
Pyrene	--	12.5	mouse	IRIS (EPA, 2006)	553 (NOAEL)	2765.0	mallard duck	Based on B(a)P, Eisler (1987)

Table F-21
LOAEL Toxicity Reference Values Used to Derive
Wildlife Toxicity Benchmarks for COPECs at SWMU 31
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COPEC	Mammalian Data				Avian Data			
	Toxicity Value	LOAEL (mg/kg/d)	Test Species	Reference	Toxicity Value	LOAEL (mg/kg/d)	Test Species	Reference
Inorganics								
Arsenic	--	1.26	mouse	Sample, et al. (1996)	--	12.84	mallard duck	Sample, et al. (1996)
Cadmium	--	10.0	rat	Sample, et al. (1996)	--	20	mallard duck	Sample, et al. (1996)
Chromium	2,737 (NOAEL)	13690	rat	Sample, et al. (1996)	--	2.78	chicken, black duck, turkey	USEPA (2005)
Copper	--	15.10	mink	Sample, et al. (1996)	--	62	chicks	Sample, et al. (1996)
Lead	--	80.0	rat	Sample, et al. (1996)	3.85 (NOAEL)	19.25	American kestrel	Sample, et al. (1996)
Mercury	1.0 (NOAEL)	5.00	mink	Sample, et al. (1996)	--	0.9	Japanese quail	Sample, et al. (1996)
Nickel	--	80.0	rat	Sample, et al. (1996)	--	107	mallard duck	Sample, et al. (1996)
Zinc	--	320	rat	Sample, et al. (1996)	--	131	hens	Sample et al. (1996)

NA indicates that the information is not available.

As recommended by Wentsel, et. al. (1996), Tri-Service Procedural Guidelines for Ecological Risk Assessments, the following adjustments were made to toxicity data when NOAEL or LOAEL data were not available:

- Subchronic LOAELs were converted to chronic NOAELs by dividing by a factor of 20.
- Chronic NOAELs were converted to chronic LOAELs by multiplying by a factor of 5.0.
- Subchronic NOAELs/LOAELs were converted to chronic NOAELs/LOAELs by dividing by a factor of 10.
- Chronic LOAELs were converted to chronic NOAELs by dividing by a factor of 10.
- LD₅₀ concentrations were converted to chronic NOAELs by dividing by a factor of 100.
- LD₅₀ concentrations were converted to chronic LOAELs by dividing by a factor of 20.

Eisler, 1987, PAH Hazards to Fish, Wildlife, and Invertebrates: A Synoptic Review.

LANL, 2005, Eco Risk Data Base, Release 2.2.

Sample, et al., 1996, Toxicological Benchmarks for Wildlife.

USEPA, 1999, SLERA Protocol for Hazardous Waste Combustion Facilities.

USEPA, 2000, Office of Pesticide Programs (OPP) Environmental Effects Database (EEDB).

USEPA, 2005, Ecological Screening Levels (Eco-SSL).

USEPA, 2006, Integrated Risk Information System (IRIS).

Table F-22
Uncertainty Factors^a for Ecological TRV^b Extrapolations^c at SWMU 31

Laboratory Animals				Selected Site Receptor Species	
Rat	G: Rattus F: Muridae O: Rodentia	Japanese quail	G: Coturnix F: Phasianidae O: Galliformes	Meadow vole	G: Microtus F: Muridae O: Rodentia
Mouse	G: Mus F: Muridae O: Rodentia	Ringed dove	G: Streptopelia F: Columbidae O: Columbiformes	Short-tailed shrew	G: Blarina F: Soricidae O: Insectivora
Mink	G: Mustela F: Mustelidae O: Carnivora	Gray partridge	G: Perdix F: Phasianidae O: Galliformes	American robin	G: Turdus F: Muscicapidae O: Passeriformes
Pheasant	G: Phasianus F: Phasianidae O: Galliformes	American kestrel	G: Falco F: Falconidae O: Ciconiiformes	Red-tailed hawk	G: Buteo F: Accipitridae O: Ciconiiformes
Chick, Poultry	G: Gallus F: Phasianidae O: Galliformes	Brown pelican	G: Pelecanus F: Pelecanidae O: Ciconiiformes	Red fox	G: Vulpes F: Canidae O: Carnivora
Black duck, Mallard	G: Anas F: Anatidae O: Anseriformes	Northern bobwhite	G: Colinus F: Odontophoridae O: Galliformes	Great blue heron	G: Ardea F: Ardeidae O: Ciconiiformes
				Mink	G: Mustela F: Mustelidae O: Carnivora

^a From *Tri-Service Procedural Guidelines for Ecological Risk Assessment* (Wentsel et al. 1996)

^b TRV = Toxicity Reference Value

^c Interclass extrapolations not performed; only within bird class or within mammal class.

The Uncertainty Factors Used for TRV Extrapolations are Summarized Below:

- Extrapolation between two different species = uncertainty factor of 2
- Extrapolation between two different genera (G) = uncertainty factor of 4
- Extrapolation between two different families (F) or orders (O) = uncertainty factor of 8

Table F-23
Comparison of Maximum Detection Limits in Surface Soil with Ecological Screening Values at SWMU 31
Page 1 of 2

Scenario Timeframe: Current
Medium: Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Ecological Screening Value (2)	Region III BTAG Screening Levels (3)	Above Screening Value? (Y/N)
	72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran			mg/kg		0/2	3.00E-08 - 1.11E-07	1.11E-07	3.86E-05	NVA	No
	99-35-4	1,3,5-Trinitrobenzene			mg/kg		0/2	1.00E-01 - 1.00E-01	1.00E-01	3.76E-01	NVA	No
	99-65-0	1,3-Dinitrobenzene			mg/kg		0/2	1.00E-01 - 1.00E-01	1.00E-01	6.55E-01	NVA	No
	118-96-7	2,4,6-Trinitrotoluene			mg/kg		0/2	2.00E-01 - 2.00E-01	2.00E-01	7.00E-01	NVA	No
	35572-78-2	2-amino-4,6-Dinitrotoluene			mg/kg		0/2	2.00E-01 - 2.00E-01	2.00E-01	5.30E+00	NVA	No
	88-72-2	2-Nitrotoluene			mg/kg		0/2	4.00E-01 - 4.00E-01	4.00E-01	4.10E+00	NVA	No
	99-08-1	3-Nitrotoluene			mg/kg		0/2	4.00E-01 - 4.00E-01	4.00E-01	5.30E+00	NVA	No
	19406-51-0	4-amino-2,6-Dinitrotoluene			mg/kg		0/2	2.00E-01 - 2.00E-01	2.00E-01	3.60E+00	NVA	No
	99-99-0	4-Nitrotoluene			mg/kg		0/2	4.00E-01 - 4.00E-01	4.00E-01	9.40E+00	NVA	No
	156-59-2	cis-1,2-Dichloroethene			mg/kg		0/2	4.60E-03 - 5.50E-03	5.50E-03	7.84E-01	3.00E-01	No
	121-82-4	Cyclonite			mg/kg		0/2	2.00E-01 - 2.00E-01	2.00E-01	5.80E+00	NVA	No
	2691-41-0	HMX			mg/kg		0/2	2.00E-01 - 2.00E-01	2.00E-01	4.30E+01	NVA	No
	ICF87	m+p-Xylenes			mg/kg		0/2	9.20E-03 - 1.10E-02	1.10E-02	1.00E+01	1.00E-01	No
	95-47-6	o-Xylene			mg/kg		0/2	4.60E-03 - 5.50E-03	5.50E-03	1.00E+01	1.00E-01	No
	78-11-5	Pentaerythritol tetranitrate			mg/kg		0/2	3.33E-01 - 3.45E-01	3.45E-01	1.40E+04	NVA	No
	479-45-8	Tetryl			mg/kg		0/2	2.00E-01 - 2.00E-01	2.00E-01	2.00E+00	NVA	No
	156-60-5	trans-1,2-Dichloroethene			mg/kg		0/2	4.60E-03 - 5.50E-03	5.50E-03	7.84E-01	3.00E-01	No
	93-76-5	2,4,5-T			mg/kg		0/2	1.15E-01 - 1.11E+00	1.11E+00	5.96E-01	NVA	Yes
	93-72-1	2,4,5-TP (Silvex)			mg/kg		0/2	1.15E-01 - 1.11E+00	1.11E+00	1.09E-01	NVA	Yes
	94-75-7	2,4-D			mg/kg		0/2	2.30E-01 - 2.22E+00	2.22E+00	2.73E-02	NVA	Yes
	94-82-6	2,4-DB			mg/kg		0/2	1.15E+00 - 1.11E+01	1.11E+01	NVA	NVA	No
	309-00-2	Aldrin			mg/kg		0/2	7.40E-04 - 7.68E-04	7.68E-04	3.32E-03	1.00E-01	No
	319-84-6	alpha-BHC			mg/kg		0/2	7.40E-04 - 7.68E-04	7.68E-04	9.94E-02	NVA	No
	5103-71-9	alpha-Chlordane			mg/kg		0/2	7.40E-04 - 7.68E-04	7.68E-04	2.24E-01	1.00E-01	No
	319-85-7	beta-BHC			mg/kg		0/2	7.40E-04 - 7.68E-04	7.68E-04	3.98E-03	NVA	No
	75-99-0	Dalapon			mg/kg		0/2	1.15E+00 - 1.11E+01	1.11E+01	NVA	NVA	No
	319-86-8	delta-BHC			mg/kg		0/2	7.40E-04 - 7.68E-04	7.68E-04	9.94E+00	NVA	No
	1918-00-9	Dicamba			mg/kg		0/2	2.30E-01 - 2.22E+00	2.22E+00	NVA	NVA	No
	120-36-5	Dichloroprop			mg/kg		0/2	2.30E-01 - 2.22E+00	2.22E+00	NVA	NVA	No
	60-57-1	Dieldrin			mg/kg		0/2	7.40E-04 - 7.68E-04	7.68E-04	3.20E-05	1.00E-01	Yes
	959-98-8	Endosulfan I			mg/kg		0/2	7.40E-04 - 7.68E-04	7.68E-04	1.19E-01	NVA	No
	72-20-8	Endrin			mg/kg		0/2	7.40E-04 - 7.68E-04	7.68E-04	1.01E-02	1.00E-01	No
	53494-70-5	Endrin ketone			mg/kg		0/2	7.40E-04 - 7.68E-04	7.68E-04	NVA	NVA	No
	58-89-9	gamma-BHC (Lindane)			mg/kg		0/2	7.40E-04 - 7.68E-04	7.68E-04	5.00E-03	1.00E-01	No
	5103-74-2	gamma-Chlordane			mg/kg		0/2	7.40E-04 - 7.68E-04	7.68E-04	2.24E-01	1.00E-01	No
	76-44-8	Heptachlor			mg/kg		0/2	7.40E-04 - 7.68E-04	7.68E-04	5.98E-03	NVA	No
	1024-57-3	Heptachlor epoxide			mg/kg		0/2	7.40E-04 - 7.68E-04	7.68E-04	1.52E-01	1.00E-01	No
	94-74-6	MCPA			mg/kg		0/4	1.15E+02 - 1.11E+03	1.11E+03	NVA	NVA	No
	93-65-2	MCPP			mg/kg		0/2	1.15E+02 - 1.11E+03	1.11E+03	NVA	NVA	No
	8001-35-2	Toxaphene			mg/kg		0/2	3.70E-02 - 3.83E-02	3.83E-02	1.19E-01	NVA	No
	12674-11-2	Aroclor 1016			mg/kg		0/2	3.70E-02 - 3.83E-02	3.83E-02	3.71E-01	1.00E-01	No
	11104-28-2	Aroclor 1221			mg/kg		0/2	7.40E-02 - 7.68E-02	7.68E-02	3.71E-01	1.00E-01	No

Table F-23
Comparison of Maximum Detection Limits in Surface Soil with Ecological Screening Values at SWMU 31
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Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Ecological Screening Value (2)	Region III BTAG Screening Levels (3)	Above Screening Value? (Y/N)
	11141-16-5	Aroclor 1232			mg/kg		0/2	3.70E-02 - 3.83E-02	3.83E-02	3.71E-01	1.00E-01	No
	53469-21-9	Aroclor 1242			mg/kg		0/2	3.70E-02 - 3.83E-02	3.83E-02	3.71E-01	1.00E-01	No
	12672-29-6	Aroclor 1248			mg/kg		0/2	3.70E-02 - 3.83E-02	3.83E-02	3.71E-01	1.00E-01	No
	11096-82-5	Aroclor 1260			mg/kg		0/2	3.70E-02 - 3.83E-02	3.83E-02	3.71E-01	1.00E-01	No
	121-14-2	2,4-Dinitrotoluene			mg/kg		0/2	2.00E-01 - 2.00E-01	2.00E-01	1.28E+00	NVA	No
	606-20-2	2,6-Dinitrotoluene			mg/kg		0/2	2.00E-01 - 2.00E-01	2.00E-01	3.28E-02	NVA	Yes
	88-85-7	2-sec-butyl-4,6-dinitrophenol			mg/kg		0/2	2.30E-01 - 2.22E+00	2.22E+00	2.18E-02	NVA	Yes
	98-95-3	Nitrobenzene			mg/kg		0/2	2.00E-01 - 2.00E-01	2.00E-01	1.31E+00	NVA	No
	71-55-6	1,1,1-Trichloroethane			mg/kg		0/2	4.60E-03 - 5.50E-03	5.50E-03	2.98E+01	3.00E-01	No
	79-34-5	1,1,2,2-Tetrachloroethane			mg/kg		0/2	4.60E-03 - 5.50E-03	5.50E-03	1.27E-01	3.00E-01	No
	79-00-5	1,1,2-Trichloroethane			mg/kg		0/2	4.60E-03 - 5.50E-03	5.50E-03	2.86E+01	3.00E-01	No
	75-34-3	1,1-Dichloroethane			mg/kg		0/2	4.60E-03 - 5.50E-03	5.50E-03	2.01E+01	3.00E-01	No
	75-35-4	1,1-Dichloroethene			mg/kg		0/2	4.60E-03 - 5.50E-03	5.50E-03	8.28E+00	NVA	No
	107-06-2	1,2-Dichloroethane			mg/kg		0/2	4.60E-03 - 5.50E-03	5.50E-03	2.12E+01	8.70E+02	No
	78-87-5	1,2-Dichloropropane			mg/kg		0/2	4.60E-03 - 5.50E-03	5.50E-03	3.27E+01	NVA	No
	78-93-3	2-Butanone			mg/kg		0/2	4.60E-03 - 5.50E-03	5.50E-03	8.96E+01	NVA	No
	591-78-6	2-Hexanone			mg/kg		0/2	4.60E-03 - 5.50E-03	5.50E-03	1.26E+01	NVA	No
	108-10-1	4-Methyl-2-pentanone			mg/kg		0/2	4.60E-03 - 5.50E-03	5.50E-03	4.43E+02	1.00E+02	No
	67-64-1	Acetone			mg/kg		0/2	4.60E-03 - 5.50E-03	5.50E-03	2.50E+00	NVA	No
	71-43-2	Benzene			mg/kg		0/2	4.60E-03 - 5.50E-03	5.50E-03	2.55E-01	1.00E-01	No
	75-27-4	Bromodichloromethane			mg/kg		0/2	4.60E-03 - 5.50E-03	5.50E-03	5.40E-01	4.50E+02	No
	74-83-9	Bromomethane			mg/kg		0/2	4.60E-03 - 5.50E-03	5.50E-03	2.35E-01	NVA	No
	75-15-0	Carbon disulfide			mg/kg		0/2	4.60E-03 - 5.50E-03	5.50E-03	9.41E-02	NVA	No
	56-23-5	Carbon tetrachloride			mg/kg		0/2	4.60E-03 - 5.50E-03	5.50E-03	2.98E+00	3.00E-01	No
	108-90-7	Chlorobenzene			mg/kg		0/2	4.60E-03 - 5.50E-03	5.50E-03	4.00E+01	1.00E-01	No
	75-00-3	Chloroethane			mg/kg		0/2	4.60E-03 - 5.50E-03	5.50E-03	NVA	NVA	No
	74-87-3	Chloromethane			mg/kg		0/2	4.60E-03 - 5.50E-03	5.50E-03	1.04E+01	NVA	No
	10061-01-5	cis-1,3-Dichloro-1-propene			mg/kg		0/2	4.60E-03 - 5.50E-03	5.50E-03	3.98E-01	3.00E-01	No
	124-48-1	Dibromochloromethane			mg/kg		0/2	4.60E-03 - 5.50E-03	5.50E-03	2.05E+00	NVA	No
	100-41-4	Ethylbenzene			mg/kg		0/2	4.60E-03 - 5.50E-03	5.50E-03	5.16E+00	1.00E-01	No
	75-09-2	Methylene chloride			mg/kg		0/2	4.60E-03 - 5.50E-03	5.50E-03	4.05E+00	3.00E-01	No
	100-42-5	Styrene			mg/kg		0/2	4.60E-03 - 5.50E-03	5.50E-03	3.00E+02	1.00E-01	No
	127-18-4	Tetrachloroethene			mg/kg		0/2	4.60E-03 - 5.50E-03	5.50E-03	9.92E+00	3.00E-01	No
	108-88-3	Toluene			mg/kg		0/2	4.60E-03 - 5.50E-03	5.50E-03	2.00E+02	1.00E-01	No
	10061-02-6	trans-1,3-Dichloropropene			mg/kg		0/2	4.60E-03 - 5.50E-03	5.50E-03	3.98E-01	3.00E-01	No
	75-25-2	Tribromomethane			mg/kg		0/2	4.60E-03 - 5.50E-03	5.50E-03	1.59E+01	1.47E+03	No
	79-01-6	Trichloroethene			mg/kg		0/2	4.60E-03 - 5.50E-03	5.50E-03	1.24E+01	3.00E-01	No
	67-66-3	Trichloromethane			mg/kg		0/2	4.60E-03 - 5.50E-03	5.50E-03	1.19E+00	3.00E-01	No
	75-01-4	Vinyl Chloride			mg/kg		0/2	4.60E-03 - 5.50E-03	5.50E-03	6.46E-01	3.00E-01	No
	7782-49-2	Selenium			mg/kg		0/1	1.15E+00 - 1.15E+00	1.15E+00	2.10E-01	1.80E+00	Yes
	7440-22-4	Silver			mg/kg		0/2	5.90E-01 - 9.20E-01	9.20E-01	2.00E+00	9.80E-06	Yes

(1) Maximum non-detect limit value used for screening.

(2) Screening toxicity values from USEPA SSLs (2005); Efroymson et al., PRGs (1997); and USEPA Region V EDQLs (1999); and other sources. See text for derivation.

(3) Screening toxicity values from USEPA Region III BTAG Screening Table (September, 1995).

Table F-24
Comparison of Maximum Detection Limits in Surface Water with Ecological Screening Values at SWMU 31
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Scenario Timeframe: Current
Medium: Surface Water
Exposure Medium: Surface Water

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Ecological Screening Value (2)	Region III BTAG Screening Levels (3)	Above Screening Value ? (Y/N)
Surface Water	122-66-7	1,2-Diphenylhydrazine			mg/l		0/3	1.00E-02 - 1.00E-02	1.00E-02	NVA	NVA	No
	99-35-4	1,3,5-Trinitrobenzene			mg/l		0/3	1.30E-04 - 1.30E-04	1.30E-04	6.00E+01	NVA	No
	99-65-0	1,3-Dinitrobenzene			mg/l		0/3	1.30E-04 - 1.30E-04	1.30E-04	2.36E-03	NVA	No
	118-96-7	2,4,6-Trinitrotoluene			mg/l		0/3	2.60E-04 - 2.60E-04	2.60E-04	4.00E+01	1.00E-01	No
	35572-78-2	2-amino-4,6-Dinitrotoluene			mg/l		0/3	2.60E-04 - 2.60E-04	2.60E-04	1.20E+01	1.48E+00	No
	88-72-2	2-Nitrotoluene			mg/l		0/3	5.20E-04 - 5.20E-04	5.20E-04	8.00E+00	NVA	No
	99-08-1	3-Nitrotoluene			mg/l		0/3	5.20E-04 - 5.20E-04	5.20E-04	9.60E+00	7.50E-01	No
	19406-51-0	4-amino-2,6-Dinitrotoluene			mg/l		0/3	2.60E-04 - 2.60E-04	2.60E-04	8.60E+00	NVA	No
	99-99-0	4-Nitrotoluene			mg/l		0/3	5.20E-04 - 5.20E-04	5.20E-04	1.70E+01	1.90E+00	No
	100-51-6	Benzyl alcohol			mg/l		0/6	5.00E-03 - 2.00E-02	2.00E-02	8.60E-03	8.60E-03	Yes
	156-59-2	cis-1,2-Dichloroethene			mg/l		0/3	1.00E-03 - 1.00E-03	1.00E-03	5.90E-02	2.50E-02	No
	121-82-4	Cyclonite			mg/l		0/3	2.60E-04 - 2.60E-04	2.60E-04	4.40E+01	3.60E-01	No
	2691-41-0	HMX			mg/l		0/3	2.60E-04 - 2.60E-04	2.60E-04	3.30E+02	1.50E-01	No
	ICF87	m+p-Xylenes			mg/l		0/3	2.00E-03 - 2.00E-03	2.00E-03	1.30E-02	1.30E-02	No
	55-63-0	Nitroglycerin			mg/l		0/3	9.70E-04 - 9.70E-04	9.70E-04	4.30E+02	1.38E-01	No
	95-47-6	o-Xylene			mg/l		0/3	1.00E-03 - 1.00E-03	1.00E-03	1.30E-02	NVA	No
	78-11-5	Pentaerythritol tetranitrate			mg/l		0/3	9.70E-04 - 9.70E-04	9.70E-04	2.60E+04	8.50E+01	No
	14797-73-0	Perchlorate			mg/l		0/5	1.00E-03 - 1.00E-03	1.00E-03	NVA	NVA	No
	110-86-1	Pyridine			mg/l		0/3	5.00E-03 - 5.00E-03	5.00E-03	2.38E+00	2.38E+00	No
	479-45-8	Tetryl			mg/l		0/3	2.60E-04 - 2.60E-04	2.60E-04	5.80E+00	NVA	No
	156-60-5	trans-1,2-Dichloroethene			mg/l		0/3	1.00E-03 - 1.00E-03	1.00E-03	5.90E-01	9.70E-01	No
	7440-38-2	Arsenic			mg/l		0/6	3.00E-03 - 6.00E-03	6.00E-03	5.30E-02	5.00E-03	Yes
	7440-41-7	Beryllium			mg/l		0/6	1.00E-03 - 5.00E-03	5.00E-03	6.60E-04	6.60E-04	Yes
	7440-48-4	Cobalt			mg/l		0/6	1.00E-03 - 5.00E-02	5.00E-02	2.30E-02	2.30E-02	Yes
	93-76-5	2,4,5-T			mg/l		0/3	1.00E-04 - 1.00E-04	1.00E-04	6.86E-01	6.86E-01	No
	94-75-7	2,4-D			mg/l		0/3	5.00E-04 - 5.00E-04	5.00E-04	NVA	NVA	No
	94-82-6	2,4-DB			mg/l		0/3	2.00E-03 - 2.00E-03	2.00E-03	NVA	NVA	No
	72-54-8	4,4'-DDD			mg/l		0/3	2.00E-05 - 2.00E-05	2.00E-05	4.10E-08	1.10E-05	Yes
	72-55-9	4,4'-DDE			mg/l		0/3	2.00E-05 - 2.00E-05	2.00E-05	4.51E-12	NVA	Yes
	50-29-3	4,4-DDT			mg/l		0/3	2.00E-05 - 2.00E-05	2.00E-05	4.10E-08	1.00E-06	Yes
	309-00-2	Aldrin			mg/l		0/3	2.00E-05 - 2.00E-05	2.00E-05	3.09E-05	3.00E-03	No
	5103-71-9	alpha-Chlordane			mg/l		0/3	2.00E-05 - 2.00E-05	2.00E-05	4.30E-06	4.30E-06	Yes
	319-85-7	beta-BHC			mg/l		0/3	2.00E-05 - 2.00E-05	2.00E-05	4.00E-06	2.20E-04	Yes
	75-99-0	Dalapon			mg/l		0/3	2.00E-03 - 2.00E-03	2.00E-03	NVA	NVA	No
	120-36-5	Dichloroprop			mg/l		0/3	5.00E-04 - 5.00E-04	5.00E-04	NVA	NVA	No
	60-57-1	Dieldrin			mg/l		0/3	2.00E-05 - 2.00E-05	2.00E-05	1.90E-06	5.60E-05	No

Table F-24
Comparison of Maximum Detection Limits in Surface Water with Ecological Screening Values at SWMU 31
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Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Ecological Screening Value (2)	Region III BTAG Screening Levels (3)	Above Screening Value ? (Y/N)
	959-98-8	Endosulfan I			mg/l		0/3	2.00E-05 - 2.00E-05	2.00E-05	5.10E-05	5.10E-05	No
	1031-07-8	Endosulfan sulfate			mg/l		0/3	2.00E-05 - 2.00E-05	2.00E-05	2.22E-02	NVA	No
	7421-93-4	Endrin aldehyde			mg/l		0/3	2.00E-05 - 2.00E-05	2.00E-05	1.50E-04	NVA	No
	53494-70-5	Endrin ketone			mg/l		0/3	2.00E-05 - 2.00E-05	2.00E-05	NVA	NVA	No
	5103-74-2	gamma-Chlordane			mg/l		0/3	2.00E-05 - 2.00E-05	2.00E-05	4.30E-06	4.30E-06	Yes
	76-44-8	Heptachlor			mg/l		0/3	2.00E-05 - 2.00E-05	2.00E-05	3.80E-06	3.80E-06	Yes
	1024-57-3	Heptachlor epoxide			mg/l		0/3	2.00E-05 - 2.00E-05	2.00E-05	3.80E-06	3.80E-06	Yes
	94-74-6	MCPA			mg/l		0/6	1.25E-01 - 1.25E-01	1.25E-01	NVA	NVA	No
	93-65-2	MCPP			mg/l		0/3	1.25E-01 - 1.25E-01	1.25E-01	NVA	NVA	No
	72-43-5	Methoxychlor			mg/l		0/3	2.00E-05 - 2.00E-05	2.00E-05	1.90E-05	1.90E-05	Yes
	8001-35-2	Toxaphene			mg/l		0/3	1.00E-03 - 1.00E-03	1.00E-03	2.00E-07	2.00E-07	Yes
	12674-11-2	Aroclor 1016			mg/l		0/3	1.00E-04 - 1.00E-04	1.00E-04	1.40E-05	7.40E-08	Yes
	11104-28-2	Aroclor 1221			mg/l		0/3	2.00E-04 - 2.00E-04	2.00E-04	1.40E-05	7.40E-08	Yes
	11141-16-5	Aroclor 1232			mg/l		0/3	1.00E-04 - 1.00E-04	1.00E-04	1.40E-05	7.40E-08	Yes
	53469-21-9	Aroclor 1242			mg/l		0/3	1.00E-04 - 1.00E-04	1.00E-04	1.40E-05	7.40E-08	Yes
	12672-29-6	Aroclor 1248			mg/l		0/3	1.00E-04 - 1.00E-04	1.00E-04	1.90E-06	7.40E-08	Yes
	11097-69-1	Aroclor 1254			mg/l		0/3	1.00E-04 - 1.00E-04	1.00E-04	1.90E-06	7.40E-08	Yes
	11096-82-5	Aroclor 1260			mg/l		0/3	1.00E-04 - 1.00E-04	1.00E-04	1.40E-05	7.40E-08	Yes
	131-11-3	Dimethylphthalate			mg/l		0/6	5.00E-03 - 1.00E-02	1.00E-02	7.30E-02	NVA	No
	120-82-1	1,2,4-Trichlorobenzene			mg/l		0/6	5.00E-03 - 1.00E-02	1.00E-02	1.10E-01	2.40E-02	No
	95-95-4	2,4,5-Trichlorophenol			mg/l		0/6	5.00E-03 - 5.00E-02	5.00E-02	NVA	NVA	No
	88-06-2	2,4,6-Trichlorophenol			mg/l		0/6	5.00E-03 - 1.00E-02	1.00E-02	2.00E-03	4.90E-03	Yes
	120-83-2	2,4-Dichlorophenol			mg/l		0/6	5.00E-03 - 1.00E-02	1.00E-02	1.80E-02	1.10E-02	No
	105-67-9	2,4-Dimethylphenol			mg/l		0/6	5.00E-03 - 1.00E-02	1.00E-02	1.00E-01	NVA	No
	51-28-5	2,4-Dinitrophenol			mg/l		0/6	2.50E-02 - 5.00E-02	5.00E-02	4.07E-03	NVA	Yes
	121-14-2	2,4-Dinitrotoluene			mg/l		0/6	1.30E-04 - 1.00E-02	1.00E-02	2.30E-01	4.40E-02	No
	606-20-2	2,6-Dinitrotoluene			mg/l		0/6	2.60E-04 - 1.00E-02	1.00E-02	4.20E-02	8.10E-02	No
	91-58-7	2-Chloronaphthalene			mg/l		0/6	5.00E-03 - 1.00E-02	1.00E-02	3.96E-04	NVA	Yes
	95-57-8	2-Chlorophenol			mg/l		0/6	5.00E-03 - 1.00E-02	1.00E-02	8.80E-03	2.40E-02	Yes
	88-74-4	2-Nitroaniline			mg/l		0/6	5.00E-03 - 5.00E-02	5.00E-02	NVA	NVA	No
	88-75-5	2-Nitrophenol			mg/l		0/6	5.00E-03 - 1.00E-02	1.00E-02	1.35E-02	1.92E+00	No
	88-85-7	2-sec-butyl-4,6-dinitrophenol			mg/l		0/3	5.00E-04 - 5.00E-04	5.00E-04	3.90E-04	NVA	Yes
	91-94-1	3,3'-Dichlorobenzidine			mg/l		0/12	5.00E-03 - 2.00E-02	2.00E-02	9.98E-02	4.50E-03	Yes
	99-09-2	3-Nitroaniline			mg/l		0/6	5.00E-03 - 5.00E-02	5.00E-02	NVA	NVA	No
	534-52-1	4,6-Dinitro-o-cresol			mg/l		0/6	2.50E-02 - 5.00E-02	5.00E-02	2.30E-03	NVA	Yes
	100-01-6	4-Nitroaniline			mg/l		0/6	5.00E-03 - 5.00E-02	5.00E-02	NVA	NVA	No
	100-02-7	4-Nitrophenol			mg/l		0/6	2.50E-02 - 5.00E-02	5.00E-02	3.00E-01	6.00E-02	No
	83-32-9	Acenaphthene			mg/l		0/6	5.00E-05 - 1.00E-04	1.00E-04	2.30E-02	5.80E-03	No
	208-96-8	Acenaphthylene			mg/l		0/6	5.00E-05 - 1.00E-03	1.00E-03	4.84E+00	NVA	No
	120-12-7	Anthracene			mg/l		0/6	5.00E-05 - 5.00E-05	5.00E-05	7.30E-04	1.20E-05	Yes

Table F-24
Comparison of Maximum Detection Limits in Surface Water with Ecological Screening Values at SWMU 31
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Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Ecological Screening Value (2)	Region III BTAG Screening Levels (3)	Above Screening Value ? (Y/N)
	56-55-3	Benzo(a)anthracene			mg/l		0/6	5.00E-05 - 5.00E-05	5.00E-05	2.70E-05	1.80E-05	Yes
	50-32-8	Benzo(a)pyrene			mg/l		0/6	5.00E-05 - 5.00E-05	5.00E-05	1.40E-05	1.50E-05	Yes
	205-99-2	Benzo(b)fluoranthene			mg/l		0/6	5.00E-05 - 1.00E-04	1.00E-04	9.07E-03	NVA	No
	191-24-2	Benzo(g,h,i)perylene			mg/l		0/6	5.00E-05 - 1.00E-04	1.00E-04	7.64E-03	NVA	No
	207-08-9	Benzo(k)fluoranthene			mg/l		0/6	5.00E-05 - 5.00E-05	5.00E-05	5.60E-06	NVA	Yes
	111-91-1	bis(2-Chloroethoxy)methane			mg/l		0/6	5.00E-03 - 1.00E-02	1.00E-02	6.40E+00	NVA	No
	111-44-4	bis(2-Chloroethyl)ether			mg/l		0/6	5.00E-03 - 1.00E-02	1.00E-02	1.14E+00	NVA	No
	108-60-1	bis(2-Chloroisopropyl)ether			mg/l		0/6	5.00E-03 - 1.00E-02	1.00E-02	2.00E-02	NVA	No
	86-74-8	Carbazole			mg/l		0/6	5.00E-03 - 1.00E-02	1.00E-02	NVA	NVA	No
	218-01-9	Chrysene			mg/l		0/6	5.00E-05 - 5.00E-05	5.00E-05	3.30E-05	NVA	Yes
	117-84-0	Di-n-octyl phthalate			mg/l		0/6	5.00E-03 - 1.00E-02	1.00E-02	3.20E-01	2.20E-02	No
	53-70-3	Dibenz(a,h)anthracene			mg/l		0/6	5.00E-05 - 1.00E-04	1.00E-04	1.60E-03	NVA	No
	132-64-9	Dibenzofuran			mg/l		0/6	5.00E-03 - 1.00E-02	1.00E-02	3.70E-03	3.70E-03	Yes
	206-44-0	Fluoranthene			mg/l		0/6	5.00E-05 - 1.00E-04	1.00E-04	6.20E-03	4.00E-05	Yes
	86-73-7	Fluorene			mg/l		0/6	5.00E-05 - 1.00E-04	1.00E-04	3.90E-03	3.00E-03	No
	118-74-1	Hexachlorobenzene			mg/l		0/6	5.00E-03 - 1.00E-02	1.00E-02	2.40E-07	3.00E-07	Yes
	77-47-4	Hexachlorocyclopentadiene			mg/l		0/6	5.00E-03 - 1.00E-02	1.00E-02	7.70E-02	NVA	No
	193-39-5	Indeno(1,2,3-cd)pyrene			mg/l		0/6	5.00E-05 - 5.00E-05	5.00E-05	4.31E-03	NVA	No
	78-59-1	Isophorone			mg/l		0/6	5.00E-03 - 1.00E-02	1.00E-02	9.00E-01	NVA	No
	621-64-7	n-Nitroso-di-n-propylamine			mg/l		0/6	5.00E-03 - 1.00E-02	1.00E-02	NVA	NVA	No
	86-30-6	n-Nitrosodiphenylamine			mg/l		0/6	5.00E-03 - 1.00E-02	1.00E-02	2.10E-01	2.10E-01	No
	95-48-7	o-Cresol			mg/l		0/6	5.00E-03 - 1.00E-02	1.00E-02	1.30E-02	1.30E-02	No
	59-50-7	p-Chloro-m-cresol			mg/l		0/6	5.00E-03 - 2.00E-02	2.00E-02	3.48E-02	NVA	No
	106-47-8	p-Chloroaniline			mg/l		0/6	5.00E-03 - 2.00E-02	2.00E-02	2.32E-01	2.32E-01	No
	106-44-5	p-Cresol			mg/l		0/6	5.00E-03 - 1.00E-02	1.00E-02	NVA	5.43E-01	No
	87-86-5	Pentachlorophenol			mg/l		0/6	2.50E-02 - 5.00E-02	5.00E-02	5.23E-03	5.00E-04	Yes
	85-01-8	Phenanthrene			mg/l		0/6	5.00E-05 - 5.00E-05	5.00E-05	6.30E-03	4.00E-04	No
	108-95-2	Phenol			mg/l		0/6	5.00E-03 - 1.00E-02	1.00E-02	1.10E-01	4.00E-03	Yes
	71-55-6	1,1,1-Trichloroethane			mg/l		0/3	1.00E-03 - 1.00E-03	1.00E-03	1.10E-02	1.10E-02	No
	79-34-5	1,1,2,2-Tetrachloroethane			mg/l		0/3	1.00E-03 - 1.00E-03	1.00E-03	6.10E-01	6.10E-01	No
	79-00-5	1,1,2-Trichloroethane			mg/l		0/3	1.00E-03 - 1.00E-03	1.00E-03	1.20E+00	1.20E+00	No
	75-34-3	1,1-Dichloroethane			mg/l		0/3	1.00E-03 - 1.00E-03	1.00E-03	4.70E-02	4.70E-02	No
	75-35-4	1,1-Dichloroethene			mg/l		0/3	1.00E-03 - 1.00E-03	1.00E-03	2.50E-02	2.50E-02	No
	107-06-2	1,2-Dichloroethane			mg/l		0/3	1.00E-03 - 1.00E-03	1.00E-03	9.10E-01	1.00E-01	No
	78-87-5	1,2-Dichloropropane			mg/l		0/3	1.00E-03 - 1.00E-03	1.00E-03	3.80E-01	NVA	No
	78-93-3	2-Butanone			mg/l		0/3	4.00E-03 - 4.00E-03	4.00E-03	1.40E+01	1.40E+01	No
	591-78-6	2-Hexanone			mg/l		0/3	4.00E-03 - 4.00E-03	4.00E-03	9.90E-02	9.90E-02	No
	101-55-3	4-Bromophenyl phenylether			mg/l		0/6	5.00E-03 - 1.00E-02	1.00E-02	1.50E-03	1.50E-03	Yes
	7005-72-3	4-Chlorophenyl phenylether			mg/l		0/6	5.00E-03 - 1.00E-02	1.00E-02	NVA	NVA	No
	108-10-1	4-Methyl-2-pentanone			mg/l		0/3	4.00E-03 - 4.00E-03	4.00E-03	1.70E-01	1.70E-01	No

Table F-24
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Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Ecological Screening Value (2)	Region III BTAG Screening Levels (3)	Above Screening Value ? (Y/N)
	67-64-1	Acetone			mg/l		0/3	4.00E-03 - 4.00E-03	4.00E-03	1.50E+00	1.50E+00	No
	71-43-2	Benzene			mg/l		0/3	1.00E-03 - 1.00E-03	1.00E-03	1.30E-01	3.70E-01	No
	74-83-9	Bromomethane			mg/l		0/3	1.00E-03 - 1.00E-03	1.00E-03	NVA	NVA	No
	56-23-5	Carbon tetrachloride			mg/l		0/3	1.00E-03 - 1.00E-03	1.00E-03	9.80E-03	1.33E-02	No
	108-90-7	Chlorobenzene			mg/l		0/3	1.00E-03 - 1.00E-03	1.00E-03	6.40E-02	1.30E-03	No
	75-00-3	Chloroethane			mg/l		0/3	1.00E-03 - 1.00E-03	1.00E-03	2.30E+02	NVA	No
	74-87-3	Chloromethane			mg/l		0/3	1.00E-03 - 1.00E-03	1.00E-03	NVA	NVA	No
	10061-01-5	cis-1,3-Dichloro-1-propene			mg/l		0/3	1.00E-03 - 1.00E-03	1.00E-03	7.90E-03	NVA	No
	100-41-4	Ethylbenzene			mg/l		0/3	1.00E-03 - 1.00E-03	1.00E-03	7.30E-03	9.00E-02	No
	100-42-5	Styrene			mg/l		0/3	1.00E-03 - 1.00E-03	1.00E-03	5.60E-02	7.20E-02	No
	127-18-4	Tetrachloroethene			mg/l		0/3	1.00E-03 - 1.00E-03	1.00E-03	9.80E-02	1.11E-01	No
	108-88-3	Toluene			mg/l		0/3	1.00E-03 - 1.00E-03	1.00E-03	9.80E-03	2.00E-03	No
	10061-02-6	trans-1,3-Dichloropropene			mg/l		0/3	1.00E-03 - 1.00E-03	1.00E-03	7.90E-03	5.50E-05	Yes
	75-25-2	Tribromomethane			mg/l		0/3	1.00E-03 - 1.00E-03	1.00E-03	3.20E-01	3.20E-01	No
	79-01-6	Trichloroethene			mg/l		0/3	1.00E-03 - 1.00E-03	1.00E-03	4.70E-01	2.10E-02	No
	75-01-4	Vinyl Chloride			mg/l		0/3	1.00E-03 - 1.00E-03	1.00E-03	7.82E-01	9.30E-01	No
	7440-36-0	Antimony			mg/l		0/3	5.00E-03 - 5.00E-03	5.00E-03	3.00E-02	3.00E-02	No
	7440-43-9	Cadmium			mg/l		0/3	1.00E-03 - 1.00E-03	1.00E-03	1.10E-03	2.50E-04	Yes
	7440-50-8	Copper			mg/l		0/3	2.00E-02 - 2.00E-02	2.00E-02	9.00E-03	9.00E-03	Yes
	7782-49-2	Selenium			mg/l		0/5	4.00E-03 - 5.00E-03	5.00E-03	3.90E-04	1.00E-03	Yes
	7440-22-4	Silver			mg/l		0/3	2.00E-03 - 2.00E-03	2.00E-03	3.60E-04	3.20E-03	Yes
	7440-28-0	Thallium			mg/l		0/3	6.00E-03 - 6.00E-03	6.00E-03	9.00E-03	8.00E-04	Yes
	7440-62-2	Vanadium			mg/l		0/5	1.00E-03 - 5.00E-02	5.00E-02	2.00E-02	2.00E-02	Yes
	117-81-7	bis(2-Ethylhexyl) phthalate			mg/l		0/3	1.00E-02 - 1.00E-02	1.00E-02	1.20E-04	1.60E-02	Yes
	75-15-0	Carbon disulfide			mg/l		0/2	1.00E-03 - 1.00E-03	1.00E-03	9.20E-04	9.20E-04	Yes
	75-09-2	Methylene chloride			mg/l		0/3	7.80E-05 - 1.00E-03	1.00E-03	2.20E+00	9.81E-02	No
	91-20-3	Naphthalene			mg/l		0/3	1.00E-04 - 1.00E-04	1.00E-04	1.20E-02	1.10E-03	No

(1) Maximum non-detect limit used for screening.

(2) Screening toxicity values from Efroymsen et al. PRGs (1997); Virginia Administrative Code (2004), 9 VAC 25-260-140; USEPA Region V EDQLs (1999); and other sources. See text for derivation.

(3) Screening toxicity values from USEPA Region III BTAG Screening Table (2005).

Definitions:

N/A = Not Applicable or Not Available

NVA = No Value Available

Table F-25
Comparison of Maximum Detection Limits in Sediment with Ecological Screening Values at SWMU 31
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Scenario Timeframe: Current
Medium: Sediment
Exposure Medium: Sediment

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Ecological Screening Value (2)	Region III BTAG Screening Levels (3)	Above Screening Value ? (Y/N)
Sediment	72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran			mg/kg		0/1	7.40E-08-7.40E-08	7.40E-08	1.29E-08	NVA	Yes
	122-66-7	1,2-Diphenylhydrazine			mg/kg		0/3	3.30E+00-4.40E+00	4.40E+00	NVA	NVA	No
	99-35-4	1,3,5-Trinitrobenzene			mg/kg		0/4	1.00E-01-2.00E-01	2.00E-01	1.21E-04	NVA	Yes
	99-65-0	1,3-Dinitrobenzene			mg/kg		0/4	1.00E-01-2.00E-01	2.00E-01	9.24E-04	NVA	Yes
	35572-78-2	2-amino-4,6-Dinitrotoluene			mg/kg		0/4	2.00E-01-4.00E-01	4.00E-01	1.10E+01	NVA	No
	88-72-2	2-Nitrotoluene			mg/kg		0/4	4.00E-01-8.00E-01	8.00E-01	6.70E+00	NVA	No
	N/A	3&4-Methylphenol			mg/kg		0/3	3.30E+00-4.40E+00	4.40E+00	8.08E-04	NVA	Yes
	99-08-1	3-Nitrotoluene			mg/kg		0/4	4.00E-01-8.00E-01	8.00E-01	7.90E+00	NVA	No
	19406-51-0	4-amino-2,6-Dinitrotoluene			mg/kg		0/4	2.00E-01-4.00E-01	4.00E-01	7.50E+00	NVA	No
	99-99-0	4-Nitrotoluene			mg/kg		0/4	4.00E-01-8.00E-01	8.00E-01	1.40E+01	4.06E+00	No
	100-51-6	Benzyl alcohol			mg/kg		0/7	3.50E-01-8.70E+00	8.70E+00	3.39E-02	NVA	Yes
	156-59-2	cis-1,2-Dichloroethene			mg/kg		0/1	2.20E-02-2.20E-02	2.20E-02	4.00E-01	NVA	No
	121-82-4	Cyclonite			mg/kg		0/4	2.00E-01-4.00E-01	4.00E-01	4.40E+01	1.30E-02	Yes
	2691-41-0	HMX			mg/kg		0/4	2.00E-01-4.00E-01	4.00E-01	3.50E+02	NVA	No
	N/A	m+p-Xylenes			mg/kg		0/1	4.30E-02-4.30E-02	4.30E-02	1.60E-01	NVA	No
	55-63-0	Nitroglycerin			mg/kg		0/4	6.36E-01-4.35E+00	4.35E+00	3.90E+02	NVA	No
	95-47-6	o-Xylene			mg/kg		0/1	2.20E-02-2.20E-02	2.20E-02	1.88E+00	NVA	No
	78-11-5	Pentaerythritol tetranitrate			mg/kg		0/4	6.36E-01-4.35E+00	4.35E+00	1.80E+04	NVA	No
	110-86-1	Pyridine			mg/kg		0/4	3.50E-01-2.40E+00	2.40E+00	1.06E-01	NVA	Yes
	479-45-8	Tetryl			mg/kg		0/4	2.00E-01-4.00E-01	4.00E-01	5.20E+00	NVA	No
	156-60-5	trans-1,2-Dichloroethene			mg/kg		0/1	2.20E-02-2.20E-02	2.20E-02	4.00E-01	1.05E+00	No
	1746-01-6	2,3,7,8-Tetrachlorodibenzo-p-dioxin			mg/kg		0/1	9.40E-08-9.40E-08	9.40E-08	3.30E-06	8.50E-07	No
	7782-49-2	Selenium			mg/kg		0/6	2.12E+00-1.45E+01	1.45E+01	1.00E+00	2.00E+00	Yes
	7440-22-4	Silver			mg/kg		0/7	2.00E+00-1.50E+01	1.50E+01	1.80E+00	1.00E+00	Yes
	93-76-5	2,4,5-T			mg/kg		0/1	4.35E-02-4.35E-02	4.35E-02	5.87E+01	1.23E+01	No
	93-72-1	2,4,5-TP (Silvex)			mg/kg		0/1	4.35E-02-4.35E-02	4.35E-02	7.35E+00	6.75E-01	No
	94-75-7	2,4-D			mg/kg		0/1	8.70E-02-8.70E-02	8.70E-02	5.79E-03	NVA	Yes
	50-29-3	4,4'-DDT			mg/kg		0/1	2.90E-03-2.90E-03	2.90E-03	5.20E-02	4.16E-03	No
	309-00-2	Aldrin			mg/kg		0/1	2.90E-03-2.90E-03	2.90E-03	8.00E-02	2.00E-03	Yes
	319-84-6	alpha-BHC			mg/kg		0/1	2.90E-03-2.90E-03	2.90E-03	1.20E+02	6.00E-03	No
	5103-71-9	alpha-Chlordane			mg/kg		0/1	2.90E-03-2.90E-03	2.90E-03	4.80E-03	NVA	No
	319-85-7	beta-BHC			mg/kg		0/1	2.90E-03-2.90E-03	2.90E-03	1.20E+02	5.00E-03	No
	75-99-0	Dalapon			mg/kg		0/1	4.35E-01-4.35E-01	4.35E-01	NVA	NVA	No
	319-86-8	delta-BHC			mg/kg		0/1	2.90E-03-2.90E-03	2.90E-03	1.20E+02	6.40E+00	No
	1918-00-9	Dicamba			mg/kg		0/1	8.70E-02-8.70E-02	8.70E-02	NVA	NVA	No

Table F-25
Comparison of Maximum Detection Limits in Sediment with Ecological Screening Values at SWMU 31
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Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Ecological Screening Value (2)	Region III BTAG Screening Levels (3)	Above Screening Value ? (Y/N)
	120-36-5	Dichloroprop			mg/kg		0/1	8.70E-02-8.70E-02	8.70E-02	NVA	NVA	No
	60-57-1	Dieldrin			mg/kg		0/1	2.90E-03-2.90E-03	2.90E-03	4.30E-03	1.90E-03	Yes
	959-98-8	Endosulfan I			mg/kg		0/1	2.90E-03-2.90E-03	2.90E-03	5.50E-03	2.90E-03	No
	33213-65-9	Endosulfan II			mg/kg		0/1	2.90E-03-2.90E-03	2.90E-03	5.50E-03	1.40E-02	No
	1031-07-8	Endosulfan sulfate			mg/kg		0/1	2.90E-03-2.90E-03	2.90E-03	3.46E-02	5.40E-03	No
	7421-93-4	Endrin aldehyde			mg/kg		0/1	2.90E-03-2.90E-03	2.90E-03	3.20E+00	NVA	No
	53494-70-5	Endrin ketone			mg/kg		0/1	2.90E-03-2.90E-03	2.90E-03	NVA	NVA	No
	58-89-9	gamma-BHC (Lindane)			mg/kg		0/1	2.90E-03-2.90E-03	2.90E-03	9.90E-04	2.37E-03	Yes
	5103-74-2	gamma-Chlordane			mg/kg		0/1	2.90E-03-2.90E-03	2.90E-03	4.80E-03	NVA	No
	76-44-8	Heptachlor			mg/kg		0/1	2.90E-03-2.90E-03	2.90E-03	1.30E+01	6.80E-02	No
	1024-57-3	Heptachlor epoxide			mg/kg		0/1	2.90E-03-2.90E-03	2.90E-03	6.00E-04	2.47E-03	Yes
	94-74-6	MCPA			mg/kg		0/1	4.35E+01-4.35E+01	4.35E+01	NVA	NVA	No
	93-65-2	MCPP			mg/kg		0/1	4.35E+01-4.35E+01	4.35E+01	NVA	NVA	No
	72-43-5	Methoxychlor			mg/kg		0/1	2.90E-03-2.90E-03	2.90E-03	1.90E-02	1.87E-02	No
	8001-35-2	Toxaphene			mg/kg		0/1	1.45E-01-1.45E-01	1.45E-01	1.09E-04	1.00E-03	Yes
	12674-11-2	Aroclor 1016			mg/kg		0/1	1.45E-01-1.45E-01	1.45E-01	5.30E-01	5.98E-02	Yes
	11104-28-2	Aroclor 1221			mg/kg		0/1	2.90E-01-2.90E-01	2.90E-01	1.20E-01	5.98E-02	Yes
	11141-16-5	Aroclor 1232			mg/kg		0/1	1.45E-01-1.45E-01	1.45E-01	6.00E-01	5.98E-02	Yes
	53469-21-9	Aroclor 1242			mg/kg		0/1	1.45E-01-1.45E-01	1.45E-01	2.90E+01	5.98E-02	Yes
	12672-29-6	Aroclor 1248			mg/kg		0/1	1.45E-01-1.45E-01	1.45E-01	1.00E+00	5.98E-02	Yes
	11097-69-1	Aroclor 1254			mg/kg		0/1	1.45E-01-1.45E-01	1.45E-01	7.20E+01	5.98E-02	Yes
	11096-82-5	Aroclor 1260			mg/kg		0/1	1.45E-01-1.45E-01	1.45E-01	6.30E+01	5.98E-02	Yes
	131-11-3	Dimethylphthalate			mg/kg		0/7	3.50E-01-4.40E+00	4.40E+00	2.50E-02	NVA	Yes
	120-82-1	1,2,4-Trichlorobenzene			mg/kg		0/7	3.50E-01-4.40E+00	4.40E+00	9.70E+00	2.10E+00	Yes
	95-50-1	1,2-Dichlorobenzene			mg/kg		0/7	3.50E-01-4.40E+00	4.40E+00	3.30E-01	1.65E-02	Yes
	541-73-1	1,3-Dichlorobenzene			mg/kg		0/7	3.50E-01-4.40E+00	4.40E+00	1.70E+00	4.43E+00	Yes
	106-46-7	1,4-Dichlorobenzene			mg/kg		0/7	3.50E-01-4.40E+00	4.40E+00	3.50E-01	5.99E-01	Yes
	95-95-4	2,4,5-Trichlorophenol			mg/kg		0/7	3.50E-01-1.10E+01	1.10E+01	8.56E-02	NVA	Yes
	88-06-2	2,4,6-Trichlorophenol			mg/kg		0/7	3.50E-01-4.40E+00	4.40E+00	8.48E-02	2.13E-01	Yes
	120-83-2	2,4-Dichlorophenol			mg/kg		0/7	3.50E-01-4.40E+00	4.40E+00	1.34E-01	1.17E-01	Yes
	51-28-5	2,4-Dinitrophenol			mg/kg		0/7	1.80E+00-2.21E+01	2.21E+01	1.33E-03	NVA	Yes
	121-14-2	2,4-Dinitrotoluene			mg/kg		0/7	2.00E-01-4.40E+00	4.40E+00	7.51E-02	4.16E-02	Yes
	606-20-2	2,6-Dinitrotoluene			mg/kg		0/7	2.00E-01-4.40E+00	4.40E+00	2.06E-02	NVA	Yes
	91-58-7	2-Chloronaphthalene			mg/kg		0/7	3.50E-01-4.40E+00	4.40E+00	4.17E-01	NVA	Yes
	95-57-8	2-Chlorophenol			mg/kg		0/7	3.50E-01-4.40E+00	4.40E+00	1.17E-02	3.12E-02	Yes
	88-74-4	2-Nitroaniline			mg/kg		0/7	3.50E-01-2.20E+01	2.20E+01	2.22E-04	NVA	Yes
	88-75-5	2-Nitrophenol			mg/kg		0/7	3.50E-01-4.40E+00	4.40E+00	7.77E-03	NVA	Yes
	88-85-7	2-sec-butyl-4,6-dinitrophenol			mg/kg		0/1	8.70E-02-8.70E-02	8.70E-02	NVA	6.11E-04	Yes
	91-94-1	3,3'-Dichlorobenzidine			mg/kg		0/7	3.50E-01-8.70E+00	8.70E+00	2.82E-02	1.27E-01	Yes

Table F-25
Comparison of Maximum Detection Limits in Sediment with Ecological Screening Values at SWMU 31
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Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Ecological Screening Value (2)	Region III BTAG Screening Levels (3)	Above Screening Value ? (Y/N)
	99-09-2	3-Nitroaniline			mg/kg		0/7	3.50E-01-2.20E+01	2.20E+01	2.22E-03	NVA	Yes
	534-52-1	4,6-Dinitro-o-cresol			mg/kg		0/7	1.80E+00-2.20E+01	2.20E+01	NVA	NVA	No
	100-01-6	4-Nitroaniline			mg/kg		0/7	3.50E-01-2.21E+01	2.21E+01	2.22E-04	NVA	Yes
	100-02-7	4-Nitrophenol			mg/kg		0/7	1.80E+00-2.21E+01	2.21E+01	7.78E-03	NVA	Yes
	65-85-0	Benzoic Acid			mg/kg		0/5	1.80E+00-2.20E+01	2.20E+01	6.50E-02	6.50E-01	Yes
	111-91-1	bis(2-Chloroethoxy)methane			mg/kg		0/7	3.50E-01-4.40E+00	4.40E+00	NVA	NVA	No
	111-44-4	bis(2-Chloroethyl)ether			mg/kg		0/7	3.50E-01-4.40E+00	4.40E+00	NVA	NVA	No
	108-60-1	bis(2-Chloroisopropyl)ether			mg/kg		0/7	3.50E-01-4.40E+00	4.40E+00	NVA	NVA	No
	117-81-7	bis(2-Ethylhexyl) phthalate			mg/kg		0/7	2.00E-01-4.40E+00	4.40E+00	2.70E+00	1.80E-01	Yes
	85-68-7	Butyl benzyl phthalate			mg/kg		0/7	3.50E-01-4.40E+00	4.40E+00	4.19E+00	1.09E+01	Yes
	84-74-2	Di-n-butyl phthalate			mg/kg		0/6	3.50E-01-4.40E+00	4.40E+00	2.40E+02	6.47E+00	No
	117-84-0	Di-n-octyl phthalate			mg/kg		0/7	3.50E-01-4.40E+00	4.40E+00	2.10E+02	NVA	No
	84-66-2	Diethyl phthalate			mg/kg		0/7	3.50E-01-4.40E+00	4.40E+00	6.10E-01	6.03E-01	Yes
	118-74-1	Hexachlorobenzene			mg/kg		0/7	3.50E-01-4.40E+00	4.40E+00	2.00E-02	2.00E-02	Yes
	87-68-3	Hexachlorobutadiene			mg/kg		0/7	3.50E-01-4.40E+00	4.40E+00	1.38E+00	NVA	Yes
	77-47-4	Hexachlorocyclopentadiene			mg/kg		0/7	3.50E-01-4.40E+00	4.40E+00	9.01E-01	NVA	Yes
	67-72-1	Hexachloroethane			mg/kg		0/7	3.50E-01-4.40E+00	4.40E+00	2.23E+00	1.03E+00	Yes
	78-59-1	Isophorone			mg/kg		0/7	3.50E-01-4.40E+00	4.40E+00	4.22E+02	NVA	No
	621-64-7	n-Nitroso-di-n-propylamine			mg/kg		0/7	3.50E-01-4.40E+00	4.40E+00	NVA	NVA	No
	95-48-7	o-Cresol			mg/kg		0/5	1.10E+00-4.40E+00	4.40E+00	8.26E-04	NVA	Yes
	59-50-7	p-Chloro-m-cresol			mg/kg		0/7	3.50E-01-8.70E+00	8.70E+00	3.88E-01	NVA	Yes
	106-47-8	p-Chloroaniline			mg/kg		0/7	3.50E-01-8.70E+00	8.70E+00	1.46E-01	NVA	Yes
	106-44-5	p-Cresol			mg/kg		0/4	4.80E-02-1.10E+00	1.10E+00	8.08E-04	6.70E-01	Yes
	87-86-5	Pentachlorophenol			mg/kg		0/7	1.80E+00-2.20E+01	2.20E+01	3.01E+01	5.04E-01	Yes
	108-95-2	Phenol			mg/kg		0/7	3.50E-01-4.40E+00	4.40E+00	3.20E-02	4.20E-01	Yes
	71-55-6	1,1,1-Trichloroethane			mg/kg		0/1	2.20E-02-2.20E-02	2.20E-02	9.60E+00	3.02E-02	No
	79-34-5	1,1,2,2-Tetrachloroethane			mg/kg		0/1	2.20E-02-2.20E-02	2.20E-02	5.40E+00	1.36E+00	No
	79-00-5	1,1,2-Trichloroethane			mg/kg		0/1	2.20E-02-2.20E-02	2.20E-02	9.80E+00	1.24E+00	No
	75-34-3	1,1-Dichloroethane			mg/kg		0/1	2.20E-02-2.20E-02	2.20E-02	2.70E-02	NVA	No
	75-35-4	1,1-Dichloroethene			mg/kg		0/1	2.20E-02-2.20E-02	2.20E-02	3.50E+00	3.10E-02	No
	107-06-2	1,2-Dichloroethane			mg/kg		0/1	2.20E-02-2.20E-02	2.20E-02	4.30E+00	NVA	No
	78-87-5	1,2-Dichloropropane			mg/kg		0/1	2.20E-02-2.20E-02	2.20E-02	3.52E-01	NVA	No
	78-93-3	2-Butanone			mg/kg		0/1	2.20E-02-2.20E-02	2.20E-02	2.70E-01	NVA	No
	591-78-6	2-Hexanone			mg/kg		0/1	2.20E-02-2.20E-02	2.20E-02	2.30E-02	NVA	No
	101-55-3	4-Bromophenyl phenylether			mg/kg		0/7	3.50E-01-4.40E+00	4.40E+00	1.20E+00	1.23E+00	Yes
	7005-72-3	4-Chlorophenyl phenylether			mg/kg		0/7	3.50E-01-4.40E+00	4.40E+00	6.56E-01	NVA	Yes
	108-10-1	4-Methyl-2-pentanone			mg/kg		0/1	2.20E-02-2.20E-02	2.20E-02	1.50E+01	NVA	No
	71-43-2	Benzene			mg/kg		0/1	2.20E-02-2.20E-02	2.20E-02	1.60E-01	NVA	No
	75-27-4	Bromodichloromethane			mg/kg		0/1	2.20E-02-2.20E-02	2.20E-02	1.13E-03	NVA	Yes

Table F-25
Comparison of Maximum Detection Limits in Sediment with Ecological Screening Values at SWMU 31
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Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Ecological Screening Value (2)	Region III BTAG Screening Levels (3)	Above Screening Value ? (Y/N)
	74-83-9	Bromomethane			mg/kg		0/1	2.20E-02-2.20E-02	2.20E-02	1.48E-04	NVA	Yes
	75-15-0	Carbon disulfide			mg/kg		0/1	2.20E-02-2.20E-02	2.20E-02	1.34E-01	8.51E-04	Yes
	56-23-5	Carbon tetrachloride			mg/kg		0/1	2.20E-02-2.20E-02	2.20E-02	2.00E+00	6.42E-02	No
	108-90-7	Chlorobenzene			mg/kg		0/1	2.20E-02-2.20E-02	2.20E-02	4.17E-01	8.42E-03	Yes
	75-00-3	Chloroethane			mg/kg		0/1	2.20E-02-2.20E-02	2.20E-02	5.86E+01	NVA	No
	67-66-3	Chloroform			mg/kg		0/1	2.20E-02-2.20E-02	2.20E-02	9.60E-01	NVA	No
	74-87-3	Chloromethane			mg/kg		0/1	2.20E-02-2.20E-02	2.20E-02	7.85E-05	NVA	Yes
	10061-01-5	cis-1,3-Dichloro-1-propene			mg/kg		0/1	2.20E-02-2.20E-02	2.20E-02	2.30E-01	NVA	No
	124-48-1	Dibromochloromethane			mg/kg		0/1	2.20E-02-2.20E-02	2.20E-02	6.76E-01	NVA	No
	100-41-4	Ethylbenzene			mg/kg		0/1	2.20E-02-2.20E-02	2.20E-02	5.40E+00	1.10E+00	No
	75-09-2	Methylene chloride			mg/kg		0/1	2.20E-02-2.20E-02	2.20E-02	1.80E+01	NVA	No
	100-42-5	Styrene			mg/kg		0/1	2.20E-02-2.20E-02	2.20E-02	4.45E-01	5.59E-01	No
	127-18-4	Tetrachloroethene			mg/kg		0/1	2.20E-02-2.20E-02	2.20E-02	3.20E+00	4.68E-01	No
	108-88-3	Toluene			mg/kg		0/1	2.20E-02-2.20E-02	2.20E-02	5.00E-02	NVA	No
	10061-02-6	trans-1,3-Dichloropropene			mg/kg		0/1	2.20E-02-2.20E-02	2.20E-02	2.30E-01	NVA	No
	75-25-2	Tribromomethane			mg/kg		0/1	2.20E-02-2.20E-02	2.20E-02	6.60E-01	6.54E-01	No
	79-01-6	Trichloroethene			mg/kg		0/1	2.20E-02-2.20E-02	2.20E-02	5.20E+01	9.69E-02	No
	75-01-4	Vinyl Chloride			mg/kg		0/1	2.20E-02-2.20E-02	2.20E-02	2.00E-03	NVA	Yes
	10061-01-5	cis-1,3-Dichloro-1-propene			mg/kg		0/1	2.20E-02-2.20E-02	2.20E-02	2.30E-01	NVA	No

- (1) Maximum non-detect limit used for screening.
(2) Screening toxicity values from Efroymson et al. PRGs (1997); USEPA Region V EDQLs (1999); and other sources. See text for derivation.
(3) Screening toxicity values from USEPA Region III BTAG Screening Table (2005).

Definitions: N/A = Not Applicable or Not Available
NVA = No Value Available

Table F-26
Selection of Ecological Soil Screening Toxicity Values, for Non Detect Constituents at SWMU 31
Page 1 of 2

Parameter	Ecological Soil Screening Levels ^a (mg/kg)	Ecological Preliminary Remediation Goals ^b (mg/kg)	Ecological Data Quality Levels ^c (mg/kg)	Other Ecological Soil Screening Levels ^d (mg/kg)	Selected Ecological Screening Toxicity Value ^e (mg/kg)
1,2,3,7,8,9-Hexachlorodibenzofuran	NVA	NVA	3.86E-05	NVA	3.86E-05
1,3,5-Trinitrobenzene	NVA	NVA	3.76E-01	--	3.76E-01
1,3-Dinitrobenzene	NVA	NVA	6.55E-01	--	6.55E-01
2,4,6-Trinitrotoluene	NVA	NVA	NVA	7.00E-01	7.00E-01
2-amino-4,6-Dinitrotoluene	NVA	NVA	NVA	5.30E+00	5.30E+00
2-Nitrotoluene	NVA	NVA	NVA	4.10E+00	4.10E+00
3-Nitrotoluene	NVA	NVA	NVA	5.30E+00	5.30E+00
4-amino-2,6-Dinitrotoluene	NVA	NVA	NVA	3.60E+00	3.60E+00
4-Nitrotoluene	NVA	NVA	NVA	9.40E+00	9.40E+00
cis-1,2-Dichloroethene	NVA	NVA	7.84E-01	--	7.84E-01
Cyclonite	5.8 (mammal)	NVA	NVA	--	5.80E+00
HMX	NVA	NVA	NVA	4.30E+01	4.30E+01
m+p-Xylenes	NVA	NVA	1.00E+01	--	1.00E+01
o-Xylene	NVA	NVA	1.00E+01	--	1.00E+01
Pentaerythritol tetranitrate	NVA	NVA	NVA	1.40E+04	1.40E+04
Tetryl	NVA	NVA	NVA	2.00E+00	2.00E+00
trans-1,2-Dichloroethene	NVA	NVA	7.84E-01	--	7.84E-01
2,4,5-T	NVA	NVA	5.96E-01	--	5.96E-01
2,4,5-TP (Silvex)	NVA	NVA	1.09E-01	--	1.09E-01
2,4-D	NVA	NVA	2.73E-02	--	2.73E-02
2,4-DB	NVA	NVA	NVA	NVA	NVA
Aldrin	NVA	NVA	3.32E-03	--	3.32E-03
alpha-BHC	NVA	NVA	9.94E-02	--	9.94E-02
alpha-Chlordane	NVA	NVA	2.24E-01	--	2.24E-01
beta-BHC	NVA	NVA	3.98E-03	--	3.98E-03
Dalapon	NVA	NVA	NVA	NVA	NVA
delta-BHC	NVA	NVA	9.94E+00	--	9.94E+00
Dicamba	NVA	NVA	NVA	NVA	NVA
Dichloroprop	NVA	NVA	NVA	NVA	NVA
Dieldrin	0.000032 (mammal)	NVA	2.38E-03	--	3.20E-05
Endosulfan I	NVA	NVA	1.19E-01	--	1.19E-01
Endrin	NVA	NVA	1.01E-02	--	1.01E-02
Endrin ketone	NVA	NVA	NVA	NVA	NVA
gamma-BHC (Lindane)	NVA	NVA	5.00E-03	--	5.00E-03
gamma-Chlordane	NVA	NVA	2.24E-01	--	2.24E-01
Heptachlor	NVA	NVA	5.98E-03	--	5.98E-03
Heptachlor epoxide	NVA	NVA	1.52E-01	--	1.52E-01
MCPA	NVA	NVA	NVA	NVA	NVA
MCPP	NVA	NVA	NVA	NVA	NVA
Toxaphene	NVA	NVA	1.19E-01	--	1.19E-01
Aroclor 1016	NVA	0.371(mammal)	3.32E-04	--	3.71E-01
Aroclor 1221	NVA	0.371(mammal)	3.32E-04	--	3.71E-01
Aroclor 1232	NVA	0.371(mammal)	3.32E-04	--	3.71E-01
Aroclor 1242	NVA	0.371(mammal)	3.32E-04	--	3.71E-01
Aroclor 1248	NVA	0.371(mammal)	3.32E-04	--	3.71E-01
Aroclor 1260	NVA	0.371(mammal)	3.32E-04	--	3.71E-01
2,4-Dinitrotoluene	NVA	NVA	1.28E+00	--	1.28E+00
2,6-Dinitrotoluene	NVA	NVA	3.28E-02	--	3.28E-02
2-sec-butyl-4,6-dinitrophenol	NVA	NVA	2.18E-02	--	2.18E-02
Nitrobenzene	NVA	NVA	1.31E+00	--	1.31E+00
1,1,1-Trichloroethane	NVA	NVA	2.98E+01	--	2.98E+01
1,1,2,2-Tetrachloroethane	NVA	NVA	1.27E-01	--	1.27E-01
1,1,2-Trichloroethane	NVA	NVA	2.86E+01	--	2.86E+01
1,1-Dichloroethane	NVA	NVA	2.01E+01	--	2.01E+01

Table F-26
Selection of Ecological Soil Screening Toxicity Values, for Non Detect Constituents at SWMU 31
Page 2 of 2

Parameter	Ecological Soil Screening Levels ^a (mg/kg)	Ecological Preliminary Remediation Goals ^b (mg/kg)	Ecological Data Quality Levels ^c (mg/kg)	Other Ecological Soil Screening Levels ^d (mg/kg)	Selected Ecological Screening Toxicity Value ^e (mg/kg)
1,1-Dichloroethene	NVA	NVA	8.28E+00	--	8.28E+00
1,2-Dichloroethane	NVA	NVA	2.12E+01	--	2.12E+01
1,2-Dichloropropane	NVA	NVA	3.27E+01	--	3.27E+01
2-Butanone	NVA	NVA	8.96E+01	--	8.96E+01
2-Hexanone	NVA	NVA	1.26E+01	--	1.26E+01
4-Methyl-2-pentanone	NVA	NVA	4.43E+02	--	4.43E+02
Acetone	NVA	NVA	2.50E+00	--	2.50E+00
Benzene	NVA	NVA	2.55E-01	--	2.55E-01
Bromodichloromethane	NVA	NVA	5.40E-01	--	5.40E-01
Bromomethane	NVA	NVA	2.35E-01	--	2.35E-01
Carbon disulfide	NVA	NVA	9.41E-02	--	9.41E-02
Carbon tetrachloride	NVA	NVA	2.98E+00	--	2.98E+00
Chlorobenzene	NVA	40(earthworm)	1.31E+01	--	4.00E+01
Chloroethane	NVA	NVA	NVA	NVA	NVA
Chloromethane	NVA	NVA	1.04E+01	--	1.04E+01
cis-1,3-Dichloro-1-propene	NVA	NVA	3.98E-01	--	3.98E-01
Dibromochloromethane	NVA	NVA	2.05E+00	--	2.05E+00
Ethylbenzene	NVA	NVA	5.16E+00	--	5.16E+00
Methylene chloride	NVA	NVA	4.05E+00	--	4.05E+00
Styrene	NVA	300(plant)	4.69E+00	--	3.00E+02
Tetrachloroethene	NVA	NVA	9.92E+00	--	9.92E+00
Toluene	NVA	200(plant)	5.45E+00	--	2.00E+02
trans-1,3-Dichloropropene	NVA	NVA	3.98E-01	--	3.98E-01
Tribromomethane	NVA	NVA	1.59E+01	--	1.59E+01
Trichloroethene	NVA	NVA	1.24E+01	--	1.24E+01
Trichloromethane	NVA	NVA	1.19E+00	--	1.19E+00
Vinyl Chloride	NVA	NVA	6.46E-01	--	6.46E-01
Selenium	NVA	2.10E-01	2.77E-02	--	2.10E-01
Silver	NVA	2(plant)	4.04E+00	--	2.00E+00

^a Ecological Soil Screening Level Guidance, U.S.EPA, 2005.

^b Preliminary Remediation Goals for Ecological Endpoints, R. A. Efroymson, et. al., August 1997.

^c Ecological Data Quality Levels, U.S.EPA Region 5, October 1999.

^d Other Values.

^e The following hierarchy was utilized to select the final Ecological Screening Toxicity Values for this assessment:

1. The lower value of either the Ecological Soil Screening Level Guidance or the Preliminary Remediation Goals for Ecological Endpoints.
2. Ecological Data Quality Levels, U.S.EPA Region 5
3. Other Values.

NVA = No Value Available

Table F-27
Selection of Ecological Surface Water Screening Toxicity Values, for Non-Detect Constituents at SWMU 31
Page 1 of 3

Parameter	Ecological Preliminary Remediation Goals ^a (mg/L)	Virginia Water Quality Criteria ^b (Freshwater Chronic) (mg/L)	Ecological Data Quality Levels ^c (mg/L)	Other Ecological Screening Value ^d (mg/L)	Selected Ecological Screening Toxicity Value ^e (mg/L)
1,2-Diphenylhydrazine	NVA	NVA	NVA	NVA	NVA
1,3,5-Trinitrobenzene	NVA	NVA	NVA	6.00E+01	6.00E+01
1,3-Dinitrobenzene	NVA	NVA	2.36E-03	--	2.36E-03
2,4,6-Trinitrotoluene	NVA	NVA	NVA	4.00E+01	4.00E+01
2-amino-4,6-Dinitrotoluene	NVA	NVA	NVA	1.20E+01	1.20E+01
2-Nitrotoluene	NVA	NVA	NVA	8.00E+00	8.00E+00
3-Nitrotoluene	NVA	NVA	NVA	9.60E+00	9.60E+00
4-amino-2,6-Dinitrotoluene	NVA	NVA	NVA	8.60E+00	8.60E+00
4-Nitrotoluene	NVA	NVA	NVA	1.70E+01	1.70E+01
Benzyl alcohol	8.60E-03	NVA	2.81E-01	--	8.60E-03
cis-1,2-Dichloroethene	5.90E-02	NVA	3.10E-01	--	5.90E-02
Cyclonite	NVA	NVA	NVA	4.40E+01	4.40E+01
HMX	NVA	NVA	NVA	3.30E+02	3.30E+02
m+p-Xylenes	1.30E-02	NVA	1.17E-01	--	1.30E-02
Nitroglycerin	NVA	NVA	NVA	4.30E+02	4.30E+02
o-Xylene	1.30E-02	NVA	1.17E-01	--	1.30E-02
Pentaerythritol tetranitrate	NVA	NVA	NVA	2.60E+04	2.60E+04
Perchlorate	NVA	NVA	NVA	NVA	NVA
Pyridine	NVA	NVA	2.38E+00	--	2.38E+00
Tetryl	NVA	NVA	NVA	5.80E+00	5.80E+00
trans-1,2-Dichloroethene	5.90E-01	NVA	3.10E-01	--	5.90E-01
Arsenic (total)	--	--	5.30E-02	--	5.30E-02
Arsenic III	1.90E-01	1.90E-01	--	--	-- ^f
Beryllium	6.60E-04	NVA	7.60E-03	--	6.60E-04
Cobalt	2.30E-02	NVA	5.00E-03	--	2.30E-02
2,4,5-T	NVA	NVA	6.86E-01	--	6.86E-01
2,4-D	NVA	NVA	NVA	NVA	NVA
2,4-DB	NVA	NVA	NVA	NVA	NVA
4,4'-DDD	4.10E-08	NVA	1.10E-06	--	4.10E-08
4,4'-DDE	NVA	NVA	4.51E-12	--	4.51E-12
4,4-DDT	4.10E-08	1.00E-06	1.00E-06	--	4.10E-08
Aldrin	NVA	3.00E-04	3.09E-05	--	3.09E-05
alpha-Chlordane	3.70E-05	4.30E-06	2.90E-07	--	4.30E-06
beta-BHC	4.00E-06	8.00E-05	4.95E-04	--	4.00E-06
Dalapon	NVA	NVA	NVA	NVA	NVA
Dichloroprop	NVA	NVA	NVA	NVA	NVA
Dieldrin	NVA	1.90E-06	2.60E-08	--	1.90E-06
Endosulfan I	5.10E-05	5.60E-05	3-E6	--	5.10E-05
Endosulfan sulfate	NVA	NVA	2.22E-02	--	2.22E-02
Endrin aldehyde	NVA	NVA	1.50E-04	--	1.50E-04
Endrin ketone	NVA	NVA	NVA	NVA	NVA
gamma-Chlordane	3.70E-05	4.30E-06	2.90E-07	--	4.30E-06
Heptachlor	6.90E-06	3.80E-06	3.90E-07	--	3.80E-06
Heptachlor epoxide	NVA	3.80E-06	4.80E-07	--	3.80E-06
MCPA	NVA	NVA	NVA	NVA	NVA
MCPP	NVA	NVA	NVA	NVA	NVA
Methoxychlor	1.90E-05	3.00E-05	5.00E-06	--	1.90E-05
Toxaphene	NVA	2.00E-07	2.00E-07	--	2.00E-07
Aroclor 1016	2.30E-04	1.40E-05	2.90E-08	--	1.40E-05
Aroclor 1221	2.80E-04	1.40E-05	2.90E-08	--	1.40E-05
Aroclor 1232	5.80E-04	1.40E-05	2.90E-08	--	1.40E-05
Aroclor 1242	4.70E-05	1.40E-05	2.90E-08	--	1.40E-05
Aroclor 1248	1.90E-06	1.40E-05	2.90E-08	--	1.90E-06
Aroclor 1254	1.90E-06	1.40E-05	2.90E-08	--	1.90E-06
Aroclor 1260	9.40E-02	1.40E-05	2.90E-08	--	1.40E-05
Dimethylphthalate	NVA	NVA	7.30E-02	--	7.30E-02
1,2,4-Trichlorobenzene	1.10E-01	NVA	6.92E-02	--	1.10E-01
2,4,5-Trichlorophenol	NVA	NVA	NVA	NVA	NVA
2,4,6-Trichlorophenol	NVA	NVA	2.00E-03	--	2.00E-03
2,4-Dichlorophenol	NVA	NVA	1.80E-02	--	1.80E-02
2,4-Dimethylphenol	NVA	NVA	1.00E-01	--	1.00E-01
2,4-Dinitrophenol	NVA	NVA	4.07E-03	--	4.07E-03
2,4-Dinitrotoluene	NVA	NVA	2.30E-01	--	2.30E-01

Table F-27
Selection of Ecological Surface Water Screening Toxicity Values, for Non-Detect Constituents at SWMU 31
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Parameter	Ecological Preliminary Remediation Goals ^a (mg/L)	Virginia Water Quality Criteria ^b (Freshwater Chronic) (mg/L)	Ecological Data Quality Levels ^c (mg/L)	Other Ecological Screening Value ^d (mg/L)	Selected Ecological Screening Toxicity Value ^e (mg/L)
2,6-Dinitrotoluene	NVA	NVA	4.20E-02	--	4.20E-02
2-Chloronaphthalene	NVA	NVA	3.96E-04	--	3.96E-04
2-Chlorophenol	NVA	NVA	8.80E-03	--	8.80E-03
2-Nitroaniline	NVA	NVA	NVA	NVA	NVA
2-Nitrophenol	NVA	NVA	1.35E-02	--	1.35E-02
2-sec-butyl-4,6-dinitrophenol	NVA	NVA	3.90E-04	--	3.90E-04
3,3'-Dichlorobenzidine	NVA	NVA	9.98E-02	--	9.98E-02
3-Nitroaniline	NVA	NVA	NVA	NVA	NVA
4,6-Dinitro-o-cresol	NVA	NVA	2.30E-03	--	2.30E-03
4-Nitroaniline	NVA	NVA	NVA	NVA	NVA
4-Nitrophenol	3.00E-01	NVA	3.50E-02	--	3.00E-01
Acenaphthene	2.30E-02	NVA	9.90E-03	--	2.30E-02
Acenaphthylene	NVA	NVA	4.84E+00	--	4.84E+00
Anthracene	7.30E-04	NVA	2.90E-05	--	7.30E-04
Benzo(a)anthracene	2.70E-05	NVA	8.39E-04	--	2.70E-05
Benzo(a)pyrene	1.40E-05	NVA	1.40E-05	--	1.40E-05
Benzo(b)fluoranthene	NVA	NVA	9.07E-03	--	9.07E-03
Benzo(g,h,i)perylene	NVA	NVA	7.64E-03	--	7.64E-03
Benzo(k)fluoranthene	NVA	NVA	5.60E-06	--	5.60E-06
bis(2-Chloroethoxy)methane	NVA	NVA	6.40E+00	--	6.40E+00
bis(2-Chloroethyl)ether	NVA	NVA	1.14E+00	--	1.14E+00
bis(2-Chloroisopropyl)ether	NVA	NVA	2.00E-02	--	2.00E-02
Carbazole	NVA	NVA	NVA	NVA	NVA
Chrysene	NVA	NVA	3.30E-05	--	3.30E-05
Di-n-octyl phthalate	NVA	NVA	NVA	3.20E-01	3.20E-01
Dibenz(a,h)anthracene	NVA	NVA	1.60E-03	--	1.60E-03
Dibenzofuran	3.70E-03	NVA	2.00E-02	--	3.70E-03
Fluoranthene	6.20E-03	NVA	8.10E-03	--	6.20E-03
Fluorene	3.90E-03	NVA	3.90E-03	--	3.90E-03
Hexachlorobenzene	NVA	NVA	2.40E-07	--	2.40E-07
Hexachlorocyclopentadiene	NVA	NVA	7.70E-02	--	7.70E-02
Indeno(1,2,3-cd)pyrene	NVA	NVA	4.31E-03	--	4.31E-03
Isophorone	NVA	NVA	9.00E-01	--	9.00E-01
n-Nitroso-di-n-propylamine	NVA	NVA	NVA	NVA	NVA
n-Nitrosodiphenylamine	2.10E-01	NVA	1.30E-02	--	2.10E-01
o-Cresol	1.30E-02	NVA	NVA	--	1.30E-02
p-Chloro-m-cresol	NVA	NVA	3.48E-02	--	3.48E-02
p-Chloroaniline	NVA	NVA	2.32E-01	--	2.32E-01
p-Cresol	NVA	NVA	NVA	NVA	NVA
Pentachlorophenol	NVA	pH dependent	5.23E-03	--	5.23E-03
Phenanthrene	6.30E-03		2.10E-03	--	6.30E-03
Phenol	1.10E-01	NVA	1.00E-01	--	1.10E-01
1,1,1-Trichloroethane	1.10E-02	NVA	8.80E-02	--	1.10E-02
1,1,2,2-Tetrachloroethane	6.10E-01	NVA	1.30E-02	--	6.10E-01
1,1,2-Trichloroethane	1.20E+00	NVA	6.50E-01	--	1.20E+00
1,1-Dichloroethane	4.70E-02	NVA	4.70E-02	--	4.70E-02
1,1-Dichloroethene	2.50E-02	NVA	7.80E-02	--	2.50E-02
1,2-Dichloroethane	9.10E-01	NVA	1.90E-01	--	9.10E-01
1,2-Dichloropropane	NVA	NVA	3.80E-01	--	3.80E-01
2-Butanone	1.40E+01	NVA	7.10E+00	--	1.40E+01
2-Hexanone	9.90E-02	NVA	1.71E+00	--	9.90E-02
4-Bromophenyl phenylether	NVA	NVA	1.50E-03	--	1.50E-03
4-Chlorophenyl phenylether	NVA	NVA	NVA	NVA	NVA
4-Methyl-2-pentanone	1.70E-01	NVA	3.68E+00	--	1.70E-01
Acetone	1.50E+00	NVA	7.80E+01	--	1.50E+00
Benzene	1.30E-01	NVA	1.14E-01	--	1.30E-01
Bromomethane	NVA	NVA	NVA	NVA	NVA
Carbon tetrachloride	9.80E-03	NVA	5.90E-03	--	9.80E-03
Chlorobenzene	6.40E-02	NVA	1.00E-02	--	6.40E-02
Chloroethane	NVA	NVA	2.30E+02	--	2.30E+02
Chloromethane	NVA	NVA	NVA	NVA	NVA
cis-1,3-Dichloro-1-propene	NVA	NVA	7.90E-03	--	7.90E-03
Ethylbenzene	7.30E-03	NVA	1.72E-02	--	7.30E-03

Table F-27
Selection of Ecological Surface Water Screening Toxicity Values, for Non-Detect Constituents at SWMU 31
Page 3 of 3

Parameter	Ecological Preliminary Remediation Goals ^a (mg/L)	Virginia Water Quality Criteria ^b (Freshwater Chronic) (mg/L)	Ecological Data Quality Levels ^c (mg/L)	Other Ecological Screening Value ^d (mg/L)	Selected Ecological Screening Toxicity Value ^e (mg/L)
Styrene	NVA	NVA	5.60E-02	--	5.60E-02
Tetrachloroethene	9.80E-02	NVA	8.90E-03	--	9.80E-02
Toluene	9.80E-03	NVA	2.53E-01	--	9.80E-03
trans-1,3-Dichloropropene	NVA	NVA	7.90E-03	--	7.90E-03
Tribromomethane	3.20E-01	NVA	NVA	--	3.20E-01
Trichloroethene	4.70E-01	NVA	7.50E-02	--	4.70E-01
Vinyl Chloride	7.82E-01	NVA	9.20E-03	--	7.82E-01
Antimony	3.00E-02	NVA	3.10E-02	--	3.00E-02
Cadmium	1.10E-03	1.10E-03	6.60E-04	--	1.10E-03
Copper	1.20E-02	9.00E-03	5.00E-03	--	9.00E-03
Selenium	3.90E-04	5.00E-03	5.00E-03	--	3.90E-04
Silver	3.60E-04	NVA	1.00E-03	--	3.60E-04
Thallium	9.00E-03	NVA	5.60E-04	--	9.00E-03
Vanadium	2.00E-02	NVA	1.90E-02	--	2.00E-02
bis(2-Ethylhexyl) phthalate	1.20E-04	NVA	2.00E-03	--	1.20E-04
Carbon disulfide	9.20E-04	NVA	8.41E-02	--	9.20E-04
Methylene chloride	2.20E+00	NVA	4.30E-01	--	2.20E+00
Naphthalene	1.20E-02	NVA	4.40E-02	--	1.20E-02

^a Ecological PRGs from ORNL, Efromson, et.al., 1997.

^b Virginia Administrative Code (VAC), 2004, 9 VAC 25-260-140, Criteria for Surface Water.

^c Ecological Data Quality Levels (EDQL), U.S.EPA Region 5, October 1999.

^d Los Alamos National Laboratory (LANL), 2002, Environmental Restoration Project, Environmental Screening Levels, Release 1.5, September.

^e The following hierarchy was used to select the final ecological screening toxicity value: (1) the lower of the Eco PRG or the Virginia Criteria;
(2) the EDQL; (3) the LANL Value

^f Total arsenic value used because it is the most conservative.

NVA = No Value Available

Table F-28
Selection of Ecological Sediment Screening Toxicity Values, for Non-Detect Constituents at SWMU 31
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Parameter	Ecological Preliminary Remediation Goals ^a (mg/kg)	Ecological Data Quality Levels ^b (mg/kg)	Other Ecological Screening Value ^c (mg/kg)	Selected Ecological Screening Toxicity Value ^d (mg/kg)
1,2,3,7,8,9-Hexachlorodibenzofuran	NVA	1.29E-08	--	1.29E-08
1,2-Diphenylhydrazine	NVA	NVA	NVA	NVA
1,3,5-Trinitrobenzene	NVA	1.21E-04	--	1.21E-04
1,3-Dinitrobenzene	NVA	9.24E-04	--	9.24E-04
2-amino-4,6-Dinitrotoluene	NVA	NVA	1.10E+01	1.10E+01
2-Nitrotoluene	NVA	NVA	6.70E+00	6.70E+00
3&4-Methylphenol	NVA	8.08E-04	--	8.08E-04
3-Nitrotoluene	NVA	NVA	7.90E+00	7.90E+00
4-amino-2,6-Dinitrotoluene	NVA	NVA	7.50E+00	7.50E+00
4-Nitrotoluene	NVA	NVA	1.40E+01	1.40E+01
Benzyl alcohol	1.10E-03	3.39E-02	--	3.39E-02
cis-1,2-Dichloroethene	4.00E-01	NVA	--	4.00E-01
Cyclonite	NVA	NVA	4.40E+01	4.40E+01
HMX	NVA	NVA	3.50E+02	3.50E+02
m+p-Xylenes	1.60E-01	1.88E+00	--	1.60E-01
Nitroglycerin	NVA	NVA	3.90E+02	3.90E+02
o-Xylene	1.60E-01	1.88E+00	--	1.88E+00
Pentaerythritol tetranitrate	NVA	NVA	1.80E+04	1.80E+04
Pyridine	NVA	1.06E-01	--	1.06E-01
Tetryl	NVA	NVA	5.20E+00	5.20E+00
trans-1,2-Dichloroethene	4.00E-01	2.09E-01	--	4.00E-01
2,3,7,8-Tetrachlorodibenzo-p-dioxin	NVA	3.30E-06	--	3.30E-06
Selenium	NVA	NVA	1.00E+00	1.00E+00
Silver	1.80E+00	5.00E-01	--	1.80E+00
2,4,5-T	NVA	5.87E+01	--	5.87E+01
2,4,5-TP (Silvex)	NVA	7.35E+00	--	7.35E+00
2,4-D	NVA	5.79E-03	--	5.79E-03
4,4'-DDT	5.20E-02	1.19E-03	--	5.20E-02
Aldrin	8.00E-02	2.00E-03	--	8.00E-02
alpha-BHC	1.20E+02	6.00E-03	--	1.20E+02
alpha-Chlordane	4.80E-03	4.50E-03	--	4.80E-03
beta-BHC	1.20E+02	5.00E-03	--	1.20E+02
Dalapon	NVA	NVA	NVA	NVA
delta-BHC	1.20E+02	7.15E+01	--	1.20E+02
Dicamba	NVA	NVA	NVA	NVA
Dichloroprop	NVA	NVA	NVA	NVA
Dieldrin	4.30E-03	2.00E-03	--	4.30E-03
Endosulfan I	5.50E-03	1.75E-04	--	5.50E-03
Endosulfan II	5.50E-03	1.04E-04	--	5.50E-03
Endosulfan sulfate	NVA	3.46E-02	--	3.46E-02
Endrin aldehyde	NVA	3.20E+00	--	3.20E+00
Endrin ketone	NVA	NVA	NVA	NVA
gamma-BHC (Lindane)	9.90E-04	9.40E-04	--	9.90E-04
gamma-Chlordane	4.80E-03	4.50E-03	5.00E-04	4.80E-03
Heptachlor	1.30E+01	6.00E-04	--	1.30E+01
Heptachlor epoxide	NVA	6.00E-04	--	6.00E-04
MCPA	NVA	NVA	NVA	NVA
MCPD	NVA	NVA	NVA	NVA
Methoxychlor	1.90E-02	3.59E-03	--	1.90E-02

Table F-28
Selection of Ecological Sediment Screening Toxicity Values, for Non-Detect Constituents at SWMU 31
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Parameter	Ecological Preliminary Remediation Goals ^a (mg/kg)	Ecological Data Quality Levels ^b (mg/kg)	Other Ecological Screening Value ^c (mg/kg)	Selected Ecological Screening Toxicity Value ^d (mg/kg)
Toxaphene	NVA	1.09E-04	--	1.09E-04
Aroclor 1016	5.30E-01	3.41E-02	--	5.30E-01
Aroclor 1221	1.20E-01	3.41E-02	--	1.20E-01
Aroclor 1232	6.00E-01	3.41E-02	--	6.00E-01
Aroclor 1242	2.90E+01	3.41E-02	--	2.90E+01
Aroclor 1248	1.00E+00	3.41E-02	--	1.00E+00
Aroclor 1254	7.20E+01	3.41E-02	--	7.20E+01
Aroclor 1260	6.30E+01	3.41E-02	--	6.30E+01
Dimethylphthalate	NVA	2.50E-02	--	2.50E-02
1,2,4-Trichlorobenzene	9.70E+00	1.17E+01	--	9.70E+00
1,2-Dichlorobenzene	3.30E-01	2.31E-01	--	3.30E-01
1,3-Dichlorobenzene	1.70E+00	3.01E+00	--	1.70E+00
1,4-Dichlorobenzene	3.50E-01	1.45E+00	--	3.50E-01
2,4,5-Trichlorophenol	NVA	8.56E-02	--	8.56E-02
2,4,6-Trichlorophenol	NVA	8.48E-02	--	8.48E-02
2,4-Dichlorophenol	NVA	1.34E-01	--	1.34E-01
2,4-Dinitrophenol	NVA	1.33E-03	--	1.33E-03
2,4-Dinitrotoluene	NVA	7.51E-02	--	7.51E-02
2,6-Dinitrotoluene	NVA	2.06E-02	--	2.06E-02
2-Chloronaphthalene	NVA	4.17E-01	--	4.17E-01
2-Chlorophenol	NVA	1.17E-02	--	1.17E-02
2-Nitroaniline	NVA	2.22E-04	--	2.22E-04
2-Nitrophenol	NVA	7.77E-03	--	7.77E-03
2-sec-butyl-4,6-dinitrophenol	NVA	NVA	NVA	NVA
3,3'-Dichlorobenzidine	NVA	2.82E-02	--	2.82E-02
3-Nitroaniline	NVA	2.22E-03	--	2.22E-03
4,6-Dinitro-o-cresol	NVA	NVA	NVA	NVA
4-Nitroaniline	NVA	2.22E-04	--	2.22E-04
4-Nitrophenol	NVA	7.78E-03	--	7.78E-03
Benzoic Acid	NVA	NVA	6.50E-02	6.50E-02
bis(2-Chloroethoxy)methane	NVA	NVA	NVA	NVA
bis(2-Chloroethyl)ether	NVA	NVA	NVA	NVA
bis(2-Chloroisopropyl)ether	NVA	NVA	NVA	NVA
bis(2-Ethylhexyl) phthalate	2.70E+00	1.82E-01	--	2.70E+00
Butyl benzyl phthalate	NVA	4.19E+00	--	4.19E+00
Di-n-butyl phthalate	2.40E+02	NVA	--	2.40E+02
Di-n-octyl phthalate	NVA	NVA	2.10E+02	2.10E+02
Diethyl phthalate	6.10E-01	8.04E-03	--	6.10E-01
Hexachlorobenzene	NVA	2.00E-02	--	2.00E-02
Hexachlorobutadiene	NVA	1.38E+00	--	1.38E+00
Hexachlorocyclopentadiene	NVA	9.01E-01	--	9.01E-01
Hexachloroethane	1.00E+00	2.23E+00	--	2.23E+00
Isophorone	NVA	4.22E+02	--	4.22E+02
n-Nitroso-di-n-propylamine	NVA	NVA	NVA	NVA
o-Cresol	NVA	8.26E-04	--	8.26E-04
p-Chloro-m-cresol	NVA	3.88E-01	--	3.88E-01
p-Chloroaniline	NVA	1.46E-01	--	1.46E-01
p-Cresol	NVA	8.08E-04	--	8.08E-04
Pentachlorophenol	NVA	3.01E+01	--	3.01E+01

Table F-28
Selection of Ecological Sediment Screening Toxicity Values, for Non-Detect Constituents at SWMU 31
Page 3 of 3

Parameter	Ecological Preliminary Remediation Goals ^a (mg/kg)	Ecological Data Quality Levels ^b (mg/kg)	Other Ecological Screening Value ^c (mg/kg)	Selected Ecological Screening Toxicity Value ^d (mg/kg)
Phenol	3.20E-02	2.73E-02	--	3.20E-02
1,1,1-Trichloroethane	9.60E+00	2.47E-01	--	9.60E+00
1,1,2,2-Tetrachloroethane	5.40E+00	2.91E-02	--	5.40E+00
1,1,2-Trichloroethane	9.80E+00	6.74E-01	--	9.80E+00
1,1-Dichloroethane	2.70E-02	5.75E-04	--	2.70E-02
1,1-Dichloroethene	3.50E+00	2.33E-02	--	3.50E+00
1,2-Dichloroethane	NVA	5.42E-02	--	4.30E+00
1,2-Dichloropropane	NVA	3.52E-01	--	3.52E-01
2-Butanone	2.70E-01	1.37E-01	--	2.70E-01
2-Hexanone	2.30E-02	1.01E+00	--	2.30E-02
4-Bromophenyl phenylether	1.20E+00	1.55E+00	--	1.20E+00
4-Chlorophenyl phenylether	NVA	6.56E-01	--	6.56E-01
4-Methyl-2-pentanone	1.50E+01	5.44E-01	--	1.50E+01
Benzene	1.60E-01	1.42E-01	--	1.60E-01
Bromodichloromethane	NVA	1.13E-03	--	1.13E-03
Bromomethane	NVA	1.48E-04	--	1.48E-04
Carbon disulfide	8.60E-04	1.34E-01	--	1.34E-01
Carbon tetrachloride	2.00E+00	3.57E-02	--	2.00E+00
Chlorobenzene	4.17E-01	6.19E-02	--	4.17E-01
Chloroethane	NVA	5.86E+01	--	5.86E+01
Chloroform	9.60E-01	2.70E-02	--	9.60E-01
Chloromethane	NVA	7.85E-05	--	7.85E-05
cis-1,3-Dichloro-1-propene	2.30E-01	2.96E-03	--	2.30E-01
Dibromochloromethane	NVA	6.76E-01	--	6.76E-01
Ethylbenzene	5.40E+00	1.00E-04	--	5.40E+00
Methylene chloride	1.80E+01	1.26E+00	--	1.80E+01
Styrene	NVA	4.45E-01	--	4.45E-01
Tetrachloroethene	3.20E+00	1.96E-01	--	3.20E+00
Toluene	5.00E-02	5.25E+01	--	5.00E-02
trans-1,3-Dichloropropene	2.30E-01	2.96E-03	--	2.30E-01
Tribromomethane	6.60E-01	9.96E-01	--	6.60E-01
Trichloroethene	5.20E+01	1.80E-01	--	5.20E+01
Vinyl Chloride	NVA	2.00E-03	--	2.00E-03
cis-1,3-Dichloro-1-propene	2.30E-01	2.96E-03	--	2.30E-01

^a Ecological PRGs from ORNL, Efroymson, et.al., 1997

^b EDQLs for U.S.EPA Region 5, 1999

^c Ecological Screening Levels (ESLs) for Los Alamos National Laboratory, 2002, used if no PRG or EDQL values were available.

^d Hierarchy: Ecological PRGs were utilized for screening if available. If no PRG was available, then the EDQL was selected, if available. If neither a PRG nor an EDQL was available, then the ESLs for Los Alamos National Laboratory were selected.

Appendix F-3

Selection of Screening Concentrations for the Evaluation of Non-Detected Constituents

Appendix F-3

Compilation of Ecological Screening Values for Evaluation of Non-Detect Chemical Constituents

A comparison was performed between the maximum detection limit of chemicals that were not detected in sampled media and risk-based ecotoxicity screening values. Non-detect chemicals that had maximum detection limits that exceeded the screening values are noted and discussed in *Section 6.10* of the report. The following screening value hierarchy was used:

Soil. Soil screening values were selected using the following hierarchy:

- The lower of the flora and fauna BTAG Screening Values (USEPA Region III, 1995c)
- The lower of Ecological Soil Screening Levels (USEPA, 2005e) and Preliminary Remediation Goals for Ecological Endpoints (Efroymson et al., 1997);
- Ecological Data Quality Levels (EDQL) (USEPA, 1999a); and,
- Environmental Screening Levels (ESL) from Los Alamos National Laboratory (LANL, 2002).

Surface Water. Surface water screening values were selected using the following hierarchy:

- The lowest freshwater BTAG screening values (USEPA Region III, 2005d).
- The lower of Preliminary Remediation Goals for Ecological Endpoints (Efroymson et al., 1997) and Chronic Virginia Water Quality Criteria [Virginia Administrative Code (VAC), 2004];
- EDQLs (USEPA, 1999a); and,
- ESLs from Los Alamos National Laboratory (LANL, 2002).

Sediment. Sediment screening values were selected using the following hierarchy:

- The lowest freshwater BTAG screening values (USEPA Region III, 2005d).
- Preliminary Remediation Goals for Ecological Endpoints (Efroymson et al., 1997);
- EDQLs (USEPA, 1999a); and,
- ESLs from Los Alamos National Laboratory (LANL, 2002).

It should be noted that BTAG screening values, along with non-BTAG screening values, are summarized and presented in **Appendix F-2, Tables F-23, F-24, and F-25**. Details on non-BTAG screening values are presented in **Appendix F-2, Tables F-26, F-27, and F-28** for soil, surface water, and sediment, respectively.