03.13-3/1/03-00172

Final

Remedial Investigation/Human Health Risk Assessment/Ecological Risk Assessment Report for Sites 3, 4, 5, and 6

St. Juliens Creek Annex
Chesapeake, Virginia

Volume III - Appendixes

Prepared for

Department of the Navy
Atlantic Division
Naval Facilities Engineering Command
Norfolk, Virginia

Contract No. N62470-95-D-6007
CTO-0027

March 2003

Prepared by

CH2MHILL

Baker
Environmental, Inc.

CDM
Federal Programs Corp.

Elizabeth River Documents

BACK TO SEARCH

ID No.	Documents
007	**1990: Distribution and Management Implications of Contaminants in Elizabeth River Sediments: Compilation of Recent Research on Sediment Contamination in the Elizabeth River.** Final Report Submitted by Applied Marine Research Laboratory, College of Sciences, Old Dominion University, Norfolk, VA to Virginia Water Control Board, Richmond, VA. 262 pp.
006	**1990: Elizabeth River Long-term Monitoring Program: Water Quality Monitoring, Contaminants in Water and Sediments, and Toxicity Tests.** Final Report Submitted by Applied Marine Research Laboratory, College of Sciences, Old Dominion University, Norfolk, VA to Virginia State Water Control Board, Richmond, VA.
002	**1986: Comprehensive Elizabeth River Water Quality Management Plan: Preliminary Management Recommendations.**
005	**1990: Elizabeth River Long-Term Monitoring Program: Sediment Toxicity Assessments. Final Report for Phase I (Feb-June, 1989).** Submitted by Old Dominion University Applied Marine Research Laboratory, College of Sciences, Old Dominion University, Norfolk, VA to Virginia Water Control Board, Richmond, VA.
001	**1972: The Chesapeake Bay Bibliography, Volume II: Virginia Waters.** Special Scientific Report No. 63 of the Virginia Institute of Marine Science. RANN Report No. 5.
003	**1987: Analysis of Effluents and Associated Sediments and Tissue For Toxic Organic Compounds and Metals in the James River Estuary, 1985-1986: Individual Plant Summaries, Volume 2.** Virginia Institute of Marine Science.
004	**1987: Analysis of Effluents and Associated Sediments and Tissue For Toxic Organic Compounds and Metals in the James River Estuary, 1985-1986: Individual Plant Summaries, Appendix A.** Virginia Institute of Marine Science.
011	**1997: Water Quality Monitoring Plan Design.** Prepared for Commonwealth of Virginia, Department of Environmental Quality (DEQ). Contract No. 989700265.
008	**1995: Defining the Problem: The Elizabeth River, a Region of Concern, Volume 1 of 2.** Final Report Submitted by Applied Marine Research Laboratory, College of Sciences, Old Dominion College, Norfolk, VA to Virginia Department of Environmental Quality (DEQ), Chesapeake Bay and Coastal Programs.
009	**1995: Defining the Problem: The Elizabeth River, a Region of Concern, Volume 2 of 2.** Final Report Submitted by Applied Marine Research Laboratory, College of Sciences, Old Dominion College, Norfolk, VA to Virginia Department of Environmental Quality (DEQ), Chesapeake Bay and Coastal Programs.
010	**1995: Technical Assessments in Support of the Elizabeth River Regional Action Plan Development.** Submitted to Commonwealth of Virginia, Department of Environmental Quality (DEQ), Richmond, VA. Contract No. 970500142.
012	**1998: Elizabeth River Monitoring Program: A Baseline Environmental Study for an Assessment of Trends in Contaminant Concentrations and Effects.** Final Report Submitted by Applied Marine Research Laboratory, College of Sciences, Old Dominion College, Norfolk, VA to Virginia Department of Environmental Quality (DEQ), Tidewater Regional Office, Virginia Beach, VA.

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 01 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/21/2001 12:50 END : 6/21/01 13:05 LOGGER : Bill Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-12"	Top Soil Clayey, gray, roots.	
14	12-24"	SAND with some silt and oyster shells, gray to white sand, orange mottles, moist.	
26	24-40"	Sandy SILT becoming SILT, brown to gray at bottom.	
42			Total Depth 3'4" Water at bottom. Photo 3 and 4 Does not appear to be any indication of contamination.

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 02 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/21/2001 13:05 END : 6/21/01 13:20 LOGGER : Bill Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2			
4	0-12"	Top Soil, brown SILT.	
6			
8			
10			
12			
14			
16	12-24"	Fine to medium grained SAND with some silt, light gray, becoming wet.	
18			
20			
22			
24			
26			
28	24-36"	Medium to coarse SAND with abundant oyster shells, light gray.	
30			Water at 2'6" bgs.
32			
34			
36			
38			Total Depth 3' Photo 5 & 6 Testpit/trench, appears to be dredge fill.
40			
42			
44			
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 03 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/21/2001 13:20 END : 6/21/01 13:50 LOGGER : Bill Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2			
4	0-12"	Top Soil, clayey, brown.	
6			
8			
10			
12			
14	12-18"	Medium to fine grained SAND, occasional pieces of black quartz, (<1%).	
16			
18			
20			
22			
24			
26	18-43"	Gray silty SAND to dark gray SAND.	Water slow to move into hole.
28			
30			
32			
34			
36			
38			
40			
42			
44			Total Depth 3'7" Photo 7 No oysters found in this hole. Does not appear to have burnt or contaminated soils.
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 04 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/21/2001 14:35 END : 6/21/01 14:50 LOGGER : Bill Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2			
4	0-12"	Clayey, Top Soil, brown.	
6			
8			
10			
12			
14	12-18"	Medium to fine grained SAND, brown with orange mottles, occasional pieces of black quartz, similar to Trench 03.	
16			
18			
20			
22			
24			
26	18-40"	Gray silty SAND becoming dark gray SILT. No oysters.	
28			
30			
32			
34			
36			
38			
40			
42			Total Depth 3'4" Photo 8
44			
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 05 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/21/2001 14:50 END : 6/21/01 15:05 LOGGER : Bill Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-12"	Top Soil brown to dark brown with roots.	
14	12-24"	Medium to fine grained SAND with some silt, occasional oysters and black quartz pieces (<1%) .	
26	24-41"	Silty SAND, gray, becoming dark gray SILT.	Water slow to infiltrate. Trench looks similar to Trench 04.
42			Total depth 3'5" Photo 9

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 06 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/21/2001 15:05 END : 6/21/01 15:25 LOGGER : Bill Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS. TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-8"	Top Soil, brown, roots.	Tin can and "O" rings.
4			
6			
8			
10	8-18"	Layered SILT, roots, iron stains.	Pieces of wood (6" in length), dark brown, but no odor.
12			
14			
16			
18			
20	18-42"	Gray SILT.	
22			
24			
26			
28			
30			
32			
34			
36			
38			
40			
42			Total Depth 3'6" Photos 10, 11, & 12
44			
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 07 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/21/2001 15:25 END : 6/21/01 15:47 LOGGER : Bill Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-4"	Top Soil, clayey, sandy.	
4			
6	4-36"	Mix of Silty SAND, oysters, iron staining in some depths.	Brick, concrete, oysters, piece of aluminum strap, rocks, and rubble down to 2'6" bgs.
8			
10			
12			
14			
16			
18			
20			
22			
24			
26			
28			
30			
32			
34			
36			
38	36-42"	Silty SAND, gray.	
40			
42			
44			Total Depth 3'6" Photo 13
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 08 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/21/2001 16:53 END : 6/21/01 17:00 LOGGER : Bill Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2			
4			
6			
8			
10			
12			
14			
16			
18			
20			
22	0-40"	SAND with fine to medium grained silt, light gray to yellow.	Old fire extinguisher Photo 17 Collected sample SJS03-SB21-001. Wood, wire, brick present. 24-30" bgs soil looks burned.
24			
26			
28			
30			
32			
34			
36			
38			
40			Total Depth 3'4" No water in bottom of hole.
42			
44			
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 09 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/21/2001 16:35 END : 6/21/01 16:53 LOGGER : Bill Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-8"	Top Soil Dark brown, silty SAND with roots.	
4			
6			
8			
10			
12			
14			
16			
18			
20	8-38"	Fine to medium grained SAND with some silt, brown, dark brown mottles.	
22			
24			
26			
28			
30			
32			
34			
36			
38			
40	38-42"	SILT, brown, oyster shells.	Trench looked natural, no garbage.
42			
44			Total Depth 3'6" Photo 14, 15, & 16 Some water coming in at bottom.
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 10 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/22/2001 8:10 END : 6/22/01 8:30 LOGGER : Bill Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2			
4			
6	0-16"	Top Soil, clayey, brown, roots.	
8			
10			
12			
14			
16			
18			
20			
22			
24	16-44"	Silty CLAY, gray, blocky, slightly plastic.	
26			
28			
30			
32			
34			
36			
38			
40			
42			
44			
46			Total Depth 3'8" Photo 1 Wet at the bottom. Trench does not indicate any fill.
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 11 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/22/2001 8:15 END : 6/22/01 8:30 LOGGER : Bill Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2			
4	0-14"	Top soil, silty fine SAND, gray to brown, orange mottles, roots.	
6			
8			
10			
12			
14			
16			
18			
20	14-39"	Fine SAND and SILT, gray to almost black, appears to be dredge fill.	
22			
24			
26			
28			
30			
32			
34			
36			
38			
40			Total Depth 3'3" Photos 2 & 3
42			
44			
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 12 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/22/2001 8:50 END : 6/22/01 9:10 LOGGER : Bill Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2			
4	0-12"	Top soil, fine SAND and SILT, brown, roots.	Some wire (strapping wire), small pieces of rock, and brick.
6			
8			
10			
12			
14			
16	12-22"	SAND, light brown, with orange mottles, mixture of sand, fine and finely layered SILT.	
18			
20			
22			
24			
26	22-46"	Fine to silty SAND becoming SILT, roots, oyster shells at bottom, bottom of hole becoming wet.	
28			
30			
32			
34			
36			
38			
40			
42			
44			
46			
48			Total Depth 3'10" Photo 4 No other indication of fill, other than wire in the top 12".
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 13 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/22/2001 9:20 END : 6/22/01 9:40 LOGGER : Bill Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2			
4	0-12"	Top Soil, Silty SAND, brown, roots, some small wires.	
6			
8			
10			
12			
14			
16			
18			
20	12-43"	SAND medium to fine grained, with abundant oysters. Light brown to light gray.	
22			
24			
26			
28			
30			
32			
34			
36			
38			
40			
42			
44			Total Depth 3'7" Photo 5 & 6? No indication of fill other than wires.
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 14 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/22/2001 9:55 END : 6/22/01 10:25 LOGGER : Bill Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-6"	Top Soil, Sandy SILT, black to brown.	
4			
6			
8	6-24"	Debris in sandy material. Debris includes: used shotgun shell, dumby fuse, wood, channel iron, bolts, and scrap metal.	Does not indicate burning, just refuse. "Dumby Fuse" is a penetrator plug for a 5" diameter high velocity arial rocket (HVAR) warhead.
10			
12			
14			
16			
18			
20			
22			
24			
26	24-50"	SAND, medium to fine grained, brown, becoming gray medium to fine sandy SILT. Some oysters.	
28			
30			
32			
34			
36			
38			
40			
42			
44			
46			
48			
50			
52			Total Depth 4'2" Photo 8
54			
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 15 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/22/2001 10:25 END : 6/22/01 11:10 LOGGER : Bill Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-8"	Top soil, SAND, fine, silty, brown, roots.	
4			
6			
8			
10	8-18"	SAND, medium to fine grained with silt, light brown with orange mottles.	Pipe, wood.
12			
14			
16			
18			
20	18-24"	SAND, fine to medium grained, with silt, black, petroleum odor.	Collected sample SJS03-SB22-001 for dioxins.
22			
24			
26	24-42"	Sandy SILT, gray, medium grained, fine SAND, moist, cohesive.	
28			
30			
32			
34			
36			
38			
40			
42			Water filling bottom of hole.
44			Total depth 3'6" Photo 9
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 16 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/22/2001 10:40 END : 6/22/01 11:10 LOGGER : Bill Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2			
4			
6	0-12"	Top soil, silty SAND, brown, loose, slightly cohesive.	Pieces of bottles, glass, wood, brick.
8			
10			
12			
14			
16	12-25"	SAND, black, fine to medium grained, silt, slightly stuck together, pieces of gravel.	Collected sample SJS03-SB23-001. Material was sandy and gravelly, partially crumbly.
18			
20			
22			
24			
26			
28			
30	25-48"	Silty SAND, gray, moist, cohesive.	
32			
34			
36			
38			
40			
42			
44			
46			
48			
50			Total depth 4' Strong signs of burning. Photos 10 & 11
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 17 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/22/2001 12:10 END : 6/22/01 12:20 LOGGER : Bill Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2			
4	0-10"	Top soil, silty SAND, light brown to brown, roots, iron flakes.	
6			
8			
10			
12			
14			
16			
18			
20	10-41"	Silty, fine SAND, brown to gray, turning to gray, few oysters.	
22			
24			
26			
28			
30			
32			
34			
36			
38			
40			
42			Total Depth 3'5"
44			Location 17 was placed North of 16 to ensure that we are out of the fill, and was the first position which did not have a high amount of magnetic readings.
46			
48			No indication of fill.
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 18 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/22/2001 12:35 END : 6/22/01 12:52 LOGGER : Bill Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2			
4	0-10"	Top Soil, clayey, brown, with some fine sand and silt.	
6			
8			
10			
12	10-18"	Silty SAND, light gray to light brown, with oysters, iron staining.	
14			
16			
18			
20	18-38"	Sandy SILT, fine to medium gray, some clay, iron staining, some oyster shells.	
22			
24			
26			
28			
30			
32			
34			
36			
38			
40			Total Depth 3'2" No indication of fill.
42			
44			
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 19 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/22/2001 13:05 END : 6/22/01 13:25 LOGGER : Bill Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-8"	Top Soil, sandy SILT, brown, cohesive, roots.	
4			
6			
8			
10	8-12"	Sandy SILT, cohesive, layered.	
12			
14	12-24"	Silty Clay, gray, cohesive.	
16			
18			
20			
22			
24			
26	24-41"	Sandy SILT, moist, cohesive. Bottom of hole slightly filling in.	
28			
30			
32			
34			
36			
38			
40			
42			Total Depth 3'5" No indication of landfilling. Photo 14?
44			
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 20 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/22/2001 13:25 END : 6/22/01 13:43 LOGGER : Bill Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-6"	Top Soil, silty SAND, dark brown to black, roots.	
4			
6			
8			
10			
12			
14			
16			
18	6-42"	Silty SAND, brown, medium to fine grained, cohesive, moist. Becoming slightly wet at bottom, some oysters (1%).	Piece of brick, but no other indication of filling.
20			
22			
24			
26			
28			
30			
32			
34			
36			
38			
40			
42			Total Depth 3'6" Photo 15 & 16
44			
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 21 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/22/2001 13:43 END : 6/22/01 14:00 LOGGER : Bill Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2			
4			
6	0-18"	Top Soil, brown to black.	Pieces of glass and brick.
8			
10			
12			
14			
16			
18			
20			
22			
24	18-46"	SAND, light gray with orange mottles, fine to medium grained, silty, cohesive, moist, some plant roots at 36". Becoming wet at bottom.	
26			
28			
30			
32			
34			
36			
38			
40			
42			
44			
46			
48			Total Depth 3'10" No other indication of filling, except brick and glass at surface.
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 22 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environment: IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/22/2001 14:00 END : 6/22/01 14:30 LOGGER : Bill Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-6"	Top Soil, sandy SILT, dark brown to black, medium to fine grained.	
4			
6			
8	6-36"	Sandy SILT, oyster shells.	Pieces of brick and some rocks
10			
12			
14			
16			
18			
20			
22			
24			
26			
28			
30			
32			
34			
36			
38	36-45"	Sandy SILT, medium to fine grained, gray, cohesive, moist becoming wet at the bottom.	
40			
42			
44			
46			Total Depth 3'9" Photo 17
48			
50			Other than rock and brick fragments, no other indication of filling.
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 23 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environment: IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/22/2001 14:30 END : 6/22/01 14:50 LOGGER : Bill Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-8"	Top soil, silty SAND, brown, roots.	Small pieces if brick.
4			The device found at the top of the layer is a signal, distress, hand AN MK1.
6			Possible spent flare at bottom of top soil (8
8			
10	8-29"	SAND, fine to medium grained, light gray to gray, with silt, slightly cohesive.	
12			
14			
16			
18			
20			
22			
24			
26			
28			
30	29-47"	Fine SAND and SILT, gray, cohesive. Wet at bottom of hole.	
32			
34			
36			
38			
40			
42			
44			
46			
48			Total Depth 3'11"
50			Photo 18
52			With exception of brick, no other indicatior of fill.
54			
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 24 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environment: IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/22/2001 14:50 END : 6/22/01 15:10 LOGGER : Bill Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-8"	Top Soil, sandy SILT, brown, roots.	At bottom of top soil, piece of metal and a bolt, brick piece as well.
4			
6			
8			
10	8-24"	Clayey SILT with sand, tan to brown, oyster shells.	
12			
14			
16			
18			
20			
22			
24			
26	24-45"	SAND, fine to medium grained with silt grading to sandy silt, light gray becoming gray. Water at bottom of hole.	
28			
30			
32			
34			
36			
38			
40			
42			
44			
46			Total Depth 3'9" Photo 19
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 25 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/22/2001 15:10 END : 6/22/01 15:35 LOGGER : Bill Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-4"	Top Soil, sandy SILT, with abundant rock, brown roots.	
4			
6	4-12"	Sandy SILT, brown, almost flaky, dry to moist.	Tin can, wood, sheet metal, gravel. Coke bottle.
8			
10			
12			
14			
16	12-24"	SAND, brown to light gray.	
18			
20			
22			
24			
26	24-28"	SAND, black, fine to medium grained, with silt, no odor, cohesive but friable. May stained black.	
28			
30			
32	28-42"	Sandy SILT, fine to medium grained, cohesive, moist.	
34			
36			
38			
40			
42			
44			Total Depth 3'6" Similar in appearance to Trench 16. Photo 20
46			
48			This location may indicate that burnt soils or contaminated soils were put here.
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 26 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/22/2001 15:35 END : 6/22/01 15:55 LOGGER : Bill Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2			
4	0-10"	Top Soil, sandy SILT with some clay, gray to brown, fine grained.	Few nails.
6			
8			
10			
12			
14			
16			
18	10-32"	SAND, fine to medium grained, silty,gray, moist, slightly cohesive, oyster shells, but not abundant, maybe 5%.	
20			
22			
24			
26			
28			
30			
32			
34			
36	32-42"	Sandy SILT, fine grained, gray to brown, moist, wet, cohesive, not plastic.	
38			
40			
42			
44			Total Depth 3'6" Photo 21 Other than a few nails found just under the top soil, no other indication of fil
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 27 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/22/2001 15:55 END : 6/22/01 LOGGER : Bill Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-6"	Top Soil, sandy SILT, black, roots.	
4			
6			
8	6-12"	SILT, very fine clay layers like settling pond sediments, gray to brown.	
10			
12			
14	12-53"	SILT to CLAY, blockey, wet. Hole is slumping.	
16			
18			
20			
22			
24			
26			
28			
30			
32			
34			
36			
38			
40			
42			
44			
46			
48			
50			
52			
54			Total Depth 4'7" Photos 22 & 23
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 28 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/23/2001 9:40 END : 6/23/01 9:55 LOGGER : Bill Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-6"	Top soil, sandy, SILT, brown, dry, non-cohesive, roots.	
4			
6			
8	6-18"	Silty SAND, fine to medium grained, abundant oysters shells. Brown with some orange mottles, little iron staining, roots.	
10			
12			
14			
16			
18			
20	18-36"	SAND, medium to fine, with silt, gray to brown.	
22			
24			
26			
28			
30			
32			
34			
36			
38	36-42"	Sandy SILT, fine grained, gray, moist, bottom of hole is wet. Material is cohesive, nonplastic.	
40			
42			
44			Total Depth 3'6" Photos 35 & 34 No indication of filling.
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 29 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/23/2001 10:20 END : 6/23/01 11:00 LOGGER : Bill Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-8"	Top Soil, silty SAND, brown, abundant roots.	
4			
6			
8			
10	8-24"	Sandy SILT, fine to medium grained, brown to tan, oysters.	Wire, pipe, and a piece of scrap metal. Petroleum odor. Collected sample SJS03-SB24-001 for TPH 18-24" bgs.
12			
14			
16			
18			
20			
22			
24			
26	24-30"	SAND, fine to medium, with silt, black to brown.	
28			
30			
32	30-42"	Sandy SILT, fine to medium grained, gray, cohesive.	
34			
36			
38			
40			
42			
44			Total Depth 3'6" Photo 33
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 30 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/23/2001 11:24 END : 6/23/01 11:50 LOGGER : Bill Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-6"	Top Soil, silty SAND, brown to black, moist, roots.	
4			
6			
8	6-18"	Sandy SILT, fine to medium grained, gray to brown, oyster shells, roots.	
10			
12			
14			
16			
18			
20	18-28"	SAND, medium to fine grained, gray to brown, with silt, no oysters. Water seeping out at bottom of layer.	
22			
24			
26			
28			
30	28-40"	Sandy SILT, fine, gray, cohesive, some clay.	
32			
34			
36			
38			
40			
42			Total Depth 3'4" Photo 32
44			
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 31 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/23/2001 11:50 END : 6/23/01 12:10 LOGGER : Bill Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-8"	Top Soil, brown and gravel gray.	
4			
6			
8			
10	8-18"	Sandy SILT, brown to gray, fine to medium grained, oysters, cohesive, non plastic. Water seeping out of bottom layer.	
12			
14			
16			
18			
20	18-28"	SAND, with silt, gray, fine to medium, no oysters.	
22			
24			
26			
28			
30	28-42"	Clayey SILT, gray, cohesive, blocky, fine sand, sticky, non plastic.	
32			
34			
36			
38			
40			
42			
44			Total 3'6" Photo 31 No indication of fill, no debris found.
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 32 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/23/2001 12:10 END : 6/23/01 12:34 LOGGER : Bill Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-6"	Top Soil, SAND silty, fine, black.	Piece of wire.
4			
6			
8	6-12"	SAND matrix with abundant oyster shells.	
10			
12			
14	12-36"	SAND, brown to light gray, medium to fine, with silt, slightly cohesive, moist.	
16			
18			
20			
22			
24			
26			
28			
30			
32			
34			
36			
38	36-48"	Silty fine SAND, gray, blockey, cohesive, sticky. Water at bottom.	
40			
42			
44			
46			
48			
50			Total Depth 4' Photos 29 & 28 Other than one piece of wire found, no indication of filling.
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 33 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/23/2001 12:34 END : 6/23/01 12:55 LOGGER : Bill Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-6"	Top Soil, sandy SILT, brown, and gravel, (from older road way), roots.	
4			
6			
8	6-14"	Sandy SILT to silty SAND, tan to brown, oysters, slightly cohesive.	
10			
12			
14			
16	14-28"	Silty fine SAND, gray, medium grained.	
18			
20			
22			
24			
26			
28			
30	28-40"	Silty SAND to sandy SILT, dark gray, blocky, cohesive, nonplastic, moist.	
32			
34			
36			
38			
40			
42			Total Depth 3'4" Water at bottom of trench. No indication of fill.
44			
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 34 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/23/2001 12:55 END : 6/23/01 13:08 LOGGER : Bill Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-8"	Top Soil, dark brown organic, loamy, plant roots.	
4			
6			
8			
10	8-24"	SAND with silt, medium to fine, tan to brown with some orange mottleing, moist, slightly cohesive. Water seeping in at bottom of layer.	
12			
14			
16			
18			
20			
22			
24			
26	24-36"	SAND, silty, fine to sandy silt, gray, cohesive, blocky.	
28			
30			
32			
34			
36			
38			Total Depth 3' Photo 26 No indication of filling.
40			
42			
44			
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 35 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/23/2001 13:56 END : 6/23/01 14:25 LOGGER : Bill Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-6"	Top Soil, SAND, silty, fine, brown, roots, slighly cohesive.	
4			
6			
8	6-14"	Clayey SILT, brown with orange mottles, roots, cohesive.	
10			
12			
14			
16	14-26"	Tan to brown with orange mottles, abundant oyster shells.	
18			
20			
22			
24			
26			
28	26-32"	SAND, fine to medium grained, tan, with silt, little to no oyster shells, slightly cohesive. Water seeping in at bottom of layer.	
30			
32			
34	32-44"	SAND, gray, silty, fine, cohesive, sticky.	
36			
38			
40			
42			
44			
46			Total depth 3'8" Photo 25-23 Photo 23 close up of oysters No debris found.
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 36 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/23/2001 14:25 END : 6/23/01 15:05 LOGGER : Bill Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-8"	Top Soil, silty SAND, black, with some gravel.	May have indication of burned soils. Bottom of top soil has wood and brick.
4			
6			
8			
10	8-24"	SAND with silt, fine to medium, tan to brown.	
12			
14			
16			
18			
20			
22			
24			
26	24-38"	SAND, silty, fine, gray, cohesive. Top of the unit has black staining and what looks like coal, but is more likely burnt soil.	
28			
30			
32			
34			
36			
38			
40			Total Depth 3'2" Photos 22 & 21 The material was not extensive, only appeared as a few fist size pieces. Collected sample SJS03-SB25-001. (Not submitted for analysis)
42			
44			
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 37 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/23/2001 15:05 END : 6/23/01 15:38 LOGGER : Bill Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-8"	Top Soil, Silty SAND, black to brown, roots.	
4			
6			
8			
10	8-22"	SAND with some silt, brown, iron stained.	Material found includes a wire and an insulator from an electric pole.
12			
14			
16			
18			
20			
22			
24	22-30"	SAND, silty fine to medium, tan to gray, cohesive, non-plastic, moist.	
26			
28			
30			
32	30-48"	SAND, silty fine, gray, some clay.	
34			
36			
38			
40			
42			
44			
46			
48			
50			Total Depth 4'
52			No indication of burnt or stained soil at this location.
54			
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 38 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/23/2001 15:38 END : 6/23/01 16:15 LOGGER : Bill Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-4"	Top Soil, sandy SILT, black, roots.	
4			
6	4-10"	Silty SAND, gray to brown, with oyster shells.	
8			
10			
12	10-18"	Clayey SILT to fine SAND with silt, brown to gray, cohesive at 12".	A spent 40mm shell.
14			
16			
18			
20	18-22"	SAND, silty, fine, tan to gray.	
22			
24	22-30"	Silty SAND, fine to medium, brown with some iron stains, abundant oyster shells.	
26			
28			
30			
32	30-42"	SAND, silty fine.	A piece of coal is on top.
34			
36			
38			
40			
42			
44			Total Depth 3'6" Photo 16
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 39 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/23/2001 16:15 END : 6/23/01 16:42 LOGGER : Bill Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-8"	Top Soil, Silty SAND, brown, abundant roots.	
4			
6			
8			
10	8-14"	Silty SAND and debris.	Brick, wood planks, "O" rings, piece or two of scrap metal, terracotta shingle.
12			
14			
16	14-28"	Silty SAND, gray to brown, medium to fine, cohesive, some oyster shells.	
18			
20			
22			
24			
26			
28			
30	28-42"	Silty fine SAND, gray, cohesive, sticky.	
32			
34			
36			
38			
40			
42			
44			Total Depth 3'6" Photos 11-12 No indication of burnt or contaminated soil. Debris Photos 15-13
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 40 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/23/2001 16:42 END : 6/23/01 17:05 LOGGER : Bill Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-6"	Top Soil, Silty SAND, dark brown to black, roots, cohesive, moist.	Some debris, two 6" nails and a piece of wood.
4			
6			
8	6-18"	Silty fine to medium SAND, gray to brown, oyster shells.	
10			
12			
14			
16			
18			
20	18-34"	SAND, gray, silty, fine to medium, some oyster shells.	
22			
24			
26			
28			
30			
32			
34			
36	34-42"	Sandy SILT, fine to medium, cohesive, wet, sticky.	
38			
40			
42			
44			Total Depth 3'6"
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 41 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/23/01 17:05 END : 6/23/01 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-3"	Top Soil, brown to black, cohesive, roots.	
4			
6			
8	3-15"	SILT to CLAY, in very fine layers, like settling pond, yellow to tan to gray, cohesive.	
10			
12			
14			
16			
18			
20			
22			
24	15-39"	Silty fine SAND, some clay, gray root clumps and oyster shells.	
26			
28			
30			
32			
34			
36			
38			
40			Total Depth 3'3"
42			
44			
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 42 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/25/01 08:10 END : 6/25/01 08:34 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-6"	Top Soil, Sandy SILT, brown, dry, moist, slightly cohesive, abundant roots.	Very little debris, wire, piece of slag.
4			
6			
8	6-19"	SAND, brown to gray, medium to fine, with silt, some oyster shells, cohesive, moist.	
10			
12			
14			
16			
18			
20	19-43"	Sandy SILT, brown to gray, medium to fine grained, cohesive, becoming wet at bottom of hole.	
22			
24			
26			
28			
30			
32			
34			
36			
38			
40			
42			
44			Total Depth 3'7" Photos 34 & 35 No indication of filling.
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 43 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/25/01 08:34 END : 6/25/01 08:50 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-8"	Top Soil, Sandy SILT, dark brown, with abundant roots, friable, slightly moist.	Stained soils, possible burned soils.
10	8-24"	SAND and SILT, gravel, brown, pieces of glass.	
26	24-30"	Stained soil, Sandy to Gravelly, no odor, friable.	Burnt or stained layer present at 24" to 30" below ground. Will collect sample, but may not submit. Other pieces of debris found, brick pieces, some wood, and some wire. Collected sample SJS03-SB26-001
32	30-42"	Silty fine to medium SAND, gray, wet at bottom of hole.	
44			Total Depth 3'6"

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 44 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/25/01 09:15 END : 6/25/01 09:45 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-8"	Top Soil, Sandy SILT, dark brown to black, with abundant roots.	Few pieces of small metal and wood near surface.
4			
6			
8			
10	8-14"	Sandy SILT, gray, fine to medium grained, cohesive, moist, some oyster fragments.	
12			
14			
16	14-24"	SAND, silty fine to medium, cohesive.	
18			
20			
22			
24			
26	24-36"	Sandy SILT, gray, fine to medium grained, cohesive, wet, non-plastic.	
28			
30			
32			
34			
36			
38			Total Depth 3' Photo 31 Water in bottom of hole. Except for a few pieces of debris, no indication of filling.
40			
42			
44			
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 45 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/25/01 09:45 END : 6/25/01 10:15 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-6"	Top Soil, Sandy SILT, brown to black, fine, with some clay, moist, some roots, cohesive.	Some debris, wood, pipe.
4			
6			
8	6-18"	Sandy SILT to Silty SAND, brown, fine to medium, few oyster shell fragments.	
10			
12			
14			
16			
18			
20	18-20"	Silty SAND, black, cohesive, no odor.	
22	20-36"	Silty SAND, brown to gray, medium to fine grained, wet, cohesive.	
24			
26			
28			
30			
32			
34			
36			
38			Total Depth 3' Photos 30-28
40			
42			
44			
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS03-TRENCH 46 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A .

WATER LEVELS N/A START : 6/25/01 12:05 END : 6/25/01 12:20 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-8"	Top Soil, Silty SAND, fine, black to brown, cohesive, moist.	No debris or staining of soil.
4			
6			
8			
10	8-13"	SAND, fine to medium, gray to tan, cohesive, no oyster shells.	
12			
14	13-24"	Silty SAND to Sandy SILT, gray to brown with orange mottles, cohesive, wet.	
16			
18			
20			
22			
24			
26	24-42"	Sandy SILT, gray, sticky, cohesive, wet, some oysters.	
28			
30			
32			
34			
36			
38			
40			
42			
44			Total Depth 3'6" Photo 27
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS03-TRENCH 47	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 7/3/01 11:35 END : 7/3/01 12:00 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-6"	Silty top soil, dark brown, moist, cohesive, roots.	Couple of nails and bolts at surface.
4			
6			
8	6-18"	Sandy SILT to silty SAND, tan to brown, moist, slightly cohesive.	
10			
12			
14			
16			
18			
20	18-36"	Fine to medium grained SAND with silt, gray, slightly cohesive.	
22			
24			
26			
28			
30			
32			
34			
36			
38	36-54"	SILT, dark gray, cohesive, non plastic.	
40			
42			
44			
46			
48			
50			
52			
54			
56			Total Depth 4'6" No indication of burnt or stained soils. Photo 29

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS03-TRENCH 48	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 7/3/01 12:00 END : 7/3/01 12:38 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-6"	Silty top soil with sand, brown, dry, roots.	Some nails at surface.
4			
6			
8	6-22"	Silty SAND, tan to brown, moist, cohesive, non plastic.	
10			
12			
14			
16			
18			
20			
22			
24	22-34"	Silty SAND, gray with brown mottles, moist.	
26			
28			
30			
32			
34			
36	34-58"	SILT, dark gray, becoming wet, cohesive, non plastic.	
38			
40			
42			
44			
46			
48			
50			
52			
54			Total Depth 4'10"
56			Photos 27 & 28 No indication of filling or staining.

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS03-TRENCH 49	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 3 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 7/3/01 12:38 END : 7/3/01 13:30 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-8"	Silty top soil, brown, dry, roots.	
10	8-26"	Sandy SILT, brown to gray, moist, cohesive, non plastic.	
28	26-34"	Silty SAND, tan, becoming wet, cohesive.	
36	34-58"	SILT with oyster shells, gray to dark gray, sticky when wet, cohesive, non plastic.	Total Depth 4'10" Photos 25 & 26 No indication of stained or contaminated soils.

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS05-TRENCH 1	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 5 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/25/01 15:10 END : 6/25/01 15:30 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2			Stained soils present.
4			
6	0-12"	GRAVEL and SAND, brown to gray, dry, loose.	
8			
10			
12			
14	12-15"	Sandy SILT, orange to black stained horizon, slightly cohesive.	No odor. Collected sample SJS05-SB22-001.
16			
18			
20	15-28"	Silty CLAY, dark brown to brown, dry, sticky, cohesive, plastic.	
22			
24			
26			
28			
30	28-36"	Black organic horizon with tree branches, roots, and leaves.	
32			
34			
36			
38	36-48"	CLAY, brown, wet, sticky, cohesive, non plastic.	Photo 21
40			
42			
44			
46			
48			
50			Total Depth 4'
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS05-TRENCH 2	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 5 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/25/01 15:56 END : 6/25/01 16:30 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-7"	GRAVEL and SAND, brown, dry.	While digging trench 2 the backhoe pulls up a fabric which appears to be some type of barrier between the overlying gravel and the clay. Photo 20
4			
6			
8			
10			
12			
14			
16			
18			
20	7-43"	Clayey SILT, brown becoming gray at bottom, sticky, soft.	No indication of burning. Photo 19 & 18 Collected sample SJS05-SB23-001.
22			
24			
26			
28			
30			
32			
34			
36			
38			
40			
42			
44			Total Depth 3'7"
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS05-TRENCH 3	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 5 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/25/01 16:30 END : 6/25/01 16:45 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-7"	GRAVEL and SAND, brown, dry.	Thin synthetic liner.
4			
6			
8			
10			
12			
14			
16			
18			
20	7-43"	Clayey SILT, brown becoming gray at bottom, sticky, soft.	No indication of burning.
22			Collected sample SJS05-SB23-001.
24			
26			
28			
30			
32			
34			
36			
38			
40			
42			
44			Total Depth 3'7"
46			Location should coincide with an old burn pit. A synthetic liner over clay. May have stained soil right under synthetic layer.
48			Photo 17
50			Trench identical to Trench 2.
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS05-TRENCH 4	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 5 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/26/01 08:10 END : 6/26/01 08:50 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-6"	Top soil, organic SILT, black, moist, cohesive.	
4			
6			
8			
10			
12			
14			
16			
18			
20	6-46"	Silty CLAY to clayey SILT, gray to brown at top becoming dark gray at bottom, sticky, cohesive. Plant roots and small tree roots present.	
22			
24			
26			
28			
30			
32			
34			
36			Water rapidly moved into hole. Water table at 3' bgs. Photo 36 & 35
38			
40			
42			
44			
46			
48			Total depth 3'10" No indication of burnt soil or fill.
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS05-TRENCH 5	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 5 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/26/01 08:50 END : 6/26/01 09:00 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0			
2	0-6"	Top soil, organic SILT, black, moist, cohesive.	
4			
6			
8			
10			
12			
14			
16			
18			
20	6-48"	Silty CLAY to clayey SILT, gray to brown at top becoming dark gray at bottom, sticky, cohesive. Plant roots and small tree roots present.	Silt layers from 6-16".
22			
24			
26			
28			
30			
32			
34			
36			Water rapidly moved into hole. Water table at 3' bgs.
38			
40			
42			
44			
46			
48			
50			Total depth 4' No indication of burning. Photo 34-32
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS05-TRENCH 6	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 5 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/26/01 09:25 END : 6/26/01 10:06 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2			
4	0-12"	GRAVEL, light brown to gray over plastic mesh material.	This location has a fabric underneath it similar to location 2 & 3. Photo 30
6			
8			
10			
12			
14	12-18"	Top soil, brown, sandy SILT, roots, cohesive, non plastic grading to (see below)	
16			
18			
20	18-42"	Silty CLAY to clayey SILT, gray, sticky, cohesive.	
22			
24			
26			
28			
30			
32			
34			
36			
38			
40			
42			
44			Total Depth 3'6" No indication of contamination or burnt soils.
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS05-TRENCH 7	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 5 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/26/01 10:10 END : 6/26/01 10:20 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-3"	Top soil, black, SILT to clayey silt, cohesive, abundant roots.	
6	3-9"	Sandy GRAVEL, light brown, dry, loose.	
14	9-15"	Fine to medium grained sandy SILT with some rocks, may indicate burnt soils, loose to cohesive.	
26	15-39"	SILT to silty CLAY with fine layers of silt similar to Site 3, tan to orange with roots, cohesive.	Collected sample SJS05-SB24-001.
40			Total Depth 3'3" Photo 29
56			

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS05-TRENCH 8	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 5 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/26/01 10:42 END : 6/26/01 11:18 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-3"	GRAVEL and SAND, light gray to tan, dry, loose.	Fabric beneath sand and gravel.
4			
6	3-14"	GRAVEL and SAND, brown to tan.	
8			
10			
12			
14			
16	14-20"	Clayey SILT, black to dark brown, sticky, cohesive.	Pieces of brick in upper portion (14-17"). May indicate contaminated or burnt soils.
18			
20			
22	20-45"	Mottled CLAY to clayey SILT, gray to brown, cohesive, slightly plastic, roots present.	
24			
26			
28			
30			
32			
34			
36			
38			
40			
42			
44			
46			Total Depth 3'9" Photos 27 & 26
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS05-TRENCH 9	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 5 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/26/01 11:18 END : 6/26/01 12:25 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-7"	GRAVEL and SAND, light brown to tan, dry, loose.	Fabric at 7" bgs.
4			
6			
8	7-18"	Sandy GRAVEL, brown to tan.	
10			
12			
14			
16			
18	18-23"	Clayey SILT with roots, black.	Appears to have burned soils. Slight odor, possible contaminated soils.
20			
22			
24	23-45"	Clayey SILT, black to gray-green, dry, sticky, cohesive, non plastic.	
26			
28			
30			
32			
34			
36			
38			
40			
42			
44			
46			Total Depth 3'9" Photos 25 & 24
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS05-TRENCH 10	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 5 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/26/01 12:25 END : 6/26/01 13:00 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-8"	Top soil & GRAVEL, light brown to gray, dry, loose.	
4			
6			
8			
10	8-15"	Fine sandy SILT with some coarser sand and some pieces of gravel.	Pieces of wood present. Iron stained at top.
12			
14			
16	15-42"	Silty CLAY to clayey SILT, silt is in very fine layers, tan to brown to yellow, clay is dark gray to gray green, dry, cohesive, plastic.	
18			
20			
22			
24			
26			
28			
30			
32			
34			
36			
38			
40			
42			
44			Total Depth 3'6" Photos 23 & 22 Appears to be stained soils.
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS05-TRENCH 11	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 5 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/26/01 13:00 END : 6/26/01 13:25 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-12"	Top soil and FILL with gravel and sandy silt.	
4			
6			
8			
10			
12			
14	12-40"	CLAY, dark gray, cohesive, blocky, plastic.	
16			
18			
20			
22			
24			
26			
28			
30			
32			
34			
36			
38			
40			
42			Total Depth 3'4" Photos 21 & 20-19 Burnt material, burnt wood, and some pieces of metal.
44			
46			
48			
50			
52			
56			
58			

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS05-TRENCH 12	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 5 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/26/01 13:25 END : 6/26/01 13:55 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-7"	Top soil, silty SAND with some gravel, brown.	
4			
6			
8	7-16"	Sandy SILT matrix with debris present, black.	Debris present, corrogated shingles, scrap metal, strapping, glass, and wood. Appears have been burned at one time.
10			
12			
14			
16	16-45"	Silty clay to CLAY, gray to gray green silt, sticky, cohesive, non plastic.	Water coming in bottom.
18			
20			
22			
24			
26			
28			
30			
32			
34			
36			
38			
40			
42			
44			
46			Total Depth 3'9"
48			
50			
52			
56			
58			

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS05-TRENCH 13	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 5 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/26/01 13:55 END : 6/26/01 14:18 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-8"	Top soil and GRAVEL, sandy SILT, dry, slightly cohesive.	
4			
6			
8			
10	8-20"	Blank sandy horizon with burnt material.	
12			
14			
16			
18			
20			
22	20-24"	CLAY to SILT, gray, dry, cohesive, non plastic to plastic.	
24			
26			Total Depth 2' Photo 17 & 16 Evidence of burning or of material being pushed. Pieces of metal, ceramics, glass, pieces of metal, wires, nails, brass.
28			
30			
32			
34			
36			
38			
40			
42			
44			
46			
48			
50			
52			
56			
58			

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS05-TRENCH 14	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 5 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/26/01 14:18 END : 6/26/01 14:40 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-5"	Top soil, silty SAND, black to brown, roots, cohesive.	
4			
6			
8	5-15"	Silty SAND with debris, black to dark brown.	Some iron staining.
10			
12			
14			
16	15-22"	SILT, gray to tan, cohesive, non plastic, finely layered with some roots.	
18			
20			
22			
24			Total Depth 1'10" Photos 15 & 14 Debris found, brick, glass, wood, wire, piece of ceramic pipe. Some of the wood appears to be burned.
26			
28			
30			
32			
34			
36			
38			
40			
42			
44			
46			
48			
50			
52			
56			
58			

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS05-TRENCH 15	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 5 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/26/01 14:40 END : 6/26/01 15:15 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2			
4	0-8"	Top soil and SILT with fine sand, brown to dark brown, abundant roots.	
6			
8			
10	8-12"	Silty SAND, black, pieces of glass and small debris.	No odor.
12			
14			
16	12-24"	CLAY to silty clay, gray to greenish gray, cohesive, plastic.	May be moving away from burn material.
18			
20			
22			
24			
26			Total Depth 2" Photo 13 No strong indication of burning, few pieces of metal, brass, and glass.
28			
30			
32			
34			
36			
38			
40			
42			
44			
46			
48			
50			
52			
56			
58			

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS05-TRENCH 16	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 5 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/26/01 15:15 END : 6/26/01 15:36 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-5"	Silty top soil, brown, roots.	
4			
6			
8			
10	5-16"	Silty SAND, brown with iron staining at top becoming black layer with debris.	Debris, pieces of trees, wood, brick, glass, and scattered pieces of metal.
12			
14			
16			
18	16-26"	CLAY and clayey SILT, gray, dry, sticky, non plastic.	
20			
22			
24			
26			
28			Total Depth 2'2" Photos 12, 11, 10 Indication of burning. Burnt wood and glass.
30			
32			
34			
36			
38			
40			
42			
44			
46			
48			
50			
52			
56			
58			

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS05-TRENCH 17	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 5 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/26/01 15:36 END : 6/26/01 16:00 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-6"	Top soil and sandy SILT, dry, loose, roots.	
4			
6			
8	6-14"	Silty SAND with concrete, brown, dry, loose.	
10			
12			
14			
16	14-20"	CLAY, gray to black with some iron staining at top.	May have some burnt/contaminated soils, no odor.
18			
20			
22	20-26"	CLAY and SILT layers, gray to tan and rust colored, cohesive, blocky, non plastic, roots.	
24			
26			
28			Total Depth 2'2" Trench had abundant concrete but no wood or metal.
30			
32			
34			
36			
38			
40			
42			
44			
46			
48			
50			
52			
56			
58			

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS05-TRENCH 18	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 5 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/26/01 16:00 END : 6/26/01 16:24 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-3"	Top soil and SILT with sand, dark brown to black, roots.	
4	3-9"	Sandy debris.	Oxidized or burnt.
6			
8			
10			
12	9-19"	SILT and CLAY with layered fine silt, gray to brown, cohesive, non plastic, roots.	Photo 6
14			
16			
18			
20			Total Depth 1'7" Photo 7 Some of the soil appears orange, almost rusted soils, really doesn't look burned, oxidized metal, and piece of pipe.
22			
24			
26			
28			
30			
32			
34			
36			
38			
40			
42			
44			
46			
48			
50			
52			
56			
58			

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS05-TRENCH 19	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 5 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/26/01 16:24 END : 6/26/01 16:40 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2			
4	0-8"	Top soil, silty, brown to black, roots.	
6			
8			
10			
12	8-15"	Silty SAND, iron stained to black.	Glass, debris, possible burned soil. No odor.
14			
16			
18			
20	15-24"	CLAY and SILT, almost peat like, gray to brown, cohesive, non plastic, roots.	
22			
24			
26			Total Depth 2' Photo 6 An OE (percussion primer Mark 14) item found, copper wire, glass, soils appear to be stained.
28			
30			
32			
34			
36			
38			
40			
42			
44			
46			
48			
50			
52			
56			
58			

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS05-TRENCH 20	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 5 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/27/01 08:05 END : 6/27/01 08:25 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-6"	Top soil, SILT, and some sand, dark brown, moist, cohesive, organic, roots.	
4			
6			
8	6-15"	Finely layered SILT, gray to tan to yellow, cohesive, non plastic, roots.	
10			
12			
14			
16	15-42"	CLAY to silty clay, dark gray, sticky, non plastic.	
18			
20			
22			
24			
26			
28			
30			
32			
34			
36			
38			
40			
42			
44			Total Depth 3'6" Photo 35 No indication of filling. Followed metal detector until there was no more signal.
46			
48			
50			
52			
56			
58			

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS05-TRENCH 21	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 5 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/27/01 08:25 END : 6/27/01 08:46 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-3"	Top soil and SILT, brown, roots.	
4			
6	3-14"	Fine silty layers, tan to brown and gray, cohesive, non plastic.	
8			
10			
12			
14			
16	14-34"	CLAY to clayey SILT, sticky, cohesive, non plastic.	Oxidized zones with roots. Some water at bottom.
18			
20			
22			
24			
26			
28			
30			
32			
34			
36			Total Depth 2'10" Photos 34 & 33 No indication of burned soils. No debris found.
38			
40			
42			
44			
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS05-TRENCH 22	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 5 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/27/01 08:46 END : 6/27/01 09:15 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2			
4	0-10"	Top soil and SILT, dark brown, dry, loose, high root content.	
6			
8			
10			
12	10-18"	SILT, fine layers, tan, brown, and gray, dry to moist, cohesive, non plastic, roots	
14			
16			
18			
20	18-42"	Clayey SILT to silt, dark gray, sticky, non plastic.	
22			
24			
26			
28			
30			
32			
34			
36			
38			
40			
42			
44			Total Depth 3'6" A few pieces of scrap metal near the surface but no indication of burnt or contaminated soils.
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS05-TRENCH 23	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 5 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/27/01 09:15 END : 6/27/01 09:50 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-9"	Top soil with silty organic layer, dark brown, high root content.	Some debris, glass, piece of metal just below the top soil. May indicate some signs of debris of stained soils but a small 6" layer.
10	9-15"	SILT with some debris.	Debris, glass, wire, and small pieces of metal.
16	15-32"	Clayey SILT to silt, finely layered, brown to tan, cohesive, non plastic.	
34	32-42"	SILT to clayey silt, dark gray, moist, sticky, non plastic.	Water seeping in at bottom of hole. Photo 31
42			Total Depth 3'6"

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS05-TRENCH 24	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 5 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/27/01 09:50 END : 6/27/01 10:15 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2			
4	0-14"	Top soil layer with debris, blackened under soil.	Debris, glass, metal. May indicate area where material was pushed around. Orange staining from oxidation.
6			
8			
10			
12			
14			
16			
18	14-25"	Finely layered SILT, tan to gray with oxidized horizons, cohesive, friable, non plastic, roots.	
20			
22			
24			
26			
28			
30			
32			
34	25-44"	Clayey SILT to silt, gray, sticky, non plastic.	Hole filling with water.
36			
38			
40			
42			
44			
46			Total Depth 3'8" Photo 30
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS05-TRENCH 25	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 5 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/27/01 10:15 END : 6/27/01 10:42 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2			
4	0-9"	Silty, organic top soil, dark brown to black, roots.	
6			
8			
10			
12	9-19"	SILT, tan to gray with oxidized layers, cohesive, friable, non plastic, roots.	
14			
16			
18			
20			
22			
24			
26	19-38"	SILT to clayey silt, dark gray, sticky, non plastic.	Bottom of hole filling with water.
28			
30			
32			
34			
36			
38			
40			Total Depth 3'2" Photo 29 There was just a few pieces of metal, maybe some china just below top soil, but no other signs of filling, contaminated, or burnt soils.
42			
44			
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS05-TRENCH 26	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 5 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/27/01 10:42 END : 6/27/01 11:06 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-4"	Silty top soil, dark brown, high root content.	Minor layer of burnt material just below top soil. Horizon may just be 1-2" thick.
4			
6	4-6"	Black horizon of SILT, cohesive, loose.	Pieces of burnt wood.
8	6-11"	Finely layered SILT, gray to tan, friable.	
10			
12			
14			
16			
18			
20	11-36"	SILT to clayey silt, dark gray, sticky, non plastic.	Water coming into bottom of hole.
22			
24			
26			
28			
30			
32			
34			
36			
38			Total Depth 3' Photos 28 & 27
40			
42			
44			
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS05-TRENCH 27	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 5 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/27/01 11:06 END : 6/27/01 11:34 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-6"	Top soil and SILT, dark brown, roots.	Small debris, some pieces of wood.
8	6-9"	SILT, brown, iron stained, roots.	
10	9-10"	Silty SAND, black, stained layer.	Small pieces of wood and rock.
12	10-20"	SILT, tan to gray with oxidized layers and roots, friable, cohesive.	
22	20-41"	Dark gray, sticky, non plastic.	Water in bottom 6" of hole.
42			Total Depth 3'6" Photo 26 Surface debris beneath top soil, wire, shingle, thin lense of black stained soil, no odor, but pieces of rock and wood.

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS05-TRENCH 28	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 5 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/27/01 11:34 END : 6/27/01 12:00 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-8"	Silty top soil, brown, roots.	Pieces of wood, very little metal beneath top soil.
4			
6			
8			
10	8-15"	SILTY, black horizon, debris.	Debris includes some brick, wood. Soils do appear to be stained.
12			
14			
16	15-38"	Silty CLAY to SILT, brown at top becoming gray at bottom, cohesive, slightly plastic.	3" Mark 7 Mod Cartridge Case, Expended. Photo 24
18			
20			
22			
24			
26			
28			
30			
32			
34			
36			
38			
40			Total Depth 3'2" Photo 25 of found
42			
44			
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS05-TRENCH 29	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 5 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/27/01 12:25 END : 6/27/01 12:52 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-6"	Top soil and SILT, brown, abundant roots.	
4			
6			
8	6-10"	Silty SAND, brown to tan, friable, slightly cohesive.	
10			
12	10-12"	SILTY black horizon.	No odor, burnt wood pieces. Evidence of burnt soils.
14			
16	12-24"	CLAY to silty clay becoming silty, gray to brown, cohesive, blocky, plastic, roots.	
18			
20			
22			
24			
26			
28			
30	24-38"	SILT to clayey silt, dark gray, sticky.	Photo 23
32			
34			
36			
38			
40			Total Depth 3'2"
42			
44			
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS05-TRENCH 30	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 5 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/27/01 12:52 END : 6/27/01 13:38 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2			
4	0-10"	GRAVEL, road bed.	
6			
8			
10			
12			
14	10-22"	SILT to clayey silt, dark gray, sticky, cohesive, non plastic.	
16			
18			
20			
22			
24	22-26"	Medium grained SAND, black.	Pieces of burnt wood and rocks.
26			
28			
30	26-36"	Sandy SILT to silty SAND to sandy silt, brown.	Water coming into bottom of hole.
32			
34			
36			
38			Total Depth 4' Photo 22 & 21
40			
42			
44			
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS05-TRENCH 31	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 5 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A.

WATER LEVELS N/A START : 6/27/01 13:38 END : 6/27/01 14:06 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-2"	Top soil.	
4	2-7"	SAND and GRAVEL, gray.	
8	7-15"	Silty CLAY, brown with orange-brown mottles, cohesive, plastic.	Darker layer at about 12-17". May be older road bed. The black material is sandy silt, no debris, no odor. I don't believe that the layer is burnt soil.
16	15-20"	Black horizon.	
22	20-36"	Silty SAND medium to fine grained, brown to tan, cohesive.	Wet at bottom. Photo 20
38			Total Depth 3' Similar to Trench 30. No debris.

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS05-TRENCH 32	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 5 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/27/01 14:06 END : 6/27/01 14:25 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-4"	Top soil and organic SILT, dark brown, high root content.	
4			
6			
8	4-14"	SILT, brown with orange mottling, oxidized layers, friable, cohesive.	
10			
12			
14			
16			
18			
20			
22	14-38"	SILT to clayey SILT, gray to dark gray, dry to wet, sticky, non plastic.	
24			
26			
28			
30			
32		Last 6" is organic layer, peaty, high root content.	Water at bottom.
34			
36			
38			
40			Total Depth 3'2" Photo 19 No indication of burnt or contaminated soils.
42			
44			
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS05-TRENCH 33 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 5 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/27/01 14:25 END : 6/27/01 14:55 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0	0-6"	Silty top soil, dark brown to black, high root content.	
6	6-18"	Medium to fine-grained SAND with silt and pieces of concrete, brown, dry, loose.	Iron stained horizon at bottom. No metals found.
18	18-20"	Sandy SILT, black horizon.	Soils have a slight odor.
20	20-36"	SILT, gray to dark gray, dry at top, friable, sticky when wet, non plastic.	
36	36-42"	SILT with fine to medium grained sand, dark gray, wet.	Photo 18 Water seeping in among sand.
42			Total Depth 36"

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS05-TRENCH 34	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 5 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/27/01 14:55 END : 6/27/01 15:50 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-6"	Top soil and SILT, black to dark brown, high root content.	
4			
6			
8			
10	6-18"	SILT to silty CLAY, brown to gray, oxidized layers, roots.	
12			
14			
16			
18			
20	18-42"	Clayey SILT, wet, sticky, non plastic.	
22			
24			
26			
28			
30			
32			
34			
36			
38			
40			
42			
44			Total Depth 3'6"
46			Water filled pit to 32" bgs. No indication of stained soils, just surface debris.
48			Photo 13
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS05-TRENCH 35	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 5 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/27/01 15:50 END : 6/27/01 16:10 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-4"	Silty top soil, black, high organic content.	Pieces of metal present.
4			
6	4-12"	Fine to medium grained SAND with SILT, tan to light brown, loose, friable.	Concrete.
8			
10			
12	12-14"	Sandy SILT, black horizon.	No apparent odor. Indication of stained soils.
14			
16	14-20"	Silty CLAY to clayey SILT with fine layers of silt, tan to brown to slightly rust orange, cohesive, non plastic.	
18			
20			
22	20-36"	Silty CLAY to SILT, dark gray, moist, sticky.	
24			
26			
28			
30			
32			
34			
36			
38			Total Depth 3' Photo 13
40			
42			
44			
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS05-TRENCH 36	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 5 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/28/01 08:40 END : 6/28/01 09:10 LOGGER : P. Landin

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-5"	Top soil, dark brown, organic, abundant roots.	Pieces of metal but no burnt or contaminated soil horizon.
4			
6	5-11"	Finely layered SILT, tan to brown, dry, cohesive, friable, non plastic.	
8			
10			
12			
14			
16			
18			
20	11-39"	SILT, dark gray, dry at top, becoming moist, sticky when moist, cohesive, friable, non plastic.	Debris in top soil, but no indication of contaminated soils.
22			
24			
26			
28			
30			
32			
34			
36			
38			
40			Total Depth 3'3" Photo 35 of trench Photo 34-33 of excavator
42			
44			
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS05-TRENCH 37	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 5 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/28/01 09:10 END : 6/28/01 10:05 LOGGER : P. Landin

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-6"	Top soil, high root structure.	Bolts and nails, no other sign of filling.
4			
6			
8	6-18"	Finely layered SILT, tan to gray to yellow, friable, cohesive, non plastic.	
10			
12			
14			
16			
18			
20	18-43"	SILT, dark gray, wet, sticky, non plastic.	
22			
24			
26			
28			
30			
32			
34			
36			
38			
40			
42			
44			Total Depth 3'7" Photo 32 Water in hole, depth to water 2'6".
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS05-TRENCH 38	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 5 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/28/01 09:40 END : 6/28/01 10:05 LOGGER : P. Landin

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-2"	Top soil, sandy GRAVEL, dark brown, roots.	Scrap metal.
4 6	2-6"	GRAVEL and SAND, brown, dry, loose.	Filter fabric
8 10 12 14 16 18 20 22 24	6-24"	Finely layered, tan to gray, friable, roots.	
26 28 30 32 34 36 38 40 42 44 46 48	24-48"	SILT and fine SAND, moist, cohesive, friable.	No indication of burnt or stained soil.
50 52 54 56			Total Depth 4' Photo 31

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS05-TRENCH 39	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 5 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/28/01 10:05 END : 6/28/01 10:30 LOGGER : P. Landin

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-2"	Top soil.	
4	2-6"	Coarse GRAVEL with sand fill.	Underlain by filter fabric.
6			
8			
10	6-18"	Clayey SILT, gray with brown mottles, stiff.	
12			
14			
16			
18			
20	18-36"	Same as above, no sand at bottom, clayey silt is not mottled near bottom, gray.	Photo 30 No signs of debris or stained soils.
22			
24			
26			
28			
30			
32			
34			
36			
38			Total Depth 3'6" No visible groundwater in bottom of hole.
40			
42			
44			
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS05-TRENCH 40	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 5 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/28/01 10:30 END : 6/28/01 10:45 LOGGER : P. Landin

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-2"	Top soil, heavy roots.	
4	2-8"	Coarse GRAVEL with SAND.	No fabric at this location.
6			
8			
10	8-24"	Clayey SILT, gray with brown and orange mottles, stiff.	
12			
14			
16			
18			
20			
22			
24			
26	24-27"	Organic layer, dark brown to black, moist, roots.	
28	27-48"	Fine to medium grained SAND with trace clay, light brown to tan, wet to moist.	Groundwater filling in very bottom of hole.
30			
32			
34			
36			
38			
40			
42			
44			
46			
48			
50			Total Depth 4' No signs of waste or stained soil. Photo 29
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS05-TRENCH 41	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 5 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 7/3/01 10:00 END : 7/3/01 10:20 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2			
4	0-12"	Top soil and sandy SILT, brown with iron staining.	Some debris, glass and nails.
6			
8			
10			
12			
14			
16			
18			
20			
22			
24	12-41"	SILT, yellow to brown, oxidized horizon, finely layered.	
26			
28			
30			
32			
34			
36			
38			
40			
42			
44	41-65"	Fine to medium grained silty SAND, tan, wet, roots.	Water filling hole.
46			
48			
50			
52			
54			
56			Total Depth 5'5" Photo 31 No indication of burning or contaminated soils.

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS05-TRENCH 42	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 5 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 7/3/01 10:20 END : 7/3/01 11:35 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-4"	Top soil and SILT, brown to dark brown, dry, roots.	
4			
6			
8			
10	4-18"	SAND, tan to brown.	Concrete and wood.
12			
14			
16			
18			Iron stained at 18" bgs.
	18-20"	Silty CLAY, gray to black, cohesive, slightly plastic.	Black stained horizon - may be indication of burnt soils. The layer is discontinuous.
20			
22			
24			
26			
28			
30	20-50"	SILT, gray, non plastic.	
32			
34			
36			
38			
40			
42			
44			
46			
48			
50			
52			Total Depth 4'2" Photo 30 Collect sample SJS05-SB26-001 for dioxins
54			
56			

PROJECT NUMBER	TEST PIT NUMBER	
138804.FI.TR	SJS06-TRENCH 01	SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 6 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/25/01 13:10 END : 6/25/01 13:45 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-6"	Top soil, brown, sandy SILT, dry, mixed with concrete and in place bags of concrete.	
4			
6			
8	6-20"	Silty fine to medium SAND with oyster shells, brown, slightly cohesive, slightly moist.	
10			
12			
14			
16			
18			
20			
22	20-40"	Silty medium SAND with some fines, some silt, less oyster shells.	Collected soil sample SJS06-SB01-001 and duplicate sample SJS06-SB01-001P.
24			
26			
28			
30			
32			
34			
36			
38			
40			
42			Total Depth 3'4" Photos 26 & 25 No indication of burned soils.
44			
46			
48			
50			
52			
54			
56			

PROJECT NUMBER	TEST PIT NUMBER
138804.FI.TR	SJS06-TRENCH 02 SHEET 1 OF 1

TEST PIT LOG

PROJECT : St. Juliens Creek Annex - Site 6 LOCATION : Chesapeake, Virginia

ELEVATION : N/A TRENCHING CONTRACTOR : IMS Environmental

DRILLING METHOD AND EQUIPMENT USED : N/A

WATER LEVELS N/A START : 6/25/01 13:45 END : 6/25/01 14:55 LOGGER : B. Friedmann

Depth (inches)	Interval (inches)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-6"	Top soil, dark brown.	Found initiator and pieces of metal under grass. Initiator was a M3 cartridge-actuated device that are used in aircraft emergency escape systems to provide a source of gas pressure. Metal may be portions of initiator.
4			
6			
8	6-18"	Fine sandy SILT, brown, slightly moist, slightly cohesive, abundant oyster shells.	
10			
12			
14			
16			
18			
20	18-32"	Light brown to dark brown, cohesive.	
22			
24			
26			
28			
30			
32			
34	32-39"	Fine sandy SILT, gray to dark gray, cohesive, sticky.	No indication of burning.
36			
38			
40			Total Depth 3'3"
42			
44			
46			
48			
50			
52			
54			
56			

CH2MHILL

PROJECT NUMBER	BORING NUMBER		
CTO28	SJS05-MW20	SHEET	2 OF 2

SOIL BORING LOG

PROJECT ST JULIENS CREEK ANNEX LOCATION SITE 5 MW02D

ELEVATION : DRILLING CONTRACTOR AEDS

DRILLING METHOD AND EQUIPMENT SEE P. 1

WATER LEVELS START FINISH LOGGER L. FRANCIS

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
30		SP	1.5	3-4-55	SAND, v. fine, some clay, tr. med sand, DK GREENISH GREY (GLEY 4/1). clayey lenses 1-2" thick	START DRILLING at 30' 0800 7/13/97.
		CL	2.0	2-3-3-3	CLAY (CL) DK greenish grey (GLEY 4/1). Tr. v. fine sand in <1mm partings.	
35			2.0	2-2-2-2	increasing sand, but still a minor component.	
			2.0	3-2-3-2	CLAY, as above, V. Soft	
			2.0	2-3-3-2	Trace shells, organics	
40			2.0	3-3-3-3	decreasing sandy partings at 40 ft.	
			2.0	3-3-3-3		
			2.0	1-2-2-2	CLAY as above to 45.7'	
45		SC	0.3	2-2-3-2	SAND, clayey (SC), V. fine to fine little shell fragments. Decreasing shell fragments	
		SM	1.6	3-3-4-3	SAND, some silt (SM) v. fine to fine, little clay	
50		SP	1.6	3-2-2-3	SAND, v. fine to fine, trace med. DK greenish grey (GLEY 4/1)	
		SW	1.5	5-56-5	SAND, fine to med (SW) tr. coarse angular sandstone pebble at 53.5' clay with m-c sand at 53.7'	
55		----	1.5	5-5-4-5	SAND, c-m (SW) to 54.5. Sandy/Gravelly clays to 55.8	
		GW/CL	1.6	6-5-56	Limestone Gravel to 56'. Alternating layers (3-4") of Gravelly CLAY and clayey GRAVEL DK greenish grey (GLEY 4/1). Gravel is Coquina.	
60					Boring terminated at 60'.	SAMPLING ENDED AT 58' DRILLED W. TH 6" MUD ATTACK TO 60' TO SET WELL.

PROJECT NUMBER	BORING NUMBER	SHEET
6207-027	MW-35 SJSG5	1 OF 1

SOIL BORING LOG

PROJECT St Juliens Creek Annex LOCATION Site 5 Burning Grounds

ELEVATION Ground 557/TOC 560.68 ft MSL DRILLING CONTRACTOR American Environmental Drilling Services

DRILLING METHOD AND EQUIPMENT 6 1/4" ID Hollow Stem Augers. Ingersoll Rand A-300 Drill Rig

WATER LEVELS _____ START 6/29/97 FINISH 6/29/97 LOGGER S. Bussey (Com Feder)

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
2	2-3	S-1	12/12	2|3|5(0")	(SM) Silty F. Sand 3" of wood in Recovery and in bottom of split spoon Dry Hard mottled light yellowish brown 2.5Y6/3 and yellowish brown 10YR 5/8	1530 Start Drilling Refusal on wood at 3' (RR tie OVM 0 ppm
4					No Sample	
6	4-6	S-2	6"/24	2|1|3|1	Silty Fine Sand (SM) Wet Saturated Olive Brown 2.5Y 4/3	OVM 0 ppm
8						
10	10-12	S-3	24/24	2|3|1|3	Silty F Sand (SM) Wet ~~V. Soft~~ SD well sated Olive yellow 2.5Y 6/6	OVM - 0 ppm
12					Cuttings on auger 12-14'- dark greenish Silty Clay w/ F. Sand V. Soft	grey 5GY 4/1
14					Bottom of Boring 14' BGS	1640 Install well. 1710 Complete well

Figure 1
SOIL BORING LOG, FORM D1586

REV 11/89 FORM

CH2M HILL

PROJECT NUMBER	BORING NUMBER	SHEET
6207-028	MW-25 SJSO5	1 OF 1

SOIL BORING LOG

PROJECT St Juliens Creek Annex LOCATION Burning Grounds Site 5

ELEVATION Ground: 4.55/TOC 7.25 Htms1 DRILLING CONTRACTOR American Environmental Drilling Services

DRILLING METHOD AND EQUIPMENT 6"/4" ID Hollow Stem Augers Ingersoll Rand A-300 Drill Rig

WATER LEVELS _____ START 7/01/97 FINISH 7/01/97 LOGGER S Buttery (CDM Fed)

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
						Started Drilling 1305
3	3-5	S-1	24"/24"	2-2-3-1	Silty Med. Sand (SM) interbedded with Silty clay (CL) at 5' getting into V. Soft silty clay - color bands at 3.5' Wet at approx 3.8' dark greenish gray 10Y 4/1	Sands are from 3.5 - 4.9' OVM - 0ppm
5						
	5-7'	S-2	24/24	1-3-4-1	5-6.4 Silty Clay Very soft to soft harder with depth (CL) trace organics throughout the spoon. dark greenish gray 10Y 3/1 wet	OVM - 0ppm
7					6.4-7' Silty Sandy clay (same color) (CL)	
10	10-12	S-3	24/24	3-2-4-1	10-11 - Silty Clay with trace Sand and organics (CL) Soft dark greenish gray 10Y 3/1	OVM - 0 ppm
					11-11.5 Same as above increasing Sand and organics	
					11.5-12 Silty F. Sand with trace clay and organics wet (SM) V. dark gray 2.5Y 3/1 to light brownish gray 2.5Y 6/2	
					Bottom of Boring 14' BGS	1420 Complete drilling - Begin well construction

Figure 1
SOIL BORING LOG, FORM D1586

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
CTO28	SJSOS-MW2D	SHEET 1 OF 2

SOIL BORING LOG

PROJECT NAVYCLEAN II ST. JULIENS CREEK LOCATION SITE 5 MW02D

ELEVATION GROUND: 4.56' TOC: 7.12 DRILLING CONTRACTOR AEDS

DRILLING METHOD AND EQUIPMENT HSA (4 1/4 and 8 1/4") / 6" MUD ROTARY / INGERSOL RAND A300 RIG

WATER LEVELS _____ START _____ FINISH _____ LOGGER L. FRANCE

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
					SEE LOG FOR SITE 5 MW02S FOR 0-10' INTERVAL	0935 6/29/97 Start Auger to 10' with 4 1/4" HSA.
5						
10		CL	1.8	1/12"-1-1	CLAY (CL), Soft, moist-wet. DK. grey (5Y 4/1).	0 ppm on OVM
			2.0	1/12"-1-1	Same as above, tr. med. sand.	
15		ML	1.75	1-1-1-1	SILT (ML) Dk reddish Brown (5YR 2.5/2) sand lens	
		SP	0.4	1-1-1-1	SAND (SP), fine grained wet. brey (GLEY 5/1).	
			1.8	1-1-1-1	SAND, fine, Greyish brown (10YR 5/2) Clay in end of Split spoon	
20		CL	1.2	1-1-1-1	CLAY, greenish grey (GLEY 6/1) trace sand (CL)	SET 6" PVC ISOLATION CASING to 22' (2' into CLAY) THROUGH 8 1/4" HSA
			1.5	2-2-1-2	Clay, as above, stiff, moist (not wet) trace organics.	
25						NO SAMPLE COLLECTED 24-2
30		SP	2.0	2-2-2-3	0.2' of sand from 28.8 to 29' 29.5	START SAMPLING 25-30' 7/1 MUD ROTARY 6"

PROJECT NUMBER	BORING NUMBER	SHEET
CTO26	SITE 5 MW01D	1 OF 2

SOIL BORING LOG

PROJECT NAVYCLEANII / ST. JULIENS CREEK ANNEX LOCATION SITE 5 MW01D

ELEVATION GROUND: 6.11 / TOC: 8.59 DRILLING CONTRACTOR AEDS

DRILLING METHOD AND EQUIPMENT INGERSOL RAND A300 / HSA: 8 1/4" and 4 1/4" / 5" mud rotary

WATER LEVELS _____ START _____ FINISH _____ LOGGER L. FRANCE

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
					SEE LOG FOR SITES MW01S FOR 0-10' INTERVAL	6/28/97 1440 Start Sampling with 4 1/4" ID HSA 2' Spl.t Spoon.
5						
10		SP	1.0	3-3-3-4	SAND, v. fine to fine (SP). Gray (5Y 6/1) Wet. Loose.	
			1.2	3-3-4-3	SAND, (SP) med. Gray (5Y 6/1) and light yellowish brown (5Y 6/4)	
15		CL	2.0	2-2-1-2	14.5 CLAY(CL) Soft (GLEY 5/1) Greenish grey. tr. f. sand.	
			2.0	1-1-1-1	16'-16.6': CLAY, fine sand as above @16.6': CLAY(CL) Dry. Pk grey (2.5Y 4/1)	
			2.0	1/12"-1-1	clay, as above, soft. Stiffer 19.7-20'. f. Sand at 19.3. Wet.	
20			2.0	1-1-1-1	CLAY (CL) as above. Soft	
			2.0	1-1-2-1		
25			2.0	1-1-1-1	CLAY(CL) as above, Little organic Soft	
			2.0	1-1-1-2		
30			2.0	1-1-1-1	CLAY. Soft. GRAY (2.5YR 5/1).	

CH2MHILL

PROJECT NUMBER	BORING NUMBER	SHEET
CT02E	SJSO5-MW1D	2 OF 2

SOIL BORING LOG

PROJECT NAVYCLEAN II/ST. JULIENS CREEK ANNEX LOCATION SITE 5 MW1D

ELEVATION _____ DRILLING CONTRACTOR AEDS

DRILLING METHOD AND EQUIPMENT See p. 1

WATER LEVELS _____ START _____ FINISH _____ LOGGER L. FRANCE

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
30			2.0	1-1-1-1	CLAY, as above, Soft.	
			2.0	1-1-1-1		
35		CL	2.0	1-1-1-1		
			2.0	1-2-1-1	CLAY, as above GRAY (5Y 5/1). Shell fragments	
			2.0	1-1-1-1	Clay, as above, soft	Stop 4 1/4" HSA. Set 6" PVC at 40' Casing to 30'. Through
40			2.0	5-5-4-5	Clay, (CL); Dark greenish grey (GLEY 4/1), stiff	Start drilling with 5" mud rotary 7/10/97. at 40'.
			2.0	3-3-2-3	43' SAND (50%) and clay (50%) minor shell fragments. Dk greenish	
		SP	0.3	5-3-3-5	gray (GLEY 4/1). tr. C-m sand. Trace angular gravel	
45			0.6	3-2-2-3	SAND (SP) as above fine. little Silt, trace organics + shells med-fine.	
					Increasing Shell fragments	End Sampling at 50' 7/10/97
			0.5	3-3-2-3	Sand, as above	Start Drilling 7/11/97 at 50-52
50			0.7	3-3-2-3	Sand, as above. tr. med sand Greenish gray (GLEY 5/1). tr. clay	
			0.6	6-7-7-6	trace clay	
						Added bentonite to water to keep hole open 54-56'
55			0.4	6-5-5-6	trace clay	End sampling at 56'. 0915
					Boring terminated at 56'	
60						

PROJECT NUMBER	BORING NUMBER	SHEET
6207-028	MW-15 SJS05	1 OF 1

SOIL BORING LOG

PROJECT St Juliens Creek Annex LOCATION Burning Grounds - Site 5

ELEVATION Ground: 6.45/TOC: 9.12 ft msl DRILLING CONTRACTOR American Environmental Drilling Services

DRILLING METHOD AND EQUIPMENT 6"/4" ID Hollow Stem Augers - Ingersoll Rand A-300 Drill Rig

WATER LEVELS _____ START 7/01/97 FINISH 7/01/97 LOGGER S Bradley (CDM)

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
						1105 Begin Drilling
	3-5	S-1	24/24	1-2-3-1	Dark greenish grey 5GY 4/1 Silty Clay trace of organics (CL) moist very soft. at 5' organic peat layer in tip of split spoon	0VM - 0 ppm
5	5-7	S-2	10/24	1-2-3-3	Silt with F. Sand - some organics (Roots + reeds) (ML) very dark grey 10YR 3/1 layer of F. Sand (SP) in bottom of spoon 2.5Y 6/3 light yellowish brown	water in borehole ~ 5' 0VM - 0 ppm
10						For deeper sample see Boring log for MW-1D
14					Bottom of Boring 14' BGS	1140 Finish drilling begin well construction

Figure 1
SOIL BORING LOG, FORM D1586

CH2MHILL

PROJECT NUMBER	BORING NUMBER	SHEET
CTO27	SJS04-MW03D	2 OF 2

SOIL BORING LOG

PROJECT NAVYCLEAN II/ST. JULIENS CREEK NAVY LOCATION SITE 4 MW03D

ELEVATION _____ DRILLING CONTRACTOR AEDS

DRILLING METHOD AND EQUIPMENT See p. 1

WATER LEVELS _____ START _____ FINISH _____ LOGGER L. FRANCIS

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
32		SP	2.0	Not Recde	Sand L, as above. V. wet,	
					Greenish grey (GLEY 6/1) Clayey 32.3	Start drilling and sampling with 5" mud rotary at 32' 7/15/97
		CL	2.0	2-2-2-3	CLAY, (CL) Some sand. greenish grey (GLEY 6/1) M. stiff	
35			2.0	2-2-2-2	CLAY (CL) Light greenish grey (GLEY 7/1) with yellowish brown (10YR 5/6) mottling. Sandy layer (2") at 35'	
			2.0	2-1-2-2		
					Increased mottling. tr. m-c sand. thin (<2mm) layers of sand 37-38'.	
			2.0	2-2-1-2		
40					Same as above. No sand, less mottling.	
			2.0	2-2-3-2		
					41.7	
		SC			SAND, clayey (SC) well graded c-fine. Tr. qtz gravel	
		SW	1.25	2-1-2-2	SAND, (SW) little clay, fine. tr. well-rounded qtz gravel. greenish grey (GLEY 5/1)	
45		ML	1.25	2-2-3-2	SILT and V. fine SAND (ML) Micaceous DK greenish grey (GLEY 4/1).	
			1.5	2-2-1-2	Same as above. Thin (<2mm) layers of brown organics.	
			1.5	3-2-2-2	Same as above.	
50						
		SP	1.5	2-2-1-2	SAND (SP) fine, micaceous	
		SM	1.5	2-2-2-3	SAND (SM) and Silt. fine, loose	
55		SP	0.2	2-2-3-2	SAND (SP) coarse sand and fine qtz gravel. well-rounded. V. wet	
		CL	1.2	2-2-1-2	CLAY, soft greenish grey,	
		SP.			SAND, SP. micaceous v. fine.	
60					Total Depth of Boring 60'	

PROJECT NUMBER	BORING NUMBER	SHEET	OF
6207-027	MW-45 SJSC4	1	1

SOIL BORING LOG

PROJECT St Juliens Creek Annex LOCATION Land Fill D Site 4

ELEVATION Ground: 6.34/TOC: 8.60 MSL DRILLING CONTRACTOR American Environmental Drilling Services

DRILLING METHOD AND EQUIPMENT 6¼" ID Hollow Stem Augers -- Ingersoll Rand A-300 Drill Rig

WATER LEVELS START 6/30/97 FINISH 6/30/97 LOGGER S. Audney (CH2M Hill)

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	2-2.5'	S-1	6"/6"		Silty Sand with F. gravel (SM) Black 5Y 2.5/1 dry	1345 Begin drilling Refusal - Bounced on a Rock
3	3-5	S-2	17/24	3-3-4-1	Silty F-Med Sand trace coarse sand moist (SM) wood stuck in end of split spoon Petroleum smell	Augers at 3' Petroleum smell Cuttings Black. OVM up to 1.7 ppm
6	6-8	S-3	15/24	3-3-4-1	Clayey Silt w/ Sand trace gravel (ML) 4" Black 5Y 2.5/1 piece of wood - piece of brick above wood bottom 4" light yellowish brown 2.5Y 6/3 Silty Clay (CL) Wet End of Day	at 6' Petroleum odor OVM up to 5.2 ppm above hole 0 to 1.7 ppm in breathing zone not sustained
10	10-12	S-4	24/24	2-3-3-1	Soft Silty clay (CL) interbedded with Silty F. Sand (SM) (10.5-11 Feet) dark greenish gray 10Y 3/1	8-10' Drilled through Stiff hard. Wet at 8' Water Flowing in to open hole
15					Bottom of Boring 15' BGS	1450 ~~1720~~ 1520 Drilled to 15' BGS

Figure 1
SOIL BORING LOG, FORM D1586

CH2MHILL

PROJECT NUMBER	BORING NUMBER	SHEET	OF
6207-027	MW-3S SJS04	1	1

SOIL BORING LOG

PROJECT St Juliens Creek Annex LOCATION Landfill D - Site 4

ELEVATION Ground: 4.19 / TOC: 6.67 ft msl DRILLING CONTRACTOR American Environmental Drilling Services

DRILLING METHOD AND EQUIPMENT 6 1/4" ID Hollow Stem Augers Ingersoll Rand A-300 Drill Rig

WATER LEVELS _____ START 7/01/97 FINISH 7/01/97 LOGGER S Dudney (CH2M Hill)

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
0					NO Samples collected See Boring log for MW-1D	1650 Begin drilling
						Petroleum odor
5					Fill material down to 7' BGS. difficult drilling	10' OVM to 2 ppm above Cuttings
					0-7' BGS	Breathing Zone OK
10						
14						1745 Begin well installation
15					Bottom of Boring 14' BGS	

Figure 1
SOIL BORING LOG, FORM D1586

CH2M HILL

PROJECT NUMBER	BORING NUMBER		
010271	SJS04-MW03D	SHEET 1	OF 2

SOIL BORING LOG

PROJECT NAVYCLEANII / ST. JULIENS CREEK ANNEX LOCATION SITE 4 MW03D

ELEVATION Ground: 3.60/TOC: 5.56 DRILLING CONTRACTOR AEDS

DRILLING METHOD AND EQUIPMENT INGERSOL RAND A300 RIG/8 1/4" and 4 1/4" HSA/5" Mud Rotary

WATER LEVELS _____ START _____ FINISH _____ LOGGER L. FRANCE

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
					0-3' FILL MATERIAL: GRAVEL AND Silt.	Start 0815 6/28/97 Sampling through 4 1/4" HS with 2" split spoon.
5		GM	0.7	5-3-3-5	FILL: Gravel, f-c Sand, Some Silt. (GM). Bluish black (GLEY2 5/1) bottom 2" is wet Hit auger refusal at 5'.	0ppm on OVM @ borehole: Petroleum odor. Moved location several tim final location ~30' N of ori Difficulty in drilling through fill.
		ML	1.75	1-1-1-1	SILT (ML). One 1" layer of fine Sand. 1. Clay. DK greenish grey (GLEY 3/1)	
10		CL	2.0	1-1-1-2	CLAY. Soft DK greenish grey (GLEY 3/1). Some Silt.	
			2.0	1/12"-1-1	Clay (CL), as above, v. soft. little silt.	
15			2.0	1/12"-1-1	Clay (CL) as above trace m-c Sand in bottom 2" (@ ~16')	Strong Sulfur odor noted i clay @ 15'
			2.0	1-2-2-1	CLAY, as above, little Silt.	
			1.5	1-2-2-1	CLAY, as above. Soft	Sulfur odor at 19'
20			2.0	1-2-2-1		Sulfur odor at 21.
			2.0	1-2-2-2	CLAY, as above, medium stiff	
25		ML	2.0	2-1-1-1	25.3' SILT (ML) Clayey. Dry. V. Dark greyish brown (2.5Y 3/2)	
			1.5	2-1-1-1	Some organics, moist.	
30		SP	0.5	1-2-1-1	SAND (SP). Grey (10YR 5/1). fine loose	

CH2MHILL

PROJECT NUMBER	BORING NUMBER	SHEET
CT027	SJS04-MW01D	3 OF 3

SOIL BORING LOG

PROJECT NAVYCLEAN II/ST. JULIENS CREEK ANNEX LOCATION SITE 4 MW01D

ELEVATION _____ DRILLING CONTRACTOR AEDS

DRILLING METHOD AND EQUIPMENT SEE p. 1

WATER LEVELS _____ START _____ FINISH _____ LOGGER L. FRANCE

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
60		ML				
		ML CL	0.8	3-2-2-3	CLAY (CL), silty, and SILT, clayey.	
65		CL	1.7	2-3-3-2	CLAY (CL), silty, tr. V. fine sand V. soft from 65.0 to 66.5'.	
		ML	0.8	2-2-3-2	SILT (ML) and V. fine sand, clayey DK greenish grey (GLEY 4/1) Very wet.	Fm. taking water 65-7
70			1.7	3-4-4-5	SILT (ML), sandy, little clay. Grey mottling. Sand is V. fine.	
75			1.2	3-3-4-5	shell fragments	
			2.0	4-4-5-5		Stopped drilling/sampling at 79' 7/1/97. Start drilling at 77' 1020, 7/2/97.
80			2.0	5-4-4-5	SILT No clay	
			2.0	5-5-6-5	SILT, tr. clay.	
85			1.75	5-6-6-5		Boring terminated at 91 ft. Borehole backfilled with sand 89-60'. Backfilled with pure bentonite 60-55'.
90			2.0	5-6-6-5	SILT, as above. few clay strings.	
91						

PROJECT NUMBER	BORING NUMBER	SHEET	OF
6207-027	MW-2S SJSC4	1	1

SOIL BORING LOG

PROJECT St Juliens Creek Annex LOCATION Site 4 - Landfill D MW-2S

ELEVATION Ground: 9.36 / Top: 11.45 ft MSL DRILLING CONTRACTOR American Environmental Drilling Services

DRILLING METHOD AND EQUIPMENT Hollow Stem Auger 6¼" ID - Ingersoll Rand A-300 Drill Rig

WATER LEVELS _____ START 6/28/97 FINISH 6/28/97 LOGGER Sharon Budney (CDM Fe

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
						1115 began drilling
2	2-4'	S-1	12"/24"	2-2-3-4	Silty Clay (CL) 0-9" hard dry 9"-12" moist. Soft Dark greyish brown (2.5YR 4/2) with Yellow (10YR 7/8) and White (10YR 8/1) layers	BVM 0 ppm
4						
5	4-6'	S-2	16"/24"	1/2/3/3	0-4" Silty Clay (CL) dark greenish grey (10Y 4/1) V. soft moist to wet. 4-4.5" Shell + Med Sand (SP) layer 4.5-6.5" Silty Clay with roots V. dark grayish brown (10YR 3/2) 6.5"-16"-24" interbedded thin layers of Silty Clay (CL) layers with 7" of Medium Sand (SP) dark greenish grey 10Y 4/1 Wet. Coarse sand and Shell layers at end of spoon surrounded.	OVM 0 ppm
6						
10	10-12'	S-3	14"/24"	4-3-3-3	interbedded Silty Clay (CL) with Sand layers with Fine Sand (SP) layers Wet, Subrounded Silt - greenish grey 5GY 5/1 Sand grey ish brown 2.5Y 5/2 End of Spoon Coarse Sand with Shells (SP)	OVM 0 ppm
12						
14					Bottom of boring 14'	Driller had difficult time setting well. Material heaved in to auger at 14' - Fine to Med Sand with shells. - little silt.
15						1445 well completed

Figure 1
SOIL BORING LOG, FORM D1586

CH2MHILL

PROJECT NUMBER	BORING NUMBER	SHEET	OF
G027	SJS04 MW01D	1	3

SOIL BORING LOG

PROJECT NAVY CLEAN II / ST JULIENS CREEK ANNEX LOCATION SITE 4 MW01D

ELEVATION GROUND: 10.7' TOC: 13.32 DRILLING CONTRACTOR AEPS

DRILLING METHOD AND EQUIPMENT HSA (4¼ and 8¼) / Mud Rotary - 6"

WATER LEVELS _____ START _____ FINISH _____ LOGGER L. CAMPBELL / L. FIH

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
		ML	0.75	1-1-7/12"	SILT, sandy (ML) Brown (10YR 4/3) dry. clayey in bottom 7".	Driller notes void 3-5"
5					Wet at 5' v. dark grey (10YR 3/1) and black (10YR 2/1).	
			1.8	1/12"-1/12"-1/12"	SAME as above. Some sand in bottom of Spoon.	
10		CL	2.0	1/12"-2/12"	CLAY, Silty Dark Grey (5Y 4/1) v. Soft. clayey fine Sand 11.6-12.0' (SC).	
		SC	2.0		Clayey SAND to 12.3'	Driller notes clay getting stiff
			2.0	2-2-2/12"	CLAY (CH) Some silty, wet dark grey (5Y 4/1).	
15		OH	2.0		CLAY, as above, Some sand. DK grey (5Y 4/1), Soft	SILT CONTENT DECREASING
		SM	2.0	2-2-1/12"	SAND, silty, some clay (SM) wet Olive gray (5Y 4/2). poorly graded	
			1.5	2-1-1-2	at 19': v. fine SAND with silt, tr. clay grey (5Y (6/1)	
20		SP	2.0	2-3-3-3	SAND (SP) fine, little silt, wet poorly graded. Grey (5Y 6/1)	
			2.0	3-3-3-3	SAND as above. Coarsening downward to med sand	
25			2.0	1-1-1-2	SAME as above	
		CL			CLAY, v. soft pale olive (5Y 6/3) to gray (5Y 6/1)	
			2.0	2-2-3-4	as above. med soft to stiff GLEY 5/10G greenish gray	SET 6" PVC ISOLATION CASING THROUGH 8¼" HSA to 30' (2.5 into clay).
30			2.0	4-4-5-5		

CH2MHILL

PROJECT NUMBER	BORING NUMBER	SHEET
CT027	SJS04 MW01D	2 OF 3

SOIL BORING LOG

PROJECT NAVYCLEAN II/ST. JULIENS CREEK ANNEX LOCATION SITE 4 MW01D

ELEVATION _____ DRILLING CONTRACTOR AEDS

DRILLING METHOD AND EQUIPMENT SEE P.1

WATER LEVELS _____ START _____ FINISH _____ LOGGER L. FRANCE

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
30						Drilled out PVC plug. Plug pushed ahead of D.E to 33. No sample 30-33'. 6/30/97 - start drilling and sampling @ 33'
		CL	2.0	3-2-2-3	CLAY (CL), tr. f. SAND. Greenish-grey (GLEY 6/1). Some v. fine <1mm layers of v. f. sand, yellowish brown (10YR 5/6)	
35			2.0	3-2-2-2	trace organics, greenish grey (GLEY 5/1)	
			2.0	2-2-3-2	CLAY, as above, somewhat runny and wet SEE NOTE	
					PID NOT SEE SAND CAKE IN SPOON	NOTE: LOSING WATER TO Fm 39' (coarse-med sand cuttings.
40			2.0	2-3-3-2		
			2.0	1-2-2-1	CLAY, as above, trace f. sand and silt. in <1mm thick layers	
45			2.0	2-2-3-2	CLAY, as above, little f. sand and silt.	
			1.2	2-3-3-2	CLAY to 49.5'. Some wood fragments	
50		SP			SAND (SP), little angular gravel Dk bluish grey (GLEY 4/1), little fine sand	Fm taking water at 49.5'.
		CL	1.5		SANDY CLAY 51-52'. CLAY, some wood and other organics 52'.	
55						
		ML	2.0	2-3-3-2	SILT, clayey, tr. v. fine sand (ML). Some clay. Greenish grey (GLEY 5/1) Some mica.	
60			1.2	3-3-2-3	one 1" clay layer	

CH2M HILL

PROJECT NUMBER	BORING NUMBER	SHEET	OF
6207-027	MW-45 SJS03	1	1

SOIL BORING LOG

PROJECT St Juliens Creek Annex LOCATION Landfill C - Site 3

ELEVATION Ground: 12.64/Tec/5.09 ft MSL DRILLING CONTRACTOR American Environmental Drilling Services

DRILLING METHOD AND EQUIPMENT 6'4" ID Hollow Stem Augers Ingersoll Rand A-300 Drill Rig

WATER LEVELS _____ START 6/29/97 FINISH 6/29/97 LOGGER S Bowley (CH2M Hill)

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
						0855 Begin Drilling
2	2-4'	S-1	13"/24"	2-2-3-2	Clayey Silt with Fine Sand (ML) interbedded with F. Sand (SP) trace shells in bottom of spoon. Bottom of spoon moist dark greenish grey 5GY 4/1 small pocket of	OVM 0 ppm
4						yellowish red 5YR 5/6
	4-6'	S-2	18/24	2-3-3-1	Silty Med (SM) F. Sand trace shells 4-4.5' lower 6" of recovery thin organic layer ½" thick dark black	OVM 0 ppm
6						
8						
10	10-12	S-3	12/24	3-2-1-2	Silty Clay with F. Sand soft wet dark greenish grey 10Y 4/1 organic peat layer with shells at 6-8" (recovery) greenish black 10Y 2.5/1 organic roots + weeds present in lower 6" of recovery	OVM - OPPM
12						
14						
14.5					Bottom of Boring 14.5' BGS	

Figure 1
SOIL BORING LOG, FORM D1586

PROJECT NUMBER	BORING NUMBER	SHEET
6207-027	MW-15 SJS04	1 OF 1

SOIL BORING LOG

PROJECT St Julens Creek Annex LOCATION Landfill D - MW-15

ELEVATION Ground: 10.47 ft TOC: 13.02 ft MSL DRILLING CONTRACTOR American Environmental Drilling Services

DRILLING METHOD AND EQUIPMENT Hollow Stem Auger 6 1/4" ID - Ingersoll Rand A-300 Drill Rig

WATER LEVELS _____ START 6/28/97 FINISH 6/28/97 LOGGER Sharon Bidwell (CDF

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
0						0812 Began drilling Water table looks to be appr 3-4' below ground surface.
5	5-7'	S-1	0.1'/2'	1-2-2-2	Clayey Silt with little F sand (ML) dark greenish grey (10gy 4/1) moist V. Soft	OVM 0 ppm
7	7-9	S-2	2'/2'	2-2-1-1	7-8.75' Clayey Silt with little F Sand (ML) dark greenish grey (10gy 4/1) Wet V. Soft (CL) 8.75-9' Silty Clay light olive brown (2.5Y 5/4) moist soft.	OVM 0 ppm
10	10-12	S-3	2'/2'	2-1-2-2	Clayey Silt with little F. Sand (ML) dark greenish grey (10 GY 4/1) Wet V. Soft 10.3-10.5' Silty Sand trace Clay (ML)	OVM 0 ppm
15					Bottom of Borehole 15' BGS	1005 completed well.

Figure 1
SOIL BORING LOG, FORM D1586

PROJECT NUMBER	BORING NUMBER
CT027	SJS03-MW2D SHEET 3 OF 3

SOIL BORING LOG

PROJECT NAVY CLEANUP/ST. JULIENS CREEK ANNEX LOCATION SITE 3 MW02D

ELEVATION _____ DRILLING CONTRACTOR AEOS

DRILLING METHOD AND EQUIPMENT See p. 1

WATER LEVELS _____ START _____ FINISH _____ LOGGER L. France

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
60	/	CL SB	0.75	2-2-2-3	SAND, v. fine and CLAY. Mica Greenish grey (GLEY 5/1).	
					BORING TERMINATED @ 62'	
65						

CH2M HILL

PROJECT NUMBER	BORING NUMBER	SHEET	OF
6207-027	MW-3S SJSC3	1	1

SOIL BORING LOG

PROJECT St Juliens Creek Annex LOCATION Site 3 Landfill C

ELEVATION Ground 11'59/roc 13.4E MSL DRILLING CONTRACTOR American Environmental Drilling Services

DRILLING METHOD AND EQUIPMENT 6'4" ID Hollow Stem Augers -- Ingersoll Rand A-300 Drill Rig

WATER LEVELS _____ START 6/28/97 FINISH 6/28/97 LOGGER S. Budney (Con Federal)

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
						1647 Started drilling
2	2-4'	S-1	4"/24"	1-2-2-3	Clayey silt (ML) dry trace roots very dark greyish brown 2.5Y 3/2 thin layer - white F. sand (SP) 2.5Y 8/1	OVM 0 ppm
4					No Sample	
5						
6	6-8	S-2	24/24	2-3-3-3	6-6.2 Silty F Sand (SM) wet yellowish brown 10YR 5/6 6.2-7.8 Silty Clay some F. Sand (CL) soft moist dark greenish grey 10Y 3/1 trace organic matter 7.5-7.8' Black N 2.5/ wet 7.8-8 Silty F. Sand (SW) Dark greyish brown - 10YR 4/2	OVM 0ppm
10	10-12	S-3	20/24	3-3-4-5	F.-Med Sand with Silt wet (SM) water coming into borehole surrounded greenish grey 10Y 5/1 Color bands light olive brown 2.5Y 5/4 Trace roots	Water coming into borehole OVM 0ppm
12						
14					Bottom of Boring 14' BGS	1750 installed well

Figure 1
SOIL BORING LOG,
FORM D1586

CH2MHILL

PROJECT NUMBER	BORING NUMBER		
CTO27	STS03-MW02D	SHEET 1	OF 3

SOIL BORING LOG

PROJECT NAVYCLEAN II/ST. JULIENS CREEK ANNEX LOCATION SITE 3 MW02D

ELEVATION Ground: 12.41/TOC: 14.73 DRILLING CONTRACTOR AEDS

DRILLING METHOD AND EQUIPMENT INGERSOL RAND A300 RIG. 8'1/4" and 4 1/4" HSA / 5" MUD ROTARY

WATER LEVELS _____ START _____ FINISH _____ LOGGER L. FRANCE

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
					SEE LOG FOR SITE 3 MW02S FOR 0-12' INTERVAL	
5						
10						
		SC	0.25	1-1-1	SAND. Some silt and clay (SC) Grayish brown (2.5Y 5/2), V. Moist.	
15		SP	1.0	2-2-1-2	SAND (SP) V. fine. Greenish grey (GLEY 6/1) Wet. Loose	
			0.2	Refusal		
			1.6	3-3-4-3	SAND (SP) med. to Coarse. little fine. Loose. Greenish grey (GLEY 5/1)	
20			1.7	2-2-1-2	21.3	
		CL	0.7	2-2-2-2	CLAY (CL) Greenish grey (GLEY C/1) clay as above, Some sand. Medium stiff. to soft	
25			1.0	2-2-1-2	shell fragments (clam) to. v. fi. sand.	
			2.0	2-2-3-2	clay, Sandy to 26.5'.	
30			0.7	2-2-2-2	clay, not sandy, Greenish grey (GLEY 5/1) medium stiff.	Stopped drilling 1635 6/29/89 Installed 6" pvc surface casing to 29'.

CRA/HILL

PROJECT NUMBER	BORING NUMBER	SHEET
CTO 27	SJS03-MW02D	2 OF 3

SOIL BORING LOG

PROJECT NAVYCLEAN II/ST. JULIENS CREEK ANNEX LOCATION SITE 3 MW02D

ELEVATION _____ DRILLING CONTRACTOR AEDS

DRILLING METHOD AND EQUIPMENT Sony Rig 1

WATER LEVELS _____ START _____ FINISH _____ LOGGER L. FRANCE

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
30		CL	2.0	1-2-2-1	CLAY, DK greenish grey (GLEY4/1) Soft	Start drilling/sampling 1445 7/14/97 5" mud rotary.
			2.0	1/12"-2-2	clay, as above. Trace organics	
35			2.0	2-3-3-2	trace shells	
			2.0	3-3-3-2		
			2.0	3-2-2-2	clay as above. V. soft	
40			2.0	2-2-3-2		
			2.0	2-3-2-2	Clay, as above, Trace V. fine sand and silt along partings	
45			2.0	1-2-2-1	clay, as above	
			2.0	3-2-2-2	48.5'	
		SP	2.0	2-2-1-2	SAND (SP) v. fine to fine. DK greenish grey (GLEY4/1). tr. shells.	
50			0.7	3-3-4-3	V. fine Sand, as above. tr. clay little shell fragments.	
			1.2	3-4-4-3	Little clay in <0.5" layers	
		CL	1.6	3-3-4-3	CLAY (CL) Mica, some organics and wood. Greyish brown (2.5Y 3/2).	
55			2.0	3-2-2-3	Same as above to 57.7' @57.7': Clay, Sandy. V. fine sand. DK greenish grey (GLEY5/1)	
60			1.0	2-2-2-2	same as above, more sand	

CH2M HILL

PROJECT NUMBER	BORING NUMBER	SHEET
0027	SJ503-MW1D	2 OF 2

SOIL BORING LOG

PROJECT _____ LOCATION SITE 3 MW1D

ELEVATION _____ DRILLING CONTRACTOR _____

DRILLING METHOD AND EQUIPMENT _____

WATER LEVELS _____ START _____ FINISH _____ LOGGER L. FRANCE

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
		CL	2.0	3-3-2-3	CLAY, as above, no sandy partings	
			2.0	3-3-3-2		
35			2.0	3-3-4-3	Several sandy partings, trace mica.	
			2.0	3-3-2-3	clay, as above, no partings	
			2.0	3-2-2-3	trace silt.	
40			2.0	3-2-2-3	clay, as above, silt partings DK greenish grey (GLEY 4/1)	
			2.0	3-2-2-3	Few shells at 43', trace organics	
45			2.0	3-2-2-3	CLAY, as above to 45.1'	
		SP	1.25	3-3-3-4	SAND, Fine, trace to little clay DK. greenish grey (GLEY 4/1 5G trace shells	
			2.0	2-3-3-3	V. fine sand, no silt or clay.	
50			0.3	2-3-3-3	little organics	Formation taking water drilling to 52'.
			0.3	3-4-4-3	0.25" wood layer	
55			0.5	2-2-3-3	one 1" layer of clay and sandy clay. One 0.5" pebble of sandstone	
			0.6	3-3-4-3	Sand as above, no clay	
60			0.5	4-4-5-4	Sand, as above. END OF BORING AT 60'	

CH2MHILL

PROJECT NUMBER	BORING NUMBER	SHEET
6207-027	HW-25 SJ503	1 OF 1

SOIL BORING LOG

PROJECT St Juliens Creek Annex LOCATION Landfill C Site 3

ELEVATION Ground: 12.89/TOC 15.22 MSL DRILLING CONTRACTOR American Environmental Drilling Services

DRILLING METHOD AND EQUIPMENT 6¼" ID Hollow Stem Auger - Ingersoll Rand A-300 Drill Rig

WATER LEVELS _____ START 6/29/97 FINISH 6/29/97 LOGGER S. Bodney (CH2M Hill)

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
0						1120 Begin Drilling
2	S-1 2-4'	S-1	13/24"	1/1/3/2	Soft Silty Clay (CL) dry at top - moist at bottom of spoon. dark greenish grey 10Y 3/1 dark reddish brown 5YR 3/4 staining on bottom 4".	OVM - 0 ppm
4						
5	4-6'	S-2	24/24"	2/3/3/3	4-4.2' Silt with fine Sand (ML) wet 4.2-6' Fine to Med. Sand (SP) interbedded with Silty Clay with fine sand very soft. Black organic color at 5.5' BGS approx 2" thick. Some shells below 5.5'.	OVM - 0 ppm
6						
8						
10	S-3	10-12'	22/24"	3/2/4/2	(CL) Silty Clay with F. Sand soft, wet interbedded with clay hard moist dark greenish gray 10Y 3/1 Peat layer ½" thick at 11.3' BGS 11.3-12' Organic material in silty fine sand, light yellowish brown 2.5Y 6/4	OVM - 0 ppm
12						
14						1200 Finished Drilling
15					Bottom of Boring 14' BGS	

Figure 1
SOIL BORING LOG, FORM D1586

CH2M HILL

PROJECT NUMBER	BORING NUMBER	SHEET	OF
6207-027	SJSC3 MW-15	1	1

SOIL BORING LOG

PROJECT St Johns Creek Annex LOCATION Landfill C - Site 3

ELEVATION GROUND: 12.01 / TOC: 11.91 (MSL) DRILLING CONTRACTOR American Environmental Drilling Services

DRILLING METHOD AND EQUIPMENT 6¼" ID Hollow Stem Augers - Ingersoll Rand A-300 Drill Rig

WATER LEVELS _____ START 7/02/97 FINISH 7/02/97 LOGGER S Burney (CH2M Hill)

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
					(SM) 3-3.9 Silty F. Sand / Color banded light yellowish brown 2.5Y 6/3 and dark yellowish brown 10YR 4/6	0925 Begin Drilling
	3'-5'	S-1	24"/24"	2-2-3-1	3.9-4.5 Clayey Silt (ML) w/ organics moist	OVM OPPM
5'					4.5-5 Silty F. Sand (SM) wet dark greenish gray 10Y 4/1	Water at 4' BGS
	5-7'	S-2	24/24"	3-3-2-4	5-5.3 Silty F. Sand wet (SM)	
					5.3-7 Silty clay trace organics (CL) soft dark greenish gray 10Y 4/1 Wet Wood in tip of split spoon	OVM OPPM
10'					(SM)	
	10-12'	S-3	24/24"	2-2-3-4	10-10.5 Silt with V.F Sand V. soft loose dark greyish brown 2.5Y 4/2 Wet	
					10.5-11.4 Color bands - Silt w/ F Sand (SM) some clay greenish gray 10Y (5/1) and Olive yellow 2.5Y 6/6 Wet	OVM - 0 ppm
14'					11.4-12 Silty F. Sand (SM) olive yellow 2.5Y 6/6	
					Bottom of Boring - 14' BGS	1030 Complete well

Figure 1
SOIL BORING LOG, FORM D1586

CH2MHILL

PROJECT NUMBER	BORING NUMBER	SHEET	OF
CTO27	SJS03-MW1D	1	2

SOIL BORING LOG

PROJECT NAVYCLEAN II / ST. JULIENS CREEK ANNEX LOCATION SITE 3 MW1D

ELEVATION GROUND: 12.04' MSL DRILLING CONTRACTOR AEDS

DRILLING METHOD AND EQUIPMENT INGERSOL RAND A300 HSA / Mud Rotary (6")

WATER LEVELS _____ START _____ FINISH _____ LOGGER L. FRANKE

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
					SEE LOG FOR SITE 3 MW01S FOR 0-12' INTERVAL.	
5						
10						START SAMPLING CONTIN @12'. 1920 7/9/97. Through 3¼" HSA
			0.67	10-5-5-6	SAND (SP) V. fine, hard, moist. Light olive brown (2.5Y 5/4) Some gray mottling (2.5Y 6/1)	
15		SP	0.33	4-5-5-5	SAND (SP) as above. Light greenish gray (GLEY 7/1).	
			1.5	6-6-5-6		
		SW	1.0	5-5-4-5	SAND (SW) medium, well graded	
20		CL	2.0	3-4-5-8	CLAY (CL), Soft, Greenish grey (GLEY 5/1). Little sand @ 22'.	
			2.0	3-4-4-3		
25			2.0	3-2-2-3	Trace organics. Trace silt in 2 1mm layers	End Augering and Sampling @ 26'. 2020 7/9/97 Installed 6" PVC isolation Casing through 8¼" ID
			2.0	3-3-2-3	trace. very fine sand along partings throughout sample	Sample 26-28' 1830 7/13/ Start 0730 7/14/97 Sampling 28-30'. Mud/water R
30			2.0	2-3-3-2	—	

PROJECT NUMBER	BORING NUMBER	SHEET	OF
6207-015	BKHW3D	2	2

SOIL BORING LOG

JECT St. Juliens Creek Annex LOCATION BKHW3D (SE. Juliens Drive)

EVATION _____ DRILLING CONTRACTOR _____

DRILLING METHOD AND EQUIPMENT See p.1

WATER LEVELS _____ START _____ FINISH _____ LOGGER _____

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
					and along partings. DK greenish grey	
		14	24"	WOH-1-2	CLAY (CL) Soft, Plastic, DK greenish grey (GLEY 3/1)	
35		15	21"	1-14-22-34	CLAY with gravel (CL) and some fine sand @35'	
					SAND (SP) fine. light greenish grey GLEY 7/1.	
		16	16"	1-5-6-6	SAND (SP) fine. greenish grey (GLEY 6/1).	
			24"		SILT (SM) and fine sand @ 38.75'	
40		17		3-4-4-5	greenish grey	
		18	20"	1-2-1-1	SILT (SM) little fine sand little clay on end of spoon	
45		19	19"	8-12-14-16	SILT (SM) as above to 45.25' then shell fragments - fine. little silt.	Fin. taking water at 46'. Sampled to 48'. Reamed 6" boring to 46'
		20		9-10-13-21	Same as above/little clay	
50						

Figure 1
SOIL BORING LOG, FORM D1586

PROJECT NUMBER	BORING NUMBER	SHEET	OF
6207-015	SJSBKMW43	1	1

SOIL BORING LOG

PROJECT St. Juliens Creek LOCATION Background well MW43 Near Plant

ELEVATION _____ DRILLING CONTRACTOR Groundwater Systems

DRILLING METHOD AND EQUIPMENT Acker A02. HSA (6 1/4" ID)

WATER LEVELS _____ START 1550 4/26/94 FINISH _____ LOGGER L. Campbell

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
0		1	14"	2-4-7-7	SILT(ML), trace clay. V. Dk grayish brown (10YR 3/2). Dry	
					CLAY(CL) Some sand, Stiff. dry Dk grayish brown (10YR 3/2)	
		2	24"	6-7-7-8	SAND(SM) fine clayey slightly moist	
5		3	18"	1-2-3-4	CLAY(CL). Stiff v. moist. gray (10YR 5/1).	
					SAND(SP) fine, Some clay. well rounded. wet	OVM = 0 ppm
		4	18"	4-2-1-3	Same as above. More clay.	
		5	8"	1-2-1	Same as above. Shell fragments	
10		6	16"	10-WOH	Same as above. Very Soft	
		7	12"	1-6-6-11	Same as above. Slightly less clay.	
15					Boring Terminated @ 15' bgs	Finish constructing monitor well BKMW43 1750 4/26/94

Figure 1
SOIL BORING LOG, FORM D1586

PROJECT NUMBER	BORING NUMBER	SHEET
6207-015	SJSBKMW35	1 OF 1

SOIL BORING LOG

PROJECT ST. JULIENS CREEK LOCATION Background #3 St. Nicrens Dr.

ELEVATION . DRILLING CONTRACTOR GROUNDWATER SYSTEMS

DRILLING METHOD AND EQUIPMENT 6¼" ID HSA, ACKER AD2 Rig.

WATER LEVELS START 1100 4/10/99 FINISH 1200 4/27/99 LOGGER L. Campbell

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
0		1	18"	5-6-3-4	SILT (ML) V. DK Gray (10YR 3/1), tr. clay 0-2'	
		2	14"	3-4-7-9	SAND (SP) fine, Light yellowish brown (10YR 6/4) well rounded, Slightly moist 4" of sandy clay at 2-2.25'.	
5					For more lithologic data See log For BKMW30.	
10						Finish installing BKMW35 @ 1200 4/27/99
					BORING TERMINATED AT 14' bgs	
15						

Figure
SO
1

PROJECT NUMBER	BORING NUMBER	SHEET	OF
6207-015	BKMW3D	1	2

SOIL BORING LOG

PROJECT ST. JULIENS CREEK ANNEX LOCATION BKMW3D (Along St. Juliens Pro

ELEVATION _____ DRILLING CONTRACTOR GROUNDWATER SYSTEMS

DRILLING METHOD AND EQUIPMENT ACKER AD2, 8 1/4" ID HSA, 6" Spade bit with water rotary

WATER LEVELS _____ START 0755 4/23/99 FINISH _____ LOGGER L. France

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
		1	3"	5-10-9-8	SILT (topsoil) little fine sand, roots. black (7.5YR 2.5/1).	0755 Start drilling and Sampling with split spoon
		2	NR		End of spoon is wet	Water @ 3 to 4 ft.
5		3	18"	2-3-5-7	SAND (SP) fine, paley-yellow (2.5Y 7/3) wet. Organic material @ 5 ft.	
		4	NR	7-8-4-3	SAND, as above, in nose of spoon	Charging augers with water at 7 ft. Running sands.
10		5	20"	2-2-2-8.	SAND (SP) Bluish grey (2GLEY 6/1)	
		6	24	7-10-13-17	SAND (SP) DK. bluish grey	
15		7	24"	WOH	CLAY (CL), little sand, shells dk. bluish grey.	Stopped Sampling 900 4/23/99
		8	24"	WOH	CLAY (CL) DK. ~~brown~~ blue-grey	Start Sampling 1010 4/25/99 @ 18.5 ft. Set 6" PVC sch. 40 isolation casing at 18.5'.
20		9	24"	1-2-1-4	CLAY (CL) as above to 20'. f-m sand to 20.25. Then clay (CL) dk. greenish grey.	
		10	11"	4-10-16-18	SAND (SP) fine. DK. greenish grey	
25		11	24"	1-2-6-4	sand as above to 24.25 CLAY (CL) soft. SAND and Sandy clay (SC)	
		12	24"	1-1-1-3	CLAY (CL). Plastic, a few sand stringers	Sample 13 is from 29 to 31 ft
30		13	19"	2-3-2-3	CLAY (CL), little sand in 1-2" layers.	

Figure 1
SOIL BORING LOG, FORM D1586

REV 11/89 FOR

PROJECT NUMBER	BORING NUMBER	SHEET	OF
G207-015	BKMW2D	1	2

SOIL BORING LOG

JECT ST. JULIENS CREEK ANNEX LOCATION BKMW2D - Patrol Rd near RR tracks

VATION DRILLING CONTRACTOR GROUNDWATER SYSTEMS

DRILLING METHOD AND EQUIPMENT AKKER AD2, 8 1/4" HSA / 6" Spade bit with Water Rotary

WATER LEVELS START 1442 4/22/99 FINISH LOGGER L. Franco

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
					0-2" SILT (ML) brown topsoil	Start sampling w/ 2' split spoon @ 1440.
		1	16"	4-5-4-5	CLAY (SC) sandy, clayey sand light yellowish brown (2.5Y 6/3) moist	
		2	14"	4-7-8-7	SAND (SP) pale yellow (2.5Y 7/4) fine some med. qtz.	water @ 3-4 ft bgs
					Same as above to 5'.	
5		3	24"	3-2-3-5	CLAY (SC) Some sand, Mottled 2.5Y 6/6 and light grey.	
		4	20"	3-3-3-2	SAND (SP). Olive yellow, qtz (2.5Y 6/6). little clay and silt, fine grained some med.	
10		5	24"	3-4-6-8	SAND (SP), v. fine qtz. little shell fragments throughout. Dk greenish grey (GLEY 4/1)	
		6	5"	3-4-1-1	Same as above.	
15		7	24"		CLAY (CL). Tr. shell fragments, little fine sand. Dk greenish grey (GLEY 4/1)	CLAY @ 14'
		8	24"	WOH	CLAY (CL) as above. No sand) Soft, plastic	Stop augering at 1600 4/22/99 will set PVC (6" sch-40) casing at 17.5'. Push casing to 18 ft.
20		9	24"	1-1-1-1	CLAY (CL) as above. Dk. greenish grey (1GLEY 4/1)	Start drilling 1500 4/22/99 Sampling 19-21 ft bgs.
		10	24"	WOH-1-1	CLAY (CL), as above	
25		11	24"	WOH-1-1	CLAY (CL), as above	
		12	17"	WOH-1	CLAY (CL), as above.	
30						

Figure 1
SOIL BORING LOG,
FORM D1586

(8 30)

REV 11/89 FOR

PROJECT NUMBER 6287-015 | BORING NUMBER BKHWZ1 | SHEET 2 OF 2

SOIL BORING LOG

PROJECT ST. JULIENS CREEK ANNEX LOCATION

ELEVATION DRILLING CONTRACTOR

DRILLING METHOD AND EQUIPMENT See p. 1

WATER LEVELS START FINISH LOGGER L. France

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
		13	24"	WOH-1-2	CLAY, as above, one shell frag.	Sample 13 from 29.5-31.5 ft
		14	24"	1-1-1-1	CLAY, as above	
35		15	24".	1-1-1-2	Same as above to 36 ft. Some silt to 36.5 ft. trace shells, organic matter	
		16	14"	2-2-3-2	CLAY (CL), trace silt, organic material throughout sample. Brown	
40		17	24"	3-4-5-7	CLAY (CL), Greenish grey (GLEY 6/1) trace m-c sand to 40.5'	
					CLAY to 42.25'	
		18	24"	4-7-3-3	CLAYEY SAND)/SANDY CLAY (SC) sand is f-v. coarse Trace c. gravel (qtz) trace sandstone Gravel is subrounded	
45		19	24"	2-13-34-30	SAND + SHELLS (f-c) Little clay 44.75 coquina (GLEY 7/1) Light greenish grey	YORKTOWN Fm @ 44.75 ft.
		20	19"	26-29-23-24	SAND + SHELLS as above but m-f grained. Trace coarse shell fragments	
50		21	19"	23-31-36-33	Same as above, Pale yellow (5Y 8/2) above 50.5'	
		22	19"	9-10-13-15	Same as above. 4" layer of coarser grained material at 52.5'	
55		23		27-39-44 50/5"	Same as above: V. Coarse from 54.5' to 55.5 ft. then m-f grained	End sampling at 56.5'
					Boring Terminated at 56.5'	
60						

Figure 1
SOIL BORING LOG, FORM D1586

REV 11/89 FOR

PROJECT NUMBER	BORING NUMBER	SHEET
6207-015	BKMW10	2 OF 2

SOIL BORING LOG

PROJECT CTO15 ST. JULIENS CREEK ANNEX LOCATION BKMW10 (NE END OF CRADDOCK ST

ELEVATION _____ DRILLING CONTRACTOR _____

DRILLING METHOD AND EQUIPMENT See p. 1

WATER LEVELS _____ START _____ FINISH _____ LOGGER L. France

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
		13	24"	1-1-1-3	CLAY(CL), as above, trace mica	Sample 13 is 29.5 – 31.5' bgs
		14	24"	WOH-1-1-1	CLAY(CL), as above.	
35		15	24"	1-1-1-2	CLAY(CL), as above, occ. silt partings.	
		16	24"	1-1-1-2	CLAY, as above, trace shells embedded in clay.	
40		17	24"	2-4-5-6	CLAY(CL) as above, little shells, to 41.25, then sandy clay (SC) m-c gr2 sand.	top of sand at 42.5 ft bg
		18	12"	2-16-40-50	SAND CLAY (SC) / SAND(SP) coarsening downward. to med. sand. greenish grey (10GY 5/1).	
45		19	14"	11-14-14-24	SAND(SW) fine to med. Greenish grey (GLEY 5/1). trace shells. Trace organic matter	
		20	12"	11-13-15-19	SAND(SP) fine, trace clay and silt. trace shells, trace organic matter	
50		21	20"	2-4-12-19	SAND(SP) fine, some v. fine little clay and silt. Dk. greenish grey.	
		22		4-6-20-26	SAND(SW) Coarse, Shell fragments 12" clay layer at 53.25 - 53.5' fine sand to 54'.	Collected last sample 10:45 Stopped sampling. Drill to 54' bgs
55					Boring terminated at 54 ft. bgs.	

Figure 1
SOIL BORING LOG,
FORM D1586

PROJECT NUMBER	BORING NUMBER	SHEET
6207-015	SJSBK MW25	1 OF 1

SOIL BORING LOG

PROJECT St Juliens Creek Annex LOCATION Background Well #2 by RR Tracks + Patrol Rd.

ELEVATION _____ DRILLING CONTRACTOR Groundwater Systems

DRILLING METHOD AND EQUIPMENT Acker AD2, 6¼" ID HSA

WATER LEVELS _____ START 1405 4/26/95 FINISH 1500 4/26/95 LOGGER L. Campbell

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
0					SILT (ML) DK. Brown Dry. Grass/roots	
		1	18"	6-4-3-5	CLAY (SC) Sandy, med. soft. moist. light yellowish brown.	
		2	12"	8-13-9-6	SAND (SP) f-m trace clay. Very Moist. Light yellowish brown.	Water at ~3' bgs.
5					For more lithologic information see log for BKMW20	
10						charged augers with water during well construction due to running sands.
						Finish setting well at 1500 4/26/95
15					Boring Terminated at 14' bgs	

Figure 1
SOIL BORING LOG, FORM D1586

PROJECT NUMBER	BORING NUMBER	SHEET
6207-015	SJSBKMW15	1 OF 1

SOIL BORING LOG

PROJECT ST Juliens Creek Annex LOCATION Background - N end of Craddrock

ELEVATION _____ DRILLING CONTRACTOR _____

DRILLING METHOD AND EQUIPMENT Acker AD2 rig 6 1/4" HSA.

WATER LEVELS _____ START 1152 4/26/99 FINISH 1330 4/26/99 LOGGER L. Campbell

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
		1	18"	2-6-7-9	SILT (ML) DK brown. Grass/roots	Start sampling 1152 4/26/99
					SILT (ML) clayey. Light yellowish brown. Dry.	
		2	18"	10-10-7-6	CLAY (LL) Light yellowish brown	
					SAND (SC) clayey. well rounded. LE. Yellowish brown	
5		3	18"		SAND (SP) f-m, trace clay. Well rounded, Wet	Wet @5'
					See Log for BKMW1D for addition information	
10						
					Boring Terminated at 14' bgs	Finished Constructing Monitor Well BKMW15 1330 4/26/99.
15						
20						

Figure 1
SOIL BORING LOG,
FORM D1586

REV 11/89 FOR

PROJECT NUMBER	BORING NUMBER		
6207-05	BKMW10	SHEET 1	OF 2

SOIL BORING LOG

PROJECT CTO15 ST. JULIENS CREEK ANNEX LOCATION BKMW10 (North End of Craddock St)

ELEVATION _____ DRILLING CONTRACTOR GROUNDWATER SYSTEMS

DRILLING METHOD AND EQUIPMENT ACKER AD-2 Rig, 8¼" HSA, 6" spade bit, 2' split spoon, Water Return

WATER LEVELS _____ START 0740 4/23/99 FINISH 1045 4/24/99 LOGGER L. FRANCIS

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
		1	19"	4-8-9-14	SILT (SM), Light yellowish brown (2.5Y 6/4). Organics and silty fine sand @ 8"	Start drilling 0740 with 8¼" HSA.
		2	15"	8-12-12-11	SAND some clay (SC). Some orange mottling. Wet.	Water table ~3 ft bgs
5		3	15"	6-5-5-5	SAND and CLAY (SC). Orange and gray mottled. med-fine grained. @ 6': (SP) fine sand.	
		4	12"	5-7-4-4	SAND (SP) fine. Yellowish brown (10YR 6/8). Little clay in 1-2" layers Grey (7.5Y 7/1)	
10		5	20"	4-5-7-7	SAND (SP) vi fine - fine. Olive yellow (2.5Y 6/6) one 2" layer of clayey sand. Dk. greenish grey (GLEY 4/1)	
		6	22"	4-6-5-10	SAND (SP) fine, little med. grained Greenish grey (GLEY 5/1)	Charging augers with water to prevent running sands
15		7	22"	1-2-1-2	CLAY (CL) greenish grey (GLEY 5/1) Some layers of few shell fragments imbedded in clay. With sand to 15'.	plastic clay at 15'
		8	24"	WOH	CLAY (CL). as above to 17'. 17-18' clay with little fine sand. V. Soft.	Set 6" Sch. 40 PVC isolation casing at 16.5'. Pushed to 17' Stop drilling with 8¼" HSA 0900 4/24/99.
						Start sampling 0755 4/24/99.
20		9	24"	3-3-2-4	SILT (SM) and clay (CL). DK. greenish grey (GLEY 3/1). Little organic matter	
		10	24"	3-3-4-4	CLAY (CL). DK greenish grey, stiff little silt and vi. fine sand	
25		11	24"	1-1-1-1	CLAY (CL) DK. greenish grey. Soft.	
		12	24"	WOH-2-2-4	CLAY, as above, V. soft	
30		13				

Figure 1
SOIL BORING LOG, FORM D1586

PROJECT NUMBER	BORING NUMBER		
6207-015	SJSBKMW1D	SHEET 1	OF 1

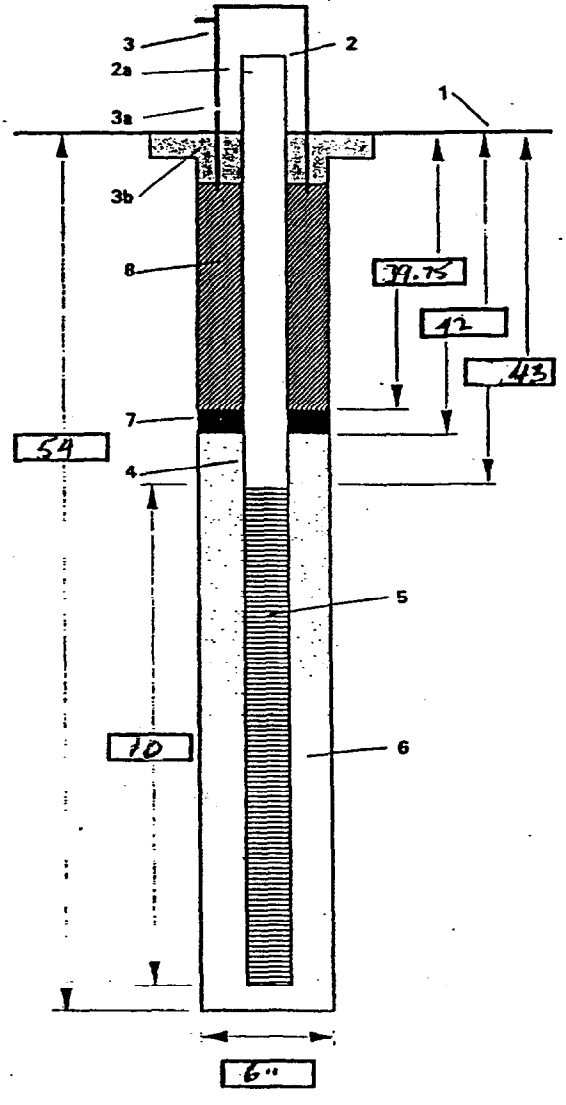
WELL COMPLETION DIAGRAM

PROJECT: St. Juliens Creek Annex — LOCATION: Background #1 (Craddock St)

ELEVATION: — DRILLING CONTRACTOR: Groundwater Systems

DRILLING METHOD AND EQUIPMENT USED: Acker AD2 8¼" HSA to 16.5'; 6" Water Rotary to 54'

WATER LEVELS: — START: — END: — LOGGER: L. France



1- Ground elevation at well: 7.39 ' msl

2- Top of casing elevation: 9.72' msl
a) vent hole?

3- Wellhead protection cover type: 4" steel/concrete pad
a) weep hole?
b) concrete pad dimensions: 3x3'

4- Diameter/type of well casing: 2" sch. 40 PVC

5- Type/slot size of screen: 2" sch 40 PVC, .010 slot

6- Type screen filter
a) Quantity used: #1 silica sand

7- Type of seal
a) Quantity used: 3/8" bentonite chips - hydrated

8- Grout
a) Grout mix used: 5% bentonite
b) Method of placement: pressure grouted
c) Quantity of well casing grout

Development method: Pump & surge

Development time: ~6.75 hours

Estimated purge volume: ~95 gallons

Comments: 6" ID PVC ISOLATION CASING INSTALLED TO 11.0' bgs. Pressure grouted into place in a 12" borehole. Bentonite-cement grout.

ABOVDIAG.XLS

PROJECT NUMBER	BORING NUMBER		
6207-015	SJSBKMW15	SHEET 1	OF 1

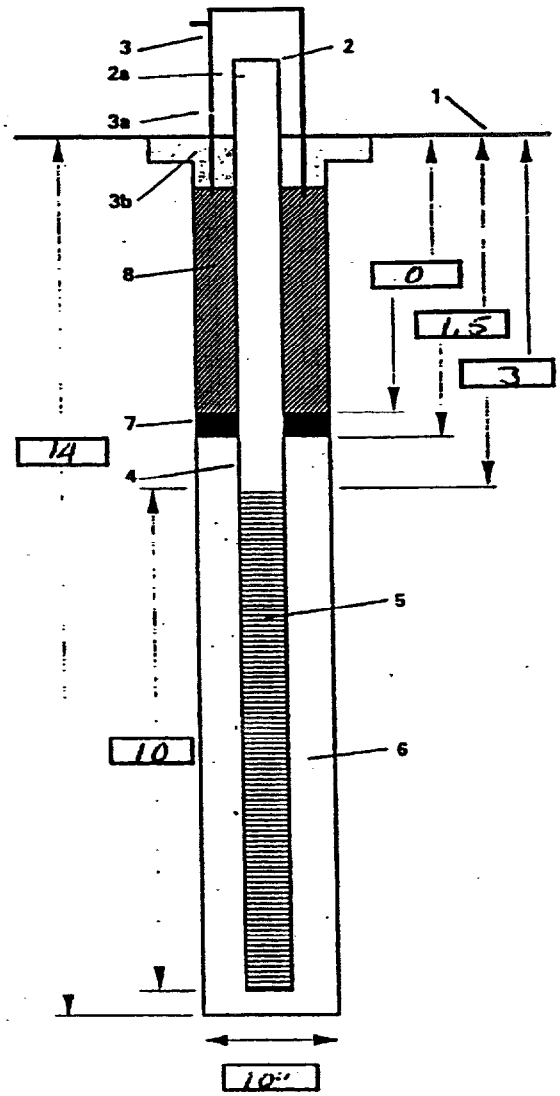
WELL COMPLETION DIAGRAM

PROJECT: ST. Juliens Creek Annex LOCATION: Background #1 Craddock St

ELEVATION: DRILLING CONTRACTOR: GROUNDWATER SYSTEMS

DRILLING METHOD AND EQUIPMENT USED: Acker AD2 6 1/4" HSA

WATER LEVELS: START: END: LOGGER: L. CAMPBELL



1- Ground elevation at well: 7.20 ft msl

2- Top of casing elevation: 9.52 ft. msl
   a) vent hole?

3- Wellhead protection cover type: 4" diameter steel/concrete pad
   a) weep hole?
   b) concrete pad dimensions: 3'x3'

4- Diameter/type of well casing: 2" Sch. 40 PVC

5- Type/slot size of screen: 2" Sch 40 010-Slot PVC

6- Type screen filter
   a) Quantity used: #1 Silica sand

7- Type of seal
   a) Quantity used: Bentonite chips (3/8")

8- Grout
   a) Grout mix used: None due to shallow
   b) Method of placement: water table
   c) Quantity of well casing grout

Development method: Pump and Surge

Development time: 4.5 HOURS

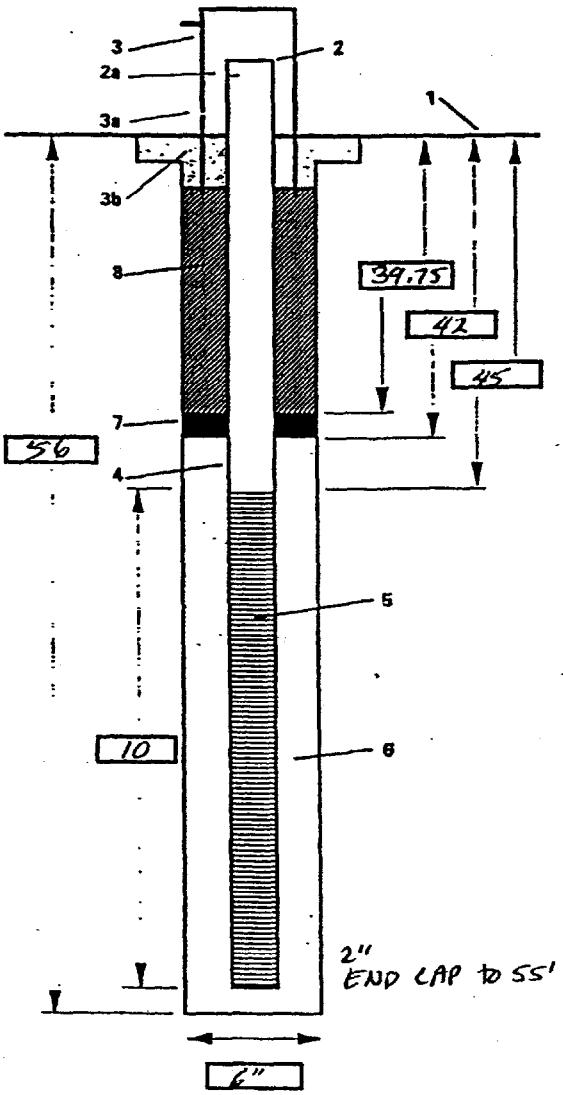
Estimated purge volume: ~5.1 gallons (3x well vol)

Comments:

PROJECT NUMBER	BORING NUMBER		
6207-015	SJSBK-MW-20	SHEET 1	OF 1

WELL COMPLETION DIAGRAM

PROJECT: St. Juliens Creek Annex Background Investigation LOCATION: #29 Background location
ELEVATION: After AD2 8¼" HSA to 17.5'6" water DRILLING CONTRACTOR: Groundwater Systems
DRILLING METHOD AND EQUIPMENT USED: rotary to 56'
WATER LEVELS: START: END: LOGGER: L. FRANCIS

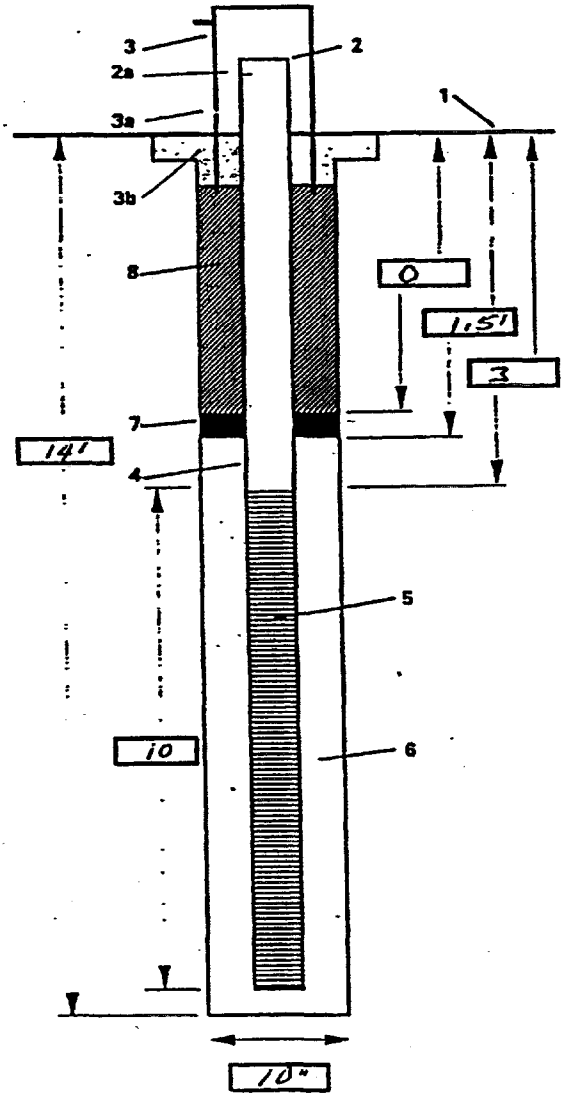


1- Ground elevation at well: 7.31' msl
2- Top of casing elevation: 9.22' msl
a) vent hole?
3- Wellhead protection cover type: 4" steel/concrete pad
a) weep hole?
b) concrete pad dimensions: 3x3'
4- Diameter/type of well casing: 2" sch. 40 PVC
5- Type/slot size of screen: 2" sch. 40 PVC, 0.10 slot
6- Type screen filter: #00 w.g. qtz filter sand 42-43'
a) Quantity used: #1 Silica sand 43 - 55' collapsed formation 55-56'.
7- Type of seal
a) Quantity used: 3/8" bentonite chips - hydrated
8- Grout
a) Grout mix used: 5% bentonite
b) Method of placement: pressure grouted
c) Quantity of well casing grout: ~50 ~~~50~~ gallons.
Development method: Pump + surge
Development time: ~3 hours
Estimated purge volume: ~27 gallons based on 3 well volumes.
Comments: 6" ID PVC ISOLATION CASING INSTALLED TO 18' bgs. pressure grouted into place in a 13" borehole. Bentonite-cement grout.

PROJECT NUMBER	BORING NUMBER
6207-015	SJSBK-MW25 SHEET 1 OF 1

WELL COMPLETION DIAGRAM

PROJECT: SJ. Juliens Creek Annex Background Investigation LOCATION: Background Location #2
ELEVATION:
DRILLING CONTRACTOR: GROUNDWATER SYSTEMS
DRILLING METHOD AND EQUIPMENT USED: Acker AD2 6¼" HSA
WATER LEVELS: START: END: LOGGER: L. CAMPBELL



1- Ground elevation at well: 7.06 ft msl
2- Top of casing elevation: 9.50 ft msl
a) vent hole?
3- Wellhead protection cover type: Concrete Pad, 4"-diam steel casing.
a) weep hole?
b) concrete pad dimensions: 3x3'
4- Diameter/type of well casing: 2" sch. 40 PVC
5- Type/slot size of screen: 2" sch. 40 010-slot PVC
6- Type screen filter
a) Quantity used: #1 Silica Sand
7- Type of seal
a) Quantity used: Bentonite chips (3/8") hydrate
8- Grout
a) Grout mix used: None due to shallow water table
b) Method of placement
c) Quantity of well casing grout
Development method: Pump and surge
Development time: 4 hours
Estimated purge volume: 4.8 based on 3 well vol (210 gallons removed during development)
Comments:

PROJECT NUMBER	BORING NUMBER		
6207-015	SJSBK-MW35	SHEET 1	OF 1

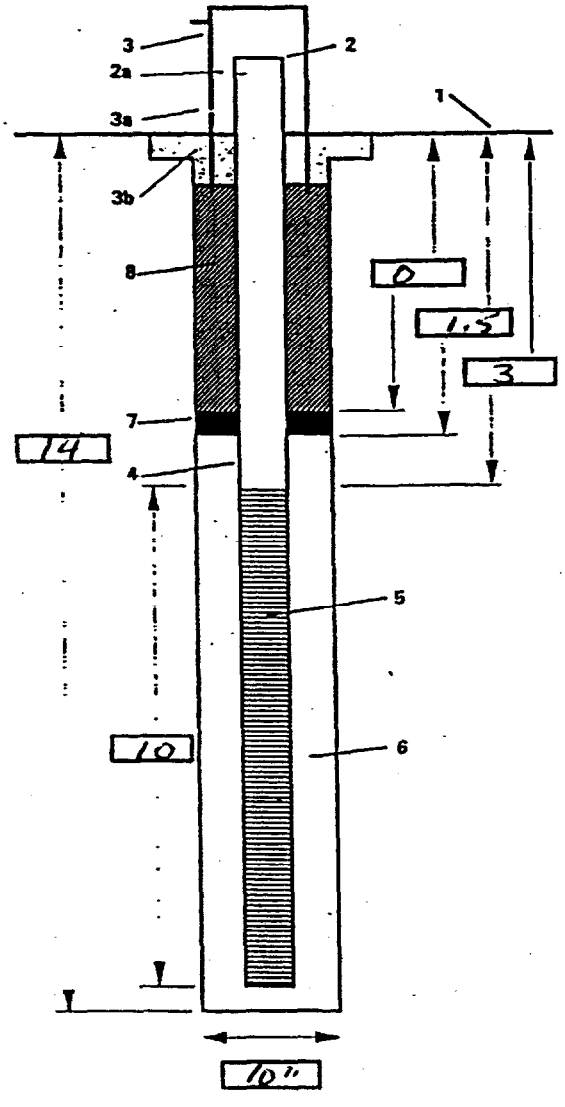
WELL COMPLETION DIAGRAM

PROJECT: ST Juliens Creek Annex Background invest. LOCATION: Background location #3

ELEVATION: DRILLING CONTRACTOR: Groundwater Systems

DRILLING METHOD AND EQUIPMENT USED: Acker AD2 6 1/4" HSA

WATER LEVELS: START: END: LOGGER: Lisa Campbell.



1- Ground elevation at well 9.00' msl

2- Top of casing elevation 11.56' msl
a) vent hole?

3- Wellhead protection cover type 4" diam. steel/concrete pad
a) weep hole?
b) concrete pad dimensions 3X3'

4- Diameter/type of well casing 2" Sch. 40 PVC

5- Type/slot size of screen 2" Sch. 40 PVC, 010-slot

6- Type screen filter
a) Quantity used #1 silica sand

7- Type of seal
a) Quantity used bentonite pellets 3/8" hydrated

8- Grout
a) Grout mix used None due to shallow
b) Method of placement water table
c) Quantity of well casing grout

Development method surge + pump

Development time 2.25 hours

Estimated purge volume 5.7 gallons based on 3 well volumes.

Comments

PROJECT NUMBER	BORING NUMBER		
6207-015	SJSBK-MW3D	SHEET 1	OF 1

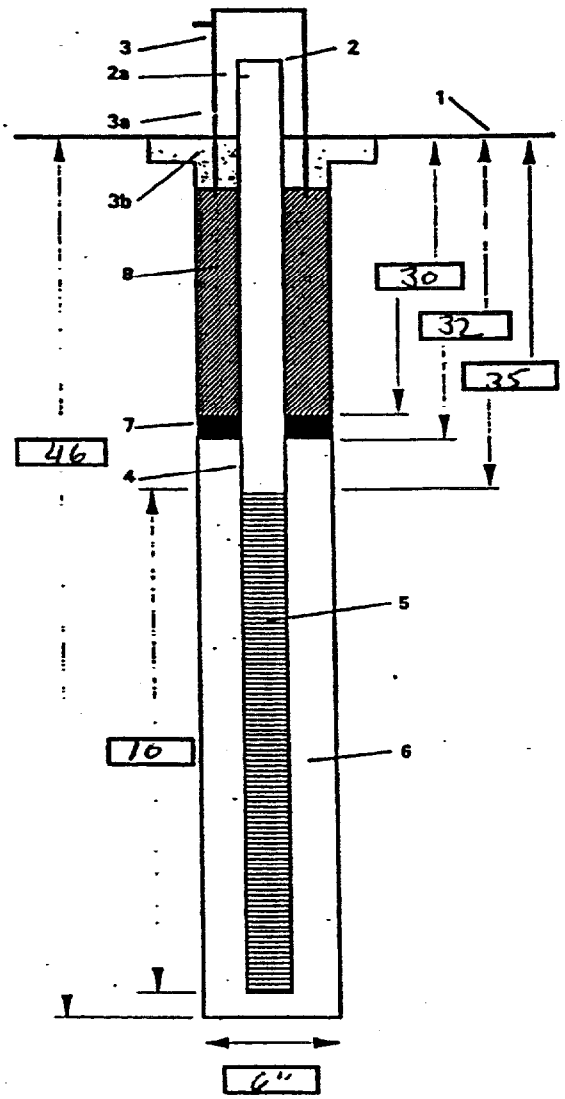
WELL COMPLETION DIAGRAM

PROJECT: St. Juliens Creek Annex Background Investigation LOCATION: Along St. Juliens Creek Drive

ELEVATION: DRILLING CONTRACTOR: Groundwater System

DRILLING METHOD AND EQUIPMENT USED: Acker AO 2 8¼" HSA to: 6¼" HSA to:

WATER LEVELS: START: END: LOGGER: L. FRANCE



1- Ground elevation at well: 8.76' msl

2- Top of casing elevation: 11.07' msl
a) vent hole?

3- Wellhead protection cover type: 4" Steel / concrete pad
a) weep hole?
b) concrete pad dimensions: 3x3'

4- Diameter/type of well casing: 2" PVC, sch. 40

5- Type/slot size of screen: 2" PVC, sch 40 .010-slot

6- Type screen filter: #00 W.G. Sand 32-31', #1 Silica Sand 33-46'
a) Quantity used

7- Type of seal
a) Quantity used: 3/8" bentonite chips

8- Grout
a) Grout mix used: 5% bentonit / cement
b) Method of placement: pressure / tremie
c) Quantity of well casing grout: ~34 gallons

Development method: pump and surge

Development time: 3.25 hours

Estimated purge volume: ~20.6 gallons based on 3 well vol.

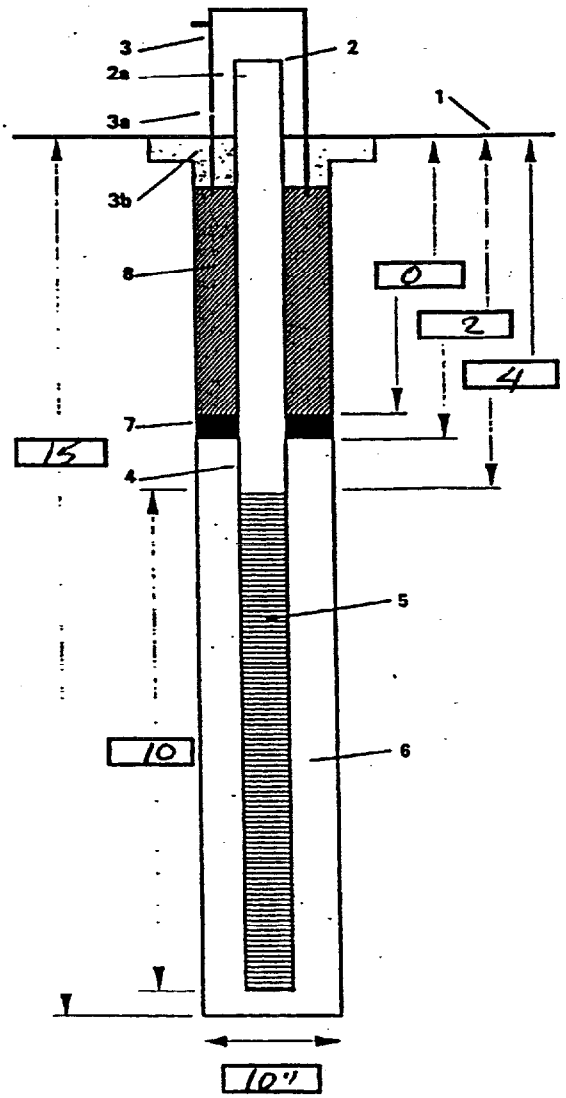
Comments: 6" PVC isolation casing to 18.5' bgs. Pressure grouted into place, in a 12½ inch borehole, with a bentonite/cement grout

ABOVDIAG.XLS

PROJECT NUMBER	BORING NUMBER		
6207-015	SJS BK-MW4S	SHEET 1	OF 1

WELL COMPLETION DIAGRAM

PROJECT: St. Juliens Creek Annex Background investigation LOCATION: Behind Signal Front Gate
ELEVATION: DRILLING CONTRACTOR: Groundwater Systems
DRILLING METHOD AND EQUIPMENT USED: Aker MD2 6 1/4" HSA
WATER LEVELS: START: END: LOGGER: Lisa Campbell.



1- Ground elevation at well: 7.85' msl
2- Top of casing elevation: 10.64' msl
a) vent hole?
3- Wellhead protection cover type: 4" steel / concrete pad
a) weep hole?
b) concrete pad dimensions: 3x3'
4- Diameter/type of well casing: 2" PVC sch. 40
5- Type/slot size of screen: 2" PVC. sch. 40, 0.10 slot
6- Type screen filter
a) Quantity used: #1 silica sand
7- Type of seal
a) Quantity used: 3/8" bentonite chips hydrated
8- Grout
a) Grout mix used: None due to shallow water table
b) Method of placement
c) Quantity of well casing grout
Development method: Surge and pump
Development time: 3.25 hours
Estimated purge volume: 5.7 gallons based on 3 well volumes.
Comments:

PROJECT NUMBER	BORING NUMBER	SHEET	OF
6207-027	MW-15 SJS03	1	1

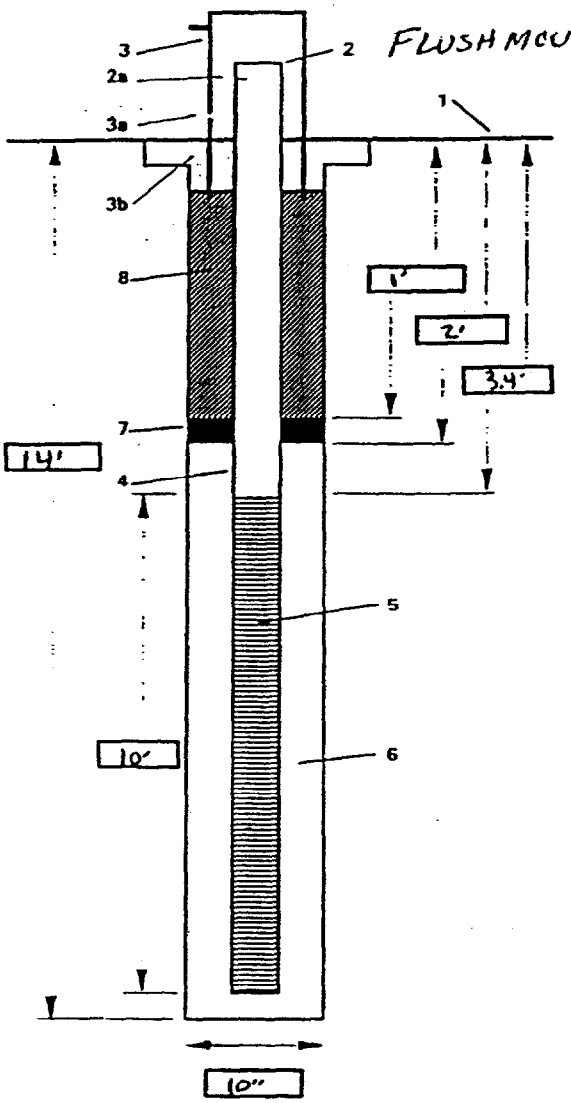
WELL COMPLETION DIAGRAM

PROJECT: St Juliens Creek Annex — LOCATION: Landfill C - Site 3

ELEVATION: TOC 11.91 ft MSL — DRILLING CONTRACTOR: American Environmental Drilling Services

DRILLING METHOD AND EQUIPMENT USED: 6"/4" ID Hollow Stem Augers, Ingersoll Rand A-300 Drill Rig

WATER LEVELS: — START: 7/10/97 — END: 7/14/97 — LOGGER: S Budney (CDM Federal)



1- Ground elevation at well: 12.01 ft msl

2- Top of casing elevation: 11.91 ft msl
   a) vent hole? —

3- Wellhead protection cover type: Flush mount
   a) weep hole? NO
   b) concrete pad dimensions —

4- Diameter/type of well casing: 2" PVC

5- Type/slot size of screen: 2" Dia 0.010 Slot PVC Screen 3.4' - 13.4' BGS

6- Type screen filter
   a) Quantity used: Med Sand

7- Type of seal
   a) Quantity used: Bentonite 1'-2' BGS

8- Grout
   a) Grout mix used: Concrete to surface
   b) Method of placement: NA
   c) Quantity of well casing grout: NA

Development method: Purge/Surge

Development time: 4 hrs 7/13/97 + 2.5 hrs 7/14/97

Estimated purge volume: 75 gal

Comments: Bottom of well 13.9' BGS

PROJECT NUMBER	BORING NUMBER		
6207-027	SJS03-MW1D	SHEET 1	OF 1

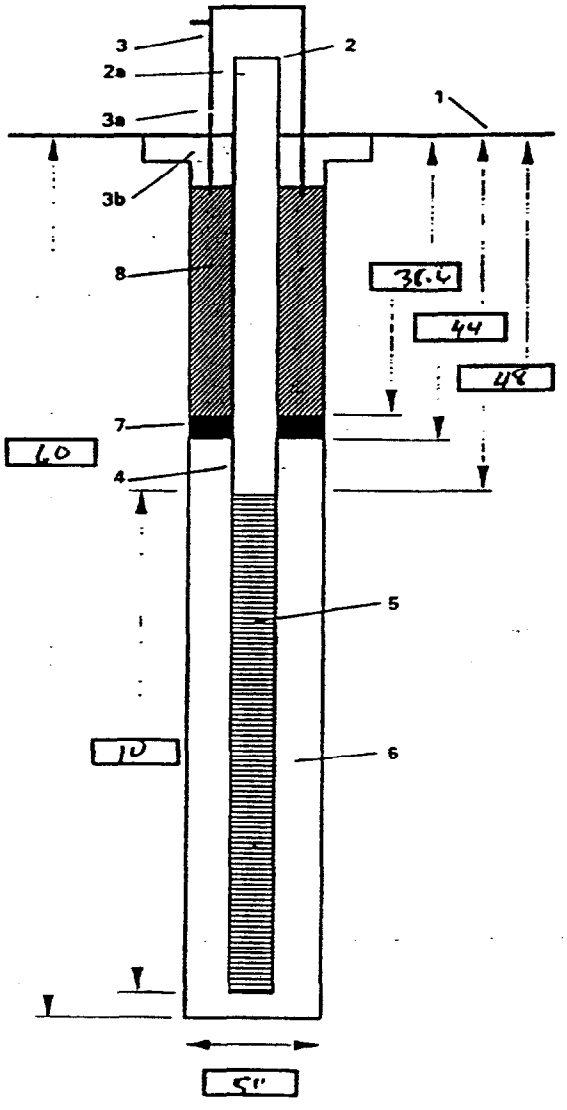
WELL COMPLETION DIAGRAM

PROJECT: NAVY CLEAN II ST. JULIENS CREEK CTO 77 · LOCATION: SITE 3 MW1D

ELEVATION: TOC 12.05 ft msl · DRILLING CONTRACTOR: NEDI

DRILLING METHOD AND EQUIPMENT USED: 8 1/4" ID HSA / MUD ROTARY 5" CORE BARREL

WATER LEVELS: · START: · END: · LOGGER: L. FRANCIS



1- Ground elevation at well: 12.04 ft msl

2- Top of casing elevation: 12.05 ft msl
a) vent hole?

3- Wellhead protection cover type: FLUSH MOUNT
a) weep hole? —
b) concrete pad dimensions

4- Diameter/type of well casing: 2" PVC Sch. 40

5- Type/slot size of screen: 2" PVC 010-SLOT

6- Type screen filter
a) Quantity used: Medium (primary) 40 - 46.5'
fine (secondary) 46.5 - ~~35~~ 44'

7- Type of seal
a) Quantity used: Bentonite Pellet 38.6 - 44'

8- Grout
a) Grout mix used: Bentonite/Cement
b) Method of placement: pumped/tremmie
c) Quantity of well casing grout

Development method: Purge/Surge

Development time: 8 hrs.

Estimated purge volume: 205 gallons

Comments: PVC 6" ESCUTCHEON CASING TO 2 FT
0.4' plug below screen

PROJECT NUMBER	BORING NUMBER	SHEET	OF
6207-C27	MW-2S SJS03	1	1

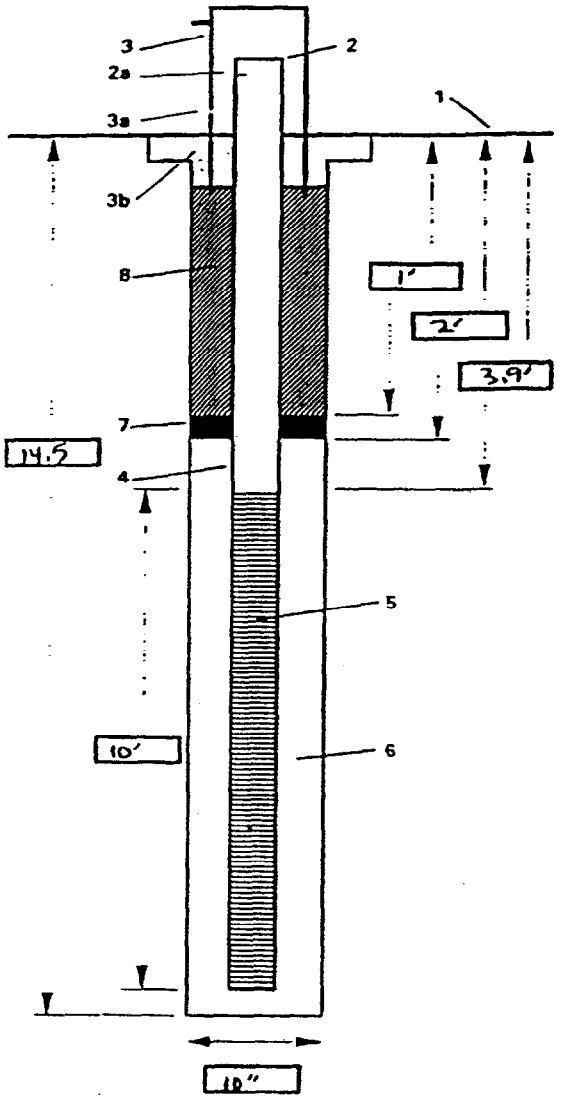
WELL COMPLETION DIAGRAM

PROJECT: St Juliens Creek Annex LOCATION: Site 3 Landfill C

ELEVATION: TOC: 15.22 ft msl DRILLING CONTRACTOR: American Environmental Drilling Services

DRILLING METHOD AND EQUIPMENT USED: 6"1/4" ID Hollow Stem Auger - Ingersoll Rand A-300 Drill Rig

WATER LEVELS: START: 7/29/97 END: 7/11/97 LOGGER: S Sweeney (CDM Federal)



1- Ground elevation at well 12.84 ft msl

2- Top of casing elevation 15.22 ft msl
   a) vent hole?

3- Wellhead protection cover type Steel Stick up
   a) weep hole? Yes
   b) concrete pad dimensions 3' x 3'

4- Diameter/type of well casing 2" Dia PVC

5- Type/slot size of screen 0.010 Slot PVC 2' Dia Screen
   Screen 3.9-13.9

6- Type screen filter
   a) Quantity used Med Sand ~ 5 cubic ft.

7- Type of seal
   a) Quantity used Bentonite 1'-2' BGS

8- Grout
   a) Grout mix used Concrete
   b) Method of placement NA
   c) Quantity of well casing grout NA

Development method Purge / Surge

Development time 4 hrs on 7/11/97

Estimated purge volume 27 gal

Comments Bottom of well 14.4'

PROJECT NUMBER	BORING NUMBER		
6207-027	SJSC3-MW2D	SHEET 1	OF 1

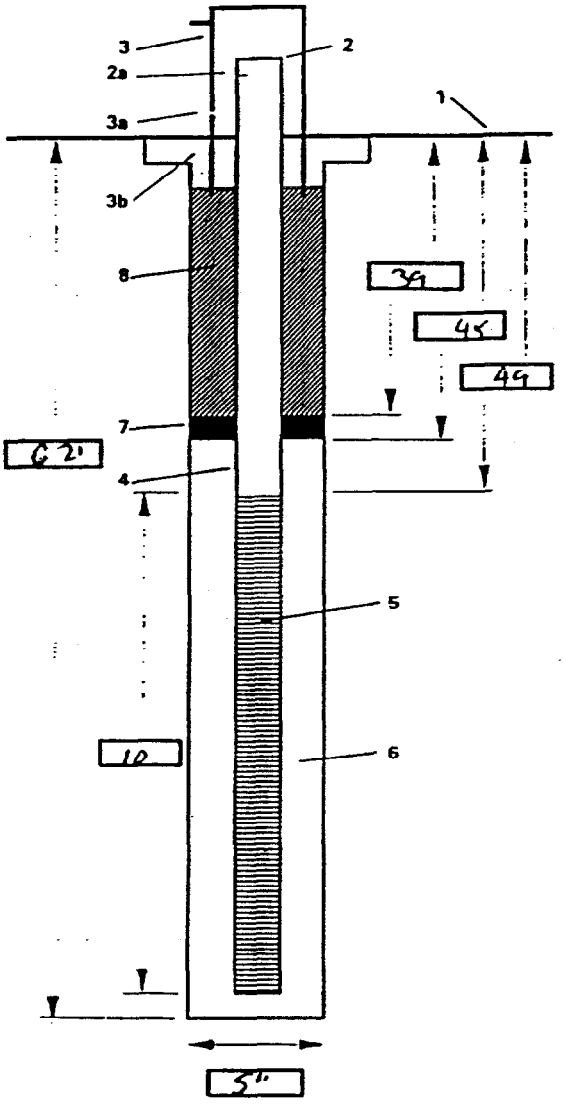
WELL COMPLETION DIAGRAM

PROJECT: NAVY CLEAN II ST. JULIENS CREEK LOCATION: SITE 3 MW2D

ELEVATION: TOC 14.73' MSL DRILLING CONTRACTOR:

DRILLING METHOD AND EQUIPMENT USED: 8 1/4" HSA / MUD ROTARY WITH 5" CORE BARREL

WATER LEVELS: START: END: LOGGER: L. FRANCK



1- Ground elevation at well 12.41 ~~4.56~~ ft msl

2- Top of casing elevation 14.73' ft msl
a) vent hole? yes

3- Wellhead protection cover type stick-up
a) weep hole? yes
b) concrete pad dimensions

4- Diameter/type of well casing 2" PVC Sch. 40

5- Type/slot size of screen 2" PVC 010-slot

6- Type screen filter
a) Quantity used medium (primary) 62'-45'
fine (secondary) 46'-45'

7- Type of seal
a) Quantity used Bentonite Pelet 45'-39'

8- Grout
a) Grout mix used Bentonite/Cemat
b) Method of placement pumped/tremmie
c) Quantity of well casing grout

Development method Purge/Surge

Development time 8-hours

Estimated purge volume 210 gallons

Comments 6" PVC Isolation casing set at 29'. 0.4' Plug on bottom of Screen

CH2M HILL

PROJECT NUMBER	BORING NUMBER	SHEET	OF
6207-027	MW-45 SJS03	1	1

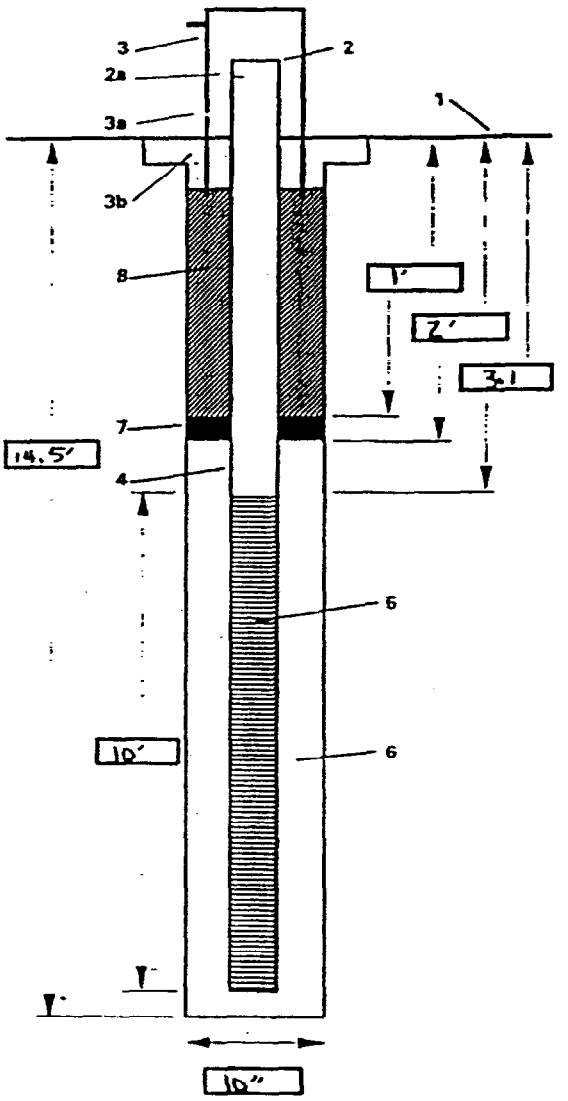
WELL COMPLETION DIAGRAM

PROJECT: St Juliens Creek Annex — LOCATION: Land fill C - Site 3

ELEVATION: TOC: 15.09 ft msl — DRILLING CONTRACTOR: American Environmental Drilling Services

DRILLING METHOD AND EQUIPMENT USED: 6¼ ID Hollow Stem Augers Ingersoll Rand A-300 Drill Rig

WATER LEVELS: — START: 6/25/97 — END: 7/10/97 — LOGGER: S. Budney (CDM Federal)



1- Ground elevation at well: 12.64 ft msl

2- Top of casing elevation: 15.09 ft msl
a) vent hole? yes

3- Wellhead protection cover type: Steel Stick up
a) weep hole? Yes
b) concrete pad dimensions: 3' x 3'

4- Diameter/type of well casing: 2" Diameter PVC

5- Type/slot size of screen: Slot 0.010 - PVC 2" Dia. Screen 3.1 - 13.1' BGS

6- Type screen filter
a) Quantity used: Approx 5 cu ft med sand

7- Type of seal
a) Quantity used: Bentonite 1-2' BGS

8- Grout
a) Grout mix used: Concrete
b) Method of placement: N/A
c) Quantity of well casing grout: N/A

Development method: purge + Surge

Development time: 4½ hours on 7/10/97

Estimated purge volume: 40 gal 7/10/97

Comments: Bottom of well 13.6'

ABOVDIAG XLS

PROJECT NUMBER	BORING NUMBER	SHEET	OF
6207-027	MW-3S SJSO3	1	1

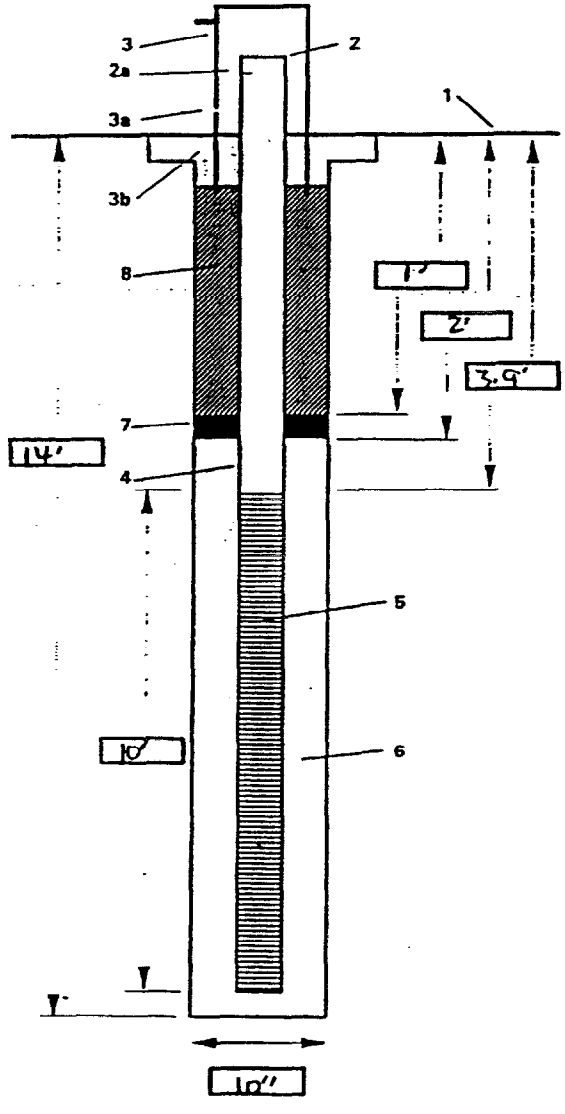
WELL COMPLETION DIAGRAM

PROJECT: St Johns Creek Annex — LOCATION: Landfill C Site 3

ELEVATION: TOC: 13.45 ft msl — DRILLING CONTRACTOR: American Environmental Drilling Services

DRILLING METHOD AND EQUIPMENT USED: 6.4 ID Hollow Stem Auger — Ingersoll Rand A-300 Drill Rig

WATER LEVELS: — START: 6/28/97 — END: 7/1/97 — LOGGER: S. Bushway (CDM Federal)



1- Ground elevation at well: 11.31 ft msl

2- Top of casing elevation: 13.48 ft msl
   a) vent hole? —

3- Wellhead protection cover type: Steel Stick Up
   a) weep hole? Yes
   b) concrete pad dimensions: 3' x 3'

4- Diameter/type of well casing: 2" ID PVC

5- Type/slot size of screen: PVC 0.010 slot 2" Dia Screen 3.9-13.9' BGS

6- Type screen filter: Med Sand
   a) Quantity used: ~4 Bags Co. Fast 14'-2' BGS

7- Type of seal
   a) Quantity used: Bentonite 1'-2' BGS

8- Grout
   a) Grout mix used: Concrete from 1' BGS
   b) Method of placement: NA
   c) Quantity of well casing grout: NA

Development method: Purge/Surge

Development time: 3 hours 7/11/97

Estimated purge volume: 55 gal

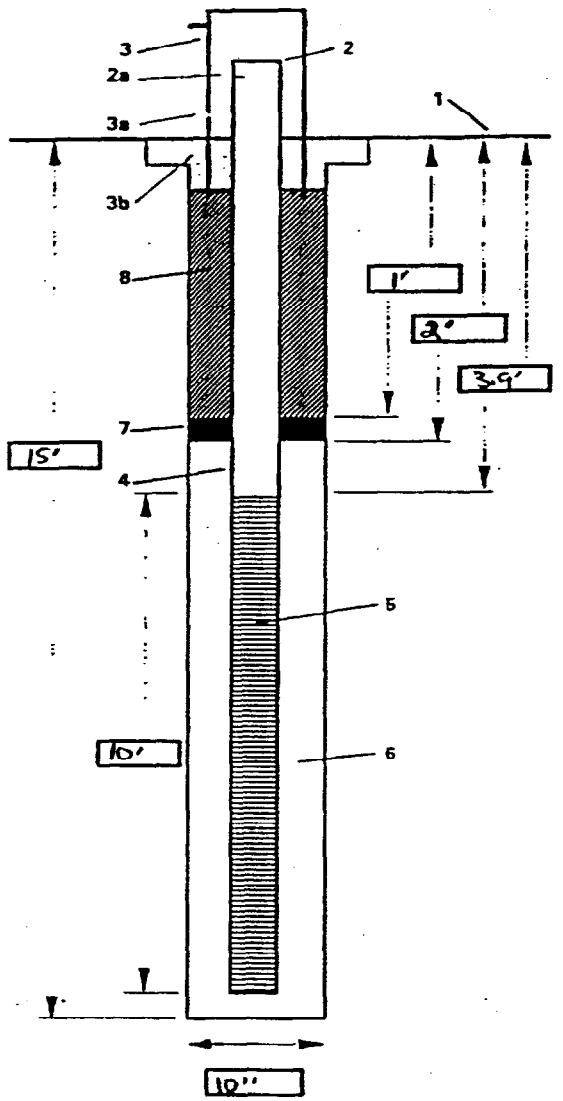
Comments: Bottom of well 14.3' BGS

CH2M HILL

PROJECT NUMBER	BORING NUMBER	SHEET	OF
6207-027	MW-15 SJS04	1	1

WELL COMPLETION DIAGRAM

PROJECT: St Juliens Creek Annex LOCATION: Landfill D Site 4
ELEVATION: TOC: 13.02 ft msl DRILLING CONTRACTOR: American Environmental Drilling Services
DRILLING METHOD AND EQUIPMENT USED: 6 1/4" ID Hollow Stem Augers - Ingersoll Rand A-300 Drill Rig
WATER LEVELS: START: 6/28/97 END: 7/10/97 LOGGER: S. Budney (Confederal)



1- Ground elevation at well 10.47 ft msl

2- Top of casing elevation 13.02 ft msl
a) vent hole? yes

3- Wellhead protection cover type Steel Stick up
a) weep hole? yes
b) concrete pad dimensions 3' x 3'

4- Diameter/type of well casing 2" Dia PVC

5- Type/slot size of screen 0.010 Slot 2" ID Screen PVC
Screen - 3.9' - 13.9' BGS

6- Type screen filter
a) Quantity used ~5 cu. ft of med sand

7- Type of seal
a) Quantity used Bentonite 1'-2' BGS

8- Grout
a) Grout mix used Cement 1' to surface
b) Method of placement NA
c) Quantity of well casing grout NA

Development method Purge + Surge

Development time 3 hrs on 7/10/97

Estimated purge volume 26 gal

Comments Bottom of well 14' 5" BGS

ABOVDIAG.XLS

PROJECT NUMBER	BORING NUMBER		
6207-027	SJS04-MW1D	SHEET 1	OF 1

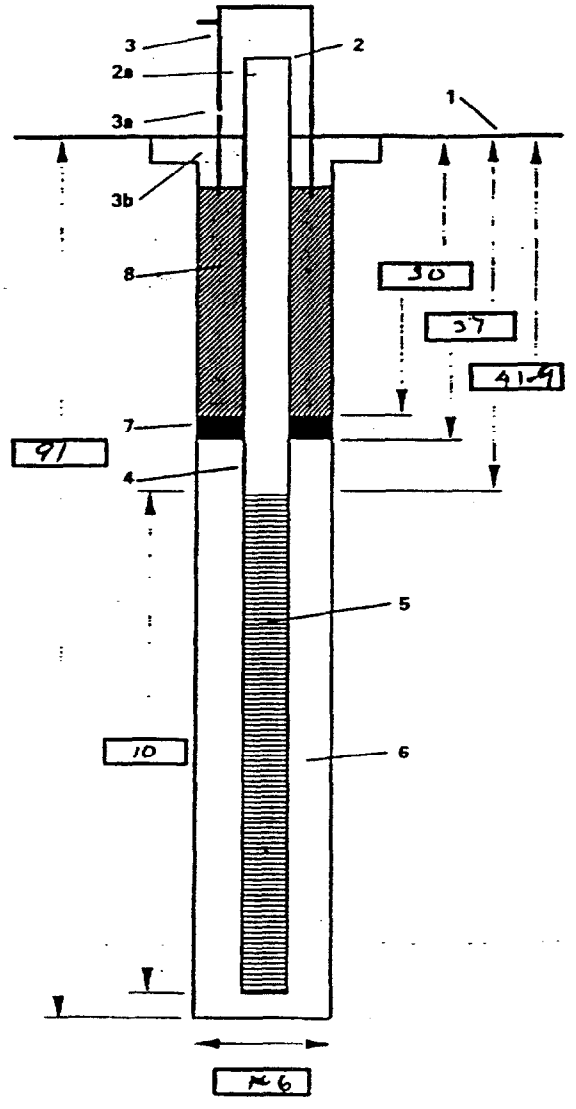
WELL COMPLETION DIAGRAM

PROJECT: NAVY CLEAN II SJ. JULIENS CREEK CTO 27 LOCATION: SITE 9 ~~MW9D~~ MW1D

ELEVATION: TOC 8.32 ft MSL DRILLING CONTRACTOR: AECOS

DRILLING METHOD AND EQUIPMENT USED: HSA (8 1/4 ID), 6" mud ROTARY

WATER LEVELS: START: END: LOGGER: L. CAMPBELL/L. FRANCE



1- Ground elevation at well 10.70 ft MSL

2- Top of casing elevation 13.32 ft MSL
a) vent hole? Yes

3- Wellhead protection cover type Stick up.
a) weep hole? Yes
b) concrete pad dimensions

4- Diameter/type of well casing ISOLATION - 6" PVC
well - 2" PVC

5- Type/slot size of screen 010-slot PVC, Sch. 40

6- Type screen filter
a) Quantity used Medium Sand.

7- Type of seal
a) Quantity used Bentonite Pellet

8- Grout
a) Grout mix used Portland Cement/Bentonite
b) Method of placement tremmie, pumped
c) Quantity of well casing grout

Development method Purge + Surge

Development time 4.5 Hours

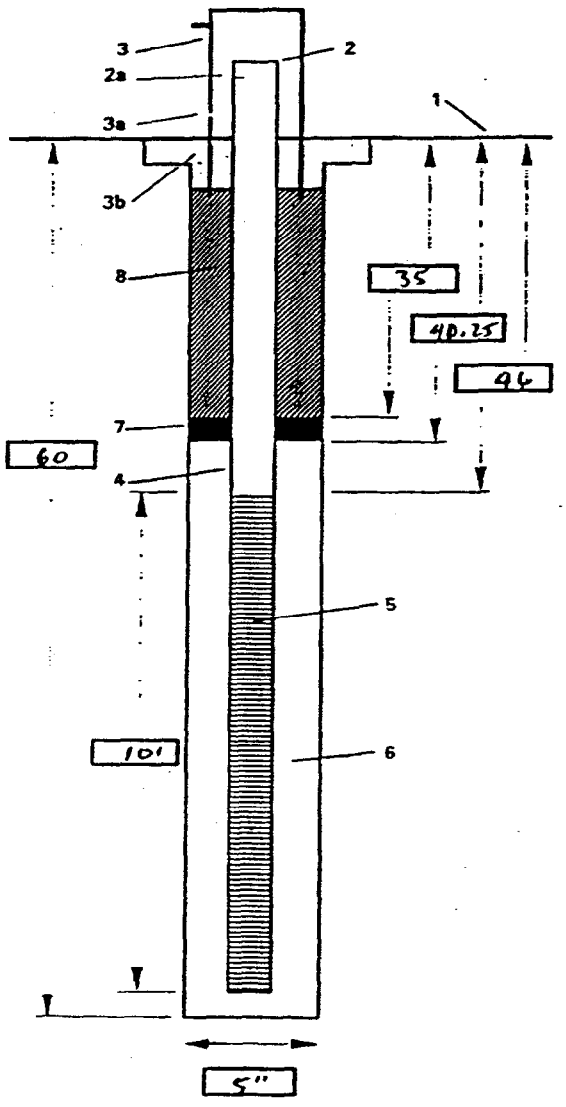
Estimated purge volume 120 gal.

Comments Isolation casing from 0-25'
Med. Sand 60-91' ft.
Bentonite pellet Seal 60-55'
med Sand 55-38
Pre Pack Sand (fine) 38-37'

PROJECT NUMBER	BORING NUMBER		
6207-027	SJSG4-MW3D	SHEET 1	OF 1

WELL COMPLETION DIAGRAM

PROJECT: NAVY CLEAN II ST. JULIENS CREEK CTO 27 LOCATION: SITE 4 MW-3D
ELEVATION: TOC 5.56 ft msl DRILLING CONTRACTOR: AEDS
DRILLING METHOD AND EQUIPMENT USED: MUD ROTARY 5" CORE BARREL
WATER LEVELS: START: END: LOGGER: L. FRANCE



1- Ground elevation at well: 3.60 ft msl
2- Top of casing elevation: 5.56 ft msl
a) vent hole? YES
3- Wellhead protection cover type: STICK-UP
a) weep hole? YES
b) concrete pad dimensions:
4- Diameter/type of well casing: 2" PVC Sch. 40
5- Type/slot size of screen: 2" PVC 010-SLOT
6- Type screen filter
a) Quantity used: medium sand (primary) 40.25
fine sand (secondary) 4 ULS
7- Type of seal
a) Quantity used: Bentonite pellet to 35'
8- Grout
a) Grout mix used: Bentonite / Cement
b) Method of placement: tremmied / pumped
c) Quantity of well casing grout:
Development method: Purge & Surge
Development time: 4 Hours
Estimated purge volume: 145 gallons
Comments: Note: Isolation Casing 6" PVC to 20.0'
0.4' plug at bottom of screen

PROJECT NUMBER	BORING NUMBER	SHEET	OF
6207-027	MW-25 SJS04	1	1

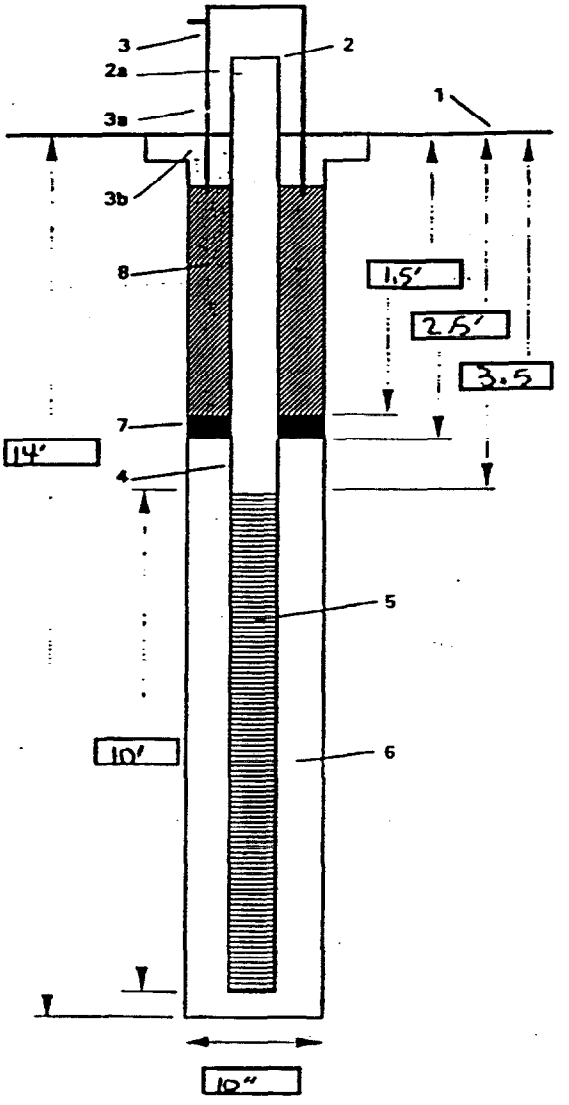
WELL COMPLETION DIAGRAM

PROJECT: St Juliens Creek Annex — LOCATION: Site 43 - Landfill D

ELEVATION: TOC. 11.48 ft msl — DRILLING CONTRACTOR: (American Environmental Drilling Services

DRILLING METHOD AND EQUIPMENT USED: 6 1/4" ID Hollow Stem Augers - Ingersoll Rand A-300 Drill Rig

WATER LEVELS: — START: 6/28/97 — END: 7/09/97 7/18/97 — LOGGER: S. Bowers (CDM Federal)



1- Ground elevation at well: 9.36 ft msl

2- Top of casing elevation: 11.48 ft msl
   a) vent hole? yes

3- Wellhead protection cover type: Steel - Stickup
   a) weep hole? yes
   b) concrete pad dimensions: 3' x 3'

4- Diameter/type of well casing: 2" Dia PVC

5- Type/slot size of screen: PVC 0.010 Slot 2" Dia Screen 3.5-13.5' BGS

6- Type screen filter
   a) Quantity used: ~5 cu. feet 14'-2.5' BGS Med Sand

7- Type of seal
   a) Quantity used: Bentonite 1.5'-2.5' BGS

8- Grout
   a) Grout mix used: Concrete to surface
   b) Method of placement: NA
   c) Quantity of well casing grout: NA

Development method: Purge / Surge

Development time: 1½ hr on 7/09/97, 1 hr on 7/17, 1¼ hr on 7/18

Estimated purge volume: ~4 gal on 7/09/97 + 3½ on 7/17, 2.7 on 7/18

Comments: Bottom of well 14.0' BGS

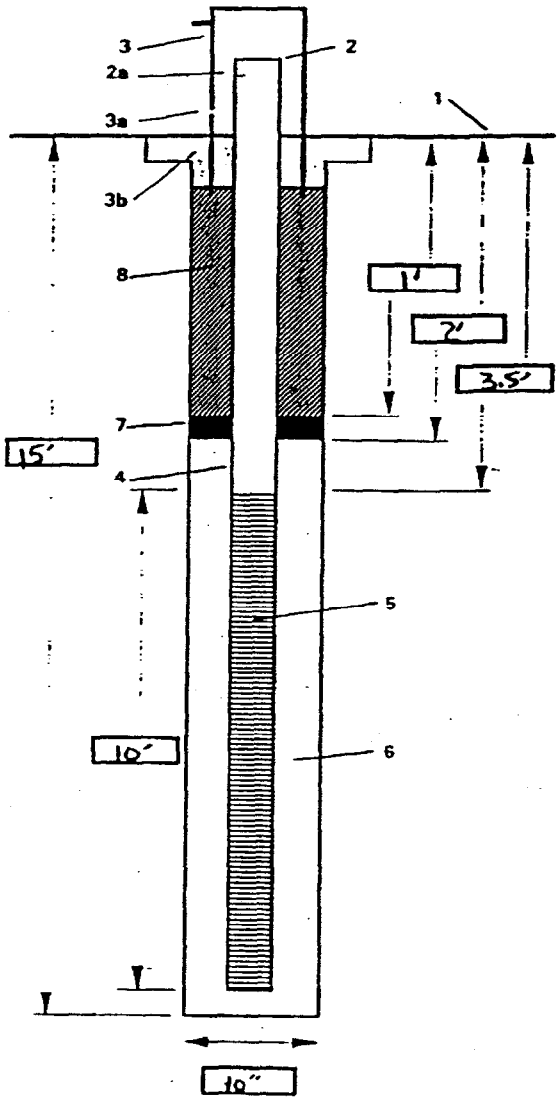
Development V. silty - low recharge

CH2M HILL

PROJECT NUMBER	BORING NUMBER		
6207-027	MW-4S	SHEET 1	OF 1

WELL COMPLETION DIAGRAM

PROJECT: St Julieus Creek Annex LOCATION: Landfill D Site 4
ELEVATION: TOC 8.60 ft msl. DRILLING CONTRACTOR: American Environmental Drilling Services
DRILLING METHOD AND EQUIPMENT USED: 6¼" ID Hollow Stem Augers - Ingersoll Rand A-300 Drill Rig
WATER LEVELS: START: 6/30/97 END: 7/09/97 LOGGER: S Bushey (CDM Federal)



1- Ground elevation at well: 6.34 ft msl

2- Top of casing elevation: 8.60 ft msl
a) vent hole?

3- Wellhead protection cover type: Steel Stick up
a) weep hole? Yes
b) concrete pad dimensions: 3' x 3'

4- Diameter/type of well casing: 2" Dia PVC

5- Type/slot size of screen: 0.010 Slot 2" Dia PVC Screen 3.5' - 13.5' BGS

6- Type screen filter
a) Quantity used: Med Sand ~5 cubic feet

7- Type of seal
a) Quantity used: Bentonite 1'-2' BGS

8- Grout
a) Grout mix used: Concrete to Surface
b) Method of placement: NA
c) Quantity of well casing grout: NA

Development method: Purge / Surge

Development time: 3 hrs on 7/09/97

Estimated purge volume: 27 gal

Comments: Bottom of well 14.0'

ABOVDIAG XLS

PROJECT NUMBER	BORING NUMBER	SHEET	OF
6207-027	MW-35 SJS04	1	1

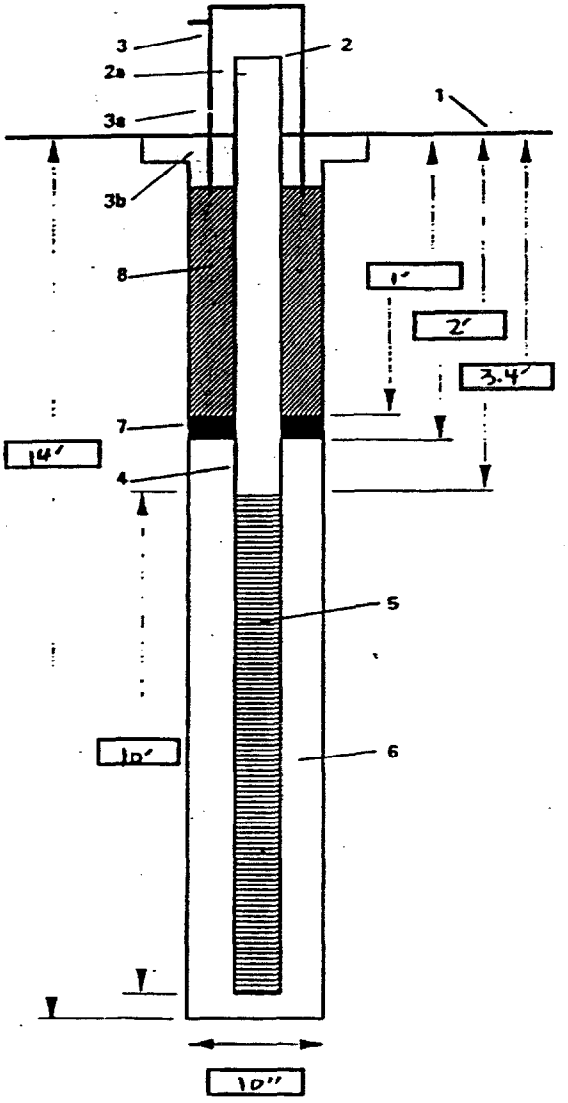
WELL COMPLETION DIAGRAM

PROJECT: St Johns Creek Annex — LOCATION: Landfill D - Site 4

ELEVATION: TOC: 6.67 ft msl — DRILLING CONTRACTOR: American Environmental Drilling Services

DRILLING METHOD AND EQUIPMENT USED: 6"¼" ID Hollow Stem Augers - Ingersoll Rand A-300 Drill Rig

WATER LEVELS: — START: 7/01/97 — END: — LOGGER: S Burdsey (CDM Federal)



1- Ground elevation at well: 4.19 ft msl

2- Top of casing elevation: 6.67 ft msl
   a) vent hole?

3- Wellhead protection cover type: Steel - Stick up
   a) weep hole? Yes
   b) concrete pad dimensions: 3' x 3'

4- Diameter/type of well casing: 2" Dia PVC

5- Type/slot size of screen: 2" Dia 0.010 Slot PVC Screen 3.4' - 13.4'

6- Type screen filter
   a) Quantity used: Med Sand ~ 5 cubic Ft.

7- Type of seal
   a) Quantity used: Bentonite 1'-2' BGS

8- Grout
   a) Grout mix used: Concrete
   b) Method of placement: NA
   c) Quantity of well casing grout: NA

Development method: Purge / Surge (Purge w/ Bailer)

Development time: 3½ hours on 7/17/97

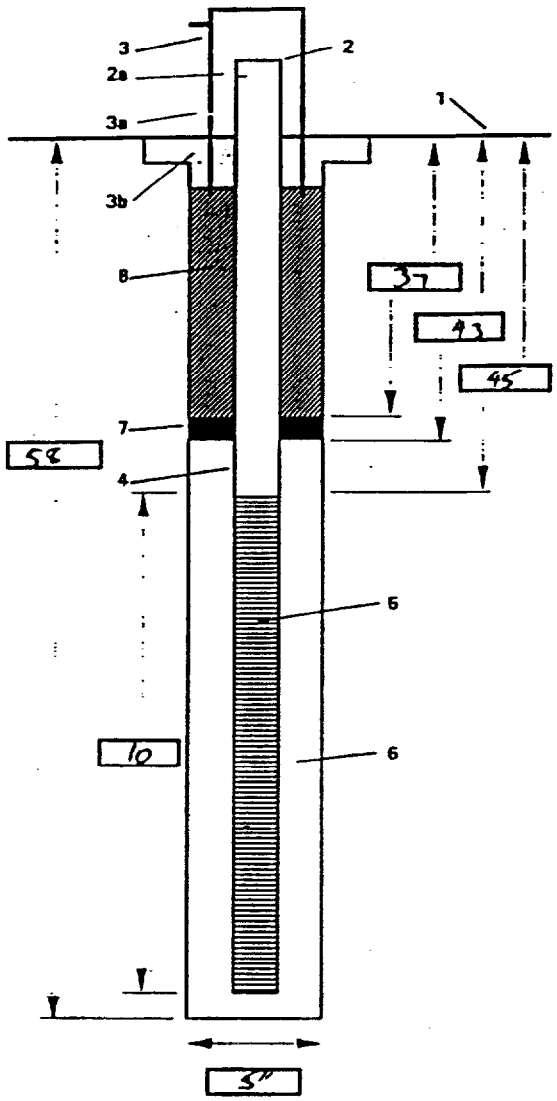
Estimated purge volume: 55 gal

Comments: Bottom of well 13.8'

PROJECT NUMBER	BORING NUMBER		
6207-028	SJSOS-MW1D	SHEET 1	OF 1

WELL COMPLETION DIAGRAM

PROJECT: NAVY CLEANUP ST JULIENS CREEK LOCATION: SITE 5 MW1D
ELEVATION: TOC 8.59 ft msl DRILLING CONTRACTOR: AEDS
DRILLING METHOD AND EQUIPMENT USED: 8¼ HSA Mud Rotary with 5"-Diam Bit
WATER LEVELS: START: END: LOGGER: L. FRANCE



1- Ground elevation at well 6.11 ft msl
2- Top of casing elevation 8.59 ft msl
a) vent hole? Yes
3- Wellhead protection cover type Sngcap
a) weep hole? Yes
b) concrete pad dimensions
4- Diameter/type of well casing 2" PVC Sch. 40
5- Type/slot size of screen 2" PVC 010-Slot
6- Type screen filter
a) Quantity used Medium Sand (primary) 43-45'
fine Sand (2ndary) –
7- Type of seal
a) Quantity used Bentonite Pellet 37-43'
8- Grout
a) Grout mix used Cement/Bentonite
b) Method of placement pump tremmie pipe
c) Quantity of well casing grout
Development method Purge & Surge
Development time 4.5 hours
Estimated purge volume 210 gallons
Comments 6" PVC Isolation Casing to 30'

PROJECT NUMBER	BORING NUMBER		
6207-02E	SJSOS-MW2D	SHEET 1	OF 1

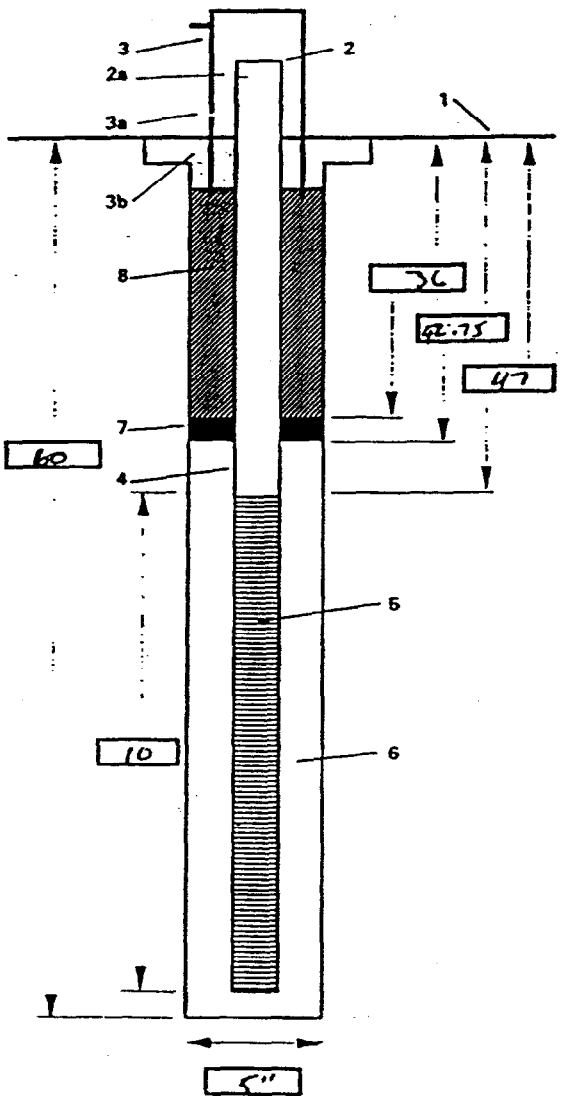
WELL COMPLETION DIAGRAM

PROJECT: NAVY CLEAN II St. Juliens Creek Annex LOCATION: SITE 5 MW2D

ELEVATION: TOC 7.12 ft msl DRILLING CONTRACTOR: AEDS

DRILLING METHOD AND EQUIPMENT USED: 8 1/4" HSA, 5" Bit and Mud Rotary

WATER LEVELS: START: ~~7/10/97~~ 6/25/97 END: 7/1/97 LOGGER: L. FRANCIS



1- Ground elevation at well 4.56 ft msl

2- Top of casing elevation 7.12 ft msl
a) vent hole? Yes

3- Wellhead protection cover type STIFF-UP
a) weep hole? yes
b) concrete pad dimensions

4- Diameter/type of well casing 2" PVC Sch. 40

5- Type/slot size of screen 2" PVC 010-slot

6- Type screen filter
a) Quantity used Medium Sand 60-44.5

7- Type of seal Primary Sand 44.5-42.75'
a) Quantity used Bentonite Pelld 42.75-36'

8- Grout
a) Grout mix used Cement/Bentonite
b) Method of placement Pumped/tremmie
c) Quantity of well casing grout

Development method Purge + Surge

Development time 4 Hours

Estimated purge volume 175 gallons

Comments 6" PVC Isolation Casing for 22'

PROJECT NUMBER	BORING NUMBER	SHEET	OF
6207-028	MW-15 SJS05	1	1

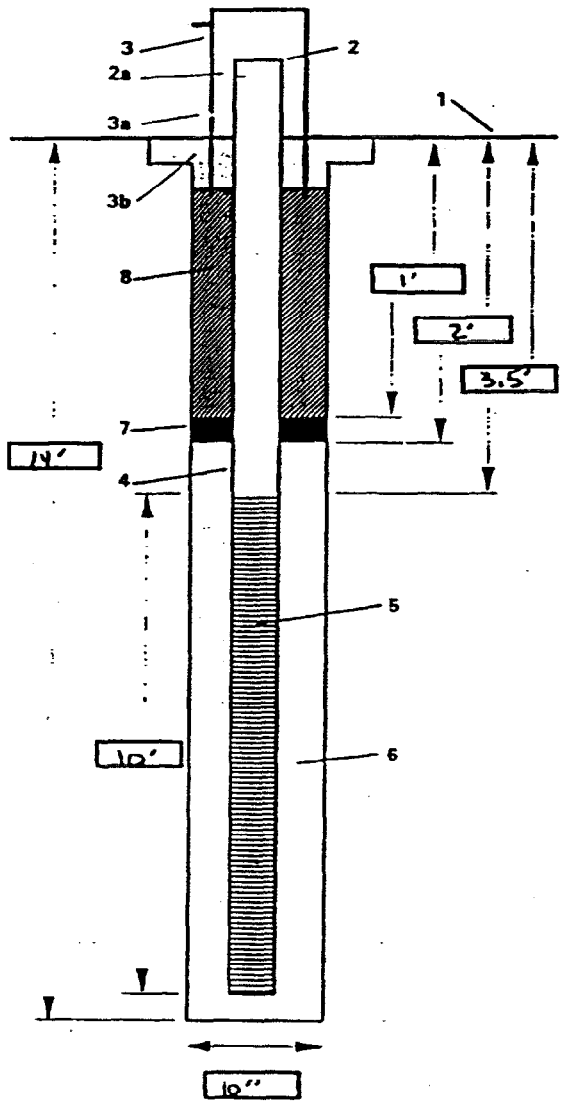
WELL COMPLETION DIAGRAM

PROJECT: St Juliens Creek Annex LOCATION: Burning Grounds - Site 5

ELEVATION: TOC: 9.12 ft msl DRILLING CONTRACTOR: American Environmental Drilling Services

DRILLING METHOD AND EQUIPMENT USED: 6 1/4" ID Hollow Stem Augers Ingersoll Rand A-300 Drill Rig

WATER LEVELS: START: 7/01/97 END: 7/08/97 LOGGER: S. Bussey (CDM Federal)



1- Ground elevation at well 6.45 ft msl

2- Top of casing elevation 9.12 ft msl
a) vent hole? yes

3- Wellhead protection cover type Steel - Stickup
a) weep hole? yes
b) concrete pad dimensions 3' x 3'

4- Diameter/type of well casing 2" Dia PVC

5- Type/slot size of screen 0.010 Slot 2" Dia PVC Screen 3.5'-13.5' BGS

6- Type screen filter
a) Quantity used Med. Sand. ~5 cubic feet

7- Type of seal
a) Quantity used Bentonite 1'-2' BGS

8- Grout
a) Grout mix used Concrete to Surface
b) Method of placement NA
c) Quantity of well casing grout NA

Development method Purge + Surge

Development time 4 hrs on 7/08/97

Estimated purge volume 55 gal

Comments Bottom of well 13.9' BGS

ABOVDIAG.XLS

PROJECT NUMBER	BORING NUMBER	SHEET	OF
6209-027	MW-35 SJS05	1	1

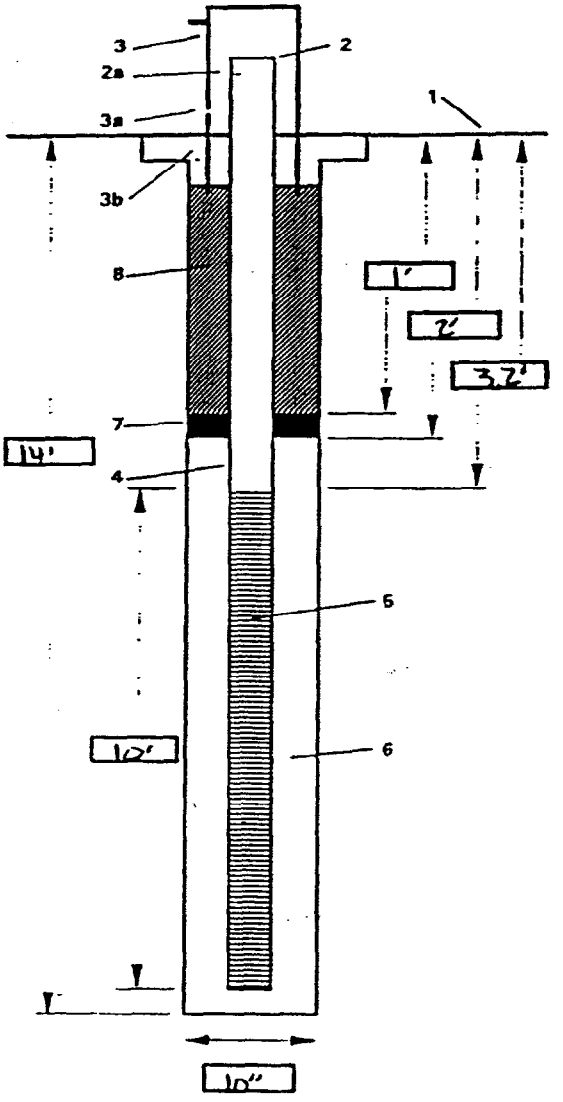
WELL COMPLETION DIAGRAM

PROJECT: St Juliens Creek Annex — LOCATION: Site 5 Burning Grounds

ELEVATION: TOC, 8.68 ft msl — DRILLING CONTRACTOR: American Environmental Drilling Services

DRILLING METHOD AND EQUIPMENT USED: 6 1/4" ID Hollow Stem Augers - Ingersoll Rand A-300 Drill Rig

WATER LEVELS: — START: 6/29/97 — END: 7/09/97 — LOGGER: S. Bowey (CDM Federal)



1- Ground elevation at well: 5.57 ft msl

2- Top of casing elevation: 8.68 ft msl
   a) vent hole? Yes

3- Wellhead protection cover type: Steel Stick Up
   a) weep hole? Yes
   b) concrete pad dimensions: 3' x 3'

4- Diameter/type of well casing: 2" Dia PVC

5- Type/slot size of screen: 0.010 Slot 2" Dia PVC Screen 3.2 - 13.2'

6- Type screen filter
   a) Quantity used: Med Sand - 5 cu.ft

7- Type of seal
   a) Quantity used: Bentonite 1'-2' BGS

8- Grout
   a) Grout mix used: Concrete from 1' BGS
   b) Method of placement: N.A.
   c) Quantity of well casing grout: NA

Development method: Purge + Surge

Development time: 2 hrs on 7/09/97

Estimated purge volume: 55 gal

Comments: Bottom of well 13.7'

PROJECT NUMBER	BORING NUMBER	SHEET	OF
6207-028	MW-25 SJS05	1	1

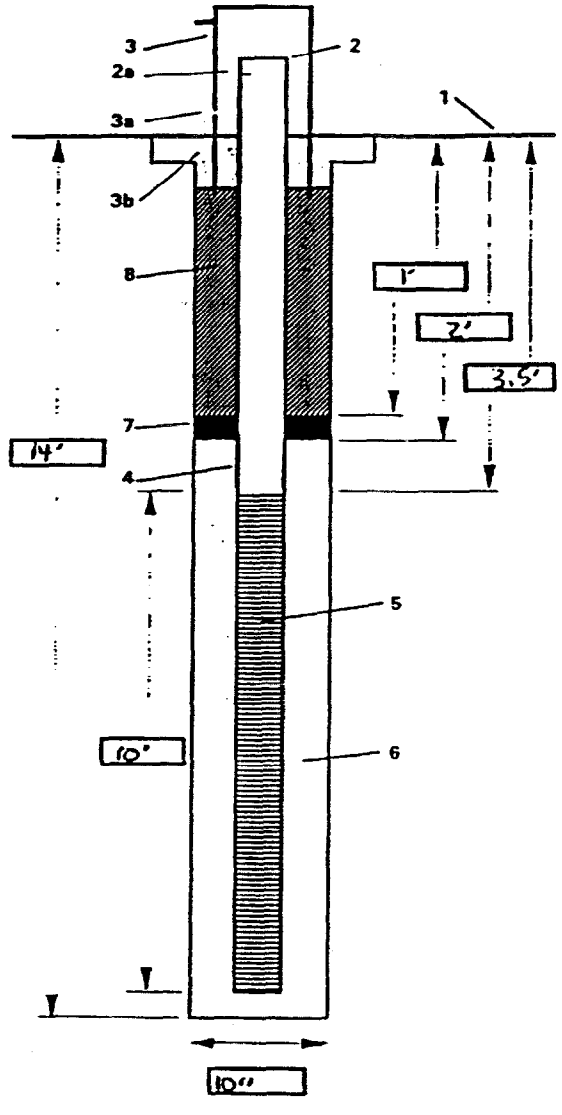
WELL COMPLETION DIAGRAM

PROJECT: St Juliens Creek Annex — LOCATION: Burning Ground 2 - Site 5

ELEVATION: 7.25 ft msl — DRILLING CONTRACTOR: American Environmental Drilling Service

DRILLING METHOD AND EQUIPMENT USED: 6 1/4" ID Hollow Stem Auger Ingersoll Rand A-300 Dirt Rig

WATER LEVELS: — START: 7/01/97 — END: 7/08/97 — LOGGER: JDuthie (CH2M Federal)



1- Ground elevation at well: 4.55 ft msl

2- Top of casing elevation: 7.25 ft msl
   a) vent hole? YES

3- Wellhead protection cover type: Steel - Stick up
   a) weep hole? YES
   b) concrete pad dimensions: 3' x 3'

4- Diameter/type of well casing: 2" Dia PVC

5- Type/slot size of screen: 2" Dia 0.010 slot PVC Screen 3.5 - 13.5'

6- Type screen filter
   a) Quantity used: Med. Sand - 5 cubic ft.

7- Type of seal
   a) Quantity used: Bentonite 1-2' BGS

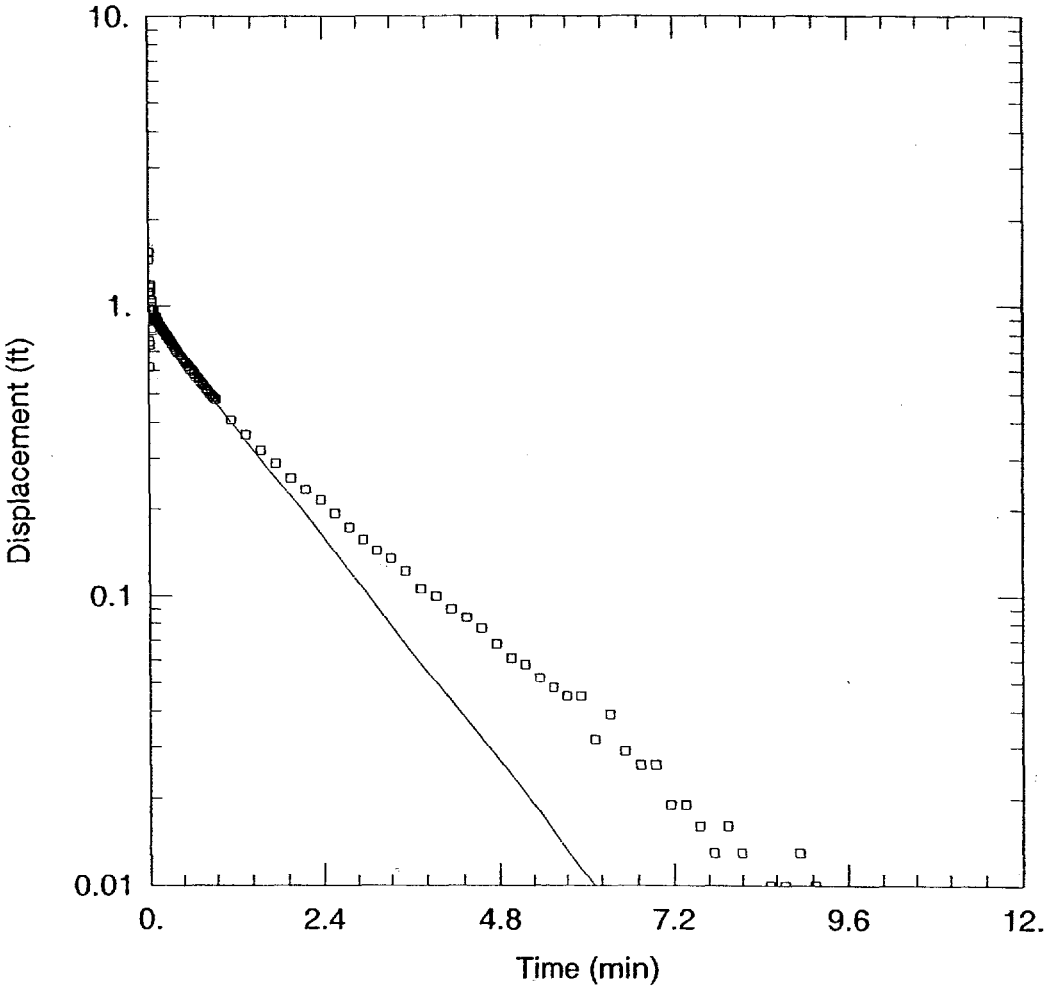
8- Grout
   a) Grout mix used: Concrete to Surface
   b) Method of placement: NA
   c) Quantity of well casing grout: NA

Development method: Purge + Surge

Development time: 3 hrs 20 min on 7/08/97

Estimated purge volume: 30 gal

Comments: Bottom of well 13.9' BGS



WELL TEST ANALYSIS

Data Set: E:\CLEANII\BASES\STJULNS\SLUGTE~1\SITE3\AQTESOLV\MW6SRHBR.AQT
Date: 10/30/01 Time: 09:40:43

AQUIFER DATA

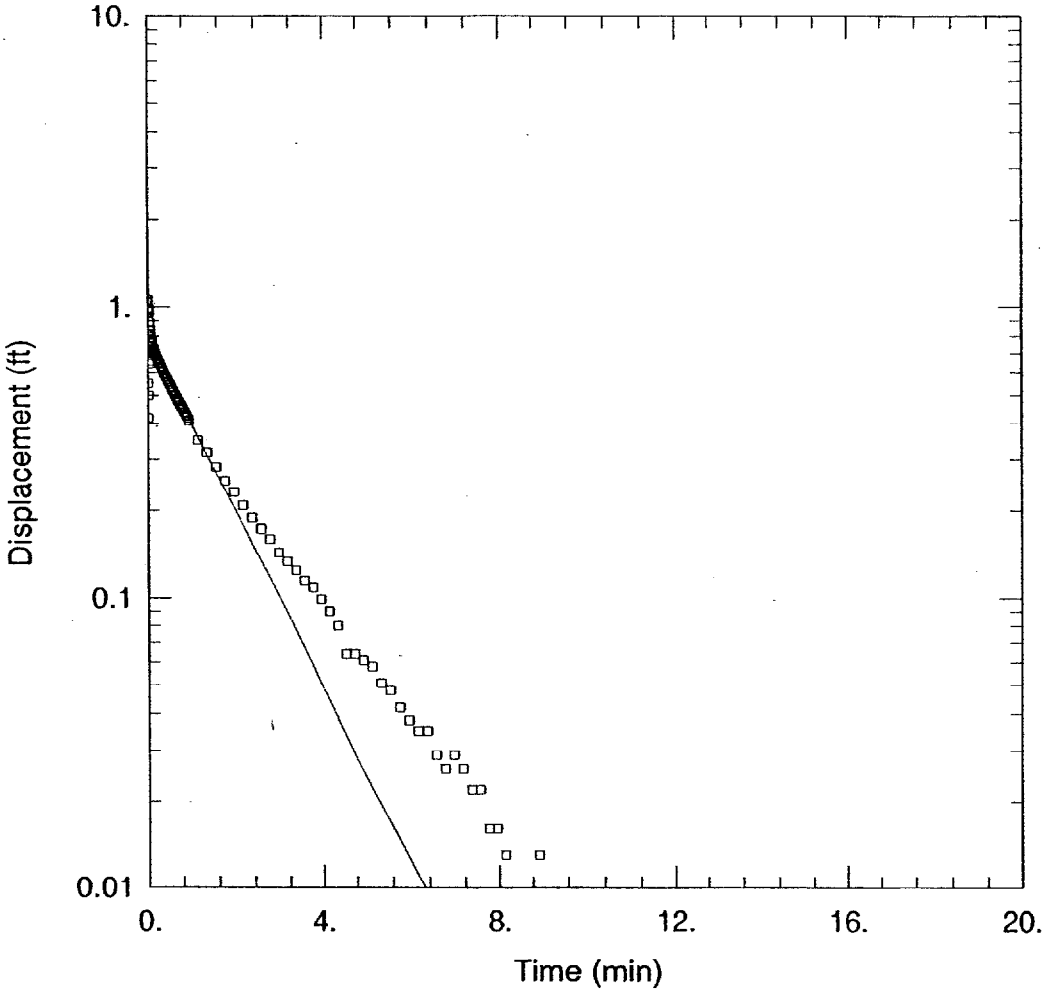
Saturated Thickness: 18.49 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 1.535 ft
Water Column Height: 15.49 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.5 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
K = 0.003276 cm/sec
Solution Method: Bouwer-Rice
y0 = 0.9444 ft



WELL TEST ANALYSIS

Data Set: E:\CLEANII\BASES\STJULNS\SLUGTE~1\SITE3\AQTESOLV\MW6SFHBR.AQT
Date: 10/30/01 Time: 09:40:28

AQUIFER DATA

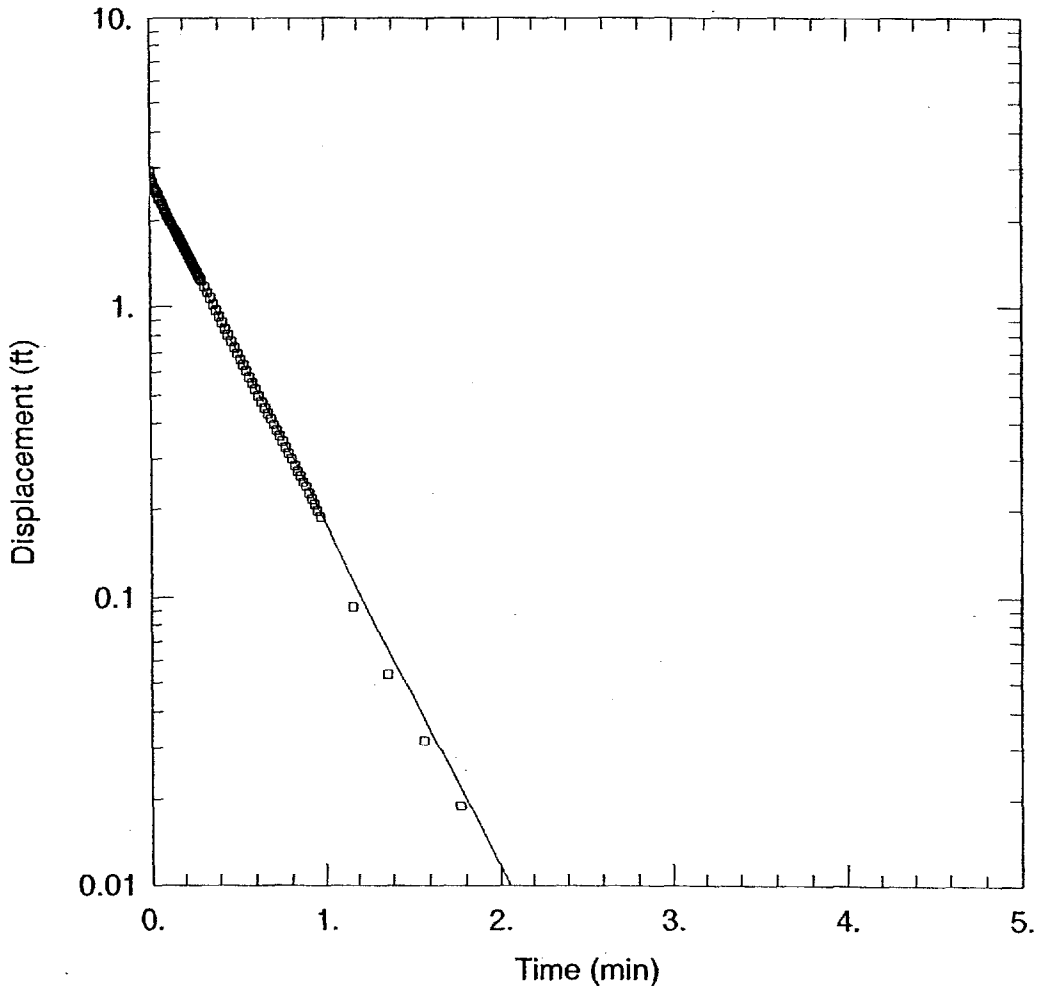
Saturated Thickness: 18.49 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 1.055 ft
Water Column Height: 15.49 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.5 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
K = 0.003079 cm/sec
Solution Method: Bouwer-Rice
y0 = 0.7978 ft



WELL TEST ANALYSIS

Data Set: E:\CLEANII\BASES\STJULNS\SLUGTE~1\SITE3\AQTESOLV\MW1DRHBR.AQT
Date: 10/30/01 Time: 09:39:53

AQUIFER DATA

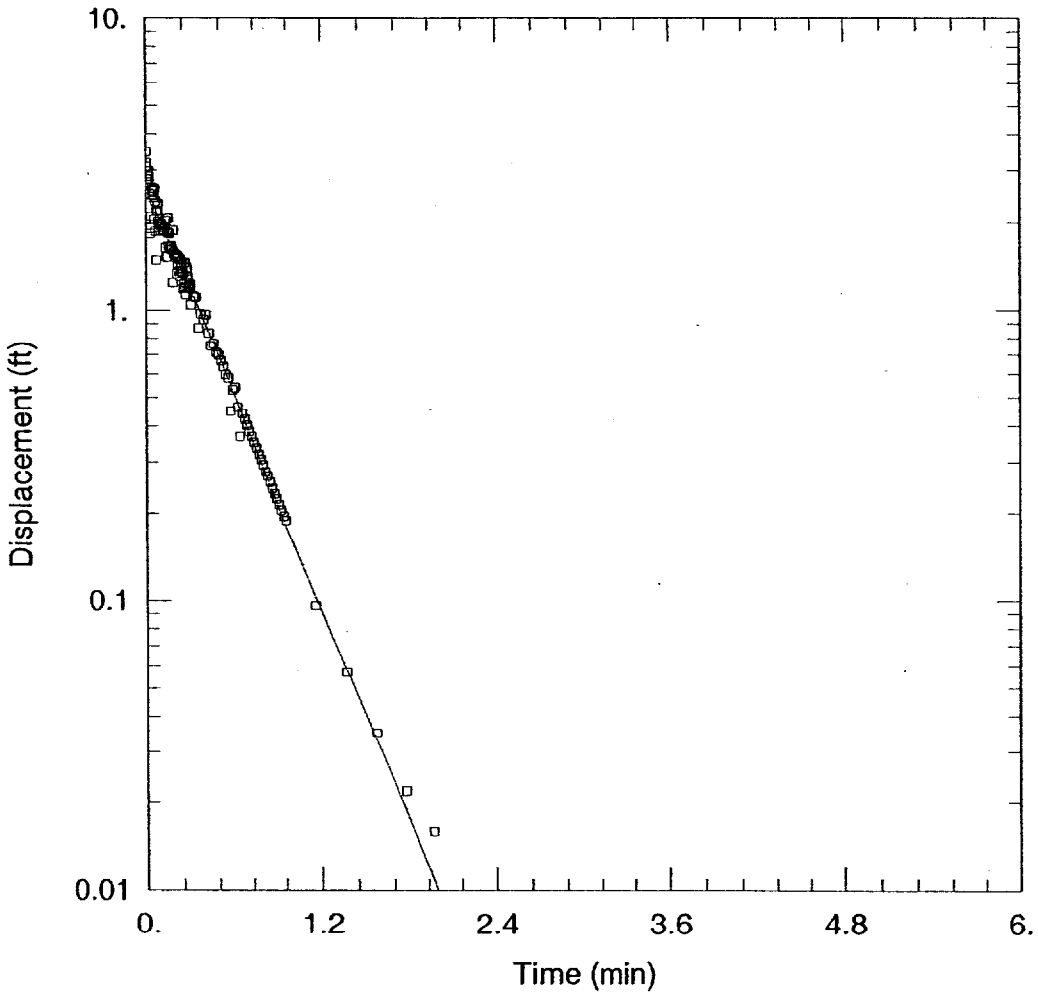
Saturated Thickness: 14.9 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 2.938 ft
Water Column Height: 47.82 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.208 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Confined
K = 0.004839 cm/sec
Solution Method: Bouwer-Rice
y0 = 2.788 ft



WELL TEST ANALYSIS

Data Set: E:\CLEANII\BASES\STJULNS\SLUGTE~1\SITE3\AQTESOLV\MW1DFHBR.AQT
Date: 10/30/01 Time: 09:39:27

AQUIFER DATA

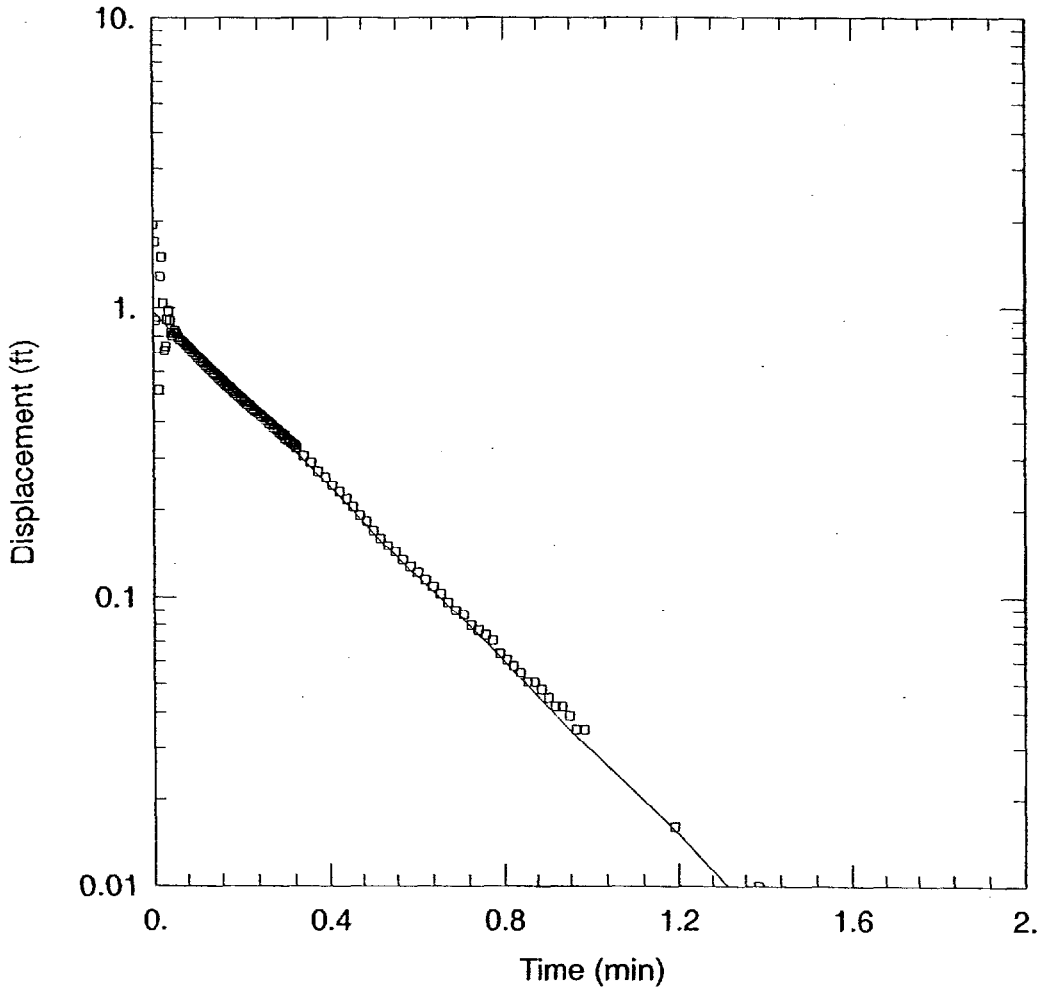
Saturated Thickness: 14.9 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 3.461 ft
Water Column Height: 47.82 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.208 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice
K = 0.004975 cm/sec
y0 = 2.676 ft



WELL TEST ANALYSIS

Data Set: E:\CLEANII\BASES\STJULNS\SLUGTE~1\SITE4\AQTESOLV\MW3SRHBR.AQT
Date: 10/30/01 Time: 09:44:13

AQUIFER DATA

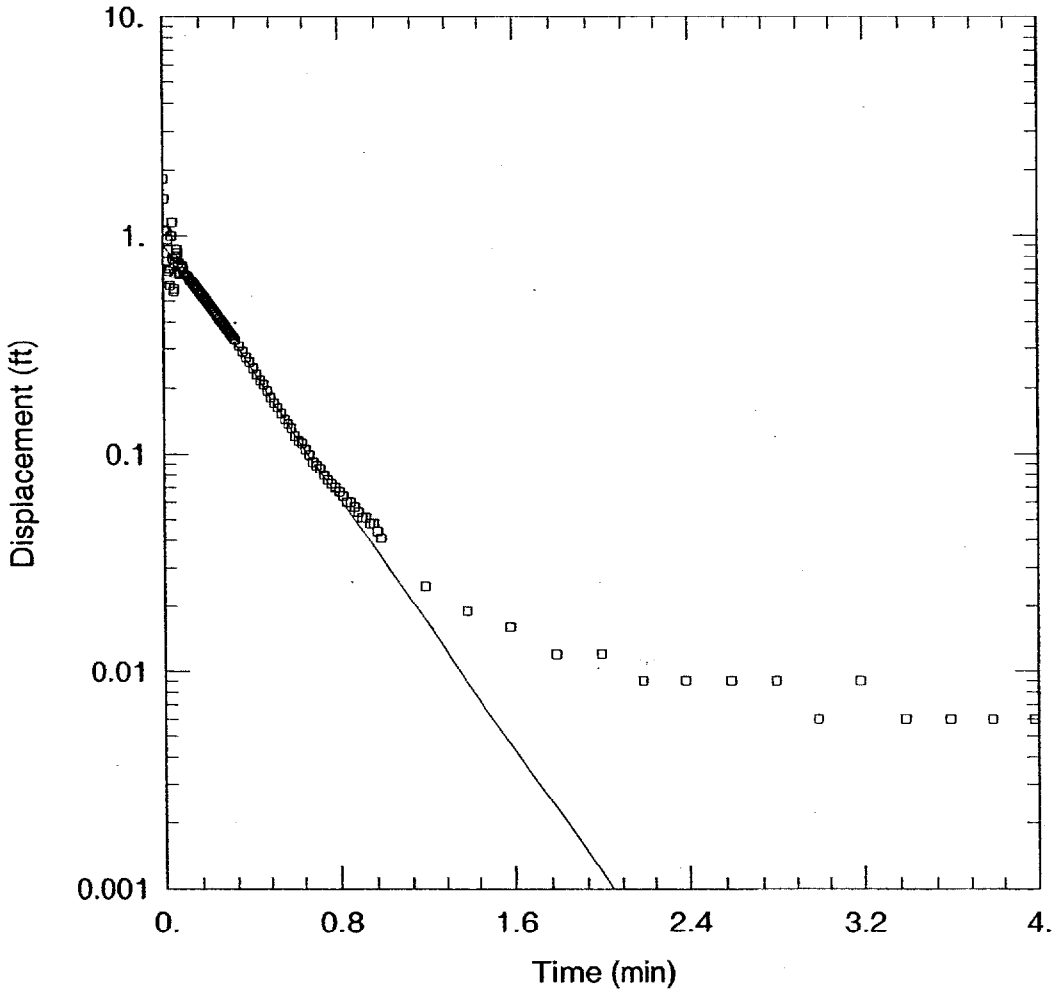
Saturated Thickness: 31. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 1.93 ft
Water Column Height: 12.51 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.5 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
K = 0.01381 cm/sec
Solution Method: Bouwer-Rice
y0 = 0.9717 ft



WELL TEST ANALYSIS

Data Set: E:\CLEANII\BASES\STJULNS\SLUGTE~1\SITE4\AQTESOLV\MW3SFHBR.AQT
Date: 10/30/01 Time: 09:44:00

AQUIFER DATA

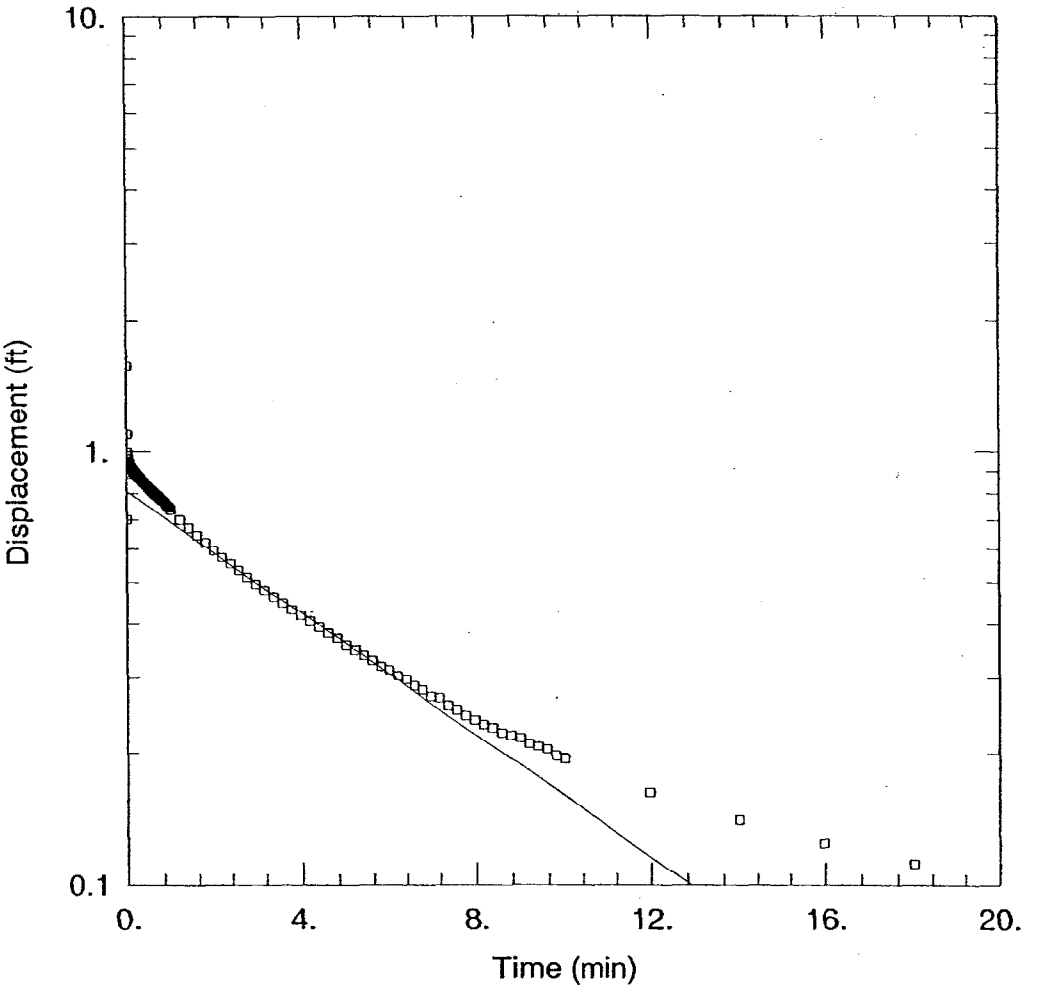
Saturated Thickness: 31. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 1.833 ft
Water Column Height: 12.51 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.5 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
K = 0.01332 cm/sec
Solution Method: Bouwer-Rice
y0 = 0.9147 ft



WELL TEST ANALYSIS

Data Set: E:\CLEANII\BASES\STJULNS\SLUGTE~1\SITE4\AQTESOLV\MW4SRHBR.AQT
Date: 10/30/01 Time: 09:44:56

AQUIFER DATA

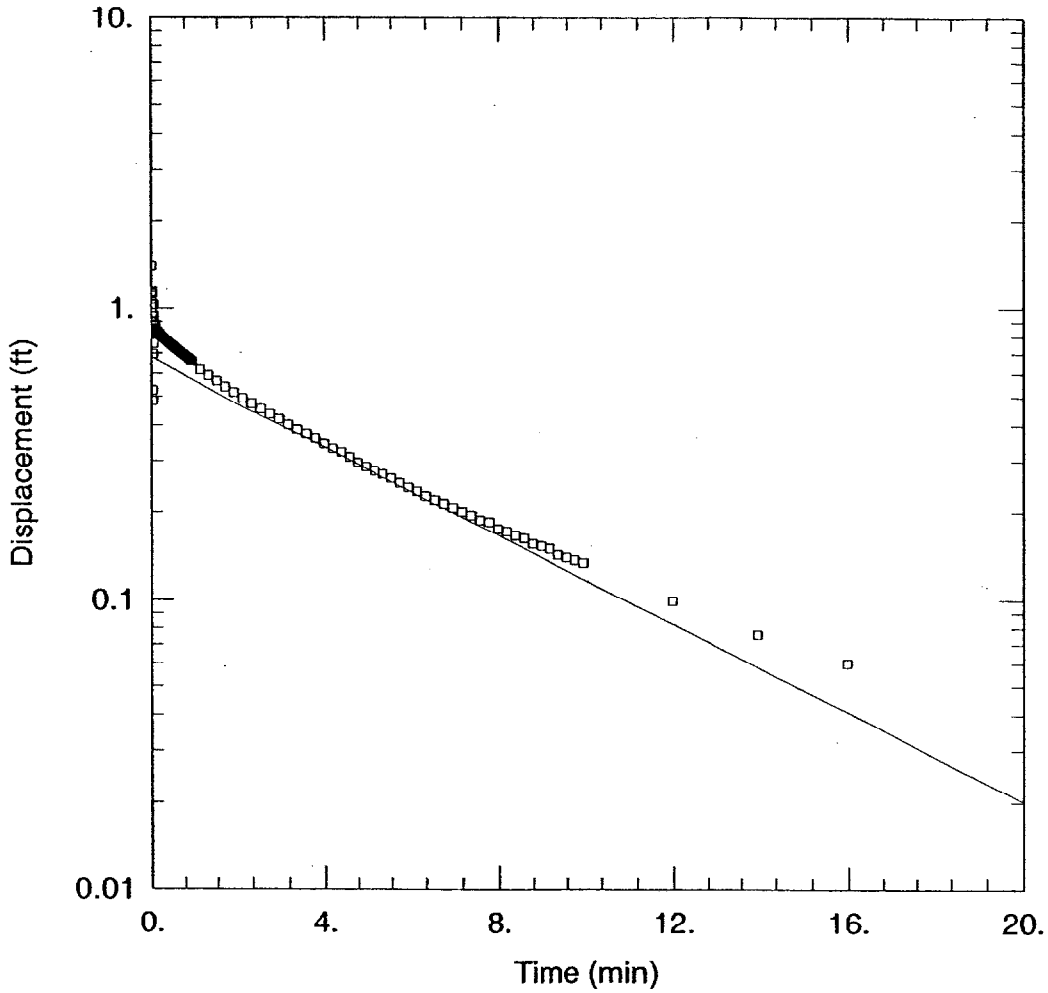
Saturated Thickness: 27. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 1.574 ft
Water Column Height: 11.68 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.5 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
K = 0.0006397 cm/sec
Solution Method: Bouwer-Rice
y0 = 0.8102 ft



WELL TEST ANALYSIS

Data Set: E:\CLEANII\BASES\STJULNS\SLUGTE~1\SITE4\AQTESOLV\MW4SFHBR.AQT
Date: 10/30/01 Time: 09:44:41

AQUIFER DATA

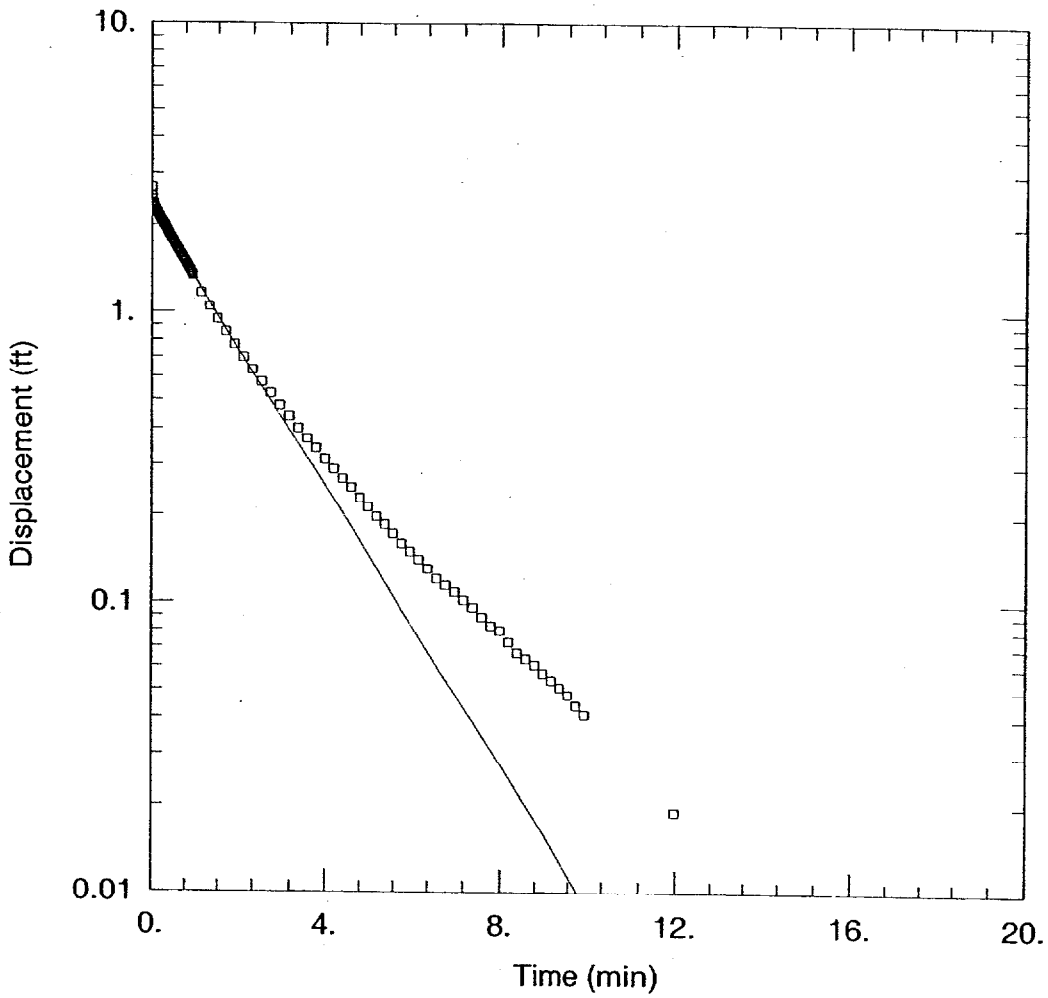
Saturated Thickness: 27. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 1.405 ft
Water Column Height: 11.68 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.5 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.0006933 cm/sec
y0 = 0.6803 ft



WELL TEST ANALYSIS

Data Set: E:\CLEANII\BASES\STJULNS\SLUGTE~1\SITE4\AQTESOLV\MW1DRHBR.AQT
Date: 10/30/01 Time: 09:43:38

AQUIFER DATA

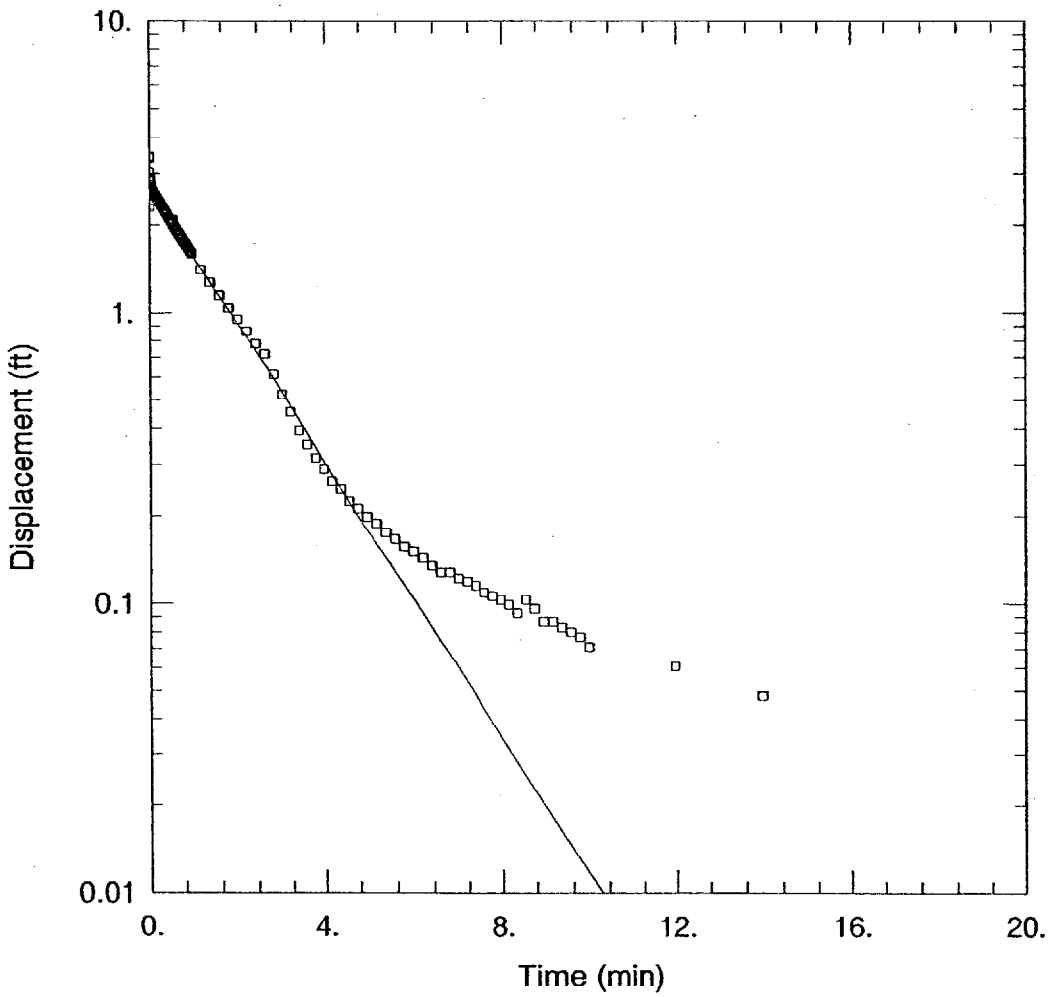
Saturated Thickness: 41.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 2.668 ft
Casing Radius: 0.083 ft
Screen Length: 10. ft
Water Column Height: 43.51 ft
Wellbore Radius: 0.25 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice
K = 0.001227 cm/sec
y0 = 2.329 ft



WELL TEST ANALYSIS

Data Set: E:\CLEANII\BASES\STJULNS\SLUGTE~1\SITE4\AQTESOLV\MW1DFHBR.AQT
Date: 10/30/01 Time: 09:43:20

AQUIFER DATA

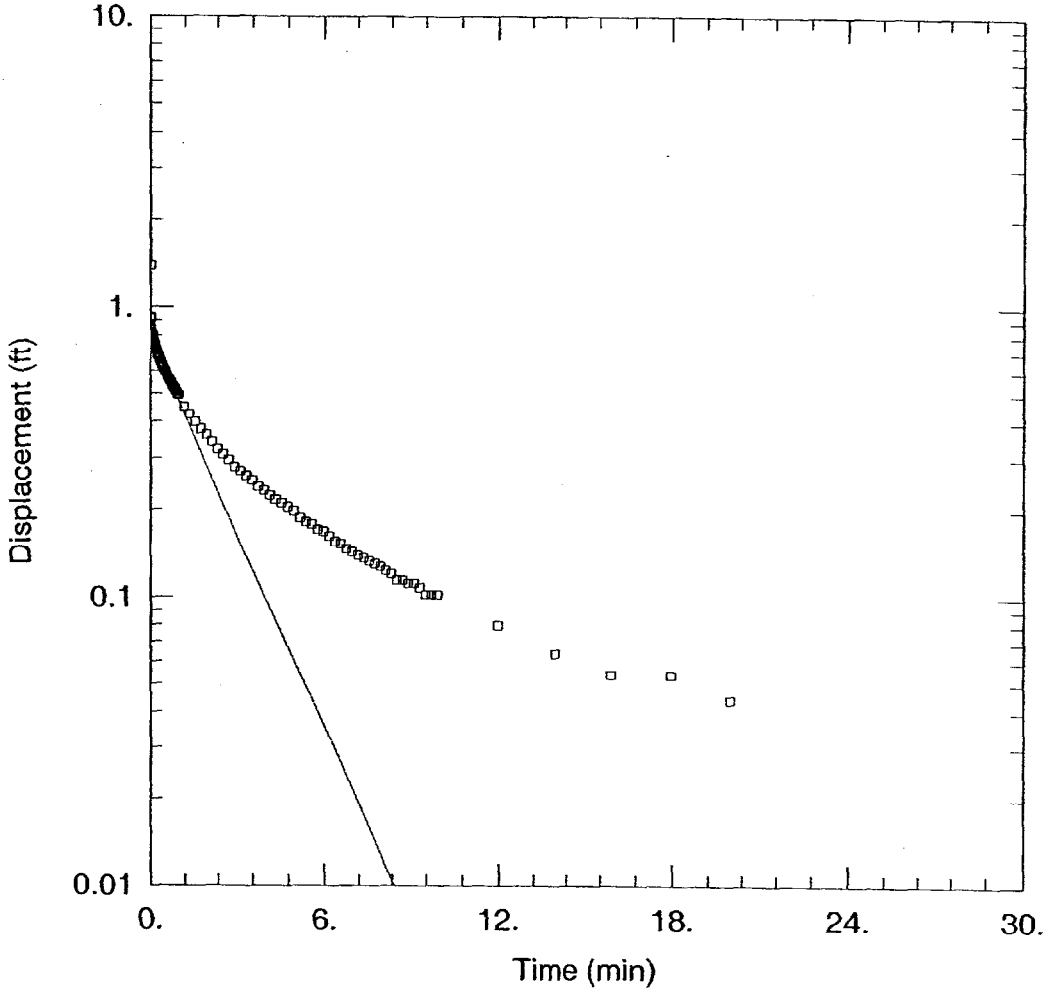
Saturated Thickness: 41.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 3.435 ft
Water Column Height: 43.51 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.25 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice
K = 0.001207 cm/sec
y0 = 2.667 ft



WELL TEST ANALYSIS

Data Set: E:\CLEANII\BASES\STJULNS\SLUGTE~1\SITE5\AQTESOLV\MW1SRHBR.AQT
Date: 10/30/01 Time: 09:45:44

AQUIFER DATA

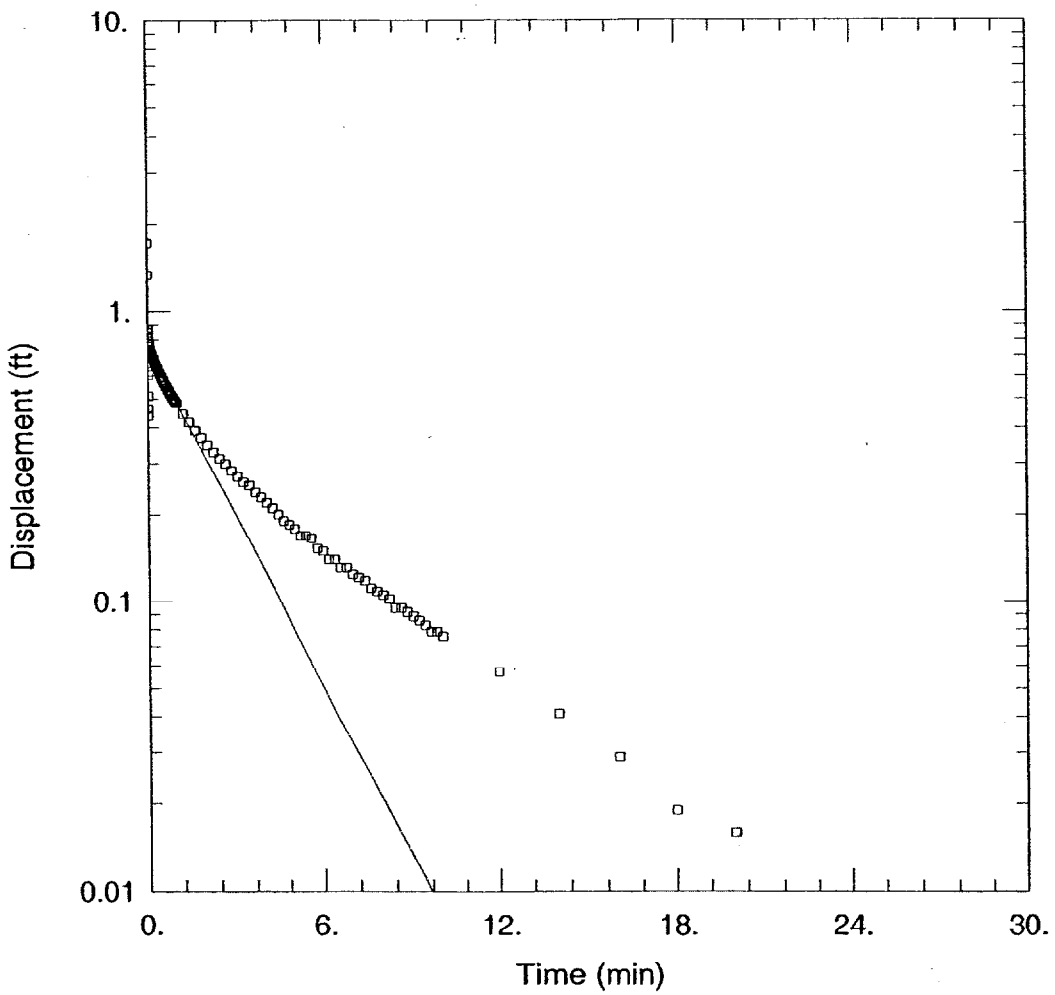
Saturated Thickness: 14. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 1.392 ft
Casing Radius: 0.083 ft
Screen Length: 10. ft
Water Column Height: 13.1 ft
Wellbore Radius: 0.5 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.002297 cm/sec
y0 = 0.7821 ft



WELL TEST ANALYSIS

Data Set: E:\CLEANII\BASES\STJULNS\SLUGTE~1\SITE5\AQTESOLV\MW1SFHBR.AQT
Date: 10/30/01 Time: 09:45:31

AQUIFER DATA

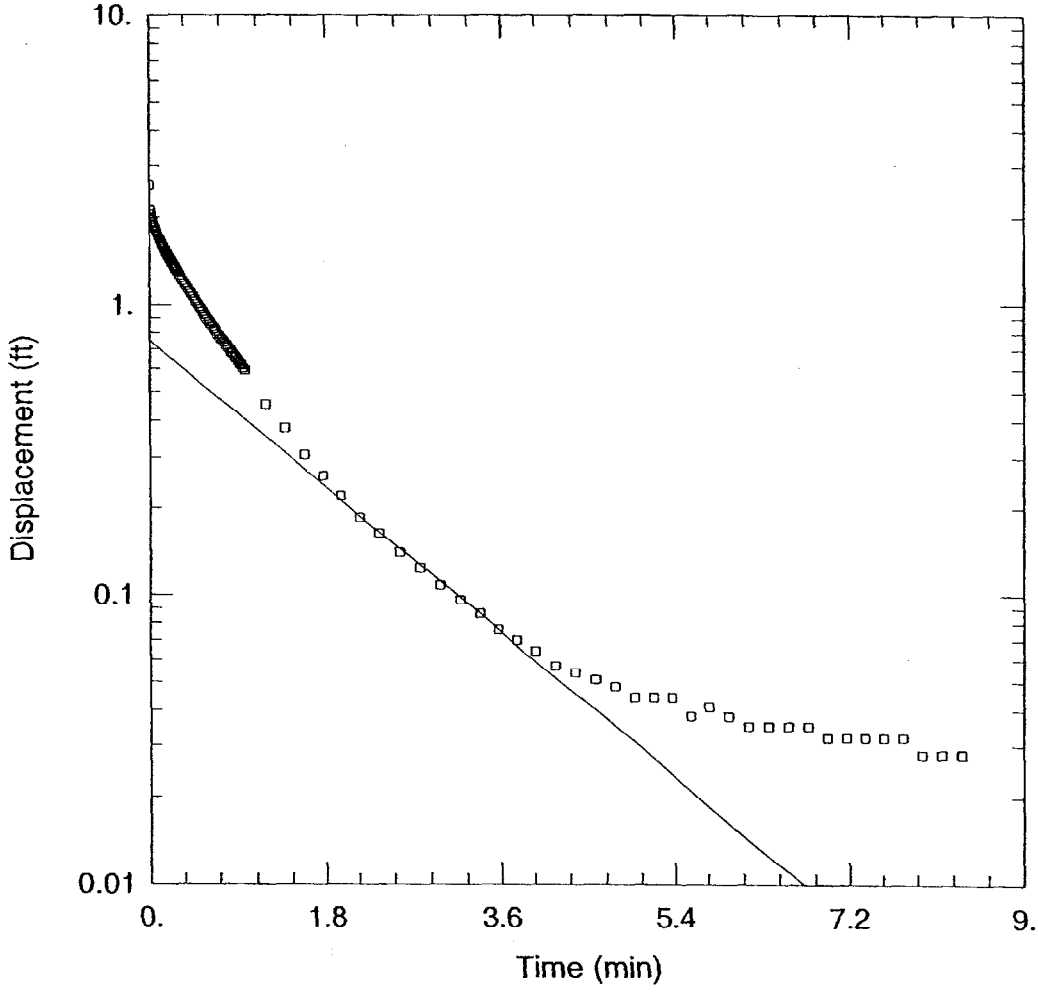
Saturated Thickness: 14. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 1.726 ft
Water Column Height: 13.1 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.5 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
K = 0.002016 cm/sec
Solution Method: Bouwer-Rice
y0 = 0.7507 ft



WELL TEST ANALYSIS

Data Set: E:\CLEANII\BASES\STJULNS\SLUGTE~1\SITE5\AQTESOLV\MW4SRHBR.AQT
Date: 10/30/01 Time: 09:47:58

AQUIFER DATA

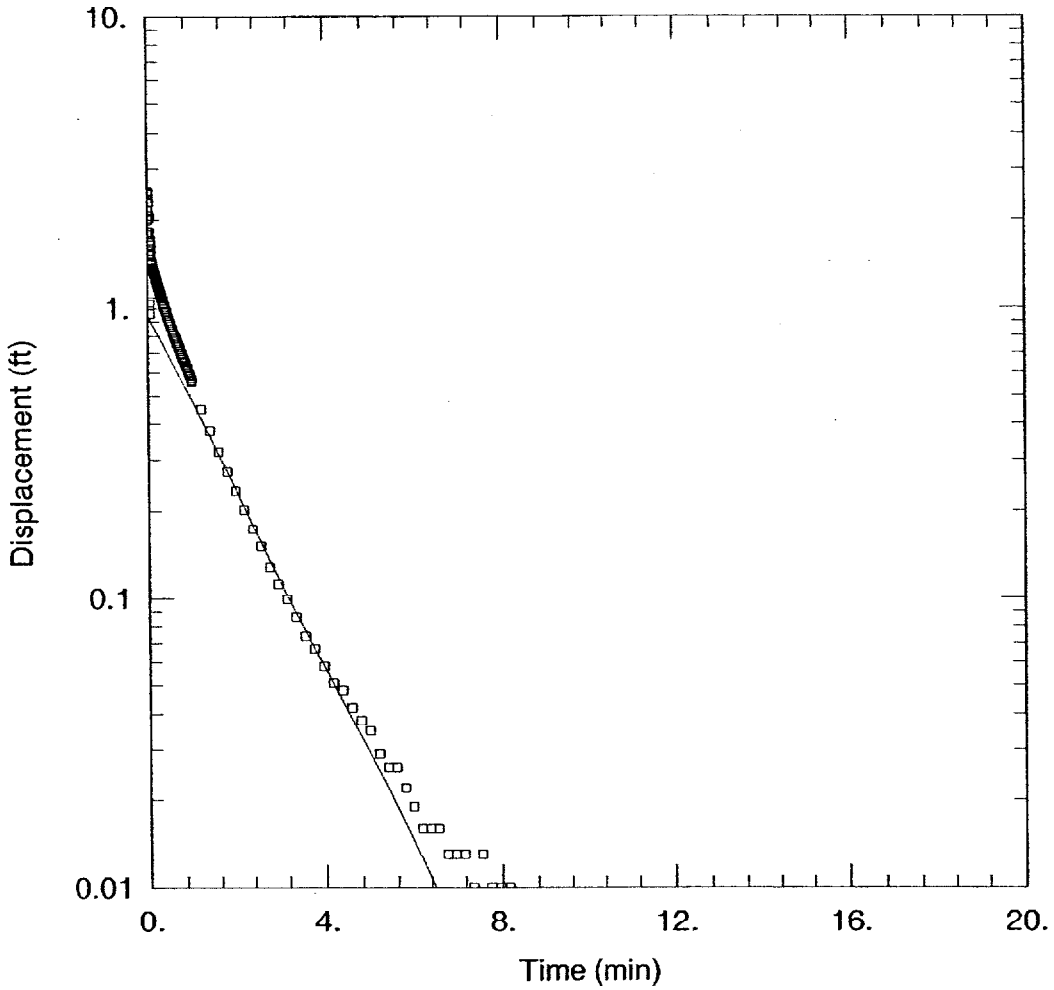
Saturated Thickness: 13. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 2.579 ft
Water Column Height: 11.25 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.5 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
K = 0.0027 cm/sec
Solution Method: Bouwer-Rice
y0 = 0.7507 ft



WELL TEST ANALYSIS

Data Set: E:\CLEANII\BASES\STJULNS\SLUGTE~1\SITE5\AQTESOLV\MW4SFHBR.AQT
Date: 10/30/01 Time: 09:47:35

AQUIFER DATA

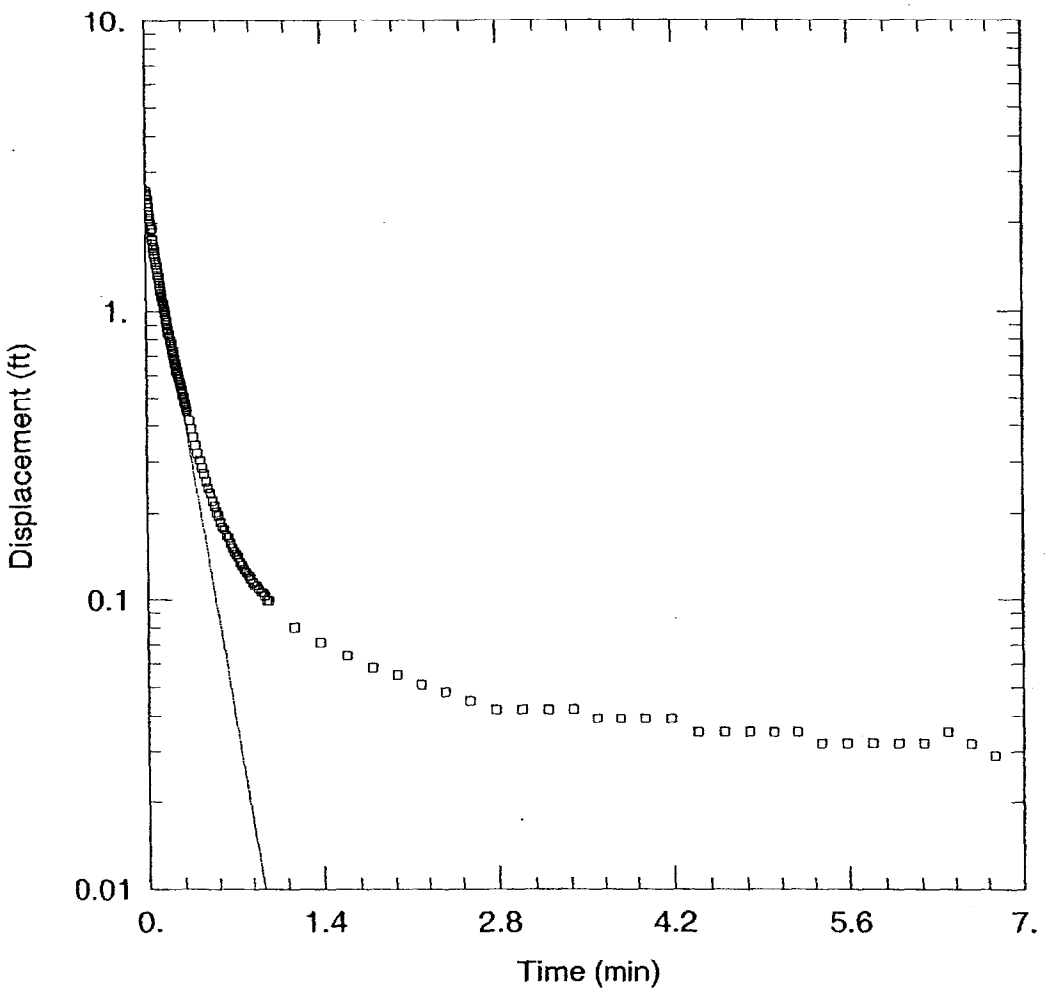
Saturated Thickness: 13. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 2.507 ft
Water Column Height: 11.25 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.5 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
K = 0.002946 cm/sec
Solution Method: Bouwer-Rice
y0 = 0.9414 ft



WELL TEST ANALYSIS

Data Set: E:\CLEANII\BASES\STJULNS\SLUGTE~1\SITE5\AQTESOLV\MW2DRHBR.AQT
Date: 10/30/01 Time: 09:46:34

AQUIFER DATA

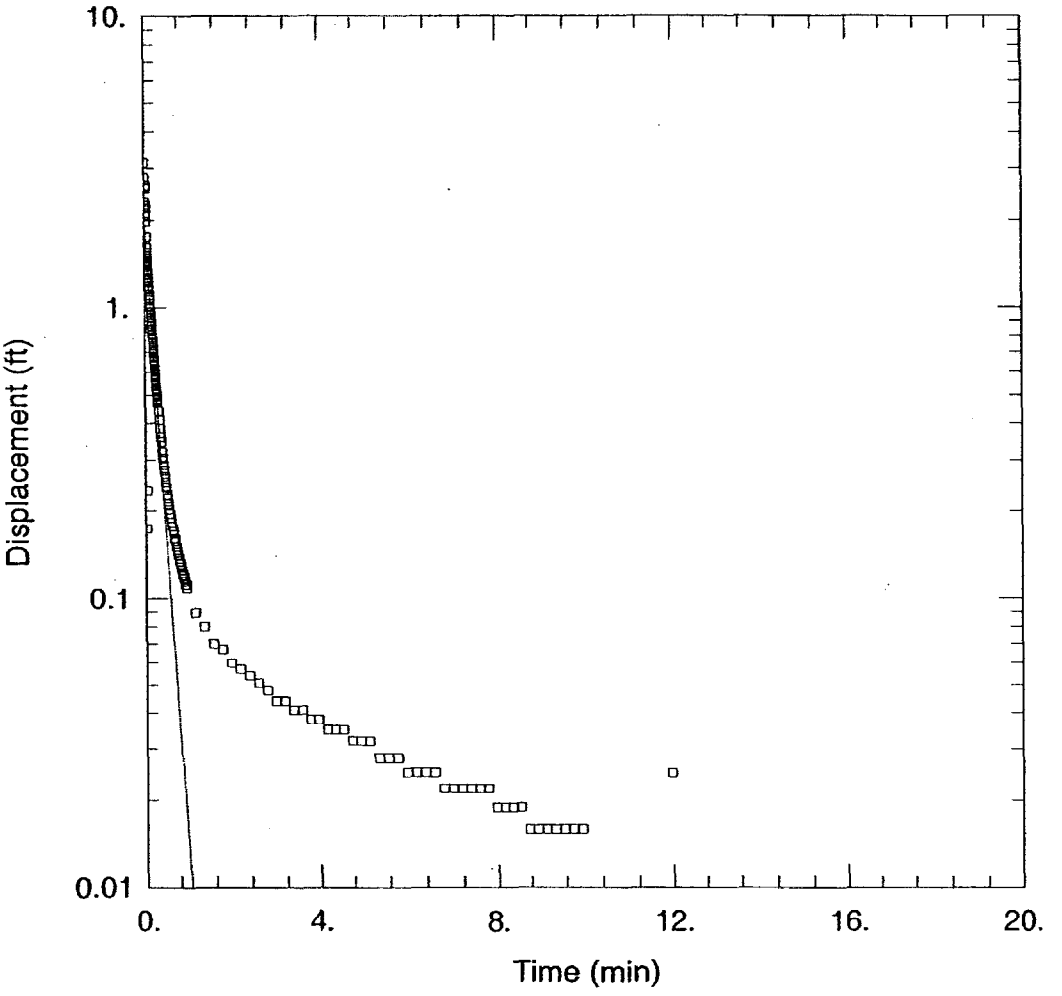
Saturated Thickness: 14. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 2.586 ft
Water Column Height: 55.11 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.208 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Confined
K = 0.01049 cm/sec
Solution Method: Bouwer-Rice
y0 = 2.26 ft



WELL TEST ANALYSIS

Data Set: E:\CLEANII\BASES\STJULNS\SLUGTE~1\SITE5\AQTESOLV\MW2DFHBR.AQT
Date: 10/30/01 Time: 09:46:14

AQUIFER DATA

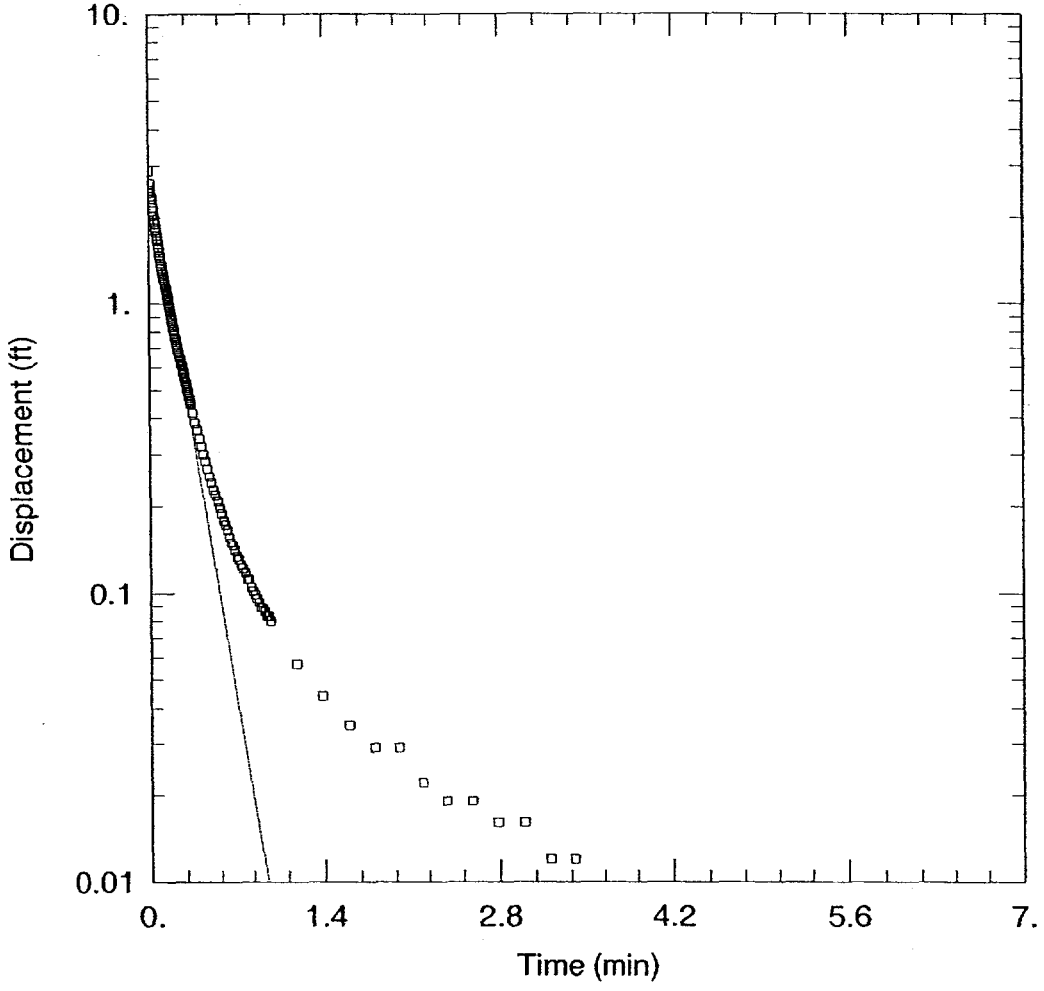
Saturated Thickness: 14. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 3.123 ft
Water Column Height: 55.11 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.208 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Confined
K = 0.009087 cm/sec
Solution Method: Bouwer-Rice
y0 = 1.993 ft



WELL TEST ANALYSIS

Data Set: E:\CLEANII\BASES\STJULNS\SLUGTE~1\SITE5\AQTESOLV\MW4DRHBR.AQT
Date: 10/30/01 Time: 09:47:13

AQUIFER DATA

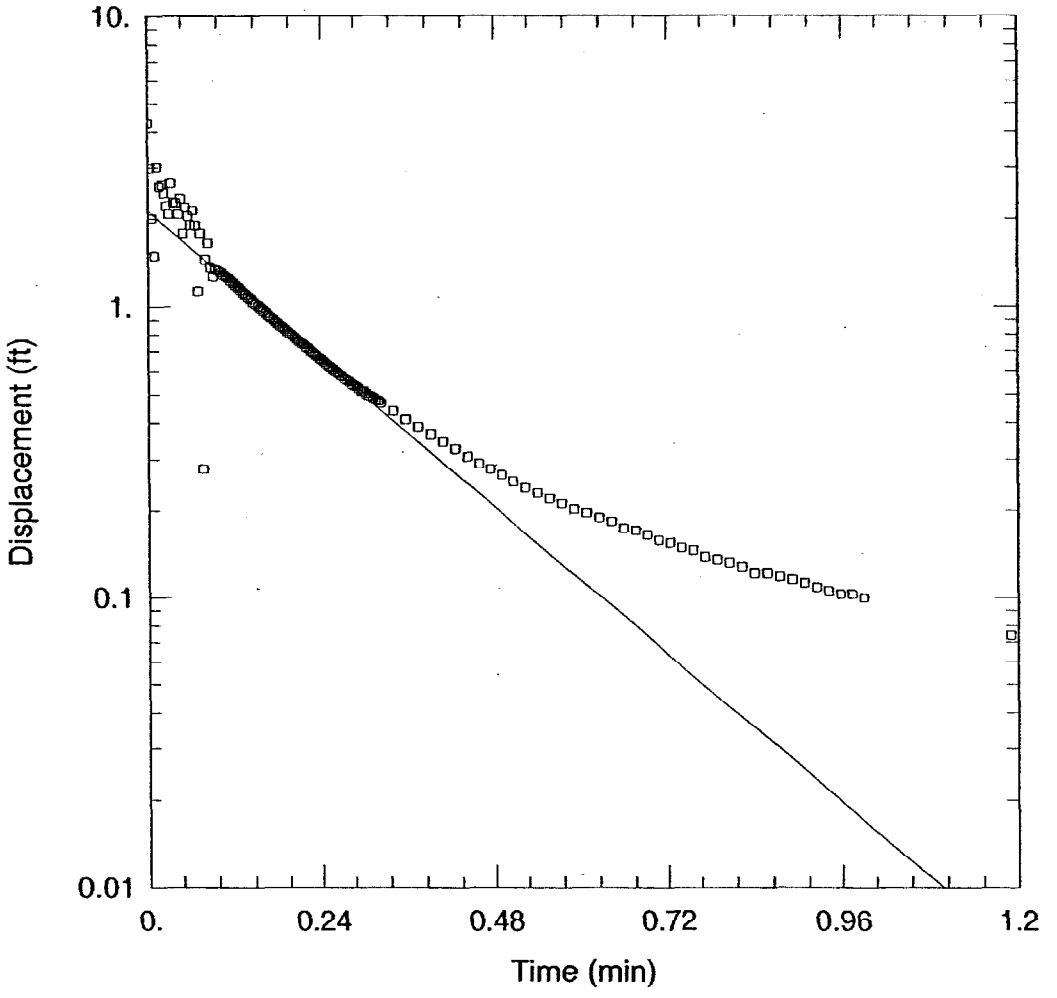
Saturated Thickness: 15. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 2.877 ft
Water Column Height: 59.22 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.5 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Confined
K = 0.03703 cm/sec
Solution Method: Bouwer-Rice
y0 = 2.368 ft



WELL TEST ANALYSIS

Data Set: E:\CLEANII\BASES\STJULNS\SLUGTE~1\SITE5\AQTESOLV\MW4DFHBR.AQT
Date: 10/30/01 Time: 09:47:02

AQUIFER DATA

Saturated Thickness: 15. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 4.279 ft
Water Column Height: 59.22 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.25 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Confined
K = 0.01131 cm/sec
Solution Method: Bouwer-Rice
y0 = 2.142 ft

Tidal Survey Data - May 1 to May 4, 1999

Time	SJS05-MW02D	SJSBK-MW02D	SJS02-MW05S	SJS02-MW05D	SJS03-MW01D	SJS04-MW03D	Surface Water	Time
36281.66667	17.284	14.64	10.027	26.344	16.989	17.318	0.95	05/01/1999 16:00
36281.6875	17.272	14.638	10.027	26.305	16.984	17.305		05/01/1999 16:30
36281.70833	17.27	14.636	10.032	26.294	16.954	17.312	1.28	05/01/1999 17:00
36281.72917	17.27	14.627	10.027	26.296	16.945	17.335		05/01/1999 17:30
36281.75	17.275	14.638	10.032	26.301	16.938	17.372	1.8	05/01/1999 18:00
36281.77083	17.286	14.645	10.032	26.321	16.924	17.436		05/01/1999 18:30
36281.79167	17.3	14.657	10.027	26.344	16.924	17.512	2.33	05/01/1999 19:00
36281.8125	17.323	14.67	10.032	26.372	16.91	17.618		05/01/1999 19:30
36281.83333	17.358	14.68	10.027	26.428	16.915	17.757	2.88	05/01/1999 20:00
36281.85417	17.411	14.696	10.027	26.478	16.915	17.907		05/01/1999 20:30
36281.875	17.471	14.712	10.027	26.522	16.91	18.052	3.24	05/01/1999 21:00
36281.89583	17.54	14.728	10.032	26.575	16.91	18.204		05/01/1999 21:30
36281.91667	17.607	14.744	10.032	26.619	16.908	18.338	3.32	05/01/1999 22:00
36281.9375	17.66	14.758	10.036	26.66	16.903	18.44		05/01/1999 22:30
36281.95833	17.701	14.777	10.039	26.704	16.899	18.516	3.04	05/01/1999 23:00
36281.97917	17.727	14.783	10.043	26.737	16.889	18.529		05/01/1999 23:30
36282	17.722	14.783	10.052	26.746	16.88	18.458	2.64	05/02/1999 0:00
36282.02083	17.699	14.767	10.057	26.746	16.869	18.35		05/02/1999 0:30
36282.04167	17.66	14.756	10.057	26.727	16.864	18.195	2.1	05/02/1999 1:00
36282.0625	17.607	14.728	10.066	26.695	16.846	18.043		05/02/1999 1:30
36282.08333	17.554	14.71	10.071	26.658	16.829	17.9	1.51	05/02/1999 2:00
36282.10417	17.505	14.693	10.08	26.621	16.809	17.782		05/02/1999 2:30
36282.125	17.464	14.682	10.085	26.587	16.795	17.678	1.1	05/02/1999 3:00
36282.14583	17.427	14.673	10.089	26.545	16.781	17.572		05/02/1999 3:30
36282.16667	17.395	14.664	10.092	26.494	16.769	17.482	0.96	05/02/1999 4:00
36282.1875	17.374	14.657	10.096	26.448	16.749	17.413		05/02/1999 4:30
36282.20833	17.355	14.657	10.092	26.423	16.744	17.365	1.13	05/02/1999 5:00
36282.22917	17.348	14.659	10.092	26.404	16.74	17.351		05/02/1999 5:30
36282.25	17.344	14.654	10.092	26.398	16.735	17.376	1.47	05/02/1999 6:00
36282.27083	17.348	14.661	10.092	26.407	16.73	17.422		05/02/1999 6:30
36282.29167	17.36	14.673	10.089	26.434	16.74	17.503	1.9	05/02/1999 7:00
36282.3125	17.376	14.68	10.087	26.462	16.735	17.591		05/02/1999 7:30
36282.33333	17.399	14.691	10.085	26.49	16.744	17.678	2.49	05/02/1999 8:00
36282.35417	17.429	14.693	10.085	26.522	16.744	17.771		05/02/1999 8:30

Tidal Survey Data - May 1 to May 4, 1999

Time	SJS05-MW02D	SJSBK-MW02D	SJS02-MW05S	SJS02-MW05D	SJS03-MW01D	SJS04-MW03D	Surface Water	Time
36282.375	17.464	14.705	10.085	26.557	16.744	17.874	2.92	05/02/1999 9:00
36282.39583	17.51	14.728	10.076	26.612	16.756	18.008		05/02/1999 9:30
36282.41667	17.57	14.74	10.076	26.667	16.769	18.163	3.16	05/02/1999 10:00
36282.4375	17.641	14.76	10.071	26.718	16.779	18.313		05/02/1999 10:30
36282.45833	17.699	14.772	10.071	26.771	16.786	18.433	3.07	05/02/1999 11:00
36282.47917	17.75	14.807	10.066	26.817	16.804	18.518		05/02/1999 11:30
36282.5	17.768	14.827	10.062	26.843	16.82	18.513	2.8	05/02/1999 12:00
36282.52083	17.768	14.83	10.066	26.85	16.82	18.453		05/02/1999 12:30
36282.54167	17.75	14.825	10.071	26.847	16.834	18.352	2.28	05/02/1999 13:00
36282.5625	17.715	14.816	10.062	26.84	16.85	18.225		05/02/1999 13:30
36282.58333	17.676	14.797	10.076	26.808	16.843	18.098	1.77	05/02/1999 14:00
36282.60417	17.632	14.783	10.08	26.774	16.839	17.983		05/02/1999 14:30
36282.625	17.588	14.774	10.08	26.734	16.834	17.856	1.52	05/02/1999 15:00
36282.64583	17.542	14.765	10.085	26.702	16.829	17.745		05/02/1999 15:30
36282.66667	17.512	14.758	10.085	26.667	16.829	17.655	1.41	05/02/1999 16:00
36282.6875	17.494	14.772	10.085	26.654	16.846	17.607		05/02/1999 16:30
36282.70833	17.485	14.772	10.092	26.642	16.846	17.586	1.47	05/02/1999 17:00
36282.72917	17.478	14.783	10.092	26.635	16.85	17.581		05/02/1999 17:30
36282.75	17.48	14.79	10.101	26.635	16.859	17.6	1.79	05/02/1999 18:00
36282.77083	17.487	14.793	10.115	26.635	16.855	17.639		05/02/1999 18:30
36282.79167	17.496	14.802	10.129	26.642	16.855	17.678	2.15	05/02/1999 19:00
36282.8125	17.512	14.811	10.145	26.663	16.859	17.745		05/02/1999 19:30
36282.83333	17.535	14.82	10.163	26.684	16.859	17.817	2.58	05/02/1999 20:00
36282.85417	17.561	14.827	10.182	26.711	16.873	17.895		05/02/1999 20:30
36282.875	17.602	14.841	10.207	26.75	16.876	18.013	2.86	05/02/1999 21:00
36282.89583	17.655	14.86	10.235	26.787	16.885	18.142		05/02/1999 21:30
36282.91667	17.704	14.866	10.26	26.817	16.885	18.246	3.12	05/02/1999 22:00
36282.9375	17.754	14.883	10.29	26.854	16.889	18.345		05/02/1999 22:30
36282.95833	17.789	14.89	10.322	26.877	16.889	18.4	3.12	05/02/1999 23:00
36282.97917	17.819	14.901	10.352	26.91	16.899	18.463		05/02/1999 23:30
36283	17.842	14.908	10.382	26.928	16.894	18.486	2.86	05/03/1999 0:00
36283.02083	17.847	14.906	10.415	26.94	16.899	18.467		05/03/1999 0:30
36283.04167	17.84	14.899	10.445	26.942	16.899	18.423	2.37	05/03/1999 1:00
36283.0625	17.821	14.88	10.477	26.923	16.889	18.333		05/03/1999 1:30

Tidal Survey Data - May 1 to May 4, 1999

Time	SJS05-MW02D	SJSBK-MW02D	SJS02-MW05S	SJS02-MW05D	SJS03-MW01D	SJS04-MW03D	Surface Water	Time
36283.08333	17.782	14.866	10.507	26.893	16.876	18.211	1.78	05/03/1999 2:00
36283.10417	17.738	14.846	10.532	26.847	16.859	18.066		05/03/1999 2:30
36283.125	17.688	14.827	10.56	26.797	16.85	17.918	1.17	05/03/1999 3:00
36283.14583	17.639	14.816	10.578	26.744	16.843	17.789		05/03/1999 3:30
36283.16667	17.595	14.809	10.59	26.695	16.843	17.669	0.83	05/03/1999 4:00
36283.1875	17.563	14.797	10.604	26.64	16.839	17.556		05/03/1999 4:30
36283.20833	17.538	14.783	10.622	26.584	16.825	17.475	0.65	05/03/1999 5:00
36283.22917	17.519	14.783	10.634	26.545	16.82	17.427		05/03/1999 5:30
36283.25	17.508	14.788	10.638	26.522	16.82	17.402	0.86	05/03/1999 6:00
36283.27083	17.503	14.788	10.643	26.506	16.82	17.397		05/03/1999 6:30
36283.29167	17.498	14.797	10.643	26.504	16.829	17.411	1.04	05/03/1999 7:00
36283.3125	17.503	14.8	10.648	26.513	16.829	17.459		05/03/1999 7:30
36283.33333	17.51	14.797	10.657	26.517	16.829	17.503	1.49	05/03/1999 8:00
36283.35417	17.515	14.8	10.666	26.515	16.825	17.542		05/03/1999 8:30
36283.375	17.526	14.797	10.671	26.531	16.816	17.605	1.98	05/03/1999 9:00
36283.39583	17.54	14.802	10.675	26.554	16.816	17.671		05/03/1999 9:30
36283.41667	17.556	14.797	10.68	26.577	16.816	17.752	2.28	05/03/1999 10:00
36283.4375	17.586	14.795	10.682	26.614	16.809	17.863		05/03/1999 10:30
36283.45833	17.621	14.795	10.687	26.656	16.813	17.987	2.43	05/03/1999 11:00
36283.47917	17.667	14.797	10.687	26.686	16.813	18.082		05/03/1999 11:30
36283.5	17.704	14.804	10.691	26.709	16.816	18.147	2.22	05/03/1999 12:00
36283.52083	17.731	14.823	10.691	26.732	16.825	18.181		05/03/1999 12:30
36283.54167	17.741	14.823	10.696	26.727	16.816	18.158	1.85	05/03/1999 13:00
36283.5625	17.727	14.818	10.701	26.714	16.816	18.077		05/03/1999 13:30
36283.58333	17.704	14.811	10.701	26.688	16.813	17.976	1.35	05/03/1999 14:00
36283.60417	17.671	14.809	10.701	26.656	16.813	17.858		05/03/1999 14:30
36283.625	17.637	14.802	10.701	26.617	16.813	17.743	0.89	05/03/1999 15:00
36283.64583	17.605	14.795	10.705	26.571	16.804	17.641		05/03/1999 15:30
36283.66667	17.579	14.79	10.705	26.529	16.799	17.549	0.61	05/03/1999 16:00
36283.6875	17.558	14.783	10.705	26.481	16.79	17.471		05/03/1999 16:30
36283.70833	17.545	14.786	10.696	26.458	16.795	17.429	0.56	05/03/1999 17:00
36283.72917	17.538	14.788	10.696	26.434	16.795	17.399		05/03/1999 17:30
36283.75	17.533	14.793	10.701	26.409	16.786	17.388	0.79	05/03/1999 18:00
36283.77083	17.531	14.795	10.701	26.404	16.786	17.404		05/03/1999 18:30

Tidal Survey Data - May 1 to May 4, 1999

Time	SJS05-MW02D	SJSBK-MW02D	SJS02-MW05S	SJS02-MW05D	SJS03-MW01D	SJS04-MW03D	Surface Water	Time
36283.79167	17.533	14.793	10.705	26.398	16.779	17.427	1.24	05/03/1999 19:00
36283.8125	17.535	14.8	10.701	26.402	16.781	17.464		05/03/1999 19:30
36283.83333	17.542	14.807	10.701	26.428	16.781	17.533	1.76	05/03/1999 20:00
36283.85417	17.554	14.811	10.696	26.453	16.786	17.609		05/03/1999 20:30
36283.875	17.572	14.82	10.691	26.504	16.799	17.713	2.29	05/03/1999 21:00
36283.89583	17.6	14.834	10.691	26.538	16.804	17.819		05/03/1999 21:30
36283.91667	17.628	14.837	10.682	26.573	16.82	17.921	2.72	05/03/1999 22:00
36283.9375	17.669	14.853	10.682	26.614	16.829	18.045		05/03/1999 22:30
36283.95833	17.715	14.866	10.682	26.654	16.839	18.163	2.84	05/03/1999 23:00
36283.97917	17.771	14.871	10.696	26.693	16.834	18.28		05/03/1999 23:30
36284	17.821	14.885	10.691	26.737	16.843	18.384	2.77	05/04/1999 0:00
36284.02083	17.854	14.892	10.701	26.76	16.843	18.414		05/04/1999 0:30
36284.04167	17.863	14.91	10.691	26.78	16.855	18.403	2.38	05/04/1999 1:00
36284.0625	17.861	14.908	10.701	26.783	16.85	18.366		05/04/1999 1:30
36284.08333	17.837	14.899	10.705	26.774	16.85	18.264	1.88	05/04/1999 2:00
36284.10417	17.801	14.883	10.71	26.744	16.843	18.133		05/04/1999 2:30
36284.125	17.754	14.869	10.714	26.707	16.843	17.994	1.24	05/04/1999 3:00
36284.14583	17.708	14.86	10.714	26.667	16.843	17.863		05/04/1999 3:30
36284.16667	17.667	14.853	10.714	26.631	16.839	17.745	0.63	05/04/1999 4:00
36284.1875	17.63	14.841	10.714	26.584	16.839	17.63		05/04/1999 4:30
36284.20833	17.6	14.837	10.705	26.531	16.834	17.515	0.27	05/04/1999 5:00
36284.22917	17.575	14.827	10.71	26.471	16.82	17.42		05/04/1999 5:30
36284.25	17.556	14.83	10.701	26.425	16.825	17.342	0.23	05/04/1999 6:00
36284.27083	17.542	14.837	10.687	26.381	16.829	17.293		05/04/1999 6:30
36284.29167	17.533	14.827	10.682	26.347	16.829	17.275	0.42	05/04/1999 7:00
36284.3125	17.528	14.83	10.68	26.331	16.829	17.284		05/04/1999 7:30
36284.33333	17.528	14.83	10.671	26.328	16.834	17.33	0.81	05/04/1999 8:00
36284.35417	17.531	14.827	10.675	26.338	16.82	17.388		05/04/1999 8:30
36284.375	17.538	14.818	10.675	26.344	16.813	17.441	1.26	05/04/1999 9:00
36284.39583	17.545	14.823	10.675	26.37	16.809	17.51		05/04/1999 9:30
36284.41667	17.556	14.818	10.675	26.388	16.799	17.577	1.71	05/04/1999 10:00
36284.4375	17.57	14.818	10.675	26.414	16.786	17.658		05/04/1999 10:30
36284.45833	17.588	14.823	10.671	26.446	16.79	17.729	1.91	05/04/1999 11:00
36284.47917	17.607	14.818	10.666	26.476	16.786	17.817		05/04/1999 11:30

Tidal Survey Data - May 1 to May 4, 1999

Time	SJS05-MW02D	SJSBK-MW02D	SJS02-MW05S	SJS02-MW05D	SJS03-MW01D	SJS04-MW03D	Surface Water	Time
36284.5	17.632	14.816	10.671	26.501	16.781	17.891	1.86	05/04/1999 12:00
36284.52083	17.655	14.816	10.675	26.511	16.769	17.937		05/04/1999 12:30
36284.54167	17.671	14.813	10.675	26.517	16.76	17.953	1.57	05/04/1999 13:00
36284.5625	17.676	14.82	10.675	26.508	16.749	17.937		05/04/1999 13:30
36284.58333	17.669	14.804	10.675	26.492	16.74	17.881	1.08	05/04/1999 14:00
36284.60417	17.653	14.786	10.666	26.467	16.735	17.801		05/04/1999 14:30
36284.625	17.63	14.79	10.661	26.428	16.721	17.694	0.52	05/04/1999 15:00
36284.64583	17.607	14.781	10.657	26.384	16.714	17.584		05/04/1999 15:30
36284.66667	17.584	14.767	10.657	26.333	16.696	17.489	0.1	05/04/1999 16:00
36284.6875	17.568	14.753	10.643	26.287	16.691	17.397		05/04/1999 16:30
36284.70833	17.551	14.742	10.634	26.241	16.686	17.335	-0.09	05/04/1999 17:00
36284.72917	17.545	14.733	10.629	26.206	16.675			05/04/1999 17:30
36284.75	0.055	0	10.618	26.176	0		-0.04	05/04/1999 18:00
36284.77083	0	0	0		0			05/04/1999 18:30
		0.016	0		0.021			

Tidal Survey Data - May 5 to May 8, 1999

Time	Surface Water	SJS05-MW01S	SJS05-MW02S	SJS05-MW04S	SJS05-MW05S	SJS03-MW05S	SJS03-MW06S	SJS04-MW02S
36285	2.12	10.528	8.175	7.13	9.065	8.878	12.184	8.632
36285.02083	2	10.53	8.175	7.135	9.04	8.878	12.182	8.627
36285.04167	1.84	10.535	8.166	7.144	9.005	8.885	12.17	8.632
36285.0625	1.63	10.539	8.161	7.146	8.975	8.885	12.165	8.632
36285.08333	1.43	10.539	8.159	7.151	8.95	8.885	12.165	8.627
36285.10417	1.17	10.539	8.161	7.148	8.925	8.885	12.165	8.627
36285.125	0.86	10.541	8.161	7.148	8.901	8.89	12.161	8.627
36285.14583	0.59	10.541	8.161	7.148	8.871	8.885	12.161	8.627
36285.16667	0.33	10.537	8.173	7.144	8.855	8.881	12.168	8.627
36285.1875	0.09	10.532	8.177	7.139	8.835	8.878	12.168	8.627
36285.20833	-0.08	10.532	8.177	7.144	8.811	8.878	12.161	8.627
36285.22917	-0.21	10.535	8.175	7.144	8.791	8.881	12.156	8.627
36285.25	-0.22	10.535	8.17	7.146	8.765	8.881	12.154	8.627
36285.27083	-0.24	10.528	8.182	7.139	8.752	8.874	12.168	8.627
36285.29167	-0.18	10.523	8.186	7.132	8.74	8.874	12.172	8.622
36285.3125	-0.05	10.516	8.182	7.13	8.717	8.869	12.172	8.627
36285.33333	0.11	10.514	8.168	7.13	8.696	8.869	12.17	8.622
36285.35417	0.35	10.514	8.156	7.132	8.675	8.869	12.17	8.622
36285.375	0.59	10.514	8.138	7.135	8.652	8.869	12.17	8.622
36285.39583	0.83	10.516	8.115	7.139	8.627	8.874	12.165	8.622
36285.41667	1.08	10.516	8.094	7.139	8.602	8.869	12.163	8.618
36285.4375	1.34	10.518	8.071	7.135	8.581	8.869	12.165	8.618
36285.45833	1.5	10.521	8.023	7.132	8.558	8.869	12.161	8.613
36285.47917	1.56	10.518	7.96	7.128	8.532	8.869	12.163	8.608
36285.5	1.58	10.518	7.898	7.118	8.507	8.869	12.161	8.613
36285.52083	1.52	10.523	7.875	7.118	8.477	8.874	12.152	8.608
36285.54167	1.46	10.528	7.94	7.116	8.452	8.878	12.14	8.608
36285.5625	1.34	10.53	7.958	7.107	8.422	8.878	12.142	8.608
36285.58333	1.15	10.53	7.997	7.098	8.412	8.869	12.145	8.608
36285.60417	0.95	10.528	7.935	7.095	8.392	8.874	12.14	8.608
36285.625	0.7	10.53	7.914	7.1	8.362	8.874	12.128	8.604
36285.64583	0.43	10.53	7.905	7.095	8.336	8.869	12.128	8.604
36285.66667	0.22	10.53	7.896	7.091	8.318	8.878	12.126	8.604

Tidal Survey Data - May 5 to May 8, 1999

Time	Surface Water	SJS05-MW01S	SJS05-MW02S	SJS05-MW04S	SJS05-MW05S	SJS03-MW05S	SJS03-MW06S	SJS04-MW02S
36285.6875	0.02	10.528	7.972	7.081	8.309	8.869	12.133	8.595
36285.70833	-0.14	10.523	8.016	7.075	8.302	8.869	12.135	8.595
36285.72917	-0.27	10.518	8.02	7.072	8.288	8.86	12.142	8.59
36285.75	-0.31	10.514	8.05	7.07	8.283	8.86	12.142	8.59
36285.77083	-0.26	10.511	8.083	7.077	8.276	8.86	12.14	8.59
36285.79167	-0.17	10.505	8.122	7.07	8.267	8.851	12.152	8.59
36285.8125	-0.03	10.5	8.154	7.07	8.267	8.851	12.158	8.59
36285.83333	0.17	10.493	8.177	7.068	8.262	8.846	12.163	8.585
36285.85417	0.39	10.491	8.182	7.075	8.258	8.841	12.163	8.585
36285.875	0.68	10.484	8.2	7.07	8.253	8.837	12.177	8.585
36285.89583	0.92	10.482	8.198	7.077	8.249	8.837	12.172	8.585
36285.91667	1.17	10.482	8.2	7.084	8.237	8.841	12.17	8.576
36285.9375	1.44	10.477	8.207	7.081	8.233	8.841	12.165	8.576
36285.95833	1.61	10.477	8.209	7.084	8.223	8.841	12.163	8.576
36285.97917	1.7	10.479	8.203	7.095	8.214	8.846	12.154	8.576
36286	1.79	10.479	8.212	7.093	8.214	8.846	12.158	8.572
36286.02083	1.81	10.479	8.216	7.091	8.212	8.846	12.163	8.572
36286.04167	1.76	10.488	8.193	7.111	8.189	8.86	12.14	8.576
36286.0625	1.66	10.495	8.186	7.111	8.182	8.86	12.14	8.572
36286.08333	1.51	10.505	8.175	7.123	8.168	8.869	12.128	8.572
36286.10417	1.32	10.511	8.173	7.125	8.159	8.874	12.126	8.572
36286.125	1.08	10.516	8.166	7.128	8.147	8.878	12.126	8.572
36286.14583	0.84	10.516	8.173	7.121	8.138	8.874	12.133	8.572
36286.16667	0.56	10.518	8.17	7.125	8.129	8.878	12.124	8.572
36286.1875	0.33	10.523	8.168	7.128	8.119	8.878	12.124	8.572
36286.20833	0.12	10.523	8.179	7.121	8.117	8.874	12.133	8.572
36286.22917	-0.08	10.521	8.184	7.116	8.117	8.869	12.14	8.567
36286.25	-0.2	10.521	8.182	7.118	8.103	8.874	12.131	8.572
36286.27083	-0.28	10.518	8.189	7.109	8.099	8.869	12.147	8.567
36286.29167	-0.3	10.509	8.2	7.098	8.103	8.855	12.163	8.572
36286.3125	-0.2	10.507	8.198	7.1	8.103	8.855	12.161	8.562
36286.33333	-0.12	10.502	8.189	7.1	8.094	8.855	12.158	8.553
36286.35417	0.01	10.502	8.182	7.102	8.087	8.855	12.163	8.562

Tidal Survey Data - May 5 to May 8, 1999

Time	Surface Water	SJS05-MW01S	SJS05-MW02S	SJS05-MW04S	SJS05-MW05S	SJS03-MW05S	SJS03-MW06S	SJS04-MW02S
36286.375	0.18	10.498	8.191	7.091	8.089	8.841	12.175	8.553
36286.39583	0.4	10.498	8.179	7.095	8.083	8.851	12.172	8.558
36286.41667	0.58	10.5	8.17	7.102	8.069	8.851	12.165	8.558
36286.4375	0.89	10.502	8.154	7.107	8.06	8.855	12.163	8.553
36286.45833	1.08	10.511	8.117	7.116	8.043	8.86	12.152	8.558
36286.47917	1.22	10.514	8.115	7.116	8.03	8.865	12.156	8.553
36286.5	1.35	10.514	8.136	7.111	8.043	8.865	12.163	8.553
36286.52083	1.4	10.525	8.103	7.128	8.03	8.878	12.142	8.553
36286.54167	1.39	10.532	8.106	7.125	8.023	8.878	12.147	8.553
36286.5625	1.34	10.539	8.064	7.135	8.009	8.89	12.131	8.553
36286.58333	1.27	10.548	7.988	7.141	7.983	8.885	12.133	8.553
36286.60417	1.09	10.56	7.937	7.153	7.958	8.904	12.108	8.553
36286.625	0.84	10.567	7.889	7.151	7.94	8.904	12.105	8.553
36286.64583	0.67	10.576	7.893	7.139	7.928	8.904	12.11	8.553
36286.66667	0.49	10.571	7.937	7.121	7.923	8.899	12.124	8.549
36286.6875	0.26	10.571	7.96	7.114	7.914	8.899	12.119	8.544
36286.70833	0.01	10.571	7.923	7.111	7.905	8.899	12.117	8.549
36286.72917	-0.12	10.571	7.907	7.109	7.893	8.895	12.119	8.539
36286.75	-0.22	10.567	7.93	7.102	7.893	8.895	12.124	8.539
36286.77083	-0.31	10.565	7.963	7.095	7.893	8.89	12.124	8.535
36286.79167	-0.3	10.571	7.981	7.102	7.884	8.895	12.115	8.539
36286.8125	-0.24	10.569	8	7.1	7.884	8.895	12.122	8.535
36286.83333	-0.08	10.565	8.032	7.095	7.889	8.895	12.128	8.535
36286.85417	0.05	10.558	8.057	7.091	7.893	8.885	12.135	8.535
36286.875	0.23	10.56	8.062	7.098	7.889	8.885	12.128	8.535
36286.89583	0.45	10.56	8.062	7.102	7.884	8.89	12.131	8.535
36286.91667	0.74	10.562	8.053	7.109	7.875	8.895	12.122	8.535
36286.9375	1.04	10.567	8.05	7.114	7.868	8.899	12.122	8.535
36286.95833	1.24	10.567	8.053	7.111	7.863	8.899	12.126	8.535
36286.97917	1.46	10.56	8.071	7.105	7.868	8.895	12.138	8.535
36287	1.65	10.567	8.069	7.114	7.859	8.899	12.126	8.53
36287.02083	1.76	10.571	8.057	7.118	7.85	8.904	12.122	8.535
36287.04167	1.8	10.569	8.06	7.114	7.84	8.899	12.126	8.53

Tidal Survey Data - May 5 to May 8, 1999

Time	Surface Water	SJS05-MW01S	SJS05-MW02S	SJS05-MW04S	SJS05-MW05S	SJS03-MW05S	SJS03-MW06S	SJS04-MW02S
36287.0625	1.79	10.569	8.055	7.116	7.84	8.904	12.128	8.53
36287.08333	1.69	10.562	8.064	7.109	7.84	8.895	12.138	8.525
36287.10417	1.58	10.565	8.066	7.114	7.838	8.899	12.135	8.525
36287.125	1.4	10.562	8.073	7.109	7.838	8.895	12.138	8.521
36287.14583	1.17	10.562	8.069	7.116	7.833	8.895	12.131	8.521
36287.16667	0.94	10.555	8.089	7.105	7.838	8.89	12.14	8.521
36287.1875	0.71	10.555	8.096	7.109	7.833	8.895	12.133	8.521
36287.20833	0.47	10.553	8.106	7.105	7.833	8.895	12.135	8.516
36287.22917	0.27	10.551	8.11	7.105	7.829	8.89	12.135	8.516
36287.25	0.04	10.546	8.124	7.098	7.833	8.885	12.142	8.516
36287.27083	-0.17	10.541	8.126	7.093	7.838	8.881	12.152	8.516
36287.29167	-0.26	10.535	8.119	7.088	7.833	8.878	12.161	8.516
36287.3125	-0.3	10.528	8.115	7.084	7.833	8.874	12.163	8.516
36287.33333	-0.28	10.523	8.106	7.086	7.829	8.869	12.161	8.512
36287.35417	-0.24	10.518	8.087	7.084	7.82	8.869	12.163	8.512
36287.375	-0.11	10.516	8.08	7.084	7.82	8.869	12.163	8.507
36287.39583	0.05	10.518	8.069	7.086	7.806	8.874	12.156	8.507
36287.41667	0.26	10.516	8.062	7.079	7.806	8.865	12.165	8.507
36287.4375	0.51	10.511	8.055	7.075	7.803	8.865	12.168	8.507
36287.45833	0.8	10.509	8.03	7.072	7.79	8.869	12.17	8.498
36287.47917	0.99	10.507	7.963	7.068	7.785	8.86	12.17	8.498
36287.5	1.2	10.5	7.889	7.058	7.776	8.86	12.177	8.498
36287.52083	1.4	10.498	7.854	7.047	7.769	8.855	12.175	8.498
36287.54167	1.46	10.498	7.868	7.035	7.76	8.855	12.175	8.498
36287.5625	1.46	10.498	7.875	7.033	7.743	8.855	12.168	8.493
36287.58333	1.43	10.498	7.873	7.024	7.734	8.86	12.165	8.493
36287.60417	1.36	10.498	7.813	7.017	7.714	8.855	12.163	8.489
36287.625	1.23	10.5	7.753	7.017	7.695	8.86	12.152	8.484
36287.64583	1.06	10.505	7.718	7.017	7.674	8.865	12.14	8.484
36287.66667	0.85	10.507	7.785	7.008	7.656	8.865	12.138	8.479
36287.6875	0.64	10.509	7.764	7.005	7.635	8.869	12.131	8.479
36287.70833	0.44	10.509	7.806	6.996	7.635	8.865	12.133	8.479
36287.72917	0.21	10.505	7.87	6.989	7.63	8.86	12.133	8.479

Tidal Survey Data - May 5 to May 8, 1999

Time	Surface Water	SJS05-MW01S	SJS05-MW02S	SJS05-MW04S	SJS05-MW05S	SJS03-MW05S	SJS03-MW06S	SJS04-MW02S
36287.75	0	10.5	7.923	6.985	7.621	8.86	12.133	8.479
36287.77083	-0.11	10.502	7.965	6.987	7.619	8.86	12.131	8.475
36287.79167	-0.15	10.502	7.958	6.994	7.61	8.865	12.122	8.475
36287.8125	-0.21	10.502	7.986	6.992	7.61	8.86	12.124	8.47
36287.83333	-0.24	10.495	8.048	6.987	7.621	8.86	12.135	8.465
36287.85417	-0.14	10.486	8.08	6.982	7.63	8.851	12.142	8.463
36287.875	-0.02	10.482	8.099	6.985	7.64	8.846	12.149	8.463
36287.89583	0.12	10.47	8.122	6.982	7.644	8.837	12.163	8.463
36287.91667	0.31	10.463	8.14	6.978	7.656	8.832	12.168	8.461
36287.9375	0.45	10.454	8.147	6.98	7.656	8.825	12.17	8.461
36287.95833	0.64	10.452	8.152	6.987	7.656	8.825	12.172	8.461
36287.97917	0.89	10.442	8.163	6.987	7.66	8.825	12.175	8.461
36288	1.12	10.452	8.133	7.015	7.64	8.837	12.145	8.461
36288.02083	1.25	10.449	8.159	7.01	7.649	8.832	12.163	8.456
36288.04167	1.41	10.447	8.156	7.012	7.644	8.832	12.158	8.449
36288.0625	1.47	10.449	8.152	7.019	7.635	8.837	12.156	8.454
36288.08333	1.46	10.454	8.143	7.031	7.626	8.841	12.147	8.454
36288.10417	1.45	10.456	8.138	7.035	7.619	8.846	12.145	8.447
36288.125	1.4	10.456	8.138	7.035	7.619	8.841	12.149	8.449
36288.14583	1.3	10.452	8.138	7.033	7.614	8.837	12.152	8.449
36288.16667	1.17	10.454	8.126	7.04	7.61	8.841	12.142	8.445
36288.1875	1.02	10.454	8.122	7.042	7.6	8.841	12.14	8.449
36288.20833	0.79	10.454	8.117	7.042	7.596	8.846	12.14	8.445
36288.22917	0.54	10.449	8.122	7.035	7.596	8.841	12.145	8.445
36288.25	0.28	10.447	8.117	7.035	7.596	8.837	12.142	8.445
36288.27083	0.07	10.442	8.124	7.033	7.6	8.832	12.149	8.445
36288.29167	-0.15	10.44	8.124	7.033	7.596	8.832	12.145	8.445
36288.3125	-0.33	10.435	8.124	7.031	7.589	8.832	12.149	8.445
36288.33333	-0.4	10.431	8.115	7.026	7.589	8.83	12.154	8.445
36288.35417	-0.38	10.426	8.11	7.024	7.584	8.825	12.154	8.44
36288.375	-0.35	10.422	8.099	7.017	7.58	8.825	12.154	8.445
36288.39583	-0.28	10.417	8.096	7.012	7.58	8.821	12.158	8.435
36288.41667	-0.15	10.419	8.078	7.01	7.566	8.821	12.152	8.431

Earth Resources Technology, Inc.

9134 Bridgewater St. College Park, MD 20740
Tel: (301) 935-5162 Fax: (301) 935-5443

August 12, 1997

David Schroeder
CDM Federal Prog Corp.
13135 Lee Jackson Memorial Hwy
Suite 200
Fairfax, VA 22033

Re: Results of the Geophysical Surveys at St. Juliens Creek Annex, Norfolk, VA

Dear Mr. Schroeder:

Earth Resources Technology, Inc. (ERT) performed geophysical surveys at Site 2, Landfill B; Site 3, Landfill C; Site 4, Landfill D; and Site 5, the Burning Grounds and the Caged Pit in the week of June 16, 1997. Figure 1-1 and Figure 1-2 show the locations of each site, respectively. The geophysical surveys involved electromagnetic (EM), magnetic, and ground penetrating radar (GPR) techniques. The EM method was used for all four sites; the magnetic method was used for Site 2, Site 4, and the caged pit; and the GPR method was used for Site 4 only. The objective of the surveys was to delineate site boundaries, identify any buried metal such as steel drums and metallic construction debris, and characterize the soil profile above the water table.

1.0 PRINCIPLE AND INSTRUMENTATION

The Geonics EM31 was used for the electromagnetic survey. The EM31 measures the changes in the ground conductivity using a patented electromagnetic inductive technique that makes the measurements without electrodes or ground contact. The unit of conductivity used is millisiemens per meter (mS/m). The conductivity changes are used to infer the geological variations, or groundwater contamination. The EM31 has two analog meters which display both the quadrature-phase (conductivity) and inphase components, respectively. Inphase measurements are the ratio of the induced secondary magnetic field to the primary magnetic field in parts per thousand (ppt). The inphase component is especially useful for searching for buried metal drums, pipes, and other ferrous and non-ferrous metallic debris. The effective depth of exploration of the equipment is about twenty (20) ft and the equipment can be used to collect one electromagnetic reading every second when operating in its auto mode.

The Geometrics Portable Cesium Magnetometer, Model G-858, was used for the magnetic survey. Using self-oscillating split-beam Cesium Vapor (non-radioactive CS-133), this magnetometer measures the earth's total geomagnetic field at a particular location in units of gamma with an accuracy of ± 1.0 gamma (nt). The total field consists of three components: the main field, the external field, and local variations. The main field remains fixed over the period of time of a field investigation. The external field does not remain constant, but is accounted for if necessary by using a diurnal variation correction. Local variations are

attributable to anomalies near the surface such as buried metal objects. When operating in its auto mode, the equipment can be used to collect a maximum of 10 magnetic readings per second.

The Subsurface Interface Radar (SIR) System-3 from Geophysical Survey Systems, Inc. (GSSI) was used for the GPR survey. This device radiates a 500 MHz electromagnetic pulse from a transmitter antenna into the earth and receives at a receiving antenna the reflection of the pulse from subsurface interfaces at which changes in the electrical properties (dielectric constant) of the subsurface materials occur. For example, metallic objects usually exhibit strong subsurface reflection character due to their high electrical impedance or contrast versus surrounding soil or fill. Depth of penetration of the radar signal is reversely proportional to the conductivity of the soil. As a result, electrically resistive earth materials such as coarse-grained, unsaturated sediments allow a deeper radar penetration than the conductive finer-grained soils such as clay and silt. Similarly, reinforced concrete and shallow groundwater are conductive and thus attenuate the radar signals.

2.0 GEOPHYSICAL SURVEYS AT SITE 2 - LANDFILL B

2.1 Field Design & Operation

As shown in Figure 2-1, both EM and magnetic surveys were conducted on grid lines set up on both sides of the existing pond located at Site 2. The grid lines on the east side of the pond were laid out in reference to Building 130. The grid lines on the west side of the pond were laid out with reference to the roads nearby. Note that one of the EW grid lines on the east side extended westerly into the pond. In reality, the gentle sloping area between Building 130 and the pond as shown in the topographic map was flat and dropped off sharply to the pond water at the west ends of the three EW grid lines. Various debris were noticed present in the woods west of Building 130.

Prior to the data collection, each grid line was staked with orange plastic flags every 50 ft. During the field data collection, the EM31 was set at the auto mode with readings in both quadrature-phase and inphase collected every second. With such a setting, approximately one reading was collected at every 3 ft while the operator carried the EM31 and walked slowly along each grid line. The EM readings were downloaded to a laptop computer and contour maps of conductivity and inphase readings were created.

The magnetometer was set to collect one magnetic reading every 0.4 second. With a normal walking pace, approximately one reading was collected per foot while the operator carried the magnetometer and walked along each grid line. The magnetic measurements were recorded and stored in the magnetometer memory and transferred to a computer at the end of the survey. The positions of both the EM and magnetic readings were calibrated against the flags staked every 50 ft.

2.2 Results and Interpretations

Figure 2-2 and Figure 2-3 are the contour maps made of the conductivity and inphase readings collected on the east bank of the pond, respectively. In the either map, the EM anomalies are shown in red or blue; while the background readings are shown in grey. The background conductivity values range around 40 mS/m. The background inphase readings vary from 4 to 6 ppt. Note that the low or high conductivity values are not absolute but relative, reflecting a deviation from the background values. The positive or negative values reflect the change of the dipole orientation of the local electromagnetic field. And it is the deviation that we are using to locate the buried materials. Several anomalies were identified in both the contour maps. They generally agree in positions between the two contour maps. The anomalies occurred

along the west edge of the bank, near the southwest corner of Building 130, and in the southeast corner of the survey area.

Figure 2-4 shows the contour map of the magnetic readings collected on the east bank of the pond. The magnetic anomalies are shown in red or blue with the background readings in grey. The magnetic anomalies occurred in the northern portion and southeast corner of the survey area, generally agreeing in position with those of EM anomalies. The locations of the EM and magnetic anomalies also agree with those of the surface debris observed in the woods, suggesting that the anomaly areas might have been landfilled.

Figures, 2-5 to 2-9, show the EM and magnetic profiles acquired along grid line A-A', B-B', C-C', D-D', and E-E', respectively (see Figure 2-1 for location reference). On an EM profile, anomalies are represented by the sudden change of the conductivity or inphase readings with distance. On a magnetic profile, anomalies are indicated by the magnetic highs or lows above or below the background readings.

As shown in the lower half of Figure 2-5, there is a magnetic high near the starting point (A), followed by relatively flat magnetic readings, representing the background conditions. The EM profile shows a general increase of conductivity and inphase readings toward the end point (A'). It is likely that the magnetic high near Point A was caused by the subsurface magnetic objects and the high conductivity and inphase readings near Point A' were caused by the increase of salt contents in the soil and groundwater. However, the presence of overhead power lines along the nearby roads might also have contributed to the anomalies.

Figure 2-6 shows the increase of both conductivity and inphase readings toward the middle of the profile but no increase or decrease of magnetic readings. The increase of the conductivity and inphase readings is likely related to the increase of salt content in the subsurface soil and groundwater. Along the magnetic profile, the background readings stayed around 52,200 gamma with several anomalies occurring at the distances of 150 ft (a magnetic low), 200 to 240 ft (fluctuated readings), and 320 to 350 ft (a magnetic low between two highs). These anomalies are most likely caused by subsurface magnetic objects or utility lines.

A conductivity low occurred in the middle of EM Profile C-C' as shown in Figure 2-7, associated with no apparent change in inphase and magnetic readings. The variation of the conductivity readings is thus more likely related to the change in soil content than the occurrence of metallic objects. The EM profile shown in Figure 2-8 is similar to that shown in Figure 2-7. However, there is a magnetic high in the middle of the profile (D-D'), which is probably caused by subsurface magnetic objects.

The EM profile along E-E' (Figure 2-9) is similar to that along A-A' with the increase of conductivity and inphase readings toward the end of the profile. Two magnetic anomalies occurred along E-E' with one low at the beginning (E) and one high at the distance of 145 ft. The magnetic high at 145 ft also corresponds to a minor fluctuation in inphase readings at the same location. The high might have been created by subsurface magnetic objects.

In summary, most of the magnetic anomalies shown along the above five transects do not occur in association with any EM anomalies. Similarly, the rise or fall of the EM readings do not concur with the occurrence of the magnetic anomalies. It is likely that the absence of EM anomalies at the locations of magnetic anomalies was due to the potentially high concentration of salt content in the groundwater, which would mask the impact of any metallic objects on the EM readings. The rise or fall of the EM readings might simply be caused by the increase or decrease of salt or clay content in the soil or groundwater, which would not have any impact on magnetic readings.

3.0 EM SURVEYS AT SITE 3 - LANDFILL C

3.1 Field Design and Operations

Figure 3-1 shows the survey grid laid out parallel to the fence lines at Site 3, Landfill C. The grid lines were spaced every 100 ft in the majority of the survey area but spaced every 50 ft in the area along the fences (50 ft) and 200 ft in the southern area. There are a total of eight east-west grid lines and ten north-south grid lines. Only the EM survey was conducted at this site. The data acquisition procedure was the same as that described in Section 2.1.

3.2 Results and Interpretations

Figure 3-2 and Figure 3-3 show the contour maps made of the conductivity and inphase readings collected at the site, respectively. Both maps show the occurrence of the high EM readings in the eastern, southern, and northwestern portions of the site, as marked by the light purple color. The relatively low EM readings occurred in the areas surrounded by the areas of the high readings, as marked by the grey to light blue color. The highest conductivity and inphase readings occurred along the eastern fence line (purple) and are probably caused by the fence line. The EM readings in the light-blue to grey area vary slightly with little fluctuation and these readings may represent the background conditions. The change of the EM readings from the grey to light purple area is steep, reflecting the increase of conductive contents in the subsurface soil or groundwater. Within the light purple area, the EM readings fluctuate from 120 mS/m to 250 mS/m or from 12 ppt to 35 ppt but without erratic changes. Usually, the erratic changes suggest the presence of isolated metallic objects. The lack of the erratic changes indicates that the increase of the EM readings was primarily due to the increase of salt or clay content in the subsurface soil or groundwater. The light-purple areas might have been filled with soils with high salt or clay contents.

Both Figure 3-2 and Figure 3-3 show a linear anomaly originated near the two existing buildings at the coordinates of {900 E, 600 N} to {900 E, 700 N} and extended westerly to the coordinate of {100 E, 650 N}. The anomaly occurred as an EM low (dark blue) near one of the buildings at the coordinate of {900 E, 600 N} and an EM high (closed contour in purple) at the coordinate of {280 E, 600 N}. The anomaly is probably caused by a subsurface utility line.

4.0 GEOPHYSICAL SURVEYS AT SITE 4 - LANDFILL D

4.1 Field Design and Operations

Figure 4-1 shows the survey grid laid out in reference to the eastern fence line at Site 4, Landfill D. The majority of Landfill D was covered by heavy vegetation and brush, which limited the grid layout. The only open area occurred in the eastern portion of the landfill and measured approximately 250 ft by 400 ft. In this open area, the grid lines were laid out every 50 ft to 100 ft. One group of grid lines were parallel to the eastern fence line and the other group in the perpendicular direction. To get access to the other areas, one machete, two brush cutters, one chain saw, and one Bobcat were used to clear the brush and vegetation. A total of four long grid lines were laid out to cover the entire landfill with three in the approximate north-south direction (or parallel to the eastern fence line) and one in the approximate east-west direction. The three north-south grid lines (A-A', B-B', and C-C') were extended northerly beyond the landfill to join the grid laid out at Landfill C. Line D-D' changed its course in the western portion of the landfill due to the obstruction of an abandoned large machine or vehicle. Various debris including concrete, steel bars, bricks, tires, woods, cannon shells and other materials were observed along these four grid lines but primarily in

the western and southern portions of the landfill. Note that the locations of A-A', B-B', C-C', and D-D' were not surveyed and therefore might not be accurate.

EM, magnetic, and GPR surveys were conducted for Landfill D. The EM and magnetic data acquisition procedures were the same as those described in Section 2.1. The collection of the GPR data was through pulling the antenna along each grid line while the marker button was pushed at 10 ft intervals to scale the printout. Because the subject property is underlain by the artificial fill, the two way travel time (TWTT) for a radar signal is estimated around 7 nanoseconds (ns) per foot. The time range was thus selected as 70 ns and would allow a penetration depth of 10 ft. The GPR data were output real-time to a hardcopy graphics recorder as continuous, high-resolution subsurface profiles. In each profile, the horizontal axis represents the distance; while the vertical axis represents the TWTT in ns (see Figure 4-10 for reference). The top horizontal line represents the ground surface. With such a setup, the distance between two horizontal time lines is approximately equal to 1 ft.

4.2 Results and Interpretations

Figures, 4-2 to 4-5, show the EM and magnetic profiles acquired along grid line A-A', B-B', C-C', and D-D', respectively. On an EM profile, anomalies are represented by the sudden change of the conductivity or inphase readings with distance. On a magnetic profile, anomalies are indicated by the magnetic highs or lows above or below the background readings.

As shown in Figure 4-2, EM and magnetic anomalies occurred from the beginning (1,050 ft or A) of the line to the distance of about 1,520 ft. The EM anomalies include two conductivity highs from 1,050 ft to 1,150 ft and 1,380 ft to 1,440 ft, and one inphase high which is completely flat (saturated) from the beginning to 1,450 ft. The magnetic anomalies are represented by fluctuated highs and lows occurring throughout the section from 1,050 ft to 1,520 ft. The saturation of the inphase readings was caused by the limitation of the EM data logger which would record any readings above 46 ppt as 46 ppt. The consistently saturated inphase readings might have been caused by the nearly continuous deposit of metallic debris or conductive materials in the subsurface. The detection of the magnetic highs and lows throughout the inphase-reading saturated area suggests the presence of numerous magnetic debris in the subsurface. The rest of the line is characterized by the smooth variation of both EM and magnetic readings. The magnetic readings stayed around 52,500 gamma, very close to the background readings obtained in Landfill B.

The other two north-south profiles, B-B' and C-C' (Figure 4-3 and 4-4), are similar to those shown in Figure 4-2, characterized by fluctuated readings in the southern section and smooth readings in the northern section. These three north-south profiles clearly define the northern boundary of Landfill D at the locations where the fluctuated EM and magnetic readings were replaced by the smooth readings. The southern boundary of the landfill is less clear because the lines could not be extended further south due to the presence of steep cliff and limitation of wetland and fence line. However, our field observation suggests that the location of the steep cliff may represent the southern boundary of Landfill D.

The east-west profile, D-D' (Figure 4-5) is almost entirely filled with fluctuated EM and magnetic readings with the exception of the first 150 ft of the profile which was lack of fluctuated EM readings but contained fluctuated magnetic readings. This area may represent the western boundary of Landfill D. The eastern boundary of the landfill cannot be determined due to the limitation of the fence line. Figure 4-5A depicts the boundary (dotted line) of the landfill as determined with the geophysical surveys. However, please be cautious when using this figure because the locations of A-A', B-B', C-C', and D-D' were not surveyed.

Figures, 4-6 to 4-8, show the contour maps made of the conductivity, inphase, and magnetic readings, respectively. These readings were collected along the grid lines laid out in the open area in the eastern

portion of the landfill. The open area is located within the extent of the landfill. These contour maps reflected the similar features exhibited by the four profiles presented earlier. Figure 4-6 shows the high conductivity readings in the areas along the fence line and in the northern and western areas, and low conductivities in the middle. Figure 4-7 is characterized by saturated inphase readings almost in the entire survey area with the exception of the northeast and northwest corners. The magnetic contour map as shown in Figure 4-8 shows the occurrence of a number of closed magnetic highs and lows, suggesting the presence of numerous magnetic objects in the subsurface. A linear magnetic low occurred along the eastern fence line and the two may be related.

GPR surveys were conducted along some of the EM and magnetic grid lines in the open areas. Figure 4-9 shows the locations of six GPR profiles acquired along these grid lines. Figures, 4-10 to 4-12, show the representative sections of GPR profiles acquired along three grid lines, respectively. Figure 4-10 shows a portion of the GPR profile acquired along B-B'. The profile ends about 5 ft from the end point (B') of B-B'. The reflections along the profile are weak, suggesting the subsurface materials are clay rich or conductive. The GPR profiles shown in Figure 4-11 and 4-12 are similar and characterized by strong reflections. Each profile contains several reflections that might have been caused by subsurface objects such as concrete blocks, metal pipes, drums, or other materials. These reflections are located at the distances of 4 ft, 22 ft, 27 ft, and 34 ft along C'-C; and at the distances of 60 ft, 74 ft, 79 ft, 82 ft, and 88 ft along D-D', respectively. Among the six GPR profiles, the majority is represented by the two profiles shown in Figure 4-11 and 4-12 with some containing the features similar to those shown in Figure 4-10.

5.0 GEOPHYSICAL SURVEYS AT SITE 5 - BURNING GROUND & CAGED PIT

5.1 Field Design & Operation

Figure 5-1 shows the survey grids laid out at the burning grounds and the caged pit. The grid at the burning grounds was laid out in reference to Building 272; while the exact location of the grid for the caged pit was not determined. Two wooden stakes were placed at the northwest and southwest corners of the grid for the future survey reference. Only the EM survey was conducted at the burning grounds; while both EM and magnetic surveys were conducted at the caged pit. Most of the grid lines were spaced every 50 ft; although some were spaced every 100 ft or 10 ft. The EM and magnetic data acquisition procedures are the same as those described in Section 2.1.

5.2 Results and Interpretations

Figure 5-2 and Figure 5-3 are the contour maps made of the conductivity and inphase readings collected at the burning grounds. The two maps show a similar pattern with the occurrence of several EM highs and lows. Both high and low conductivity and inphase readings occurred in the areas surrounding Building 272. These highs and lows are probably caused by the building. High EM readings occurred in the northeast corner of the area. The magnitude of the EM highs is similar to that of the EM highs at Landfill C. The EM highs are thus likely related to filled material with salt or clay contents. The presence of two transformers in this area might also have contributed to the high readings.

One EM high occurred with its center at the coordinate of {150 E, 330 N}. An EM low occurred directly south of this high at the coordinate of {140 E, 300 N}. No surface metallic objects were present in association with these two anomalies. Therefore, subsurface objects or changes in the soil conditions might have contributed to these two anomalies. A linear EM low occurred from {250 E, 350 N} to {250 E, 150 N}, where wooden poles and other surface metallic objects were present. These surface debris might have created the linear anomaly.

In addition to above large-scale anomalies, several small-scale anomalies also occurred at the site (Figure 5-2 and 5-3). One EM high occurred at {175 E, 200 N} and appeared to be associated with an existing wire trailer at the location. Another EM was located at {300 E, 240 N}, where metallic equipments were present. One EM low occurred at {300 E, 300 N} and seemed to be caused by the surface metallic debris such as trailers and metal boxes.

Figures, 5-4 to 5-6, show the contour maps made of conductivity, inphase, and magnetic readings acquired in the caged pit area. The conductivity contour map (Figure 5-4) shows an isolated conductivity low centered at the coordinate of {160 E, 200 N}. The conductivity values increased from less than 70 mS/m in the western portion to greater than 120 mS/m in the eastern portion. A similar pattern was shown on the contour map of the inphase readings with an isolated inphase low associated with two inphase highs occurrent at the same location as the conductivity low (Figure 5-5). The magnetic contour map (Figure 5-7) revealed a magnetic anomaly with both high and low at the approximately same location as that of the conductivity low. This general area might represent the former caged pit. In addition to the above anomalies, magnetic highs and lows also occurred near the coordinate of {340 E, 200 N}, suggesting the presence of magnetic objects in the subsurface.

6.0 CLOSING

The field procedures and interpretative methodologies used in this project are consistent with standard, recognized practices in similar geophysical investigations. The correlation of geophysical responses with probable subsurface features is based on the past result of similar surveys although it is possible that some variation could exist at this site. This warranty is in lieu of all other warranties either implied or expressed. **ERT** assumes no responsibility for interpretations made by others based on work performed by or recommendations made by **ERT.**

Sincerely,
Earth Resources Technology, Inc.

Peter H. Li, Ph.D., P.G.
Principal Geophysicist

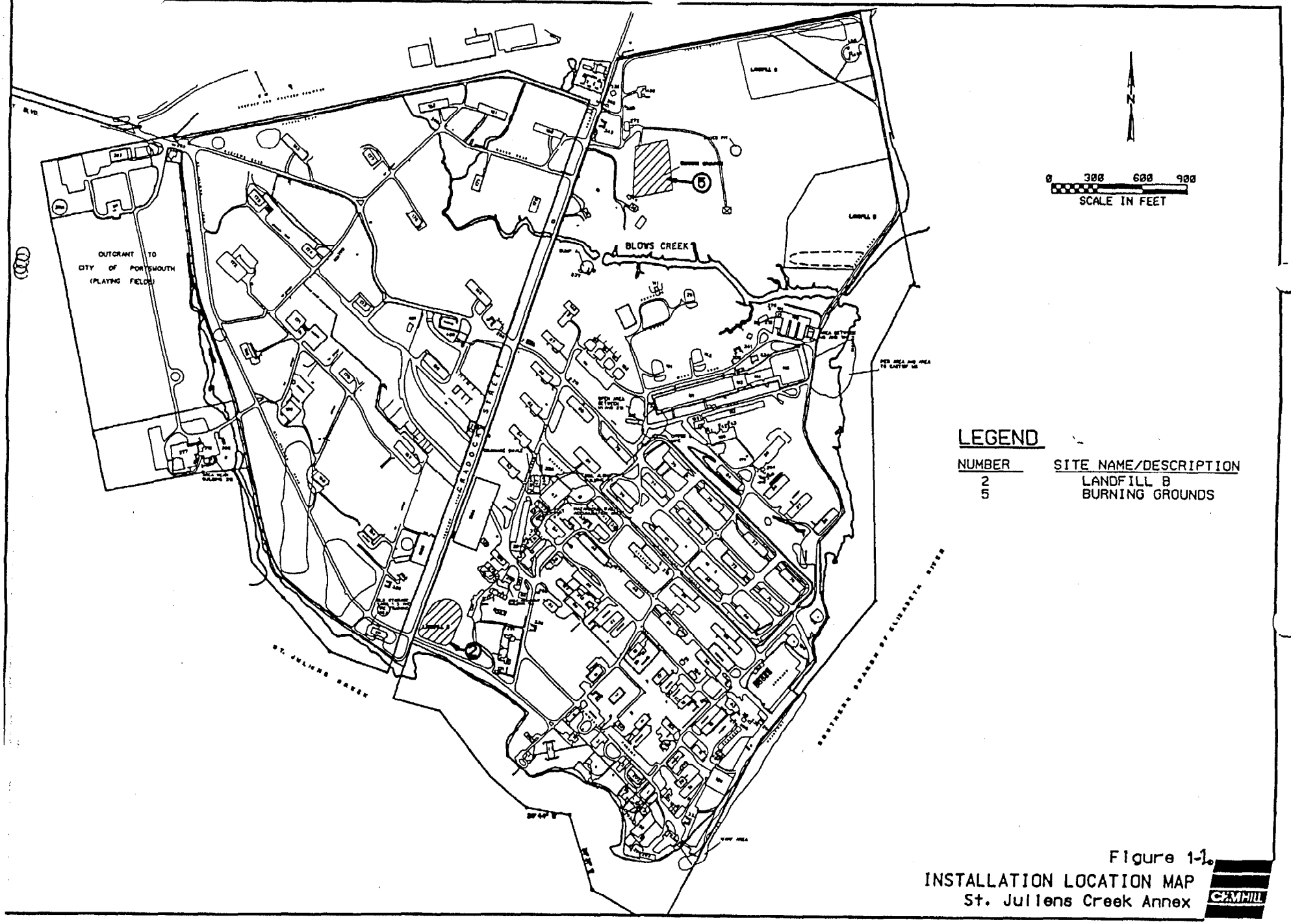


Figure 1-1.
INSTALLATION LOCATION MAP
St. Juliens Creek Annex

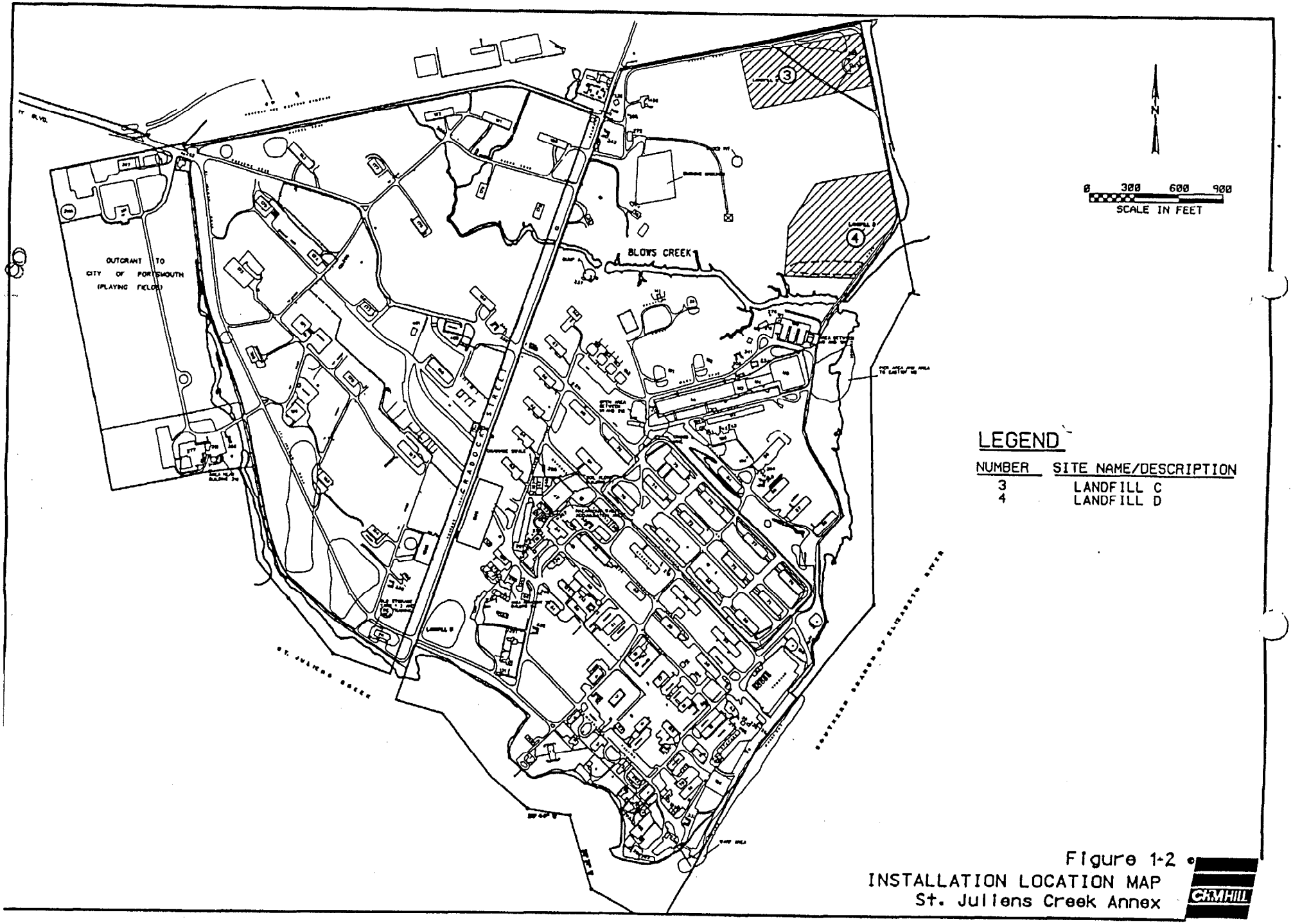
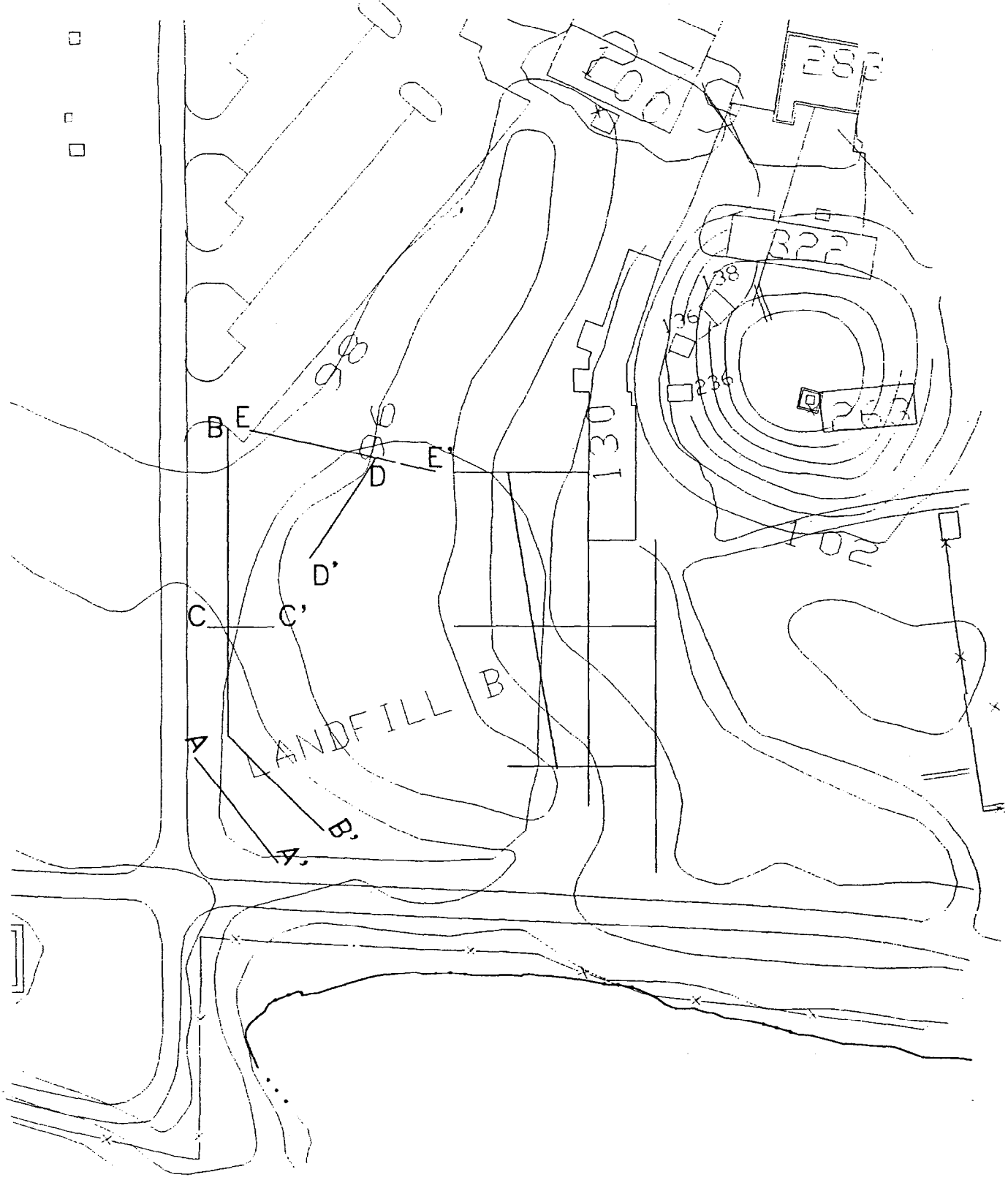


Figure 1-2
INSTALLATION LOCATION MAP
St. Juliens Creek Annex

CH2MHILL



EARTH RESOURCES TECHNOLOGY

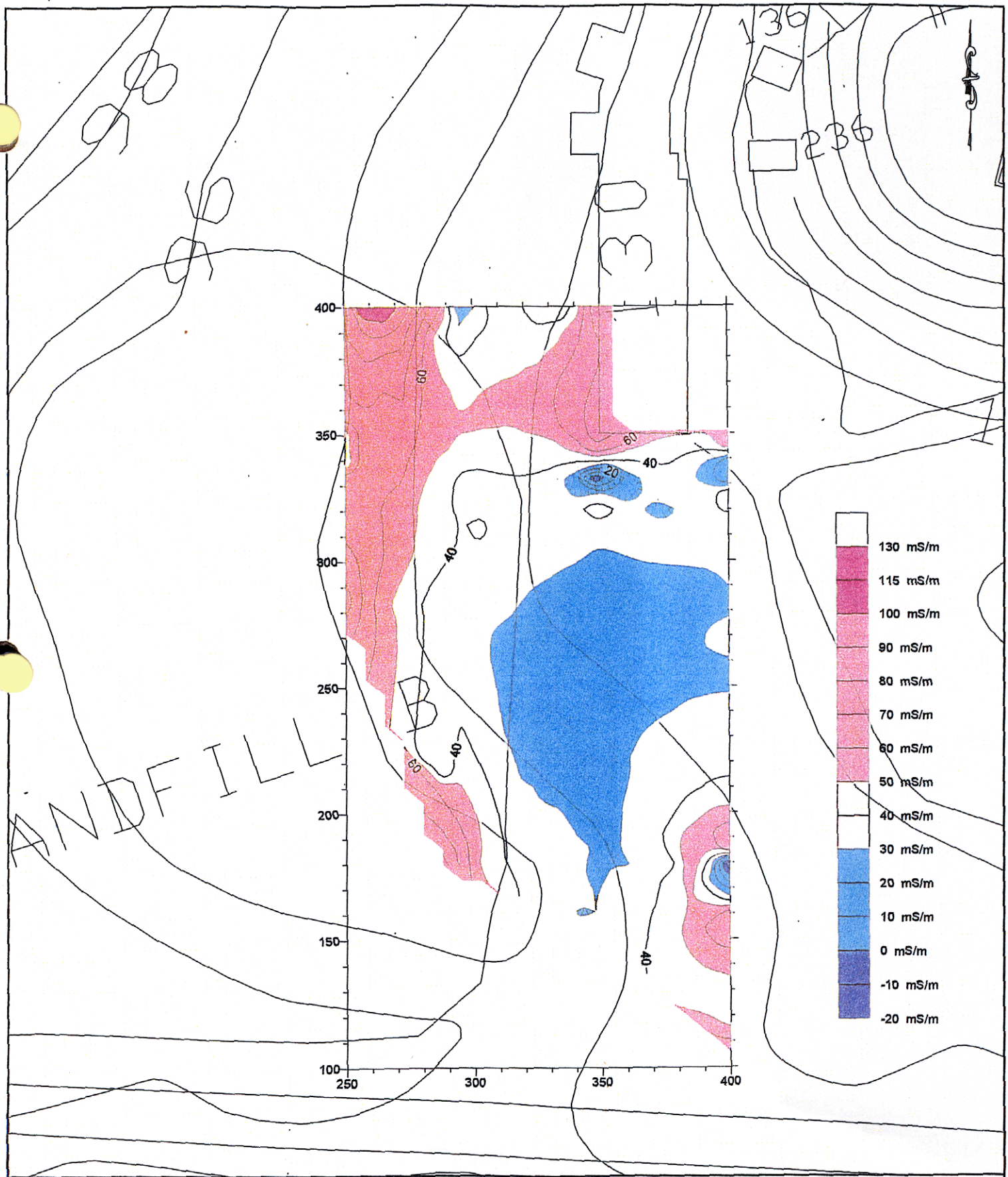
FIGURE 2-1

SCALE: 1" = 100' | JULY 17, 1997

EM SURVEY GRID

SITE 2 – LANDFILL B

ST. JULIENS CREEK ANNEX, NORFOLK, VA



EARTH RESOURCES TECHNOLOGY

CONTOUR MAP OF CONDUCTIVITY READINGS

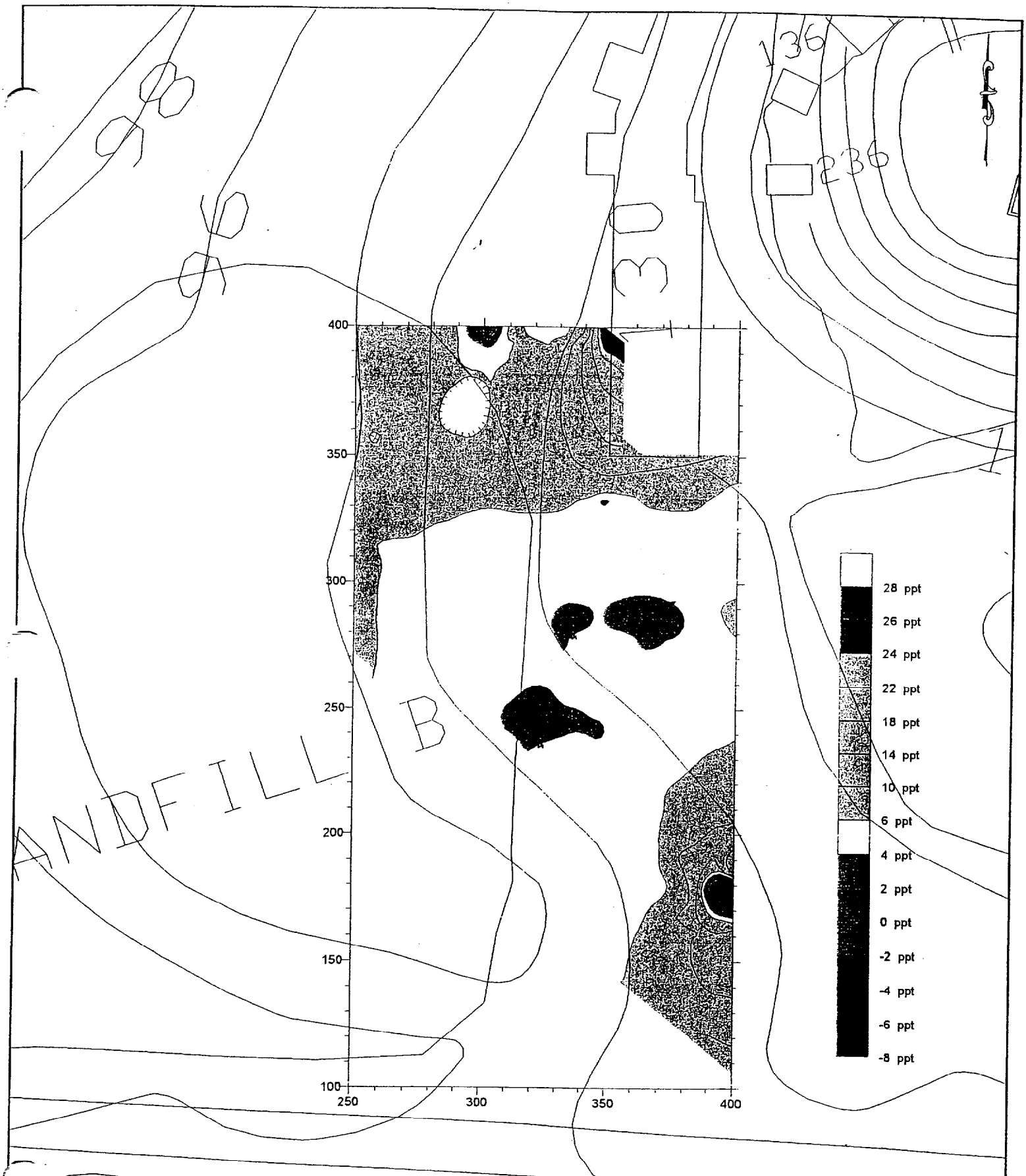
FIGURE 2-2

SITE 2 – LANDFILL B

ST. JULIENS CREEK ANNEX, NORFOLK, VA

SCALE: 1" = 50'

JULY 17, 1997



EARTH RESOURCES TECHNOLOGY

FIGURE 2-3

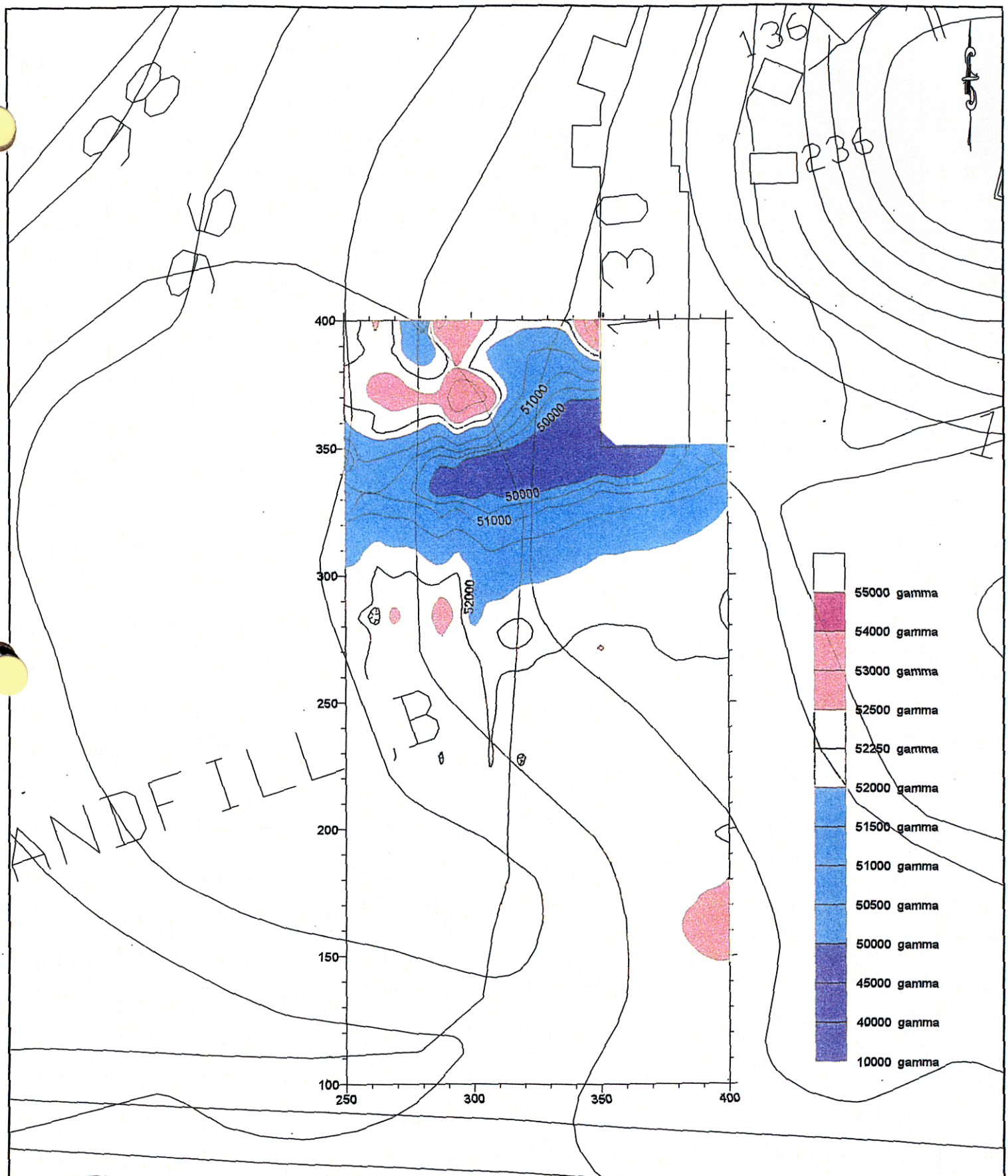
SCALE: 1" = 50'

JULY 17, 1997

CONTOUR MAP OF INPHASE READINGS

SITE 2 – LANDFILL B

ST. JULIENS CREEK ANNEX, NORFOLK, VA



EARTH RESOURCES TECHNOLOGY

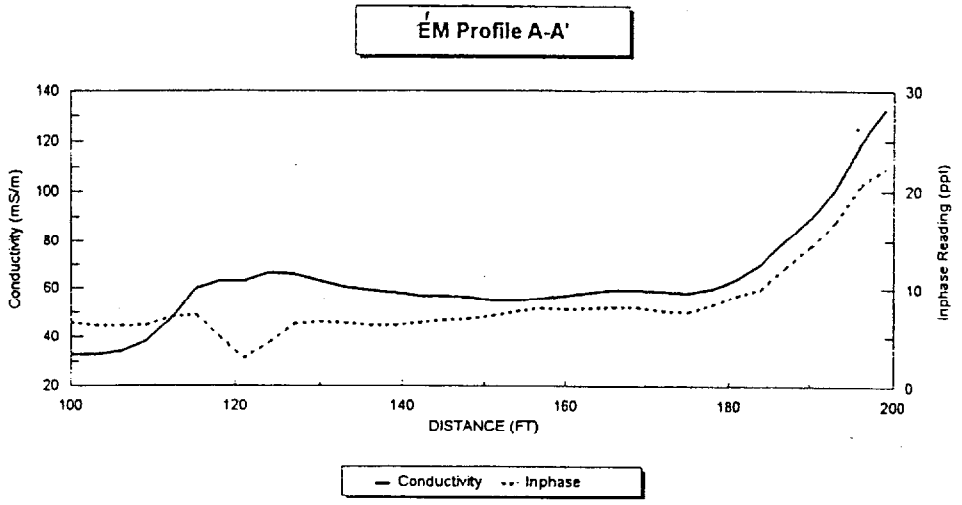
FIGURE 2-4

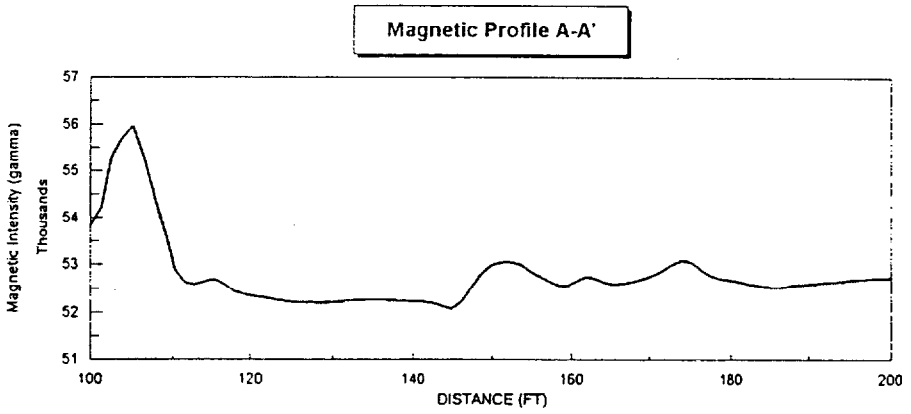
SCALE: 1" = 50' | JULY 17, 1997

CONTOUR MAP OF MAGNETIC READINGS

SITE 2 – LANDFILL B

ST. JULIENS CREEK ANNEX, NORFOLK, VA





EARTH RESOURCES TECHNOLOGY

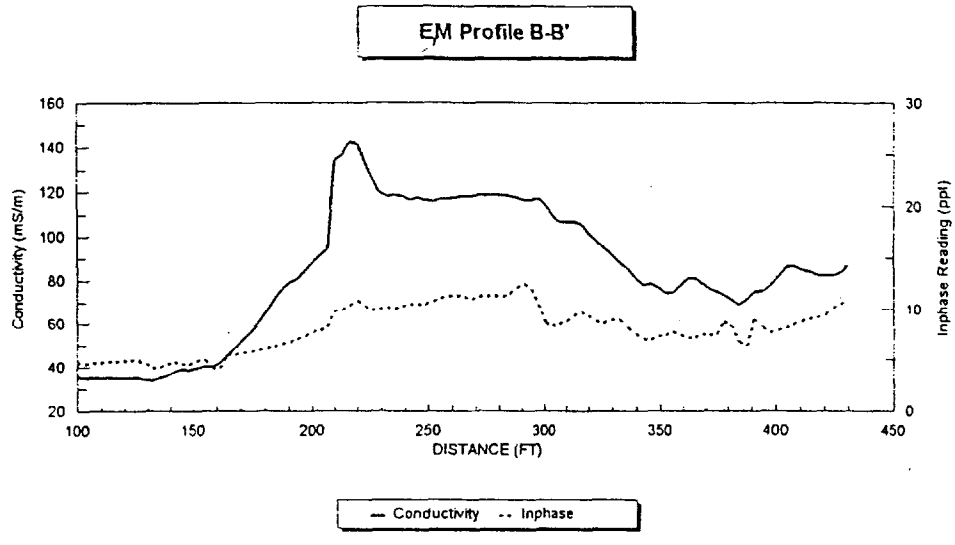
FIGURE 2-5

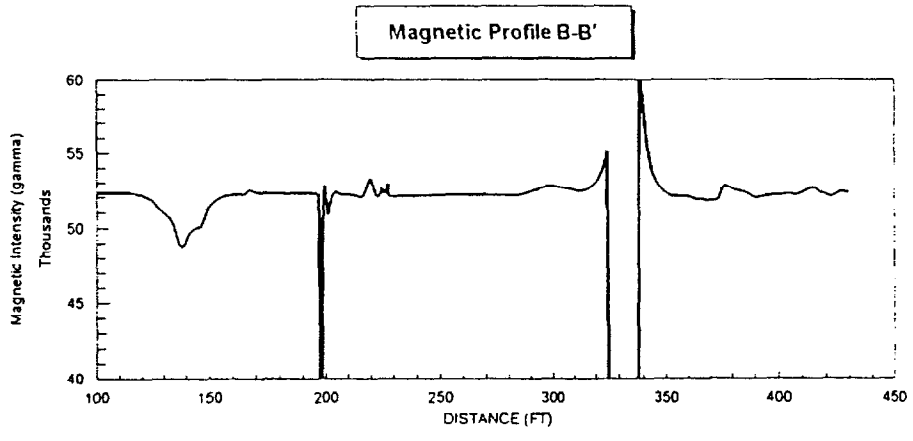
SCALE AS SHOWN | JULY 17, 1997

EM & MAGNETIC PROFILE: A – A'

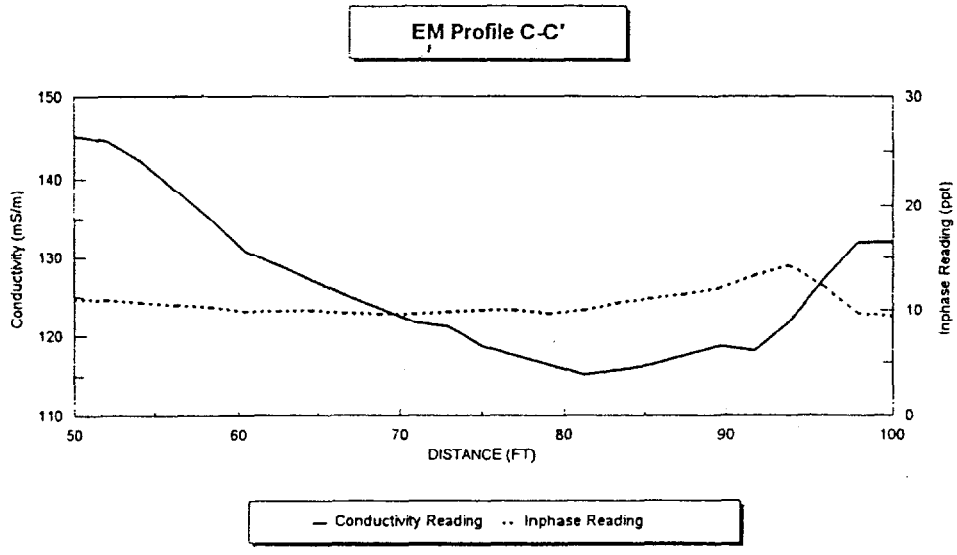
SITE 2 – LANDFILL B

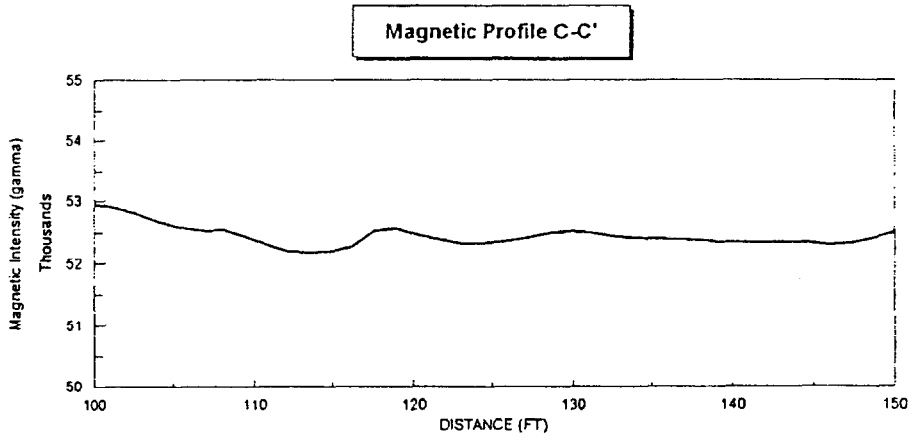
ST. JULENS CREEK ANNEX, NORFOLK, VA





EARTH RESOURCES TECHNOLOGY		EM & MAGNETIC PROFILE: B – B'
FIGURE 2–6		SITE 2 – LANDFILL B
SCALE AS SHOWN	JULY 17, 1997	ST. JULENS CREEK ANNEX, NORFOLK, VA





EARTH RESOURCES TECHNOLOGY

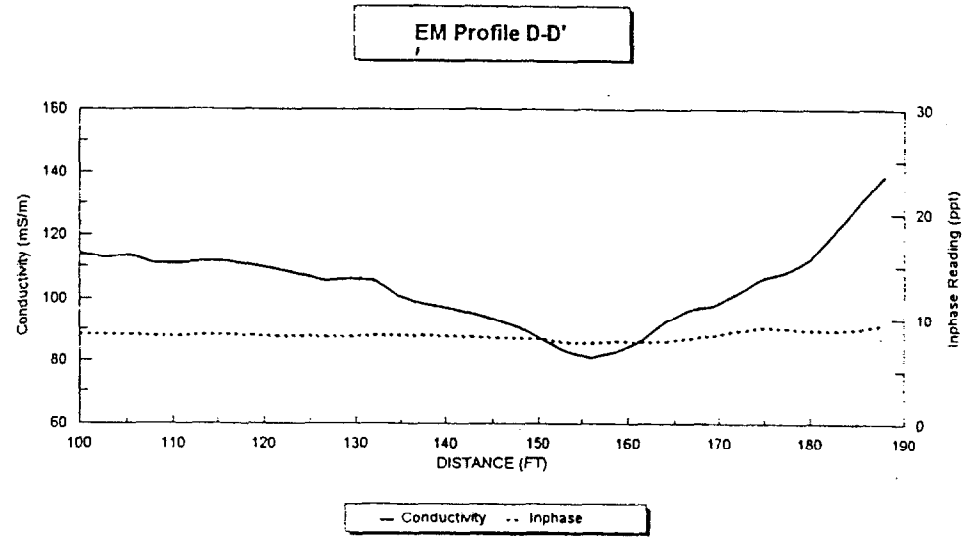
FIGURE 2-7

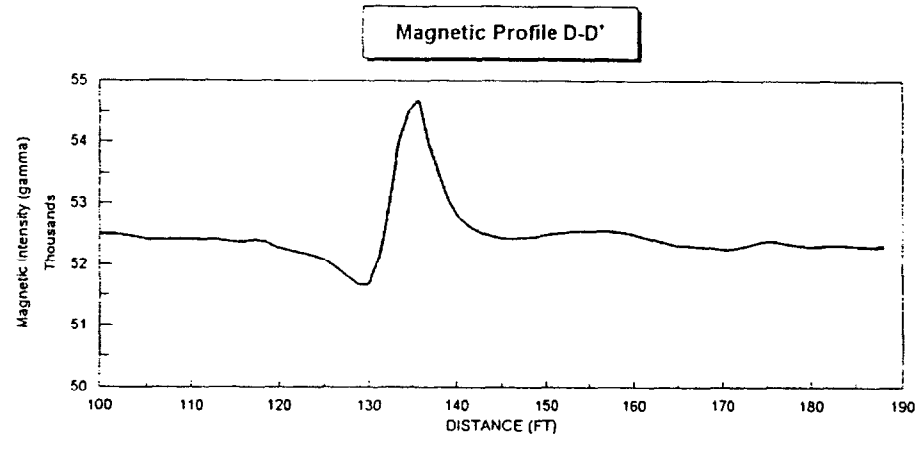
SCALE AS SHOWN | JULY 17, 1997

EM & MAGNETIC PROFILE: C – C'

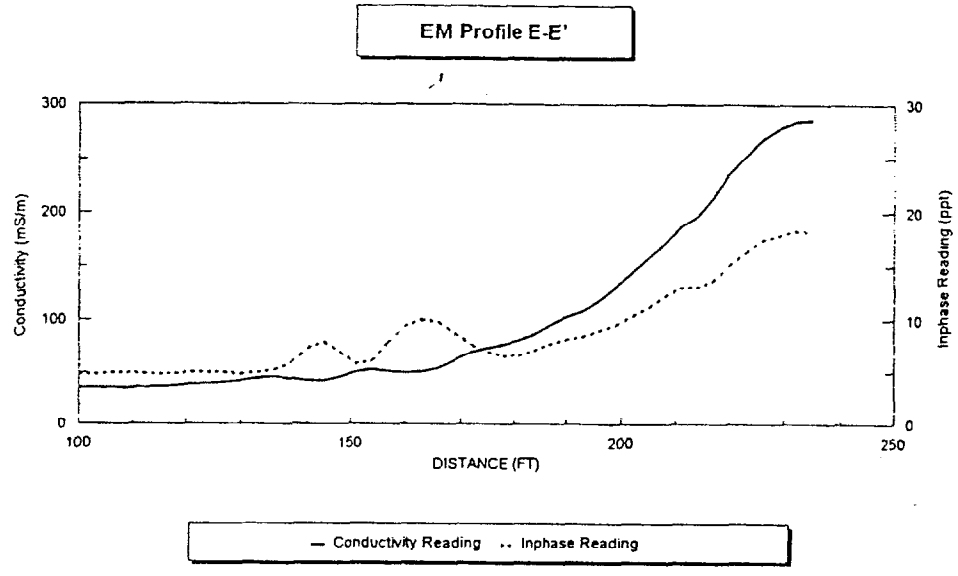
SITE 2 – LANDFILL B

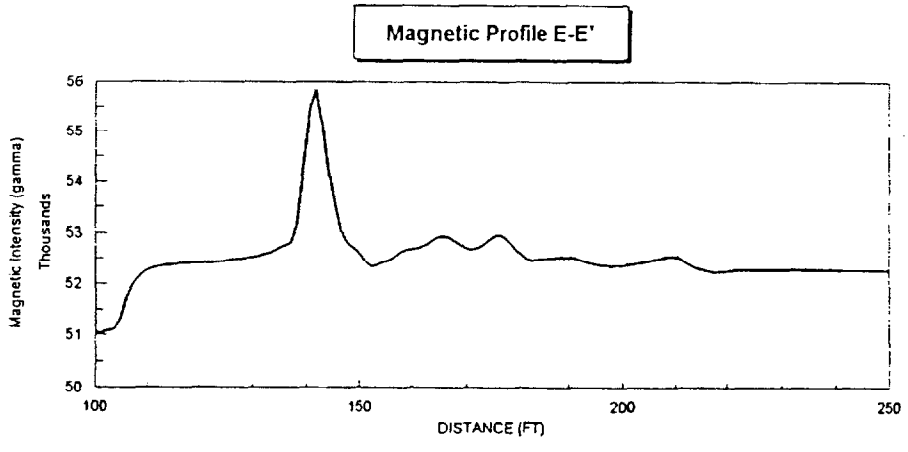
ST. JULENS CREEK ANNEX, NORFOLK, VA



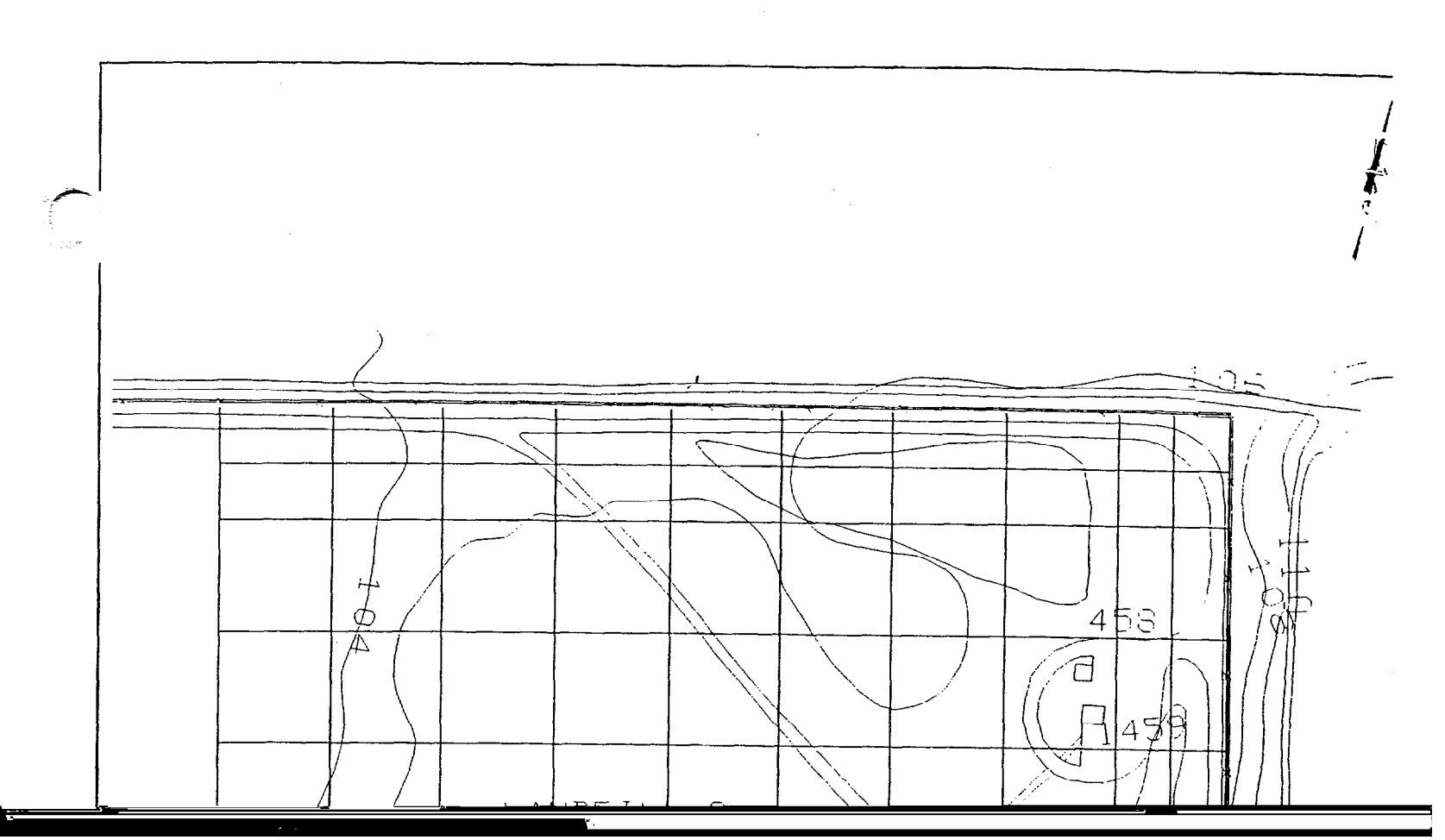


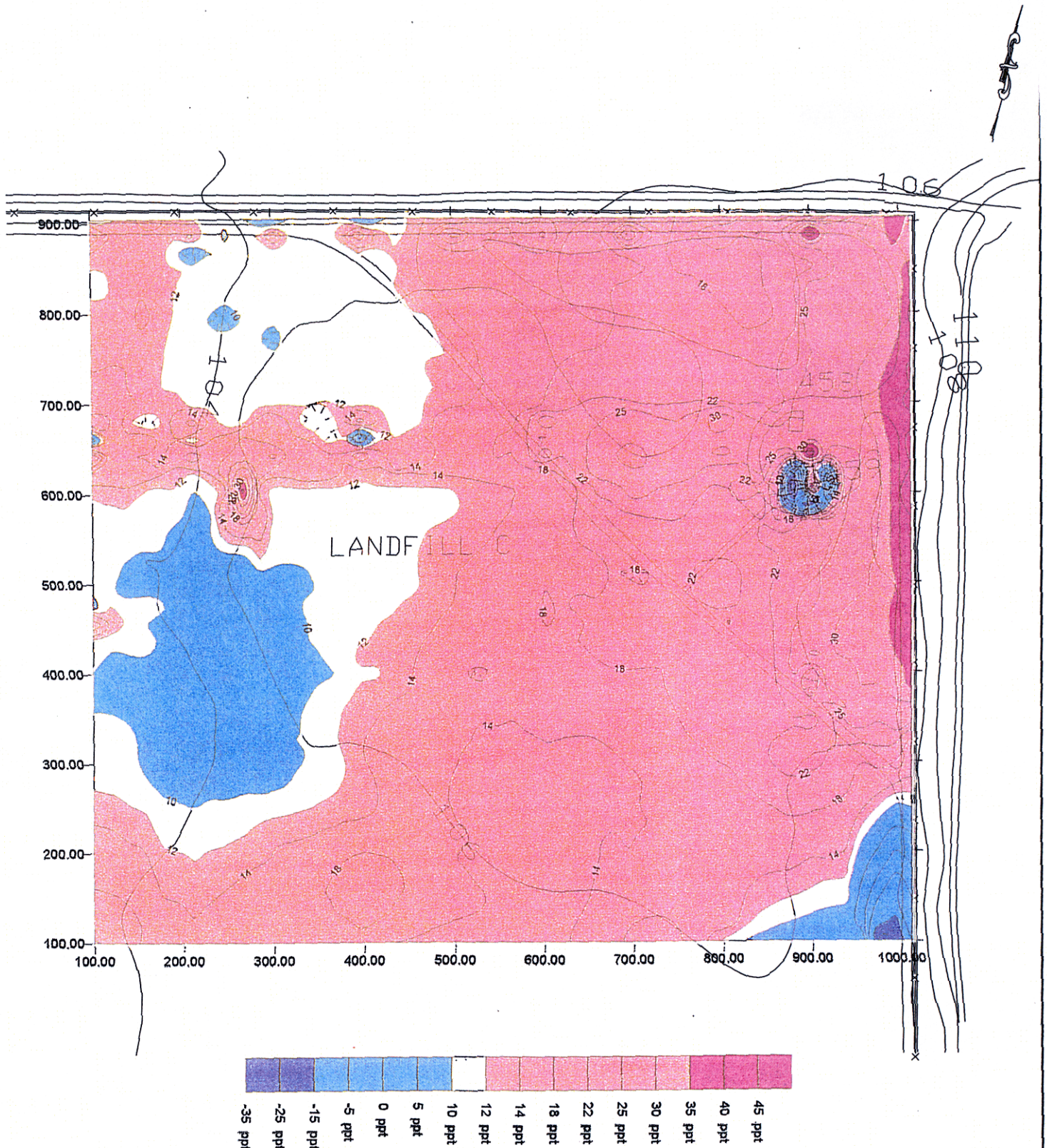
EARTH RESOURCES TECHNOLOGY		EM & MAGNETIC PROFILE: D – D'
FIGURE 2-8		SITE 2 – LANDFILL B
SCALE AS SHOWN	JULY 17, 1997	ST. JULENS CREEK ANNEX, NORFOLK, VA





EARTH RESOURCES TECHNOLOGY	EM & MAGNETIC PROFILE: E – E'
FIGURE 2–9	SITE 2 – LANDFILL B
SCALE AS SHOWN / JULY 17, 1997	ST. JULENS CREEK ANNEX, NORFOLK, VA


458
458



EARTH RESOURCES TECHNOLOGY

CONTOUR MAP OF INPHASE READINGS

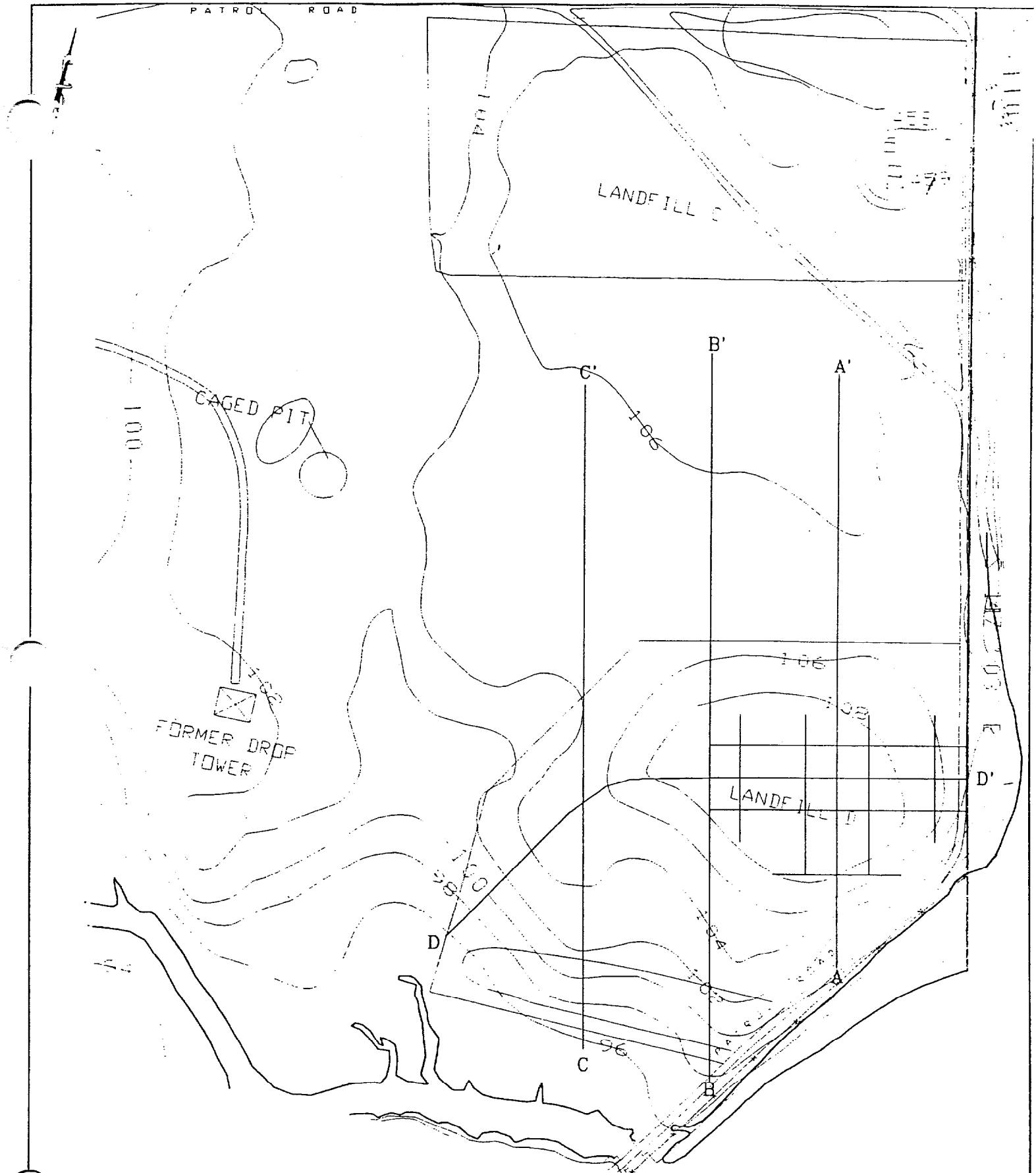
FIGURE 3-3

SITE 3 – LANDFILL C

ST. JULIENS CREEK ANNEX, NORFOLK, VA

SCALE: 1" = 150'

JULY 17, 1997



EARTH RESOURCES TECHNOLOGY

FIGURE 4-1

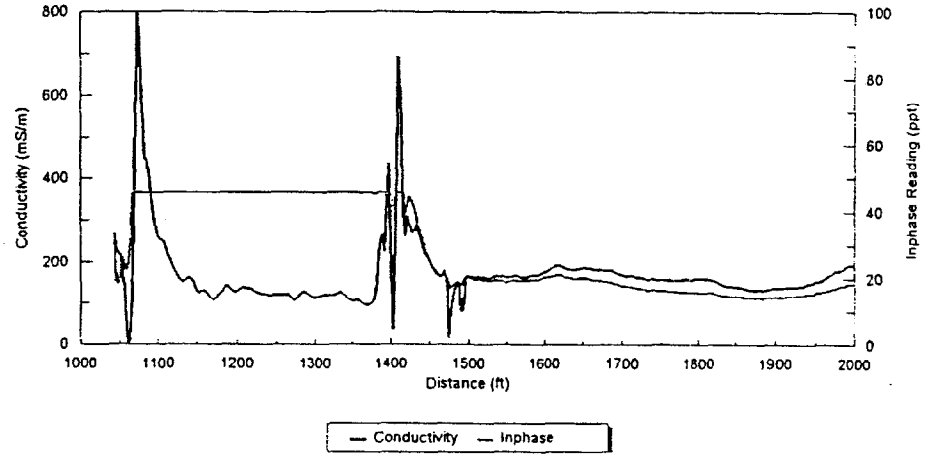
SCALE: 1" = 200' | JULY 17, 1997

EM & MAGNETIC SURVEY GRID

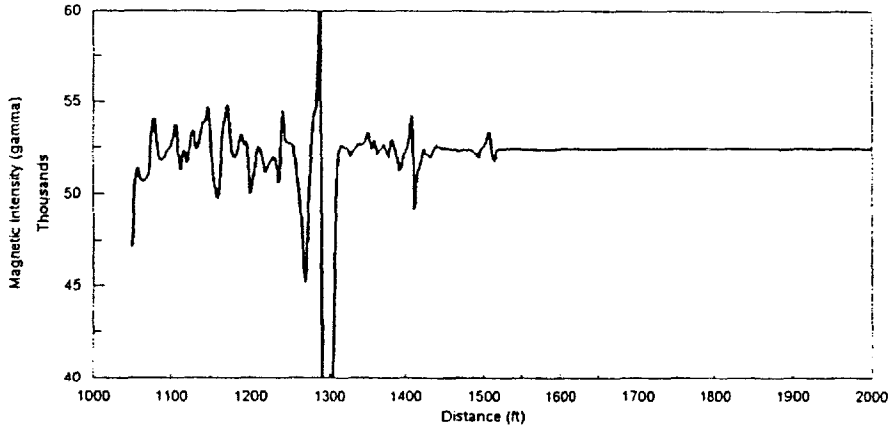
SITE 4 – LANDFILL D

ST. JULENS CREEK ANNEX, NORFOLK, VA

EM PROFILE A - A'

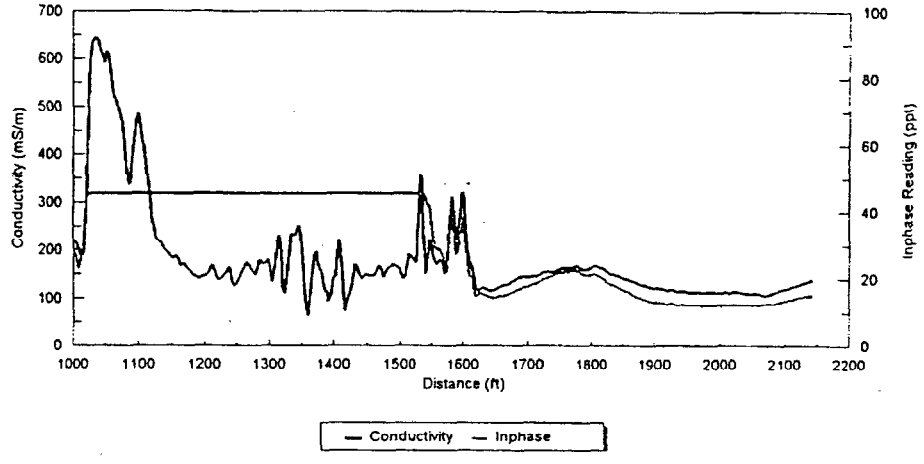


MAGNETIC PROFILE A - A'

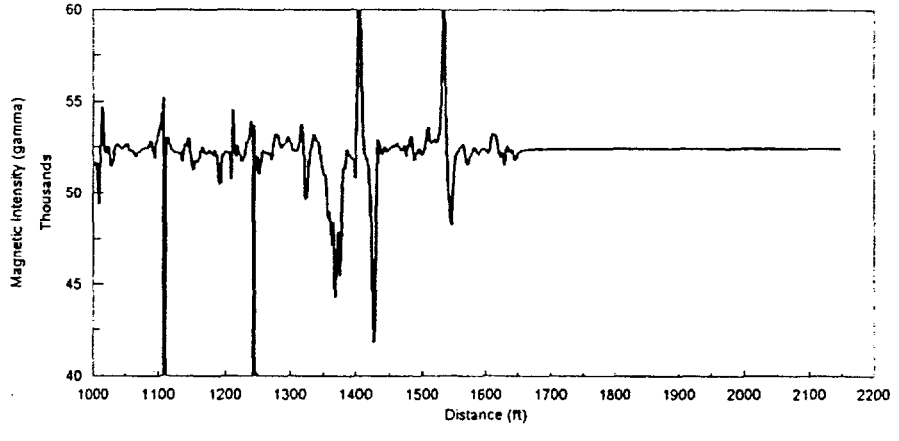


EARTH RESOURCES TECHNOLOGY	EM & MAGNETIC PROFILE: A – A'
FIGURE 4–2	SITE 4 – LANDFILL D
SCALE AS SHOWN / JULY 17, 1997	ST. JULENS CREEK ANNEX, NORFOLK, VA

EM PROFILE B - B'

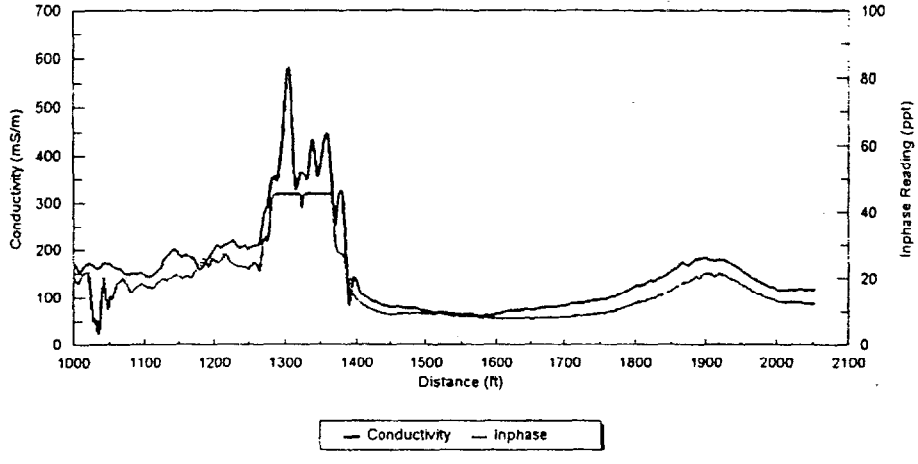


MAGNETIC PROFILE B - B'

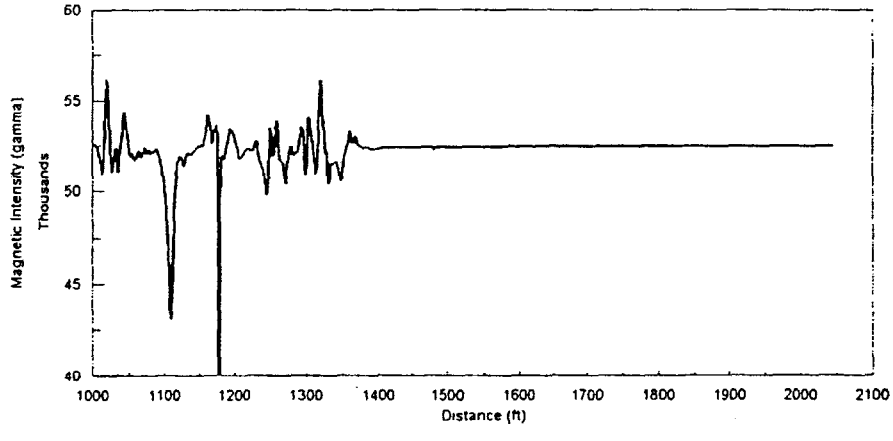


EARTH RESOURCES TECHNOLOGY	EM & MAGNETIC PROFILE: B – B'
FIGURE 4-3	SITE 4 – LANDFILL D
SCALE AS SHOWN / JULY 17, 1997	ST. JULENS CREEK ANNEX, NORFOLK, VA

EM PROFILE C - C'

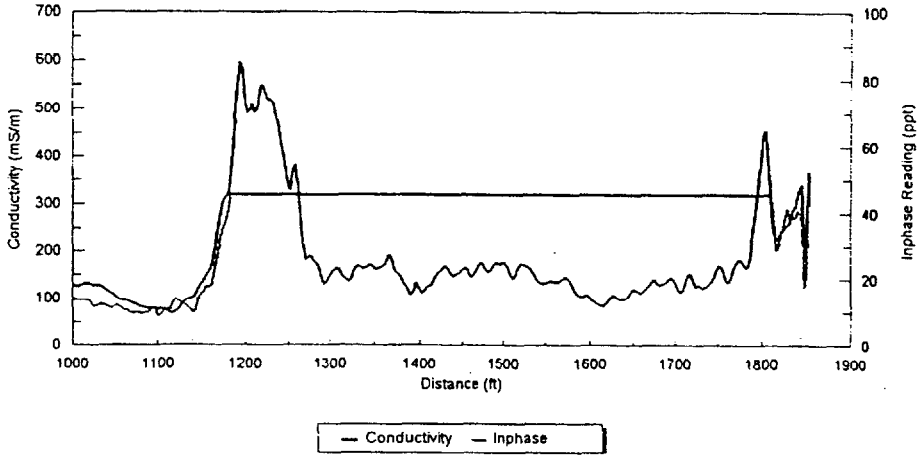


MAGNETIC PROFILE C - C'

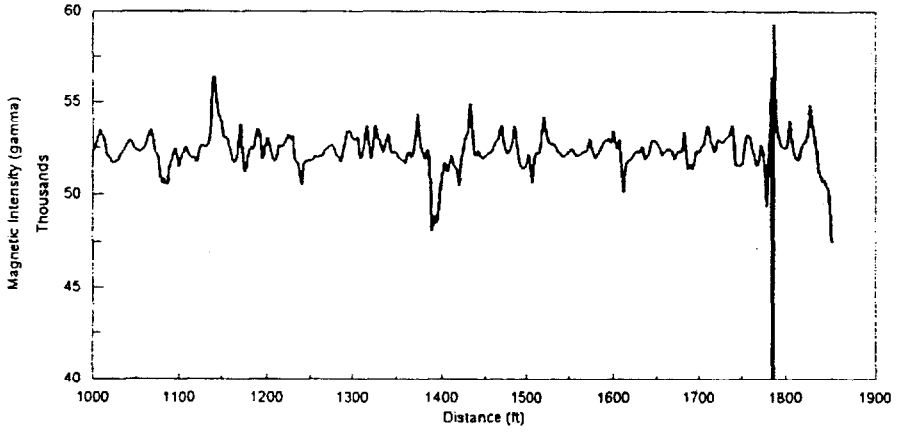


EARTH RESOURCES TECHNOLOGY	EM & MAGNETIC PROFILE: C – C'
FIGURE 4–4	SITE 4 – LANDFILL D
SCALE AS SHOWN / JULY 17, 1997	ST. JULENS CREEK ANNEX, NORFOLK, VA

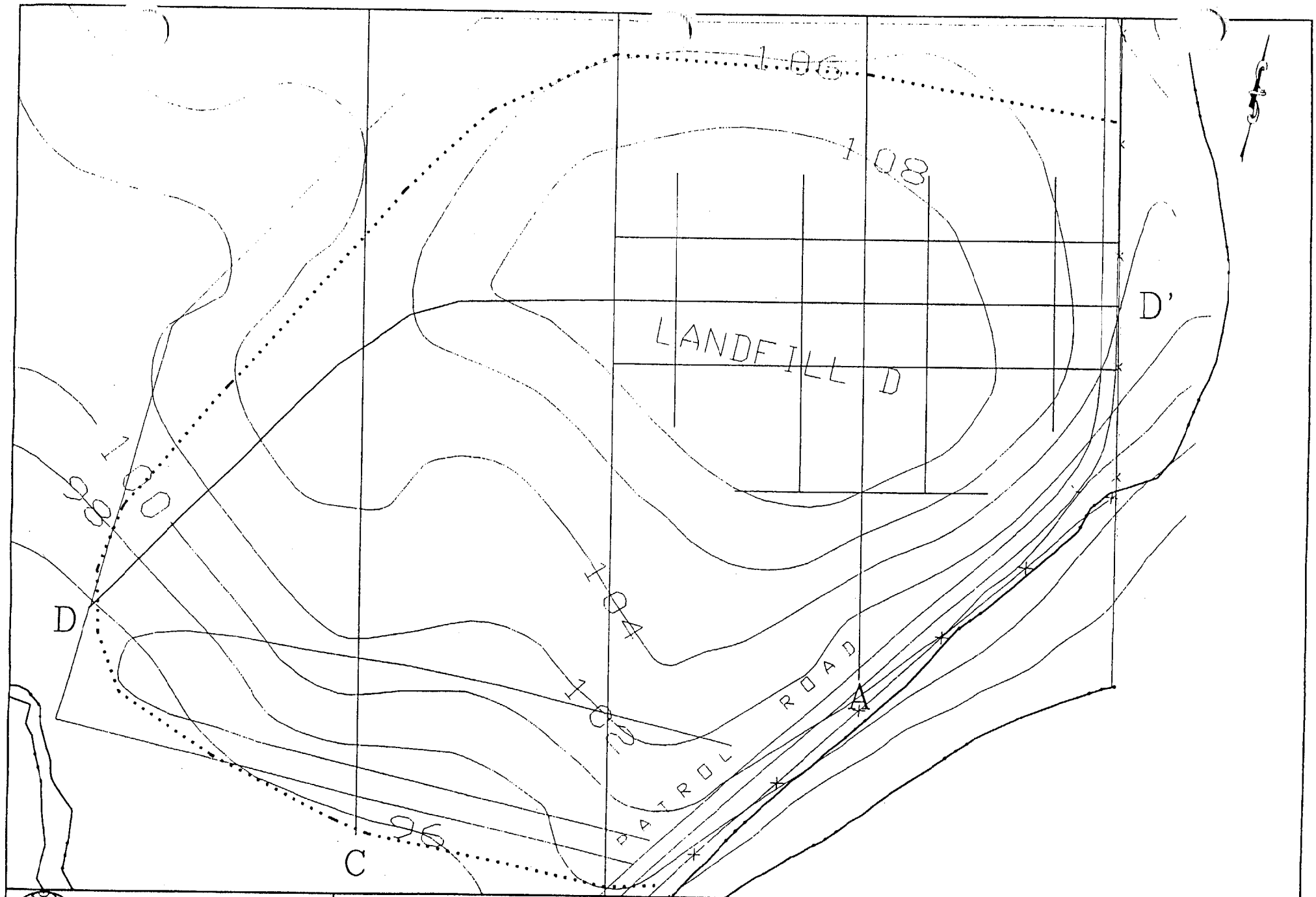
EM PROFILE D - D'



MAGNETIC PROFILE D - D'



EARTH RESOURCES TECHNOLOGY	EM & MAGNETIC PROFILE: D – D'
FIGURE 4-5	SITE 4 – LANDFILL D
SCALE AS SHOWN / JULY 17, 1997	ST. JULENS CREEK ANNEX, NORFOLK, VA



EARTH RESOURCES TECHNOLOGY

SCALE: 1" = 100'

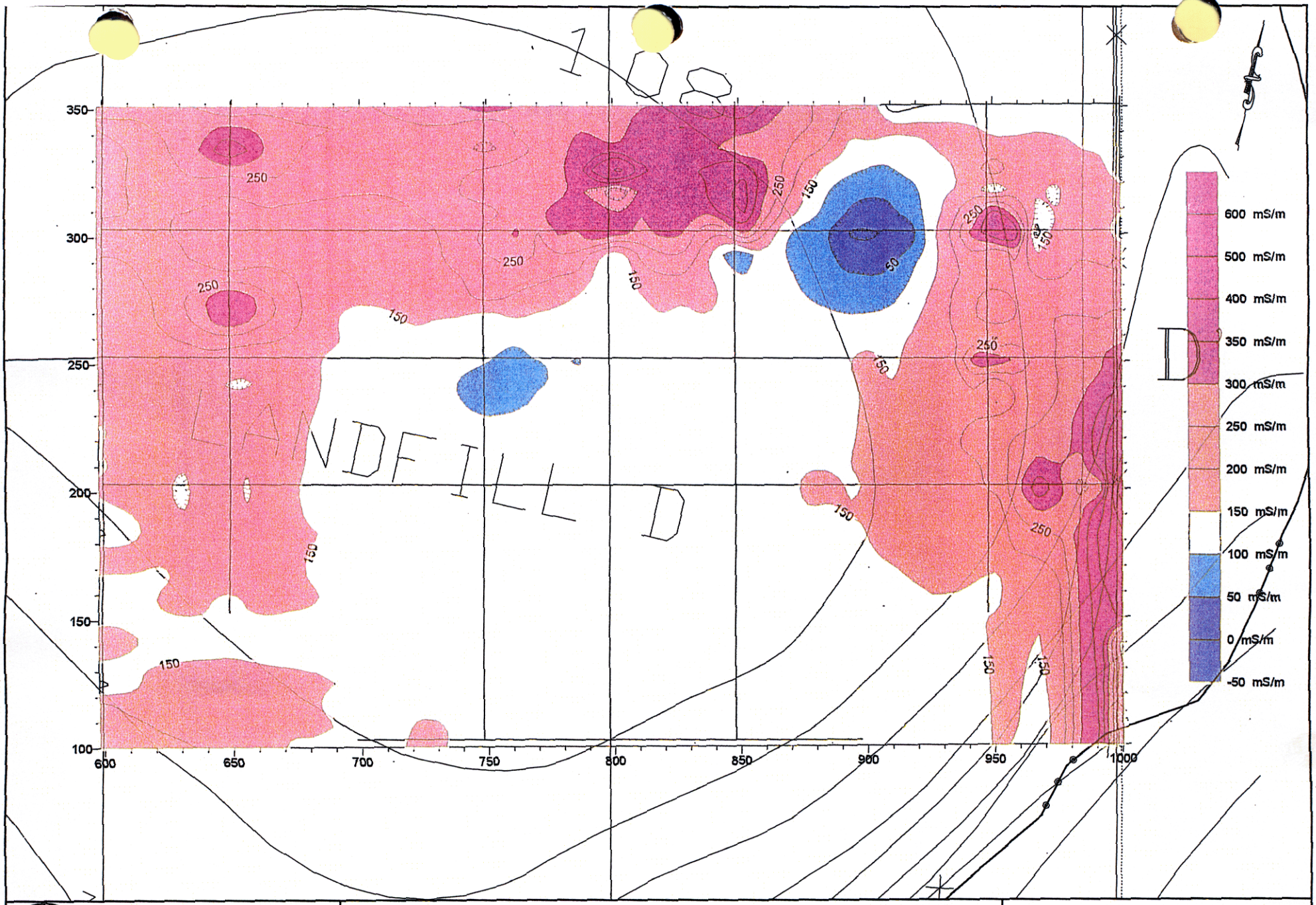
EXTENT OF LANDFILL D

SITE 4 – LANDFILL D

ST. JULIENS CREEK ANNEX, NORFOLK, VA

FIGURE 4-5A

JULY 17, 1997



EARTH RESOURCES TECHNOLOGY

CONTOUR MAP OF CONDUCTIVITY READINGS

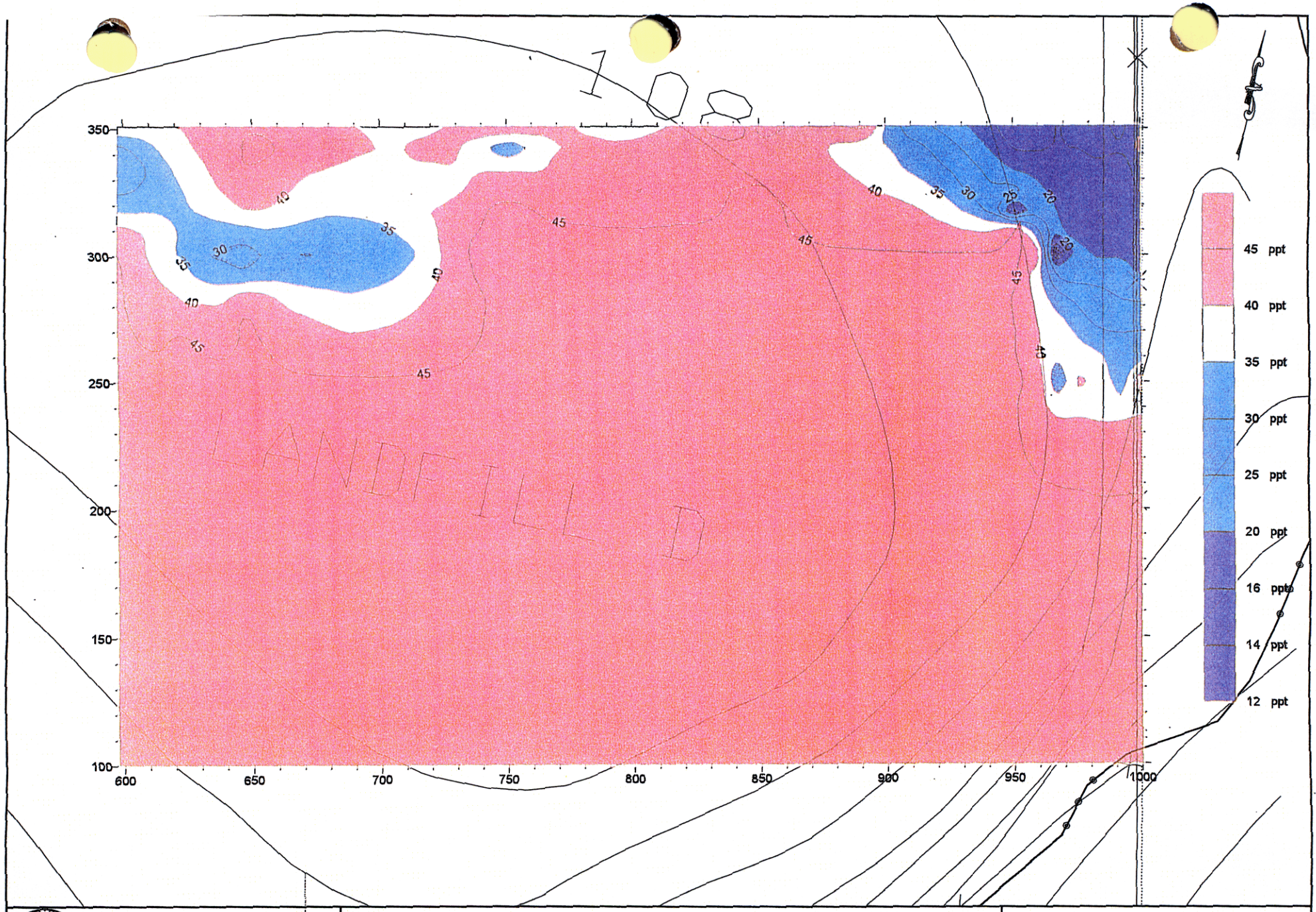
SITE 4 – LANDFILL D

ST. JULIENS CREEK ANNEX, NORFOLK, VA

FIGURE 4–6

SCALE: 1" = 50'

JULY 17, 1997



EARTH RESOURCES TECHNOLOGY

SCALE: 1" = 50'

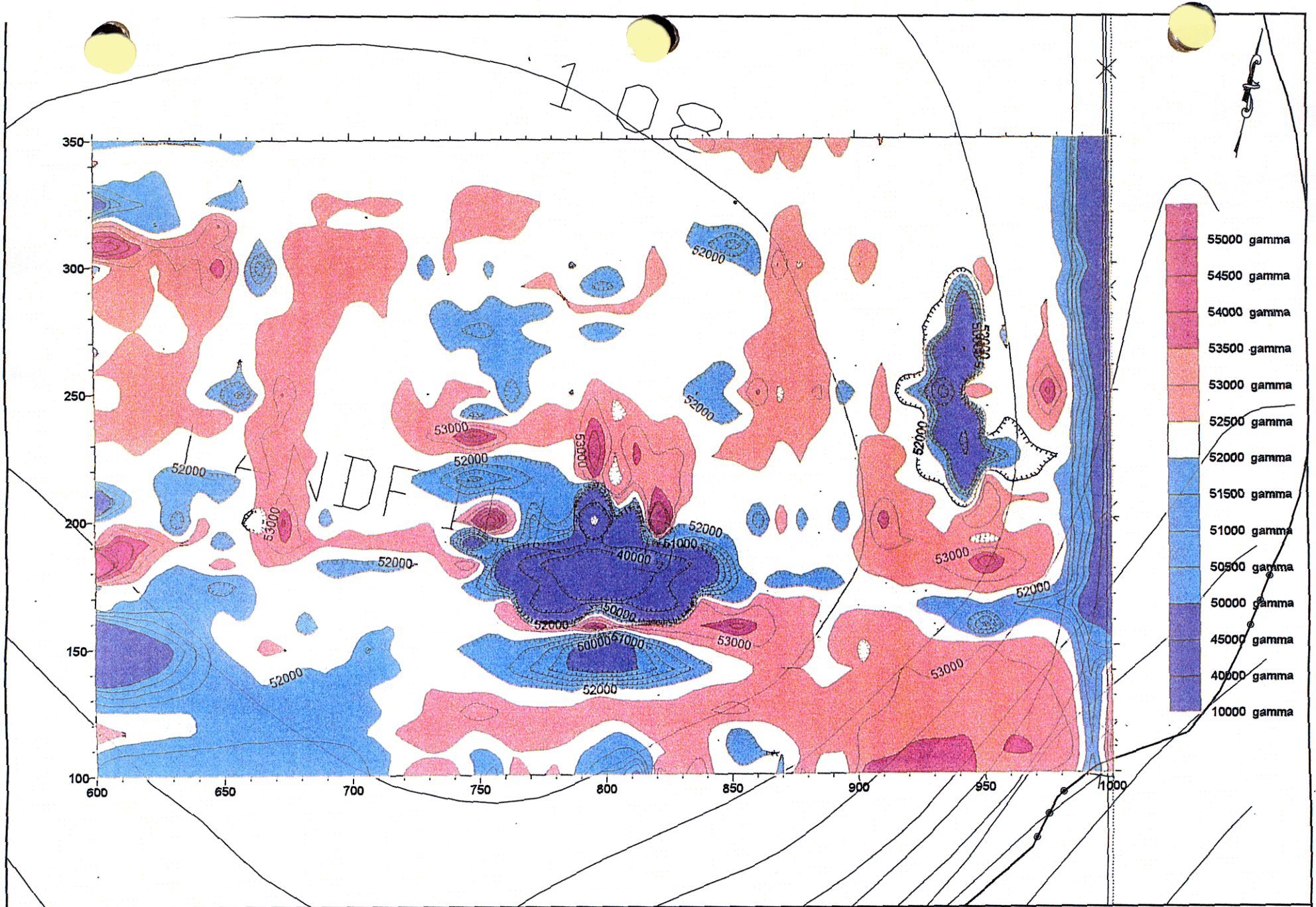
CONTOUR MAP OF INPHASE READINGS

SITE 4 – LANDFILL D

ST. JULIENS CREEK ANNEX, NORFOLK, VA

FIGURE 4-7

JULY 17, 1997



EARTH RESOURCES TECHNOLOGY

SCALE: 1" = 50'

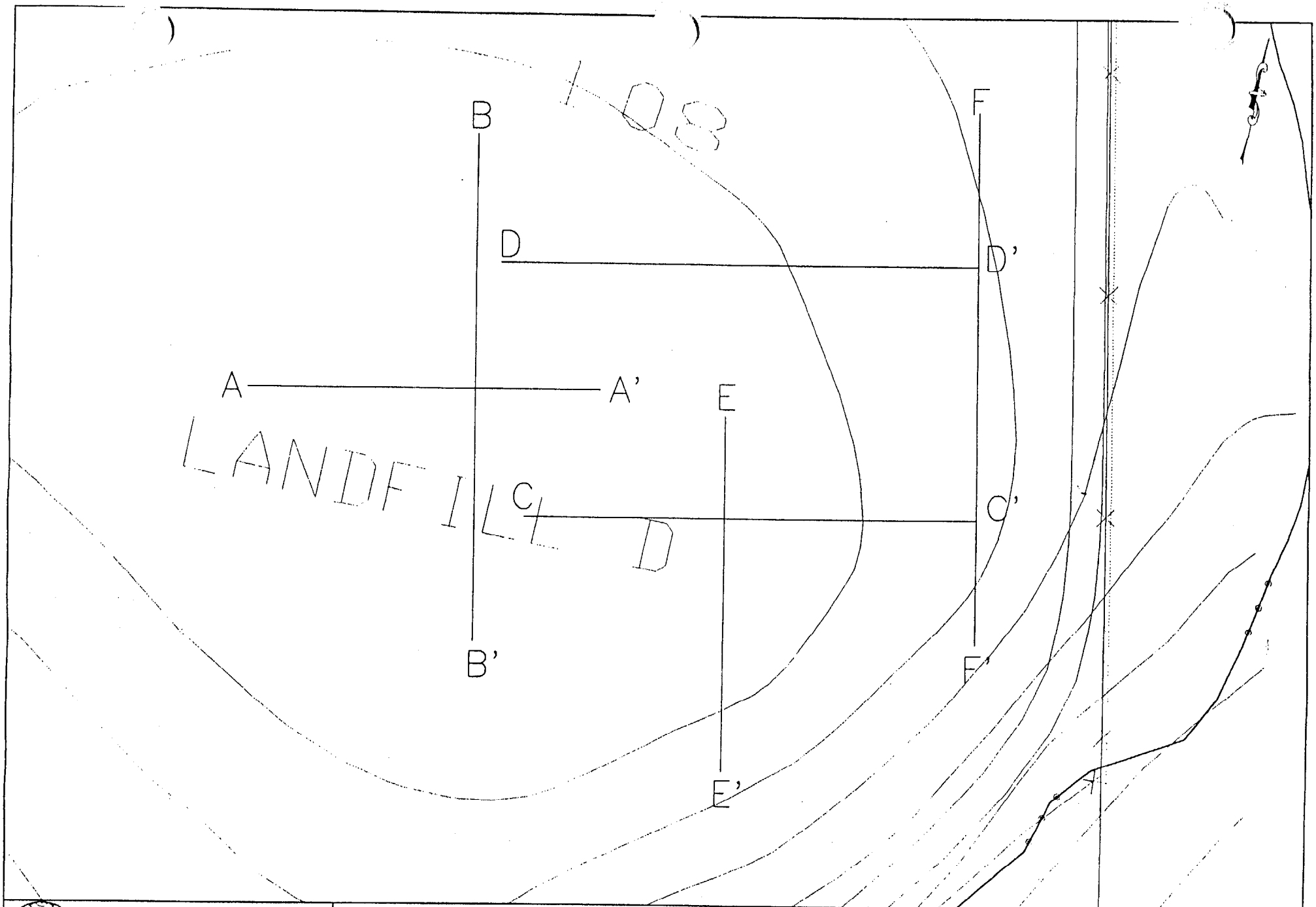
CONTOUR MAP OF MAGNETIC READINGS

SITE 4 – LANDFILL D

ST. JULIENS CREEK ANNEX, NORFOLK, VA

FIGURE 4-8

JULY 17, 1997



EARTH RESOURCES TECHNOLOGY

SCALE: 1" = 50'

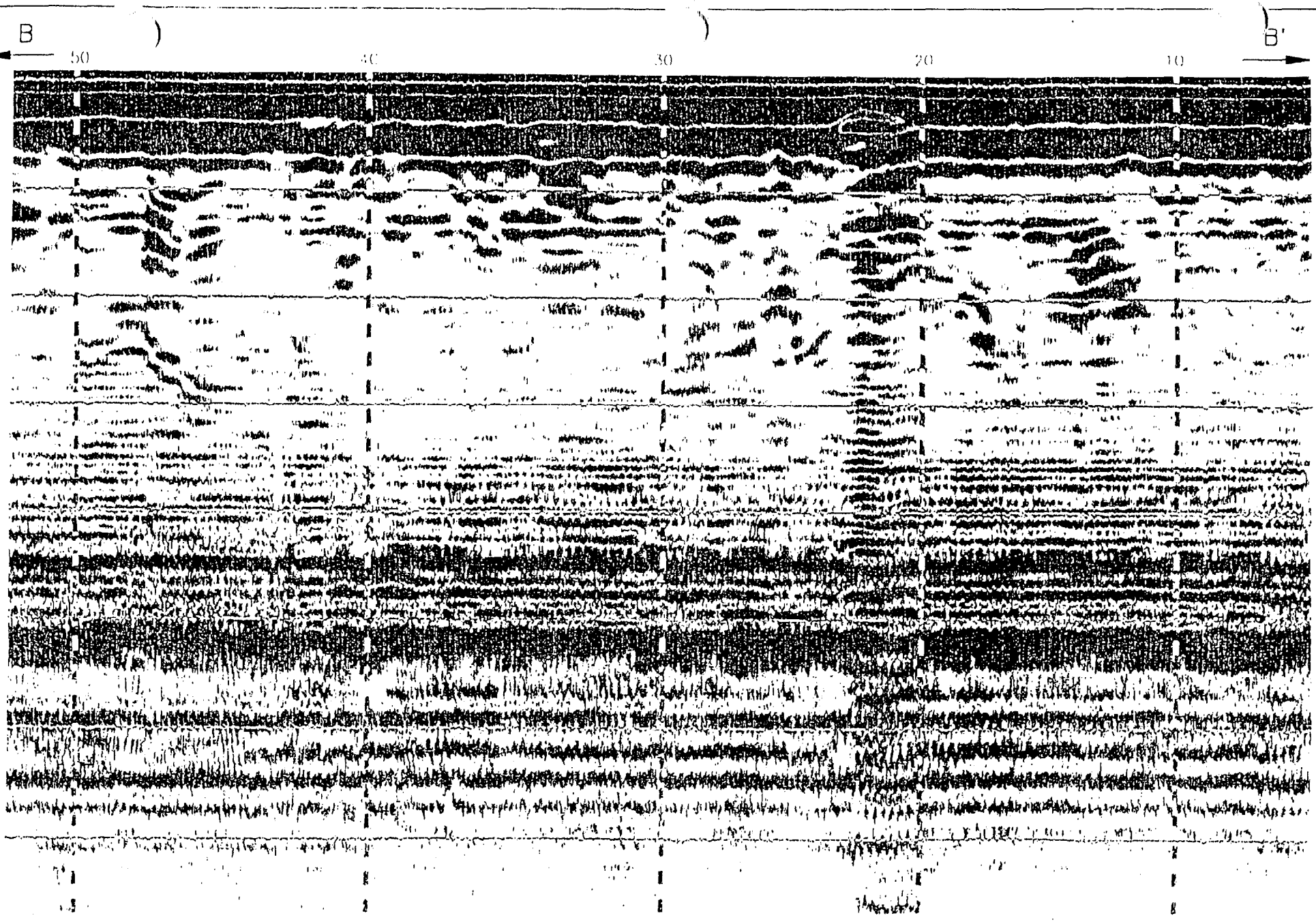
GPR SURVEY GRID

SITE 4 – LANDFILL D

ST. JULIENS CREEK ANNEX, NORFOLK, VA

FIGURE 4-9

JULY 17, 1997



EARTH RESOURCES TECHNOLOGY

HORIZONTAL DISTANCE FOR TWO VERTICAL INCHES = 10 FT

VERTICAL DISTANCE FOR TWO HORIZONTAL INCHES = 5 FT

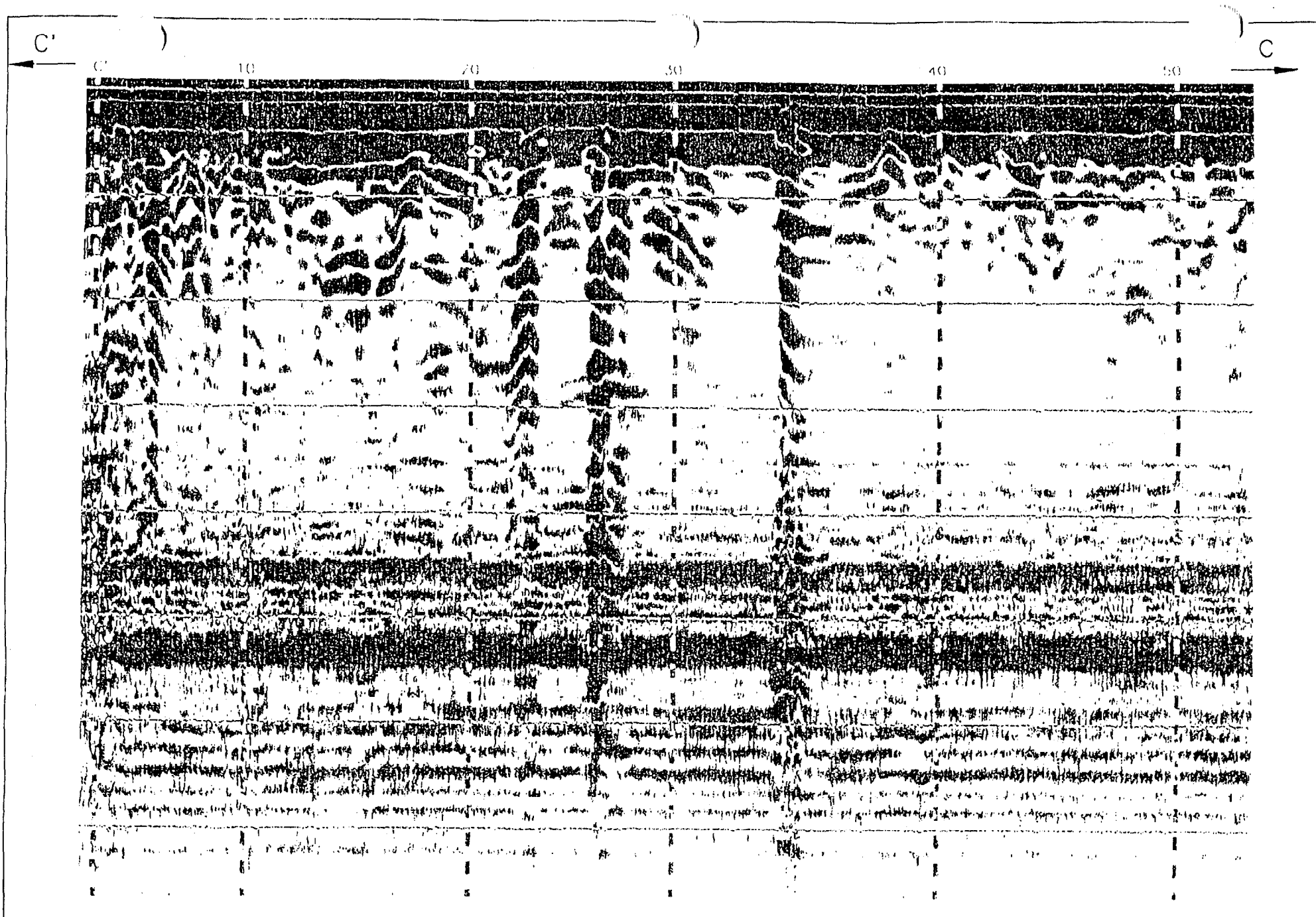
GPR PROFILE B – B'

SITE 4 – LANDFILL D

ST. JULIENS CREEK ANNEX, NORFOLK, VA

FIGURE 4–10

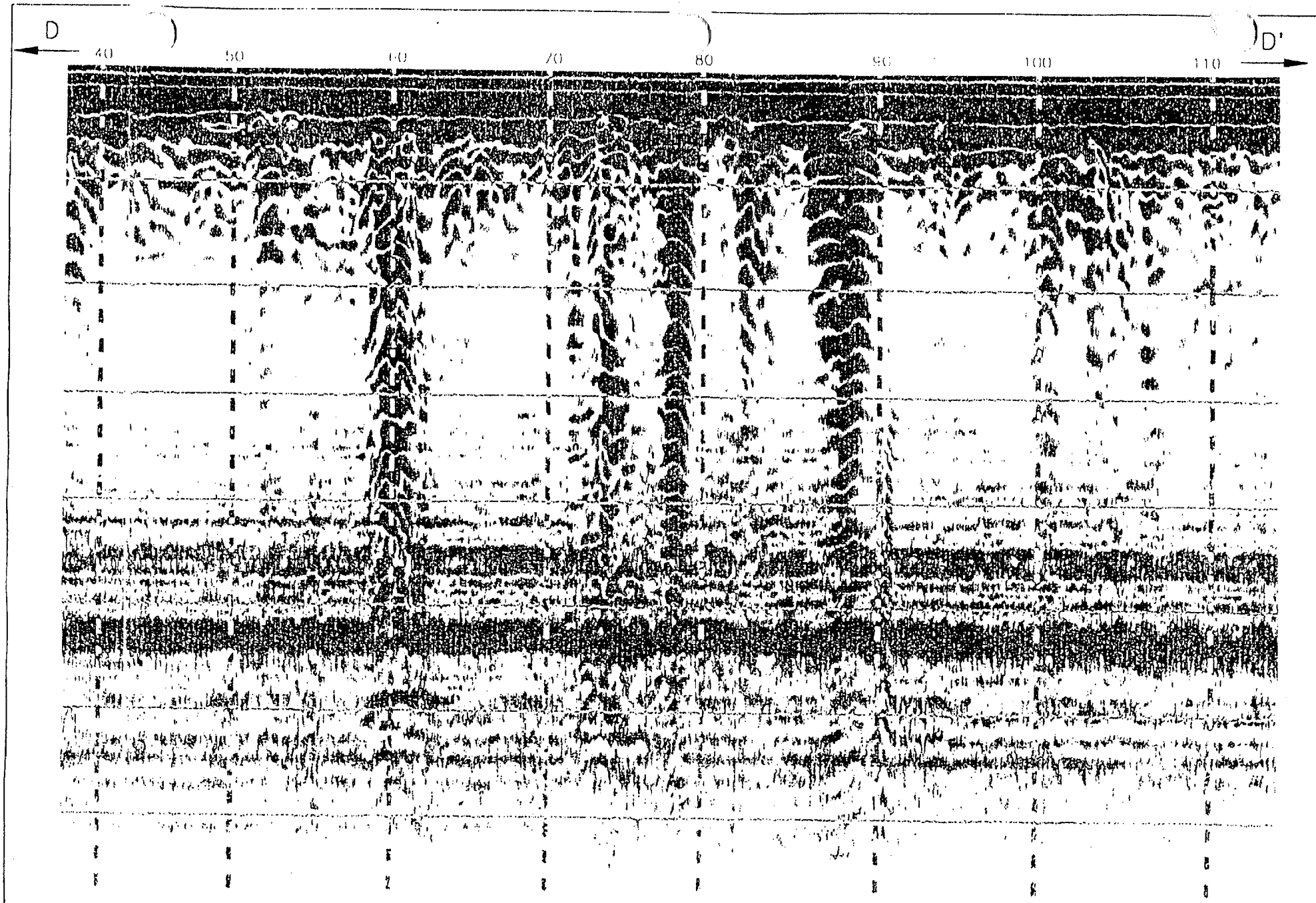
JULY 17, 1992



EARTH RESOURCES TECHNOLOGY

GPR PROFILE C' – C

FIGURE 4-11



EARTH RESOURCES TECHNOLOGY

HORIZONTAL DISTANCE B/W TWO VERTICAL LINES [illegible]

VERTICAL DISTANCE B/W TWO HORIZONTAL LINES [illegible]

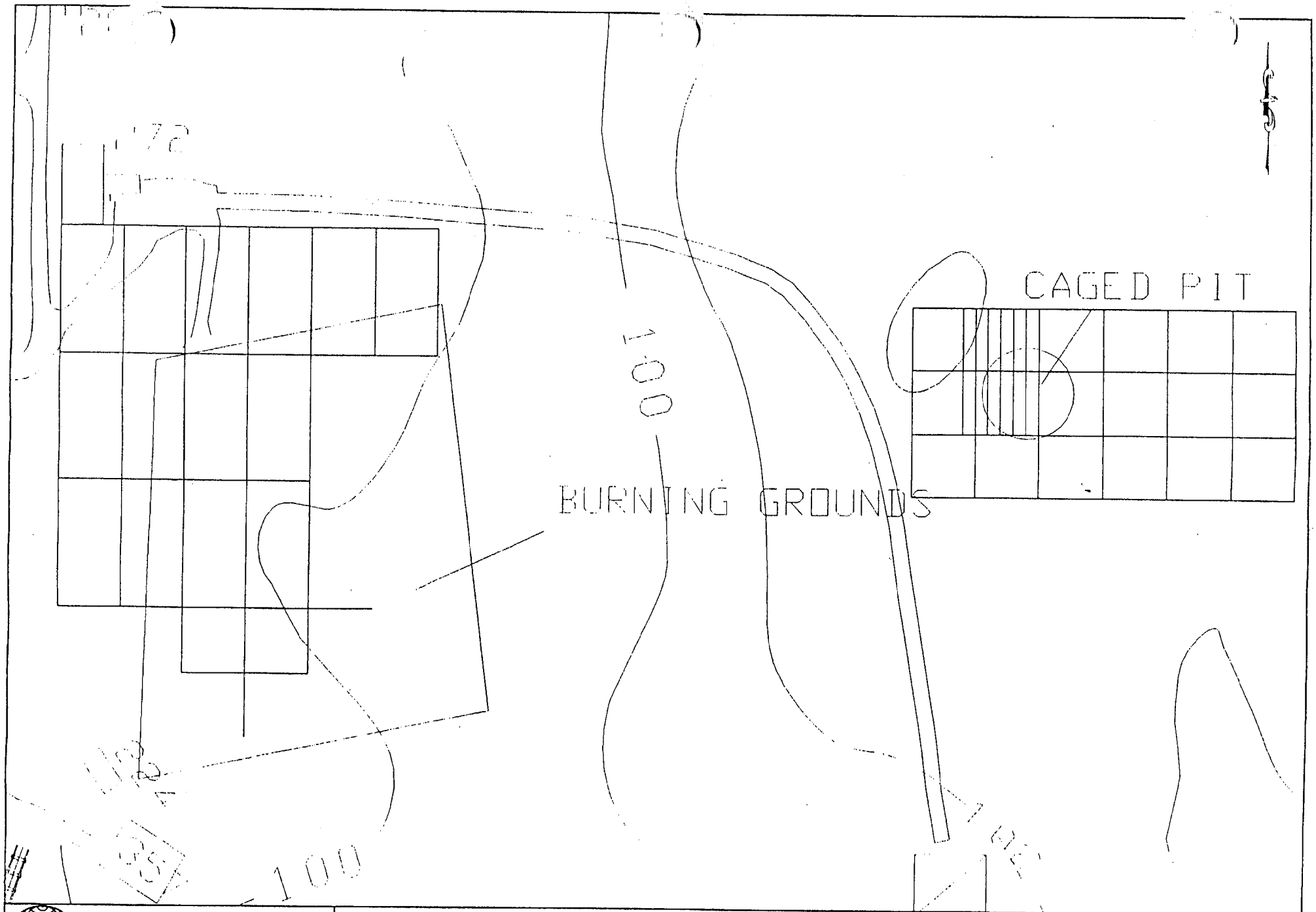
GPR PROFILE D – D'

SITE 4 LANDFILL D

ST. JOHNS CREEK ANNEX, NORFOLK, VA

FIGURE 4-12

[illegible]



EARTH RESOURCES TECHNOLOGY

SCALE: 1" = 100'

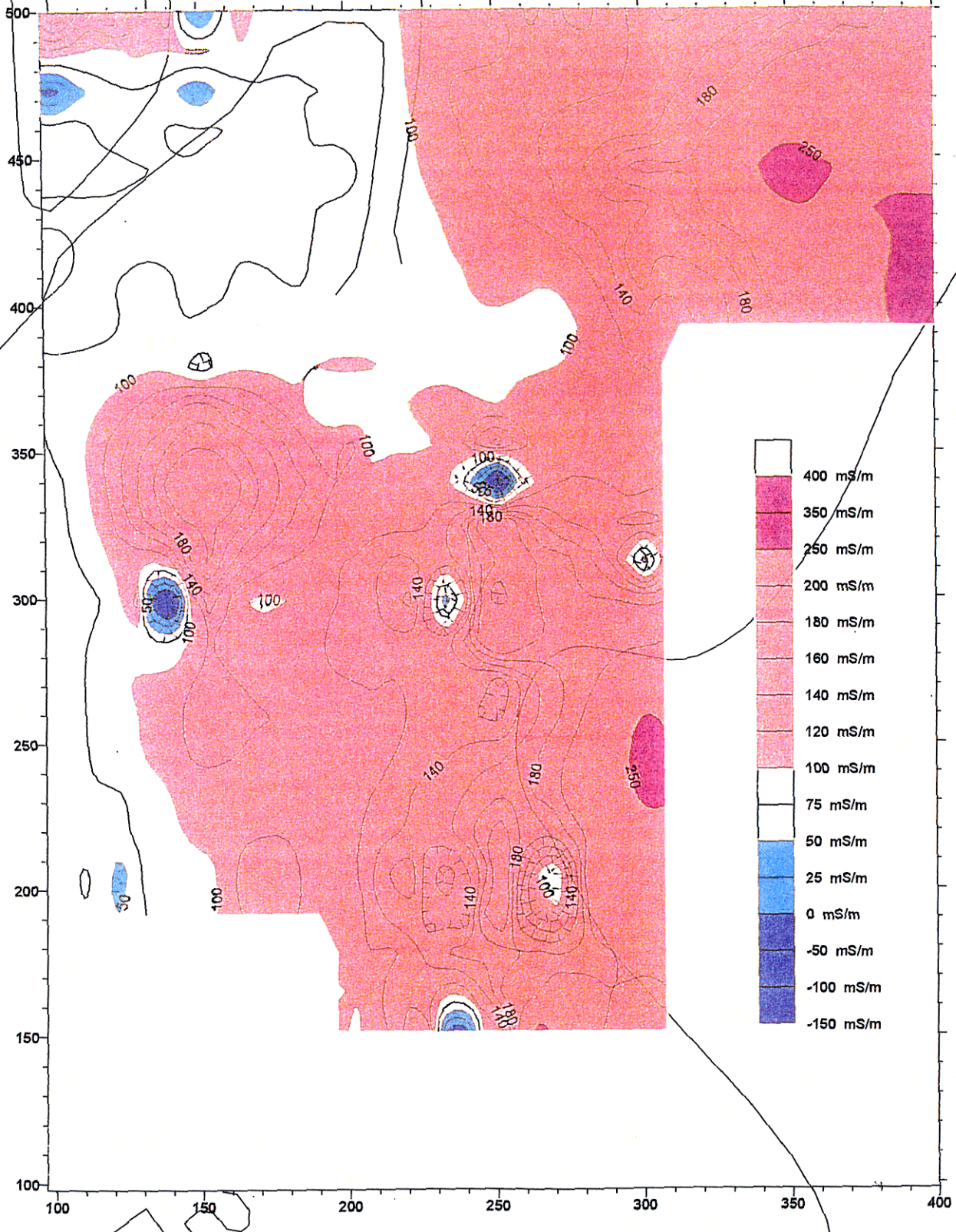
EM SURVEY GRID

SITE 5 – BURNING GROUNDS & CAGED PIT

ST. JULIENS CREEK ANNEX, NORFOLK, VA

FIGURE 5-1

JULY 17, 1997



EARTH RESOURCES TECHNOLOGY

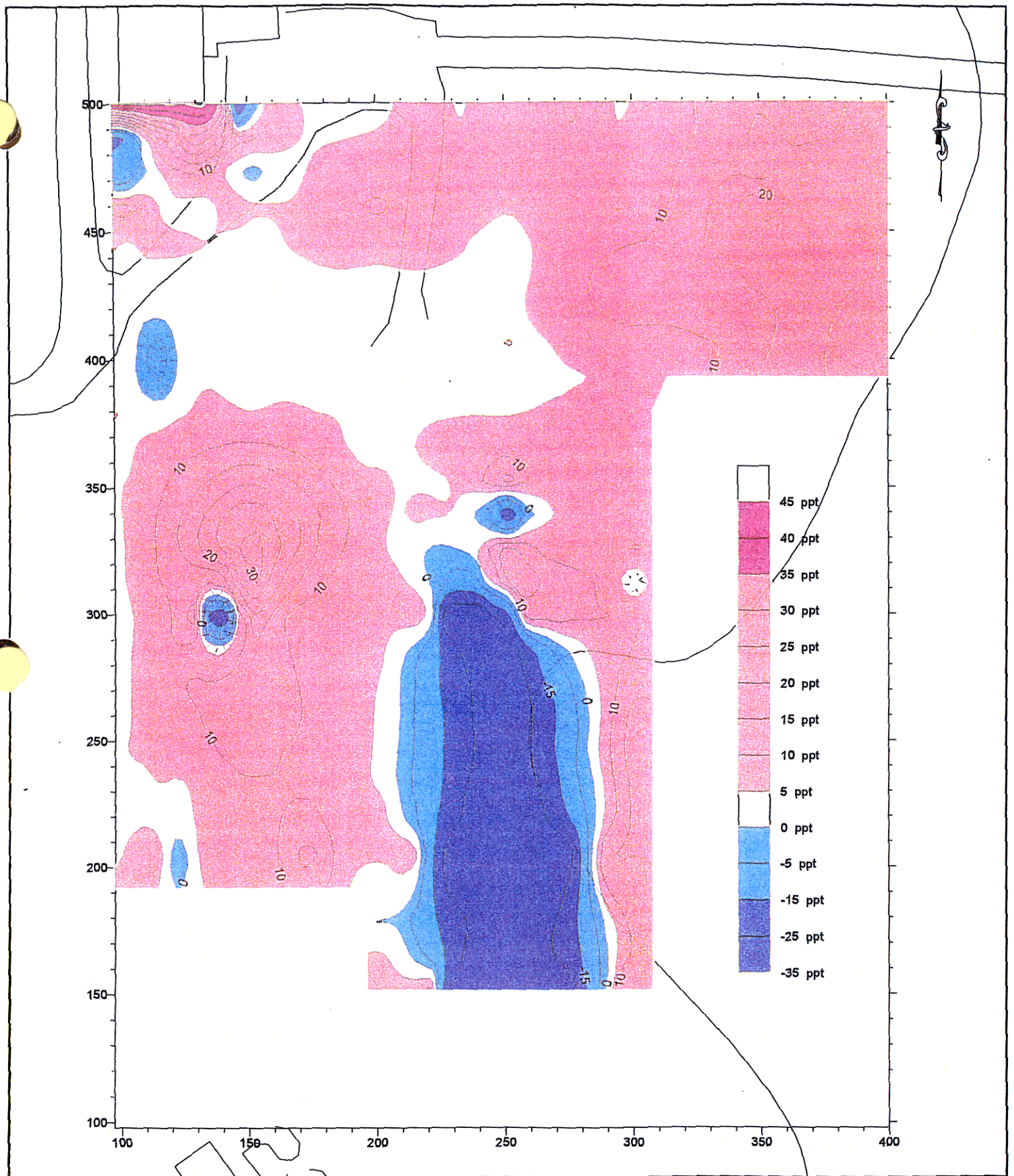
FIGURE 5-2

SCALE: 1" = 50' | JULY 17, 1997

CONTOUR MAP OF CONDUCTIVITY READINGS

SITE 5 – BURNING GROUNDS
ST. JULIENS CREEK ANNEX, NORFOLK, VA

172CB5Y



EARTH RESOURCES TECHNOLOGY

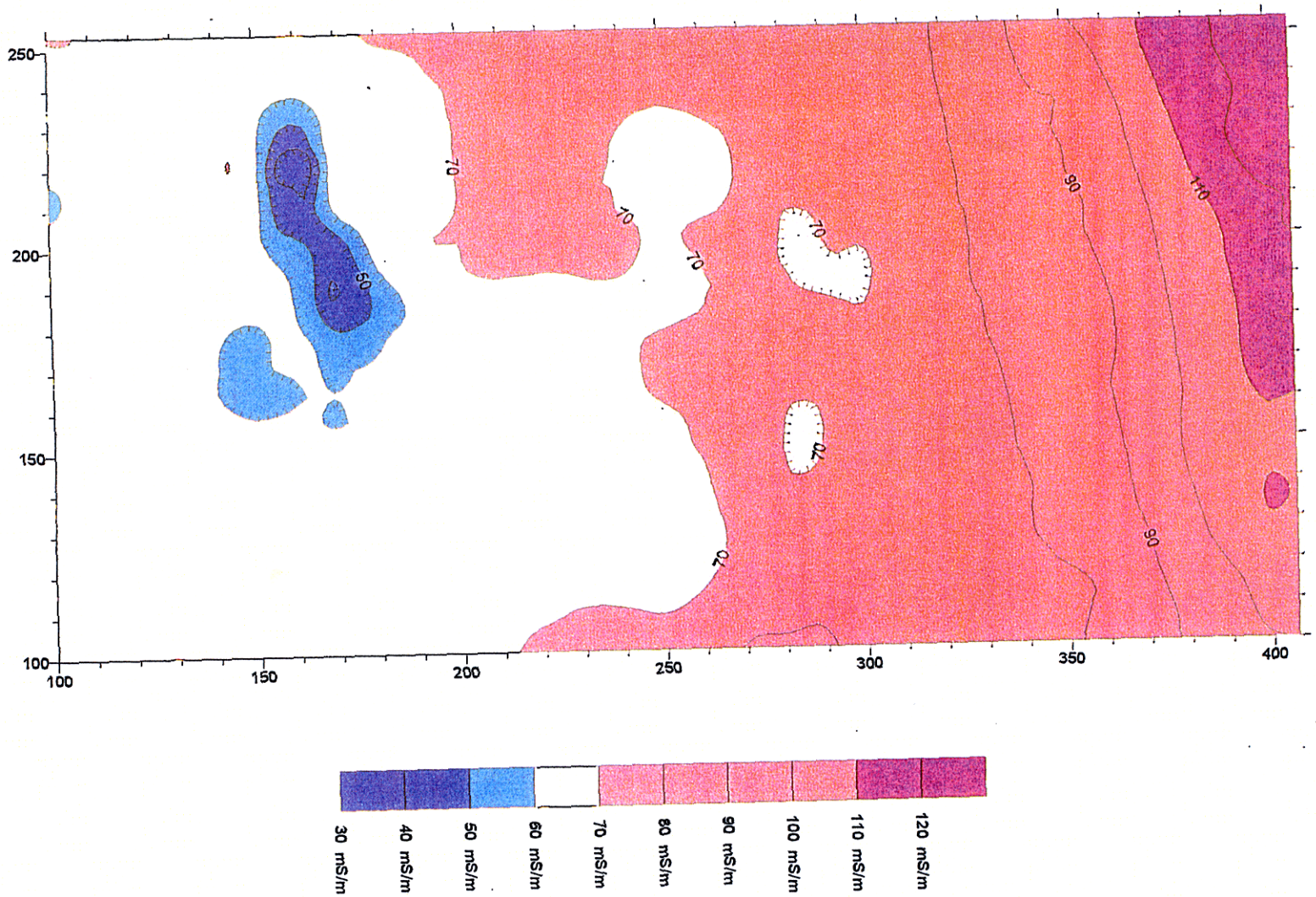
FIGURE 5-3

SCALE: 1" = 50' | JULY 17, 1997

CONTOUR MAP OF INPHASE READINGS

SITE 5 – BURNING GROUNDS

ST. JULIENS CREEK ANNEX, NORFOLK, VA



EARTH RESOURCES TECHNOLOGY

SCALE: 1" = 40'

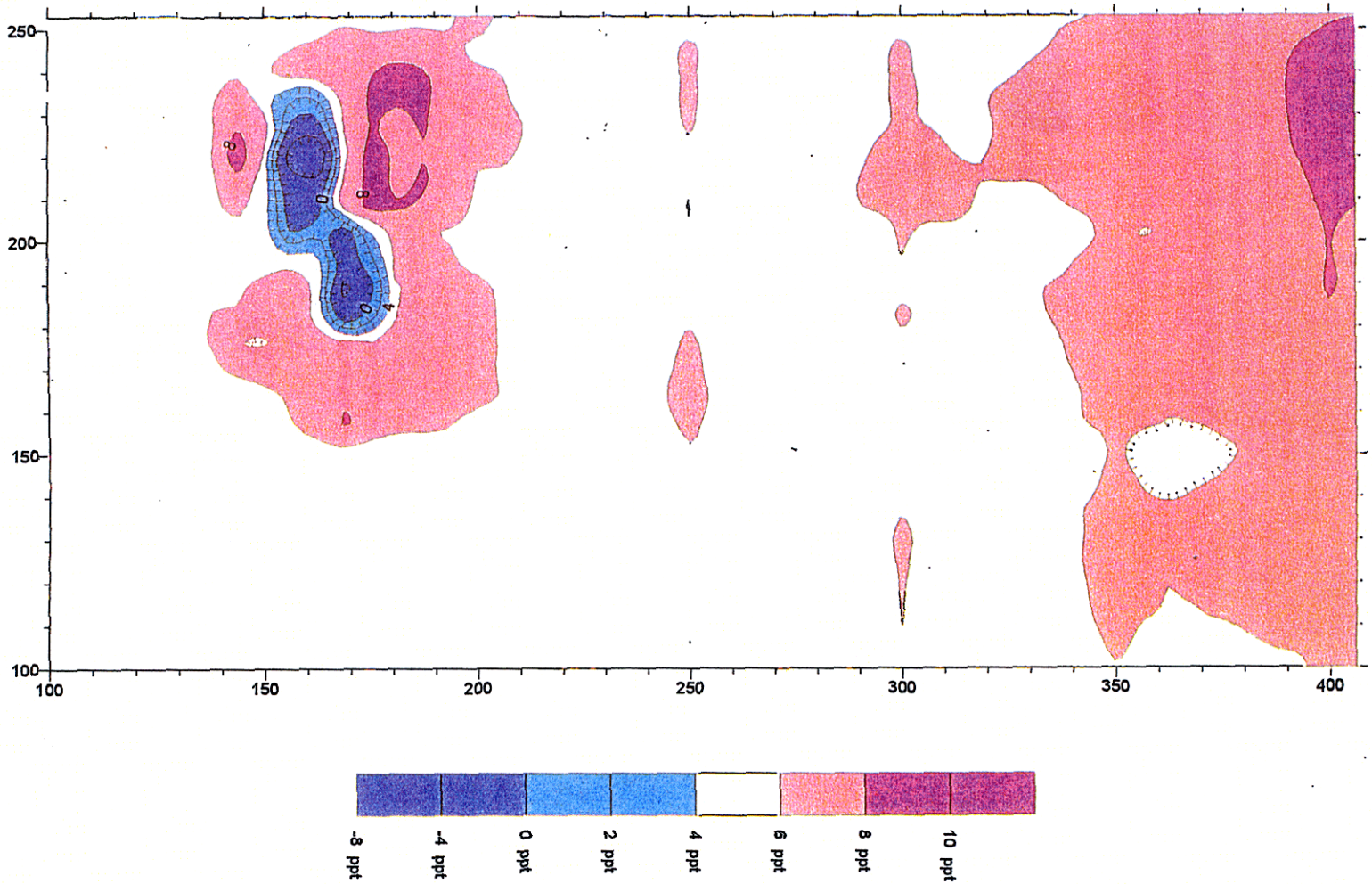
CONTOUR MAP OF CONDUCTIVITY READINGS

SITE 5 – CAGED PIT

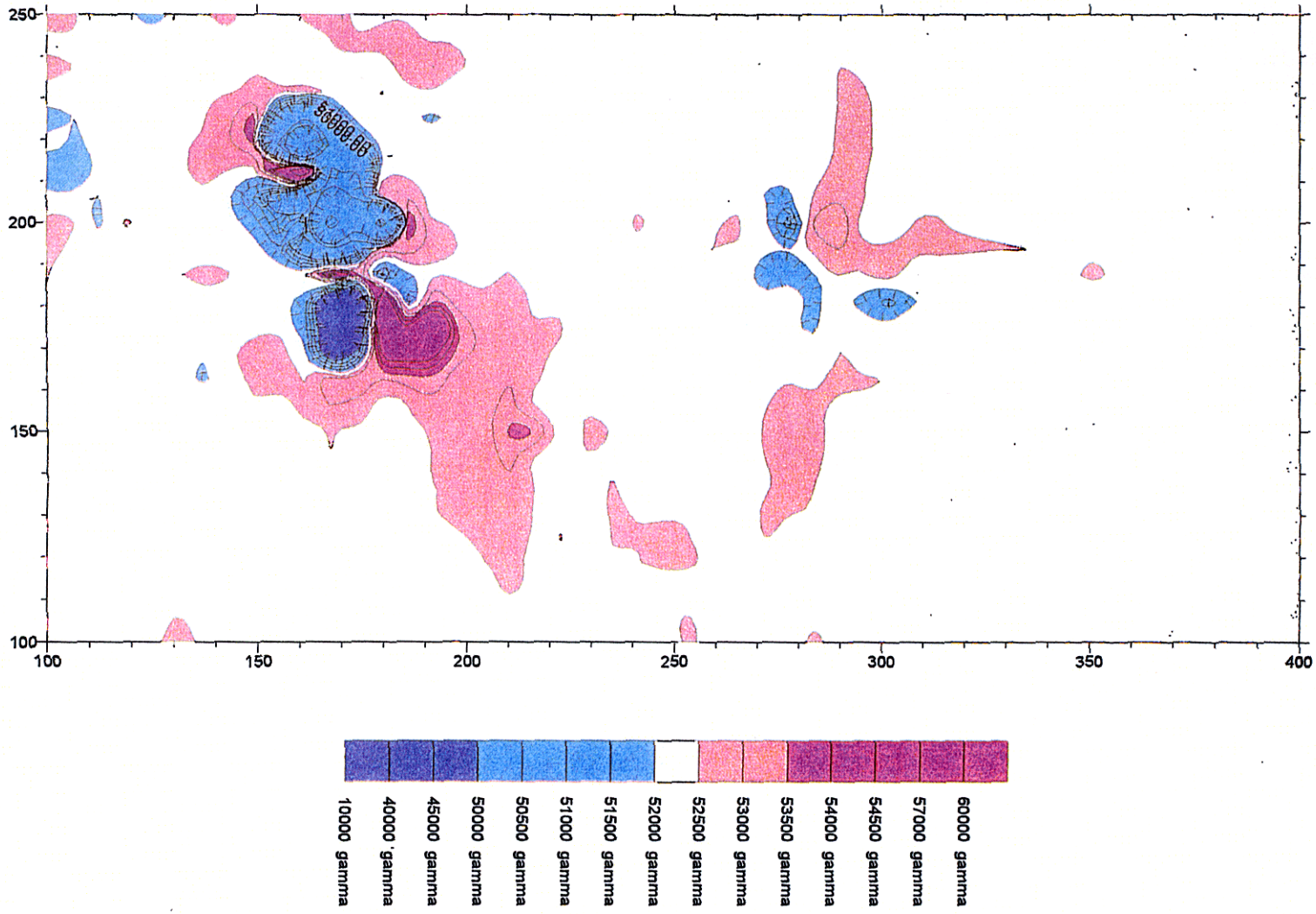
ST. JULIENS CREEK ANNEX, NORFOLK, VA

FIGURE 5-4

JULY 17, 1997



EARTH RESOURCES TECHNOLOGY	CONTOUR MAP OF INPHASE READINGS	FIGURE 5-5
SCALE: 1" = 40'	SITE 5 – CAGED PIT ST. JULIENS CREEK ANNEX, NORFOLK, VA	JULY 17, 1997



EARTH RESOURCES TECHNOLOGY

SCALE: 1" = 40'

CONTOUR MAP OF MAGNETIC READINGS

SITE 5 – CAGED PIT

ST. JULIENS CREEK ANNEX, NORFOLK, VA

FIGURE 5-6

JULY 17, 1997

Table G-1
Soil Sample Data Summary
Background Investigation
St. Juliens Creek Annex, Chesapeake, VA

Chemical Name	Number of Detects	Number of Non Detects	Total Number of Samples	Frequency of Detection	~L = Log Normal	~N = Normal	Assumed Distribution	Mean (Conc.)	Lower Confidence Interval (Conc.)	Upper Confidence Interval (Conc.)	~ Conf = 95% Confidence Level	Upper Tolerance Level (UTL) (Conc.)	Lower Bound UTL (Conc.)	Upper Bound UTL (Conc.)	~Conf = Associated Confidence
Munden-Tetotum/Dragston-Augusta Surface and Subsurface															
Arsenic (mg/Kg)	31	9	40	77.5	0.18	E-6	L	2.6	2.2	3.3	95%	5.7	4.5	7.9	95%
Benzo(a)anthracence (ug/Kg)	12	28	40	30.0	E-6	E-6	NP	2	1.8	2.6	94%	6.9	4.7	9.4	82%
Benzo(a)pyrene (ug/Kg)	10	30	40	25.0	E-7	E-6	NP	77	76	79	94%	91	84	150	82%
Benzo(b)fluoranthene (ug/Kg)	7	33	40	17.5	E-8	E-6	NP	78	77	80	94%	91	86	120	86%
Benzo(g,h,I)perlyene (ug/Kg)	9	31	40	22.5	E-8	E-6	NP	77	76	79	94%	91	84	120	82%
Benzo(k)fluoranthene (ug/Kg)	9	31	40	22.5	E-8	E-6	NP	77	76	79	94%	91	84	130	82%
Beryllium (mg/Kg)	2	38	40	5.0	0.78	0.09	L	0.15	0.13	0.18	95%	0.28	0.24	0.36	95%
Calcium (mg/Kg)	38	2	40	95.0	E-4	E-13	NP	194	146	282	94%	1225	504	9060	82%
Chrysene (ug/Kg)	13	27	40	32.5	E-6	E-8	NP	77	76	78	94%	102	84	230	82%
Fluoranthene (ug/Kg)	12	28	40	30.0	E-7	e-10	NP	77	76	79	94%	103	85	300	82%
Indeno(1,2,3-cd)pyrene (ug/Kg)	9	31	40	22.5	E-8	E-7	NP	77	76	79	94%	91	84	99	82%
Nickel (mg/Kg)	11	29	40	27.5	0.004	0.001	NP	4.2	3	5.1	94%	6.9	5.8	9.5	82%
Phenanthrene (ug/Kg)	6	34	40	15.0	E-8	E-7	NP	78	77	80	94%	91	85	99	82%
Potassium (mg/Kg)	10	30	40	25.0	0.002	E-5	NP	172	135	204	94%	368	308	409	82%
Pyrene (ug/Kg)	12	28	40	30.0	E-7	E-11	NP	77	76	79	94%	125	85	420	82%
Sodium (mg/Kg)	26	14	40	65.0	E-5	E-8	NP	44	40	51	94%	174	112	290	82%
Vanadium (mg/Kg)	39	1	40	97.5	0.007	0.2	N	16.3	14.2	18.3	95%	26.6	24.1	30.3	95%
Munden-Tetotum/Dragston-Augusta Surface															
4,4'-DDT (ug/Kg)	17	2	19	89.5	0.002	E-9	NP	7.2	4	19	94%	237	28	1600	56%
4,4'-DDT (ug/Kg)	5	14	19	26.3	E-4	E-6	NP	4.2	3.9	4.3	94%	10.6	7.8	16	56%
4,4'-DDE (ug/Kg)	16	3	19	84.2	0.03	E-8	NP	11	5	41	94%	532	350	1900	56%
Acenaphthene (ug/Kg)		20	20	0.0	0.06	0.02	L	82	80	85	95%	92	88	97	95%
Acenaphthylene (ug/Kg)	3	17	20	15.0	E-7	E-6	NP	82	79	86	92%	95	91	99	57%
Aldrin (ug/Kg)		19	19	0.0	E-7	E-8	NP	2.1	2	2.2	94%	2.7	2.2	5.9	56%
alpha-Chlordane (ug/Kg)	3	16	19	15.8	E-7	E-8	NP	2.1	2	2.2	94%	9.8	2.3	45	56%
Aluminum (mg/Kg)	20		20	100.0	0.02	0.28	N	4610	3739	5480	95%	7669	6647	9401	95%
Anthracene (ug/Kg)	1	19	20	5.0	E-7	E-6	NP	81	79	85	92%	91	87	99	57%
Antimony (mg/Kg)	1	19	20	5.0	0.002	E-4	NP	0.5	0.5	0.6	94%	0.7	0.7	0.7	57%
Barium (mg/Kg)	20		20	100.0	0.11	0.69	N	25	21	30	95%	40	35	49	95%
beta -BHC (ug/Kg)		19	19	0.0	E-7	E-8	NP	2.1	2	2.2	94%	2.7	2.2	5.9	56%
Copper (mg/Kg)	20		20	100.0	0.99	0.02	L	8.4	6.7	11.3	95%	17.1	13	27.5	95%
delta - BHC (ug/Kg)		19	19	0.0	E-7	E-8	NP	2.1	2	2.2	94%	2.7	2.2	5.9	56%
Dibenz(a,h)anthracene (ug/Kg)	2	18	20	10.0	E-6	E-5	NP	81	79	85	92%	91	87	99	57%
Dieldrin (ug/Kg)	1	18	19	5.3	E-7	E-7	NP	4.1	4	4.2	94%	11.5	4.5	16	56%
Endosulfan I (ug/Kg)		19	19	0.0	E-7	E-8	NP	2.1	2	2.2	94%	2.7	2.2	5.9	56%
Endosulfan II (ug/Kg)	1	18	19	5.3	E-7	E-8	NP	4.1	4	4.2	94%	13.5	4.5	36	56%
Endrin (ug/Kg)	2	17	19	10.5	E-7	E-8	NP	4.1	3.9	4.2	94%	13.4	4.5	35	56%
Endrin aldehyde (ug/Kg)	2	17	19	10.5	E-6	E-7	NP	4	3.9	4.2	94$	11.6	4.5	17	56%
Fluorene (ug/Kg)		20	20	0.0	0.06	0.02	L	82	80	85	95%	92	88	97	95%
gamma-Chlordane (ug/Kg)	1	18	19	5.3	E-7	E-7	NP	2.1	2	2.2	94%	6.1	2.3	8.1	56%
Lead (mg/Kg)	20		20	100.0	0.29	0.17	L	31	25	41	95%	61	47	95	95%
Manganese (mg/Kg)	20		20	100.0	0.74	E-5	L	16	12	27	95%	42	28	84	95%
Mercury (mg/Kg)	9	11	20	45.0	0.26	0.08	L	0.14	0.11	0.19	95%	0.3	0.23	0.5	95%
Magnesium (mg/Kg)	20		20	100.0	0.47	0.06	L	251	200	344	95%	527	393	865	95%
Naphthalene (ug/Kg)		20	20	0.0	0.06	0.02	L	82	80	85	95%	92	88	97	95%
Selenium (mg/Kg)	3	17	20	15.0	E-4	E-4	NP	0.7	0.7	0.7	92%	1	1	1.2	57%
Silver (mg/Kg)		20	20	0.0	0.02	0.007	NP	0.52	0.5	0.54	92%	0.62	0.58	0.63	57%
Zinc (mg/Kg)	20		20	100.0	0.83	0.17	L	19	15	25	95%	38	29	62	95%
Munden-Tetotum/Dragston-Augusta Subsurface															
4,4'-DDT (ug/Kg)	2	18	20	10.0	E-8	E-8	NP	3.8	3.8	3.9	92%	7.8	4.9	19	57%
4,4'-DDT (ug/Kg)		20	20	0.0	E-6	E-6	NP	3.8	3.8	3.9	92%	4	4	4.9	57%
4,4'-DDE (ug/Kg)	5	15	20	25.0	E-6	E-7	NP	3.9	3.8	4	92%	18	12	18	57%

Table G-1
Soil Sample Data Summary
Background Investigation
St. Juliens Creek Annex, Chesapeake, VA

Chemical Name	Number of Detects	Number of Non Detects	Total Number of Samples	Frequency of Detection	~L = Log Normal	~N = Normal	Assumed Distribution	Mean (Conc.)	Lower Confidence Interval (Conc.)	Upper Confidence Interval (Conc.)	~ Conf = 95% Confidence Level	Upper Tolerance Level (UTL) (Conc.)	Lower Bound UTL (Conc.)	Upper Bound UTL (Conc.)	~Conf = Associated Confidence
Acenaphthene (ug/Kg)		20	20	0.0	E-6	E-6	NP	77	76	78	92%	81	80	99	57%
Acenaphthylene (ug/Kg)		20	20	0.0	E-6	E-6	NP	77	76	78	92%	81	80	99	57%
Aldrin (ug/Kg)		20	20	0.0	E-7	E-7	NP	2	1.9	2	92%	2	2	2.5	57%
alpha-Chlordane (ug/Kg)	1	19	20	5.0	E-8	E-9	NP	2	1.9	2	92%	2.8	2	8.4	57%
Aluminum (mg/Kg)	20		20	100.0	E-4	0.97	N	9361	7586	11136	95%	15599	13516	19131	95%
Anthracene (ug/Kg)		20	20	0.0	E-6	E-6	NP	77	76	78	92%	81	80	99	57%
Antimony (mg/Kg)		20	20	0.0	E-7	E-8	NP	0.5	0.5	0.5	92%	0.6	0.5	1.2	57%
Barium (mg/Kg)	20		20	100.0	E-5	0.33	N	39	33	45	95%	61	54	74	95%
beta -BHC (ug/Kg)	1	19	20	5.0	E-6	E-6	NP	2	1.9	2	92%	2	2	2.5	57%
Copper (mg/Kg)	17	3	20	85.0	0.009	0.81	N	3	2.4	3.6	95%	5.1	4.4	6.3	95%
delta - BHC (ug/Kg)		20	20	0.0	E-7	E-7	NP	2	1.9	2	92%	2	2	2.5	57%
Dibenz(a,h)anthracene (ug/Kg)		20	20	0.0	E-6	E-6	NP	77	76	78	92%	81	80	99	57%
Dieldrin (ug/Kg)	1	19	20	5.0	E-6	E-6	NP	3.8	3.8	3.9	92%	4	4	4.9	57%
Endosulfan I (ug/Kg)		20	20	0.0	E-7	E-7	NP	2	1.9	2	92%	2	2	2.5	57%
Endosulfan II (ug/Kg)	1	19	20	5.0	E-7	E-8	NP	3.8	3.8	3.9	92%	5	4	7.4	57%
Endrin (ug/Kg)	2	18	20	10.0	E-6	E-7	NP	3.8	3.8	3.9	92%	5.1	4	8.9	57%
Endrin aldehyde (ug/Kg)	1	19	20	5.0	E-5	E-6	NP	3.8	3.8	3.9	92%	4.2	4	4.9	57%
Fluorene (ug/Kg)		20	20	0.0	E-6	E-6	NP	77	76	78	92%	81	80	99	57%
gamma-Chlordane (ug/Kg)	1	19	20	5.0	E-5	E-6	NP	2	1.9	2	92%	2	2	2.5	57%
Lead (mg/Kg)	20		20	100.0	0.97	0.13	L	7.3	6.4	8.6	95%	12	10	15	95%
Manganese (mg/Kg)	20		20	100.0	0.68	0.1	L	8.9	7.7	10.5	95%	14	12	19	95%
Mercury (mg/Kg)	6	14	20	30.0	0.02	0.047	NP	0.08	0.06	0.09	92%	0.1	0.1	0.13	57%
Magnesium (mg/Kg)	20		20	100.0	0.52	0.63	N	372	311	433	95%	587	515	709	95%
Naphthalene (ug/Kg)		20	20	0.0	E-6	E-6	NP	77	76	78	92%	81	80	99	57%
Selenium (mg/Kg)		20	20	0.0	E-6	E-7	NP	0.6	0.6	0.6	92%	0.7	0.7	0.8	57%
Silver (mg/Kg)		20	20	0.0	E-6	E-7	NP	0.49	0.48	0.49	92%	0.52	0.5	0.63	57%
Zinc (mg/Kg)	20		20	100.0	0.03	E-6	NP	7.9	6.2	8.6	92%	13	10	30	57%
Munden-Tetotum Surface and Subsurface															
Cobalt (mg/Kg)	11	10	21	52.4	0.03	0.002	NP	1.2	1	1.5	95%	2.2	2	2.6	57%
Munden-Tetotum Surface															
Chromium (mg/Kg)	9	1	10	90.0	--	0.43	N	4.8	3.8	5.8	95%	7	6	9	95%
Iron (mg/Kg)	10		10	100.0	--	0.79	N	2501	1993	3009	95%	3669	3151	4815	95%
Munden-Tetotum Subsurface															
Chromium (mg/Kg)	10	1	11	90.9	--	0.63	N	9.5	6.1	12.8	95%	18	14	25	95%
Iron (mg/Kg)	11		11	100.0	--	0.71	N	4614	3062	6165	95%	8412	6791	11838	95%
Dragston-Augusta Surface and Subsurface															
Cobalt (mg/Kg)	14	5	19	73.7	--	0.16	N	1.8	1.5	2	95%	2.7	2.4	3.2	95%
Dragston-Augusta Surface															
Chromium (mg/Kg)	9	1	10	90.0	0.31	0.63	N	6.7	5.4	7.9	95%	9.6	8.3	12.4	95%
Iron (mg/Kg)	10		10	100.0	0.11	0.81	N	3366	2547	4185	95%	5249	4414	7097	95%
Dragston-Augusta Subsurface															
Chromium (mg/Kg)	9	0	9	100.0	--	0.03	NP	14	12	14	89%	15	14	15	30%
Iron (mg/Kg)	9	0	9	100.0	--	E-4	NP	6550	5120	7310	89%	13664	7310	17900	30%
Bohicket Surface and Subsurface															
4,4'-DDT (ug/Kg)	7	13	20	35	E-4	E-7	NP	6	5.4	13	92%	34	26	81	57%
4,4'-DDE (ug/Kg)	10	10	20	50	E-5	E-8	NP	6.3	5.5	11	92%	308	36	840	57%
Acenaphthene (ug/Kg)	2	18	20	10	0.02	E-4	NP	110	110	130	92%	292	240	320	57%
Acenaphthylene (ug/Kg)	3	17	20	15	0.002	E-4	NP	120	110	150	92%	292	240	320	57%
Aldrin (ug/Kg)	1	19	20	5	0.001	E-6	NP	3.1	2.8	5.1	92%	8.7	7.4	17	57%
alpha-Chlordane (ug/Kg)	2	18	20	10	E-5	E-7	NP	3.1	2.8	3.8	92%	9.1	7.4	25	57%
Aluminum (mg/Kg)	20		20	100	0.77	E-4	L	10777	7617	18937	95%	30002	19241	63698	95%
Anthracene (ug/Kg)	4	16	20	20	0.03	E-4	NP	125	110	170	92%	332	290	550	57%

Table G-1
Soil Sample Data Summary
Background Investigation
St. Juliens Creek Annex, Chesapeake, VA

Chemical Name	Number of Detects	Number of Non Detects	Total Number of Samples	Frequency of Detection	~L = Log Normal	~N = Normal	Assumed Distribution	Mean (Conc.)	Lower Confidence Interval (Conc.)	Upper Confidence Interval (Conc.)	~ Conf = 95% Confidence Level	Upper Tolerance Level (UTL) (Conc.)	Lower Bound UTL (Conc.)	Upper Bound UTL (Conc.)	~Conf = Associated Confidence
Antimony (mg/Kg)	20		20	100	0.11	E-5	L	7.4	5.1	13.4	95%	21	13	46	95%
Barium (mg/Kg)	20		20	100	0.22	0.03	L	30	21	53	95%	83	53	179	95%
Benzo(a)anthracence (ug/Kg)	12	8	20	60	0.047	E-6	NP	96	68	120	92%	749	650	910	57%
Benzo(a)pyrene (ug/Kg)	13	7	20	65	0.047	E-6	NP	96	79	120	92%	732	550	770	57%
Benzo(b)fluoranthene (ug/Kg)	9	11	20	45	0.001	E-6	NP	125	110	140	92%	825	610	910	57%
Benzo(g,h,I)perlyene (ug/Kg)	10	10	20	50	0.11	E-5	L	181	128	316	95%	501	322	1060	95%
Benzo(k)fluoranthene (ug/Kg)	11	9	20	55	0.05	E-5	L	160	111	297	95%	467	291	1039	95%
Beryllium (mg/Kg)	2	18	20	10	0.85	E-5	L	0.74	0.48	1.6	95%	2.3	1.4	5.8	95%
beta -BHC (ug/Kg)		20	20	0	0.002	E-4	NP	3.1	2.8	3.8	92%	7.5	6.2	8.3	57%
Calcium (mg/Kg)	20		20	100	0.59	0.13	L	1395	1031	2218	95%	3530	2394	6818	95%
Chromium (mg/Kg)	20		20	100	0.12	0.002	L	19	13	33	95%	53	34	111	95%
Chrysene (ug/Kg)	16	4	20	80	0.009	E-7	NP	103	83	130	92%	986	930	1100	57%
Cobalt (mg/Kg)	11	9	20	55	0.06	E-5	L	8.5	5.2	22	95%	30	16	85	95%
delta - BHC (ug/Kg)	1	19	20	5	0.005	E-4	NP	3.1	2.8	5.1	92%	7.5	6.2	8.3	57%
Dibenz(a,h)anthracene (ug/Kg)	4	16	20	20	0.047	0.004	NP	125	110	150	92%	292	260	320	57%
Dieldrin (ug/Kg)	1	19	20	5	0.005	E-4	NP	5.8	5.4	7.3	92%	14	12	16	57%
Endosulfan I (ug/Kg)	1	19	20	5	E-4	E-5	NP	3.1	2.8	3.8	92%	8.3	7.4	8.4	57%
Endosulfan II (ug/Kg)		20	20	0	0.004	E-4	NP	6	5.5	7.3	92%	14	12	16	57%
Endrin (ug/Kg)	1	19	20	5	0.008	E-4	NP	6	5.5	9	92%	14	12	16	57%
Endrin aldehyde (ug/Kg)	2	18	20	10	0.004	E-4	NP	6	5.5	9.1	92%	15	14	16	57%
Fluoranthene (ug/Kg)	16	4	20	80	0.003	E-7	NP	110	93	160	92%	2500	1400	2400	57%
Fluorene (ug/Kg)	2	18	20	10	0.01	E-5	NP	110	110	130	92%	292	240	320	57%
gamma-Chlordane (ug/Kg)	2	18	20	10	E-4	E-7	NP	3.1	2.8	3.8	92%	9.7	8.3	24	57%
Indeno(1,2,3-cd)pyrene (ug/Kg)	10	10	20	50	0.18	E-5	L	164	114	300	95%	472	297	1035	95%
Iron (mg/Kg)	20		20	100	0.16	0.003	L	15220	9795	34042	95%	50142	28682	129228	95%
Manganese (mg/Kg)	20		20	100	0.055	E-4	L	93	55	270	95%	345	178	1059	95%
Mercury (mg/Kg)	16	4	20	80	0.18	E-4	L	0.21	0.15	0.38	95%	0.6	0.4	1.3	95%
Magnesium (mg/Kg)	20		20	100	0.35	0.005	L	3191	2110	6630	95%	10058	5944	24534	95%
Naphthalene (ug/Kg)	3	17	20	15	0.001	E-4	NP	110	100	130	92%	292	240	320	57%
Nickel (mg/Kg)	18	2	20	90	0.06	0.004	L	15	10	29	95%	44	27	102	95%
Phenanthrene (ug/Kg)	5	15	20	25	0.25	E-4	L	158	120	238	95%	376	264	687	95%
Potassium (mg/Kg)	13	7	20	65	0.26	0.003	L	1702	1039	4428	95%	6046	3252	17299	95%
Pyrene (ug/Kg)	13	7	20	65	E-4	E-7	NP	115	95	150	92%	1905	1400	2000	57%
Selenium (mg/Kg)	7	13	20	35	0.004	E-4	NP	1	0.9	1.7	92%	2.6	2.4	3	57%
Silver (mg/Kg)	3	17	20	15	0.002	E-4	NP	0.76	0.7	1.3	92%	1.8	1.5	2.1	57%
Sodium (mg/Kg)	19	1	20	95	0.84	E-4	L	6199	4024	13584	95%	20145	11643	51017	95%
Vanadium (mg/Kg)	20		20	100	0.053	E-4	L	28	20	45	95%	72	48	143	95%
Zinc (mg/Kg)	20		20	100	0.12	0.002	L	108	67	264	95%	372	205	1024	95%
Bohicket Surface															
4,4'-DDE (ug/Kg)	8	1	9	88.9	--	E-6	NP	20	16	28	89%	269	28	430	30%
Antimony (mg/Kg)		9	9	0.0	--	0.47	N	1.4	0.9	1.8	95%	2.4	1.9	3.4	95%
Copper (mg/Kg)	9		9	100.0	--	0.06	N	36	15	57	95%	81	60	129	95%
Lead (mg/Kg)	9		9	100.0	--	0.05	N	82	29	136	95%	198	144	322	95%
Bohicket Subsurface															
4,4'-DDE (ug/Kg)	6	5	11	54.5	--	E-6	NP	6.4	5	17	93%	99	58	140	33%
Antimony (mg/Kg)		11	11	0.0	--	0.01	NP	0.7	0.6	1.1	93%	1.2	1.2	1.2	33%
Copper (mg/Kg)	11		11	100.0	--	E-5	NP	11	7	21	93%	64	64	64	33%
Lead (mg/Kg)	11		11	100.0	--	E-4	NP	23	14	37	93%	145	116	174	33%
Urban-Udorthent Surface and Subsurface															
4,4'-DDT (ug/Kg)	6	13	19	31.6	E-5	E-7	NP	3.9	3.9	4.1	94%	22.1	6	32	56%
Acenaphthene (ug/Kg)	2	18	20	10.0	E-7	E-6	NP	79	79	82	92%	88	88	91	57%
Acenaphthylene (ug/Kg)	4	16	20	20.0	E-6	E-5	NP	79	78	82	92%	88	88	91	57%
Aldrin (ug/Kg)		19	19	0.0	E-8	E-8	NP	2	2	2.1	94%	2.9	2.2	8.1	56%

Table G-1
Soil Sample Data Summary
Background Investigation
St. Juliens Creek Annex, Chesapeake, VA

Chemical Name	Number of Detects	Number of Non Detects	Total Number of Samples	Frequency of Detection	~L = Log Normal	~N = Normal	Assumed Distribution	Mean (Conc.)	Lower Confidence Interval (Conc.)	Upper Confidence Interval (Conc.)	~ Conf = 95% Confidence Level	Upper Tolerance Level (UTL) (Conc.)	Lower Bound UTL (Conc.)	Upper Bound UTL (Conc.)	~Conf = Associated Confidence
alpha-Chlordane (ug/Kg)	1	18	19	5.3	E-8	E-8	NP	2.1	2	2.1	94%	9.6	2.3	23	56%
Aluminum (mg/Kg)	20		20	100.0	0.49	0.07	L	8389	6206	13297	95%	21155	14371	40741	95%
Anthracene (ug/Kg)	4	16	20	20.0	E-7	E-6	NP	79	78	82	92%	88	88	91	57%
Antimony (mg/Kg)	1	19	20	5.0	E-4	E-4	NP	0.52	0.49	0.65	92%	0.91	0.86	1	57%
Arsenic (mg/Kg)	20		20	100.0	0.08	0.67	N	3	2.3	3.7	95%	5.5	4.6	6.9	95%
Barium (mg/Kg)	20		20	100.0	0.11	0.79	N	33	25	41	95%	61	51	77	95%
Benzo(a)anthracence (ug/Kg)	9	11	20	45.0	0.13	E-5	L	88	65	139	95%	221	151	423	95%
Benzo(a)pyrene (ug/Kg)	10	10	20	50.0	0.03	E-5	NP	79	78	84	92%	253	170	300	57%
Benzo(b)fluoranthene (ug/Kg)	9	11	20	45.0	0.009	E-6	NP	80	78	91	92%	316	200	420	57%
Benzo(g,h,I)perlyene (ug/Kg)	11	9	20	55.0	0.1	E-4	L	88	65	138	95%	219	150	418	95%
Benzo(k)fluoranthene (ug/Kg)	10	10	20	50.0	0.04	E-4	NP	79	78	84	92%	241	180	270	57%
Beryllium (mg/Kg)		20	20	0.0	E-8	0.001	NP	0.2	0.2	0.3	92%	0.6	0.3	0.7	57%
beta -BHC (ug/Kg)		19	19	0.0	E-8	E-8	NP	78	63	84	92%	252	180	290	57%
Calcium (mg/Kg)	20		20	100.0	E-4	E-8	NP	741	585	1100	92%	57405	9490	105000	57%
Chromium (mg/Kg)	19	1	20	95.0	0.86	0.005	L	12.5	9.7	17.9	95%	28	20	48	95%
Chrysene (ug/Kg)	12	8	20	60.0	0.08	E-5	L	106	77	174	95%	277	184	553	95%
Cobalt (mg/Kg)	14	6	20	70.0	0.25	0.002	L	2.7	2.1	4	95%	6.3	4.5	11.3	95%
delta - BHC (ug/Kg)		19	19	0.0	E-8	E-8	NP	2	2	2.1	94%	2.9	2.2	8.1	56%
Dibenz(a,h)anthracene (ug/Kg)	4	16	20	20.0	E-6	E-4	NP	81	79	84	92%	98	91	110	57%
Dieldrin (ug/Kg)		19	19	0.0	E-8	E-8	NP	3.9	3.9	4	94%	5.7	4.3	16	56%
Endosulfan I (ug/Kg)		19	19	0.0	E-8	E-8	NP	2	2	2.1	94%	2.9	2.2	8.1	56%
Endosulfan II (ug/Kg)		19	19	0.0	E-8	E-8	NP	3.9	3.9	4	94%	5.7	4.3	16	56%
Endrin (ug/Kg)		19	19	0.0	E-8	E-8	NP	3.9	3.9	4	94%	5.7	4.3	16	56%
Endrin aldehyde (ug/Kg)		19	19	0.0	E-8	E-8	NP	3.9	3.9	4	94%	5.7	4.3	16	56%
Fluorene (ug/Kg)	1	19	20	5.0	E-8	E-7	NP	80	79	82	92%	88	88	91	57%
gamma-Chlordane (ug/Kg)	1	18	19	5.3	E-7	E-8	NP	2.1	2	2.1	94%	5.6	2.3	8.1	56%
Indeno(1,2,3-cd)pyrene (ug/Kg)	9	11	20	45.0	0.05	E-4	L	89	68	129	95%	202	145	356	95%
Iron (mg/Kg)	20		20	100.0	0.3	0.01	L	8023	6295	11288	95%	17494	12822	29624	95%
Magnesium (mg/Kg)	20		20	100.0	0.74	E-4	L	777	588	1172	95%	1853	1297	3392	95%
Manganese (mg/Kg)	20		20	100.0	0.02	E-6	L	44	30	86	95%	133	81	312	95%
Naphthalene (ug/Kg)	4	16	20	20.0	E-6	E-5	NP	79	78	82	92%	88	88	91	57%
Nickel (mg/Kg)	19	1	20	95.0	0.05	E-6	L	5.3	4.3	7.1	95%	11	8	17	95%
Phenanthrene (ug/Kg)	9	11	20	45.0	0.03	E-5	NP	79	78	84	92%	149	140	310	57%
Potassium (mg/Kg)	5	15	20	25.0	0.34	E-4	L	415	304	670	95%	1067	717	2094	95%
Selenium (mg/Kg)		20	20	0.0	E-6	E-7	NP	0.66	0.64	0.72	92%	0.82	0.79	1.3	57%
Silver (mg/Kg)		20	20	0.0	0.001	E-4	NP	0.5	0.5	0.51	92%	0.56	0.55	0.57	57%
Sodium (mg/Kg)	15	5	20	75.0	E-5	E-7	NP	47	39	64	92%	574	308	1260	57%
Vanadium (mg/Kg)	20		20	100.0	0.08	0.08	N	21	16	26	95%	39	33	49	95%
Urban-Udorthent Surface															
4,4'-DDE (ug/Kg)	6	3	9	66.7	--	E-6	NP	15	4	240	89%	1116	240	1700	30%
4,4'-DDT (ug/Kg)	7	2	9	77.8	--	E-7	NP	13	4	36	89%	566	36	920	30%
Copper (mg/Kg)	10		10	100.0	--	E-4	NP	9	8	27	93%	38	27	47	32%
Fluoranthene (ug/Kg)	8	2	10	80.0	--	0.002	NP	93	78	430	93%	469	430	500	32%
Lead (mg/Kg)	10		10	100.0	--	0.08	N	46	26	66	95%	92	72	138	95%
Mercury (mg/Kg)	1	9	10	10.0	--	0.002	NP	0.14	0.13	0.25	93%	0.34	0.25	0.42	32%
Pyrene (ug/Kg)	8	2	10	80.0	--	0.002	NP	100	88	430	93%	480	430	520	32%
Zinc (mg/Kg)	10		10	100.0	--	0.004	NP	48	32	91	93%	131	91	164	32%
Urban-Udorthent Subsurface															
4,4'-DDE (ug/Kg)	1	9	10	10.0	--	E-7	NP	4	4	4.5	93%	41	4.5	79	32%
4,4'-DDT (ug/Kg)	1	9	10	10.0	--	E-7	NP	4	4	4.5	93%	9	4.5	12	32%
Copper (mg/Kg)	8	2	10	80.0	--	0.59	N	4.3	2.2	6.4	95%	9.1	7	14	95%
Fluoranthene (ug/Kg)	3	7	10	30.0	--	0.002	NP	79	64	81	93%	83	81	84	32%
Lead (mg/Kg)	10		10	100.0	--	0.006	NP	7.3	5.5	21	93%	27	21	31	32%

Table G-1
Soil Sample Data Summary
Background Investigation
St. Juliens Creek Annex, Chesapeake, VA

Chemical Name	Number of Detects	Number of Non Detects	Total Number of Samples	Frequency of Detection	~L = Log Normal	~N = Normal	Assumed Distribution	Mean (Conc.)	Lower Confidence Interval (Conc.)	Upper Confidence Interval (Conc.)	~ Conf = 95% Confidence Level	Upper Tolerance Level (UTL) (Conc.)	Lower Bound UTL (Conc.)	Upper Bound UTL (Conc.)	~Conf = Associated Confidence
Mercury (mg/Kg)		10	10	0.0	--	0.51	N	0.1	0.08	0.11	95%	0.12	0.11	0.15	95%
Pyrene (ug/Kg)	3	7	10	30.0	--	E-4	NP	79	69	81	93%	83	81	84	32%
Zinc (mg/Kg)	9	1	10	90.0	--	0.001	NP	12	10	31	93%	46	31	59	32%
Dredge Fill Surface and Subsurface															
4,4'-DDT (ug/Kg)	1	19	20	5.0	E-4	0.002	NP	4.7	4.7	5	92%	5.3	5.2	5.5	57%
4,4'-DDE (ug/Kg)	7	13	20	35.0	0.08	0.002	L	5.2	4.5	6.4	95%	9	7.3	13	95%
Acenaphthene (ug/Kg)	5	15	20	25.0	0.04	E-6	NP	96	87	110	92%	592	480	1200	57%
Aldrin (ug/Kg)		20	20	0.0	0.1	0.23	N	2.4	2.3	2.5	95%	2.8	2.7	3	95%
alpha-Chlordane (ug/Kg)		20	20	0.0	0.1	0.23	N	2.4	2.3	2.5	95%	2.8	2.7	3	95%
Anthracene (ug/Kg)	18	2	20	90.0	0.007	E-8	NP	78	69	130	92%	462	340	2400	57%
Antimony (mg/Kg)	11	9	20	55.0	0.38	0.003	L	0.86	0.73	1.05	95%	1.47	1.2	2.06	95%
Benzo(a)anthracence (ug/Kg)	20		20	100.0	0.99	E-7	L	578	356	1462	95%	2027	1102	5692	95%
Benzo(a)pyrene (ug/Kg)	20		20	100.0	0.91	E-7	L	525	331	1244	95%	1785	997	4792	95%
Benzo(k)fluoranthene (ug/Kg)	20		20	100.0	0.76	E-5	L	594	372	1434	95%	2038	1130	5542	95%
beta -BHC (ug/Kg)		20	20	0.0	0.1	0.23	N	2.4	2.3	2.5	95%	2.8	2.7	3	95%
Calcium (mg/Kg)	20		20	100.0	0.16	E-4	L	1217	877	2043	95%	3251	2137	6617	95%
Chrysene (ug/Kg)	20		20	100.0	0.66	E-5	L	992	610	2521	95%	3487	1893	9823	95%
Cobalt (mg/Kg)	17	3	20	85.0	0.15	0.82	N	7	5.4	8.6	95%	13	11	16	95%
delta - BHC (ug/Kg)		20	20	0.0	0.1	0.23	N	2.4	2.3	2.5	95%	2.8	2.7	3	95%
Dieldrin (ug/Kg)	2	18	20	10.0	E-4	0.005	NP	4.7	4.7	5	92%	5.3	5.2	5.5	57%
Endosulfan I (ug/Kg)		20	20	0.0	0.1	0.23	N	2.4	2.3	2.5	95%	2.8	2.7	3	95%
Endosulfan II (ug/Kg)		20	20	0.0	0.02	0.06	N	4.7	4.5	4.9	95%	5.4	5.2	5.8	95%
Endrin (ug/Kg)		20	20	0.0	0.02	0.06	N	4.7	4.5	4.9	95%	5.4	5.2	5.8	95%
Endrin aldehyde (ug/Kg)		20	20	0.0	0.02	0.06	N	4.7	4.5	4.9	95%	5.4	5.2	5.8	95%
Fluoranthene (ug/Kg)	20		20	100.0	0.22	E-8	L	758	453	2101	95%	2766	1453	8242	95%
Fluorene (ug/Kg)	4	16	20	20.0	0.02	E-6	NP	96	94	110	92%	602	480	1400	57%
gamma-Chlordane (ug/Kg)		20	20	0.0	0.1	0.23	N	2.4	2.3	2.5	95%	2.8	2.7	3	95%
Naphthalene (ug/Kg)	14	6	20	70.0	0.02	E-6	NP	59	32	87	92%	485	480	570	57%
Phenanthrene (ug/Kg)	19	1	20	95.0	E-4	E-9	NP	84	68	140	92%	913	260	9700	57%
Pyrene (ug/Kg)	20		20	100.0	0.4	E-8	L	696	410	2026	95%	2590	1336	7953	95%
Silver (mg/Kg)	2	18	20	10.0	E-4	E-4	NP	0.6	0.55	0.61	92%	0.67	0.64	0.67	57%
Dredge Fill Surface															
4,4'-DDT (ug/Kg)	9	1	10	90.0	0.87	0.73	N	11	6.2	15	95%	21	16	31	95%
Acenaphthylene (ug/Kg)	10		10	100.0	0.08	0.04	NP	144	64	240	93%	246	240	250	32%
Aluminum (mg/Kg)	10		10	100.0	0.01	0.15	N	17083	14603	19563	95%	22786	20256	28382	95%
Arsenic (mg/Kg)	10		10	100.0	0.69	0.99	N	17	14	20	95%	24	21	32	95%
Barium (mg/Kg)	10		10	100.0	0.24	0.05	N	77	68	86	95%	98	88	118	95%
Benzo(b)fluoranthene (ug/Kg)	10		10	100.0	0.59	0.12	N	1431	663	2199	95%	3197	2413	4931	95%
Benzo(g,h,I)perlyene (ug/Kg)	10		10	100.0	0.4	0.38	N	811	444	1178	95%	1655	1280	2483	95%
Beryllium (mg/Kg)	4	6	10	40.0	0.02	E-4	NP	0.62	0.53	0.71	93%	1	0.7	1.3	32%
Chromium (mg/Kg)	10		10	100.0	0.004	0.04	NP	39	35	45	93%	45	45	45	32%
Copper (mg/Kg)	10		10	100.0	0.45	0.95	N	43	36	49	95%	58	51	72	95%
Dibenz(a,h)anthracene (ug/Kg)	6	4	10	60.0	0.004	0.05	N	401	264	537	95%	714	575	1022	95%
Indeno(1,2,3-cd)pyrene (ug/Kg)	10		10	100.0	0.53	0.27	N	847	420	1274	95%	1829	1393	2792	95%
Iron (mg/Kg)	10		10	100.0	0.02	0.11	N	35570	31119	40021	95%	45805	41265	55850	95%
Lead (mg/Kg)	10		10	100.0	0.22	0.69	N	105	87	123	95%	147	128	188	95%
Magnesium (mg/Kg)	10		10	100.0	0.39	0.77	N	3446	2984	3908	95%	4507	4037	5549	95%
Manganese (mg/Kg)	10		10	100.0	0.06	0.01	NP	131	124	166	93%	198	166	224	32%
Mercury (mg/Kg)	10		10	100.0	0.42	0.35	N	0.8	0.6	1	95%	1.3	1.1	1.7	95%
Nickel (mg/Kg)	10		10	100.0	0.01	E-4	NP	13	12	14	93%	19	14	24	32%
Potassium (mg/Kg)	10		10	100.0	0.59	0.79	N	3276	2710	3842	95%	4577	4000	5854	95%
Selenium (mg/Kg)	8	2	10	80.0	0.37	0.57	N	1.5	1.2	1.8	95%	2.2	1.9	2.9	95%
Sodium (mg/Kg)	10		10	100.0	0.05	E-4	NP	187	151	392	93%	620	392	806	32%

Table G-1
Soil Sample Data Summary
Background Investigation
St. Juliens Creek Annex, Chesapeake, VA

Chemical Name	Number of Detects	Number of Non Detects	Total Number of Samples	Frequency of Detection	~L = Log Normal	~N = Normal	Assumed Distribution	Mean (Conc.)	Lower Confidence Interval (Conc.)	Upper Confidence Interval (Conc.)	~ Conf = 95% Confidence Level	Upper Tolerance Level (UTL) (Conc.)	Lower Bound UTL (Conc.)	Upper Bound UTL (Conc.)	~Conf = Associated Confidence
Vanadium (mg/Kg)	10		10	100.0	0.01	0.08	N	55	49	62	95%	70	64	85	95%
Zinc (mg/Kg)	10		10	100.0	0.01	E-4	NP	91	83	107	93%	137	107	162	32%
Dredge Fill Subsurface															
4,4'-DDT (ug/Kg)	1	9	10	10.0	E-4	E-5	NP	4.7	4.5	5.3	93%	9	5.3	12	32%
Acenaphthene (ug/Kg)	9	1	10	90.0	0.63	0.06	N	69	41	96	95%	131	103	192	95%
Aluminum (mg/Kg)	10		10	100.0	0.08	0.27	N	9150	4936	13364	95%	18839	14541	28347	95%
Arsenic (mg/Kg)	10		10	100.0	0.11	0.1	N	7.8	5.2	10	95%	14	11	20	95%
Barium (mg/Kg)	10		10	100.0	0.41	0.43	N	27	17	37	95%	50	40	72	95%
Benzo(b)fluoranthene (ug/Kg)	10		10	100.0	0.36	E-5	NP	375	260	910	93%	2335	910	3500	32%
Benzo(g,h,I)perlyene (ug/Kg)	10		10	100.0	0.59	E-6	NP	245	100	630	93%	2099	630	3300	32%
Beryllium (mg/Kg)		10	10	0.0	0.99	0.42	N	0.42	0.25	0.59	95%	0.81	0.64	1.18	95%
Chromium (mg/Kg)	10		10	100.0	0.03	0.09	N	20	12	28	95%	39	30	57	95%
Copper (mg/Kg)	10		10	100.0	0.94	0.55	N	22	14	30	95%	40	32	57	95%
Dibenz(a,h)anthracene (ug/Kg)	9	1	10	90.0	0.71	E-5	NP	111	67	350	93%	708	350	1000	32%
Indeno(1,2,3-cd)pyrene (ug/Kg)	10		10	100.0	0.67	E-5	NP	230	120	630	93%	1769	630	2700	32%
Iron (mg/Kg)	10		10	100.0	0.05	0.08	N	18829	11107	26551	95%	36585	28709	54009	95%
Lead (mg/Kg)	10		10	100.0	0.52	0.11	N	46	28	63	95%	86	68	125	95%
Magnesium (mg/Kg)	10		10	100.0	0.08	0.47	N	1923	1086	2760	95%	3847	2994	5736	95%
Manganese (mg/Kg)	10		10	100.0	0.83	0.15	N	79	47	110	95%	151	119	223	95%
Mercury (mg/Kg)	10		10	100.0	0.46	0.6	N	0.37	0.26	0.48	95%	0.62	0.51	0.86	95%
Nickel (mg/Kg)	9	1	10	90.0	0.05	0.14	N	8.2	5.1	11	95%	15	12	23	95%
Potassium (mg/Kg)	10		10	100.0	0.09	0.33	N	1626	827	2426	95%	3465	2649	5269	95%
Selenium (mg/Kg)	5	5	10	50.0	0.48	0.24	N	1	0.8	1.2	95%	1.5	1.3	1.9	95%
Sodium (mg/Kg)	9	1	10	90.0	0.01	0.05	N	92	43	140	95%	203	153	312	95%
Vanadium (mg/Kg)	10		10	100.0	0.08	0.08	N	22	13	31	95%	42	33	62	95%
Zinc (mg/Kg)	10		10	100.0	0.46	0.39	N	47	29	65	95%	87	70	127	95%

Table G-2
Columbia Aquifer Background Groundwater Quality Summary
Background Investigation
St. Juliens Creek Annex, Chesapeake, VA

Chemical Name	Number of Detects	Total Number of Samples	Frequency of Detection	Reporting Limit Minimum	Reporting Limit Maximum	Minimum Detected Conc.	Maximum Detected Conc.	Average Conc.	Median Conc.	Standard Deviation	Coefficient of Variation	Upper Confidence Limit
Dissolved Metals (ug/L)												
Barium	4	4	1.00			24	63.2	50.5	57.5	18.2	0.4	72.0
Calcium	4	4	1.00			21400	141000	56800.0	32400.0	56406.4	1.0	123186.0
Iron	4	4	1.00			65	21100	7513.8	4445.0	9941.3	1.3	19213.9
Magnesium	4	4	1.00			4890	22400	11692.5	9740.0	8163.2	0.7	21299.9
Manganese	4	4	1.00			120	1040	442.8	305.5	411.8	0.9	927.4
Nickel	4	4	1.00			2.2	14.3	7.7	7.1	5.0	0.7	13.5
Potassium	4	4	1.00			1600	5620	3185.0	2760.0	1953.4	0.6	5484.0
Sodium	4	4	1.00			18400	57700	39675.0	41300.0	17363.6	0.4	60110.7
Cobalt	3	4	0.75	0.5	0.5	4.6	14.4	6.8	6.3	6.0	0.9	13.8
Aluminum	2	4	0.50	38.2	38.2	69.9	399	126.8	54.1	183.1	1.4	342.2
Arsenic	2	4	0.50	2	2	2.1	2.2	1.6	2.1	0.7	0.4	2.4
Lead	2	4	0.50	1	1	1.1	2.1	1.1	1.1	0.8	0.7	1.9
Beryllium	1	4	0.25	0.1	0.1	0.31	0.31	0.1	0.1	0.1	1.1	0.3
Antimony		4	0.00	2.7	2.7			1.4	2.7			1.4
Cadmium		4	0.00	0.3	0.3			0.2	0.3			0.2
Chromium		4	0.00	1.1	1.1			0.6	1.1			0.6
Copper		4	0.00	2.2	3.3			1.5	3.1	0.2	0.2	1.8
Mercury		4	0.00	0.1	0.1			0.1	0.1			0.1
Selenium		4	0.00	2.6	2.6			1.3	2.6			1.3
Silver		4	0.00	0.9	0.9			0.5	0.9			0.5
Thallium		4	0.00	3.2	3.2			1.6	3.2			1.6
Vanadium		4	0.00	0.6	0.6			0.3	0.6			0.3
Zinc	4	4	1.00			9.1	109	47.3	35.6	43.7	0.9	98.8
Total Metals (ug/L)												
Aluminum	4	4	1.00			181	357	232.3	195.5	84.0	0.4	331.1
Barium	4	4	1.00			26.1	63.5	52.8	60.9	18.0	0.3	74.0
Calcium	4	4	1.00			21300	142000	56075.0	30500.0	57486.5	1.0	123732.2
Cobalt	4	4	1.00			0.84	13.9	7.1	6.8	5.5	0.8	13.6
Iron	4	4	1.00			374	18000	6927.3	4667.5	8306.8	1.2	16703.7
Magnesium	4	4	1.00			4860	19600	11337.5	10445.0	7106.7	0.6	19701.5
Manganese	4	4	1.00			121	912	415.8	315.0	347.8	0.8	825.1
Nickel	4	4	1.00			2.7	15.1	8.3	7.8	5.1	0.6	14.3
Potassium	4	4	1.00			1620	5010	3027.5	2740.0	1678.6	0.6	5003.1
Sodium	4	4	1.00			18600	53900	39850.0	43450.0	16793.0	0.4	59614.0
Vanadium	4	4	1.00			0.79	1	0.9	0.9	0.1	0.1	1.0
Zinc	4	4	1.00			9.5	89.7	46.9	44.2	32.9	0.7	85.6
Lead	2	4	0.50	1	1	1.1	1.9	1.0	1.1	0.7	0.7	1.8
Arsenic	1	4	0.25	2	2	2	2	1.3	2.0	0.5	0.4	1.8
Beryllium	1	4	0.25	0.1	0.1	0.27	0.27	0.1	0.1	0.1	1.0	0.2
Antimony		4	0.00	2.7	2.7			1.4	2.7			1.4
Cadmium		4	0.00	0.3	0.3			0.2	0.3			0.2

Table G-2
Columbia Aquifer Background Groundwater Quality Summary
Background Investigation
St. Juliens Creek Annex, Chesapeake, VA

Chemical Name	Number of Detects	Total Number of Samples	Frequency of Detection	Reporting Limit Minimum	Reporting Limit Maximum	Minimum Detected Conc.	Maximum Detected Conc.	Average Conc.	Median Conc.	Standard Deviation	Coefficient of Variation	Upper Confidence Limit
Chromium		4	0.00	1.1	1.1			0.6	1.1			0.6
Copper		4	0.00	2.7	4.2			1.7	3.5	0.3	0.2	2.1
Cyanide		4	0.00	5	5			2.5	5.0			2.5
Mercury		4	0.00	0.1	0.1			0.1	0.1			0.1
Selenium		4	0.00	2.6	2.6			1.3	2.6			1.3
Silver		4	0.00	0.9	0.9			0.5	0.9			0.5
Thallium		4	0.00	3.2	3.2			1.6	3.2			1.6
Semivolatile Organic (ug/L)												
2,2'-oxybis(1-Chloropropane)		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
2,4,5-Trichlorophenol		4	0.00	26	29			13.5	26.5	0.7	0.1	14.3
2,4,6-Trichlorophenol		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
2,4-Dichlorophenol		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
2,4-Dimethylphenol		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
2,4-Dinitrophenol		4	0.00	26	29			13.5	26.5	0.7	0.1	14.3
2,4-Dinitrotoluene		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
2,6-Dinitrotoluene		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
2-Chloronaphthalene		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
2-Chlorophenol		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
2-Methylnaphthalene		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
2-Methylphenol		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
2-Nitroaniline		4	0.00	26	29			13.5	26.5	0.7	0.1	14.3
2-Nitrophenol		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
3,3'-Dichlorobenzidine		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
3-Nitroaniline		4	0.00	26	29			13.5	26.5	0.7	0.1	14.3
4,6-Dinitro-2-methylphenol		4	0.00	26	29			13.5	26.5	0.7	0.1	14.3
4-Bromophenyl-phenylether		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
4-Chloro-3-methylphenol		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
4-Chloroaniline		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
4-Chlorophenyl-phenylether		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
4-Methylphenol		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
4-Nitroaniline		4	0.00	26	29			13.5	26.5	0.7	0.1	14.3
4-Nitrophenol		4	0.00	26	29			13.5	26.5	0.7	0.1	14.3
Acenaphthene		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
Acenaphthylene		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
Anthracene		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
Benzo(a)anthracene		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
Benzo(a)pyrene		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
Benzo(b)fluoranthene		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
Benzo(g,h,i)perylene		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
Benzo(k)fluoranthene		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
bis(2-Chloroethoxy)methane		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
bis(2-Chloroethyl)ether		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9

Table G-2
Columbia Aquifer Background Groundwater Quality Summary
Background Investigation
St. Juliens Creek Annex, Chesapeake, VA

Chemical Name	Number of Detects	Total Number of Samples	Frequency of Detection	Reporting Limit Minimum	Reporting Limit Maximum	Minimum Detected Conc.	Maximum Detected Conc.	Average Conc.	Median Conc.	Standard Deviation	Coefficient of Variation	Upper Confidence Limit
bis(2-Ethylhexyl)phthalate		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
Butylbenzylphthalate		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
Carbazole		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
Chrysene		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
Di-n-butylphthalate		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
Di-n-octylphthalate		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
Dibenz(a,h)anthracene		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
Dibenzofuran		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
Diethylphthalate		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
Dimethylphthalate		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
Fluoranthene		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
Fluorene		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
Hexachlorobenzene		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
Hexachlorobutadiene		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
Hexachlorocyclopentadiene		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
Hexachloroethane		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
Indeno(1,2,3-cd)pyrene		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
Isophorone		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
n-Nitroso-di-n-propylamine		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
n-Nitrosodiphenylamine		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
Naphthalene		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
Nitrobenzene		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
Pentachlorophenol		4	0.00	26	29			13.5	26.5	0.7	0.1	14.3
Phenanthrene		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
Phenol		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
Pyrene		4	0.00	11	12			5.6	11.0	0.3	0.0	5.9
Volatile Organic (ug/L)												
Acetone	1	4	0.25	5	5	30.5	30.5	9.5	5.0	14.0	1.5	26.0
cis-1,2-Dichloroethene	1	4	0.25	1	1	0.2	0.2	0.4	1.0	0.2	0.4	0.6
Trichloroethene	1	4	0.25	1	1	0.8	0.8	0.6	1.0	0.2	0.3	0.8
1,1,1-Trichloroethane		4	0.00	1	1			0.5	1.0			0.5
1,1,2,2-Tetrachloroethane		4	0.00	1	1			0.5	1.0			0.5
1,1,2-Trichloroethane		4	0.00	1	1			0.5	1.0			0.5
1,1-Dichloroethane		4	0.00	1	1			0.5	1.0			0.5
1,1-Dichloroethene		4	0.00	1	1			0.5	1.0			0.5
1,2,4-Trichlorobenzene		8	0.00	1	12			3.1	6.0	2.7	0.9	4.9
1,2-Dibromo-3-chloropropane		4	0.00	1	1			0.5	1.0			0.5
1,2-Dibromoethane		4	0.00	1	1			0.5	1.0			0.5
1,2-Dichlorobenzene		8	0.00	1	12			3.1	6.0	2.7	0.9	4.9
1,2-Dichloroethane		4	0.00	1	1			0.5	1.0			0.5
1,2-Dichloropropane		4	0.00	1	1			0.5	1.0			0.5
1,3-Dichlorobenzene		8	0.00	1	12			3.1	6.0	2.7	0.9	4.9

Table G-2
Columbia Aquifer Background Groundwater Quality Summary
Background Investigation
St. Juliens Creek Annex, Chesapeake, VA

Chemical Name	Number of Detects	Total Number of Samples	Frequency of Detection	Reporting Limit Minimum	Reporting Limit Maximum	Minimum Detected Conc.	Maximum Detected Conc.	Average Conc.	Median Conc.	Standard Deviation	Coefficient of Variation	Upper Confidence Limit
1,4-Dichlorobenzene		8	0.00	1	12			3.1	6.0	2.7	0.9	4.9
2-Butanone		4	0.00	5	5			2.5	5.0			2.5
2-Hexanone		4	0.00	5	5			2.5	5.0			2.5
4-Methyl-2-pentanone		4	0.00	5	5			2.5	5.0			2.5
Benzene		4	0.00	1	1			0.5	1.0			0.5
Bromochloromethane		4	0.00	1	1			0.5	1.0			0.5
Bromodichloromethane		4	0.00	1	1			0.5	1.0			0.5
Bromoform		4	0.00	1	1			0.5	1.0			0.5
Bromomethane		4	0.00	1	1			0.5	1.0			0.5
Carbon disulfide		4	0.00	1	2.1			0.8	1.5	0.2	0.3	1.0
Carbon tetrachloride		4	0.00	1	1			0.5	1.0			0.5
Chlorobenzene		4	0.00	1	1			0.5	1.0			0.5
Chloroethane		4	0.00	1	1			0.5	1.0			0.5
Chloroform		4	0.00	0.2	1			0.3	0.5	0.2	0.8	0.5
Chloromethane		4	0.00	1	1			0.5	1.0			0.5
cis-1,3-Dichloropropene		4	0.00	1	1			0.5	1.0			0.5
Dibromochloromethane		4	0.00	1	1			0.5	1.0			0.5
Ethylbenzene		4	0.00	1	1			0.5	1.0			0.5
Methylene chloride		4	0.00	1	1.2			0.6	1.1	0.0	0.1	0.6
Styrene		4	0.00	1	1			0.5	1.0			0.5
Tetrachloroethene		4	0.00	1	1			0.5	1.0			0.5
Toluene		4	0.00	1	1			0.5	1.0			0.5
Xylene, total		4	0.00	1	1			0.5	1.0			0.5
trans-1,2-Dichloroethene		4	0.00	1	1			0.5	1.0			0.5
trans-1,3-Dichloropropene		4	0.00	1	1			0.5	1.0			0.5
Vinyl chloride		4	0.00	1	1			0.5	1.0			0.5
Water Chemistry												
Total Phosphorous (as P) (mg/L)		4	0.00	0.02	0.02			0.0	0.0			0.0

Table G-3
Summary Statistics Table
Reference Sediment Samples - Blows Creek
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical	Reporting Limit Range	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Concentration	Arithmetic Mean[1]	Standard Deviation of Mean
Inorganics (MG/KG)						
Aluminum	4.10 - 24.5	8 / 8	27,400	SJSBK-SD09-002	16,758	8,101
Antimony	0.61 - 1.70	1 / 8	0.0	SJSBK-SD09-001	0.45	0.25
Arsenic	0.59 - 1.80	8 / 8	22.5	SJSBK-SD09-002	13.0	5.39
Barium	0.060 - 0.13	8 / 8	59.1	SJSBK-SD09-002	43.3	15.7
Beryllium	0.030 - 0.090	8 / 8	1.90	SJSBK-SD09-002	1.29	0.54
Cadmium	0.070 - 0.26	8 / 8	2.30	SJSBK-SD08-001	1.05	0.74
Calcium	6.80 - 50.8	8 / 8	3,870	SJSBK-SD09-001	2,218	984
Chromium	0.13 - 0.70	8 / 8	49.2	SJSBK-SD09-002	31.6	13.8
Cobalt	0.15 - 0.34	8 / 8	17.7	SJSBK-SD09-002	10.4	4.76
Copper	0.17 - 0.97	8 / 8	112	SJSBK-SD08-001	75.1	30.5
Cyanide	0.35 - 0.89	2 / 8	0.99	SJSBK-SD07-001	0.36	0.29
Iron	3.80 - 19.7	8 / 8	50,400	SJSBK-SD09-002	27,950	11,718
Lead	0.30 - 0.64	8 / 8	165	SJSBK-SD10-001	97.7	42.2
Magnesium	5.80 - 15.6	8 / 8	8,880	SJSBK-SD09-002	5,018	2,157
Manganese	0.090 - 0.19	8 / 8	403	SJSBK-SD09-002	217	99.6
Mercury	0.020 - 0.060	8 / 8	0.69	SJSBK-SD09-002	0.49	0.17
Nickel	0.20 - 0.58	8 / 8	35.4	SJSBK-SD09-002	22.1	10.1
Potassium	3.60 - 8.60	8 / 8	5,030	SJSBK-SD09-002	2,794	1,383
Selenium	0.68 - 1.70	8 / 8	2.30	SJSBK-SD08-001	1.50	0.55
Silver	0.15 - 0.58	4 / 8	0.63	SJSBK-SD08-001	0.21	0.18
Sodium	43.8 - 130	8 / 8	18,400	SJSBK-SD09-001	8,869	5,246
Thallium	0.95 - 2.60	1 / 8	0.0	SJSBK-SD09-001	0.69	0.39
Vanadium	0.15 - 0.38	8 / 8	86.0	SJSBK-SD09-001	42.5	23.8
Zinc	0.15 - 1.70	8 / 8	383	SJSBK-SD10-001	265	111
Pesticide/Polychlorinated Biphenyls (UG/KG)						
4,4'-DDD	5.50 - 13.0	7 / 8	51.0	SJSBK-SD10-001	13.1	17.3
4,4'-DDE	5.50 - 13.0	7 / 8	37.0	SJSBK-SD10-002	11.3	11.6
4,4'-DDT	5.50 - 13.0	6 / 8	7.20	SJSBK-SD10-001	3.20	2.42
Aldrin	3.00 - 6.40	1 / 5	0.0	SJSBK-SD09-001	1.93	1.21
Aroclor-1016	60.0 - 130	1 / 5	0.0	SJSBK-SD09-001	39.0	24.6
Aroclor-1221	120 - 260	1 / 5	0.0	SJSBK-SD09-001	78.0	49.2
Aroclor-1232	60.0 - 130	1 / 5	0.0	SJSBK-SD09-001	39.0	24.6
Aroclor-1242	60.0 - 130	1 / 5	0.0	SJSBK-SD09-001	39.0	24.6
Aroclor-1248	60.0 - 130	1 / 5	0.0	SJSBK-SD09-001	39.0	24.6
Aroclor-1254	60.0 - 130	1 / 5	0.0	SJSBK-SD09-001	39.0	24.6
Aroclor-1260	60.0 - 130	1 / 5	0.0	SJSBK-SD09-001	39.0	24.6
Dieldrin	6.00 - 13.0	1 / 5	0.0	SJSBK-SD09-001	3.90	2.46
Endosulfan I	3.00 - 6.40	1 / 5	0.0	SJSBK-SD09-001	1.93	1.21
Endosulfan II	6.00 - 13.0	1 / 5	0.0	SJSBK-SD09-001	3.90	2.46
Endosulfan sulfate	6.00 - 13.0	1 / 5	0.0	SJSBK-SD09-001	3.90	2.46
Endrin	6.00 - 13.0	1 / 5	0.0	SJSBK-SD09-001	3.90	2.46
Endrin aldehyde	6.00 - 13.0	1 / 5	0.0	SJSBK-SD09-001	3.90	2.46
Endrin ketone	6.00 - 13.0	1 / 5	0.0	SJSBK-SD09-001	3.90	2.46
Heptachlor	3.00 - 6.40	1 / 5	0.0	SJSBK-SD09-001	1.93	1.21
Heptachlor epoxide	3.00 - 6.40	1 / 5	0.0	SJSBK-SD09-001	1.93	1.21
Methoxychlor	30.0 - 64.0	1 / 5	0.0	SJSBK-SD09-001	19.3	12.1
Toxaphene	300 - 640	1 / 5	0.0	SJSBK-SD09-001	193	121
alpha-BHC	3.00 - 6.40	1 / 5	0.0	SJSBK-SD09-001	1.93	1.21
alpha-Chlordane	3.00 - 6.40	1 / 5	0.0	SJSBK-SD09-001	1.93	1.21
beta-BHC	3.00 - 6.40	1 / 5	0.0	SJSBK-SD09-001	1.93	1.21
delta-BHC	3.00 - 6.40	1 / 5	0.0	SJSBK-SD09-001	1.93	1.21
gamma-BHC (Lindane)	3.00 - 6.40	1 / 5	0.0	SJSBK-SD09-001	1.93	1.21
gamma-Chlordane	3.00 - 6.40	1 / 5	0.0	SJSBK-SD09-001	1.93	1.21
Semivolatile Organic Compounds (UG/KG)						
1,2,4-Trichlorobenzene	600 - 1,300	1 / 4	0.0	SJSBK-SD09-001	338	250
1,2-Dichlorobenzene	600 - 1,300	1 / 4	0.0	SJSBK-SD09-001	338	250
1,3-Dichlorobenzene	600 - 1,300	1 / 4	0.0	SJSBK-SD09-001	338	250
1,4-Dichlorobenzene	600 - 1,300	1 / 4	0.0	SJSBK-SD09-001	338	250
2,2'-Oxybis(1-chloropropane)	600 - 1,300	1 / 4	0.0	SJSBK-SD09-001	338	250
2,4,5-Trichlorophenol	1,500 - 3,200	2 / 6	0.0	SJSBK-SD09-001	817	683
2,4,6-Trichlorophenol	600 - 1,300	2 / 6	0.0	SJSBK-SD09-001	325	272
2,4-Dichlorophenol	600 - 1,300	2 / 6	0.0	SJSBK-SD09-001	325	272
2,4-Dimethylphenol	600 - 1,300	2 / 6	0.0	SJSBK-SD09-001	325	272
2,4-Dinitrophenol	1,500 - 3,200	2 / 6	0.0	SJSBK-SD09-001	817	683
2,4-Dinitrotoluene	600 - 1,300	1 / 4	0.0	SJSBK-SD09-001	338	250
2,6-Dinitrotoluene	600 - 1,300	1 / 4	0.0	SJSBK-SD09-001	338	250
2-Chloronaphthalene	600 - 1,300	1 / 4	0.0	SJSBK-SD09-001	338	250
2-Chlorophenol	600 - 1,300	2 / 6	0.0	SJSBK-SD09-001	325	272
2-Methylnaphthalene	600 - 1,300	1 / 4	0.0	SJSBK-SD09-001	338	250
2-Methylphenol	600 - 1,300	2 / 6	0.0	SJSBK-SD09-001	325	272

1 - One-half of the reporting limit was used for non-detected samples when calculating the mean.

Table G-3
Summary Statistics Table
Reference Sediment Samples - Blows Creek
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical	Reporting Limit Range	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Concentration	Arithmetic Mean[1]	Standard Deviation of Mean
2-Nitroaniline	1,500 - 3,200	1 / 4	0.0	SJSBK-SD09-001	850	631
2-Nitrophenol	600 - 1,300	2 / 6	0.0	SJSBK-SD09-001	325	272
3,3'-Dichlorobenzidine	600 - 1,300	1 / 4	0.0	SJSBK-SD09-001	338	250
3-Nitroaniline	1,500 - 3,200	1 / 4	0.0	SJSBK-SD09-001	850	631
4,6-Dinitro-2-methylphenol	1,500 - 3,200	2 / 6	0.0	SJSBK-SD09-001	817	683
4-Bromophenyl-phenylether	600 - 1,300	1 / 4	0.0	SJSBK-SD09-001	338	250
4-Chloro-3-methylphenol	600 - 1,300	2 / 6	0.0	SJSBK-SD09-001	325	272
4-Chloroaniline	600 - 1,300	1 / 4	0.0	SJSBK-SD09-001	338	250
4-Chlorophenyl-phenylether	600 - 1,300	1 / 4	0.0	SJSBK-SD09-001	338	250
4-Methylphenol	600 - 1,300	2 / 6	0.0	SJSBK-SD09-001	325	272
4-Nitroaniline	1,500 - 3,200	1 / 4	0.0	SJSBK-SD09-001	850	631
4-Nitrophenol	1,500 - 3,200	2 / 6	0.0	SJSBK-SD09-001	817	683
Acenaphthene	600 - 1,300	1 / 4	0.0	SJSBK-SD09-001	338	250
Acenaphthylene	600 - 1,300	1 / 4	0.0	SJSBK-SD09-001	338	250
Anthracene	600 - 1,300	1 / 4	0.0	SJSBK-SD09-001	338	250
Benzo(a)anthracene	600 - 1,300	4 / 5	360	SJSBK-SD08-001	272	185
Benzo(a)pyrene	600 - 1,300	4 / 5	320	SJSBK-SD08-001	248	182
Benzo(b)fluoranthene	550 - 1,300	7 / 8	520	SJSBK-SD08-001	248	191
Benzo(g,h,i)perylene	600 - 1,300	4 / 5	190	SJSBK-SD08-001	181	193
Benzo(k)fluoranthene	600 - 1,300	4 / 5	210	SJSBK-SD08-001	208	182
Butylbenzylphthalate	600 - 1,300	1 / 4	0.0	SJSBK-SD09-001	338	250
Carbazole	600 - 1,300	1 / 4	0.0	SJSBK-SD09-001	338	250
Chrysene	550 - 1,300	6 / 7	430	SJSBK-SD08-001	234	188
Di-n-butylphthalate	600 - 1,300	1 / 4	0.0	SJSBK-SD09-001	338	250
Di-n-octylphthalate	600 - 1,300	1 / 4	0.0	SJSBK-SD09-001	338	250
Dibenz(a,h)anthracene	600 - 1,300	2 / 4	60.0	SJSBK-SD07-001	278	288
Dibenzofuran	600 - 1,300	1 / 4	0.0	SJSBK-SD09-001	338	250
Diethylphthalate	600 - 1,300	2 / 4	86.0	SJSBK-SD07-001	284	281
Dimethyl phthalate	600 - 1,300	1 / 4	0.0	SJSBK-SD09-001	338	250
Fluoranthene	550 - 1,500	7 / 8	470	SJSBK-SD08-001	271	159
Fluorene	600 - 1,300	1 / 4	0.0	SJSBK-SD09-001	338	250
Hexachlorobenzene	600 - 1,300	1 / 4	0.0	SJSBK-SD09-001	338	250
Hexachlorobutadiene	600 - 1,300	1 / 4	0.0	SJSBK-SD09-001	338	250
Hexachlorocyclopentadiene	600 - 1,300	1 / 4	0.0	SJSBK-SD09-001	338	250
Hexachloroethane	600 - 1,300	1 / 4	0.0	SJSBK-SD09-001	338	250
Indeno(1,2,3-cd)pyrene	600 - 1,300	3 / 4	190	SJSBK-SD08-001	208	211
Isophorone	600 - 1,300	1 / 5	0.0	SJSBK-SD09-001	390	246
Naphthalene	600 - 1,300	1 / 4	0.0	SJSBK-SD09-001	338	250
Nitrobenzene	600 - 1,300	1 / 4	0.0	SJSBK-SD09-001	338	250
Pentachlorophenol	1,500 - 3,200	2 / 6	0.0	SJSBK-SD09-001	817	683
Phenanthrene	600 - 1,300	1 / 4	0.0	SJSBK-SD09-001	338	250
Phenol	600 - 1,300	2 / 6	0.0	SJSBK-SD09-001	325	272
Pyrene	550 - 1,300	7 / 8	380	SJSBK-SD07-002	234	176
bis(2-Chloroethoxy)methane	600 - 1,300	2 / 4	1,000	SJSBK-SD10-001	463	423
bis(2-Chloroethyl)ether	600 - 1,300	1 / 4	0.0	SJSBK-SD09-001	338	250
bis(2-Ethylhexyl)phthalate	600 - 1,300	1 / 4	0.0	SJSBK-SD09-001	338	250
n-Nitroso-di-n-propylamine	600 - 1,300	1 / 4	0.0	SJSBK-SD09-001	338	250
n-Nitrosodiphenylamine	600 - 1,300	1 / 4	0.0	SJSBK-SD09-001	338	250
Volatile Organic Compounds (UG/KG)						
1,1,1-Trichloroethane	16.0 - 39.0	2 / 7	0.0	SJSBK-SD09-001	8.50	6.81
1,1,2,2-Tetrachloroethane	16.0 - 39.0	2 / 7	0.0	SJSBK-SD09-001	8.50	6.81
1,1,2-Trichloroethane	16.0 - 39.0	2 / 7	0.0	SJSBK-SD09-001	8.50	6.81
1,1-Dichloroethane	16.0 - 39.0	2 / 7	0.0	SJSBK-SD09-001	8.50	6.81
1,1-Dichloroethene	16.0 - 39.0	2 / 7	0.0	SJSBK-SD09-001	8.50	6.81
1,2-Dichloroethane	16.0 - 39.0	2 / 7	0.0	SJSBK-SD09-001	8.50	6.81
1,2-Dichloroethene (total)	16.0 - 39.0	2 / 7	0.0	SJSBK-SD09-001	8.50	6.81
1,2-Dichloropropane	16.0 - 39.0	2 / 7	0.0	SJSBK-SD09-001	8.50	6.81
2-Butanone	16.0 - 39.0	5 / 7	47.0	SJSBK-SD07-002	19.4	15.4
2-Hexanone	16.0 - 39.0	2 / 7	0.0	SJSBK-SD09-001	8.50	6.81
4-Methyl-2-pentanone	16.0 - 39.0	2 / 7	0.0	SJSBK-SD09-001	8.50	6.81
Acetone	16.0 - 39.0	3 / 7	1,100	SJSBK-SD07-002	187	407
Benzene	16.0 - 39.0	2 / 7	0.0	SJSBK-SD09-001	8.50	6.81
Bromodichloromethane	16.0 - 39.0	2 / 7	0.0	SJSBK-SD09-001	8.50	6.81
Bromoform	16.0 - 39.0	2 / 7	0.0	SJSBK-SD09-001	8.50	6.81
Bromomethane	16.0 - 39.0	2 / 7	0.0	SJSBK-SD09-001	8.50	6.81
Carbon disulfide	16.0 - 39.0	5 / 7	45.0	SJSBK-SD09-002P	16.7	14.8
Carbon tetrachloride	16.0 - 39.0	2 / 7	0.0	SJSBK-SD09-001	8.50	6.81
Chlorobenzene	16.0 - 39.0	2 / 7	0.0	SJSBK-SD09-001	8.50	6.81
Chloroethane	16.0 - 39.0	2 / 7	0.0	SJSBK-SD09-001	8.50	6.81
Chloroform	16.0 - 39.0	2 / 7	0.0	SJSBK-SD09-001	8.50	6.81
Chloromethane	16.0 - 39.0	2 / 7	0.0	SJSBK-SD09-001	8.50	6.81

1 - One-half of the reporting limit was used for non-detected samples when calculating the mean.

Table G-3
Summary Statistics Table
Reference Sediment Samples - Blows Creek
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical	Reporting Limit Range	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Concentration	Arithmetic Mean[1]	Standard Deviation of Mean
Dibromochloromethane	16.0 - 39.0	2 / 7	0.0	SJSBK-SD09-001	8.50	6.81
Ethylbenzene	16.0 - 39.0	2 / 7	0.0	SJSBK-SD09-001	8.50	6.81
Methylene chloride	16.0 - 39.0	2 / 7	0.0	SJSBK-SD09-001	8.50	6.81
Styrene	16.0 - 39.0	2 / 7	0.0	SJSBK-SD09-001	8.50	6.81
Tetrachloroethene	16.0 - 39.0	2 / 7	0.0	SJSBK-SD09-001	8.50	6.81
Toluene	16.0 - 39.0	4 / 7	5.00	SJSBK-SD09-002	7.29	6.97
Trichloroethene	16.0 - 39.0	2 / 7	0.0	SJSBK-SD09-001	8.50	6.81
Vinyl chloride	16.0 - 39.0	2 / 7	0.0	SJSBK-SD09-001	8.50	6.81
Xylene, total	16.0 - 39.0	2 / 7	0.0	SJSBK-SD09-001	8.50	6.81
cis-1,3-Dichloropropene	16.0 - 39.0	2 / 7	0.0	SJSBK-SD09-001	8.50	6.81
trans-1,3-Dichloropropene	16.0 - 39.0	2 / 7	0.0	SJSBK-SD09-001	8.50	6.81

1 - One-half of the reporting limit was used for non-detected samples when calculating the mean.

Table G-4
Summary Statistics Table
Reference Surface Water Samples - Blows Creek
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical	Reporting Limit Range	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Concentration	Arithmetic Mean[1]	Standard Deviation of Mean
Inorganics (UG/L)						
Aluminum	18.7 - 38.2	8 / 8	2,530	SJSBK-SW09-002	1,137	688
Antimony	2.70 - 2.80	0 / 8	--	--	1.38	0.027
Arsenic	2.00 - 3.60	3 / 8	5.50	SJSBK-SW07-002	2.21	1.43
Barium	0.20 - 0.30	8 / 8	44.2	SJSBK-SW10-001	38.6	3.30
Beryllium	0.10 - 0.20	1 / 8	0.11	SJSBK-SW08-001	0.083	0.027
Cadmium	0.30 - 0.30	1 / 8	0.32	SJSBK-SW10-001	0.20	0.086
Calcium	31.1 - 57.9	8 / 8	185,000	SJSBK-SW09-001	124,988	46,293
Chromium	0.60 - 1.10	5 / 8	2.50	SJSBK-SW09-002	1.19	0.73
Cobalt	0.50 - 0.80	8 / 8	5.00	SJSBK-SW08-001	2.17	1.41
Copper	0.80 - 1.10	8 / 8	12.2	SJSBK-SW08-001	9.00	2.10
Cyanide	5.00 - 5.00	1 / 8	7.70	SJSBK-SW10-001	3.15	1.84
Iron	17.2 - 30.8	8 / 8	2,400	SJSBK-SW09-002	1,335	717
Lead	1.00 - 1.40	8 / 8	16.8	SJSBK-SW10-002	8.07	5.21
Magnesium	24.3 - 243	8 / 8	579,000	SJSBK-SW09-001	326,050	170,904
Manganese	0.040 - 0.40	8 / 8	415	SJSBK-SW08-001	204	107
Mercury	0.10 - 0.10	1 / 8	0.11	SJSBK-SW09-002	0.058	0.021
Nickel	0.90 - 0.90	8 / 8	7.90	SJSBK-SW08-001	4.03	2.23
Potassium	16.7 - 167	8 / 8	210,000	SJSBK-SW09-001	119,063	61,756
Selenium	2.60 - 3.10	0 / 8	--	--	1.42	0.13
Silver	0.70 - 0.90	0 / 8	--	--	0.40	0.053
Sodium	408 - 2,040	8 / 8	4,990,000	SJSBK-SW09-001	2,803,250	1,530,619
Thallium	3.20 - 5.20	0 / 8	--	--	2.10	0.53
Vanadium	0.60 - 0.70	8 / 8	7.70	SJSBK-SW09-002	4.46	2.14
Zinc	0.70 - 1.90	7 / 8	63.5	SJSBK-SW08-001	35.1	22.9
Semivolatile Organic Compounds (UG/L)						
1,2,4-Trichlorobenzene	10.0 - 11.0	0 / 8	--	--	5.25	0.27
1,2-Dichlorobenzene	10.0 - 11.0	0 / 8	--	--	5.25	0.27
1,3-Dichlorobenzene	10.0 - 11.0	0 / 8	--	--	5.25	0.27
1,4-Dichlorobenzene	10.0 - 11.0	0 / 8	--	--	5.25	0.27
2,2'-Oxybis(1-chloropropane)	10.0 - 11.0	0 / 8	--	--	5.25	0.27
2,4,5-Trichlorophenol	26.0 - 28.0	0 / 8	--	--	13.3	0.46
2,4,6-Trichlorophenol	10.0 - 11.0	0 / 8	--	--	5.25	0.27
2,4-Dichlorophenol	10.0 - 11.0	0 / 8	--	--	5.25	0.27
2,4-Dimethylphenol	10.0 - 11.0	0 / 8	--	--	5.25	0.27
2,4-Dinitrophenol	26.0 - 28.0	0 / 8	--	--	13.3	0.46
2,4-Dinitrotoluene	10.0 - 11.0	0 / 8	--	--	5.25	0.27
2,6-Dinitrotoluene	10.0 - 11.0	0 / 8	--	--	5.25	0.27
2-Chloronaphthalene	10.0 - 11.0	0 / 8	--	--	5.25	0.27
2-Chlorophenol	10.0 - 11.0	0 / 8	--	--	5.25	0.27
2-Methylnaphthalene	10.0 - 11.0	0 / 8	--	--	5.25	0.27
2-Methylphenol	10.0 - 11.0	0 / 8	--	--	5.25	0.27
2-Nitroaniline	26.0 - 28.0	0 / 8	--	--	13.3	0.46
2-Nitrophenol	10.0 - 11.0	0 / 8	--	--	5.25	0.27
3,3'-Dichlorobenzidine	10.0 - 11.0	0 / 8	--	--	5.25	0.27
3-Nitroaniline	26.0 - 28.0	0 / 8	--	--	13.3	0.46
4,6-Dinitro-2-methylphenol	26.0 - 28.0	0 / 8	--	--	13.3	0.46
4-Bromophenyl-phenylether	10.0 - 11.0	0 / 8	--	--	5.25	0.27
4-Chloro-3-methylphenol	10.0 - 11.0	0 / 8	--	--	5.25	0.27
4-Chloroaniline	10.0 - 11.0	0 / 8	--	--	5.25	0.27
4-Chlorophenyl-phenylether	10.0 - 11.0	0 / 8	--	--	5.25	0.27
4-Methylphenol	10.0 - 11.0	0 / 8	--	--	5.25	0.27
4-Nitroaniline	26.0 - 28.0	0 / 8	--	--	13.3	0.46
4-Nitrophenol	26.0 - 28.0	0 / 8	--	--	13.3	0.46
Acenaphthene	10.0 - 11.0	0 / 8	--	--	5.25	0.27
Acenaphthylene	10.0 - 11.0	0 / 8	--	--	5.25	0.27
Anthracene	10.0 - 11.0	0 / 8	--	--	5.25	0.27
Benzo(a)anthracene	10.0 - 11.0	0 / 8	--	--	5.25	0.27
Benzo(a)pyrene	10.0 - 11.0	0 / 8	--	--	5.25	0.27
Benzo(b)fluoranthene	10.0 - 11.0	0 / 8	--	--	5.25	0.27
Benzo(g,h,i)perylene	10.0 - 11.0	0 / 8	--	--	5.25	0.27
Benzo(k)fluoranthene	10.0 - 11.0	0 / 8	--	--	5.25	0.27
Butylbenzylphthalate	10.0 - 11.0	0 / 8	--	--	5.25	0.27
Carbazole	10.0 - 11.0	0 / 8	--	--	5.25	0.27
Chrysene	10.0 - 11.0	0 / 8	--	--	5.25	0.27
Di-n-butylphthalate	10.0 - 11.0	1 / 8	1.00	SJSBK-SW09-002	4.75	1.54
Di-n-octylphthalate	10.0 - 11.0	0 / 8	--	--	5.25	0.27
Dibenz(a,h)anthracene	10.0 - 11.0	0 / 8	--	--	5.25	0.27
Dibenzofuran	10.0 - 11.0	0 / 8	--	--	5.25	0.27
Diethylphthalate	10.0 - 11.0	0 / 8	--	--	5.25	0.27

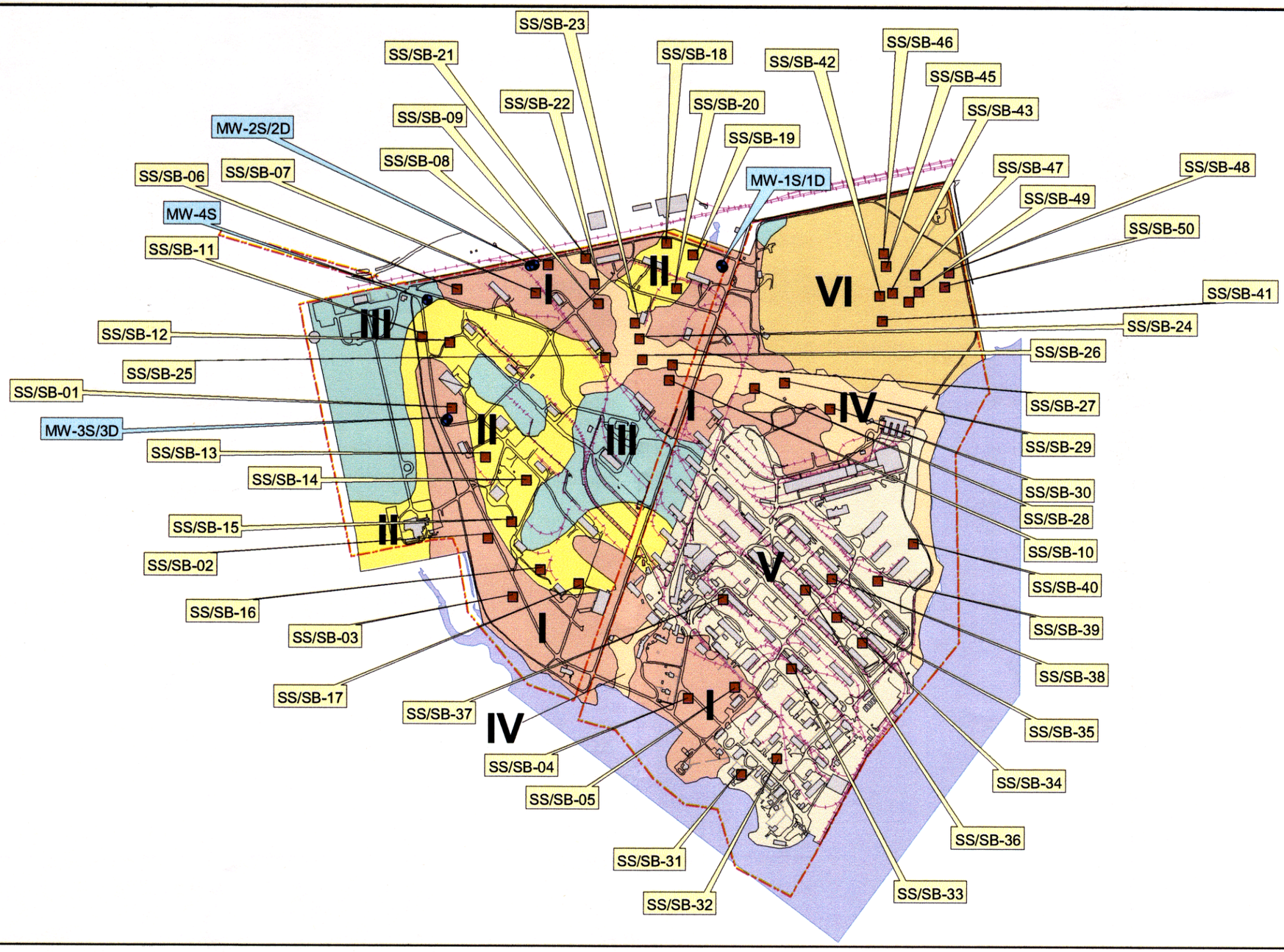
1 - One-half of the reporting limit was used for non-detected samples when calculating the mean.

Table G-4
Summary Statistics Table
Reference Surface Water Samples - Blows Creek
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical	Reporting Limit Range	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Concentration	Arithmetic Mean[1]	Standard Deviation of Mean
Dimethyl phthalate	10.0 - 11.0	0 / 8	--	--	5.25	0.27
Fluoranthene	10.0 - 11.0	0 / 8	--	--	5.25	0.27
Fluorene	10.0 - 11.0	0 / 8	--	--	5.25	0.27
Hexachlorobenzene	10.0 - 11.0	0 / 8	--	--	5.25	0.27
Hexachlorobutadiene	10.0 - 11.0	0 / 8	--	--	5.25	0.27
Hexachlorocyclopentadiene	10.0 - 11.0	0 / 8	--	--	5.25	0.27
Hexachloroethane	10.0 - 11.0	0 / 8	--	--	5.25	0.27
Indeno(1,2,3-cd)pyrene	10.0 - 11.0	0 / 8	--	--	5.25	0.27
Isophorone	10.0 - 11.0	0 / 8	--	--	5.25	0.27
Naphthalene	10.0 - 11.0	0 / 8	--	--	5.25	0.27
Nitrobenzene	10.0 - 11.0	0 / 8	--	--	5.25	0.27
Pentachlorophenol	26.0 - 28.0	0 / 8	--	--	13.3	0.46
Phenanthrene	10.0 - 11.0	0 / 8	--	--	5.25	0.27
Phenol	10.0 - 11.0	0 / 8	--	--	5.25	0.27
Pyrene	10.0 - 11.0	0 / 8	--	--	5.25	0.27
bis(2-Chloroethoxy)methane	10.0 - 11.0	0 / 8	--	--	5.25	0.27
bis(2-Chloroethyl)ether	10.0 - 11.0	0 / 8	--	--	5.25	0.27
bis(2-Ethylhexyl)phthalate	10.0 - 11.0	0 / 8	--	--	5.25	0.27
n-Nitroso-di-n-propylamine	10.0 - 11.0	0 / 8	--	--	5.25	0.27
n-Nitrosodiphenylamine	10.0 - 11.0	0 / 8	--	--	5.25	0.27

1 - One-half of the reporting limit was used for non-detected samples when calculating the mean.

File Path: v:\18gis\st.juliens creek\figures\stjuliens-egis.apr



LEGEND

- Soil Sample Locations
- Monitoring Well Locations
- I - Munden-Tetotum
- II - Dragston-Augusta Association
- III - Nimmo
- IV - Bohicket
- V - Urban-Udorthents
- VI - Dredge Fill

N

0 500 1000 Feet

Figure G-1
Background Sampling Locations
St. Juliens Creek Annex
Chesapeake, Virginia

CH2MHILL

File Path: v:\18gis\st-juliens\figures\era study.apr

LEGEND

- Sediment Sample Locations
- Surface Water Sample Locations
- IR Sites

N

0 200 400 Feet

Figure G-2
Reference Background Sediment and
Surface Water Locations in Blows Creek
St. Juliens Creek Annex
Chesapeake, Virginia

CH2MHILL

Appendix H
Surface Soil Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-SS01	SJS3-SS02	SJS3-SS03	SJS3-SS04	SJS3-SS05	SJS3-SS06		SJS3-SS07	SJS3-SS08
Sample ID	SJS03-SS01-000	SJS03-SS02-000	SJS03-SS03-000	SJS03-SS04-000	SJS03-SS05-000	SJS03-SS06-000	SJS03-SS06-000P	SJS03-SS07-000	SJS03-SS08-000
Sample Date	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	04/20/99
Chemical Name									
Volatile Organic Compounds (UG/KG)									
1,1,1-Trichloroethane	10 U	10 U	11 U	11 UJ	12 U	12 U	12 UJ	12 U	14 U
1,1,2,2-Tetrachloroethane	10 U	10 U	11 UJ	11 UJ	12 UJ	12 UJ	12 UJ	12 U	14 U
1,1,2-Trichloroethane	10 U	10 U	11 U	11 UJ	12 U	12 U	12 UJ	12 U	14 U
1,1-Dichloroethane	10 U	10 U	11 U	11 U	12 U	12 U	12 UJ	12 U	14 U
1,1-Dichloroethene	10 U	10 U	11 U	11 U	12 U	12 U	12 UJ	12 U	14 U
1,2-Dichloroethane	10 U	10 U	11 U	11 U	12 U	12 U	12 UJ	12 U	14 U
1,2-Dichloroethene (total)	10 U	10 U	11 U	11 U	12 U	12 U	12 UJ	12 U	14 U
1,2-Dichloropropane	10 U	10 U	11 U	11 UJ	12 U	12 U	12 UJ	12 U	14 U
2-Butanone	10 U	10 U	11 U	11 U	12 U	12 U	12 UJ	12 U	14 U
2-Hexanone	10 U	10 U	11 UJ	11 UJ	12 UJ	12 UJ	12 UJ	12 U	14 U
4-Methyl-2-pentanone	10 U	10 U	11 UJ	11 UJ	12 UJ	12 UJ	12 UJ	12 U	14 U
Acetone	5 B	6 B	21 B	6 B	4 B	8 B	77 B	69 B	19
Benzene	10 U	10 U	11 U	11 UJ	12 U	12 U	12 UJ	12 U	14 U
Bromodichloromethane	10 U	10 U	11 U	11 UJ	12 U	12 U	12 UJ	12 U	14 U
Bromoform	10 U	10 U	11 U	11 UJ	12 U	12 U	12 UJ	12 U	14 U
Bromomethane	10 U	10 U	11 U	11 U	12 U	12 U	12 UJ	12 U	14 U
Carbon disulfide	10 U	10 U	11 U	11 U	12 U	12 U	12 UJ	12 U	14 U
Carbon tetrachloride	10 U	10 U	11 U	11 UJ	12 U	12 U	12 UJ	12 U	14 U
Chlorobenzene	10 U	10 U	11 UJ	11 UJ	12 UJ	12 UJ	12 UJ	12 U	14 U
Chloroethane	10 U	10 U	11 U	11 U	12 U	12 U	12 UJ	12 U	14 U
Chloroform	10 U	10 U	11 U	11 U	12 U	12 U	12 UJ	12 U	14 U
Chloromethane	10 U	10 U	11 U	11 U	12 U	12 U	12 UJ	12 U	4 J
Dibromochloromethane	10 U	10 U	11 U	11 UJ	12 U	12 U	12 UJ	12 U	14 U
Ethylbenzene	10 U	10 U	11 UJ	11 UJ	12 UJ	12 UJ	12 UJ	12 U	14 U
Methylene chloride	15 B	9 B	130 B	140 B	110 B	100 B	71 B	82 B	10 B
Styrene	10 U	10 U	11 UJ	11 UJ	12 UJ	12 UJ	12 UJ	12 U	14 U
Tetrachloroethene	2 J	2 J	11 UJ	11 UJ	12 UJ	12 UJ	12 UJ	12 U	14 U
Toluene	10 U	10 U	11 UJ	11 UJ	2 J	12 UJ	12 UJ	12 U	14 U
Trichloroethene	10 U	10 U	11 U	11 UJ	12 U	12 U	12 UJ	12 U	14 U
Vinyl chloride	10 U	10 U	11 U	11 U	12 U	12 U	12 UJ	12 U	14 U
Xylene, total	10 U	10 U	11 UJ	11 UJ	12 UJ	12 UJ	12 UJ	12 U	14 U
cis-1,3-Dichloropropene	10 U	10 U	11 U	11 UJ	12 U	12 U	12 UJ	12 U	14 U
trans-1,3-Dichloropropene	10 U	10 U	11 U	11 UJ	12 U	12 U	12 UJ	12 U	14 U

U - Analyte not detected
UJ - Not detected, quantitation limit may be inaccurate

B - Analyte not detected above associated blank
J - Reported value is estimated
L - Reported value may be biased low
R - Unreliable result

Appendix H
Surface Soil Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-SS01	SJS3-SS02	SJS3-SS03	SJS3-SS04	SJS3-SS05	SJS3-SS06		SJS3-SS07	SJS3-SS08
Sample ID	SJS03-SS01-000	SJS03-SS02-000	SJS03-SS03-000	SJS03-SS04-000	SJS03-SS05-000	SJS03-SS06-000	SJS03-SS06-000P	SJS03-SS07-000	SJS03-SS08-000
Sample Date	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	04/20/99
Chemical Name									
Semi-volatile Organic Compounds (UG/KG)									
1,2,4-Trichlorobenzene	340 UJ	340 U	360 U	360 U	430 U	410 U	410 U	380 U	480 UJ
1,2-Dichlorobenzene	340 UJ	340 U	360 U	360 U	430 U	410 U	410 U	380 U	480 UJ
1,3-Dichlorobenzene	340 UJ	340 U	360 U	360 U	430 U	410 U	410 U	380 U	480 UJ
1,4-Dichlorobenzene	340 UJ	340 U	360 U	360 U	430 U	410 U	410 U	380 U	480 UJ
2,2'-Oxybis(1-chloropropane)	340 UJ	340 U	360 U	360 U	430 U	410 U	410 U	380 U	480 UJ
2,4,5-Trichlorophenol	840 UJ	840 U	900 U	900 U	1,100 U	1,000 U	1,000 U	960 U	1,200 UJ
2,4,6-Trichlorophenol	340 UJ	340 U	360 U	360 U	430 U	410 U	410 U	380 U	480 UJ
2,4-Dichlorophenol	340 UJ	340 U	360 U	360 U	430 U	410 U	410 U	380 U	480 UJ
2,4-Dimethylphenol	340 UJ	340 U	360 U	360 U	430 U	410 U	410 U	380 U	480 UJ
2,4-Dinitrophenol	840 UJ	840 U	900 U	900 U	1,100 U	1,000 U	1,000 U	960 U	1,200 UJ
2,4-Dinitrotoluene	340 UJ	340 U	360 U	360 U	430 U	410 U	410 U	380 U	480 UJ
2,6-Dinitrotoluene	340 UJ	340 U	360 U	360 U	430 U	410 U	410 U	380 U	480 UJ
2-Chloronaphthalene	340 UJ	340 U	360 U	360 U	430 U	410 U	410 U	380 U	480 UJ
2-Chlorophenol	340 UJ	340 U	360 U	360 U	430 U	410 U	410 U	380 U	480 UJ
2-Methylnaphthalene	340 UJ	340 U	360 U	360 U	430 U	410 U	410 U	380 U	480 UJ
2-Methylphenol	340 UJ	340 U	360 U	360 U	430 U	410 U	410 U	380 U	480 UJ
2-Nitroaniline	840 UJ	840 U	900 U	900 U	1,100 U	1,000 U	1,000 U	960 U	1,200 UJ
2-Nitrophenol	340 UJ	340 U	360 U	360 U	430 U	410 U	410 U	380 U	480 UJ
3,3'-Dichlorobenzidine	340 UJ	340 U	360 U	360 U	430 U	410 U	410 U	380 U	480 UJ
3-Nitroaniline	840 UJ	840 U	900 U	900 UJ	1,100 U	1,000 UJ	1,000 UJ	960 U	1,200 UJ
4,6-Dinitro-2-methylphenol	840 UJ	840 U	900 U	900 U	1,100 U	1,000 U	1,000 U	960 U	1,200 UJ
4-Bromophenyl-phenylether	340 UJ	340 U	360 U	360 U	430 U	410 U	410 U	380 U	480 UJ
4-Chloro-3-methylphenol	340 UJ	340 U	360 U	360 U	430 U	410 U	410 U	380 U	480 UJ
4-Chloroaniline	340 UJ	340 U	360 U	360 U	430 U	410 U	410 U	380 U	480 UJ
4-Chlorophenyl-phenylether	340 UJ	340 U	360 U	360 U	430 U	410 U	410 U	380 U	480 UJ
4-Methylphenol	340 UJ	340 U	360 U	360 U	430 U	410 U	410 U	380 U	480 UJ
4-Nitroaniline	840 UJ	840 U	900 U	900 U	1,100 U	1,000 U	1,000 U	960 U	1,200 UJ
4-Nitrophenol	840 UJ	840 U	900 U	900 U	1,100 U	1,000 U	1,000 U	960 U	1,200 UJ
Acenaphthene	340 UJ	340 U	360 U	360 U	430 U	410 U	410 U	380 U	480 UJ
Acenaphthylene	340 UJ	340 U	63 J	360 U	56 J	84 J	86 J	54 J	480 UJ
Anthracene	340 UJ	340 U	65 J	43 J	57 J	79 J	120 J	83 J	480 UJ
Benzo(a)anthracene	340 UJ	36 J	370	120 J	200 J	300 J	390 J	350 J	480 UJ
Benzo(a)pyrene	340 UJ	38 J	320 J	180 J	200 J	340 J	350 J	350 J	480 UJ
Benzo(b)fluoranthene	60 J	62 J	670	550	850	1,500	1,500	1,200	480 UJ
Benzo(g,h,i)perylene	340 UJ	340 U	130 J	170 J	190 J	340 J	330 J	220 J	480 UJ

B - Analyte not detected above associated blank
J - Reported value is estimated
L - Reported value may be biased low
R - Unreliable result

U - Analyte not detected
UJ - Not detected, quantitation limit may be inaccurate

Appendix H
Surface Soil Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-SS01	SJS3-SS02	SJS3-SS03	SJS3-SS04	SJS3-SS05	SJS3-SS06		SJS3-SS07	SJS3-SS08
Sample ID	SJS03-SS01-000	SJS03-SS02-000	SJS03-SS03-000	SJS03-SS04-000	SJS03-SS05-000	SJS03-SS06-000	SJS03-SS06-000P	SJS03-SS07-000	SJS03-SS08-000
Sample Date	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	04/20/99
Chemical Name									
Benzo(k)fluoranthene	340 UJ	340 U	270 J	170 J	350 J	400 J	420	460	480 UJ
Butylbenzylphthalate	340 UJ	340 U	360 U	360 U	430 U	410 U	410 U	380 U	480 UJ
Carbazole	340 UJ	340 U	360 U	45 J	430 U	43 J	130 J	380 U	480 UJ
Chrysene	68 J	41 J	460	280 J	420 J	690	890	730	480 UJ
Di-n-butylphthalate	340 UJ	340 U	360 U	360 U	430 U	410 U	410 U	380 U	480 UJ
Di-n-octylphthalate	340 UJ	340 U	360 U	360 U	430 U	410 U	410 U	380 U	480 UJ
Dibenz(a,h)anthracene	340 UJ	340 U	360 U	360 U	430 U	410 U	410 U	380 U	480 UJ
Dibenzofuran	340 UJ	340 U	38 J	360 U	430 U	410 U	58 J	380 U	480 UJ
Diethylphthalate	340 UJ	340 U	360 U	360 U	430 U	410 U	410 U	79 J	480 UJ
Dimethyl phthalate	340 UJ	340 U	360 U	360 U	430 U	410 U	410 U	380 U	480 UJ
Fluoranthene	340 UJ	63 J	610	270 J	310 J	460	640	550	480 UJ
Fluorene	340 UJ	340 U	360 U	360 U	430 U	410 U	48 J	380 U	480 UJ
Hexachlorobenzene	340 UJ	340 U	360 U	360 U	430 U	410 U	410 U	380 U	480 UJ
Hexachlorobutadiene	340 UJ	340 U	360 U	360 U	430 U	410 U	410 U	380 U	480 UJ
Hexachlorocyclopentadiene	340 UJ	340 U	360 U	360 U	430 U	410 U	410 U	380 U	480 UJ
Hexachloroethane	340 UJ	340 U	360 U	360 U	430 U	410 U	410 U	380 U	480 UJ
Indeno(1,2,3-cd)pyrene	340 UJ	340 U	180 J	180 J	260 J	390 J	440	250 J	480 UJ
Isophorone	340 UJ	340 U	360 U	360 U	430 U	410 U	410 U	380 U	480 UJ
Naphthalene	340 UJ	340 U	130 J	360 U	430 U	55 J	69 J	53 J	480 UJ
Nitrobenzene	340 UJ	340 U	360 U	360 U	430 U	410 U	410 U	380 U	480 UJ
Pentachlorophenol	840 UJ	840 U	900 U	900 U	1,100 U	87 J	160 J	960 U	1,200 UJ
Phenanthrene	340 UJ	340 U	220 J	130 J	100 J	160 J	420 J	200 J	480 UJ
Phenol	340 UJ	340 U	360 U	360 U	430 U	410 U	410 U	380 U	480 UJ
Pyrene	110 J	54 J	440 J	200 J	200 J	350 J	560 J	370 J	480 UJ
bis(2-Chloroethoxy)methane	340 UJ	340 U	360 U	360 U	430 U	410 U	410 U	380 U	480 UJ
bis(2-Chloroethyl)ether	340 UJ	340 U	360 U	360 U	430 U	410 U	410 U	380 U	480 UJ
bis(2-Ethylhexyl)phthalate	96 B	340 U	70 B	490 B	66 B	100 B	81 B	67 B	480 UJ
n-Nitroso-di-n-propylamine	340 UJ	340 U	360 U	360 U	430 U	410 U	410 U	380 U	480 UJ
n-Nitrosodiphenylamine	340 UJ	340 U	360 U	360 U	430 U	410 U	410 U	380 U	480 UJ
Pesticide/Polychlorinated Biphenyls (UG/KG)									
4,4'-DDD	3.4 U	3.4 U	4.6 J	13 J	4.3 UJ	2.4 J	2.9 J	43	4.70 UJ
4,4'-DDE	3.4 U	3.4 U	12 J	18	4.3 UJ	5.6 J	6.4 J	34	4.70 UJ
4,4'-DDT	3.4 U	3.4 U	13 J	19 J	4.3 UJ	15 J	16 J	130	4.70 UJ
Aldrin	1.7 U	1.7 U	1.9 UJ	1.9 U	2.2 UJ	2.1 UJ	2.1 U	2 U	2.40 UJ
Aroclor-1016	34 U	34 U	36 UJ	36 U	43 UJ	41 UJ	41 U	38 U	47 UJ

B - Analyte not detected above associated blank
J - Reported value is estimated
L - Reported value may be biased low
R - Unreliable result

U - Analyte not detected
UJ - Not detected, quantitation limit may be inaccurate

Appendix H
Surface Soil Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-SS01	SJS3-SS02	SJS3-SS03	SJS3-SS04	SJS3-SS05	SJS3-SS06		SJS3-SS07	SJS3-SS08
Sample ID	SJS03-SS01-000	SJS03-SS02-000	SJS03-SS03-000	SJS03-SS04-000	SJS03-SS05-000	SJS03-SS06-000	SJS03-SS06-000P	SJS03-SS07-000	SJS03-SS08-000
Sample Date	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	04/20/99
Chemical Name									
Aroclor-1221	69 U	68 U	73 UJ	73 U	88 UJ	83 UJ	83 U	78 U	95 UJ
Aroclor-1232	34 U	34 U	36 UJ	36 U	43 UJ	41 UJ	41 U	38 U	47 UJ
Aroclor-1242	34 U	34 U	36 UJ	36 U	43 UJ	41 UJ	41 U	38 U	47 UJ
Aroclor-1248	34 U	34 U	36 UJ	36 U	43 UJ	41 UJ	41 U	38 U	47 UJ
Aroclor-1254	34 U	34 U	36 UJ	100	43 UJ	41 UJ	41 U	78	47 UJ
Aroclor-1260	34 U	34 U	36 UJ	36 U	43 UJ	41 UJ	41 U	38 U	47 UJ
Dieldrin	3.4 U	3.4 U	3.6 UJ	3.6 U	4.3 UJ	4.1 UJ	4.1 U	5.3 J	4.70 UJ
Endosulfan I	1.7 U	1.7 U	1.9 UJ	1.9 U	2.2 UJ	2.1 UJ	2.1 U	2 U	2.40 UJ
Endosulfan II	3.4 U	3.4 U	3.6 UJ	3.6 U	4.3 UJ	4.1 UJ	4.1 U	3.8 U	4.70 UJ
Endosulfan sulfate	3.4 U	3.4 U	3.6 UJ	3.6 U	4.3 UJ	4.1 UJ	4.1 U	3.8 U	4.70 UJ
Endrin	3.4 U	3.4 U	3.6 UJ	3.6 U	4.3 UJ	4.1 UJ	4.1 U	3.8 U	4.70 UJ
Endrin aldehyde	3.4 U	3.4 U	3.6 UJ	3.6 U	4.3 UJ	4.1 UJ	4.1 U	3.8 U	4.70 UJ
Endrin ketone	3.4 U	3.4 U	3.6 UJ	3.6 U	4.3 UJ	4.1 UJ	4.1 U	3.8 U	4.70 UJ
Heptachlor	1.7 U	1.7 U	1.9 UJ	1.9 U	2.2 UJ	2.1 UJ	2.1 U	2 U	2.40 UJ
Heptachlor epoxide	1.7 U	1.7 U	1.9 UJ	1.9 U	2.2 UJ	2.1 UJ	2.1 U	2 U	2.40 UJ
Methoxychlor	17 U	17 U	19 UJ	19 U	22 UJ	21 UJ	21 U	20 U	24 UJ
Toxaphene	170 U	170 U	190 UJ	190 U	220 UJ	210 UJ	210 U	200 U	240 UJ
alpha-BHC	1.7 U	1.7 U	1.9 UJ	1.9 U	2.2 UJ	2.1 UJ	2.1 U	2 U	2.40 UJ
alpha-Chlordane	1.7 U	1.7 U	1.9 UJ	1.9 U	2.2 UJ	2.1 UJ	2.1 U	2 U	2.40 UJ
beta-BHC	1.7 U	1.7 U	1.9 UJ	1.9 U	2.2 UJ	2.1 UJ	2.1 U	2 U	2.40 UJ
delta-BHC	1.7 U	1.7 U	1.9 UJ	1.9 U	2.2 UJ	2.1 UJ	2.1 U	2 U	2.40 UJ
gamma-BHC (Lindane)	1.7 U	1.7 U	1.9 UJ	1.9 U	2.2 UJ	2.1 UJ	2.1 U	2 U	2.40 UJ
gamma-Chlordane	1.7 U	1.7 U	1.9 UJ	1.9 U	2.2 UJ	2.1 UJ	2.1 U	2 U	2.40 UJ
Total Metals (MG/KG)									
Aluminum	6,700	3,310	4,550	9,320	21,400	17,800	17,500	14,000	6,390
Antimony	0.38 UL	0.38 UL	0.54 B	1.4 B	0.65 B	0.81 B	0.61 B	1.4 B	0.650 UL
Arsenic	1.3 J	2.2	4.2 L	6.3 L	13.9 L	12.6 L	13.3 L	13.1 L	3
Barium	45.4	14.6 J	37 J	170	124	94.1	87.2	211	37.2 J
Beryllium	0.31 J	0.19 U	0.29 J	0.35 J	0.76 J	0.51 J	0.53 J	1.3	0.210 J
Cadmium	0.1 U	0.47 J	0.09 U	0.38 J	0.12 U	0.12 U	0.12 U	0.32 J	0.180 B
Calcium	3,090	702 J	1,440	6,240	773 J	1,700	1,670	4,750	836 J
Chromium	6.4	6.8	9.9	24.1	42.1	33.2	33.9	30.2	10.4
Cobalt	7.4 J	1.5 U	3.4 J	5.6 J	6.7 J	6.4 J	6.5 J	6.7 J	1.20 J
Copper	10.3	5.3	17.1	89.4	60.9	37.7	35.8	125	10.3
Cyanide	0.5 U	0.5 U	0.54 U	0.57 U	0.61 U	0.62 U	0.62 U	0.59 U	0.350 U

U - Analyte not detected
UJ - Not detected, quantitation limit may be inaccurate

B - Analyte not detected above associated blank
J - Reported value is estimated
L - Reported value may be biased low
R - Unreliable result

Appendix H
Surface Soil Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-SS01	SJS3-SS02	SJS3-SS03	SJS3-SS04	SJS3-SS05	SJS3-SS06		SJS3-SS07	SJS3-SS08
Sample ID	SJS03-SS01-000	SJS03-SS02-000	SJS03-SS03-000	SJS03-SS04-000	SJS03-SS05-000	SJS03-SS06-000	SJS03-SS06-000P	SJS03-SS07-000	SJS03-SS08-000
Sample Date	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	04/20/99
Chemical Name									
Iron	12,700	3,440	9,650	21,900	31,600	30,700	34,000	15,600	6,110
Lead	6.7 J	11.4 J	37.5 J	226 J	147 J	86 J	107 J	240 J	27.1
Magnesium	4,690	283 J	961 B	2,900	3,590	3,180	3,340	1,590	441 J
Manganese	274	16	114	246	119	138	143	119	29.8
Mercury	0.04 U	0.05 U	0.18	0.22	0.6	0.53	0.35	0.54	0.0400 J
Nickel	7.1 J	1.32 U	4.9 J	13	15.8	13	11.4	22	3.40 J
Potassium	4,030	241 J	1,100	2,090	2,590	2,950	3,130	1,540	387 J
Selenium	0.57 U	0.56 U	0.57 UL	0.68 UL	0.74 UL	0.7 UL	0.73 UL	0.71 UL	0.620 U
Silver	0.67 B	0.19 U	0.19 U	1.2 B	1.1 B	0.48 B	0.74 B	0.98 B	0.220 U
Sodium	77.2 B	43.5 B	90.7 B	473 J	233 B	238 B	240 B	399 J	35.4 U
Thallium	0.38 U	0.38 U	0.69 J	1.8 J	2.5	2.2 B	2.2 B	1.1 B	0.770 U
Vanadium	30.7	7.9 J	23.5	31.5	79.8	76.6	60.1	79.4	18.1
Zinc	57	15.5	64.6 L	460 L	94.6 L	92.8 L	94.5 L	253 L	29.6
Wet Chemistry (MG/KG)									
% Solids	NA	NA	NA	NA	NA	NA	NA	NA	71.5
Phosphorus	23	4	4.5	15.7	4.7	2.9	114	7.9	45.2
pH	NA	NA	NA	NA	NA	NA	NA	NA	5.71
Total Petroleum Hydrocarbons (MG/KG)									
TPH-diesel range	NA	NA	NA	NA	NA	NA	NA	NA	2.30 R
TPH-gas range	NA	NA	NA	NA	NA	NA	NA	NA	0.0200 B

B - Analyte not detected above associated blank
J - Reported value is estimated
L - Reported value may be biased low
R - Unreliable result

U - Analyte not detected
UJ - Not detected, quantitation limit may be inaccurate

Appendix H
Surface Soil Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-SS09	SJS3-SS10	SJS3-SS11	SJS3-SS12		SJS3-SS13	SJS3-SS14	SJS3-SS15	SJS3-SS16
Sample ID	SJS03-SS09-000	SJS03-SS10-000	SJS03-SS11-000	SJS03-SS12-000	SJS03-SS12-000P	SJS03-SS13-000	SJS03-SS14-000	SJS03-SS15-000	SJS03-SS16-000
Sample Date	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99
Chemical Name									
Volatile Organic Compounds (UG/KG)									
1,1,1-Trichloroethane	16 UJ	16 UJ	16 UJ	13 UJ	12 UJ	19 UJ	14 UJ	13 U	13 UJ
1,1,2,2-Tetrachloroethane	16 UJ	16 UJ	16 UJ	13 UJ	12 UJ	19 UJ	14 UJ	13 U	13 UJ
1,1,2-Trichloroethane	16 UJ	16 UJ	16 UJ	13 UJ	12 UJ	19 UJ	14 UJ	13 U	13 UJ
1,1-Dichloroethane	16 UJ	16 UJ	16 UJ	13 UJ	12 UJ	19 UJ	14 U	13 U	13 UJ
1,1-Dichloroethene	16 UJ	16 UJ	16 UJ	13 UJ	12 UJ	19 UJ	14 U	13 U	13 UJ
1,2-Dichloroethane	16 UJ	16 UJ	16 UJ	13 UJ	12 UJ	19 UJ	14 U	13 U	13 UJ
1,2-Dichloroethene (total)	16 UJ	16 UJ	16 UJ	13 UJ	12 UJ	19 UJ	14 U	13 U	13 UJ
1,2-Dichloropropane	16 UJ	16 UJ	16 UJ	13 UJ	12 UJ	19 UJ	14 UJ	13 U	13 UJ
2-Butanone	16 UJ	16 UJ	16 UJ	13 UJ	12 UJ	19 UJ	14 U	13 U	13 UJ
2-Hexanone	16 UJ	16 UJ	16 UJ	13 UJ	12 UJ	19 UJ	14 UJ	13 U	13 UJ
4-Methyl-2-pentanone	16 UJ	16 UJ	16 UJ	13 UJ	12 UJ	19 UJ	14 UJ	13 U	13 UJ
Acetone	18 J	60 J	210 J	44 J	12 UJ	46 J	23	13 U	13 UJ
Benzene	16 UJ	16 UJ	16 UJ	13 UJ	12 UJ	19 UJ	14 UJ	13 U	13 UJ
Bromodichloromethane	16 UJ	16 UJ	16 UJ	13 UJ	12 UJ	19 UJ	14 UJ	13 U	13 UJ
Bromoform	16 UJ	16 UJ	16 UJ	13 UJ	12 UJ	19 UJ	14 UJ	13 U	13 UJ
Bromomethane	16 UJ	16 UJ	16 UJ	13 UJ	12 UJ	19 UJ	14 U	13 U	13 UJ
Carbon disulfide	16 UJ	16 UJ	16 UJ	13 UJ	12 UJ	19 UJ	14 U	13 U	13 UJ
Carbon tetrachloride	16 UJ	16 UJ	16 UJ	13 UJ	12 UJ	19 UJ	14 UJ	13 U	13 UJ
Chlorobenzene	16 UJ	16 UJ	16 UJ	13 UJ	12 UJ	19 UJ	14 UJ	13 U	13 UJ
Chloroethane	16 UJ	16 UJ	16 UJ	13 UJ	12 UJ	19 UJ	14 U	13 U	13 UJ
Chloroform	16 UJ	16 UJ	16 UJ	13 UJ	12 UJ	19 UJ	14 U	13 U	13 UJ
Chloromethane	16 UJ	16 UJ	16 UJ	13 UJ	12 UJ	19 UJ	14 U	13 U	13 UJ
Dibromochloromethane	16 UJ	16 UJ	16 UJ	13 UJ	12 UJ	19 UJ	14 UJ	13 U	13 UJ
Ethylbenzene	16 UJ	16 UJ	16 UJ	13 UJ	12 UJ	19 UJ	14 UJ	13 U	13 UJ
Methylene chloride	9 B	13 B	14 B	11 B	5 B	33 B	13 B	5 B	10 B
Styrene	16 UJ	16 UJ	16 UJ	13 UJ	12 UJ	19 UJ	14 UJ	13 U	13 UJ
Tetrachloroethene	16 UJ	16 UJ	16 UJ	13 UJ	12 UJ	19 UJ	14 UJ	13 U	13 UJ
Toluene	16 UJ	16 UJ	16 UJ	13 UJ	12 UJ	19 UJ	14 UJ	13 U	13 UJ
Trichloroethene	16 UJ	16 UJ	16 UJ	13 UJ	12 UJ	19 UJ	14 UJ	13 U	13 UJ
Vinyl chloride	16 UJ	16 UJ	16 UJ	13 UJ	12 UJ	19 UJ	14 U	13 U	13 UJ
Xylene, total	16 UJ	16 UJ	16 UJ	13 UJ	12 UJ	19 UJ	14 UJ	13 U	13 UJ
cis-1,3-Dichloropropene	16 UJ	16 UJ	16 UJ	13 UJ	12 UJ	19 UJ	14 UJ	13 U	13 UJ
trans-1,3-Dichloropropene	16 UJ	16 UJ	16 UJ	13 UJ	12 UJ	19 UJ	14 UJ	13 U	13 UJ

B - Analyte not detected above associated blank
J - Reported value is estimated
L - Reported value may be biased low
R - Unreliable result
U - Analyte not detected
UJ - Not detected, quantitation limit may be inaccurate

Appendix H
Surface Soil Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-SS09	SJS3-SS10	SJS3-SS11	SJS3-SS12		SJS3-SS13	SJS3-SS14	SJS3-SS15	SJS3-SS16
Sample ID	SJS03-SS09-000	SJS03-SS10-000	SJS03-SS11-000	SJS03-SS12-000	SJS03-SS12-000P	SJS03-SS13-000	SJS03-SS14-000	SJS03-SS15-000	SJS03-SS16-000
Sample Date	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99
Chemical Name									
Semi-volatile Organic Compounds (UG/KG)									
1,2,4-Trichlorobenzene	550 UJ	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	470 UJ	440 UJ	430 UJ
1,2-Dichlorobenzene	550 UJ	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	470 UJ	440 UJ	430 UJ
1,3-Dichlorobenzene	550 UJ	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	470 UJ	440 UJ	430 UJ
1,4-Dichlorobenzene	550 UJ	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	470 UJ	440 UJ	430 UJ
2,2'-Oxybis(1-chloropropane)	550 UJ	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	470 UJ	440 UJ	430 UJ
2,4,5-Trichlorophenol	1,400 UJ	1,400 UJ	1,300 UJ	1,100 UJ	1,000 UJ	1,600 UJ	1,200 UJ	1,100 UJ	1,100 UJ
2,4,6-Trichlorophenol	550 UJ	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	470 UJ	440 UJ	430 UJ
2,4-Dichlorophenol	550 UJ	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	470 UJ	440 UJ	430 UJ
2,4-Dimethylphenol	550 UJ	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	470 UJ	440 UJ	430 UJ
2,4-Dinitrophenol	1,400 UJ	1,400 UJ	1,300 UJ	1,100 UJ	1,000 UJ	1,600 UJ	1,200 UJ	1,100 UJ	1,100 UJ
2,4-Dinitrotoluene	550 UJ	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	470 UJ	440 UJ	430 UJ
2,6-Dinitrotoluene	550 UJ	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	470 UJ	440 UJ	430 UJ
2-Chloronaphthalene	550 UJ	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	470 UJ	440 UJ	430 UJ
2-Chlorophenol	550 UJ	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	470 UJ	440 UJ	430 UJ
2-Methylnaphthalene	85 J	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	470 UJ	440 UJ	430 UJ
2-Methylphenol	550 UJ	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	470 UJ	440 UJ	430 UJ
2-Nitroaniline	1,400 UJ	1,400 UJ	1,300 UJ	1,100 UJ	1,000 UJ	1,600 UJ	1,200 UJ	1,100 UJ	1,100 UJ
2-Nitrophenol	550 UJ	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	470 UJ	440 UJ	430 UJ
3,3'-Dichlorobenzidine	550 UJ	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	470 UJ	440 UJ	430 UJ
3-Nitroaniline	1,400 UJ	1,400 UJ	1,300 UJ	1,100 UJ	1,000 UJ	1,600 UJ	1,200 UJ	1,100 UJ	1,100 UJ
4,6-Dinitro-2-methylphenol	1,400 UJ	1,400 UJ	1,300 UJ	1,100 UJ	1,000 UJ	1,600 UJ	1,200 UJ	1,100 UJ	1,100 UJ
4-Bromophenyl-phenylether	550 UJ	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	470 UJ	440 UJ	430 UJ
4-Chloro-3-methylphenol	550 UJ	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	470 UJ	440 UJ	430 UJ
4-Chloroaniline	550 UJ	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	470 UJ	440 UJ	430 UJ
4-Chlorophenyl-phenylether	550 UJ	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	470 UJ	440 UJ	430 UJ
4-Methylphenol	550 UJ	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	470 UJ	440 UJ	430 UJ
4-Nitroaniline	1,400 UJ	1,400 UJ	1,300 UJ	1,100 UJ	1,000 UJ	1,600 UJ	1,200 UJ	1,100 UJ	1,100 UJ
4-Nitrophenol	1,400 UJ	1,400 UJ	1,300 UJ	1,100 UJ	1,000 UJ	1,600 UJ	1,200 UJ	1,100 UJ	1,100 UJ
Acenaphthene	300 J	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	470 UJ	440 UJ	430 UJ
Acenaphthylene	550 UJ	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	54 J	440 UJ	430 UJ
Anthracene	1,000 J	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	130 J	440 UJ	430 UJ
Benzo(a)anthracene	4,000 J	75 J	220 J	74 J	90 J	160 J	580 J	190 J	150 J
Benzo(a)pyrene	4,100 J	74 J	260 J	170 J	210 J	220 J	560 J	170 J	150 J
Benzo(b)fluoranthene	6,500 J	210 J	510 J	330 J	590	470 J	1,300 J	300 J	310 J
Benzo(g,h,i)perylene	2,600 J	98 J	250 J	190 J	300 J	260 J	560 J	88 J	130 J

U - Analyte not detected
UJ - Not detected, quantitation limit may be inaccurate

B - Analyte not detected above associated blank
J - Reported value is estimated
L - Reported value may be biased low
R - Unreliable result

Appendix H
Surface Soil Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-SS09	SJS3-SS10	SJS3-SS11	SJS3-SS12		SJS3-SS13	SJS3-SS14	SJS3-SS15	SJS3-SS16
Sample ID	SJS03-SS09-000	SJS03-SS10-000	SJS03-SS11-000	SJS03-SS12-000	SJS03-SS12-000P	SJS03-SS13-000	SJS03-SS14-000	SJS03-SS15-000	SJS03-SS16-000
Sample Date	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99
Chemical Name									
Benzo(k)fluoranthene	2,000 J	61 J	190 J	85 J	140 J	160 J	490 J	90 J	110 J
Butylbenzylphthalate	550 UJ	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	470 UJ	440 UJ	430 UJ
Carbazole	370 J	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	470 UJ	440 UJ	430 UJ
Chrysene	3,600 J	140 J	430 J	160 J	200 J	330 J	1,200 J	200 J	200 J
Di-n-butylphthalate	550 UJ	260 J	520 UJ	440 UJ	400 UJ	630 UJ	470 UJ	130 J	430 UJ
Di-n-octylphthalate	550 UJ	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	470 UJ	440 UJ	430 UJ
Dibenz(a,h)anthracene	550 UJ	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	210 J	440 UJ	430 UJ
Dibenzofuran	150 J	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	470 UJ	440 UJ	430 UJ
Diethylphthalate	550 UJ	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	470 UJ	440 UJ	430 UJ
Dimethyl phthalate	550 UJ	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	470 UJ	440 UJ	430 UJ
Fluoranthene	4,100 J	83 J	230 J	87 J	85 J	200 J	440 J	300 J	160 J
Fluorene	260 J	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	470 UJ	440 UJ	430 UJ
Hexachlorobenzene	550 UJ	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	470 UJ	440 UJ	430 UJ
Hexachlorobutadiene	550 UJ	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	470 UJ	440 UJ	430 UJ
Hexachlorocyclopentadiene	550 UJ	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	470 UJ	440 UJ	430 UJ
Hexachloroethane	550 UJ	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	470 UJ	440 UJ	430 UJ
Indeno(1,2,3-cd)pyrene	2,300 J	92 J	230 J	170 J	260 J	240 J	530 J	84 J	130 J
Isophorone	550 UJ	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	470 UJ	440 UJ	430 UJ
Naphthalene	98 J	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	470 UJ	440 UJ	180 J
Nitrobenzene	550 UJ	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	470 UJ	440 UJ	430 UJ
Pentachlorophenol	1,400 UJ	1,400 UJ	1,300 UJ	1,100 UJ	1,000 UJ	1,600 UJ	1,200 UJ	1,100 UJ	1,100 UJ
Phenanthrene	3,300 J	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	120 J	72 J	49 J
Phenol	550 UJ	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	470 UJ	440 UJ	430 UJ
Pyrene	3,500 J	74 J	230 J	110 J	100 J	180 J	450 J	200 J	170 J
bis(2-Chloroethoxy)methane	550 UJ	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	470 UJ	440 UJ	430 UJ
bis(2-Chloroethyl)ether	550 UJ	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	470 UJ	440 UJ	430 UJ
bis(2-Ethylhexyl)phthalate	550 UJ	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	470 UJ	76 J	430 UJ
n-Nitroso-di-n-propylamine	550 UJ	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	470 UJ	440 UJ	430 UJ
n-Nitrosodiphenylamine	550 UJ	550 UJ	520 UJ	440 UJ	400 UJ	630 UJ	470 UJ	440 UJ	430 UJ
Pesticide/Polychlorinated Biphenyls (UG/KG)									
4,4'-DDD	30 J	5.5 UJ	4.10 J	4.40 UJ	4 UJ	0.910 J	4.70 UJ	25 J	1.30 J
4,4'-DDE	38 J	5.5 UJ	6.5 J	7.10 J	25 J	6.20 UJ	4.70 UJ	59 J	17 J
4,4'-DDT	30 J	0.670 J	15 J	9.10 J	27 J	0.740 J	5.10 J	17 J	6.70 J
Aldrin	2.70 UJ	2.80 UJ	2.60 UJ	2.20 UJ	2 UJ	3.10 UJ	2.30 UJ	2.20 UJ	2.20 UJ
Aroclor-1016	55 UJ	55 UJ	52 UJ	44 UJ	40 UJ	62 UJ	47 UJ	45 UJ	43 UJ

U - Analyte not detected
UJ - Not detected, quantitation limit may be inaccurate

B - Analyte not detected above associated blank
J - Reported value is estimated
L - Reported value may be biased low
R - Unreliable result

Appendix H
Surface Soil Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-SS09	SJS3-SS10	SJS3-SS11	SJS3-SS12		SJS3-SS13	SJS3-SS14	SJS3-SS15	SJS3-SS16
Sample ID	SJS03-SS09-000	SJS03-SS10-000	SJS03-SS11-000	SJS03-SS12-000	SJS03-SS12-000P	SJS03-SS13-000	SJS03-SS14-000	SJS03-SS15-000	SJS03-SS16-000
Sample Date	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99
Chemical Name									
Aroclor-1221	110 UJ	110 UJ	100 UJ	89 UJ	80 UJ	120 UJ	94 UJ	89 UJ	87 UJ
Aroclor-1232	55 UJ	55 UJ	52 UJ	44 UJ	40 UJ	62 UJ	47 UJ	45 UJ	43 UJ
Aroclor-1242	55 UJ	55 UJ	52 UJ	44 UJ	40 UJ	62 UJ	47 UJ	45 UJ	43 UJ
Aroclor-1248	55 UJ	55 UJ	52 UJ	44 UJ	40 UJ	62 UJ	47 UJ	45 UJ	43 UJ
Aroclor-1254	55 UJ	55 UJ	52 UJ	130 J	280 J	62 UJ	47 UJ	45 UJ	43 UJ
Aroclor-1260	91 J	55 UJ	52 UJ	44 UJ	40 UJ	62 UJ	47 UJ	45 UJ	43 UJ
Dieldrin	5.5 UJ	5.5 UJ	5.20 UJ	4.40 UJ	4 UJ	6.20 UJ	4.70 UJ	4.5 UJ	4.30 UJ
Endosulfan I	2.70 UJ	2.80 UJ	2.60 UJ	3.80 J	2 UJ	3.10 UJ	2.30 UJ	2.20 UJ	2.20 UJ
Endosulfan II	5.5 UJ	5.5 UJ	5.20 UJ	4.40 UJ	4 UJ	6.20 UJ	4.70 UJ	4.5 UJ	4.30 UJ
Endosulfan sulfate	5.5 UJ	5.5 UJ	5.20 UJ	4.40 UJ	4 UJ	6.20 UJ	4.70 UJ	4.5 UJ	4.30 UJ
Endrin	5.5 UJ	5.5 UJ	5.20 UJ	4.40 UJ	4 UJ	6.20 UJ	4.70 UJ	4.5 UJ	4.30 UJ
Endrin aldehyde	5.5 UJ	5.5 UJ	5.20 UJ	4.40 UJ	4 UJ	6.20 UJ	4.70 UJ	4.5 UJ	4.30 UJ
Endrin ketone	5.5 UJ	5.5 UJ	5.20 UJ	4.40 UJ	4 UJ	6.20 UJ	4.70 UJ	4.5 UJ	4.30 UJ
Heptachlor	2.70 UJ	2.80 UJ	2.60 UJ	2.20 UJ	2 UJ	3.10 UJ	2.30 UJ	2.20 UJ	2.20 UJ
Heptachlor epoxide	2.70 UJ	2.80 UJ	2.60 UJ	2.20 UJ	2 UJ	3.10 UJ	2.30 UJ	2.20 UJ	2.20 UJ
Methoxychlor	27 UJ	28 UJ	26 UJ	22 UJ	20 UJ	31 UJ	23 UJ	22 UJ	22 UJ
Toxaphene	270 UJ	280 UJ	260 UJ	220 UJ	200 UJ	310 UJ	230 UJ	220 UJ	220 UJ
alpha-BHC	2.70 UJ	2.80 UJ	2.60 UJ	2.20 UJ	2 UJ	3.10 UJ	2.30 UJ	2.20 UJ	2.20 UJ
alpha-Chlordane	2.70 UJ	2.80 UJ	2.60 UJ	2.20 UJ	7.20 J	3.10 UJ	2.30 UJ	2.20 UJ	2.20 UJ
beta-BHC	2.70 UJ	2.80 UJ	2.60 UJ	2.20 UJ	2 UJ	3.10 UJ	2.30 UJ	2.20 UJ	2.20 UJ
delta-BHC	2.70 UJ	2.80 UJ	2.60 UJ	2.20 UJ	2 UJ	3.10 UJ	2.30 UJ	2.20 UJ	2.20 UJ
gamma-BHC (Lindane)	2.70 UJ	2.80 UJ	2.60 UJ	2.20 UJ	2 UJ	3.10 UJ	2.30 UJ	2.20 UJ	2.20 UJ
gamma-Chlordane	2.70 UJ	2.80 UJ	2.60 UJ	2.20 UJ	2 UJ	3.10 UJ	2.30 UJ	2.20 UJ	2.20 UJ
Total Metals (MG/KG)									
Aluminum	11,300	18,100	13,100	9,300	7,010 J	18,400	11,100	3,390 J	3,520
Antimony	35.9 L	0.800 UL	0.820 UL	2.40 L	2.5 J	0.800 UL	0.710 UL	182	0.560 UL
Arsenic	59.6	19.6	21	14.8	13.1	18.9	18.1	10.4	3.60
Barium	1,550	68.9	102	220	216	99.2	57.7	143	76.6
Beryllium	0.710 J	0.570 J	0.390 J	0.540 J	0.480 J	0.650 J	0.340 J	0.380 J	0.240 J
Cadmium	13.9	0.370 B	0.290 B	1.60	1.5	0.460 B	0.230 B	3	0.180 B
Calcium	6,160	2,020	1,140 J	37,000	29,600 J	6,490	288 J	2,160 J	401 J
Chromium	124	40.9	33.7	26.8	22.5	42.6	28.2	14.3	25.3
Cobalt	14.2 J	6 J	3.90 J	5.5 J	5.80 J	6 J	3.10 J	6.30 J	1.10 J
Copper	1,010	35.7	41.1	402	108	45.8	28.2	104	30.4
Cyanide	0.400 U	0.410 U	0.350 U	0.290 U	0.270 U	0.410 U	0.330 U	0.300 U	0.320 U

U - Analyte not detected
UJ - Not detected, quantitation limit may be inaccurate

B - Analyte not detected above associated blank
J - Reported value is estimated
L - Reported value may be biased low
R - Unreliable result

Appendix H
Surface Soil Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-SS09	SJS3-SS10	SJS3-SS11	SJS3-SS12		SJS3-SS13	SJS3-SS14	SJS3-SS15	SJS3-SS16
Sample ID	SJS03-SS09-000	SJS03-SS10-000	SJS03-SS11-000	SJS03-SS12-000	SJS03-SS12-000P	SJS03-SS13-000	SJS03-SS14-000	SJS03-SS15-000	SJS03-SS16-000
Sample Date	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99
Chemical Name									
Iron	108,000	43,800	38,000	23,000	22,500	37,200	34,300	61,800	8,000
Lead	2,070	58.1	87.5	255	218 J	118	56.9	307 J	250
Magnesium	2,510	3,820	2,480	2,350	1,950	3,990	2,030	544 J	617 J
Manganese	922	153	108 L	326	309	169	84.2	208	25.5
Mercury	0.630	0.510	0.530	0.320	0.290 J	0.790	0.560	0.0900 J	0.180
Nickel	77.8	13.1	9.10 J	13.4	13.8	15.9	7.40 J	21.2	2.90 J
Potassium	1,440 J	3,860	2,530	1,960	1,580 L	3,200	3,160	318 L	633 J
Selenium	2.5	0.870 J	1.5	0.640 U	0.590 U	1.40 J	0.690 U	1.30	0.540 U
Silver	5.80	0.270 U	0.270 U	0.970 J	0.760 J	0.270 U	0.240 U	0.380 J	0.190 U
Sodium	681 J	224 J	220 J	418 J	344 L	195 J	557 J	151 L	30.9 U
Thallium	1 U	0.940 U	0.970 U	0.780 U	0.730 U	0.950 U	0.850 U	0.740 U	0.670 U
Vanadium	63.4	50.2	55.3	32.2	27.6	71.6	41	19.8	14.8
Zinc	3,760	98.4	66.3	397	406	115	53.6	724	39.5
Wet Chemistry (MG/KG)									
% Solids	61	60.6	63.7	75	82.8	53.3	71.4	74.6	76.6
Phosphorus	145	130	100	107	5.75 UL	162	74.5	6.09 UL	87.4
pH	6.83	4.40	4.36	7.59	7.72	5.88	3.95	6.84	5.08
Total Petroleum Hydrocarbons (MG/KG)									
TPH-diesel range	12 R	2.70 R	6.30 R	9.70 R	12 J	4.60 R	7.20 R	3.10 J	3.20 R
TPH-gas range	0.0200 B	0.0200 B	0.0300 B	0.0200 B	0.0200 B	0.0300 B	0.0200 B	0.0200 B	0.0200 B

B - Analyte not detected above associated blank
J - Reported value is estimated
L - Reported value may be biased low
R - Unreliable result

U - Analyte not detected
UJ - Not detected, quantitation limit may be inaccurate

Appendix H
Surface Soil Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-SS17		SJS3-SS18		SJS3-SS18	
Sample ID	SJS03-SS17-000		SJS03-SS18-000		SJS03-SS18-000P	
Sample Date	04/20/99		04/20/99		04/20/99	
Chemical Name						
Volatile Organic Compounds (UG/KG)						
1,1,1-Trichloroethane	16	UJ	13	UJ	12	UJ
1,1,2,2-Tetrachloroethane	16	UJ	13	UJ	12	UJ
1,1,2-Trichloroethane	16	UJ	13	UJ	12	UJ
1,1-Dichloroethane	16	UJ	13	UJ	12	UJ
1,1-Dichloroethene	16	UJ	13	UJ	12	UJ
1,2-Dichloroethane	16	UJ	13	UJ	12	UJ
1,2-Dichloroethene (total)	16	UJ	13	UJ	12	UJ
1,2-Dichloropropane	16	UJ	13	UJ	12	UJ
2-Butanone	16	UJ	13	UJ	12	UJ
2-Hexanone	16	UJ	13	UJ	12	UJ
4-Methyl-2-pentanone	16	UJ	13	UJ	12	UJ
Acetone	16	UJ	13	UJ	12	UJ
Benzene	16	UJ	13	UJ	12	UJ
Bromodichloromethane	16	UJ	13	UJ	12	UJ
Bromoform	16	UJ	13	UJ	12	UJ
Bromomethane	16	UJ	13	UJ	12	UJ
Carbon disulfide	16	UJ	13	UJ	12	UJ
Carbon tetrachloride	16	UJ	13	UJ	12	UJ
Chlorobenzene	16	UJ	13	UJ	12	UJ
Chloroethane	16	UJ	13	UJ	12	UJ
Chloroform	16	UJ	13	UJ	12	UJ
Chloromethane	16	UJ	13	UJ	12	UJ
Dibromochloromethane	16	UJ	13	UJ	12	UJ
Ethylbenzene	16	UJ	13	UJ	12	UJ
Methylene chloride	14	B	15	B	3	B
Styrene	16	UJ	13	UJ	12	UJ
Tetrachloroethene	16	UJ	13	UJ	12	UJ
Toluene	16	UJ	13	UJ	12	UJ
Trichloroethene	16	UJ	13	UJ	12	UJ
Vinyl chloride	16	UJ	13	UJ	12	UJ
Xylene, total	16	UJ	13	UJ	12	UJ
cis-1,3-Dichloropropene	16	UJ	13	UJ	12	UJ
trans-1,3-Dichloropropene	16	UJ	13	UJ	12	UJ

U - Analyte not detected
UJ - Not detected, quantitation limit may be inaccurate

B - Analyte not detected above associated blank
J - Reported value is estimated
L - Reported value may be biased low
R - Unreliable result

Appendix H
Surface Soil Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-SS17	SJS3-SS18	
Sample ID	SJS03-SS17-000	SJS03-SS18-000	SJS03-SS18-000P
Sample Date	04/20/99	04/20/99	04/20/99
Chemical Name			
Semi-volatile Organic Compounds (UG/KG)			
1,2,4-Trichlorobenzene	550 UJ	430 UJ	410 UJ
1,2-Dichlorobenzene	550 UJ	430 UJ	410 UJ
1,3-Dichlorobenzene	550 UJ	430 UJ	410 UJ
1,4-Dichlorobenzene	550 UJ	430 UJ	410 UJ
2,2'-Oxybis(1-chloropropane)	550 UJ	430 UJ	410 UJ
2,4,5-Trichlorophenol	1,400 UJ	1,100 UJ	1,000 UJ
2,4,6-Trichlorophenol	550 UJ	430 UJ	410 UJ
2,4-Dichlorophenol	550 UJ	430 UJ	410 UJ
2,4-Dimethylphenol	550 UJ	430 UJ	410 UJ
2,4-Dinitrophenol	1,400 UJ	1,100 UJ	1,000 UJ
2,4-Dinitrotoluene	550 UJ	430 UJ	410 UJ
2,6-Dinitrotoluene	550 UJ	430 UJ	410 UJ
2-Chloronaphthalene	550 UJ	430 UJ	410 UJ
2-Chlorophenol	550 UJ	430 UJ	410 UJ
2-Methylnaphthalene	550 UJ	430 UJ	410 UJ
2-Methylphenol	550 UJ	430 UJ	410 UJ
2-Nitroaniline	1,400 UJ	1,100 UJ	1,000 UJ
2-Nitrophenol	550 UJ	430 UJ	410 UJ
3,3'-Dichlorobenzidine	550 UJ	430 UJ	410 UJ
3-Nitroaniline	1,400 UJ	1,100 UJ	1,000 UJ
4,6-Dinitro-2-methylphenol	1,400 UJ	1,100 UJ	1,000 UJ
4-Bromophenyl-phenylether	550 UJ	430 UJ	410 UJ
4-Chloro-3-methylphenol	550 UJ	430 UJ	410 UJ
4-Chloroaniline	550 UJ	430 UJ	410 UJ
4-Chlorophenyl-phenylether	550 UJ	430 UJ	410 UJ
4-Methylphenol	550 UJ	430 UJ	410 UJ
4-Nitroaniline	1,400 UJ	1,100 UJ	1,000 UJ
4-Nitrophenol	1,400 UJ	1,100 UJ	1,000 UJ
Acenaphthene	550 UJ	430 UJ	410 UJ
Acenaphthylene	550 UJ	430 UJ	410 UJ
Anthracene	150 J	430 UJ	410 UJ
Benzo(a)anthracene	1,400 J	120 J	200 J
Benzo(a)pyrene	1,500 J	99 J	200 J
Benzo(b)fluoranthene	2,100 J	140 J	300 J
Benzo(g,h,i)perylene	1,100 J	65 J	110 J

U - Analyte not detected
UJ - Not detected, quantitation limit may be inaccurate

B - Analyte not detected above associated blank
J - Reported value is estimated
L - Reported value may be biased low
R - Unreliable result

Appendix H
Surface Soil Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-SS17	SJS3-SS18	
Sample ID	SJS03-SS17-000	SJS03-SS18-000	SJS03-SS18-000P
Sample Date	04/20/99	04/20/99	04/20/99
Chemical Name			
Benzo(k)fluoranthene	770 J	50 J	120 J
Butylbenzylphthalate	550 UJ	430 UJ	410 UJ
Carbazole	63 J	430 UJ	410 UJ
Chrysene	1,400 J	120 J	220 J
Di-n-butylphthalate	550 UJ	430 UJ	43 J
Di-n-octylphthalate	550 UJ	430 UJ	410 UJ
Dibenz(a,h)anthracene	280 J	430 UJ	410 UJ
Dibenzofuran	550 UJ	430 UJ	410 UJ
Diethylphthalate	550 UJ	430 UJ	410 UJ
Dimethyl phthalate	550 UJ	430 UJ	410 UJ
Fluoranthene	2,000 J	180 J	300 J
Fluorene	550 UJ	430 UJ	410 UJ
Hexachlorobenzene	550 UJ	430 UJ	410 UJ
Hexachlorobutadiene	550 UJ	430 UJ	410 UJ
Hexachlorocyclopentadiene	550 UJ	430 UJ	410 UJ
Hexachloroethane	550 UJ	430 UJ	410 UJ
Indeno(1,2,3-cd)pyrene	980 J	67 J	110 J
Isophorone	550 UJ	430 UJ	410 UJ
Naphthalene	550 UJ	430 UJ	410 UJ
Nitrobenzene	550 UJ	430 UJ	410 UJ
Pentachlorophenol	1,400 UJ	1,100 UJ	1,000 UJ
Phenanthrene	650 J	88 J	120 J
Phenol	550 UJ	430 UJ	410 UJ
Pyrene	1,900 J	170 J	260 J
bis(2-Chloroethoxy)methane	550 UJ	430 UJ	410 UJ
bis(2-Chloroethyl)ether	550 UJ	430 UJ	410 UJ
bis(2-Ethylhexyl)phthalate	580 J	430 UJ	410 UJ
n-Nitroso-di-n-propylamine	550 UJ	430 UJ	410 UJ
n-Nitrosodiphenylamine	550 UJ	430 UJ	410 UJ
Pesticide/Polychlorinated Biphenyls (UG/KG)			
4,4'-DDD	5.5 UJ	4.30 UJ	4 UJ
4,4'-DDE	16 J	4.30 UJ	4 UJ
4,4'-DDT	13 J	4.30 UJ	4 UJ
Aldrin	2.70 UJ	2.20 UJ	2 UJ
Aroclor-1016	55 UJ	43 UJ	40 UJ

U - Analyte not detected
UJ - Not detected, quantitation limit may be inaccurate

B - Analyte not detected above associated blank
J - Reported value is estimated
L - Reported value may be biased low
R - Unreliable result

Appendix H
Surface Soil Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-SS17	SJS3-SS18	
Sample ID	SJS03-SS17-000	SJS03-SS18-000	SJS03-SS18-000P
Sample Date	04/20/99	04/20/99	04/20/99
Chemical Name			
Aroclor-1221	110 UJ	87 UJ	80 UJ
Aroclor-1232	55 UJ	43 UJ	40 UJ
Aroclor-1242	55 UJ	43 UJ	40 UJ
Aroclor-1248	55 UJ	43 UJ	40 UJ
Aroclor-1254	55 UJ	43 UJ	40 UJ
Aroclor-1260	69 J	43 UJ	40 UJ
Dieldrin	5.5 UJ	4.30 UJ	4 UJ
Endosulfan I	2.70 UJ	2.20 UJ	2 UJ
Endosulfan II	5.5 UJ	4.30 UJ	4 UJ
Endosulfan sulfate	5.5 UJ	4.30 UJ	4 UJ
Endrin	5.5 UJ	4.30 UJ	4 UJ
Endrin aldehyde	5.5 UJ	4.30 UJ	4 UJ
Endrin ketone	5.5 UJ	4.30 UJ	4 UJ
Heptachlor	2.70 UJ	2.20 UJ	2 UJ
Heptachlor epoxide	2.70 UJ	2.20 UJ	2 UJ
Methoxychlor	27 UJ	22 UJ	20 UJ
Toxaphene	270 UJ	220 UJ	200 UJ
alpha-BHC	2.70 UJ	2.20 UJ	2 UJ
alpha-Chlordane	2.70 UJ	2.20 UJ	2 UJ
beta-BHC	2.70 UJ	2.20 UJ	2 UJ
delta-BHC	2.70 UJ	2.20 UJ	2 UJ
gamma-BHC (Lindane)	2.70 UJ	2.20 UJ	2 UJ
gamma-Chlordane	2.70 UJ	2.20 UJ	2 UJ
Total Metals (MG/KG)			
Aluminum	7,360	7,290	6,430 J
Antimony	32.2 L	0.560 UL	0.530 U
Arsenic	66.1	7.40	5.80
Barium	1,640	43.6	39.9
Beryllium	0.550 J	0.570 J	0.540 J
Cadmium	15.3	0.290 B	0.340 B
Calcium	20,700	6,470	9,930 J
Chromium	87.3	15.4	13.8
Cobalt	11.5 J	4.80 J	4.80 J
Copper	888	30.3	32.7
Cyanide	0.370 U	0.290 U	0.300 U

U - Analyte not detected
UJ - Not detected, quantitation limit may be inaccurate

B - Analyte not detected above associated blank
J - Reported value is estimated
L - Reported value may be biased low
R - Unreliable result

Appendix H
Surface Soil Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-SS17	SJS3-SS18	
Sample ID	SJS03-SS17-000	SJS03-SS18-000	SJS03-SS18-000P
Sample Date	04/20/99	04/20/99	04/20/99
Chemical Name			
Iron	126,000	15,800	14,600
Lead	1,870	64.6	70.7 J
Magnesium	2,430	1,620	1,510
Manganese	935	169	165
Mercury	0.710	0.410	0.390 J
Nickel	52	10.3	9.5
Potassium	1,320 J	1,500	1,340 L
Selenium	2.30	0.540 U	0.510 U
Silver	4.5	0.190 U	0.180 U
Sodium	669 J	56.2 J	90.5 L
Thallium	0.870 U	0.660 U	0.620 U
Vanadium	44.2	27.3	24.7
Zinc	3,640	88.4	84.9
Wet Chemistry (MG/KG)			
% Solids	60.6	77	82.1
Phosphorus	129	84.7	5.08 UL
pH	7.56	7.48	7.71
Total Petroleum Hydrocarbons (MG/KG)			
TPH-diesel range	22 R	2.5 R	2.90 J
TPH-gas range	0.0300 B	0.0200 B	0.0200 B

B - Analyte not detected above associated blank
J - Reported value is estimated
L - Reported value may be biased low
R - Unreliable result

U - Analyte not detected
UJ - Not detected, quantitation limit may be inaccurate

Appendix H
Subsurface Soil Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-SB01	SJS3-SB02	SJS3-SB03	SJS3-SB04	SJS3-SB05		SJS3-SB06	SJS3-SB07	SJS3-SB08
Sample ID	SJS03-SB01-001	SJS03-SB02-001	SJS03-SB03-002	SJS03-SB04-002	SJS03-SB05-002	SJS03-SB05-002P	SJS03-SB06-000	SJS03-SB07-000	SJS03-SB08-001
Sample Date	06/24/97	06/24/97	06/25/97	06/25/97	06/24/97	06/24/97	06/24/97	06/24/97	04/20/99
Chemical Name									
Volatile Organic Compounds (UG/KG)									
1,1,1-Trichloroethane	15 U	14 U	14 U	18 U	14 U	15 U	13 U	16 U	14 UJ
1,1,2,2-Tetrachloroethane	15 UJ	14 U	14 U	18 U	14 U	15 U	13 U	16 U	14 UJ
1,1,2-Trichloroethane	15 U	14 U	14 U	18 U	14 U	15 U	13 U	16 U	14 UJ
1,1-Dichloroethane	15 U	14 U	14 U	18 U	14 U	15 U	13 U	16 U	14 UJ
1,1-Dichloroethene	15 U	14 U	14 U	18 U	14 U	15 U	13 U	16 U	14 UJ
1,2-Dichloroethane	15 U	14 U	14 U	18 U	14 U	15 U	13 U	16 U	14 UJ
1,2-Dichloroethene (total)	15 U	14 U	14 U	18 U	14 U	15 U	13 U	16 U	14 UJ
1,2-Dichloropropane	15 U	14 U	14 U	18 U	14 U	15 U	13 U	16 U	14 UJ
2-Butanone	31	21	14 U	18 U	14 U	19 J	13 U	16 U	14 UJ
2-Hexanone	15 UJ	14 U	14 U	18 U	14 U	15 U	13 U	16 U	14 UJ
4-Methyl-2-pentanone	15 U	14 U	14 U	18 U	14 U	15 U	13 U	16 U	14 UJ
Acetone	160 B	120 B	6 B	44 B	52 B	130 B	120 B	50 B	14 UJ
Benzene	15 U	14 U	14 U	18 U	14 U	15 U	13 U	16 U	14 UJ
Bromodichloromethane	15 U	14 U	14 U	18 U	14 U	15 U	13 U	16 U	14 UJ
Bromoform	15 U	14 U	14 U	18 U	14 U	15 U	13 U	16 U	14 UJ
Bromomethane	15 U	14 U	14 U	18 U	14 U	15 U	13 U	16 U	14 UJ
Carbon disulfide	8 J	14 U	14 U	18 U	14 U	15 U	13 U	16 U	2 B
Carbon tetrachloride	15 U	14 U	14 U	18 U	14 U	15 U	13 U	16 U	14 UJ
Chlorobenzene	15 UJ	14 U	14 U	18 U	14 U	15 U	13 U	16 U	14 UJ
Chloroethane	15 U	14 U	14 U	18 U	14 U	15 U	13 U	16 U	14 UJ
Chloroform	15 U	14 U	14 U	18 U	14 U	15 U	13 U	16 U	14 UJ
Chloromethane	15 U	14 U	14 U	18 U	14 U	15 U	13 U	16 U	14 UJ
Dibromochloromethane	15 U	14 U	14 U	18 U	14 U	15 U	13 U	16 U	14 UJ
Ethylbenzene	15 UJ	14 U	14 U	18 U	14 U	15 U	13 U	16 U	14 UJ
Methylene chloride	47 B	73 B	12 J	40 B	24 B	31 B	170 B	74 B	6 B
Styrene	15 UJ	14 U	14 U	18 U	14 U	15 U	13 U	16 U	14 UJ
Tetrachloroethene	5 J	14 U	14 U	18 U	14 U	15 U	3 J	16 U	14 UJ
Toluene	2 J	14 U	14 U	18 U	14 U	2 J	3 J	16 U	14 UJ
Trichloroethene	15 U	14 U	14 U	18 U	14 U	15 U	13 U	16 U	14 UJ
Vinyl chloride	15 U	14 U	14 U	18 U	14 U	15 U	13 U	16 U	14 UJ
Xylene, total	15 UJ	14 U	14 U	18 U	14 U	15 U	13 U	16 U	14 UJ
cis-1,3-Dichloropropene	15 U	14 U	14 U	18 U	14 U	15 U	13 U	16 U	14 UJ
trans-1,3-Dichloropropene	15 U	14 U	14 U	18 U	14 U	15 U	13 U	16 U	14 UJ
Semi-volatile Organic Compounds (UG/KG)									

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
R - Unreliable result
U - Analyte not detected

Appendix H
Subsurface Soil Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-SB01	SJS3-SB02	SJS3-SB03	SJS3-SB04	SJS3-SB05		SJS3-SB06	SJS3-SB07	SJS3-SB08
Sample ID	SJS03-SB01-001	SJS03-SB02-001	SJS03-SB03-002	SJS03-SB04-002	SJS03-SB05-002	SJS03-SB05-002P	SJS03-SB06-000	SJS03-SB07-000	SJS03-SB08-001
Sample Date	06/24/97	06/24/97	06/25/97	06/25/97	06/24/97	06/24/97	06/24/97	06/24/97	04/20/99
Chemical Name									
1,2,4-Trichlorobenzene	400 U	510 U	370 U	400 U	520 U	470 U	480 U	430 U	480 UJ
1,2-Dichlorobenzene	400 U	510 U	370 U	400 U	520 U	470 U	480 U	430 U	480 UJ
1,3-Dichlorobenzene	400 U	510 U	370 U	400 U	520 U	470 U	480 U	430 U	480 UJ
1,4-Dichlorobenzene	400 U	510 U	370 U	400 U	520 U	470 U	480 U	430 U	480 UJ
2,2'-Oxybis(1-chloropropane)	400 U	510 U	370 U	400 U	520 U	470 U	480 U	430 U	480 UJ
2,4,5-Trichlorophenol	1,000 U	1,300 U	940 U	1,000 U	1,300 U	1,200 U	1,200 U	1,100 U	1,200 UJ
2,4,6-Trichlorophenol	400 U	510 U	370 U	400 U	520 U	470 U	480 U	430 U	480 UJ
2,4-Dichlorophenol	400 U	510 U	370 U	400 U	520 U	470 U	480 U	430 U	480 UJ
2,4-Dimethylphenol	400 U	510 U	370 U	400 U	520 U	470 U	480 U	430 U	480 UJ
2,4-Dinitrophenol	1,000 U	1,300 U	940 U	1,000 U	1,300 U	1,200 U	1,200 U	1,100 U	1,200 UJ
2,4-Dinitrotoluene	400 U	510 U	370 U	400 U	520 U	470 U	480 U	430 U	480 UJ
2,6-Dinitrotoluene	400 U	510 U	370 U	400 U	520 U	470 U	480 U	430 U	480 UJ
2-Chloronaphthalene	400 U	510 U	370 U	400 U	520 U	470 U	480 U	430 U	480 UJ
2-Chlorophenol	400 U	510 U	370 U	400 U	520 U	470 U	480 U	430 U	480 UJ
2-Methylnaphthalene	400 U	510 U	370 U	400 U	520 U	470 U	480 U	430 U	480 UJ
2-Methylphenol	400 U	510 U	370 U	400 U	520 U	470 U	480 U	430 U	480 UJ
2-Nitroaniline	1,000 U	1,300 U	940 U	1,000 U	1,300 U	1,200 U	1,200 U	1,100 U	1,200 UJ
2-Nitrophenol	400 U	510 U	370 U	400 U	520 U	470 U	480 U	430 U	480 UJ
3,3'-Dichlorobenzidine	400 U	510 U	370 U	400 U	520 U	470 U	480 U	430 U	480 UJ
3-Nitroaniline	1,000 U	1,300 U	940 U	1,000 U	1,300 U	1,200 U	1,200 U	1,100 U	1,200 UJ
4,6-Dinitro-2-methylphenol	1,000 U	1,300 U	940 U	1,000 U	1,300 U	1,200 U	1,200 U	1,100 U	1,200 UJ
4-Bromophenyl-phenylether	400 U	510 U	370 U	400 U	520 U	470 U	480 U	430 U	480 UJ
4-Chloro-3-methylphenol	400 U	510 U	370 U	400 U	520 U	470 U	480 U	430 U	480 UJ
4-Chloroaniline	400 U	510 U	370 U	400 U	520 U	470 U	480 U	430 U	480 UJ
4-Chlorophenyl-phenylether	400 U	510 U	370 U	400 U	520 U	470 U	480 U	430 U	480 UJ
4-Methylphenol	400 U	510 U	370 U	400 U	520 U	470 U	480 U	430 U	480 UJ
4-Nitroaniline	1,000 U	1,300 U	940 U	1,000 U	1,300 U	1,200 U	1,200 U	1,100 U	1,200 UJ
4-Nitrophenol	1,000 U	1,300 U	940 U	1,000 U	1,300 U	1,200 U	1,200 U	1,100 U	1,200 UJ
Acenaphthene	400 U	510 U	370 U	400 U	520 U	49 J	480 U	430 U	480 UJ
Acenaphthylene	400 U	510 U	370 U	400 U	100 J	84 J	480 U	430 U	480 UJ
Anthracene	74 J	170 J	370 U	400 U	120 J	170 J	65 J	55 J	480 UJ
Benzo(a)anthracene	500	490 J	370 U	400 U	640	700	190 J	220 J	130 J
Benzo(a)pyrene	370 J	330 J	370 U	400 U	440 J	560	200 J	140 J	150 J
Benzo(b)fluoranthene	820	1,500	370 U	400 U	1,300	1,200	540	840	320 J
Benzo(g,h,i)perylene	280 J	400 J	370 U	400 U	280 J	300 J	140 J	170 J	98 J
Benzo(k)fluoranthene	160 J	490 J	370 U	400 U	410 J	410 J	200 J	230 J	120 J
Butylbenzylphthalate	400 U	510 U	370 U	400 U	520 U	470 U	480 U	430 U	480 UJ

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
R - Unreliable result
U - Analyte not detected

Appendix H
Subsurface Soil Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-SB01	SJS3-SB02	SJS3-SB03	SJS3-SB04	SJS3-SB05		SJS3-SB06	SJS3-SB07	SJS3-SB08
Sample ID	SJS03-SB01-001	SJS03-SB02-001	SJS03-SB03-002	SJS03-SB04-002	SJS03-SB05-002	SJS03-SB05-002P	SJS03-SB06-000	SJS03-SB07-000	SJS03-SB08-001
Sample Date	06/24/97	06/24/97	06/25/97	06/25/97	06/24/97	06/24/97	06/24/97	06/24/97	04/20/99
Chemical Name									
Carbazole	400 U	510 U	370 U	400 U	520 U	470 U	480 U	430 U	480 UJ
Chrysene	580	1,200	370 U	400 U	960	680	370 J	400 J	280 J
Di-n-butylphthalate	400 U	510 U	370 U	400 U	520 U	470 U	480 U	430 U	480 UJ
Di-n-octylphthalate	400 U	510 U	370 U	400 U	520 U	470 U	480 U	430 U	480 UJ
Dibenz(a,h)anthracene	400 U	510 U	370 U	400 U	520 U	470 U	480 U	430 U	480 UJ
Dibenzofuran	400 U	510 U	370 U	400 U	520 U	60 J	480 U	430 U	480 UJ
Diethylphthalate	400 U	510 U	370 U	400 U	520 U	470 U	480 U	430 U	480 UJ
Dimethyl phthalate	400 U	510 U	370 U	400 U	520 U	470 U	480 U	430 U	480 UJ
Fluoranthene	670	350 J	370 U	110 J	1,100	1,100	250 J	210 J	180 J
Fluorene	400 U	510 U	370 U	400 U	520 U	51 J	480 U	430 U	480 UJ
Hexachlorobenzene	400 U	510 U	370 U	400 U	520 U	470 U	480 U	430 U	480 UJ
Hexachlorobutadiene	400 U	510 U	370 U	400 U	520 U	470 U	480 U	430 U	480 UJ
Hexachlorocyclopentadiene	400 U	510 U	370 U	400 U	520 U	470 U	480 U	430 U	480 UJ
Hexachloroethane	400 U	510 U	370 U	400 U	520 U	470 U	480 U	430 U	480 UJ
Indeno(1,2,3-cd)pyrene	280 J	500 J	370 U	400 U	360 J	320 J	180 J	220 J	98 J
Isophorone	400 U	510 U	370 U	400 U	520 U	470 U	480 U	430 U	480 UJ
Naphthalene	400 U	510 U	370 U	400 U	140 J	160 J	60 J	430 U	480 UJ
Nitrobenzene	400 U	510 U	370 U	400 U	520 U	470 U	480 U	430 U	480 UJ
Pentachlorophenol	1,000 U	1,300 U	940 U	1,000 U	1,300 U	1,200 U	1,200 U	1,100 U	1,200 UJ
Phenanthrene	140 J	94 J	370 U	400 U	140 J	250 J	97 J	56 J	480 UJ
Phenol	400 U	510 U	370 U	400 U	520 U	470 U	480 U	430 U	480 UJ
Pyrene	440	230 J	370 U	81 J	760	990	210 J	180 J	280 J
bis(2-Chloroethoxy)methane	400 U	510 U	370 U	400 U	520 U	470 U	480 U	430 U	480 UJ
bis(2-Chloroethyl)ether	400 U	510 U	370 U	400 U	520 U	470 U	480 U	430 U	480 UJ
bis(2-Ethylhexyl)phthalate	120 B	510 U	75 B	53 B	64 B	94 B	480 U	71 B	480 UJ
n-Nitroso-di-n-propylamine	400 U	510 U	370 U	400 U	520 U	470 U	480 U	430 U	480 UJ
n-Nitrosodiphenylamine	400 U	510 U	370 U	400 U	520 U	470 U	480 U	430 U	480 UJ
Pesticide/Polychlorinated Biphenyls (UG/KG)									
4,4'-DDD	4 U	5 U	3.7 U	4 U	5.2 U	4.7 U	4.8 U	4.3 UJ	4.70 UJ
4,4'-DDE	4 U	5 U	3.7 U	4 U	5.2 U	4.7 U	4.8 U	4.3 UJ	4.70 UJ
4,4'-DDT	4 U	5 U	3.7 U	4 U	5.2 U	4.7 U	4.8 U	4.3 UJ	4.70 UJ
Aldrin	2.1 U	2.6 U	1.9 U	2.1 U	2.7 U	2.4 U	2.5 U	2.2 UJ	2.40 UJ
Aroclor-1016	40 U	50 U	37 U	40 U	52 U	47 U	48 U	43 UJ	47 UJ
Aroclor-1221	82 U	100 U	75 U	81 U	110 U	96 U	98 U	87 UJ	94 UJ
Aroclor-1232	40 U	50 U	37 U	40 U	52 U	47 U	48 U	43 UJ	47 UJ
Aroclor-1242	40 U	50 U	37 U	40 U	52 U	47 U	48 U	43 UJ	47 UJ

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
R - Unreliable result
U - Analyte not detected

Appendix H
Subsurface Soil Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-SB01	SJS3-SB02	SJS3-SB03	SJS3-SB04	SJS3-SB05		SJS3-SB06	SJS3-SB07	SJS3-SB08
Sample ID	SJS03-SB01-001	SJS03-SB02-001	SJS03-SB03-002	SJS03-SB04-002	SJS03-SB05-002	SJS03-SB05-002P	SJS03-SB06-000	SJS03-SB07-000	SJS03-SB08-001
Sample Date	06/24/97	06/24/97	06/25/97	06/25/97	06/24/97	06/24/97	06/24/97	06/24/97	04/20/99
Chemical Name									
Aroclor-1248	40 U	50 U	37 U	40 U	52 U	47 U	48 U	43 UJ	47 UJ
Aroclor-1254	40 U	50 U	37 U	40 U	52 U	47 U	48 U	43 UJ	47 UJ
Aroclor-1260	40 U	50 U	37 U	40 U	52 U	47 U	48 U	43 UJ	47 UJ
Dieldrin	4 U	5 U	3.7 U	4 U	5.2 U	4.7 U	4.8 U	4.3 UJ	4.70 UJ
Endosulfan I	2.1 U	2.6 U	1.9 U	2.1 U	2.7 U	2.4 U	2.5 U	2.2 UJ	2.40 UJ
Endosulfan II	4 U	5 U	3.7 U	4 U	5.2 U	4.7 U	4.8 U	4.3 UJ	4.70 UJ
Endosulfan sulfate	4 U	5 U	3.7 U	4 U	5.2 U	4.7 U	4.8 U	4.3 UJ	4.70 UJ
Endrin	4 U	5 U	3.7 U	4 U	5.2 U	4.7 U	4.8 U	4.3 UJ	4.70 UJ
Endrin aldehyde	4 U	5 U	3.7 U	4 U	5.2 U	4.7 U	4.8 U	4.3 UJ	4.70 UJ
Endrin ketone	4 U	5 U	3.7 U	4 U	5.2 U	4.7 U	4.8 U	4.3 UJ	4.70 UJ
Heptachlor	2.1 U	2.6 U	1.9 U	2.1 U	2.7 U	2.4 U	2.5 U	2.2 UJ	2.40 UJ
Heptachlor epoxide	2.1 U	2.6 U	1.9 U	2.1 U	2.7 U	2.4 U	2.5 U	2.2 UJ	2.40 UJ
Methoxychlor	21 U	26 U	19 U	21 U	27 U	24 U	25 U	22 UJ	24 UJ
Toxaphene	210 U	260 U	190 U	210 U	270 U	240 U	250 U	220 UJ	240 UJ
alpha-BHC	2.1 U	2.6 U	1.9 U	2.1 U	2.7 U	2.4 U	2.5 U	2.2 UJ	2.40 UJ
alpha-Chlordane	2.1 U	2.6 U	1.9 U	2.1 U	2.7 U	2.4 U	2.5 U	2.2 UJ	2.40 UJ
beta-BHC	2.1 U	2.6 U	1.9 U	2.1 U	2.7 U	2.4 U	2.5 U	2.2 UJ	2.40 UJ
delta-BHC	2.1 U	2.6 U	1.9 U	2.1 U	2.7 U	2.4 U	2.5 U	2.2 UJ	2.40 UJ
gamma-BHC (Lindane)	2.1 U	2.6 U	1.9 U	2.1 U	2.7 U	2.4 U	2.5 U	2.2 UJ	2.40 UJ
gamma-Chlordane	2.1 U	2.6 U	1.9 U	2.1 U	2.7 U	2.4 U	2.5 U	2.2 UJ	2.40 UJ
Dioxin/Furans (UG/KG)									
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,6,7,8-Heptachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8,9-Heptachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8-Hexachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,6,7,8-Hexachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8,9-Hexachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8-Pentachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,3,4,6,7,8-Hexachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,3,4,7,8-Pentachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,3,7,8-TCDD (dioxin)	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,3,7,8-Tetrachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
R - Unreliable result
U - Analyte not detected

Appendix H
Subsurface Soil Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-SB01	SJS3-SB02	SJS3-SB03	SJS3-SB04	SJS3-SB05		SJS3-SB06	SJS3-SB07	SJS3-SB08
Sample ID	SJS03-SB01-001	SJS03-SB02-001	SJS03-SB03-002	SJS03-SB04-002	SJS03-SB05-002	SJS03-SB05-002P	SJS03-SB06-000	SJS03-SB07-000	SJS03-SB08-001
Sample Date	06/24/97	06/24/97	06/25/97	06/25/97	06/24/97	06/24/97	06/24/97	06/24/97	04/20/99
Chemical Name									
Total heptachlorodibenzo-p-dioxin	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total heptachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total hexachlorodibenzo-p-dioxin	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total hexachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total octachlorodibenzo-p-dioxin	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total octachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total pentachlorodibenzo-p-dioxin	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total pentachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total tetrachlorodibenzo-p-dioxin	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total tetrachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Metals (MG/KG)									
Aluminum	8,250	6,520	963	2,390	3,580	5,370	17,100	8,190	7,200 J
Antimony	0.58 UL	0.57 UL	0.41 U	0.38 J	NA	NA	NA	NA	0.700 U
Arsenic	5.3	4.7	0.79 J	1.9 J	0.7 UL	1.6 L	12.3 L	7.8 L	11.2
Barium	30.2 J	22.9 J	5.1 B	11.3 J	7.2 J	13.3 J	67.7	29.2 J	26.4 J
Beryllium	0.29 U	0.28 U	0.21 U	0.19 U	0.44 J	0.28 U	0.48 J	0.51 J	0.270 B
Cadmium	3.4	0.14 U	0,1 U	0.09 U	0.12 U	0.2 J	0.13 U	0.14 U	0.130 B
Calcium	1,340 J	5,730	7,550	5,290	683 J	371 J	1,030 J	6,720	469 J
Chromium	17.9	14.7	3	5.9 B	3.4 K	8.9	34.4	15.9	19
Cobalt	5.9 J	5 J	1.65 U	2.3 J	3.9 J	6.2 J	6 J	7.7 J	2.60 J
Copper	10.3 B	8.1	7.6	4.8	1.7 B	13.8 B	43.5	12.7 B	13
Cyanide	0.73 U	0.72 U	0.57 U	0.6 U	0.59 U	0.77 U	0.67 U	0.7 U	0.340 U
Iron	11,200	9,180	2,030	4,550	2,420	4,140	34,300	16,900	25,300
Lead	32.2 J	42.8 J	10.1	16.6	2.5 B	17.9 J	77.9 J	69.9 J	27.9 J
Magnesium	1,880	904 J	203 J	516 J	396 J	840 J	3,250	2,500	1,540
Manganese	85.6	54.1	26	38.8	19.2	33.8	114	133	70.7
Mercury	0.07 U	0.3	0.09 J	0.22	0.06 U	0.18	0.88	0.07 U	0.330 J
Nickel	11.1 B	6.1 J	1.44 U	3 J	4.5 B	8.2 B	10.5 B	9 B	5.90 J
Potassium	1,520	723 J	162 J	389 J	351 J	647 J	2,900	1,430	2,240 L
Selenium	0.87 U	0.85 U	0.62 U	0.57 U	0.7 UL	0.84 UL	0.78 UL	0.82 UL	0.800 J
Silver	0.29 U	0.73 J	1 B	1.1 B	0.23 U	0.28 U	1 B	0.87 B	0.230 U
Sodium	176 B	151 J	65.4 B	81.9 B	91.2 B	102 B	445 B	925 B	359 L
Thallium	0.71 J	0.57 U	0.41 U	0.38 U	0.47 U	0.56 U	2.8	2.4 J	0.830 U
Vanadium	23	19	2 J	6.2 J	4.5 B	9.1 B	40.9	21	24
Zinc	130	20.1 B	10.9 B	13.3 B	37.4 L	104 L	83.9 L	533 L	35.4

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
R - Unreliable result
U - Analyte not detected

Appendix H
Subsurface Soil Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-SB01	SJS3-SB02	SJS3-SB03	SJS3-SB04	SJS3-SB05		SJS3-SB06	SJS3-SB07	SJS3-SB08
Sample ID	SJS03-SB01-001	SJS03-SB02-001	SJS03-SB03-002	SJS03-SB04-002	SJS03-SB05-002	SJS03-SB05-002P	SJS03-SB06-000	SJS03-SB07-000	SJS03-SB08-001
Sample Date	06/24/97	06/24/97	06/25/97	06/25/97	06/24/97	06/24/97	06/24/97	06/24/97	04/20/99
Chemical Name									
Wet Chemistry (MG/KG)									
% Solids	NA	NA	NA	NA	NA	NA	NA	NA	70
Phosphorus	18.6	8.5	5.4	5	8.5	4.6	9.6	3.4	5.49 UL
pH	NA	NA	NA	NA	NA	NA	NA	NA	3.19
Total Petroleum Hydrocarbons (MG/KG)									
TPH-diesel range	NA	NA	NA	NA	NA	NA	NA	NA	4 J
TPH-gas range	NA	NA	NA	NA	NA	NA	NA	NA	0.100 B

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
R - Unreliable result
U - Analyte not detected

Appendix H
Subsurface Soil Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-SB09	SJS3-SB10	SJS3-SB11	SJS3-SB12		SJS3-SB13	SJS3-SB14	SJS3-SB15	SJS3-SB16
Sample ID	SJS03-SB09-001	SJS03-SB10-001	SJS03-SB11-001	SJS03-SB12-001P	SJS03-SB12-001	SJS03-SB13-001	SJS03-SB14-001	SJS03-SB15-001	SJS03-SB16-001
Sample Date	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99
Chemical Name									
Volatile Organic Compounds (UG/KG)									
1,1,1-Trichloroethane	13 U	12 UJ	13 U	14 U	15 U	12 U	17 U	13 U	12 U
1,1,2,2-Tetrachloroethane	13 U	12 UJ	13 U	14 U	15 U	12 U	17 U	13 U	12 U
1,1,2-Trichloroethane	13 U	12 UJ	13 U	14 U	15 U	12 U	17 U	13 U	12 U
1,1-Dichloroethane	13 U	12 UJ	13 U	14 U	15 U	12 U	17 U	13 U	12 U
1,1-Dichloroethene	13 U	12 UJ	13 U	14 U	15 U	12 U	17 U	13 U	12 U
1,2-Dichloroethane	13 U	12 UJ	13 U	14 U	15 U	12 U	17 U	13 U	12 U
1,2-Dichloroethene (total)	13 U	12 UJ	13 U	14 U	15 U	12 U	17 U	13 U	12 U
1,2-Dichloropropane	13 U	12 UJ	13 U	14 U	15 U	12 U	17 U	13 U	12 U
2-Butanone	13 U	12 UJ	13 U	14 U	6 J	29 J	17 U	13 U	12 U
2-Hexanone	13 U	12 UJ	13 U	14 U	15 U	12 U	17 U	13 U	12 U
4-Methyl-2-pentanone	13 U	12 UJ	13 U	14 U	15 U	12 U	17 U	13 U	12 U
Acetone	13 U	12 UJ	13 U	16 J	26 J	12 U	17 U	11 J	12 U
Benzene	13 U	12 UJ	13 U	14 U	15 U	12 U	17 U	13 U	12 U
Bromodichloromethane	13 U	12 UJ	13 U	14 U	15 U	12 U	17 U	13 U	12 U
Bromoform	13 U	12 UJ	13 U	14 U	15 U	12 U	17 U	13 U	12 U
Bromomethane	13 U	12 UJ	13 U	14 U	15 U	12 U	17 U	13 U	12 U
Carbon disulfide	3 B	12 UJ	13 U	14 U	2 B	12 U	17 U	13 U	12 U
Carbon tetrachloride	13 U	12 UJ	13 U	14 U	15 U	12 U	17 U	13 U	12 U
Chlorobenzene	13 U	12 UJ	13 U	14 U	15 U	12 U	17 U	13 U	12 U
Chloroethane	13 U	12 UJ	13 U	14 U	15 U	12 U	17 U	13 U	12 U
Chloroform	13 U	12 UJ	13 U	14 U	15 U	12 U	17 U	13 U	12 U
Chloromethane	13 U	12 UJ	13 U	14 U	15 U	12 U	17 U	13 U	12 U
Dibromochloromethane	13 U	12 UJ	13 U	14 U	15 U	12 U	17 U	13 U	12 U
Ethylbenzene	13 U	12 UJ	13 U	14 U	15 U	12 U	17 U	13 U	12 U
Methylene chloride	5 B	5 B	5 B	6 B	6 B	130 B	5 B	5 B	5 B
Styrene	13 U	12 UJ	13 U	14 U	15 U	12 U	17 U	13 U	12 U
Tetrachloroethene	13 U	12 UJ	13 U	14 U	15 U	12 U	17 U	13 U	12 U
Toluene	13 U	12 UJ	13 U	14 U	15 U	12 U	17 U	13 U	12 U
Trichloroethene	13 U	12 UJ	13 U	14 U	15 U	12 U	17 U	13 U	12 U
Vinyl chloride	13 U	12 UJ	13 U	14 U	15 U	12 U	17 U	13 U	12 U
Xylene, total	13 U	12 UJ	13 U	14 U	15 U	12 U	17 U	13 U	12 U
cis-1,3-Dichloropropene	13 U	12 UJ	13 U	14 U	15 U	12 U	17 U	13 U	12 U
trans-1,3-Dichloropropene	13 U	12 UJ	13 U	14 U	15 U	12 U	17 U	13 U	12 U
Semi-volatile Organic Compounds (UG/KG)									

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
R - Unreliable result
U - Analyte not detected

Appendix H
Subsurface Soil Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-SB09	SJS3-SB10	SJS3-SB11	SJS3-SB12		SJS3-SB13	SJS3-SB14	SJS3-SB15	SJS3-SB16
Sample ID	SJS03-SB09-001	SJS03-SB10-001	SJS03-SB11-001	SJS03-SB12-001P	SJS03-SB12-001	SJS03-SB13-001	SJS03-SB14-001	SJS03-SB15-001	SJS03-SB16-001
Sample Date	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99
Chemical Name									
1,2,4-Trichlorobenzene	420 UJ	410 UJ	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	430 UJ	400 UJ
1,2-Dichlorobenzene	420 UJ	410 UJ	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	430 UJ	400 UJ
1,3-Dichlorobenzene	420 UJ	410 UJ	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	430 UJ	400 UJ
1,4-Dichlorobenzene	420 UJ	410 UJ	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	430 UJ	400 UJ
2,2'-Oxybis(1-chloropropane)	420 UJ	410 UJ	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	430 UJ	400 UJ
2,4,5-Trichlorophenol	1,100 UJ	1,000 UJ	1,100 UJ	1,200 UJ	1,200 UJ	1,000 UJ	1,400 UJ	1,100 UJ	1,000 UJ
2,4,6-Trichlorophenol	420 UJ	410 UJ	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	430 UJ	400 UJ
2,4-Dichlorophenol	420 UJ	410 UJ	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	430 UJ	400 UJ
2,4-Dimethylphenol	420 UJ	410 UJ	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	430 UJ	400 UJ
2,4-Dinitrophenol	1,100 UJ	1,000 UJ	1,100 UJ	1,200 UJ	1,200 UJ	1,000 UJ	1,400 UJ	1,100 UJ	1,000 UJ
2,4-Dinitrotoluene	420 UJ	410 UJ	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	430 UJ	400 UJ
2,6-Dinitrotoluene	420 UJ	410 UJ	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	430 UJ	400 UJ
2-Chloronaphthalene	420 UJ	410 UJ	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	430 UJ	400 UJ
2-Chlorophenol	420 UJ	410 UJ	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	430 UJ	400 UJ
2-Methylnaphthalene	720	410 UJ	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	430 UJ	400 UJ
2-Methylphenol	420 UJ	410 UJ	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	430 UJ	400 UJ
2-Nitroaniline	1,100 UJ	1,000 UJ	1,100 UJ	1,200 UJ	1,200 UJ	1,000 UJ	1,400 UJ	1,100 UJ	1,000 UJ
2-Nitrophenol	420 UJ	410 UJ	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	430 UJ	400 UJ
3,3'-Dichlorobenzidine	420 UJ	410 UJ	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	430 UJ	400 UJ
3-Nitroaniline	1,100 UJ	1,000 UJ	1,100 UJ	1,200 UJ	1,200 UJ	1,000 UJ	1,400 UJ	1,100 UJ	1,000 UJ
4,6-Dinitro-2-methylphenol	1,100 UJ	1,000 UJ	1,100 UJ	1,200 UJ	1,200 UJ	1,000 UJ	1,400 UJ	1,100 UJ	1,000 UJ
4-Bromophenyl-phenylether	420 UJ	410 UJ	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	430 UJ	400 UJ
4-Chloro-3-methylphenol	420 UJ	410 UJ	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	430 UJ	400 UJ
4-Chloroaniline	420 UJ	410 UJ	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	430 UJ	400 UJ
4-Chlorophenyl-phenylether	420 UJ	410 UJ	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	430 UJ	400 UJ
4-Methylphenol	420 UJ	410 UJ	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	430 UJ	400 UJ
4-Nitroaniline	1,100 UJ	1,000 UJ	1,100 UJ	1,200 UJ	1,200 UJ	1,000 UJ	1,400 UJ	1,100 UJ	1,000 UJ
4-Nitrophenol	1,100 UJ	1,000 UJ	1,100 UJ	1,200 UJ	1,200 UJ	1,000 UJ	1,400 UJ	1,100 UJ	1,000 UJ
Acenaphthene	420 UJ	450	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	580 J	400 UJ
Acenaphthylene	420 UJ	410 UJ	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	430 UJ	400 UJ
Anthracene	81 J	620 J	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	500 J	400 UJ
Benzo(a)anthracene	86 J	820 J	430 UJ	480 UJ	56 J	420 UJ	150 J	720 J	76 J
Benzo(a)pyrene	84 J	680 J	430 UJ	480 UJ	100 J	420 UJ	100 J	420 J	65 J
Benzo(b)fluoranthene	140 J	760 J	430 UJ	62 J	190 J	45 J	190 J	680 J	130 J
Benzo(g,h,i)perylene	420 UJ	250 J	430 UJ	480 UJ	50 J	420 UJ	65 J	150 J	42 J
Benzo(k)fluoranthene	58 J	290 J	430 UJ	480 UJ	65 J	420 UJ	83 J	250 J	51 J
Butylbenzylphthalate	420 UJ	410 UJ	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	430 UJ	400 UJ

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
R - Unreliable result
U - Analyte not detected

Appendix H
Subsurface Soil Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-SB09	SJS3-SB10	SJS3-SB11	SJS3-SB12		SJS3-SB13	SJS3-SB14	SJS3-SB15	SJS3-SB16
Sample ID	SJS03-SB09-001	SJS03-SB10-001	SJS03-SB11-001	SJS03-SB12-001P	SJS03-SB12-001	SJS03-SB13-001	SJS03-SB14-001	SJS03-SB15-001	SJS03-SB16-001
Sample Date	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99
Chemical Name									
Carbazole	420 UJ	67 J	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	430 UJ	400 UJ
Chrysene	160 J	790 J	430 UJ	51 J	130 J	420 UJ	150 J	790 J	94 J
Di-n-butylphthalate	420 UJ	72 J	94 J	480 UJ	190 J	420 UJ	560 UJ	430 UJ	400 UJ
Di-n-octylphthalate	420 UJ	410 UJ	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	430 UJ	400 UJ
Dibenz(a,h)anthracene	420 UJ	410 UJ	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	430 UJ	400 UJ
Dibenzofuran	420 UJ	41 J	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	430 UJ	400 UJ
Diethylphthalate	420 UJ	410 UJ	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	430 UJ	400 UJ
Dimethyl phthalate	420 UJ	410 UJ	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	430 UJ	400 UJ
Fluoranthene	97 J	1,800 J	430 UJ	480 UJ	96 J	420 UJ	370 J	1,500 J	140 J
Fluorene	420 UJ	280 J	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	430 UJ	400 UJ
Hexachlorobenzene	420 UJ	410 UJ	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	430 UJ	400 UJ
Hexachlorobutadiene	420 UJ	410 UJ	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	430 UJ	400 UJ
Hexachlorocyclopentadiene	420 UJ	410 UJ	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	430 UJ	400 UJ
Hexachloroethane	420 UJ	410 UJ	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	430 UJ	400 UJ
Indeno(1,2,3-cd)pyrene	43 J	230 J	430 UJ	480 UJ	50 J	420 UJ	72 J	180 J	47 J
Isophorone	420 UJ	410 UJ	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	430 UJ	400 UJ
Naphthalene	420 UJ	42 J	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	52 J	50 J
Nitrobenzene	420 UJ	410 UJ	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	430 UJ	400 UJ
Pentachlorophenol	1,100 UJ	1,000 UJ	1,100 UJ	1,200 UJ	1,200 UJ	1,000 UJ	1,400 UJ	1,100 UJ	1,000 UJ
Phenanthrene	130 J	2,000 J	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	85 J	68 J
Phenol	420 UJ	410 UJ	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	430 UJ	400 UJ
Pyrene	100 J	2,000 J	430 UJ	480 UJ	160 J	420 UJ	270 J	1,100 J	100 J
bis(2-Chloroethoxy)methane	420 UJ	410 UJ	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	430 UJ	400 UJ
bis(2-Chloroethyl)ether	420 UJ	410 UJ	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	430 UJ	400 UJ
bis(2-Ethylhexyl)phthalate	49 J	410 UJ	430 UJ	480 UJ	490 UJ	420 UJ	130 J	430 UJ	400 UJ
n-Nitroso-di-n-propylamine	420 UJ	410 UJ	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	430 UJ	400 UJ
n-Nitrosodiphenylamine	420 UJ	410 UJ	430 UJ	480 UJ	490 UJ	420 UJ	560 UJ	430 UJ	400 UJ
Pesticide/Polychlorinated Biphenyls (UG/KG)									
4,4'-DDD	38 J	4 UJ	4.30 UJ	0.430 J	4.90 UJ	4.10 UJ	5.5 UJ	4.20 UJ	0.590 J
4,4'-DDE	20 J	4 UJ	4.30 UJ	4.80 UJ	4.90 UJ	4.10 UJ	5.5 UJ	4.20 UJ	3.80 J
4,4'-DDT	4.20 UJ	4 UJ	4.30 UJ	1.30 J	4.90 UJ	4.10 UJ	5.5 UJ	4.20 UJ	0.810 J
Aldrin	2.10 UJ	2 UJ	2.10 UJ	2.40 UJ	2.5 UJ	2.10 UJ	2.80 UJ	2.10 UJ	2 UJ
Aroclor-1016	42 UJ	40 UJ	43 UJ	48 UJ	49 UJ	41 UJ	55 UJ	42 UJ	40 UJ
Aroclor-1221	83 UJ	81 UJ	85 UJ	95 UJ	98 UJ	83 UJ	110 UJ	85 UJ	80 UJ
Aroclor-1232	42 UJ	40 UJ	43 UJ	48 UJ	49 UJ	41 UJ	55 UJ	42 UJ	40 UJ
Aroclor-1242	42 UJ	40 UJ	43 UJ	48 UJ	49 UJ	41 UJ	55 UJ	42 UJ	40 UJ

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
R - Unreliable result
U - Analyte not detected

Appendix H
Subsurface Soil Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-SB09	SJS3-SB10	SJS3-SB11	SJS3-SB12		SJS3-SB13	SJS3-SB14	SJS3-SB15	SJS3-SB16
Sample ID	SJS03-SB09-001	SJS03-SB10-001	SJS03-SB11-001	SJS03-SB12-001P	SJS03-SB12-001	SJS03-SB13-001	SJS03-SB14-001	SJS03-SB15-001	SJS03-SB16-001
Sample Date	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99
Chemical Name									
Aroclor-1248	42 UJ	40 UJ	43 UJ	48 UJ	49 UJ	41 UJ	55 UJ	42 UJ	40 UJ
Aroclor-1254	42 UJ	40 UJ	43 UJ	48 UJ	49 UJ	41 UJ	55 UJ	42 UJ	40 UJ
Aroclor-1260	42 UJ	40 UJ	43 UJ	48 UJ	49 UJ	41 UJ	55 UJ	42 UJ	40 UJ
Dieldrin	4.20 UJ	4 UJ	4.30 UJ	4.80 UJ	4.90 UJ	4.10 UJ	5.5 UJ	4.20 UJ	4 UJ
Endosulfan I	2.10 UJ	2 UJ	2.10 UJ	2.40 UJ	2.5 UJ	2.10 UJ	2.80 UJ	2.10 UJ	2 UJ
Endosulfan II	4.20 UJ	4 UJ	4.30 UJ	4.80 UJ	4.90 UJ	4.10 UJ	5.5 UJ	4.20 UJ	4 UJ
Endosulfan sulfate	4.20 UJ	4 UJ	4.30 UJ	4.80 UJ	4.90 UJ	4.10 UJ	5.5 UJ	4.20 UJ	4 UJ
Endrin	4.20 UJ	4 UJ	4.30 UJ	4.80 UJ	4.90 UJ	4.10 UJ	5.5 UJ	4.20 UJ	4 UJ
Endrin aldehyde	4.20 UJ	4 UJ	4.30 UJ	4.80 UJ	4.90 UJ	4.10 UJ	5.5 UJ	4.20 UJ	4 UJ
Endrin ketone	4.20 UJ	4 UJ	4.30 UJ	4.80 UJ	4.90 UJ	4.10 UJ	5.5 UJ	4.20 UJ	4 UJ
Heptachlor	2.10 UJ	2 UJ	2.10 UJ	2.40 UJ	2.5 UJ	2.10 UJ	2.80 UJ	2.10 UJ	2 UJ
Heptachlor epoxide	2.10 UJ	2 UJ	2.10 UJ	2.40 UJ	2.5 UJ	2.10 UJ	2.80 UJ	2.10 UJ	2 UJ
Methoxychlor	21 UJ	20 UJ	21 UJ	24 UJ	25 UJ	21 UJ	28 UJ	21 UJ	20 UJ
Toxaphene	210 UJ	200 UJ	210 UJ	240 UJ	250 UJ	210 UJ	280 UJ	210 UJ	200 UJ
alpha-BHC	2.10 UJ	2 UJ	2.10 UJ	2.40 UJ	2.5 UJ	2.10 UJ	2.80 UJ	2.10 UJ	2 UJ
alpha-Chlordane	2.10 UJ	2 UJ	2.10 UJ	2.40 UJ	2.5 UJ	2.10 UJ	2.80 UJ	2.10 UJ	2 UJ
beta-BHC	2.10 UJ	2 UJ	2.10 UJ	2.40 UJ	2.5 UJ	2.10 UJ	2.80 UJ	2.10 UJ	2 UJ
delta-BHC	2.10 UJ	2 UJ	2.10 UJ	2.40 UJ	2.5 UJ	2.10 UJ	2.80 UJ	2.10 UJ	2 UJ
gamma-BHC (Lindane)	2.10 UJ	2 UJ	2.10 UJ	2.40 UJ	2.5 UJ	2.10 UJ	2.80 UJ	2.10 UJ	2 UJ
gamma-Chlordane	2.10 UJ	2 UJ	2.10 UJ	2.40 UJ	2.5 UJ	2.10 UJ	2.80 UJ	2.10 UJ	2 UJ
Dioxin/Furans (UG/KG)									
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,6,7,8-Heptachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8,9-Heptachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8-Hexachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,6,7,8-Hexachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8,9-Hexachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8-Pentachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,3,4,6,7,8-Hexachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,3,4,7,8-Pentachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,3,7,8-TCDD (dioxin)	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,3,7,8-Tetrachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
R - Unreliable result
U - Analyte not detected

Appendix H
Subsurface Soil Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-SB09	SJS3-SB10	SJS3-SB11	SJS3-SB12		SJS3-SB13	SJS3-SB14	SJS3-SB15	SJS3-SB16
Sample ID	SJS03-SB09-001	SJS03-SB10-001	SJS03-SB11-001	SJS03-SB12-001P	SJS03-SB12-001	SJS03-SB13-001	SJS03-SB14-001	SJS03-SB15-001	SJS03-SB16-001
Sample Date	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99
Chemical Name									
Total heptachlorodibenzo-p-dioxin	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total heptachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total hexachlorodibenzo-p-dioxin	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total hexachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total octachlorodibenzo-p-dioxin	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total octachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total pentachlorodibenzo-p-dioxin	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total pentachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total tetrachlorodibenzo-p-dioxin	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total tetrachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Metals (MG/KG)									
Aluminum	6,100 J	4,800 J	2,930 J	8,160 J	9,830 J	2,520 J	10,500 J	1,960 J	2,110 J
Antimony	3 J	0.450 U	0.630 U	0.580 U	0.740 U	0.580 U	0.810 U	0.600 U	0.570 U
Arsenic	19.3	4.30	3.10	9.80	14.1	3.40	6.70	1.30 J	3.10
Barium	101	17.3 J	37.5 J	20.4 J	26.1 J	11.1 J	24.7 J	9 J	17.5 J
Beryllium	3.10 J	0.260 J	0.190 J	0.390 J	0.640 J	0.380 J	0.820 J	0.140 J	0.160 J
Cadmium	6.30	0.100 B	0.130 B	0.150 B	0.170 B	0.140 B	0.380 B	0.100 B	0.0800 B
Calcium	4,130 J	606 J	343 J	14,700 J	1,590 J	6,430 J	2,160 J	376 J	197 J
Chromium	45.3	10.8	7.40	19.6	22.7	5.30	20.5	4.80	72.1
Cobalt	12.7	2.10 J	1.80 J	4.10 J	5.5 J	2.20 J	9.30 J	1.40 J	1.80 J
Copper	8,190	23.5	11.8	14.9	12.1	14.8	28	3.10 J	21.7
Cyanide	0.310 U	0.290 U	0.320 U	0.340 U	0.360 U	0.300 U	0.400 U	0.290 U	0.280 U
Iron	54,700	11,000	5,940	22,100	29,000	8,360	18,000	4,130	6,560
Lead	802 J	25.5 J	33.3 J	16.1 J	26.5 J	24.3 J	25.1 J	6.60 J	137 J
Magnesium	850 J	1,020	535 J	2,040	2,490	560 J	2,110	470 J	420 J
Manganese	947	46.5	23.8	113	138	62	238	27.5	46.6
Mercury	0.130 J	0.110 J	0.200 J	0.290 J	0.270 J	0.0700 J	0.220 J	0.0800 J	0.140 J
Nickel	32.9	4.30 J	3 J	8.40 J	10.3 J	3.20 J	14	2 J	1.80 J
Potassium	618 L	759 L	467 L	1,710 L	1,860 L	390 L	1,540 L	397 L	369 L
Selenium	0.770 J	0.5 J	0.600 UJ	0.610 J	0.720 U	0.550 UJ	0.780 U	0.580 U	0.550 U
Silver	0.730 J	0.150 U	0.210 U	0.190 U	0.25 U	0.190 U	0.270 U	0.200 U	0.190 U
Sodium	412 L	61.3 L	34.4 UL	283 L	252 L	53.2 L	44.6 UL	276 L	31.2 UL
Thallium	0.740 U	0.530 U	0.740 U	0.690 U	0.880 U	0.680 U	0.960 U	0.710 U	0.670 U
Vanadium	7.80 J	13.7	8.70 J	23.6	34.7	5.90 J	20.3	4.90 J	6 J
Zinc	716	33.5	19.5	38	51.5	26.3	59.4	13.2	18.9

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
R - Unreliable result
U - Analyte not detected

Appendix H
Subsurface Soil Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-SB09	SJS3-SB10	SJS3-SB11	SJS3-SB12		SJS3-SB13	SJS3-SB14	SJS3-SB15	SJS3-SB16
Sample ID	SJS03-SB09-001	SJS03-SB10-001	SJS03-SB11-001	SJS03-SB12-001P	SJS03-SB12-001	SJS03-SB13-001	SJS03-SB14-001	SJS03-SB15-001	SJS03-SB16-001
Sample Date	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99	04/20/99
Chemical Name									
Wet Chemistry (MG/KG)									
% Solids	79.1	82.6	77.5	69.7	67.8	80.2	59.3	78.6	83.2
Phosphorus	4.86 UL	5.27 UL	3 UL	2.76 UL	4.10 UL	2.40 UL	3.07 UL	2.36 UL	2.36 UL
pH	7.5	5.10	4.08	3.71	3.53	8.04	5.12	4.51	4.59
Total Petroleum Hydrocarbons (MG/KG)									
TPH-diesel range	2,500 J	2.90 J	3.90 J	3.90 J	6.20 J	2.20 J	1.90 J	7 J	2.30 J
TPH-gas range	35.2 J	0.400 B	0.0200 B	0.0300 B	0.0200 B	0.100 B	0.100 B	0.100 B	0.0200 B

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
R - Unreliable result
U - Analyte not detected

Appendix H
Subsurface Soil Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-SB17	SJS3-SB18	SJS3-SB19	SJS3-SB20	SJS3-SB21	SJS3-SB22	SJS3-SB23	SJS3-SB24	SJS3-SB26
Sample ID	SJS03-SB17-001	SJS03-SB18-001	SJS03-SB19-001	SJS03-SB20-001	SJS03-SB21-001	SJS03-SB22-001	SJS03-SB23-001	SJS03-SB24-001	SJS03-SB26-001
Sample Date	04/21/99	04/21/99	04/21/99	04/21/99	06/21/01	06/22/01	06/22/01	06/23/01	06/25/01
Chemical Name									
Volatile Organic Compounds (UG/KG)									
1,1,1-Trichloroethane	13 UJ	12 UJ	15 UJ	16 UJ	NA	NA	NA	NA	NA
1,1,2,2-Tetrachloroethane	13 UJ	12 UJ	15 UJ	16 UJ	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	13 UJ	12 UJ	15 UJ	16 UJ	NA	NA	NA	NA	NA
1,1-Dichloroethane	13 UJ	12 UJ	15 UJ	16 U	NA	NA	NA	NA	NA
1,1-Dichloroethene	13 UJ	12 UJ	15 UJ	16 U	NA	NA	NA	NA	NA
1,2-Dichloroethane	13 UJ	12 UJ	15 UJ	16 U	NA	NA	NA	NA	NA
1,2-Dichloroethene (total)	13 UJ	12 UJ	15 UJ	16 U	NA	NA	NA	NA	NA
1,2-Dichloropropane	13 UJ	12 UJ	15 UJ	16 UJ	NA	NA	NA	NA	NA
2-Butanone	13 UJ	12 UJ	32 J	16 U	NA	NA	NA	NA	NA
2-Hexanone	13 UJ	12 UJ	15 UJ	16 UJ	NA	NA	NA	NA	NA
4-Methyl-2-pentanone	13 UJ	12 UJ	15 UJ	16 UJ	NA	NA	NA	NA	NA
Acetone	13 UJ	12 UJ	230 J	130	NA	NA	NA	NA	NA
Benzene	13 UJ	12 UJ	15 UJ	16 UJ	NA	NA	NA	NA	NA
Bromodichloromethane	13 UJ	12 UJ	15 UJ	16 UJ	NA	NA	NA	NA	NA
Bromoform	13 UJ	12 UJ	15 UJ	16 UJ	NA	NA	NA	NA	NA
Bromomethane	13 UJ	12 UJ	15 UJ	16 U	NA	NA	NA	NA	NA
Carbon disulfide	13 UJ	12 UJ	5 J	18	NA	NA	NA	NA	NA
Carbon tetrachloride	13 UJ	12 UJ	15 UJ	16 UJ	NA	NA	NA	NA	NA
Chlorobenzene	13 UJ	12 UJ	15 UJ	16 UJ	NA	NA	NA	NA	NA
Chloroethane	13 UJ	12 UJ	15 UJ	16 U	NA	NA	NA	NA	NA
Chloroform	13 UJ	12 UJ	2 J	16 U	NA	NA	NA	NA	NA
Chloromethane	13 UJ	12 UJ	15 UJ	16 U	NA	NA	NA	NA	NA
Dibromochloromethane	13 UJ	12 UJ	15 UJ	16 UJ	NA	NA	NA	NA	NA
Ethylbenzene	13 UJ	12 UJ	15 UJ	16 UJ	NA	NA	NA	NA	NA
Methylene chloride	10 B	2 J	15 B	20 B	NA	NA	NA	NA	NA
Styrene	13 UJ	12 UJ	15 UJ	16 UJ	NA	NA	NA	NA	NA
Tetrachloroethene	13 UJ	12 UJ	15 UJ	16 UJ	NA	NA	NA	NA	NA
Toluene	13 UJ	12 UJ	15 UJ	16 UJ	NA	NA	NA	NA	NA
Trichloroethene	13 UJ	12 UJ	15 UJ	16 UJ	NA	NA	NA	NA	NA
Vinyl chloride	13 UJ	12 UJ	15 UJ	16 U	NA	NA	NA	NA	NA
Xylene, total	13 UJ	12 UJ	15 UJ	16 UJ	NA	NA	NA	NA	NA
cis-1,3-Dichloropropene	13 UJ	12 UJ	15 UJ	16 UJ	NA	NA	NA	NA	NA
trans-1,3-Dichloropropene	13 UJ	12 UJ	15 UJ	16 UJ	NA	NA	NA	NA	NA
Semi-volatile Organic Compounds (UG/KG)									

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
R - Unreliable result
U - Analyte not detected

Appendix H
Subsurface Soil Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-SB17	SJS3-SB18	SJS3-SB19	SJS3-SB20	SJS3-SB21	SJS3-SB22	SJS3-SB23	SJS3-SB24	SJS3-SB26
Sample ID	SJS03-SB17-001	SJS03-SB18-001	SJS03-SB19-001	SJS03-SB20-001	SJS03-SB21-001	SJS03-SB22-001	SJS03-SB23-001	SJS03-SB24-001	SJS03-SB26-001
Sample Date	04/21/99	04/21/99	04/21/99	04/21/99	06/21/01	06/22/01	06/22/01	06/23/01	06/25/01
Chemical Name									
1,2,4-Trichlorobenzene	440 UJ	410 UJ	510 UJ	540 UJ	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	440 UJ	410 UJ	510 UJ	540 UJ	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	440 UJ	410 UJ	510 UJ	540 UJ	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	440 UJ	410 UJ	510 UJ	540 UJ	NA	NA	NA	NA	NA
2,2'-Oxybis(1-chloropropane)	440 UJ	410 UJ	510 UJ	540 UJ	NA	NA	NA	NA	NA
2,4,5-Trichlorophenol	1,100 UJ	1,000 UJ	1,300 UJ	1,300 UJ	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	440 UJ	410 UJ	510 UJ	540 UJ	NA	NA	NA	NA	NA
2,4-Dichlorophenol	440 UJ	410 UJ	510 UJ	540 UJ	NA	NA	NA	NA	NA
2,4-Dimethylphenol	440 UJ	410 UJ	510 UJ	540 UJ	NA	NA	NA	NA	NA
2,4-Dinitrophenol	1,100 UJ	1,000 UJ	1,300 UJ	1,300 UJ	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	440 UJ	410 UJ	510 UJ	540 UJ	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	440 UJ	410 UJ	510 UJ	540 UJ	NA	NA	NA	NA	NA
2-Chloronaphthalene	440 UJ	410 UJ	510 UJ	540 UJ	NA	NA	NA	NA	NA
2-Chlorophenol	440 UJ	410 UJ	510 UJ	540 UJ	NA	NA	NA	NA	NA
2-Methylnaphthalene	440 UJ	410 UJ	510 UJ	540 UJ	NA	NA	NA	NA	NA
2-Methylphenol	440 UJ	410 UJ	510 UJ	540 UJ	NA	NA	NA	NA	NA
2-Nitroaniline	1,100 UJ	1,000 UJ	1,300 UJ	1,300 UJ	NA	NA	NA	NA	NA
2-Nitrophenol	440 UJ	410 UJ	510 UJ	540 UJ	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	440 UJ	410 UJ	510 UJ	540 UJ	NA	NA	NA	NA	NA
3-Nitroaniline	1,100 UJ	1,000 UJ	1,300 UJ	1,300 UJ	NA	NA	NA	NA	NA
4,6-Dinitro-2-methylphenol	1,100 UJ	1,000 UJ	1,300 UJ	1,300 UJ	NA	NA	NA	NA	NA
4-Bromophenyl-phenylether	440 UJ	410 UJ	510 UJ	540 UJ	NA	NA	NA	NA	NA
4-Chloro-3-methylphenol	440 UJ	410 UJ	510 UJ	540 UJ	NA	NA	NA	NA	NA
4-Chloroaniline	440 UJ	410 UJ	510 UJ	540 UJ	NA	NA	NA	NA	NA
4-Chlorophenyl-phenylether	440 UJ	410 UJ	510 UJ	540 UJ	NA	NA	NA	NA	NA
4-Methylphenol	440 UJ	410 UJ	510 UJ	540 UJ	NA	NA	NA	NA	NA
4-Nitroaniline	1,100 UJ	1,000 UJ	1,300 UJ	1,300 UJ	NA	NA	NA	NA	NA
4-Nitrophenol	1,100 UJ	1,000 UJ	1,300 UJ	1,300 UJ	NA	NA	NA	NA	NA
Acenaphthene	440 UJ	410 UJ	510 UJ	540 UJ	NA	NA	NA	NA	NA
Acenaphthylene	440 UJ	410 UJ	510 UJ	540 UJ	NA	NA	NA	NA	NA
Anthracene	440 UJ	50 J	66 J	540 UJ	NA	NA	NA	NA	NA
Benzo(a)anthracene	180 J	380 J	220 J	91 J	NA	NA	NA	NA	NA
Benzo(a)pyrene	78 J	440	310 J	140 J	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	290 J	1,100	330 J	200 J	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	240 J	480	270 J	68 J	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	100 J	290 J	260 J	96 J	NA	NA	NA	NA	NA
Butylbenzylphthalate	440 UJ	410 UJ	510 UJ	540 UJ	NA	NA	NA	NA	NA

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
R - Unreliable result
U - Analyte not detected

Appendix H
Subsurface Soil Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-SB17	SJS3-SB18	SJS3-SB19	SJS3-SB20	SJS3-SB21	SJS3-SB22	SJS3-SB23	SJS3-SB24	SJS3-SB26
Sample ID	SJS03-SB17-001	SJS03-SB18-001	SJS03-SB19-001	SJS03-SB20-001	SJS03-SB21-001	SJS03-SB22-001	SJS03-SB23-001	SJS03-SB24-001	SJS03-SB26-001
Sample Date	04/21/99	04/21/99	04/21/99	04/21/99	06/21/01	06/22/01	06/22/01	06/23/01	06/25/01
Chemical Name									
Carbazole	440 UJ	410 UJ	510 UJ	540 UJ	NA	NA	NA	NA	NA
Chrysene	200 J	790	380 J	340 J	NA	NA	NA	NA	NA
Di-n-butylphthalate	440 UJ	410 UJ	53 J	540 UJ	NA	NA	NA	NA	NA
Di-n-octylphthalate	440 UJ	410 UJ	100 J	540 UJ	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	67 J	160 J	250 J	540 UJ	NA	NA	NA	NA	NA
Dibenzofuran	440 UJ	410 UJ	510 UJ	540 UJ	NA	NA	NA	NA	NA
Diethylphthalate	440 UJ	410 UJ	510 UJ	540 UJ	NA	NA	NA	NA	NA
Dimethyl phthalate	440 UJ	410 UJ	510 UJ	540 UJ	NA	NA	NA	NA	NA
Fluoranthene	250 J	170 J	59 J	540 UJ	NA	NA	NA	NA	NA
Fluorene	440 UJ	410 UJ	510 UJ	540 UJ	NA	NA	NA	NA	NA
Hexachlorobenzene	440 UJ	410 UJ	510 UJ	540 UJ	NA	NA	NA	NA	NA
Hexachlorobutadiene	440 UJ	410 UJ	510 UJ	540 UJ	NA	NA	NA	NA	NA
Hexachlorocyclopentadiene	440 UJ	410 UJ	510 UJ	540 UJ	NA	NA	NA	NA	NA
Hexachloroethane	440 UJ	410 UJ	510 UJ	540 UJ	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	190 J	420	260 J	70 J	NA	NA	NA	NA	NA
Isophorone	440 UJ	410 UJ	510 UJ	540 UJ	NA	NA	NA	NA	NA
Naphthalene	440 UJ	410 UJ	510 UJ	540 UJ	NA	NA	NA	NA	NA
Nitrobenzene	440 UJ	410 UJ	510 UJ	540 UJ	NA	NA	NA	NA	NA
Pentachlorophenol	1,100 UJ	1,000 UJ	1,300 UJ	1,300 UJ	NA	NA	NA	NA	NA
Phenanthrene	120 J	72 J	510 UJ	540 UJ	NA	NA	NA	NA	NA
Phenol	440 UJ	410 UJ	510 UJ	540 UJ	NA	NA	NA	NA	NA
Pyrene	260 J	250 J	67 J	130 J	NA	NA	NA	NA	NA
bis(2-Chloroethoxy)methane	440 UJ	410 UJ	510 UJ	540 UJ	NA	NA	NA	NA	NA
bis(2-Chloroethyl)ether	440 UJ	410 UJ	510 UJ	540 UJ	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	440 UJ	410 UJ	76 J	540 UJ	NA	NA	NA	NA	NA
n-Nitroso-di-n-propylamine	440 UJ	410 UJ	510 UJ	540 UJ	NA	NA	NA	NA	NA
n-Nitrosodiphenylamine	440 UJ	410 UJ	510 UJ	540 UJ	NA	NA	NA	NA	NA
Pesticide/Polychlorinated Biphenyls (UG/KG)									
4,4'-DDD	65	4.20	5.10 U	5.30 U	NA	NA	NA	NA	NA
4,4'-DDE	19	8.60	5.10 U	5.30 U	NA	NA	NA	NA	NA
4,4'-DDT	6.40 J	4.10 U	5.10 U	5.30 U	NA	NA	NA	NA	NA
Aldrin	2.20 U	2 U	2.5 U	2.70 U	NA	NA	NA	NA	NA
Aroclor-1016	43 U	41 U	51 U	53 U	NA	NA	NA	NA	NA
Aroclor-1221	87 U	81 U	100 U	110 U	NA	NA	NA	NA	NA
Aroclor-1232	43 U	41 U	51 U	53 U	NA	NA	NA	NA	NA
Aroclor-1242	43 U	41 U	51 U	53 U	NA	NA	NA	NA	NA

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
R - Unreliable result
U - Analyte not detected

Appendix H
Subsurface Soil Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-SB17	SJS3-SB18	SJS3-SB19	SJS3-SB20	SJS3-SB21	SJS3-SB22	SJS3-SB23	SJS3-SB24	SJS3-SB26
Sample ID	SJS03-SB17-001	SJS03-SB18-001	SJS03-SB19-001	SJS03-SB20-001	SJS03-SB21-001	SJS03-SB22-001	SJS03-SB23-001	SJS03-SB24-001	SJS03-SB26-001
Sample Date	04/21/99	04/21/99	04/21/99	04/21/99	06/21/01	06/22/01	06/22/01	06/23/01	06/25/01
Chemical Name									
Aroclor-1248	43 U	41 U	51 U	53 U	NA	NA	NA	NA	NA
Aroclor-1254	43 U	41 U	51 U	53 U	NA	NA	NA	NA	NA
Aroclor-1260	43 U	41 U	51 U	53 U	NA	NA	NA	NA	NA
Dieldrin	4.30 J	4.10 U	5.10 U	5.30 U	NA	NA	NA	NA	NA
Endosulfan I	2.20 U	2 U	2.5 U	2.70 U	NA	NA	NA	NA	NA
Endosulfan II	4.30 U	4.10 U	5.10 U	5.30 U	NA	NA	NA	NA	NA
Endosulfan sulfate	4.30 U	4.10 U	5.10 U	5.30 U	NA	NA	NA	NA	NA
Endrin	4.30 U	4.10 U	5.10 U	5.30 U	NA	NA	NA	NA	NA
Endrin aldehyde	4.30 U	4.10 U	5.10 U	5.30 U	NA	NA	NA	NA	NA
Endrin ketone	4.30 U	4.10 U	5.10 U	5.30 U	NA	NA	NA	NA	NA
Heptachlor	2.20 U	2 U	2.5 U	2.70 U	NA	NA	NA	NA	NA
Heptachlor epoxide	2.20 U	2 U	2.5 U	2.70 U	NA	NA	NA	NA	NA
Methoxychlor	22 U	20 U	25 U	27 U	NA	NA	NA	NA	NA
Toxaphene	220 U	200 U	250 U	270 U	NA	NA	NA	NA	NA
alpha-BHC	2.20 U	2 U	2.5 U	2.70 U	NA	NA	NA	NA	NA
alpha-Chlordane	9.5	2 U	2.5 U	2.70 U	NA	NA	NA	NA	NA
beta-BHC	2.20 U	2 U	2.5 U	2.70 U	NA	NA	NA	NA	NA
delta-BHC	2.20 U	2 U	2.5 U	2.70 U	NA	NA	NA	NA	NA
gamma-BHC (Lindane)	2.20 U	2 U	2.5 U	2.70 U	NA	NA	NA	NA	NA
gamma-Chlordane	8.90	2 U	2.5 U	2.70 U	NA	NA	NA	NA	NA
[illegible]	NA	NA	NA	NA	[illegible]	NA	[illegible]	NA	[illegible]
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	NA	NA	NA	NA	0.00135 J	NA	0.00490 J	NA	0.00841 J
1,2,3,7,8-Pentachlorodibenzofuran	NA	NA	NA	NA	0.00168 J	NA	0.00919 J	NA	0.0188 J
2,3,4,6,7,8-Hexachlorodibenzofuran	NA	NA	NA	NA	0.00195 J	NA	0.0102 J	NA	0.0226 J
2,3,4,7,8-Pentachlorodibenzofuran	NA	NA	NA	NA	0.00230 J	NA	0.0183 J	NA	0.0319 J
2,3,7,8-TCDD (dioxin)	NA	NA	NA	NA	3.72E-04 J	NA	0.00151 J	NA	0.00447 NJ
2,3,7,8-Tetrachlorodibenzofuran	NA	NA	NA	NA	0.00710 J	NA	0.0677 J	NA	0.107 J

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
R - Unreliable result
U - Analyte not detected

Appendix H
Subsurface Soil Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-SB17	SJS3-SB18	SJS3-SB19	SJS3-SB20	SJS3-SB21	SJS3-SB22	SJS3-SB23	SJS3-SB24	SJS3-SB26
Sample ID	SJS03-SB17-001	SJS03-SB18-001	SJS03-SB19-001	SJS03-SB20-001	SJS03-SB21-001	SJS03-SB22-001	SJS03-SB23-001	SJS03-SB24-001	SJS03-SB26-001
Sample Date	04/21/99	04/21/99	04/21/99	04/21/99	06/21/01	06/22/01	06/22/01	06/23/01	06/25/01
Chemical Name									
Total heptachlorodibenzo-p-dioxin	NA	NA	NA	NA	0.336 J	NA	0.589 J	NA	0.759 J
Total heptachlorodibenzofuran	NA	NA	NA	NA	0.0334 J	NA	0.0812 J	NA	0.106 J
Total hexachlorodibenzo-p-dioxin	NA	NA	NA	NA	0.179 J	NA	0.243 J	NA	0.246 J
Total hexachlorodibenzofuran	NA	NA	NA	NA	0.0240 J	NA	0.111 J	NA	0.217 J
Total octachlorodibenzo-p-dioxin	NA	NA	NA	NA	1.14 J	NA	2.39 J	NA	2.54 J
Total octachlorodibenzofuran	NA	NA	NA	NA	0.0208 J	NA	0.0344 J	NA	0.0746 J
Total pentachlorodibenzo-p-dioxin	NA	NA	NA	NA	0.0181 J	NA	0.0577 J	NA	0.0517 J
Total pentachlorodibenzofuran	NA	NA	NA	NA	0.0265 J	NA	0.225 J	NA	0.375 J
Total tetrachlorodibenzo-p-dioxin	NA	NA	NA	NA	0.0110 J	NA	0.0637 J	NA	0.0515 J
Total tetrachlorodibenzofuran	NA	NA	NA	NA	0.0427 J	NA	0.437 J	NA	0.677 J
Total Metals (MG/KG)									
Aluminum	9,830	3,880	16,700	23,700	NA	NA	NA	NA	NA
Antimony	7.90 L	0.680 L	0.780 UL	0.800 UL	NA	NA	NA	NA	NA
Arsenic	20.7	4.70	10.5	11.7	NA	NA	NA	NA	NA
Barium	646	40.5 J	39.2 J	49.1 J	NA	NA	NA	NA	NA
Beryllium	0.740 J	0.220 J	0.660 J	1.20 J	NA	NA	NA	NA	NA
Cadmium	4.20	1.40	0.0900 U	0.0900 U	NA	NA	NA	NA	NA
Calcium	18,900 J	2,980 J	945 J	3,680 J	NA	NA	NA	NA	NA
Chromium	63.4	12.7	31.7	40.4	NA	NA	NA	NA	NA
Cobalt	9.10 J	2.20 J	4.90 J	10.7 J	NA	NA	NA	NA	NA
Copper	895	85.4	17.5	20.8	NA	NA	NA	NA	NA
Cyanide	0.320 U	0.260 U	0.240 U	0.400 U	NA	NA	NA	NA	NA
Iron	60,400	11,900	28,600	34,900	NA	NA	NA	NA	NA
Lead	2,990 J	108 J	21.6 J	31.5 J	NA	NA	NA	NA	NA
Magnesium	2,580	890 J	2,670	5,750	NA	NA	NA	NA	NA
Manganese	525	62.4	127	343	NA	NA	NA	NA	NA
Mercury	0.450	0.0900	0.25	0.240	NA	NA	NA	NA	NA
Nickel	38.5	8.10 J	9.70 J	20.4	NA	NA	NA	NA	NA
Potassium	1,690	702 J	3,120	3,600	NA	NA	NA	NA	NA
Selenium	0.620 UL	0.560 UL	0.75 UL	0.770 UL	NA	NA	NA	NA	NA
Silver	1.90 J	0.430 J	0.260 U	0.270 U	NA	NA	NA	NA	NA
Sodium	1,190	392 J	695 J	1,230 J	NA	NA	NA	NA	NA
Thallium	0.760 U	0.680 U	0.920 U	0.950 U	NA	NA	NA	NA	NA
Vanadium	28.5	8.90 J	37.2	44.5	NA	NA	NA	NA	NA
Zinc	2,340	142	51.8	93.9	NA	NA	NA	NA	NA

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
R - Unreliable result
U - Analyte not detected

Appendix H
Subsurface Soil Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-SB17	SJS3-SB18	SJS3-SB19	SJS3-SB20	SJS3-SB21	SJS3-SB22	SJS3-SB23	SJS3-SB24	SJS3-SB26
Sample ID	SJS03-SB17-001	SJS03-SB18-001	SJS03-SB19-001	SJS03-SB20-001	SJS03-SB21-001	SJS03-SB22-001	SJS03-SB23-001	SJS03-SB24-001	SJS03-SB26-001
Sample Date	04/21/99	04/21/99	04/21/99	04/21/99	06/21/01	06/22/01	06/22/01	06/23/01	06/25/01
Chemical Name									
Wet Chemistry (MG/KG)									
% Solids	76	82.2	66.1	62.4	NA	NA	NA	NA	NA
Phosphorus	85.4	56.2	89.6	84.5	NA	NA	NA	NA	NA
pH	7.49	5.87	2.99	7.20	NA	NA	NA	NA	NA
Total Petroleum Hydrocarbons (MG/KG)									
TPH-diesel range	44 R	19 R	1.40 R	3.5 R	NA	22	NA	109	NA
TPH-gas range	4.60	NA	0.300	0.0400 J	NA	0.031	NA	0.12	NA

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
R - Unreliable result
U - Analyte not detected

Appendix H
Shallow GW Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-MW01S			SJS3-MW02S			SJS3-MW03S		
Sample ID	SJS03-GW1S-001	SJS03-GW1S-002	SJS03-GW1S-003	SJS03-GW2S-001	SJS03-GW2S-002	SJS03-GW2S-003	SJS03-GW3S-001	SJS03-GW3S-001P	SJS03-GW3S-002
Sample Date	07/17/97	11/04/97	05/23/99	07/17/97	11/04/97	05/19/99	07/21/97	07/21/97	11/04/97
Chemical Name									
Volatile Organic Compounds (UG/L)									
1,1,1-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromo-3-chloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	5 U	NA	NA	5 U	NA	NA	5 U	5 U	NA
2-Hexanone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	24	NA	NA	8	5 U	NA	5 U	5 J	10
Benzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon disulfide	1 U	1 U	1.10 B	1 U	1 U	0.5 B	1 U	1 U	1 U
Carbon tetrachloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	0.6 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene chloride	2 B	2 B	0.800 B	2 B	2 B	1.10 B	0.9 B	1 B	3 B
Styrene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	0.2 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl chloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Xylene, total	1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Shallow GW Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-MW01S			SJS3-MW02S			SJS3-MW03S		
Sample ID	SJS03-GW1S-001	SJS03-GW1S-002	SJS03-GW1S-003	SJS03-GW2S-001	SJS03-GW2S-002	SJS03-GW2S-003	SJS03-GW3S-001	SJS03-GW3S-001P	SJS03-GW3S-002
Sample Date	07/17/97	11/04/97	05/23/99	07/17/97	11/04/97	05/19/99	07/21/97	07/21/97	11/04/97
Chemical Name									
cis-1,2-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Semi-volatile Organic Compounds (UG/L)									
1,2,4-Trichlorobenzene	NA	NA	11 U	NA	NA	11 U	NA	NA	NA
1,2-Dichlorobenzene	NA	NA	11 U	NA	NA	11 U	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	11 U	NA	NA	11 U	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	11 U	NA	NA	11 U	NA	NA	NA
2,2'-Oxybis(1-chloropropane)	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
2,4,5-Trichlorophenol	25 U	25 U	28 U	25 U	25 U	28 U	25 U	25 U	25 U
2,4,6-Trichlorophenol	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
2,4-Dichlorophenol	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
2,4-Dimethylphenol	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
2,4-Dinitrophenol	25 U	25 U	28 U	25 U	25 U	28 U	25 U	25 U	25 U
2,4-Dinitrotoluene	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
2,6-Dinitrotoluene	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
2-Chloronaphthalene	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
2-Chlorophenol	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
2-Methylnaphthalene	1 J	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
2-Methylphenol	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
2-Nitroaniline	25 U	25 U	28 U	25 U	25 U	28 U	25 U	25 U	25 U
2-Nitrophenol	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
3,3'-Dichlorobenzidine	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
3-Nitroaniline	25 U	25 U	28 U	25 U	25 U	28 U	25 U	25 U	25 U
4,6-Dinitro-2-methylphenol	25 U	25 U	28 U	25 U	25 U	28 U	25 U	25 U	25 U
4-Bromophenyl-phenylether	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
4-Chloro-3-methylphenol	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
4-Chloroaniline	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
4-Chlorophenyl-phenylether	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
4-Methylphenol	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
4-Nitroaniline	25 U	25 U	28 U	25 U	25 U	28 U	25 U	25 U	25 U
4-Nitrophenol	25 U	25 U	28 U	25 U	25 U	28 U	25 U	25 U	25 U
Acenaphthene	15	4 J	3 J	10 U	10 U	11 U	2 J	2 J	7 J
Acenaphthylene	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
Anthracene	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
Benzo(a)anthracene	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
Benzo(a)pyrene	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
U - Analyte not detected

Appendix H
Shallow GW Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-MW01S			SJS3-MW02S			SJS3-MW03S		
Sample ID	SJS03-GW1S-001	SJS03-GW1S-002	SJS03-GW1S-003	SJS03-GW2S-001	SJS03-GW2S-002	SJS03-GW2S-003	SJS03-GW3S-001	SJS03-GW3S-001P	SJS03-GW3S-002
Sample Date	07/17/97	11/04/97	05/23/99	07/17/97	11/04/97	05/19/99	07/21/97	07/21/97	11/04/97
Chemical Name									
Benzo(b)fluoranthene	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
Benzo(g,h,i)perylene	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
Benzo(k)fluoranthene	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
Butylbenzylphthalate	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
Carbazole	2 J	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
Chrysene	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
Di-n-butylphthalate	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
Di-n-octylphthalate	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
Dibenz(a,h)anthracene	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
Dibenzofuran	8 J	1 J	11 U	10 U	10 U	11 U	10 U	10 U	10 U
Diethylphthalate	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
Dimethyl phthalate	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
Fluoranthene	10 U	1 J	11 U	10 U	10 U	11 U	10 U	10 U	10 U
Fluorene	9 J	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
Hexachlorobenzene	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
Hexachlorobutadiene	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
Hexachloroethane	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
Indeno(1,2,3-cd)pyrene	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
Isophorone	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
Naphthalene	19	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
Nitrobenzene	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
Pentachlorophenol	25 U	25 U	28 U	25 U	25 U	28 U	25 U	25 U	25 U
Phenanthrene	5 J	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
Phenol	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
Pyrene	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
bis(2-Chloroethoxy)methane	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
bis(2-Chloroethyl)ether	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
bis(2-Ethylhexyl)phthalate	10 U	10 U	1 J	10 U	10 U	11 U	10 U	2 J	10 U
n-Nitroso-di-n-propylamine	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
n-Nitrosodiphenylamine	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	10 U
Pesticide/Polychlorinated Biphenyls (UG/L)									
4,4'-DDD	0.1 U	0.1 U	0.100 U	0.1 U	0.1 U	0.110 U	0.1 U	0.1 U	0.1 U
4,4'-DDE	0.1 U	0.1 U	0.100 U	0.1 U	0.1 U	0.110 U	0.1 U	0.1 U	0.1 U
4,4'-DDT	0.1 U	0.1 U	0.100 U	0.1 U	0.1 U	0.110 U	0.1 U	0.1 U	0.1 U
Aldrin	0.05 U	0.05 U	0.0520 U	0.05 U	0.05 U	0.0560 U	0.05 U	0.05 U	0.05 U
Aroclor-1016	1 U	1 U	1 U	1 U	1 U	1.10 U	1 U	1 U	1 U
Aroclor-1221	2 U	2 U	2.10 U	2 U	2 U	2.20 U	2 U	2 U	2 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
U - Analyte not detected

Appendix H
Shallow GW Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-MW01S			SJS3-MW02S			SJS3-MW03S		
Sample ID	SJS03-GW1S-001	SJS03-GW1S-002	SJS03-GW1S-003	SJS03-GW2S-001	SJS03-GW2S-002	SJS03-GW2S-003	SJS03-GW3S-001	SJS03-GW3S-001P	SJS03-GW3S-002
Sample Date	07/17/97	11/04/97	05/23/99	07/17/97	11/04/97	05/19/99	07/21/97	07/21/97	11/04/97
Chemical Name									
Aroclor-1232	1 U	1 U	1 U	1 U	1 U	1.10 U	1 U	1 U	1 U
Aroclor-1242	1 U	1 U	1 U	1 U	1 U	1.10 U	1 U	1 U	1 U
Aroclor-1248	1 U	1 U	1 U	1 U	1 U	1.10 U	1 U	1 U	1 U
Aroclor-1254	1 U	1 U	1 U	1 U	1 U	1.10 U	1 U	1 U	1 U
Aroclor-1260	1 U	1 U	1 U	1 U	1 U	1.10 U	1 U	1 U	1 U
Dieldrin	0.1 U	0.1 U	0.100 U	0.1 U	0.1 U	0.110 U	0.1 U	0.1 U	0.1 U
Endosulfan I	0.05 U	0.05 U	0.0520 U	0.05 U	0.05 U	0.0560 U	0.05 U	0.05 U	0.05 U
Endosulfan II	0.1 U	0.1 U	0.100 U	0.1 U	0.1 U	0.110 U	0.1 U	0.1 U	0.1 U
Endosulfan sulfate	0.1 U	0.1 U	0.100 U	0.1 U	0.1 U	0.110 U	0.1 U	0.1 U	0.1 U
Endrin	0.1 U	0.1 U	0.100 U	0.1 U	0.1 U	0.110 U	0.1 U	0.1 U	0.1 U
Endrin aldehyde	0.1 U	0.1 U	0.100 U	0.1 U	0.1 U	0.110 U	0.1 U	0.1 U	0.1 U
Endrin ketone	0.1 U	0.1 U	0.100 U	0.1 U	0.1 U	0.110 U	0.1 U	0.1 U	0.1 U
Heptachlor	0.05 U	0.05 U	0.0520 U	0.05 U	0.05 U	0.0240 J	0.05 U	0.05 U	0.05 U
Heptachlor epoxide	0.05 U	0.05 U	0.0520 U	0.05 U	0.05 U	0.0560 U	0.05 U	0.05 U	0.05 U
Methoxychlor	0.5 U	0.5 U	0.520 U	0.5 U	0.5 U	0.560 U	0.5 U	0.5 U	0.5 U
Toxaphene	5 U	5 U	5.20 U	5 U	5 U	5.60 U	5 U	5 U	5 U
alpha-BHC	0.05 U	0.05 U	0.0520 U	0.05 U	0.05 U	0.0560 U	0.05 U	0.05 U	0.05 U
alpha-Chlordane	0.05 U	0.05 U	0.0520 U	0.05 U	0.05 U	0.0560 U	0.05 U	0.05 U	0.05 U
beta-BHC	0.05 U	0.05 U	0.0520 U	0.05 U	0.05 U	0.0560 U	0.05 U	0.05 U	0.05 U
delta-BHC	0.05 U	0.05 U	0.0520 U	0.05 U	0.05 U	0.0560 U	0.05 U	0.05 U	0.05 U
gamma-BHC (Lindane)	0.05 U	0.05 U	0.0520 U	0.05 U	0.05 U	0.0560 U	0.05 U	0.05 U	0.05 U
gamma-Chlordane	0.05 U	0.05 U	0.0520 U	0.05 U	0.05 U	0.0560 U	0.05 U	0.05 U	0.05 U
Total Metals (UG/L)									
Aluminum	4,100 K	1,710	395	19,200 K	7,660	6,850	4,460 K	8,270 K	38.1 U
Antimony	2.2 B	2.3 J	2.70 U	2 U	1.7 U	2.70 U	2 U	2 U	1.7 U
Arsenic	4.4 J	3.2 U	3.40 J	3 U	3.4 J	4.70 J	3 U	3 U	3.2 U
Barium	176 J	31.1 J	23.1 J	75.6 J	24.7 J	26.6 J	43 J	47.6 J	16.1 J
Beryllium	1.4 J	0.76 J	0.100 U	1 U	4 J	2 J	1 U	1 U	0.96 J
Cadmium	0.5 U	0.4 U	0.420 J	0.5 U	0.4 U	1.10 J	0.5 U	0.5 U	0.4 U
Calcium	100,000	92,000	141,000	366,000	488,000	539,000	89,700	95,900	367,000
Chromium	16.1 B	12 B	3.20 J	56.7	4.6 U	3.10 J	13.8 B	18.3 B	4.6 U
Cobalt	8.5 J	8.8 J	2.30 J	16 J	59.7	16.6 J	8 U	8 U	6 U
Copper	7.4 B	6.3 J	5.20 B	15.9 B	5.8 U	7 B	6.8 B	7.8 B	5.8 U
Cyanide	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Iron	31,900	26,200	34,600	33,900	19,400	38,300	32,900	35,000	45,000
Lead	2.4 B	3.5	2.30 J	9	1.3 U	1.90 J	2.6 J	4.3	1.7 J
Magnesium	115,000	34,800	31,600	179,000	168,000	179,000	75,300	77,000	33,600
Manganese	2,000	1,720	1,770	2,990	5,330	5,440	830	890	2,960

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Shallow GW Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-MW01S			SJS3-MW02S			SJS3-MW03S		
Sample ID	SJS03-GW1S-001	SJS03-GW1S-002	SJS03-GW1S-003	SJS03-GW2S-001	SJS03-GW2S-002	SJS03-GW2S-003	SJS03-GW3S-001	SJS03-GW3S-001P	SJS03-GW3S-002
Sample Date	07/17/97	11/04/97	05/23/99	07/17/97	11/04/97	05/19/99	07/21/97	07/21/97	11/04/97
Chemical Name									
Mercury	0.69 B	0.12 U	0.100 U	0.26 B	0.13 U	0.100 U	0.22 B	0.22 B	0.16 U
Nickel	7 U	14.5 J	4 J	25.1 J	84.8	21 J	7 U	7 U	6.3 U
Potassium	37,300	26,600	27,100	61,100	25,100	35,400	30,200	31,000	23,000
Selenium	3 U	3.3 U	2.60 U	3 U	3.3 K	2.60 U	3 U	3 U	3.3 U
Silver	1.9 J	1.1 U	0.900 U	1 U	1.1 U	0.900 U	1.4 B	1 U	1.3 J
Sodium	810,000	122,000	132,000	612,000	298,000	376,000	470,000	468,000	39,400
Thallium	4.6 B	3.1 B	3.20 U	2 U	1.5 U	3.20 UL	2.8 B	2.4 B	1.5 U
Vanadium	13.7 J	12.2 J	1.5 J	43 J	6.8 U	0.600 U	18.5 J	22.7 J	6.8 U
Zinc	35.3 B	55.2 B	241	90	397	46.9	20.8 B	22 B	15.5 B
Dissolved Metals (UG/L)									
Aluminum	44 U	64.2 B	67.1 B	44 U	807	116 B	149 B	164 B	38.1 U
Antimony	2 U	3.8 J	2.70 U	2 U	1.7 U	2.70 U	2 U	2 U	1.7 U
Arsenic	3 U	3.2 U	2.40 J	3 U	3.2 U	2.30 J	3 U	3 U	3.2 U
Barium	285	26 J	21.4 J	43.4 J	25 J	24 J	37.6 J	44.3 J	14.9 J
Beryllium	1 U	0.58 U	0.100 U	1 U	1.9 J	0.100 U	1 U	1 U	0.58 U
Cadmium	0.5 U	0.4 U	0.330 J	0.5 U	0.49 J	0.540 J	0.5 U	0.5 U	0.4 U
Calcium	148,000	93,500	132,000	348,000	524,000	513,000	87,500	98,200	340,000
Chromium	7 U	5.8 J	1.60 J	7 U	4.6 U	1.10 U	9.2 B	12.5 B	4.6 U
Cobalt	8 U	7.7 J	2.10 J	12.2 J	63	16.1 J	8 U	8 U	6 U
Copper	6 U	5.8 U	2.70 B	6 U	5.8 U	2.5 B	6 U	6 U	5.8 U
Iron	74,800	24,900	31,900	10,900	20,000	34,000	30,000	33,600	42,200
Lead	1 U	1.9 B	1 U	1 U	1.4 J	1 U	1 U	1 U	1.3 U
Magnesium	194,000	35,400	32,900	170,000	183,000	169,000	77,800	86,800	31,900
Manganese	3,070	1,750	1,790	2,770	5,710	5,180	809	911	2,760
Mercury	0.31 B	0.13 U	0.100 U	0.22 B	0.13 U	0.100 U	0.2 B	0.18 B	0.12 U
Nickel	7 U	8.3 B	3.10 J	7 U	88.1	22.1 J	7 U	7 U	6.3 U
Potassium	38,900	27,000	28,400	57,200	27,100	33,100	30,800	34,600	21,400
Selenium	3 U	3.3 U	2.60 U	3 U	4.3 J	2.60 U	3 U	3 U	3.3 U
Silver	2.4 J	1.5 B	0.900 U	1 U	1.1 U	0.900 U	1.2 B	1 U	2 B
Sodium	1,530,000	125,000	141,000	587,000	307,000	352,000	525,000	557,000	38,700
Thallium	2.7 B	2.5 B	3.20 U	2 U	1.5 U	3.20 U	4 B	2 U	1.5 U
Vanadium	9 U	7.1 J	1.20 J	9 U	6.8 U	0.600 U	9 U	9 U	6.8 U
Zinc	22.4 B	49.7 B	10.5 J	27.3 B	497	36	20.5 B	11.7 B	24.4 B
Wet Chemistry (MG/L)									
Phosphate	NA	0.56	NA	NA	0.241	NA	NA	NA	0.78
Phosphorus	0.134 J	NA	0.319	0.173 J	NA	0.0580	0.142 J	0.101 J	NA

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
U - Analyte not detected

Appendix H
Shallow GW Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID		SJS3-MW04S				SJS3-MW05S	SJS3-MW06S	
Sample ID	SJS03-GW3S-003	SJS03-GW4S-001	SJS03-GW4S-002	SJS03-GW4S-002P	SJS03-GW4S-003	SJS03-GW5S-001	SJS03-GW6S-001	SJS03-GW6S-001P
Sample Date	05/19/99	07/17/97	11/04/97	11/04/97	05/19/99	05/19/99	05/19/99	05/19/99
Chemical Name								
Volatile Organic Compounds (UG/L)								
1,1,1-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromo-3-chloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	NA	5 U	NA	NA	NA	NA	NA	NA
2-Hexanone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	NA	5 U	5 U	5 U	NA	NA	17	17.3
Benzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon disulfide	1.40 B	1 U	1 U	1 U	0.600 B	0.5 B	0.5 B	0.5 B
Carbon tetrachloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	1 U	1 U	1 U	1 U	1 U	0.5 B	0.600 B	0.5 B
Chloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene chloride	1.10 B	2 B	3 B	2 B	1.10 B	1.20 B	1.20 B	1.10 B
Styrene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl chloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Xylene, total	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Shallow GW Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID		SJS3-MW04S				SJS3-MW05S	SJS3-MW06S	
Sample ID	SJS03-GW3S-003	SJS03-GW4S-001	SJS03-GW4S-002	SJS03-GW4S-002P	SJS03-GW4S-003	SJS03-GW5S-001	SJS03-GW6S-001	SJS03-GW6S-001P
Sample Date	05/19/99	07/17/97	11/04/97	11/04/97	05/19/99	05/19/99	05/19/99	05/19/99
Chemical Name								
cis-1,2-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Semi-volatile Organic Compounds (UG/L)								
1,2,4-Trichlorobenzene	11 U	NA	NA	NA	11 U	11 U	10 U	11 U
1,2-Dichlorobenzene	11 U	NA	NA	NA	11 U	11 U	10 U	11 U
1,3-Dichlorobenzene	11 U	NA	NA	NA	11 U	11 U	10 U	11 U
1,4-Dichlorobenzene	11 U	NA	NA	NA	11 U	11 U	10 U	11 U
2,2'-Oxybis(1-chloropropane)	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
2,4,5-Trichlorophenol	29 U	25 U	25 U	25 U	27 U	27 U	26 U	28 U
2,4,6-Trichlorophenol	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
2,4-Dichlorophenol	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
2,4-Dimethylphenol	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
2,4-Dinitrophenol	29 U	25 U	25 U	25 U	27 U	27 U	26 U	28 U
2,4-Dinitrotoluene	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
2,6-Dinitrotoluene	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
2-Chloronaphthalene	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
2-Chlorophenol	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
2-Methylnaphthalene	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
2-Methylphenol	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
2-Nitroaniline	29 U	25 U	25 U	25 U	27 U	27 U	26 U	28 U
2-Nitrophenol	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
3,3'-Dichlorobenzidine	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
3-Nitroaniline	29 U	25 U	25 U	25 U	27 U	27 U	26 U	28 U
4,6-Dinitro-2-methylphenol	29 U	25 U	25 U	25 U	27 U	27 U	26 U	28 U
4-Bromophenyl-phenylether	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
4-Chloro-3-methylphenol	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
4-Chloroaniline	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
4-Chlorophenyl-phenylether	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
4-Methylphenol	11 U	10 U	10 U	10 U	11 U	11 U	2 J	2 J
4-Nitroaniline	29 U	25 U	25 U	25 U	27 U	27 U	26 U	28 U
4-Nitrophenol	29 U	25 U	25 U	25 U	27 U	27 U	26 U	28 U
Acenaphthene	3 J	10 U	10 U	10 U	11 U	11 U	10 U	11 U
Acenaphthylene	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
Anthracene	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
Benzo(a)anthracene	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
Benzo(a)pyrene	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Shallow GW Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID		SJS3-MW04S				SJS3-MW05S	SJS3-MW06S	
Sample ID	SJS03-GW3S-003	SJS03-GW4S-001	SJS03-GW4S-002	SJS03-GW4S-002P	SJS03-GW4S-003	SJS03-GW5S-001	SJS03-GW6S-001	SJS03-GW6S-001P
Sample Date	05/19/99	07/17/97	11/04/97	11/04/97	05/19/99	05/19/99	05/19/99	05/19/99
Chemical Name								
Benzo(b)fluoranthene	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
Benzo(g,h,i)perylene	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
Benzo(k)fluoranthene	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
Butylbenzylphthalate	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
Carbazole	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
Chrysene	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
Di-n-butylphthalate	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
Di-n-octylphthalate	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
Dibenz(a,h)anthracene	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
Dibenzofuran	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
Diethylphthalate	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
Dimethyl phthalate	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
Fluoranthene	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
Fluorene	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
Hexachlorobenzene	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
Hexachlorobutadiene	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
Hexachlorocyclopentadiene	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
Hexachloroethane	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
Indeno(1,2,3-cd)pyrene	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
Isophorone	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
Naphthalene	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
Nitrobenzene	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
Pentachlorophenol	29 U	25 U	25 U	25 U	27 U	27 U	26 U	28 U
Phenanthrene	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
Phenol	11 U	10 U	10 U	10 U	11 U	11 U	2 J	2 J
Pyrene	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
bis(2-Chloroethoxy)methane	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
bis(2-Chloroethyl)ether	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
bis(2-Ethylhexyl)phthalate	11 U	25	14 B	7 B	11 U	11 U	10 U	11 U
n-Nitroso-di-n-propylamine	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
n-Nitrosodiphenylamine	11 U	10 U	10 U	10 U	11 U	11 U	10 U	11 U
Pesticide/Polychlorinated Biphenyls (UG/L)								
4,4'-DDD	0.110 U	0.1 U	0.1 U	0.1 U	0.110 U	0.100 U	0.100 U	0.100 U
4,4'-DDE	0.110 U	0.1 U	0.1 U	0.1 U	0.110 U	0.100 U	0.100 U	0.100 U
4,4'-DDT	0.110 U	0.1 U	0.1 U	0.1 U	0.110 U	0.100 U	0.100 U	0.100 U
Aldrin	0.0570 U	0.05 U	0.05 U	0.05 U	0.0570 U	0.0520 U	0.0520 U	0.0520 U
Aroclor-1016	1.10 U	1 U	1 U	1 U	1.10 U	1 U	1 U	1 U
Aroclor-1221	2.30 U	2 U	2 U	2 U	2.30 U	2.10 U	2.10 U	2.10 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Shallow GW Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID		SJS3-MW04S				SJS3-MW05S	SJS3-MW06S	
Sample ID	SJS03-GW3S-003	SJS03-GW4S-001	SJS03-GW4S-002	SJS03-GW4S-002P	SJS03-GW4S-003	SJS03-GW5S-001	SJS03-GW6S-001	SJS03-GW6S-001P
Sample Date	05/19/99	07/17/97	11/04/97	11/04/97	05/19/99	05/19/99	05/19/99	05/19/99
Chemical Name								
Aroclor-1232	1.10 U	1 U	1 U	1 U	1.10 U	1 U	1 U	1 U
Aroclor-1242	1.10 U	1 U	1 U	1 U	1.10 U	1 U	1 U	1 U
Aroclor-1248	1.10 U	1 U	1 U	1 U	1.10 U	1 U	1 U	1 U
Aroclor-1254	1.10 U	1 U	1 U	1 U	1.10 U	1 U	1 U	1 U
Aroclor-1260	1.10 U	1 U	1 U	1 U	1.10 U	1 U	1 U	1 U
Dieldrin	0.110 U	0.1 U	0.1 U	0.1 U	0.110 U	0.100 U	0.100 U	0.100 U
Endosulfan I	0.0570 U	0.05 U	0.05 U	0.05 U	0.0570 U	0.0520 U	0.0520 U	0.0520 U
Endosulfan II	0.110 U	0.1 U	0.1 U	0.1 U	0.110 U	0.100 U	0.100 U	0.100 U
Endosulfan sulfate	0.110 U	0.1 U	0.1 U	0.1 U	0.110 U	0.100 U	0.100 U	0.100 U
Endrin	0.110 U	0.1 U	0.1 U	0.1 U	0.110 U	0.100 U	0.100 U	0.100 U
Endrin aldehyde	0.110 U	0.1 U	0.1 U	0.1 U	0.110 U	0.100 U	0.100 U	0.100 U
Endrin ketone	0.110 U	0.1 U	0.1 U	0.1 U	0.110 U	0.100 U	0.100 U	0.100 U
Heptachlor	0.0570 U	0.05 U	0.05 U	0.05 U	0.0570 U	0.0520 U	0.0520 U	0.0520 U
Heptachlor epoxide	0.0570 U	0.05 U	0.05 U	0.05 U	0.0570 U	0.0520 U	0.0520 U	0.0520 U
Methoxychlor	0.570 U	0.5 U	0.5 U	0.5 U	0.570 U	0.520 U	0.520 U	0.520 U
Toxaphene	5.70 U	5 U	5 U	5 U	5.70 U	5.20 U	5.20 U	5.20 U
alpha-BHC	0.0570 U	0.05 U	0.05 U	0.05 U	0.0570 U	0.0520 U	0.0520 U	0.0520 U
alpha-Chlordane	0.0570 U	0.05 U	0.05 U	0.05 U	0.0570 U	0.0520 U	0.0520 U	0.0520 U
beta-BHC	0.0570 U	0.05 U	0.05 U	0.05 U	0.0570 U	0.0520 U	0.0520 U	0.0520 U
delta-BHC	0.0570 U	0.05 U	0.05 U	0.05 U	0.0570 U	0.0520 U	0.0520 U	0.0520 U
gamma-BHC (Lindane)	0.0570 U	0.05 U	0.05 U	0.05 U	0.0570 U	0.0520 U	0.0520 U	0.0520 U
gamma-Chlordane	0.0570 U	0.05 U	0.05 U	0.05 U	0.0570 U	0.0520 U	0.0520 U	0.0520 U
Total Metals (UG/L)								
Aluminum	186 B	9,170 K	56.8 J	38.1 U	247 B	621	92.7 B	55.5 B
Antimony	2.70 U	2 U	1.7 U	1.7 U	2.70 U	2.70 U	2.70 U	2.70 U
Arsenic	2 U	3 U	3.2 U	3.2 U	2 U	5.10 J	5.80 J	4.10 J
Barium	12.6 J	51.4 J	20.7 J	20.7 J	21.3 J	121 J	143 J	147 J
Beryllium	0.100 U	1.4 J	0.96 J	1.2 J	0.420 J	0.100 U	0.100 U	0.100 U
Cadmium	0.300 U	0.5 U	0.4 U	0.4 U	0.300 U	0.350 J	0.480 J	0.360 J
Calcium	201,000	178,000	130,000	129,000	156,000	194,000	226,000	212,000
Chromium	1.10 U	35.2	4.6 U	4.6 U	1.10 U	1.60 J	1.10 U	1.10 U
Cobalt	0.5 U	8 U	38.5 J	36.8 J	6.10 J	6.10 J	0.890 B	1.20 B
Copper	4.10 B	9 J	5.8 U	5.8 U	3.40 B	10.6 B	5.5 J	4.60 J
Cyanide	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Iron	24,600	16,900	20,100	20,000	20,600	26,900	25,400	18,100
Lead	1.40 J	5.7	1.4 J	1.3 U	1 U	1 U	1 U	1 U
Magnesium	15,000	154,000	49,900	48,700	54,200	128,000	310,000	300,000
Manganese	1,500	1,030	1,320	1,320	1,440	2,510	1,530	1,440

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Shallow GW Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID		SJS3-MW04S				SJS3-MW05S	SJS3-MW06S	
Sample ID	SJS03-GW3S-003	SJS03-GW4S-001	SJS03-GW4S-002	SJS03-GW4S-002P	SJS03-GW4S-003	SJS03-GW5S-001	SJS03-GW6S-001	SJS03-GW6S-001P
Sample Date	05/19/99	07/17/97	11/04/97	11/04/97	05/19/99	05/19/99	05/19/99	05/19/99
Chemical Name								
Mercury	0.100 U	0.3 B	0.13 U	0.13 U	0.100 U	0.100 U	0.100 U	0.100 U
Nickel	0.900 U	7 U	46.1	43.1	5 J	7.90 J	1.70 J	1.60 J
Potassium	13,900	57,000	28,200	27,800	31,000	33,800	83,400	81,300
Selenium	2.60 U	3 U	3.3 U	3.3 U	2.60 U	2.60 U	3.20 B	2.60 U
Silver	0.900 U	2.3 B	1.7 J	2 J	0.900 U	0.900 U	0.900 U	0.900 U
Sodium	20,800	799,000	155,000	154,000	182,000	1,080,000	1,660,000	1,740,000
Thallium	3.20 UL	2 U	1.5 U	1.5 U	3.20 UL	3.20 UL	5.60 L	3.20 UL
Vanadium	0.600 U	15.5 J	6.8 U	6.8 U	0.600 U	0.810 J	0.650 J	0.600 U
Zinc	5.40 J	36.4 B	327	327	28.5	13.8 J	1.90 U	1.90 U
Dissolved Metals (UG/L)								
Aluminum	38.2 U	44 U	38.1 U	38.1 U	161 B	70.8 B	50.1 B	44.1 B
Antimony	2.70 U	2 U	1.7 U	1.7 U	2.70 U	2.70 U	2.70 U	2.70 U
Arsenic	2 U	3 U	3.2 U	3.2 U	2 U	6 J	5.5 J	5.10 B
Barium	10.5 J	38 J	23.6 J	22.1 J	21.3 J	113 J	175 J	161 J
Beryllium	0.100 U	1 U	1.2 J	1.2 J	0.510 J	0.100 U	0.100 U	0.100 U
Cadmium	0.300 U	0.5 U	0.4 U	0.4 U	0.300 U	0.450 J	0.900 J	0.560 J
Calcium	202,000	178,000	139,000	133,000	150,000	154,000	223,000	198,000
Chromium	1.10 U	7 U	4.6 U	4.6 U	1.10 U	1.40 J	1.80 J	2.5 J
Cobalt	0.5 U	8 U	42.9 J	41.8 J	7 J	4.30 J	0.5 U	0.5 U
Copper	3.5 B	6 U	5.8 U	5.8 U	3.20 B	3 B	3.10 B	2.90 B
Iron	24,100	6,990	21,400	20,700	20,100	38,000	42,300	42,100
Lead	1 U	1 U	1.3 U	1.3 U	1 U	1 U	1.30 J	1 U
Magnesium	15,000	150,000	52,500	50,600	51,700	131,000	333,000	299,000
Manganese	1,490	1,020	1,420	1,370	1,400	2,930	1,760	1,640
Mercury	0.100 U	0.19 B	0.13 U	0.13 U	0.100 U	0.100 U	0.100 U	0.100 U
Nickel	0.900 U	7 U	50.5	45.7	7.5 J	7.20 J	1.5 J	2.80 B
Potassium	13,500	56,000	30,300	29,000	29,900	28,600	85,400	75,000
Selenium	2.60 U	3 U	3.3 U	3.3 U	4.5 J	2.60 U	2.60 U	3.90 B
Silver	0.900 U	1 U	1.6 B	2.7 B	0.900 U	0.900 U	0.900 U	0.900 U
Sodium	20,200	793,000	168,000	161,000	172,000	1,170,000	2,120,000	1,980,000
Thallium	3.20 U	2 B	1.5 B	1.5 U	3.20 U	3.20 U	3.20 U	3.20 U
Vanadium	0.600 U	9 U	6.8 U	6.8 U	0.600 U	0.600 U	0.600 U	0.600 U
Zinc	13.7 J	13.5 B	325	311	10.9 J	21.8	1.90 U	1.90 U
Wet Chemistry (MG/L)								
Phosphate	NA	NA	0.47	0.45	NA	NA	NA	NA
Phosphorus	0.0370	0.48 J	NA	NA	0.0560	0.0340	0.0280	0.0320

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Deep GW Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-MW01D			SJS3-MW02D		
Sample ID	SJS03-GW1D-001	SJS03-GW1D-002	SJS03-GW1D-003	SJS03-GW2D-001	SJS03-GW2D-002	SJS03-GW2D-003
Sample Date	07/24/97	11/04/97	05/19/99	07/24/97	11/04/97	05/19/99
Chemical Name						
Volatile Organic Compounds (UG/L)						
1,1,1-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromo-3-chloropropane	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U
2-Hexanone	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	5 U	20 B	NA	8 B	5 U	NA
Benzene	1 U	1 U	1 U	1 U	1 U	1 U
Bromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	1 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	1 U	1 U	1 U	1 U	1 U	1 U
Carbon disulfide	1 U	0.3 J	0.200 J	1 U	1 U	7.60
Carbon tetrachloride	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	0.4 J	1 U	1 U	0.3 J	1 U	1 U
Chloromethane	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	1 U	1 U	1 U	1 U	1 U	1 U
Methylene chloride	3 B	3 B	0.200 B	2 B	3 B	0.200 B
Styrene	1 U	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl chloride	1 U	1 U	1 U	1 U	1 U	1 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
L - Reported value may be biased low
U - Analyte not detected
UL - Not detected, quantitation limit is probably higher

Appendix H
Deep GW Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-MW01D			SJS3-MW02D		
Sample ID	SJS03-GW1D-001	SJS03-GW1D-002	SJS03-GW1D-003	SJS03-GW2D-001	SJS03-GW2D-002	SJS03-GW2D-003
Sample Date	07/24/97	11/04/97	05/19/99	07/24/97	11/04/97	05/19/99
Chemical Name						
Xylene, total	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U
Semi-volatile Organic Compounds (UG/L)						
1,2,4-Trichlorobenzene	NA	NA	12 U	NA	NA	12 U
1,2-Dichlorobenzene	NA	NA	12 U	NA	NA	12 U
1,3-Dichlorobenzene	NA	NA	12 U	NA	NA	12 U
1,4-Dichlorobenzene	NA	NA	12 U	NA	NA	12 U
2,2'-Oxybis(1-chloropropane)	10 U	10 U	12 U	10 U	10 U	12 U
2,4,5-Trichlorophenol	25 U	25 U	29 U	25 U	25 U	30 U
2,4,6-Trichlorophenol	10 U	10 U	12 U	10 U	10 U	12 U
2,4-Dichlorophenol	10 U	10 U	12 U	10 U	10 U	12 U
2,4-Dimethylphenol	10 U	10 U	12 U	10 U	10 U	12 U
2,4-Dinitrophenol	25 U	25 U	29 U	25 U	25 U	30 U
2,4-Dinitrotoluene	10 U	10 U	12 U	10 U	10 U	12 U
2,6-Dinitrotoluene	10 U	10 U	12 U	10 U	10 U	12 U
2-Chloronaphthalene	10 U	10 U	12 U	10 U	10 U	12 U
2-Chlorophenol	10 U	10 U	12 U	10 U	10 U	12 U
2-Methylnaphthalene	10 U	10 U	12 U	10 U	10 U	12 U
2-Methylphenol	10 U	10 U	12 U	10 U	10 U	12 U
2-Nitroaniline	25 U	25 U	29 U	25 U	25 U	30 U
2-Nitrophenol	10 U	10 U	12 U	10 U	10 U	12 U
3,3'-Dichlorobenzidine	10 U	10 U	12 U	10 U	10 U	12 U
3-Nitroaniline	25 U	25 U	29 U	25 U	25 U	30 U
4,6-Dinitro-2-methylphenol	25 U	25 U	29 U	25 U	25 U	30 U
4-Bromophenyl-phenylether	10 U	10 U	12 U	10 U	10 U	12 U
4-Chloro-3-methylphenol	10 U	10 U	12 U	10 U	10 U	12 U
4-Chloroaniline	10 U	10 U	12 U	10 U	10 U	12 U
4-Chlorophenyl-phenylether	10 U	10 U	12 U	10 U	10 U	12 U
4-Methylphenol	10 U	10 U	12 U	10 U	10 U	12 U
4-Nitroaniline	25 U	25 U	29 U	25 U	25 U	30 U
4-Nitrophenol	25 U	25 U	29 U	25 U	25 U	30 U
Acenaphthene	10 U	10 U	12 U	10 U	10 U	12 U
Acenaphthylene	10 U	10 U	12 U	10 U	10 U	12 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
L - Reported value may be biased low
U - Analyte not detected
UL - Not detected, quantitation limit is probably higher

Appendix H
Deep GW Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-MW01D			SJS3-MW02D		
Sample ID	SJS03-GW1D-001	SJS03-GW1D-002	SJS03-GW1D-003	SJS03-GW2D-001	SJS03-GW2D-002	SJS03-GW2D-003
Sample Date	07/24/97	11/04/97	05/19/99	07/24/97	11/04/97	05/19/99
Chemical Name						
Anthracene	10 U	10 U	12 U	10 U	10 U	12 U
Benzo(a)anthracene	10 U	10 U	12 U	10 U	10 U	12 U
Benzo(a)pyrene	10 U	10 U	12 U	10 U	10 U	12 U
Benzo(b)fluoranthene	10 U	10 U	12 U	10 U	10 U	12 U
Benzo(g,h,i)perylene	10 U	10 U	12 U	10 U	10 U	12 U
Benzo(k)fluoranthene	10 U	10 U	12 U	10 U	10 U	12 U
Butylbenzylphthalate	10 U	10 U	12 U	10 U	10 U	12 U
Carbazole	10 U	10 U	12 U	10 U	10 U	12 U
Chrysene	10 U	10 U	12 U	10 U	10 U	12 U
Di-n-butylphthalate	10 U	10 U	12 U	10 U	10 U	12 U
Di-n-octylphthalate	10 U	10 U	12 U	10 U	10 U	12 U
Dibenz(a,h)anthracene	10 U	10 U	12 U	10 U	10 U	12 U
Dibenzofuran	10 U	10 U	12 U	10 U	10 U	12 U
Diethylphthalate	10 U	10 U	12 U	10 U	10 U	12 U
Dimethyl phthalate	10 U	10 U	12 U	10 U	10 U	12 U
Fluoranthene	10 U	10 U	12 U	10 U	10 U	12 U
Fluorene	10 U	10 U	12 U	10 U	10 U	12 U
Hexachlorobenzene	10 U	10 U	12 U	10 U	10 U	12 U
Hexachlorobutadiene	10 U	10 U	12 U	10 U	10 U	12 U
Hexachlorocyclopentadiene	10 U	10 U	12 U	10 U	10 U	12 U
Hexachloroethane	10 U	10 U	12 U	10 U	10 U	12 U
Indeno(1,2,3-cd)pyrene	10 U	10 U	12 U	10 U	10 U	12 U
Isophorone	10 U	10 U	12 U	10 U	10 U	12 U
Naphthalene	10 U	10 U	12 U	10 U	10 U	12 U
Nitrobenzene	10 U	10 U	12 U	10 U	10 U	12 U
Pentachlorophenol	25 U	25 U	29 U	25 U	25 U	30 U
Phenanthrene	10 U	10 U	12 U	10 U	10 U	12 U
Phenol	10 U	10 U	12 U	10 U	10 U	12 U
Pyrene	10 U	10 U	12 U	10 U	10 U	12 U
bis(2-Chloroethoxy)methane	10 U	10 U	12 U	10 U	10 U	12 U
bis(2-Chloroethyl)ether	10 U	10 U	12 U	10 U	10 U	12 U
bis(2-Ethylhexyl)phthalate	10 U	3 J	12 U	10 U	10 U	1 J
n-Nitroso-di-n-propylamine	10 U	10 U	12 U	10 U	10 U	12 U
n-Nitrosodiphenylamine	10 U	10 U	12 U	10 U	10 U	12 U
Pesticide/Polychlorinated Biphenyls (UG/L)						
4,4'-DDD	0.1 U	0.1 U	0.110 U	0.1 U	0.1 U	0.100 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
L - Reported value may be biased low
U - Analyte not detected
UL - Not detected, quantitation limit is probably higher

Appendix H
Deep GW Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-MW01D			SJS3-MW02D		
Sample ID	SJS03-GW1D-001	SJS03-GW1D-002	SJS03-GW1D-003	SJS03-GW2D-001	SJS03-GW2D-002	SJS03-GW2D-003
Sample Date	07/24/97	11/04/97	05/19/99	07/24/97	11/04/97	05/19/99
Chemical Name						
4,4'-DDE	0.1 U	0.1 U	0.110 U	0.1 U	0.1 U	0.100 U
4,4'-DDT	0.1 U	0.1 U	0.110 U	0.1 U	0.1 U	0.100 U
Aldrin	0.05 U	0.05 U	0.0550 U	0.05 U	0.05 U	0.0520 U
Aroclor-1016	1 U	1 U	1.10 U	1 U	1 U	1 U
Aroclor-1221	2 U	2 U	2.20 U	2 U	2 U	2.10 U
Aroclor-1232	1 U	1 U	1.10 U	1 U	1 U	1 U
Aroclor-1242	1 U	1 U	1.10 U	1 U	1 U	1 U
Aroclor-1248	1 U	1 U	1.10 U	1 U	1 U	1 U
Aroclor-1254	1 U	1 U	1.10 U	1 U	1 U	1 U
Aroclor-1260	1 U	1 U	1.10 U	1 U	1 U	1 U
Dieldrin	0.1 U	0.1 U	0.110 U	0.1 U	0.1 U	0.100 U
Endosulfan I	0.05 U	0.05 U	0.0550 U	0.05 U	0.05 U	0.0520 U
Endosulfan II	0.1 U	0.1 U	0.110 U	0.1 U	0.1 U	0.100 U
Endosulfan sulfate	0.1 U	0.1 U	0.110 U	0.1 U	0.1 U	0.100 U
Endrin	0.1 U	0.1 U	0.110 U	0.1 U	0.1 U	0.100 U
Endrin aldehyde	0.1 U	0.1 U	0.110 U	0.1 U	0.1 U	0.100 U
Endrin ketone	0.1 U	0.1 U	0.110 U	0.1 U	0.1 U	0.100 U
Heptachlor	0.05 U	0.05 U	0.0550 U	0.05 U	0.05 U	0.0520 U
Heptachlor epoxide	0.05 U	0.05 U	0.0550 U	0.05 U	0.05 U	0.0520 U
Methoxychlor	0.5 U	0.5 U	0.550 U	0.5 U	0.5 U	0.520 U
Toxaphene	5 U	5 U	5.5 U	5 U	5 U	5.20 U
alpha-BHC	0.05 U	0.05 U	0.0550 U	0.05 U	0.05 U	0.0520 U
alpha-Chlordane	0.05 U	0.05 U	0.0550 U	0.05 U	0.05 U	0.0520 U
beta-BHC	0.05 U	0.05 U	0.0550 U	0.05 U	0.05 U	0.0520 U
delta-BHC	0.05 U	0.05 U	0.0550 U	0.05 U	0.05 U	0.0520 U
gamma-BHC (Lindane)	0.05 U	0.05 U	0.0550 U	0.05 U	0.05 U	0.0520 U
gamma-Chlordane	0.05 U	0.05 U	0.0550 U	0.05 U	0.05 U	0.0520 U
Total Metals (UG/L)						
Aluminum	415 B	48.4 B	180 B	202 B	38.1 U	62.2 B
Antimony	NA	1.7 U	2.70 U	NA	1.7 U	2.70 U
Arsenic	3 U	3.2 U	4.20 J	3 U	3.2 U	2 U
Barium	15.8 J	21.7 J	30.7 J	46.6 J	48.1 J	60.2 J
Beryllium	1.1 B	0.58 U	0.100 U	1.1 B	0.58 U	0.100 U
Cadmium	0.5 UL	0.4 U	0.300 U	0.5 UL	0.4 U	0.300 U
Calcium	49,300 J	49,500	61,700	103,000 J	95,200	110,000
Chromium	7 U	4.6 U	1.40 J	7 U	4.6 U	2.40 J

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
L - Reported value may be biased low
U - Analyte not detected
UL - Not detected, quantitation limit is probably higher

Appendix H
Deep GW Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-MW01D			SJS3-MW02D		
Sample ID	SJS03-GW1D-001	SJS03-GW1D-002	SJS03-GW1D-003	SJS03-GW2D-001	SJS03-GW2D-002	SJS03-GW2D-003
Sample Date	07/24/97	11/04/97	05/19/99	07/24/97	11/04/97	05/19/99
Chemical Name						
Cobalt	8 U	6 U	0.5 U	8 U	6 U	0.5 U
Copper	6 U	5.8 U	3.60 B	6 U	5.8 U	3.40 B
Cyanide	5 U	5 U	5 U	5 U	5 U	5 U
Iron	788 J	170 B	476	487 J	272	541
Lead	1 UL	1.8 J	1 J	2.1 B	1.3 U	1 U
Magnesium	14,400 J	12,700	16,600	39,000 J	37,100	48,000
Manganese	91.3 L	45.6	110	291 L	354	612
Mercury	0.17 B	0.13 U	0.100 U	0.15 B	0.13 U	0.100 U
Nickel	8.1 J	6.3 U	0.900 U	7 U	6.3 U	1 J
Potassium	15,100	15,400	16,600	17,700	16,000	17,600
Selenium	NA	3.3 U	2.60 U	NA	3.3 U	2.60 U
Silver	1 U	1.1 U	0.900 U	1 U	1.2 J	0.900 U
Sodium	40,600 J	43,300	50,600	37,300 J	34,500	41,000
Thallium	2.7 J	2.5 B	3.20 UL	2 U	1.5 B	3.20 UL
Vanadium	9 U	6.8 U	0.600 U	9 U	6.8 U	0.600 U
Zinc	6.4 B	10.9 B	3.80 J	7.1 B	9 B	16.6 J
Dissolved Metals (UG/L)						
Aluminum	44 U	42.3 B	145 B	47 B	38.1 U	42.7 B
Antimony	2 UL	1.7 U	2.70 U	2 UL	1.7 U	2.70 U
Arsenic	3 UL	3.2 U	2 U	3 UL	3.2 U	2 U
Barium	14.1 B	20.8 J	23.6 J	42.8 J	53.7 J	58.7 J
Beryllium	1 U	0.58 U	0.100 U	1.1 B	0.58 U	0.100 U
Cadmium	0.5 UL	0.4 U	0.300 U	0.5 UL	0.4 U	0.300 U
Calcium	53,800 J	51,100	63,700	98,400 J	103,000	105,000
Chromium	7 U	4.6 U	1.10 U	7 U	4.6 U	1.10 U
Cobalt	8 U	6 U	0.5 U	8 U	6 U	0.5 U
Copper	6 U	5.8 U	2.60 B	6 U	5.8 U	3.30 B
Iron	180 B	130 B	301	156 B	276	464
Lead	1 U	1.3 U	1 U	1 U	1.3 U	1 U
Magnesium	18,700 J	13,200	18,000	38,200 J	40,900	46,300
Manganese	101 J	46.4	123	284 J	365	563
Mercury	0.15 B	0.12 U	0.100 U	0.17 B	0.13 U	0.100 U
Nickel	7 U	6.3 U	0.980 J	7 U	6.3 U	0.900 U
Potassium	12,600	15,100	17,900	16,600	17,600	18,100
Selenium	NA	3.3 U	2.60 U	NA	3.3 U	2.60 U
Silver	1 U	1.1 U	0.900 U	1 U	3.1 B	0.900 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
L - Reported value may be biased low
U - Analyte not detected
UL - Not detected, quantitation limit is probably higher

Appendix H
Deep GW Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-MW01D			SJS3-MW02D		
Sample ID	SJS03-GW1D-001	SJS03-GW1D-002	SJS03-GW1D-003	SJS03-GW2D-001	SJS03-GW2D-002	SJS03-GW2D-003
Sample Date	07/24/97	11/04/97	05/19/99	07/24/97	11/04/97	05/19/99
Chemical Name						
Sodium	44,100 J	44,800	52,900	35,200 J	37,800	39,600
Thallium	2.1 J	1.5 U	3.20 U	2 U	1.9 B	3.20 U
Vanadium	9 U	6.8 U	0.600 U	9 U	6.8 U	0.600 U
Zinc	5 U	5.7 B	4.40 J	7.2 B	18.5 B	10.5 J
Wet Chemistry (MG/L)						
Phosphate	NA	0.56	NA	NA	1.17	NA
Phosphorus	0.51	NA	0.0750	0.7	NA	0.0540

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
L - Reported value may be biased low
U - Analyte not detected
UL - Not detected, quantitation limit is probably higher

Appendix H
Sediment Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-SD01	SJS3-SD02		SJS3-SD03	SJS3-SD04	SJS3-SD06	SJS3-SD07	SJS3-SD08	
Sample ID	SJS03-SD01-000	SJS03-SD02-000	SJS03-SD02-000P	SJS03-SD03-000	SJS03-SD04-001	SJS03-SD06-000	SJS03-SD07-001	SJS03-SD08-001	SJS03-SD08-001P
Sample Date	07/14/97	07/15/97	07/15/97	07/14/97	04/16/99	06/26/97	04/15/99	04/15/99	04/15/99
Chemical Name									
Volatile Organic Compounds (UG/KG)									
1,1,1-Trichloroethane	11 U	14 UJ	14 UJ	24 UJ	31 U	11 UJ	19 U	21 U	23 U
1,1,2,2-Tetrachloroethane	11 U	14 UJ	14 UJ	24 UJ	31 U	11 UJ	19 U	21 U	23 U
1,1,2-Trichloroethane	11 U	14 UJ	14 UJ	24 UJ	31 U	11 UJ	19 U	21 U	23 U
1,1-Dichloroethane	11 U	14 UJ	14 U	24 UJ	31 U	11 U	19 U	21 U	23 U
1,1-Dichloroethene	11 U	14 UJ	14 U	24 UJ	31 U	11 U	19 U	21 U	23 U
1,2-Dichloroethane	11 U	14 UJ	14 U	24 UJ	31 U	11 U	19 U	21 U	23 U
1,2-Dichloroethene (total)	11 U	14 UJ	14 U	24 UJ	31 U	11 U	19 U	21 U	23 U
1,2-Dichloropropane	11 U	14 UJ	14 UJ	24 UJ	31 U	11 UJ	19 U	21 U	23 U
2-Butanone	11 U	14 UJ	14 U	24 UJ	31 U	11 U	19 U	21 U	23 U
2-Hexanone	11 U	14 UJ	14 UJ	24 UJ	31 U	11 UJ	19 U	21 U	23 U
4-Methyl-2-pentanone	11 U	14 UJ	14 UJ	24 UJ	31 U	11 UJ	19 U	21 U	23 U
Acetone	11 U	14 UJ	14 U	64 B	31 UJ	11 U	51 J	45 J	23 U
Benzene	11 U	14 UJ	14 UJ	24 UJ	31 U	11 UJ	19 U	21 U	23 U
Bromodichloromethane	11 U	14 UJ	14 UJ	24 UJ	31 U	11 UJ	19 U	21 U	23 U
Bromoform	11 U	14 UJ	14 UJ	24 UJ	31 U	11 UJ	19 U	21 U	23 U
Bromomethane	11 U	14 UJ	14 U	24 UJ	31 U	11 U	19 U	21 U	23 U
Carbon disulfide	11 U	14 UJ	14 U	24 UJ	31 U	11 U	19 U	4 J	23 U
Carbon tetrachloride	11 U	14 UJ	14 UJ	24 UJ	31 U	11 UJ	19 U	21 U	23 U
Chlorobenzene	11 U	14 UJ	14 UJ	24 UJ	31 U	11 UJ	19 U	21 U	23 U
Chloroethane	11 U	14 UJ	14 U	24 UJ	31 U	11 U	19 U	21 U	23 U
Chloroform	11 U	14 UJ	14 U	24 UJ	4 J	11 U	19 U	21 U	23 U
Chloromethane	11 U	14 UJ	14 U	24 UJ	31 U	11 U	19 U	21 U	23 U
Dibromochloromethane	11 U	14 UJ	14 UJ	24 UJ	31 U	11 UJ	19 U	21 U	23 U
Ethylbenzene	11 U	14 UJ	14 UJ	24 UJ	31 U	11 UJ	19 U	21 U	23 U
Methylene chloride	40 B	110 J	100 B	66 B	8 B	100	2 B	3 B	23 U
Styrene	11 U	14 UJ	14 UJ	24 UJ	31 U	11 UJ	19 U	21 U	23 U
Tetrachloroethene	11 U	14 UJ	14 UJ	24 UJ	31 U	11 UJ	19 U	21 U	23 U
Toluene	11 U	14 UJ	14 UJ	24 UJ	31 U	4 J	19 U	21 U	23 U
Trichloroethene	11 U	14 UJ	14 UJ	24 UJ	31 U	11 UJ	19 U	21 U	23 U
Vinyl chloride	11 U	14 UJ	14 U	24 UJ	31 U	11 U	19 U	21 U	23 U
Xylene, total	11 U	14 UJ	14 UJ	24 UJ	31 U	11 UJ	19 U	21 U	23 U
cis-1,3-Dichloropropene	11 U	14 UJ	14 UJ	24 UJ	31 U	11 UJ	19 U	21 U	23 U
trans-1,3-Dichloropropene	11 U	14 UJ	14 UJ	24 UJ	31 U	11 UJ	19 U	21 U	23 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
U - Analyte not detected

Appendix H
Sediment Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-SD01	SJS3-SD02		SJS3-SD03	SJS3-SD04	SJS3-SD06	SJS3-SD07	SJS3-SD08	
Sample ID	SJS03-SD01-000	SJS03-SD02-000	SJS03-SD02-000P	SJS03-SD03-000	SJS03-SD04-001	SJS03-SD06-000	SJS03-SD07-001	SJS03-SD08-001	SJS03-SD08-001P
Sample Date	07/14/97	07/15/97	07/15/97	07/14/97	04/16/99	06/26/97	04/15/99	04/15/99	04/15/99
Chemical Name									
Semi-volatile Organic Compounds (UG/KG)									
1,2,4-Trichlorobenzene	350 U	4,300 U	4,400 U	530 U	1,000 U	1,600 U	640 U	690 U	760 U
1,2-Dichlorobenzene	350 U	4,300 U	4,400 U	530 U	1,000 U	1,600 U	640 U	690 U	760 U
1,3-Dichlorobenzene	350 U	4,300 U	4,400 U	530 U	1,000 U	1,600 U	640 U	690 U	760 U
1,4-Dichlorobenzene	350 U	4,300 U	4,400 U	530 U	1,000 U	1,600 U	640 U	690 U	760 U
2,2'-Oxybis(1-chloropropane)	350 U	4,300 U	4,400 UJ	530 U	1,000 U	1,600 U	640 U	690 U	760 U
2,4,5-Trichlorophenol	890 U	11,000 U	11,000 U	1,300 U	2,500 U	4,100 U	1,600 U	1,700 U	1,900 U
2,4,6-Trichlorophenol	350 U	4,300 U	4,400 U	530 U	1,000 U	1,600 U	640 U	690 U	760 U
2,4-Dichlorophenol	350 U	4,300 U	4,400 U	530 U	1,000 U	1,600 U	640 U	690 U	760 U
2,4-Dimethylphenol	350 U	4,300 U	4,400 U	530 U	1,000 U	1,600 U	640 U	690 U	760 U
2,4-Dinitrophenol	890 UJ	11,000 U	11,000 U	1,300 U	2,500 U	4,100 U	1,600 U	1,700 U	1,900 U
2,4-Dinitrotoluene	350 U	4,300 U	4,400 U	530 U	1,000 U	1,600 U	640 U	690 U	760 U
2,6-Dinitrotoluene	350 U	4,300 U	4,400 U	530 U	1,000 U	1,600 U	640 U	690 U	760 U
2-Chloronaphthalene	350 U	4,300 U	4,400 U	530 U	1,000 U	1,600 U	640 U	690 U	760 U
2-Chlorophenol	350 U	4,300 U	4,400 U	530 U	1,000 U	1,600 U	640 U	690 U	760 U
2-Methylnaphthalene	350 U	4,300 U	4,400 U	530 U	1,000 U	1,600 U	640 U	690 U	760 U
2-Methylphenol	350 U	4,300 U	4,400 U	530 U	1,000 U	1,600 U	640 U	690 U	760 U
2-Nitroaniline	890 U	11,000 U	11,000 U	1,300 U	2,500 U	4,100 U	1,600 U	1,700 U	1,900 U
2-Nitrophenol	350 U	4,300 U	4,400 U	530 U	1,000 U	1,600 U	640 U	690 U	760 U
3,3'-Dichlorobenzidine	350 U	4,300 U	4,400 U	530 U	1,000 U	1,600 U	640 U	690 U	760 U
3-Nitroaniline	890 U	11,000 U	11,000 U	1,300 U	2,500 U	4,100 U	1,600 U	1,700 U	1,900 U
4,6-Dinitro-2-methylphenol	890 U	11,000 U	11,000 U	1,300 U	2,500 U	4,100 U	1,600 U	1,700 U	1,900 U
4-Bromophenyl-phenylether	350 U	4,300 U	4,400 U	530 U	1,000 U	1,600 U	640 U	690 U	760 U
4-Chloro-3-methylphenol	350 U	4,300 U	4,400 U	530 U	1,000 U	1,600 U	640 U	690 U	760 U
4-Chloroaniline	350 U	4,300 U	4,400 U	530 U	1,000 U	1,600 U	640 U	690 U	760 U
4-Chlorophenyl-phenylether	350 U	4,300 U	4,400 U	530 U	1,000 U	1,600 U	640 U	690 U	760 U
4-Methylphenol	350 U	4,300 U	4,400 U	530 U	1,000 U	1,600 U	640 U	690 U	760 U
4-Nitroaniline	890 U	11,000 U	11,000 U	1,300 U	2,500 U	4,100 U	1,600 U	1,700 U	1,900 U
4-Nitrophenol	890 U	11,000 U	11,000 U	1,300 U	2,500 U	4,100 U	1,600 U	1,700 U	1,900 U
Acenaphthene	350 U	4,300 U	4,400 U	530 U	1,000 U	1,600 U	640 U	690 U	760 U
Acenaphthylene	55 J	4,300 U	4,400 U	66 J	1,000 U	1,600 U	640 U	690 U	760 U
Anthracene	39 J	4,300 U	4,400 U	56 J	1,000 U	1,600 U	640 U	690 U	760 U
Benzo(a)anthracene	260 J	4,300 U	4,400 U	250 J	1,000 U	180 J	110 J	180 J	92 J
Benzo(a)pyrene	140 J	4,300 U	4,400 U	220 J	1,000 U	1,600 U	86 J	170 J	77 J
Benzo(b)fluoranthene	660	4,300 U	4,400 U	450 J	1,000 U	280 J	150 J	380 J	200 J
Benzo(g,h,i)perylene	130 J	4,300 U	4,400 U	150 J	1,000 U	1,600 U	82 J	170 J	110 J

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
U - Analyte not detected

Appendix H
Sediment Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-SD01	SJS3-SD02		SJS3-SD03	SJS3-SD04	SJS3-SD06	SJS3-SD07	SJS3-SD08	
Sample ID	SJS03-SD01-000	SJS03-SD02-000	SJS03-SD02-000P	SJS03-SD03-000	SJS03-SD04-001	SJS03-SD06-000	SJS03-SD07-001	SJS03-SD08-001	SJS03-SD08-001P
Sample Date	07/14/97	07/15/97	07/15/97	07/14/97	04/16/99	06/26/97	04/15/99	04/15/99	04/15/99
Chemical Name									
Benzo(k)fluoranthene	210 J	4,300 U	470 J	170 J	1,000 U	1,600 U	640 U	200 J	98 J
Butylbenzylphthalate	55 J	4,300 U	4,400 U	530 U	1,000 U	1,600 U	640 U	690 U	760 U
Carbazole	350 U	4,300 U	4,400 U	530 U	1,000 U	1,600 U	640 U	690 U	760 U
Chrysene	420	4,300 U	4,400 U	270 J	1,000 U	240 J	120 J	370 J	180 J
Di-n-butylphthalate	54 B	4,300 U	4,400 U	530 U	1,000 U	1,600 U	640 U	690 U	760 U
Di-n-octylphthalate	350 U	4,300 U	4,400 U	530 U	1,000 U	1,600 U	640 U	690 U	760 U
Dibenz(a,h)anthracene	350 U	4,300 U	4,400 U	66 J	1,000 U	1,600 U	640 U	690 U	760 U
Dibenzofuran	350 U	4,300 U	4,400 U	530 U	1,000 U	1,600 U	640 U	690 U	760 U
Diethylphthalate	350 U	4,300 U	4,400 U	530 U	120 J	340 J	75 J	690 U	95 J
Dimethyl phthalate	350 U	4,300 U	4,400 U	530 U	1,000 U	1,600 U	640 U	690 U	760 U
Fluoranthene	250 J	4,300 U	4,400 U	320 J	1,000 U	200 J	170 J	180 J	89 J
Fluorene	350 U	4,300 U	4,400 U	530 U	1,000 U	1,600 U	640 U	690 U	760 U
Hexachlorobenzene	350 U	4,300 U	4,400 U	530 U	1,000 U	1,600 U	640 U	690 U	760 U
Hexachlorobutadiene	350 U	4,300 U	4,400 U	530 U	1,000 U	1,600 U	640 U	690 U	760 U
Hexachlorocyclopentadiene	350 UJ	4,300 U	4,400 U	530 U	1,000 U	1,600 U	640 U	690 U	760 U
Hexachloroethane	350 U	4,300 U	4,400 U	530 U	1,000 U	1,600 U	640 U	690 U	760 U
Indeno(1,2,3-cd)pyrene	200 J	4,300 U	4,400 U	180 J	1,000 U	1,600 U	78 J	170 J	110 J
Isophorone	350 U	4,300 U	4,400 U	530 U	1,000 U	1,600 U	640 U	690 U	760 U
Naphthalene	350 U	4,300 U	4,400 U	110 J	1,000 U	1,600 U	640 U	690 U	760 U
Nitrobenzene	350 U	4,300 U	4,400 U	530 U	1,000 U	1,600 U	640 U	690 U	760 U
Pentachlorophenol	890 U	11,000 U	11,000 U	1,300 U	2,500 U	4,100 U	1,600 U	1,700 U	1,900 U
Phenanthrene	76 J	4,300 U	4,400 U	120 J	1,000 U	1,600 U	640 U	690 U	760 U
Phenol	350 U	4,300 U	4,400 U	530 U	1,000 U	1,600 U	640 U	690 U	760 U
Pyrene	270 J	440 J	460 J	290 J	1,000 U	220 J	120 J	130 J	760 U
bis(2-Chloroethoxy)methane	350 U	4,300 U	4,400 U	530 U	1,000 U	1,600 U	640 U	690 U	760 U
bis(2-Chloroethyl)ether	350 U	4,300 U	4,400 U	530 U	1,000 U	1,600 U	640 U	690 U	760 U
bis(2-Ethylhexyl)phthalate	56 B	4,300 U	4,400 U	88 B	1,000 U	1,600 U	640 U	690 U	760 U
n-Nitroso-di-n-propylamine	350 U	4,300 U	4,400 U	530 U	1,000 U	1,600 U	640 U	690 U	760 U
n-Nitrosodiphenylamine	350 U	4,300 U	4,400 U	530 U	1,000 U	1,600 U	640 U	690 U	760 U
Pesticide/Polychlorinated Biphenyls (UG/KG)									
4,4'-DDD	4.2	66	27 J	60	1.60 J	3.3 U	6.40 U	2.30 J	2.10 J
4,4'-DDE	10	5.1 J	6.2 J	78 J	4.40 J	5.6	2.60 J	2.10 J	2.30 J
4,4'-DDT	7.7	4.3 U	4.4 U	20	3.5 J	16 J	6.40 U	1.5 J	2.10 J
Aldrin	1.8 U	2.2 U	2.3 U	2.7 U	5.10 U	1.7 U	3.20 U	3.5 U	3.80 U
Aroclor-1016	35 U	43 U	44 U	53 U	100 U	33 U	64 U	69 U	76 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Sediment Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-SD01	SJS3-SD02		SJS3-SD03	SJS3-SD04	SJS3-SD06	SJS3-SD07	SJS3-SD08	
Sample ID	SJS03-SD01-000	SJS03-SD02-000	SJS03-SD02-000P	SJS03-SD03-000	SJS03-SD04-001	SJS03-SD06-000	SJS03-SD07-001	SJS03-SD08-001	SJS03-SD08-001P
Sample Date	07/14/97	07/15/97	07/15/97	07/14/97	04/16/99	06/26/97	04/15/99	04/15/99	04/15/99
Chemical Name									
Aroclor-1221	72 U	88 U	90 U	110 U	200 U	67 U	130 U	140 U	150 U
Aroclor-1232	35 U	43 U	44 U	53 U	100 U	33 U	64 U	69 U	76 U
Aroclor-1242	35 U	43 U	44 U	53 U	100 U	33 U	64 U	69 U	76 U
Aroclor-1248	35 U	43 U	44 U	53 U	100 U	33 U	64 U	69 U	76 U
Aroclor-1254	35 U	43 U	44 U	53 U	100 U	33 U	64 U	69 U	76 U
Aroclor-1260	35 U	150	100	53 U	100 U	64 J	64 U	69 U	76 U
Dieldrin	3.5 U	13 J	9.2 J	5.3 U	10 U	6 J	6.40 U	6.90 U	7.60 U
Endosulfan I	1.8 U	2.2 U	2.3 U	2.7 U	5.10 U	1.7 U	3.20 U	3.5 U	3.80 U
Endosulfan II	3.5 U	4.3 U	4.4 U	5.3 U	10 U	3.3 U	6.40 U	6.90 U	7.60 U
Endosulfan sulfate	3.5 U	4.3 U	4.4 U	5.3 U	10 U	3.3 U	6.40 U	6.90 U	7.60 U
Endrin	3.5 U	4.3 U	4.4 U	5.3 U	10 U	3.3 U	6.40 U	6.90 U	7.60 U
Endrin aldehyde	3.5 U	4.3 U	4.4 U	5.3 U	10 U	3.3 U	6.40 U	6.90 U	7.60 U
Endrin ketone	3.5 U	4.3 U	4.4 U	5.3 U	10 U	3.3 U	6.40 U	6.90 U	7.60 U
Heptachlor	1.8 U	2.2 U	2.3 U	2.7 U	5.10 U	1.7 U	3.20 U	3.5 U	3.80 U
Heptachlor epoxide	1.8 U	2.2 U	2.3 U	2.7 U	5.10 U	1.7 U	3.20 U	3.5 U	3.80 U
Methoxychlor	18 U	22 U	23 U	27 U	51 U	17 U	32 U	35 U	38 U
Toxaphene	180 U	220 U	230 U	270 U	510 U	170 U	320 U	350 U	380 U
alpha-BHC	1.8 U	2.2 U	2.3 U	2.7 U	5.10 U	1.7 U	3.20 U	3.5 U	3.80 U
alpha-Chlordane	1.8 U	2.2 U	2.3 U	0.88 J	5.10 U	1.7 U	3.20 U	3.5 U	3.80 U
beta-BHC	1.8 U	2.2 U	2.3 U	2.7 U	5.10 U	1.7 U	3.20 U	3.5 U	3.80 U
delta-BHC	1.8 U	2.2 U	2.3 U	2.7 U	5.10 U	1.7 U	3.20 U	3.5 U	3.80 U
gamma-BHC (Lindane)	1.8 U	2.2 U	2.3 U	2.7 U	5.10 U	1.7 U	3.20 U	3.5 U	3.80 U
gamma-Chlordane	1.8 U	3.3 J	2.8 J	2.7 U	5.10 U	1.7 U	3.20 U	3.5 U	3.80 U
Total Metals (MG/KG)									
Aluminum	3,970	6,920	7,130	14,200	46,500	4,240	10,700	17,600	19,800
Antimony	0.45 B	3.1 B	3.9 B	0.65 UL	1.10 U	2.4 L	0.820 U	173 J	1 U
Arsenic	16.2	8.1	9.1	3.8	7.20	4.4	6.90 J	26.3 J	13.8 J
Barium	18.6 J	242	300	25.8 J	30.3 J	96	126	80.1	66.4 J
Beryllium	0.4 J	1.1 J	1.2	1.7	7.90	0.19 U	1.60	2.20	2.30
Cadmium	0.11 U	2.4	2.5	0.16 U	1.5 J	0.77 J	0.850 J	1 J	1.10 J
Calcium	157 J	3,290	3,120	2,210	5,330	3,970 J	2,570	4,630	5,180
Chromium	8.3	42.4	93.3	20.4	18.7	13.7	15.4	31.6	30.6
Cobalt	1.72 U	5.5 J	5.6 J	4.8 J	24.7	3.7 J	9.80 J	9.80 J	11.7 J
Copper	8.3	118	126	40.2	61.4	50.2	96.6	139 J	75.5 J
Cyanide	0.55 U	0.64 U	0.67 U	0.8 U	0.584 UL	0.54 U	0.410 UL	0.520 UL	1.10 L

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
U - Analyte not detected

Appendix H
Sediment Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-SD01	SJS3-SD02		SJS3-SD03	SJS3-SD04	SJS3-SD06	SJS3-SD07	SJS3-SD08	
Sample ID	SJS03-SD01-000	SJS03-SD02-000	SJS03-SD02-000P	SJS03-SD03-000	SJS03-SD04-001	SJS03-SD06-000	SJS03-SD07-001	SJS03-SD08-001	SJS03-SD08-001P
Sample Date	07/14/97	07/15/97	07/15/97	07/14/97	04/16/99	06/26/97	04/15/99	04/15/99	04/15/99
Chemical Name									
Iron	4,580	18,700	17,700	18,200	61,500	8,310	12,000	80,200	91,000
Lead	14.5	603	734	47.9	53.4	142	130 J	1,050 J	81.7 J
Magnesium	365 J	1,920	1,940	1,050 J	1,360 J	953 J	1,830	2,980	3,290
Manganese	15.7 K	257 K	248 K	51.5 K	387	158	155	206	237
Mercury	0.05 U	0.25	0.27	0.24	0.130	0.15	0.230	0.540	0.590
Nickel	2.3 B	15.4	14.8	14	55.1	8.1	28.1	22.1	24.8
Potassium	339 J	1,350	1,430	771 J	955 J	577 J	1,020 J	2,230	2,420
Selenium	0.64 UL	0.75 UL	0.68 UL	0.98 UL	2.40	0.58 U	0.790 U	1.60 J	1.80 J
Silver	0.21 U	1.1 B	0.91 B	0.37 J	0.370 U	0.48 B	0.270 U	0.440 J	0.350 U
Sodium	71.5 B	453 B	440 B	195 J	946 J	173 B	1,740	1,240 J	1,430 J
Thallium	0.43 U	0.5 U	0.45 U	0.65 U	1.30 U	0.39 U	0.970 U	1.10 U	1.20 U
Vanadium	12.1	32.6	32.4	31.4	39.2	26.9	33.7	37.6	41
Zinc	21.9	577	577	93.4	306	252 L	342	275	323
Wet Chemistry (MG/KG)									
% Solids	NA	NA	NA	NA	32.7	NA	51.6	47.9	43.9
Phosphorus	116	1.6 U	11	48.4	239	3.2	98.3	108	90.1
Total organic carbon (TOC)	4,650	67,700	66,300	38,400	51,600	37,100 L	39,300	27,600	34,600
pH	NA	NA	NA	NA	6.99	NA	6.48	5.74	5.68

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
U - Analyte not detected

Appendix H
Surface Water Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-SW01	SJS3-SW02	SJS3-SW03	SJS3-SW04		SJS3-SW06		SJS3-SW07	SJS3-SW08
Sample ID	SJS03-SW01-001	SJS03-SW02-001	SJS03-SW03-001	SJS03-SW04-001	SJS03-SW04-001P	SJS03-SW06-001	SJS03-SW06-001P	SJS03-SW07-001	SJS03-SW08-001
Sample Date	04/14/99	04/15/99	04/14/99	04/16/99	04/16/99	04/14/99	04/14/99	04/15/99	04/15/99
Chemical Name									
Volatile Organic Compounds (UG/L)									
1,1,1-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U
1,1,2,2-Tetrachloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U
1,1-Dichloroethene	1 U	1 U	1 U	0.100 J	1 U	1 U	1 U	10 U	10 U
1,2,4-Trichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U
1,2-Dibromo-3-chloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U
1,2-Dibromoethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U
1,2-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U
1,2-Dichloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U
1,3-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U
2-Butanone	5 U	5 U	5 U	NA	NA	5 U	5 U	50 U	50 U
2-Hexanone	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	50 U	50 U
4-Methyl-2-pentanone	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	50 U	50 U
Acetone	5 U	5 U	5 U	NA	NA	5 U	5 U	50 U	50 U
Benzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U
Bromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U
Bromodichloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U
Bromoform	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U
Bromomethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U
Carbon disulfide	8 J	74.5 J	32.2 L	20.5	12.5 UJ	15.6 J	14.7 J	83.8 J	85.7 J
Carbon tetrachloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U
Chlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U
Chloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U
Chloroform	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U
Chloromethane	1 U	1 U	9.70	1 U	1 U	1 U	1 U	10 U	10 U
Dibromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U
Ethylbenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U
Methylene chloride	0.200 B	2 U	2 U	1.10 B	1.20 B	2 U	2 U	20 U	20 U
Styrene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U
Tetrachloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U
Toluene	1 U	0.5 J	1 U	1 U	1 U	0.200 J	1 U	10 U	10 U
Trichloroethene	1 U	1 U	1 U	1.10	0.300 J	1 U	1 U	10 U	10 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Surface Water Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-SW01	SJS3-SW02	SJS3-SW03	SJS3-SW04		SJS3-SW06		SJS3-SW07	SJS3-SW08
Sample ID	SJS03-SW01-001	SJS03-SW02-001	SJS03-SW03-001	SJS03-SW04-001	SJS03-SW04-001P	SJS03-SW06-001	SJS03-SW06-001P	SJS03-SW07-001	SJS03-SW08-001
Sample Date	04/14/99	04/15/99	04/14/99	04/16/99	04/16/99	04/14/99	04/14/99	04/15/99	04/15/99
Chemical Name									
Vinyl chloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U
Xylene, total	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U
cis-1,2-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U
cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U
trans-1,2-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U
trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	10 U
Semi-volatile Organic Compounds (UG/L)									
1,2,4-Trichlorobenzene	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
1,2-Dichlorobenzene	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
1,3-Dichlorobenzene	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
1,4-Dichlorobenzene	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
2,2'-Oxybis(1-chloropropane)	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
2,4,5-Trichlorophenol	26 U	28 U	27 U	29 U	30 U	26 U	28 U	26 U	29 U
2,4,6-Trichlorophenol	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
2,4-Dichlorophenol	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
2,4-Dimethylphenol	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
2,4-Dinitrophenol	26 U	28 U	27 U	29 U	30 U	26 U	28 U	26 U	29 U
2,4-Dinitrotoluene	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
2,6-Dinitrotoluene	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
2-Chloronaphthalene	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
2-Chlorophenol	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
2-Methylnaphthalene	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
2-Methylphenol	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
2-Nitroaniline	26 U	28 U	27 U	29 U	30 U	26 U	28 U	26 U	29 U
2-Nitrophenol	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
3,3'-Dichlorobenzidine	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
3-Nitroaniline	26 U	28 U	27 U	29 U	30 U	26 U	28 U	26 U	29 U
4,6-Dinitro-2-methylphenol	26 U	28 U	27 U	29 U	30 U	26 U	28 U	26 U	29 U
4-Bromophenyl-phenylether	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
4-Chloro-3-methylphenol	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
4-Chloroaniline	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
4-Chlorophenyl-phenylether	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
4-Methylphenol	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
4-Nitroaniline	26 U	28 U	27 U	29 U	30 U	26 U	28 U	26 U	29 U
4-Nitrophenol	26 U	28 U	27 U	29 U	30 U	26 U	28 U	26 U	29 U
Acenaphthene	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Surface Water Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-SW01	SJS3-SW02	SJS3-SW03	SJS3-SW04		SJS3-SW06		SJS3-SW07	SJS3-SW08
Sample ID	SJS03-SW01-001	SJS03-SW02-001	SJS03-SW03-001	SJS03-SW04-001	SJS03-SW04-001P	SJS03-SW06-001	SJS03-SW06-001P	SJS03-SW07-001	SJS03-SW08-001
Sample Date	04/14/99	04/15/99	04/14/99	04/16/99	04/16/99	04/14/99	04/14/99	04/15/99	04/15/99
Chemical Name									
Acenaphthylene	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
Anthracene	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
Benzo(a)anthracene	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
Benzo(a)pyrene	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
Benzo(b)fluoranthene	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
Benzo(g,h,i)perylene	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
Benzo(k)fluoranthene	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
Butylbenzylphthalate	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
Carbazole	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
Chrysene	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
Di-n-butylphthalate	10 U	11 U	11 U	2 B	2 B	10 U	11 U	10 U	11 U
Di-n-octylphthalate	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
Dibenz(a,h)anthracene	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
Dibenzofuran	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
Diethylphthalate	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
Dimethyl phthalate	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
Fluoranthene	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
Fluorene	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
Hexachlorobenzene	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
Hexachlorobutadiene	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
Hexachlorocyclopentadiene	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
Hexachloroethane	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
Indeno(1,2,3-cd)pyrene	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
Isophorone	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
Naphthalene	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
Nitrobenzene	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
Pentachlorophenol	26 U	28 U	27 U	29 U	30 U	26 U	28 U	26 U	29 U
Phenanthrene	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
Phenol	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
Pyrene	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
bis(2-Chloroethoxy)methane	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
bis(2-Chloroethyl)ether	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
bis(2-Ethylhexyl)phthalate	10 U	1 J	1 J	2 B	12 U	10 U	11 U	1 B	11 U
n-Nitroso-di-n-propylamine	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
n-Nitrosodiphenylamine	10 U	11 U	11 U	12 U	12 U	10 U	11 U	10 U	11 U
Pesticide/Polychlorinated Biphenyls (UG/L)									

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Surface Water Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-SW01	SJS3-SW02	SJS3-SW03	SJS3-SW04		SJS3-SW06		SJS3-SW07	SJS3-SW08
Sample ID	SJS03-SW01-001	SJS03-SW02-001	SJS03-SW03-001	SJS03-SW04-001	SJS03-SW04-001P	SJS03-SW06-001	SJS03-SW06-001P	SJS03-SW07-001	SJS03-SW08-001
Sample Date	04/14/99	04/15/99	04/14/99	04/16/99	04/16/99	04/14/99	04/14/99	04/15/99	04/15/99
Chemical Name									
4,4'-DDD	0.100 UJ	0.110 U	0.0620 J	0.120 U	0.120 U	0.110 U	0.110 U	0.120 U	0.120 U
4,4'-DDE	0.100 UJ	0.110 U	0.0150 J	0.120 U	0.120 U	0.110 U	0.110 U	0.120 U	0.120 U
4,4'-DDT	0.100 UJ	0.110 U	0.100 U	0.120 U	0.120 U	0.110 U	0.110 U	0.120 U	0.120 U
Aldrin	0.0520 UJ	0.0560 U	0.0520 U	0.0590 U	0.0580 U	0.0560 U	0.0550 U	0.0620 U	0.0600 U
Aroclor-1016	1 UJ	1.10 U	1 U	1.20 U	1.20 U	1.10 U	1.10 U	1.20 U	1.20 U
Aroclor-1221	2.10 UJ	2.20 U	2.10 U	2.40 U	2.30 U	2.20 U	2.20 U	2.5 U	2.40 U
Aroclor-1232	1 UJ	1.10 U	1 U	1.20 U	1.20 U	1.10 U	1.10 U	1.20 U	1.20 U
Aroclor-1242	1 UJ	1.10 U	1 U	1.20 U	1.20 U	1.10 U	1.10 U	1.20 U	1.20 U
Aroclor-1248	1 UJ	1.10 U	1 U	1.20 U	1.20 U	1.10 U	1.10 U	1.20 U	1.20 U
Aroclor-1254	1 UJ	1.10 U	1 U	1.20 U	1.20 U	1.10 U	1.10 U	1.20 U	1.20 U
Aroclor-1260	1 UJ	1.10 U	1 U	1.20 U	1.20 U	1.10 U	1.10 U	1.20 U	1.20 U
Dieldrin	0.100 UJ	0.110 U	0.100 U	0.120 U	0.120 U	0.110 U	0.110 U	0.120 U	0.120 U
Endosulfan I	0.0520 UJ	0.0560 U	0.0520 U	0.0590 U	0.0580 U	0.0560 U	0.0550 U	0.0620 U	0.0600 U
Endosulfan II	0.100 UJ	0.110 U	0.100 U	0.120 U	0.120 U	0.110 U	0.110 U	0.120 U	0.120 U
Endosulfan sulfate	0.100 UJ	0.110 U	0.100 U	0.120 U	0.120 U	0.110 U	0.110 U	0.120 U	0.120 U
Endrin	0.100 UJ	0.110 U	0.100 U	0.120 U	0.120 U	0.110 U	0.110 U	0.120 U	0.120 U
Endrin aldehyde	0.100 UJ	0.110 U	0.100 U	0.120 U	0.120 U	0.110 U	0.110 U	0.120 U	0.120 U
Endrin ketone	0.100 UJ	0.110 U	0.100 U	0.120 U	0.120 U	0.110 U	0.110 U	0.120 U	0.120 U
Heptachlor	0.0520 UJ	0.0560 U	0.0520 U	0.0590 U	0.0580 U	0.0560 U	0.0550 U	0.0620 U	0.0600 U
Heptachlor epoxide	0.0520 UJ	0.0560 U	0.0520 U	0.0590 U	0.0580 U	0.0560 U	0.0550 U	0.0620 U	0.0600 U
Methoxychlor	0.520 UJ	0.560 U	0.520 U	0.590 U	0.580 U	0.560 U	0.550 U	0.620 U	0.600 U
Toxaphene	5.20 UJ	5.60 U	5.20 U	5.90 U	5.80 U	5.60 U	5.5 U	6.20 U	6 U
alpha-BHC	0.0520 UJ	0.0560 U	0.0520 U	0.0590 U	0.0580 U	0.0560 U	0.0550 U	0.0620 U	0.0600 U
alpha-Chlordane	0.0520 UJ	0.0560 U	0.0110 J	0.0590 U	0.0580 U	0.0560 U	0.0550 U	0.0620 U	0.0600 U
beta-BHC	0.0520 UJ	0.0560 U	0.0520 U	0.0590 U	0.0580 U	0.0560 U	0.0550 U	0.0620 U	0.0600 U
delta-BHC	0.0520 UJ	0.0560 U	0.0520 U	0.0590 U	0.0580 U	0.0560 U	0.0550 U	0.0620 U	0.0600 U
gamma-BHC (Lindane)	0.0520 UJ	0.0560 U	0.0520 U	0.0590 U	0.0580 U	0.0560 U	0.0550 U	0.0620 U	0.0600 U
gamma-Chlordane	0.0520 UJ	0.0560 U	0.00980 J	0.0590 U	0.0580 U	0.0560 U	0.0550 U	0.0620 U	0.0600 U
Total Metals (UG/L)									
Aluminum	70,600 K	162 K	1,980 K	1,940	1,050	84.1 B	291 K	3,150 K	2,300 K
Antimony	2.70 U	2.70 J	2.70 U	2.70 U	2.70 U	2.70 U	2.70 U	2.70 U	2.70 U
Arsenic	7.70 J	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Barium	2.80 B	72.8 J	29.7 J	19.9 J	15.2 J	20.4 J	20.6 J	28.4 J	56 J
Beryllium	22.6	0.100 U	0.390 B	0.770 J	0.270 J	0.100 U	0.100 U	1.5 J	1.10 J
Cadmium	8.40	1.30 J	1.30 B	0.690 J	0.370 J	0.300 U	0.300 U	0.760 J	0.630 J
Calcium	229,000	405,000	159,000	136,000	165,000	75,000	73,200	146,000	374,000

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
U - Analyte not detected

Appendix H
Surface Water Analytical Results
at
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS3-SW01	SJS3-SW02	SJS3-SW03	SJS3-SW04		SJS3-SW06		SJS3-SW07	SJS3-SW08
Sample ID	SJS03-SW01-001	SJS03-SW02-001	SJS03-SW03-001	SJS03-SW04-001	SJS03-SW04-001P	SJS03-SW06-001	SJS03-SW06-001P	SJS03-SW07-001	SJS03-SW08-001
Sample Date	04/14/99	04/15/99	04/14/99	04/16/99	04/16/99	04/14/99	04/14/99	04/15/99	04/15/99
Chemical Name									
Chromium	8.60 J	1.10 U	3.5 J	1.10 U	1.30 J	1.10 U	1.10 U	1.10 U	1.10 U
Cobalt	255	3.30 J	32.7 J	48.2 J	16 J	0.900 J	0.940 J	52.4	46.9 J
Copper	32.2	22.4 J	12.9 J	17.3 J	13 J	10.8 J	10.7 B	15.9 J	15.9 J
Cyanide	5 UL	5 UL	14.5 L	9.70	5 U	25.8 L	5 UL	5 UL	5 UL
Iron	7,170	3,660	43,300	5,660	2,130	295	485	8,160	66,900
Lead	2.5 J	27.8 J	8.90 J	2.70 B	1.40 B	1 U	3.30 J	9.70 J	7.20 J
Magnesium	72,900	173,000	26,600	28,500	34,900	12,800	12,500	99,500	123,000
Manganese	5,890	427	1,040	1,830	800	34.6	40.7	2,910	6,330
Mercury	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U
Nickel	364	6.80 J	20.1 J	33.3 J	24.5 J	3.70 J	3.80 J	52.7	29.2 J
Potassium	5,450 J	53,600 J	10,300 J	11,300	13,900	7,830	7,710 J	27,300 J	29,500 J
Selenium	2.60 U	2.60 U	2.60 U	2.60 U	2.60 U	2.60 U	2.60 U	2.60 U	2.60 U
Silver	0.900 U	0.900 U	0.900 U	0.900 U	0.900 U	1.80 J	0.900 U	0.900 U	0.900 U
Sodium	115,000	514,000	93,400	107,000	130,000	30,600	29,900	371,000	265,000
Thallium	3.20 U	3.20 U	3.20 U	3.20 U	3.20 U	3.20 U	3.20 U	3.20 U	3.20 U
Vanadium	0.600 U	1.80 J	4.5 J	1.20 J	0.810 J	1.40 J	2 J	2.60 J	0.600 U
Zinc	2,720	169	88.3	117	101	13.7 J	13.4 J	385	213
Wet Chemistry (MG/L)									
Hardness	724	1,600	544	325	325	261	264	959	1,720
Phosphorus	0.0480	0.135	0.0200 U	0.0700	0.0910	0.0200 U	0.0200 U	0.169	0.252

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Surface Soil Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-SS01	SJS4-SS02	SJS4-SS03	SJS4-SS04	SJS4-SS05		SJS4-SS06	SJS4-SS07	SJS4-SS08
Sample ID	SJS04-SS01-000	SJS04-SS02-000	SJS04-SS03-000	SJS04-SS04-000	SJS04-SS05-000	SJS04-SS05-000P	SJS04-SS06-000	SJS04-SS07-000	SJS04-SS08-000
Sample Date	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97
Chemical Name									
Volatile Organic Compounds (UG/KG)									
1,1,1-Trichloroethane	13 UJ	16 U	10 U	10 U	10 U	10 U	10 U	10 U	11 U
1,1,2,2-Tetrachloroethane	13 UJ	16 UJ	10 UJ	10 UJ	10 U	10 U	10 U	10 U	11 UJ
1,1,2-Trichloroethane	13 UJ	16 U	10 U	10 U	10 U	10 U	10 U	10 U	11 U
1,1-Dichloroethane	13 U	16 U	10 U	10 U	10 U	10 U	10 U	10 U	11 U
1,1-Dichloroethene	13 U	16 U	10 U	10 U	10 U	10 U	10 U	10 U	11 U
1,2-Dichloroethane	13 U	16 U	10 U	10 U	10 U	10 U	10 U	10 U	11 U
1,2-Dichloroethene (total)	13 U	16 U	10 U	10 U	10 U	10 U	10 U	10 U	11 U
1,2-Dichloropropane	13 UJ	16 U	10 U	10 U	10 U	10 U	10 U	10 U	11 U
2-Butanone	13 U	16 U	10 U	28	10 U	11	10 U	10 U	11 U
2-Hexanone	13 UJ	16 UJ	10 UJ	10 UJ	10 U	10 U	10 U	10 U	11 UJ
4-Methyl-2-pentanone	13 UJ	16 UJ	2 J	10 UJ	10 U	10 U	10 U	10 U	11 UJ
Acetone	13 U	16 U	8 J	8 J	10 U	9 J	11 J	14 J	79 J
Benzene	13 UJ	16 U	10 U	10 U	10 U	10 U	10 U	10 U	11 U
Bromodichloromethane	13 UJ	16 U	10 U	10 U	10 U	10 U	10 U	10 U	11 U
Bromoform	13 UJ	16 U	10 U	10 U	10 U	10 U	10 U	10 U	11 U
Bromomethane	13 U	16 U	10 U	10 U	10 U	10 U	10 U	10 U	11 U
Carbon disulfide	13 U	16 U	10 U	10 U	10 U	10 U	10 U	10 U	11 U
Carbon tetrachloride	13 UJ	16 U	10 U	10 U	10 U	10 U	10 U	10 U	11 U
Chlorobenzene	13 UJ	16 UJ	10 UJ	10 UJ	10 U	10 U	10 U	10 U	11 UJ
Chloroethane	13 U	16 U	10 U	10 U	10 U	10 U	10 U	10 U	11 U
Chloroform	13 U	16 U	10 U	10 U	10 U	10 U	10 U	10 U	11 U
Chloromethane	13 U	16 U	10 U	10 U	10 U	10 U	10 U	10 U	11 U
Dibromochloromethane	13 UJ	16 U	10 U	10 U	10 U	10 U	10 U	10 U	11 U
Ethylbenzene	13 UJ	16 UJ	10 UJ	10 UJ	10 U	10 U	10 U	10 U	11 UJ
Methylene chloride	62 B	110 B	24 B	29 B	19 B	30 B	48 B	28 B	48 B
Styrene	13 UJ	16 UJ	10 UJ	10 UJ	10 U	10 U	10 U	10 U	11 UJ
Tetrachloroethene	13 UJ	16 UJ	10 UJ	10 UJ	10 U	10 U	10 U	10 U	11 UJ
Toluene	13 UJ	16 UJ	10 UJ	10 UJ	10 U	10 U	1 J	10 U	11 UJ
Trichloroethene	13 UJ	16 U	10 U	10 U	10 U	10 U	10 U	10 U	11 U
Vinyl chloride	13 U	16 U	10 U	10 U	10 U	10 U	10 U	10 U	11 U
Xylene, total	13 UJ	16 UJ	10 UJ	10 UJ	10 U	10 U	10 U	10 U	11 UJ
cis-1,3-Dichloropropene	13 UJ	16 U	10 U	10 U	10 U	10 U	10 U	10 U	11 U
trans-1,3-Dichloropropene	13 UJ	16 U	10 U	10 U	10 U	10 U	10 U	10 U	11 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Surface Soil Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-SS01	SJS4-SS02	SJS4-SS03	SJS4-SS04	SJS4-SS05		SJS4-SS06	SJS4-SS07	SJS4-SS08
Sample ID	SJS04-SS01-000	SJS04-SS02-000	SJS04-SS03-000	SJS04-SS04-000	SJS04-SS05-000	SJS04-SS05-000P	SJS04-SS06-000	SJS04-SS07-000	SJS04-SS08-000
Sample Date	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97
Chemical Name									
Semi-volatile Organic Compounds (UG/KG)									
1,2,4-Trichlorobenzene	450 U	340 U	1,700 U	1,700 U	2,100 U	2,100 U	40,000 U	340 U	1,700 U
1,2-Dichlorobenzene	450 U	340 U	1,700 U	1,700 U	2,100 U	2,100 U	40,000 U	340 U	1,700 U
1,3-Dichlorobenzene	450 U	340 U	1,700 U	1,700 U	2,100 U	2,100 U	40,000 U	340 U	1,700 U
1,4-Dichlorobenzene	450 U	340 U	1,700 U	1,700 U	2,100 U	2,100 U	40,000 U	340 U	1,700 U
2,2'-Oxybis(1-chloropropane)	450 U	340 U	1,700 U	1,700 U	2,100 U	2,100 U	40,000 U	340 U	1,700 U
2,4,5-Trichlorophenol	1,100 U	840 U	4,200 U	4,200 U	5,200 U	5,400 U	100,000 U	850 U	4,400 U
2,4,6-Trichlorophenol	450 U	340 U	1,700 U	1,700 U	2,100 U	2,100 U	40,000 U	340 U	1,700 U
2,4-Dichlorophenol	450 U	340 U	1,700 U	1,700 U	2,100 U	2,100 U	40,000 U	340 U	1,700 U
2,4-Dimethylphenol	450 U	340 U	1,700 U	1,700 U	2,100 U	2,100 U	40,000 U	340 U	1,700 U
2,4-Dinitrophenol	1,100 UJ	840 U	4,200 UJ	4,200 U	5,200 U	5,400 U	100,000 U	850 U	NA
2,4-Dinitrotoluene	450 U	340 U	1,700 U	1,700 U	2,100 U	2,100 U	40,000 U	340 U	1,700 U
2,6-Dinitrotoluene	450 U	340 U	1,700 U	1,700 U	2,100 U	2,100 U	40,000 U	340 U	1,700 U
2-Chloronaphthalene	450 U	340 U	1,700 U	1,700 U	2,100 U	2,100 U	40,000 U	340 U	1,700 U
2-Chlorophenol	450 U	340 U	1,700 U	1,700 U	2,100 U	2,100 U	40,000 U	340 U	1,700 U
2-Methylnaphthalene	450 U	340 U	1,700 U	1,700 U	2,100 U	2,100 U	40,000 U	340 U	1,700 U
2-Methylphenol	450 U	340 U	1,700 U	1,700 U	2,100 U	2,100 U	40,000 U	340 U	1,700 U
2-Nitroaniline	1,100 U	840 U	4,200 U	4,200 U	5,200 U	5,400 U	100,000 U	850 U	4,400 U
2-Nitrophenol	450 U	340 U	1,700 U	1,700 U	2,100 U	2,100 U	40,000 U	340 U	1,700 U
3,3'-Dichlorobenzidine	450 U	340 U	1,700 U	1,700 U	2,100 U	2,100 U	40,000 U	340 U	1,700 U
3-Nitroaniline	1,100 U	840 U	4,200 U	4,200 U	5,200 U	5,400 U	100,000 U	850 U	4,400 U
4,6-Dinitro-2-methylphenol	1,100 U	840 U	4,200 U	4,200 U	5,200 U	5,400 U	100,000 U	850 U	4,400 U
4-Bromophenyl-phenylether	450 U	340 U	1,700 U	1,700 U	2,100 U	2,100 U	40,000 U	340 U	1,700 U
4-Chloro-3-methylphenol	450 U	340 U	1,700 U	1,700 U	2,100 U	2,100 U	40,000 U	340 U	1,700 U
4-Chloroaniline	450 U	340 U	1,700 U	1,700 U	2,100 U	2,100 U	40,000 U	340 U	1,700 U
4-Chlorophenyl-phenylether	450 U	340 U	1,700 U	1,700 U	2,100 U	2,100 U	40,000 U	340 U	1,700 U
4-Methylphenol	450 U	340 U	1,700 U	1,700 U	2,100 U	2,100 U	40,000 U	340 U	1,700 U
4-Nitroaniline	1,100 U	840 U	4,200 U	4,200 U	5,200 U	5,400 U	100,000 U	850 U	4,400 U
4-Nitrophenol	1,100 U	840 U	4,200 U	4,200 U	5,200 U	5,400 U	100,000 U	850 U	4,400 U
Acenaphthene	450 U	340 U	1,700 U	1,700 U	2,100 U	2,100 U	40,000 U	54 J	1,700 U
Acenaphthylene	89 J	340 U	1,700 U	1,700 U	2,100 U	2,100 U	40,000 U	340 U	1,700 U
Anthracene	95 J	340 U	1,700 U	1,700 U	2,100 U	2,100 U	40,000 U	74 J	200 J
Benzo(a)anthracene	460	39 J	450 J	260 J	1,400 J	790 J	40,000 U	180 J	1,100 J
Benzo(a)pyrene	310 J	35 J	390 J	250 J	1,300 J	780 J	40,000 U	170 J	870 J
Benzo(b)fluoranthene	1,700	79 J	430 J	390 J	1,900 J	1,100 J	40,000 U	350	1,100 J
Benzo(g,h,i)perylene	390 J	55 J	270 J	1,700 UJ	770 J	570 J	40,000 U	100 J	590 J

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Surface Soil Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-SS01	SJS4-SS02	SJS4-SS03	SJS4-SS04	SJS4-SS05		SJS4-SS06	SJS4-SS07	SJS4-SS08
Sample ID	SJS04-SS01-000	SJS04-SS02-000	SJS04-SS03-000	SJS04-SS04-000	SJS04-SS05-000	SJS04-SS05-000P	SJS04-SS06-000	SJS04-SS07-000	SJS04-SS08-000
Sample Date	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97
Chemical Name									
Benzo(k)fluoranthene	620	37 J	460 J	1,700 UJ	770 J	500 J	40,000 U	120 J	390 J
Butylbenzylphthalate	450 U	340 U	1,700 U	1,700 U	2,100 U	2,100 U	40,000 U	36 J	1,700 U
Carbazole	450 U	340 U	1,700 U	1,700 U	300 J	2,100 U	40,000 U	53 J	1,700 U
Chrysene	1,000	39 J	510 J	230 J	1,800 J	940 J	40,000 U	170 J	1,200 J
Di-n-butylphthalate	450 U	340 U	1,700 U	1,700 U	2,100 U	2,100 U	40,000 U	340 U	1,700 U
Di-n-octylphthalate	450 U	340 U	1,700 U	1,700 UJ	2,100 U	2,100 U	40,000 U	340 U	1,700 U
Dibenz(a,h)anthracene	250 J	340 U	1,700 U	1,700 UJ	2,100 U	2,100 U	40,000 U	340 U	1,700 U
Dibenzofuran	47 J	340 U	1,700 U	1,700 U	2,100 U	2,100 U	40,000 U	340 U	1,700 U
Diethylphthalate	450 U	340 U	1,700 U	1,700 U	2,100 U	2,100 U	40,000 U	340 U	610 J
Dimethyl phthalate	450 U	340 U	1,700 U	1,700 U	2,100 U	2,100 U	40,000 U	340 U	1,700 U
Fluoranthene	500	49 J	1,000 J	470 J	3,300	1,300 J	40,000 U	420	2,000
Fluorene	450 U	340 U	1,700 U	1,700 U	2,100 U	2,100 U	40,000 U	47 J	1,700 U
Hexachlorobenzene	450 U	340 U	1,700 U	1,700 U	2,100 U	2,100 U	40,000 U	340 U	1,700 U
Hexachlorobutadiene	450 U	340 U	1,700 U	1,700 U	2,100 U	2,100 U	40,000 U	340 U	1,700 U
Hexachlorocyclopentadiene	450 U	340 U	1,700 U	1,700 U	2,100 U	2,100 U	40,000 U	340 U	1,700 U
Hexachloroethane	450 U	340 U	1,700 U	1,700 U	2,100 U	2,100 U	40,000 U	340 U	1,700 U
Indeno(1,2,3-cd)pyrene	560	46 J	280 J	1,700 UJ	750 J	510 J	40,000 U	100 J	480 J
Isophorone	450 U	340 U	1,700 U	1,700 U	2,100 U	2,100 U	40,000 U	340 U	1,700 U
Naphthalene	83 J	340 U	1,700 U	1,700 U	2,100 U	2,100 U	40,000 U	340 U	1,700 U
Nitrobenzene	450 U	340 U	1,700 U	1,700 U	2,100 U	2,100 U	40,000 U	340 U	1,700 U
Pentachlorophenol	1,100 U	840 U	4,200 U	4,200 U	5,200 U	5,400 U	100,000 U	850 U	4,400 U
Phenanthrene	160 J	340 U	870 J	280 J	2,200	670 J	40,000 U	390	1,200 J
Phenol	450 U	340 U	1,700 U	1,700 U	2,100 U	2,100 U	40,000 U	340 U	1,700 U
Pyrene	590	56 J	1,300 J	490 J	3,100	1,400 J	40,000 U	340	1,700 U
bis(2-Chloroethoxy)methane	450 U	340 U	1,700 U	1,700 U	2,100 U	2,100 U	40,000 U	340 U	1,700 U
bis(2-Chloroethyl)ether	450 U	340 U	1,700 U	1,700 U	2,100 U	2,100 U	40,000 U	340 U	1,700 U
bis(2-Ethylhexyl)phthalate	130 B	260 B	1,700 U	1,700 U	260 B	250 B	150,000 B	1,600 B	1,700 U
n-Nitroso-di-n-propylamine	450 U	340 U	1,700 U	1,700 U	2,100 U	2,100 U	40,000 U	340 U	1,700 U
n-Nitrosodiphenylamine	450 U	340 U	1,700 U	1,700 U	2,100 U	2,100 U	40,000 U	340 U	1,700 U
Pesticide/Polychlorinated Biphenyls (UG/KG)									
4,4'-DDD	4.5 U	3.3 U	3.8 J	3.3 U	13 J	15 J	7.7 J	3.4 U	17 U
4,4'-DDE	4.8 J	3.3 U	3.3 U	3.5	37	32	4 U	3.4 U	17 U
4,4'-DDT	11 J	3.3 U	14 J	6.1 J	40 J	32 J	22 J	3.4 U	17 J
Aldrin	2.3 U	1.7 U	1.7 U	1.7 U	11 U	11 U	2 U	1.7 U	9 U
Aroclor-1016	45 U	33 U	33 U	33 U	210 U	210 U	40 U	34 U	170 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Surface Soil Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-SS01	SJS4-SS02	SJS4-SS03	SJS4-SS04	SJS4-SS05		SJS4-SS06	SJS4-SS07	SJS4-SS08
Sample ID	SJS04-SS01-000	SJS04-SS02-000	SJS04-SS03-000	SJS04-SS04-000	SJS04-SS05-000	SJS04-SS05-000P	SJS04-SS06-000	SJS04-SS07-000	SJS04-SS08-000
Sample Date	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97
Chemical Name									
Aroclor-1221	92 U	67 U	68 U	68 U	420 U	430 U	81 U	69 U	350 U
Aroclor-1232	45 U	33 U	33 U	33 U	210 U	210 U	40 U	34 U	170 U
Aroclor-1242	45 U	33 U	33 U	33 U	210 U	210 U	40 U	34 U	170 U
Aroclor-1248	45 U	33 U	33 U	33 U	210 U	210 U	40 U	34 U	170 U
Aroclor-1254	45 U	33 U	33 U	33 U	210 U	210 U	40 U	34 U	170 U
Aroclor-1260	45 U	33 U	33 U	22 J	170 J	200 J	50 J	34 U	6,300
Dieldrin	4.5 U	3.3 U	3.3 U	3.4 J	32 J	29 J	9.3 J	3.4 U	72 J
Endosulfan I	2.3 U	1.7 U	1.7 U	1.7 U	11 U	11 U	2 U	1.7 U	9 U
Endosulfan II	4.5 U	3.3 U	3.3 U	3.3 U	21 U	21 U	4 U	3.4 U	17 U
Endosulfan sulfate	4.5 U	3.3 U	3.3 U	3.3 U	21 U	21 U	4 U	3.4 U	17 U
Endrin	4.5 U	3.3 U	3.3 U	3.3 U	21 U	21 U	4 U	3.4 U	17 U
Endrin aldehyde	4.5 U	3.3 U	3.3 U	3.3 U	21 U	21 U	4 U	3.4 U	160 J
Endrin ketone	4.5 U	3.3 U	3.3 U	3.3 U	21 U	21 U	4 U	3.4 U	83 J
Heptachlor	2.3 U	1.7 U	1.7 U	1.7 U	11 U	11 U	2 U	1.7 U	9 U
Heptachlor epoxide	2.3 U	1.7 U	1.7 U	1.7 U	11 U	11 U	2 U	1.7 U	9 U
Methoxychlor	23 U	17 U	17 U	17 U	110 U	110 U	20 U	17 U	90 U
Toxaphene	230 U	170 U	170 U	170 U	1,100 U	1,100 U	200 U	170 U	900 U
alpha-BHC	2.3 U	1.7 U	1.7 U	1.7 U	11 U	11 U	2 U	1.7 U	9 U
alpha-Chlordane	2.3 U	1.7 U	1.7 U	1.7 U	12 J	10 J	7.4 J	1.7 U	42
beta-BHC	2.3 U	1.7 U	1.7 U	1.7 U	11 U	11 U	2 U	1.7 U	9 U
delta-BHC	2.3 U	1.7 U	1.7 U	1.7 U	11 U	11 U	2 U	1.7 U	9 U
gamma-BHC (Lindane)	2.3 U	1.7 U	1.7 U	1.7 U	11 U	11 U	2 U	1.7 U	9 U
gamma-Chlordane	2.3 U	1.7 U	1.7 U	1.7 U	11 J	10 J	4.5 J	1.7 U	33
Total Metals (MG/KG)									
Aluminum	17,800	4,550	4,300	6,720	6,370	4,640	3,910	6,550	4,990
Antimony	NA	1.3 L	1.9 L	0.67 J	4.7 J	9.1 J	0.92 J	0.31 U	2.3 J
Arsenic	17.4 K	2.5 K	2.3 K	10.9	6.5	7.1	4.9	1.9	5.3
Barium	148	105	84.2	74.6	79.3	91.7	70.8	19.4 J	83
Beryllium	0.86 J	0.9 J	1.1	0.75 J	0.26 J	0.28 J	0.17 U	0.15 U	0.18 U
Cadmium	0.11 U	0.09 U	0.1 U	0.3 J	0.08 U	0.17 J	0.27 J	0.09 J	0.88 J
Calcium	516 J	3,410 J	1,280 J	2,840	11,500	6,300	4,120	998	4,210
Chromium	36.8	19.7	17.7	36.2	323	680	36.1	7.2	52.4
Cobalt	4.5 J	7.9 J	6.5 J	5.2 J	9.6	10.6	3.6 J	1.23 U	3.9 J
Copper	74.8	165	117	280	598	324	130	7	500
Cyanide	0.63 U	0.5 U	0.51 U	0.5 U	0.5 U	0.5 U	0.5 U	0.51 U	0.52 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Surface Soil Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-SS01	SJS4-SS02	SJS4-SS03	SJS4-SS04	SJS4-SS05		SJS4-SS06	SJS4-SS07	SJS4-SS08
Sample ID	SJS04-SS01-000	SJS04-SS02-000	SJS04-SS03-000	SJS04-SS04-000	SJS04-SS05-000	SJS04-SS05-000P	SJS04-SS06-000	SJS04-SS07-000	SJS04-SS08-000
Sample Date	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97
Chemical Name									
Iron	31,300	11,900	11,800	13,800	29,500	24,700	11,800	2,920	13,600
Lead	120	179	198	158	219	243	197	19.4	264
Magnesium	2,630	1,810	1,430	976	1,460	1,340	1,200	744 J	1,160
Manganese	88.5 K	173 K	159 K	101	352	349	139	38.6	132
Mercury	0.96 L	0.3 L	0.28 L	0.84	1	1.1	1.3	0.06 J	0.97
Nickel	10.9	22.3	17.3	109	413	546	41.2	3.7 J	150
Potassium	2,480	974	723 J	954	1,010	824 J	879	393 J	752 J
Selenium	0.65 U	0.56 U	0.58 U	0.48 U	0.45 U	0.58 U	0.52 U	0.46 U	0.54 U
Silver	1.1 B	1 B	0.19 U	0.8 B	1.6	1 B	0.53 B	0.29 B	0.41 B
Sodium	270 J	140 B	380 J	135 B	135 B	98 B	68.6 B	49.4 B	74.6 B
Thallium	3.4	0.89 J	0.5 J	1.2 B	1.6 B	1.6 B	0.75 B	0.31 U	1.1 B
Vanadium	75	23	31	354	32.8	31.7	30	11.2	125
Zinc	76.2	607	577	353	338	336	267	26.4	433
Wet Chemistry (MG/KG)									
% Solids	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phosphorus	2.7	5.3	5.9	6.1	3	1.4	6.4	11.8	2.3
pH	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
U - Analyte not detected

Appendix H
Surface Soil Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-SS09	SJS4-SS10	SJS4-SS11		SJS4-SS12	SJS4-SS13	SJS4-SS14	SJS4-SS15	SJS4-SS16
Sample ID	SJS04-SS09-000	SJS04-SS10-000	SJS04-SS11-000	SJS04-SS11-000P	SJS04-SS12-000	SJS04-SS13-000	SJS04-SS14-000	SJS04-SS15-000	SJS04-SS16-000
Sample Date	06/26/97	06/26/97	04/22/99	04/22/99	04/22/99	04/19/99	04/20/99	04/20/99	04/19/99
Chemical Name									
Volatile Organic Compounds (UG/KG)									
1,1,1-Trichloroethane	10 U	10 U	17 U	17 U	16 U	12 U	15 U	13 U	16 UJ
1,1,2,2-Tetrachloroethane	10 U	10 UJ	17 U	17 U	16 U	12 UJ	15 U	13 U	16 UJ
1,1,2-Trichloroethane	10 U	10 U	17 U	17 U	16 U	12 U	15 U	13 U	16 UJ
1,1-Dichloroethane	10 U	10 U	17 U	17 U	16 U	12 U	15 U	13 U	16 UJ
1,1-Dichloroethene	10 U	10 U	17 U	17 U	16 U	12 U	15 U	13 U	16 UJ
1,2-Dichloroethane	10 U	10 U	17 U	17 U	16 U	12 U	15 U	13 U	16 UJ
1,2-Dichloroethene (total)	10 U	10 U	17 U	17 U	16 U	12 U	15 U	13 U	16 UJ
1,2-Dichloropropane	10 U	10 U	17 U	17 U	16 U	12 U	15 U	13 U	16 UJ
2-Butanone	10 U	10 U	20 B	22 B	20 B	12 U	15 U	13 U	16 UJ
2-Hexanone	10 U	10 UJ	17 U	17 U	16 U	12 UJ	15 U	13 U	16 UJ
4-Methyl-2-pentanone	10 U	10 UJ	17 U	17 U	16 U	12 UJ	15 U	13 U	16 UJ
Acetone	10 U	10 U	23	23	10 J	19	15 U	13 U	51 J
Benzene	10 U	10 U	17 U	17 U	16 U	12 U	15 U	13 U	16 UJ
Bromodichloromethane	10 U	10 U	17 U	17 U	16 U	12 U	15 U	13 U	16 UJ
Bromoform	10 U	10 U	17 U	17 U	16 U	12 U	15 U	13 U	16 UJ
Bromomethane	10 U	10 U	17 U	17 U	16 U	12 U	15 U	13 U	16 UJ
Carbon disulfide	10 U	10 U	17 U	17 U	16 U	4 B	15 U	13 U	16 UJ
Carbon tetrachloride	10 U	10 U	17 U	17 U	16 U	12 U	15 U	13 U	16 UJ
Chlorobenzene	10 U	10 UJ	17 U	17 U	16 U	12 UJ	15 U	13 U	16 UJ
Chloroethane	10 U	10 U	17 U	17 U	16 U	12 U	15 U	13 U	16 UJ
Chloroform	10 U	10 U	2 J	17 U	16 U	12 U	15 U	13 U	16 UJ
Chloromethane	10 U	10 U	17 U	17 U	16 U	12 U	15 U	13 U	16 UJ
Dibromochloromethane	10 U	10 U	17 U	17 U	16 U	12 U	15 U	13 U	16 UJ
Ethylbenzene	10 U	10 UJ	17 U	17 U	16 U	12 UJ	15 U	13 U	16 UJ
Methylene chloride	29 B	76 B	18 B	19 B	20 B	23 B	3 B	3 B	43 B
Styrene	10 U	10 UJ	17 U	17 U	16 U	12 UJ	15 U	13 U	16 UJ
Tetrachloroethene	10 U	10 UJ	17 U	17 U	16 U	12 UJ	15 U	13 U	16 UJ
Toluene	10 U	2 J	17 U	17 U	16 U	12 UJ	15 U	13 U	16 UJ
Trichloroethene	10 U	10 U	17 U	17 U	16 U	12 U	15 U	13 U	16 UJ
Vinyl chloride	10 U	10 U	17 U	17 U	16 U	12 U	15 U	13 U	16 UJ
Xylene, total	10 U	10 UJ	17 U	17 U	16 U	12 UJ	15 U	13 U	16 UJ
cis-1,3-Dichloropropene	10 U	10 U	17 U	17 U	16 U	12 U	15 U	13 U	16 UJ
trans-1,3-Dichloropropene	10 U	10 U	17 U	17 U	16 U	12 U	15 U	13 U	16 UJ

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Surface Soil Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-SS09	SJS4-SS10	SJS4-SS11		SJS4-SS12	SJS4-SS13	SJS4-SS14	SJS4-SS15	SJS4-SS16
Sample ID	SJS04-SS09-000	SJS04-SS10-000	SJS04-SS11-000	SJS04-SS11-000P	SJS04-SS12-000	SJS04-SS13-000	SJS04-SS14-000	SJS04-SS15-000	SJS04-SS16-000
Sample Date	06/26/97	06/26/97	04/22/99	04/22/99	04/22/99	04/19/99	04/20/99	04/20/99	04/19/99
Chemical Name									
Semi-volatile Organic Compounds (UG/KG)									
1,2,4-Trichlorobenzene	1,700 U	1,700 U	670 UJ	560 UJ	530 UJ	400 UJ	510 UJ	430 UJ	520 UJ
1,2-Dichlorobenzene	1,700 U	1,700 U	670 UJ	560 UJ	530 UJ	400 UJ	510 UJ	430 UJ	520 UJ
1,3-Dichlorobenzene	1,700 U	1,700 U	670 UJ	560 UJ	530 UJ	400 UJ	510 UJ	430 UJ	520 UJ
1,4-Dichlorobenzene	1,700 U	1,700 U	670 UJ	560 UJ	530 UJ	400 UJ	510 UJ	430 UJ	520 UJ
2,2'-Oxybis(1-chloropropane)	1,700 U	1,700 U	670 UJ	560 UJ	530 UJ	400 UJ	510 UJ	430 UJ	520 UJ
2,4,5-Trichlorophenol	4,300 U	4,200 U	1,700 UJ	1,400 UJ	1,300 UJ	1,000 UJ	1,300 UJ	1,100 UJ	1,300 UJ
2,4,6-Trichlorophenol	1,700 U	1,700 U	670 UJ	560 UJ	530 UJ	400 UJ	510 UJ	430 UJ	520 UJ
2,4-Dichlorophenol	1,700 U	1,700 U	670 UJ	560 UJ	530 UJ	400 UJ	510 UJ	430 UJ	520 UJ
2,4-Dimethylphenol	1,700 U	1,700 U	670 UJ	560 UJ	530 UJ	400 UJ	510 UJ	430 UJ	520 UJ
2,4-Dinitrophenol	NA	NA	1,700 UJ	1,400 UJ	1,300 UJ	1,000 UJ	1,300 UJ	1,100 UJ	1,300 UJ
2,4-Dinitrotoluene	1,700 U	1,700 U	670 UJ	560 UJ	530 UJ	400 UJ	510 UJ	430 UJ	520 UJ
2,6-Dinitrotoluene	1,700 U	1,700 U	670 UJ	560 UJ	530 UJ	400 UJ	510 UJ	430 UJ	520 UJ
2-Chloronaphthalene	1,700 U	1,700 U	670 UJ	560 UJ	530 UJ	400 UJ	510 UJ	430 UJ	520 UJ
2-Chlorophenol	1,700 U	1,700 U	670 UJ	560 UJ	530 UJ	400 UJ	510 UJ	430 UJ	520 UJ
2-Methylnaphthalene	1,700 U	1,700 U	200 J	560 UJ	530 UJ	400 UJ	510 UJ	430 UJ	520 UJ
2-Methylphenol	1,700 U	1,700 U	670 UJ	560 UJ	530 UJ	400 UJ	510 UJ	430 UJ	520 UJ
2-Nitroaniline	4,300 U	4,200 U	1,700 UJ	1,400 UJ	1,300 UJ	1,000 UJ	1,300 UJ	1,100 UJ	1,300 UJ
2-Nitrophenol	1,700 U	1,700 U	670 UJ	560 UJ	530 UJ	400 UJ	510 UJ	430 UJ	520 UJ
3,3'-Dichlorobenzidine	1,700 U	1,700 U	670 UJ	560 UJ	530 UJ	400 UJ	510 UJ	430 UJ	520 UJ
3-Nitroaniline	4,300 U	4,200 U	1,700 UJ	1,400 UJ	1,300 UJ	1,000 UJ	1,300 UJ	1,100 UJ	1,300 UJ
4,6-Dinitro-2-methylphenol	4,300 U	4,200 U	1,700 UJ	1,400 UJ	1,300 UJ	1,000 UJ	1,300 UJ	1,100 UJ	1,300 UJ
4-Bromophenyl-phenylether	1,700 U	1,700 U	670 UJ	560 UJ	530 UJ	400 UJ	510 UJ	430 UJ	520 UJ
4-Chloro-3-methylphenol	1,700 U	1,700 U	670 UJ	560 UJ	530 UJ	400 UJ	510 UJ	430 UJ	520 UJ
4-Chloroaniline	1,700 U	1,700 U	670 UJ	560 UJ	530 UJ	400 UJ	510 UJ	430 UJ	520 UJ
4-Chlorophenyl-phenylether	1,700 U	1,700 U	670 UJ	560 UJ	530 UJ	400 UJ	510 UJ	430 UJ	520 UJ
4-Methylphenol	1,700 U	1,700 U	670 UJ	560 UJ	530 UJ	400 UJ	510 UJ	430 UJ	520 UJ
4-Nitroaniline	4,300 U	4,200 U	1,700 UJ	1,400 UJ	1,300 UJ	1,000 UJ	1,300 UJ	1,100 UJ	1,300 UJ
4-Nitrophenol	4,300 U	4,200 U	1,700 UJ	1,400 UJ	1,300 UJ	1,000 UJ	1,300 UJ	1,100 UJ	1,300 UJ
Acenaphthene	1,700 U	1,700 U	670	170 J	530 UJ	400 UJ	510 UJ	430 UJ	520 UJ
Acenaphthylene	1,700 U	1,700 U	670 UJ	560 UJ	530 UJ	400 UJ	510 UJ	68 J	93 J
Anthracene	1,700 U	1,700 U	950 J	340 J	530 UJ	400 UJ	53 J	130 J	91 J
Benzo(a)anthracene	380 J	220 J	3,000 J	900 J	56 J	160 J	190 J	910	290 J
Benzo(a)pyrene	270 J	240 J	2,300 J	730 J	68 J	120 J	210 J	690	230 J
Benzo(b)fluoranthene	380 J	330 J	3,000 J	880 J	96 J	280 J	350 J	1,200	1,100 J
Benzo(g,h,i)perylene	230 J	1,700 U	1,400 J	370 J	83 J	130 J	190 J	360 J	450 J

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Surface Soil Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-SS09	SJS4-SS10	SJS4-SS11		SJS4-SS12	SJS4-SS13	SJS4-SS14	SJS4-SS15	SJS4-SS16
Sample ID	SJS04-SS09-000	SJS04-SS10-000	SJS04-SS11-000	SJS04-SS11-000P	SJS04-SS12-000	SJS04-SS13-000	SJS04-SS14-000	SJS04-SS15-000	SJS04-SS16-000
Sample Date	06/26/97	06/26/97	04/22/99	04/22/99	04/22/99	04/19/99	04/20/99	04/20/99	04/19/99
Chemical Name									
Benzo(k)fluoranthene	230 J	1,700 U	690 J	370 J	530 UJ	88 J	140 J	370 J	350 J
Butylbenzylphthalate	1,700 U	1,700 U	670 UJ	560 UJ	530 UJ	400 UJ	510 UJ	430 UJ	520 UJ
Carbazole	1,700 U	1,700 U	240 J	120 J	530 UJ	400 UJ	510 UJ	430 UJ	520 UJ
Chrysene	440 J	260 J	2,900 J	560 UJ	530 UJ	200 J	280 J	920	570 J
Di-n-butylphthalate	1,700 U	1,700 U	670 UJ	560 UJ	530 UJ	400 UJ	510 UJ	430 UJ	200 J
Di-n-octylphthalate	1,700 U	1,700 U	670 UJ	560 UJ	530 UJ	400 UJ	510 UJ	430 UJ	520 UJ
Dibenz(a,h)anthracene	1,700 U	1,700 U	320 J	110 J	530 UJ	400 UJ	510 UJ	430 UJ	520 UJ
Dibenzofuran	1,700 U	1,700 U	190 J	64 J	530 UJ	400 UJ	510 UJ	430 UJ	520 UJ
Diethylphthalate	620 J	360 J	670 UJ	560 UJ	530 UJ	400 UJ	510 UJ	430 UJ	520 UJ
Dimethyl phthalate	1,700 U	1,700 U	670 UJ	560 UJ	530 UJ	400 UJ	510 UJ	430 UJ	520 UJ
Fluoranthene	620 J	400 J	4,000 J	1,700 J	63 J	190 J	300 J	1,300	300 J
Fluorene	1,700 U	1,700 U	570 J	170 J	530 UJ	400 UJ	510 UJ	430 UJ	520 UJ
Hexachlorobenzene	1,700 U	1,700 U	670 UJ	560 UJ	530 UJ	400 UJ	510 UJ	430 UJ	520 UJ
Hexachlorobutadiene	1,700 U	1,700 U	670 UJ	560 UJ	530 UJ	400 UJ	510 UJ	430 UJ	520 UJ
Hexachlorocyclopentadiene	1,700 U	1,700 U	670 UJ	560 UJ	530 UJ	400 UJ	510 UJ	430 UJ	520 UJ
Hexachloroethane	1,700 U	1,700 U	670 UJ	560 UJ	530 UJ	400 UJ	510 UJ	430 UJ	520 UJ
Indeno(1,2,3-cd)pyrene	190 J	1,700 U	1,100 J	300 J	61 J	130 J	160 J	400 J	480 J
Isophorone	1,700 U	1,700 U	670 UJ	560 UJ	530 UJ	400 UJ	510 UJ	430 UJ	520 UJ
Naphthalene	1,700 U	1,700 U	250 J	64 J	530 UJ	400 UJ	510 UJ	430 UJ	520 UJ
Nitrobenzene	1,700 U	1,700 U	670 UJ	560 UJ	530 UJ	400 UJ	510 UJ	430 UJ	520 UJ
Pentachlorophenol	4,300 U	4,200 U	1,700 UJ	1,400 UJ	1,300 UJ	1,000 UJ	1,300 UJ	1,100 UJ	1,300 UJ
Phenanthrene	340 J	210 J	6,300 J	1,800 J	530 UJ	79 J	120 J	300 J	66 J
Phenol	1,700 U	1,700 U	670 UJ	560 UJ	530 UJ	400 UJ	510 UJ	430 UJ	520 UJ
Pyrene	750 J	400 J	7,500 J	2,100 J	79 J	190 J	310 J	1,200	260 J
bis(2-Chloroethoxy)methane	1,700 U	1,700 U	670 UJ	560 UJ	530 UJ	400 UJ	510 UJ	430 UJ	520 UJ
bis(2-Chloroethyl)ether	1,700 U	1,700 U	670 UJ	560 UJ	530 UJ	400 UJ	510 UJ	430 UJ	520 UJ
bis(2-Ethylhexyl)phthalate	1,700 U	190 B	110 J	560 UJ	530 UJ	43 J	510 UJ	430 UJ	91 J
n-Nitroso-di-n-propylamine	1,700 U	1,700 U	670 UJ	560 UJ	530 UJ	400 UJ	510 UJ	430 UJ	520 UJ
n-Nitrosodiphenylamine	1,700 U	1,700 U	670 UJ	560 UJ	530 UJ	400 UJ	510 UJ	430 UJ	520 UJ
Pesticide/Polychlorinated Biphenyls (UG/KG)									
4,4'-DDD	4.3 J	3.3 U	7	7.60 J	1.60 J	4 UJ	5.10 UJ	4.30 UJ	5.20 UJ
4,4'-DDE	9.8 J	7.5 J	6.60 U	2.60 J	1.30 J	2.80 J	5.10 UJ	4.30 UJ	1.70 J
4,4'-DDT	21 J	22 J	18	36	2.10 J	2.80 J	5.10 UJ	4.30 UJ	5.40 J
Aldrin	1.7 U	1.7 U	3.30 U	2.80 U	2.60 U	2 UJ	2.5 UJ	2.10 UJ	2.60 UJ
Aroclor-1016	34 U	33 U	66 U	55 U	53 U	40 UJ	51 UJ	43 UJ	52 UJ

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Surface Soil Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-SS09	SJS4-SS10	SJS4-SS11		SJS4-SS12	SJS4-SS13	SJS4-SS14	SJS4-SS15	SJS4-SS16
Sample ID	SJS04-SS09-000	SJS04-SS10-000	SJS04-SS11-000	SJS04-SS11-000P	SJS04-SS12-000	SJS04-SS13-000	SJS04-SS14-000	SJS04-SS15-000	SJS04-SS16-000
Sample Date	06/26/97	06/26/97	04/22/99	04/22/99	04/22/99	04/19/99	04/20/99	04/20/99	04/19/99
Chemical Name									
Aroclor-1221	69 U	68 U	130 U	110 U	110 U	80 UJ	100 UJ	86 UJ	100 UJ
Aroclor-1232	34 U	33 U	66 U	55 U	53 U	40 UJ	51 UJ	43 UJ	52 UJ
Aroclor-1242	34 U	33 U	66 U	55 U	53 U	40 UJ	51 UJ	43 UJ	52 UJ
Aroclor-1248	34 U	33 U	66 U	55 U	53 U	40 UJ	51 UJ	43 UJ	52 UJ
Aroclor-1254	34 U	33 U	66 U	55 U	53 U	11 J	51 UJ	43 UJ	12 J
Aroclor-1260	37 J	33 U	66 U	55 U	53 U	40 UJ	75 J	43 UJ	52 UJ
Dieldrin	6.4 J	11	6.60 U	5.5 U	5.30 U	4 UJ	5.10 UJ	4.30 UJ	5.20 UJ
Endosulfan I	1.7 U	1.7 U	3.30 U	2.80 U	2.60 U	2 UJ	2.5 UJ	2.10 UJ	2.60 UJ
Endosulfan II	3.4 U	3.3 U	6.60 U	5.5 U	5.30 U	4 UJ	5.10 UJ	4.30 UJ	5.20 UJ
Endosulfan sulfate	3.4 U	3.3 U	6.60 U	5.5 U	5.30 U	4 UJ	5.10 UJ	4.30 UJ	5.20 UJ
Endrin	3.4 U	3.9 J	6.60 U	5.5 U	5.30 U	4 UJ	5.10 UJ	4.30 UJ	5.20 UJ
Endrin aldehyde	3.4 U	3.3 U	6.60 U	5.5 U	5.30 U	4 UJ	5.10 UJ	4.30 UJ	5.20 UJ
Endrin ketone	3.4 U	3.3 U	6.60 U	5.5 U	5.30 U	4 UJ	5.10 UJ	4.30 UJ	5.20 UJ
Heptachlor	1.7 U	1.7 U	3.30 U	2.80 U	2.60 U	2 UJ	2.5 UJ	2.10 UJ	2.60 UJ
Heptachlor epoxide	1.7 U	1.7 U	3.30 U	2.80 U	2.60 U	2 UJ	2.5 UJ	2.10 UJ	2.60 UJ
Methoxychlor	17 U	17 U	33 U	28 U	26 U	20 UJ	25 UJ	21 UJ	26 UJ
Toxaphene	170 U	170 U	330 U	280 U	260 U	200 UJ	250 UJ	210 UJ	260 UJ
alpha-BHC	1.7 U	1.7 U	3.30 U	2.80 U	2.60 U	2 UJ	2.5 UJ	2.10 UJ	2.60 UJ
alpha-Chlordane	3.8 J	1.7 U	3.30 U	2.80 U	2.60 U	2 UJ	2.5 UJ	2.10 UJ	2.60 UJ
beta-BHC	1.7 U	1.7 U	3.30 U	2.80 U	2.60 U	2 UJ	2.5 UJ	2.10 UJ	2.60 UJ
delta-BHC	1.7 U	1.7 U	3.30 U	2.80 U	2.60 U	2 UJ	2.5 UJ	2.10 UJ	2.60 UJ
gamma-BHC (Lindane)	1.7 U	1.7 U	3.30 U	2.80 U	2.60 U	2 UJ	2.5 UJ	2.10 UJ	2.60 UJ
gamma-Chlordane	2.3 J	1.7 U	5.80	2.80 U	2.60 U	2 UJ	2.5 UJ	2.10 UJ	2.60 UJ
Total Metals (MG/KG)									
Aluminum	5,510	7,010	7,960	9,350	5,450	4,180	9,060 J	11,600 J	16,000
Antimony	0.79 J	2.4 J	18.6 J	16.7 J	0.760 U	0.970 J	1.10 J	0.680 U	0.830 U
Arsenic	3.7	3.6	15.9	16.9	9.10	6	22.9	9.20	22.3
Barium	55.5	58.5	908	991	23.6 J	43.6	119	301	87.3
Beryllium	0.19 J	0.23 J	3.90	5.5	0.590 J	0.400 J	1.5 J	0.800 J	0.620 J
Cadmium	0.42 J	0.08 J	9.70	7.80	0.390 J	0.530 J	0.770 J	0.350 J	0.210 B
Calcium	2,710	4,700	49,100	38,600	3,080	3,930	7,260	4,880 J	493 J
Chromium	33.3	16.5	59.6	64	13.5	12	23.2	25.6	38.1
Cobalt	3.4 J	4.9 J	12 J	10.4 J	4.70 J	3.60 J	10.7 J	7.20 J	5.20 J
Copper	192	85.6	739	874	68.6	20.7	125	41.8	44.5
Cyanide	0.52 U	0.51 U	0.356 U	0.344 U	0.370 U	0.290 U	0.320 U	0.290 U	0.310 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Surface Soil Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-SS09	SJS4-SS10	SJS4-SS11		SJS4-SS12	SJS4-SS13	SJS4-SS14	SJS4-SS15	SJS4-SS16
Sample ID	SJS04-SS09-000	SJS04-SS10-000	SJS04-SS11-000	SJS04-SS11-000P	SJS04-SS12-000	SJS04-SS13-000	SJS04-SS14-000	SJS04-SS15-000	SJS04-SS16-000
Sample Date	06/26/97	06/26/97	04/22/99	04/22/99	04/22/99	04/19/99	04/20/99	04/20/99	04/19/99
Chemical Name									
Iron	15,800	14,300	65,100	63,700	23,100	9,150	24,000	21,000	34,100
Lead	181	198	1,090	1,110	174	89.4	163 J	65.3 J	76.3
Magnesium	1,030	1,200	2,980	3,100	979 J	810 J	2,040	2,250	3,110
Manganese	136	103	883	710	221	223	495	160	121
Mercury	0.52	0.35	0.860	0.720	0.600	0.180	0.460 J	0.510 J	0.0300 U
Nickel	25.2	12.3	73.3	76.4	14.3	9.30	28.1	14.9	11.9 J
Potassium	791	884	784 J	905 J	693 J	840 J	1,910 L	1,880 L	2,860
Selenium	0.5 U	0.49 U	1.30 J	0.850 U	1.10 J	0.550 U	1.30 J	0.660 U	1.30 J
Silver	0.45 B	0.62 B	2.20 J	2.20 J	0.25 U	0.190 U	0.320 J	0.230 U	0.280 U
Sodium	79.6 B	71.9 B	945 J	954 J	165 J	112 J	235 L	37.4 UL	146 J
Thallium	0.66 B	0.83 B	1 U	1 U	0.910 U	0.670 U	0.950 U	0.810 U	0.980 U
Vanadium	80.3	27.3	59	74.4	28.4	34.4	62.6	34.4	61
Zinc	269	350	3,880	3,410	231	90.8	558	130	76.5
Wet Chemistry (MG/KG)									
% Solids	NA	NA	59	60	63.1	62.6	64.9	77.5	64
Phosphorus	6	2.6	NA	NA	NA	NA	2.96 UL	3.40 UL	NA
pH	NA	NA	7.20	7.26	7.59	7.31	7.89	7.43	3.91

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Surface Soil Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-SS17	SJS4-SS18	SJS4-SS19	SJS4-SS20	SJS4-SS21	SJS4-SS22
Sample ID	SJS04-SS17-000	SJS04-SS18-000	SJS04-SS19-000	SJS04-SS20-000	SJS04-SS21-000	SJS04-SS22-000
Sample Date	04/19/99	04/19/99	04/19/99	04/19/99	04/19/99	04/19/99
Chemical Name						
Volatile Organic Compounds (UG/KG)						
1,1,1-Trichloroethane	13 U	14 U	14 UJ	14 U	14 U	17 UJ
1,1,2,2-Tetrachloroethane	13 UJ	14 UJ	14 UJ	14 UJ	14 UJ	17 UJ
1,1,2-Trichloroethane	13 U	14 U	14 UJ	14 U	14 U	17 UJ
1,1-Dichloroethane	13 U	14 U	14 U	14 U	14 U	17 UJ
1,1-Dichloroethene	13 U	14 U	14 U	14 U	14 U	17 UJ
1,2-Dichloroethane	13 U	14 U	14 U	14 U	14 U	17 UJ
1,2-Dichloroethene (total)	13 U	14 U	14 U	14 U	14 U	17 UJ
1,2-Dichloropropane	13 U	14 U	14 UJ	14 U	14 U	17 UJ
2-Butanone	13 U	14 U	14 U	14 U	14 U	17 UJ
2-Hexanone	13 UJ	14 UJ	14 UJ	14 UJ	14 UJ	17 UJ
4-Methyl-2-pentanone	13 UJ	14 UJ	14 UJ	14 UJ	14 UJ	17 UJ
Acetone	54	29	74	37	17	61 J
Benzene	13 U	14 U	14 UJ	14 U	14 U	17 UJ
Bromodichloromethane	13 U	14 U	14 UJ	14 U	14 U	17 UJ
Bromoform	13 U	14 U	14 UJ	14 U	14 U	17 UJ
Bromomethane	13 U	14 U	14 U	14 U	14 U	17 UJ
Carbon disulfide	13 U	14 U	14 U	14 U	14 U	17 UJ
Carbon tetrachloride	13 U	14 U	14 UJ	14 U	14 U	17 UJ
Chlorobenzene	13 UJ	14 UJ	14 UJ	14 UJ	14 UJ	17 UJ
Chloroethane	13 U	14 U	14 U	14 U	14 U	17 UJ
Chloroform	13 U	14 U	14 U	14 U	14 U	17 UJ
Chloromethane	13 U	14 U	14 U	14 U	14 U	17 UJ
Dibromochloromethane	13 U	14 U	14 UJ	14 U	14 U	17 UJ
Ethylbenzene	13 UJ	14 UJ	14 UJ	14 UJ	14 UJ	17 UJ
Methylene chloride	31 B	16 B	25 B	17 B	17 B	10 B
Styrene	13 UJ	14 UJ	14 UJ	14 UJ	14 UJ	17 UJ
Tetrachloroethene	13 UJ	14 UJ	14 UJ	14 UJ	14 UJ	17 UJ
Toluene	13 UJ	14 UJ	14 UJ	14 UJ	14 UJ	17 UJ
Trichloroethene	2 B	14 U	14 UJ	14 U	14 U	17 UJ
Vinyl chloride	13 U	14 U	14 U	14 U	14 U	17 UJ
Xylene, total	13 UJ	14 UJ	14 UJ	14 UJ	14 UJ	17 UJ
cis-1,3-Dichloropropene	13 U	14 U	14 UJ	14 U	14 U	17 UJ
trans-1,3-Dichloropropene	13 U	14 U	14 UJ	14 U	14 U	17 UJ

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
U - Analyte not detected

Appendix H
Surface Soil Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-SS17	SJS4-SS18	SJS4-SS19	SJS4-SS20	SJS4-SS21	SJS4-SS22
Sample ID	SJS04-SS17-000	SJS04-SS18-000	SJS04-SS19-000	SJS04-SS20-000	SJS04-SS21-000	SJS04-SS22-000
Sample Date	04/19/99	04/19/99	04/19/99	04/19/99	04/19/99	04/19/99
Chemical Name						
Semi-volatile Organic Compounds (UG/KG)						
1,2,4-Trichlorobenzene	440 UJ	480 UJ	480 UJ	470 UJ	480 UJ	560 UJ
1,2-Dichlorobenzene	440 UJ	480 UJ	480 UJ	470 UJ	480 UJ	560 UJ
1,3-Dichlorobenzene	440 UJ	480 UJ	480 UJ	470 UJ	480 UJ	560 UJ
1,4-Dichlorobenzene	440 UJ	480 UJ	480 UJ	470 UJ	480 UJ	560 UJ
2,2'-Oxybis(1-chloropropane)	440 UJ	480 UJ	480 UJ	470 UJ	480 UJ	560 UJ
2,4,5-Trichlorophenol	1,100 UJ	1,200 UJ	1,200 UJ	1,200 UJ	1,200 UJ	1,400 UJ
2,4,6-Trichlorophenol	440 UJ	480 UJ	480 UJ	470 UJ	480 UJ	560 UJ
2,4-Dichlorophenol	440 UJ	480 UJ	480 UJ	470 UJ	480 UJ	560 UJ
2,4-Dimethylphenol	440 UJ	480 UJ	480 UJ	470 UJ	480 UJ	560 UJ
2,4-Dinitrophenol	1,100 UJ	1,200 UJ	1,200 UJ	1,200 UJ	1,200 UJ	1,400 UJ
2,4-Dinitrotoluene	440 UJ	480 UJ	480 UJ	470 UJ	480 UJ	560 UJ
2,6-Dinitrotoluene	440 UJ	480 UJ	480 UJ	470 UJ	480 UJ	560 UJ
2-Chloronaphthalene	440 UJ	480 UJ	480 UJ	470 UJ	480 UJ	560 UJ
2-Chlorophenol	440 UJ	480 UJ	480 UJ	470 UJ	480 UJ	560 UJ
2-Methylnaphthalene	440 UJ	480 UJ	480 UJ	470 UJ	480 UJ	560 UJ
2-Methylphenol	440 UJ	480 UJ	480 UJ	470 UJ	480 UJ	560 UJ
2-Nitroaniline	1,100 UJ	1,200 UJ	1,200 UJ	1,200 UJ	1,200 UJ	1,400 UJ
2-Nitrophenol	440 UJ	480 UJ	480 UJ	470 UJ	480 UJ	560 UJ
3,3'-Dichlorobenzidine	440 UJ	480 UJ	480 UJ	470 UJ	480 UJ	560 UJ
3-Nitroaniline	1,100 UJ	1,200 UJ	1,200 UJ	1,200 UJ	1,200 UJ	1,400 UJ
4,6-Dinitro-2-methylphenol	1,100 UJ	1,200 UJ	1,200 UJ	1,200 UJ	1,200 UJ	1,400 UJ
4-Bromophenyl-phenylether	440 UJ	480 UJ	480 UJ	470 UJ	480 UJ	560 UJ
4-Chloro-3-methylphenol	440 UJ	480 UJ	480 UJ	470 UJ	480 UJ	560 UJ
4-Chloroaniline	440 UJ	480 UJ	480 UJ	470 UJ	480 UJ	560 UJ
4-Chlorophenyl-phenylether	440 UJ	480 UJ	480 UJ	470 UJ	480 UJ	560 UJ
4-Methylphenol	440 UJ	480 UJ	480 UJ	470 UJ	480 UJ	560 UJ
4-Nitroaniline	1,100 UJ	1,200 UJ	1,200 UJ	1,200 UJ	1,200 UJ	1,400 UJ
4-Nitrophenol	1,100 UJ	1,200 UJ	1,200 UJ	1,200 UJ	1,200 UJ	1,400 UJ
Acenaphthene	440 UJ	480 UJ	480 UJ	470 UJ	480 UJ	560 UJ
Acenaphthylene	68 J	130 J	63 J	250 J	88 J	240 J
Anthracene	64 J	140 J	89 J	360 J	91 J	340 J
Benzo(a)anthracene	220 J	540 J	210 J	1,400 J	360 J	1,200 J
Benzo(a)pyrene	160 J	310 J	150 J	1,200 J	260 J	790 J
Benzo(b)fluoranthene	860 J	1,900 J	790 J	3,300 J	1,200 J	3,200 J
Benzo(g,h,i)perylene	310 J	820 J	310 J	1,600 J	500 J	1,400 J

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
U - Analyte not detected

Appendix H
Surface Soil Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-SS17	SJS4-SS18	SJS4-SS19	SJS4-SS20	SJS4-SS21	SJS4-SS22
Sample ID	SJS04-SS17-000	SJS04-SS18-000	SJS04-SS19-000	SJS04-SS20-000	SJS04-SS21-000	SJS04-SS22-000
Sample Date	04/19/99	04/19/99	04/19/99	04/19/99	04/19/99	04/19/99
Chemical Name						
Benzo(k)fluoranthene	280 J	610 J	200 J	1,500 J	340 J	1,400 J
Butylbenzylphthalate	440 UJ	480 UJ	480 UJ	470 UJ	480 UJ	560 UJ
Carbazole	440 UJ	480 UJ	480 UJ	470 UJ	480 UJ	560 UJ
Chrysene	450 J	1,200 J	430 J	2,700 J	680	2,400 J
Di-n-butylphthalate	440 UJ	480 UJ	480 UJ	470 UJ	480 UJ	560 UJ
Di-n-octylphthalate	440 UJ	480 UJ	480 UJ	470 UJ	480 UJ	560 UJ
Dibenz(a,h)anthracene	440 UJ	480 UJ	480 UJ	470 UJ	480 UJ	560 UJ
Dibenzofuran	440 UJ	480 UJ	480 UJ	470 UJ	480 UJ	560 UJ
Diethylphthalate	440 UJ	480 UJ	480 UJ	470 UJ	480 UJ	560 UJ
Dimethyl phthalate	440 UJ	480 UJ	480 UJ	470 UJ	480 UJ	560 UJ
Fluoranthene	270 J	520 J	230 J	1,100 J	350 J	880 J
Fluorene	440 UJ	480 UJ	480 UJ	470 UJ	480 UJ	560 UJ
Hexachlorobenzene	440 UJ	480 UJ	480 UJ	470 UJ	480 UJ	560 UJ
Hexachlorobutadiene	440 UJ	480 UJ	480 UJ	470 UJ	480 UJ	560 UJ
Hexachlorocyclopentadiene	440 UJ	480 UJ	480 UJ	470 UJ	480 UJ	560 UJ
Hexachloroethane	440 UJ	480 UJ	480 UJ	470 UJ	480 UJ	560 UJ
Indeno(1,2,3-cd)pyrene	330 J	880 J	330 J	1,700 J	520 J	1,800 J
Isophorone	440 UJ	480 UJ	480 UJ	470 UJ	480 UJ	560 UJ
Naphthalene	440 UJ	480 UJ	480 UJ	470 UJ	480 UJ	62 J
Nitrobenzene	440 UJ	480 UJ	480 UJ	470 UJ	480 UJ	560 UJ
Pentachlorophenol	1,100 UJ	1,200 UJ	1,200 UJ	1,200 UJ	1,200 UJ	1,400 UJ
Phenanthrene	48 J	87 J	57 J	260 J	68 J	190 J
Phenol	440 UJ	480 UJ	480 UJ	470 UJ	480 UJ	560 UJ
Pyrene	220 J	510 J	210 J	1,100 J	310 J	890 J
bis(2-Chloroethoxy)methane	440 UJ	480 UJ	480 UJ	470 UJ	480 UJ	560 UJ
bis(2-Chloroethyl)ether	440 UJ	480 UJ	480 UJ	470 UJ	480 UJ	560 UJ
bis(2-Ethylhexyl)phthalate	440 UJ	480 UJ	53 J	57 J	54 J	57 J
n-Nitroso-di-n-propylamine	440 UJ	480 UJ	480 UJ	470 UJ	480 UJ	560 UJ
n-Nitrosodiphenylamine	440 UJ	480 UJ	480 UJ	470 UJ	480 UJ	560 UJ
Pesticide/Polychlorinated Biphenyls (UG/KG)						
4,4'-DDD	4.30 UJ	4.80 UJ	4.90 UJ	4.70 UJ	4.70 UJ	5.5 UJ
4,4'-DDE	2.10 J	4.80 UJ	2.10 J	4.70 UJ	2.90 J	5.5 UJ
4,4'-DDT	8.5 J	4.80 UJ	11 J	11 J	8.10 J	5.5 UJ
Aldrin	2.20 UJ	2.40 UJ	2.40 UJ	2.30 UJ	2.30 UJ	2.80 UJ
Aroclor-1016	43 UJ	48 UJ	49 UJ	47 UJ	47 UJ	55 UJ

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Surface Soil Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-SS17	SJS4-SS18	SJS4-SS19	SJS4-SS20	SJS4-SS21	SJS4-SS22
Sample ID	SJS04-SS17-000	SJS04-SS18-000	SJS04-SS19-000	SJS04-SS20-000	SJS04-SS21-000	SJS04-SS22-000
Sample Date	04/19/99	04/19/99	04/19/99	04/19/99	04/19/99	04/19/99
Chemical Name						
Aroclor-1221	87 UJ	95 UJ	97 UJ	93 UJ	94 UJ	110 UJ
Aroclor-1232	43 UJ	48 UJ	49 UJ	47 UJ	47 UJ	55 UJ
Aroclor-1242	43 UJ	48 UJ	49 UJ	47 UJ	47 UJ	55 UJ
Aroclor-1248	43 UJ	48 UJ	49 UJ	47 UJ	47 UJ	55 UJ
Aroclor-1254	12 J	48 UJ	9.60 J	13 J	16 J	14 J
Aroclor-1260	43 UJ	48 UJ	49 UJ	47 UJ	47 UJ	55 UJ
Dieldrin	4.30 UJ	4.80 UJ	4.90 UJ	4.70 UJ	4.70 UJ	5.5 UJ
Endosulfan I	2.20 UJ	2.40 UJ	2.40 UJ	2.30 UJ	2.30 UJ	2.80 UJ
Endosulfan II	4.30 UJ	4.80 UJ	4.90 UJ	4.70 UJ	4.70 UJ	5.5 UJ
Endosulfan sulfate	4.30 UJ	4.80 UJ	4.90 UJ	4.70 UJ	4.70 UJ	5.5 UJ
Endrin	4.30 UJ	4.80 UJ	4.90 UJ	4.70 UJ	4.70 UJ	5.5 UJ
Endrin aldehyde	4.30 UJ	4.80 UJ	4.90 UJ	4.70 UJ	4.70 UJ	5.5 UJ
Endrin ketone	4.30 UJ	4.80 UJ	4.90 UJ	4.70 UJ	4.70 UJ	5.5 UJ
Heptachlor	2.20 UJ	2.40 UJ	2.40 UJ	2.30 UJ	2.30 UJ	2.80 UJ
Heptachlor epoxide	2.20 UJ	2.40 UJ	2.40 UJ	2.30 UJ	2.30 UJ	2.80 UJ
Methoxychlor	22 UJ	24 UJ	24 UJ	23 UJ	23 UJ	28 UJ
Toxaphene	220 UJ	240 UJ	240 UJ	230 UJ	230 UJ	280 UJ
alpha-BHC	2.20 UJ	2.40 UJ	2.40 UJ	2.30 UJ	2.30 UJ	2.80 UJ
alpha-Chlordane	2.20 UJ	2.40 UJ	2.40 UJ	2.30 UJ	2.30 UJ	2.80 UJ
beta-BHC	2.20 UJ	2.40 UJ	2.40 UJ	2.30 UJ	2.30 UJ	2.80 UJ
delta-BHC	2.20 UJ	2.40 UJ	2.40 UJ	2.30 UJ	2.30 UJ	2.80 UJ
gamma-BHC (Lindane)	2.20 UJ	2.40 UJ	2.40 UJ	2.30 UJ	2.30 UJ	2.80 UJ
gamma-Chlordane	2.20 UJ	2.40 UJ	2.40 UJ	2.30 UJ	2.30 UJ	2.80 UJ
Total Metals (MG/KG)						
Aluminum	12,900	17,800	17,000	14,800	17,700	19,100
Antimony	0.690 U	0.660 U	0.740 U	0.630 U	0.670 U	0.740 U
Arsenic	16.7	16.7	18	20.1	17.2	22.4
Barium	65.6	81.1	75.6	66.3	83.5	71.6
Beryllium	0.5 J	0.480 J	0.510 J	0.460 J	0.710 J	0.630 J
Cadmium	0.200 B	0.180 B	0.200 B	0.200 B	0.280 B	0.290 B
Calcium	650 J	1,000 J	1,470	556 J	508 J	936 J
Chromium	31.5	40.2	39.3	39.7	38.6	45
Cobalt	4.70 J	4.60 J	6.30 J	4.5 J	5.40 J	5.60 J
Copper	40	47	38.3	57.8	47.4	46.6
Cyanide	0.260 U	0.320 U	0.300 U	0.260 U	0.210 U	0.380 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
U - Analyte not detected

Appendix H
Surface Soil Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-SS17	SJS4-SS18	SJS4-SS19	SJS4-SS20	SJS4-SS21	SJS4-SS22
Sample ID	SJS04-SS17-000	SJS04-SS18-000	SJS04-SS19-000	SJS04-SS20-000	SJS04-SS21-000	SJS04-SS22-000
Sample Date	04/19/99	04/19/99	04/19/99	04/19/99	04/19/99	04/19/99
Chemical Name						
Iron	31,500	32,400	37,600	38,100	32,100	42,800
Lead	75.3	156	80.3	93.1	112	111
Magnesium	2,730	3,210	3,620	3,030	3,010	3,610
Manganese	117	112	157	115	115	137
Mercury	0.570	0.940	0.590	1.10	0.740	1.20
Nickel	10.7	11.4	12.8	11	12.7	13.2
Potassium	2,930	3,470	2,980	3,830	2,780	4,870
Selenium	1.10 J	0.830 J	0.920 J	1.80	1.5	1.20 J
Silver	0.230 U	0.220 U	0.25 U	0.350 J	0.220 U	0.310 J
Sodium	218 J	152 J	168 J	806 J	134 J	392 J
Thallium	0.820 U	0.790 U	0.880 U	0.75 U	0.790 U	0.880 U
Vanadium	50.1	50.5	57.5	53.2	65.6	63.7
Zinc	93	73.3	99	83.3	78.9	82.1
Wet Chemistry (MG/KG)						
% Solids	76.3	69.6	68.7	70.9	70.5	60
Phosphorus	NA	NA	NA	NA	NA	NA
pH	4.21	4.11	4.26	3.91	3.76	3.64

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
U - Analyte not detected

Appendix H
Subsurface Soil Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-SB01	SJS4-SB02	SJS4-SB03	SJS4-SB04	SJS4-SB05	SJS4-SB06		SJS4-SB07	SJS4-SB08
Sample ID	SJS04-SB01-002	SJS04-SB02-002	SJS04-SB03-002	SJS04-SB04-001	SJS04-SB05-001	SJS04-SB06-001	SJS04-SB06-001P	SJS04-SB07-001	SJS04-SB08-001
Sample Date	06/24/97	06/24/97	06/24/97	04/22/99	04/19/99	04/22/99	04/22/99	04/20/99	04/20/99
Chemical Name									
Volatile Organic Compounds (UG/KG)									
1,1,1-Trichloroethane	18 U	14 UJ	12 U	15 U	14 UJ	30 U	35 U	16 UJ	18 U
1,1,2,2-Tetrachloroethane	18 UJ	14 UJ	12 U	15 UJ	14 UJ	30 U	35 U	16 UJ	18 U
1,1,2-Trichloroethane	18 U	14 UJ	12 U	15 U	14 UJ	30 U	35 U	16 UJ	18 U
1,1-Dichloroethane	18 U	14 U	12 U	15 U	14 UJ	30 U	35 U	16 U	18 U
1,1-Dichloroethene	18 U	14 U	12 U	15 U	14 UJ	30 U	35 U	16 U	18 U
1,2-Dichloroethane	18 U	14 U	12 U	15 U	14 UJ	30 U	35 U	16 U	18 U
1,2-Dichloroethene (total)	18 U	14 U	12 U	15 U	14 UJ	30 U	35 U	16 U	18 U
1,2-Dichloropropane	18 U	14 UJ	12 U	15 U	14 UJ	30 U	35 U	16 UJ	18 U
2-Butanone	18 U	14 U	12 U	28 B	14 UJ	599	297 B	16 U	18 U
2-Hexanone	18 UJ	14 UJ	12 U	15 UJ	14 UJ	30 U	35 U	16 UJ	18 U
4-Methyl-2-pentanone	18 UJ	14 UJ	12 U	15 UJ	14 UJ	30 U	35 U	16 UJ	18 U
Acetone	18 U	85 B	86 B	48	69 J	457	228	16 U	18 U
Benzene	18 U	14 UJ	12 U	15 U	14 UJ	30 U	35 U	16 UJ	18 U
Bromodichloromethane	18 U	14 UJ	12 U	15 U	14 UJ	30 U	35 U	16 UJ	18 U
Bromoform	18 U	14 UJ	12 U	15 U	14 UJ	30 U	35 U	16 UJ	18 U
Bromomethane	18 U	14 U	12 U	15 U	14 UJ	30 U	35 U	16 U	18 U
Carbon disulfide	18 U	14 U	12 U	15 U	11 B	6 J	6 J	16 U	18 U
Carbon tetrachloride	18 U	14 UJ	12 U	15 U	14 UJ	30 U	35 U	16 UJ	18 U
Chlorobenzene	18 UJ	14 UJ	12 U	15 UJ	14 UJ	30 U	35 U	16 UJ	18 U
Chloroethane	18 U	14 U	12 U	15 U	14 UJ	30 U	35 U	16 U	18 U
Chloroform	18 U	14 U	12 U	15 U	14 UJ	30 U	35 U	16 U	18 U
Chloromethane	18 U	14 U	12 U	15 U	14 UJ	30 U	35 U	16 U	18 U
Dibromochloromethane	18 U	14 UJ	12 U	15 U	14 UJ	30 U	35 U	16 UJ	18 U
Ethylbenzene	18 UJ	14 UJ	12 U	15 UJ	14 UJ	30 U	35 U	16 UJ	18 U
Methylene chloride	47 B	120 B	110 B	26 B	29 B	41 B	44 B	5 B	5 B
Styrene	18 UJ	14 UJ	12 U	15 UJ	14 UJ	30 U	35 U	16 UJ	18 U
Tetrachloroethene	5 J	3 J	2 J	15 UJ	14 UJ	30 U	35 U	16 UJ	18 U
Toluene	3 J	14 UJ	12 U	15 UJ	14 UJ	30 U	35 U	16 UJ	18 U
Trichloroethene	18 U	14 UJ	12 U	15 U	14 UJ	30 U	35 U	16 UJ	18 U
Vinyl chloride	18 U	14 U	12 U	15 U	14 UJ	30 U	35 U	16 U	18 U
Xylene, total	18 UJ	14 UJ	12 U	15 UJ	14 UJ	30 U	35 U	16 UJ	18 U
cis-1,3-Dichloropropene	18 U	14 UJ	12 U	15 U	14 UJ	30 U	35 U	16 UJ	18 U
trans-1,3-Dichloropropene	18 U	14 UJ	12 U	15 U	14 UJ	30 U	35 U	16 UJ	18 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
U - Analyte not detected

Appendix H
Subsurface Soil Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-SB01	SJS4-SB02	SJS4-SB03	SJS4-SB04	SJS4-SB05	SJS4-SB06		SJS4-SB07	SJS4-SB08
Sample ID	SJS04-SB01-002	SJS04-SB02-002	SJS04-SB03-002	SJS04-SB04-001	SJS04-SB05-001	SJS04-SB06-001	SJS04-SB06-001P	SJS04-SB07-001	SJS04-SB08-001
Sample Date	06/24/97	06/24/97	06/24/97	04/22/99	04/19/99	04/22/99	04/22/99	04/20/99	04/20/99
Chemical Name									
Semi-volatile Organic Compounds (UG/KG)									
1,2,4-Trichlorobenzene	550 U	7,500 U	400 U	480 UJ	450 UJ	1,000 UJ	1,200 UJ	550 UJ	600 UJ
1,2-Dichlorobenzene	550 U	7,500 U	400 U	480 UJ	450 UJ	1,000 UJ	1,200 UJ	550 UJ	600 UJ
1,3-Dichlorobenzene	550 U	7,500 U	400 U	480 UJ	450 UJ	1,000 UJ	1,200 UJ	550 UJ	600 UJ
1,4-Dichlorobenzene	550 U	7,500 U	400 U	480 UJ	450 UJ	1,000 UJ	1,200 UJ	550 UJ	600 UJ
2,2'-Oxybis(1-chloropropane)	550 U	7,500 U	400 U	480 UJ	450 UJ	1,000 UJ	1,200 UJ	550 UJ	600 UJ
2,4,5-Trichlorophenol	1,400 U	19,000 U	1,000 U	1,200 UJ	1,100 UJ	2,500 UJ	2,900 UJ	1,400 UJ	1,500 UJ
2,4,6-Trichlorophenol	550 U	7,500 U	400 U	480 UJ	450 UJ	1,000 UJ	1,200 UJ	550 UJ	600 UJ
2,4-Dichlorophenol	550 U	7,500 U	400 U	480 UJ	450 UJ	1,000 UJ	1,200 UJ	550 UJ	600 UJ
2,4-Dimethylphenol	550 U	7,500 U	400 U	480 UJ	450 UJ	1,000 UJ	1,200 UJ	550 UJ	600 UJ
2,4-Dinitrophenol	1,400 U	19,000 U	1,000 U	1,200 UJ	1,100 UJ	2,500 UJ	2,900 UJ	1,400 UJ	1,500 UJ
2,4-Dinitrotoluene	550 U	7,500 U	400 U	480 UJ	450 UJ	1,000 UJ	1,200 UJ	550 UJ	600 UJ
2,6-Dinitrotoluene	550 U	7,500 U	400 U	480 UJ	450 UJ	1,000 UJ	1,200 UJ	550 UJ	600 UJ
2-Chloronaphthalene	550 U	7,500 U	400 U	480 UJ	450 UJ	1,000 UJ	1,200 UJ	550 UJ	600 UJ
2-Chlorophenol	550 U	7,500 U	400 U	480 UJ	450 UJ	1,000 UJ	1,200 UJ	550 UJ	600 UJ
2-Methylnaphthalene	550 U	7,500 U	400 U	480 UJ	450 UJ	1,000 UJ	1,200 UJ	550 UJ	600 UJ
2-Methylphenol	550 U	7,500 U	400 U	480 UJ	450 UJ	1,000 UJ	1,200 UJ	550 UJ	600 UJ
2-Nitroaniline	1,400 U	19,000 U	1,000 U	1,200 UJ	1,100 UJ	2,500 UJ	2,900 UJ	1,400 UJ	1,500 UJ
2-Nitrophenol	550 U	7,500 U	400 U	480 UJ	450 UJ	1,000 UJ	1,200 UJ	550 UJ	600 UJ
3,3'-Dichlorobenzidine	550 U	7,500 U	400 U	480 UJ	450 UJ	1,000 UJ	1,200 UJ	550 UJ	600 UJ
3-Nitroaniline	1,400 U	19,000 U	1,000 U	1,200 UJ	1,100 UJ	2,500 UJ	2,900 UJ	1,400 UJ	1,500 UJ
4,6-Dinitro-2-methylphenol	1,400 U	19,000 U	1,000 U	1,200 UJ	1,100 UJ	2,500 UJ	2,900 UJ	1,400 UJ	1,500 UJ
4-Bromophenyl-phenylether	550 U	7,500 U	400 U	480 UJ	450 UJ	1,000 UJ	1,200 UJ	550 UJ	600 UJ
4-Chloro-3-methylphenol	550 U	7,500 U	400 U	480 UJ	450 UJ	1,000 UJ	1,200 UJ	550 UJ	600 UJ
4-Chloroaniline	550 U	7,500 U	400 U	480 UJ	450 UJ	1,000 UJ	1,200 UJ	550 UJ	600 UJ
4-Chlorophenyl-phenylether	550 U	7,500 U	400 U	480 UJ	450 UJ	1,000 UJ	1,200 UJ	550 UJ	600 UJ
4-Methylphenol	550 U	7,500 U	400 U	480 UJ	450 UJ	1,000 UJ	1,200 UJ	550 UJ	600 UJ
4-Nitroaniline	1,400 U	19,000 U	1,000 U	1,200 UJ	1,100 UJ	2,500 UJ	2,900 UJ	1,400 UJ	1,500 UJ
4-Nitrophenol	1,400 U	19,000 U	1,000 U	1,200 UJ	1,100 UJ	2,500 UJ	2,900 UJ	1,400 UJ	1,500 UJ
Acenaphthene	550 U	7,500 U	400 U	480 UJ	450 UJ	1,000 UJ	1,200 UJ	550 UJ	600 UJ
Acenaphthylene	550 U	7,500 U	400 U	480 UJ	84 J	1,000 UJ	1,200 UJ	550 UJ	600 UJ
Anthracene	550 U	7,500 U	400 U	480 UJ	72 J	1,000 UJ	1,200 UJ	550 UJ	600 UJ
Benzo(a)anthracene	90 J	7,500 U	100 J	480 UJ	340 J	340 J	230 J	91 J	120 J
Benzo(a)pyrene	120 J	7,500 U	100 J	480 UJ	230 J	470 J	200 J	110 J	97 J
Benzo(b)fluoranthene	600 J	7,500 U	240 J	480 UJ	630 J	980 J	360 J	330 J	250 J
Benzo(g,h,i)perylene	100 J	7,500 U	73 J	480 UJ	310 J	340 J	130 J	73 J	74 J

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Subsurface Soil Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-SB01	SJS4-SB02	SJS4-SB03	SJS4-SB04	SJS4-SB05	SJS4-SB06		SJS4-SB07	SJS4-SB08
Sample ID	SJS04-SB01-002	SJS04-SB02-002	SJS04-SB03-002	SJS04-SB04-001	SJS04-SB05-001	SJS04-SB06-001	SJS04-SB06-001P	SJS04-SB07-001	SJS04-SB08-001
Sample Date	06/24/97	06/24/97	06/24/97	04/22/99	04/19/99	04/22/99	04/22/99	04/20/99	04/20/99
Chemical Name									
Benzo(k)fluoranthene	140 J	7,500 U	81 J	480 UJ	250 J	280 J	1,200 UJ	130 J	100 J
Butylbenzylphthalate	550 U	7,500 U	400 U	480 UJ	450 UJ	1,000 UJ	1,200 UJ	550 UJ	600 UJ
Carbazole	550 U	7,500 U	400 U	480 UJ	450 UJ	1,000 UJ	1,200 UJ	550 UJ	600 UJ
Chrysene	250 J	7,500 U	160 J	480 UJ	420 J	610 J	350 J	240 J	220 J
Di-n-butylphthalate	550 U	7,500 U	400 U	480 UJ	450 UJ	1,000 UJ	1,200 UJ	550 UJ	600 UJ
Di-n-octylphthalate	550 U	7,500 U	400 U	480 UJ	450 UJ	1,000 UJ	1,200 UJ	550 UJ	600 UJ
Dibenz(a,h)anthracene	550 U	7,500 U	400 U	480 UJ	450 UJ	100 J	1,200 UJ	550 UJ	600 UJ
Dibenzofuran	550 U	7,500 U	400 U	480 UJ	450 UJ	1,000 UJ	1,200 UJ	550 UJ	600 UJ
Diethylphthalate	550 U	7,500 U	400 U	480 UJ	450 UJ	1,000 UJ	1,200 UJ	550 UJ	600 UJ
Dimethyl phthalate	550 U	7,500 U	400 U	480 UJ	450 UJ	1,000 UJ	1,200 UJ	550 UJ	600 UJ
Fluoranthene	100 J	7,500 U	87 J	480 UJ	330 J	350 J	260 J	76 J	160 J
Fluorene	550 U	7,500 U	400 U	480 UJ	450 UJ	1,000 UJ	1,200 UJ	550 UJ	600 UJ
Hexachlorobenzene	550 U	7,500 U	400 U	480 UJ	450 UJ	1,000 UJ	1,200 UJ	550 UJ	600 UJ
Hexachlorobutadiene	550 U	7,500 U	400 U	480 UJ	450 UJ	1,000 UJ	1,200 UJ	550 UJ	600 UJ
Hexachlorocyclopentadiene	550 U	7,500 U	400 U	480 UJ	450 UJ	1,000 UJ	1,200 UJ	550 UJ	600 UJ
Hexachloroethane	550 U	7,500 U	400 U	480 UJ	450 UJ	1,000 UJ	1,200 UJ	550 UJ	600 UJ
Indeno(1,2,3-cd)pyrene	120 J	7,500 U	78 J	480 UJ	330 J	280 J	1,200 UJ	84 J	83 J
Isophorone	550 U	7,500 U	400 U	480 UJ	450 UJ	1,000 UJ	1,200 UJ	550 UJ	600 UJ
Naphthalene	550 U	7,500 U	400 U	480 UJ	450 UJ	1,000 UJ	1,200 UJ	550 UJ	600 UJ
Nitrobenzene	550 U	7,500 U	400 U	480 UJ	450 UJ	1,000 UJ	1,200 UJ	550 UJ	600 UJ
Pentachlorophenol	1,400 U	19,000 U	1,000 U	1,200 UJ	1,100 UJ	2,500 UJ	2,900 UJ	1,400 UJ	1,500 UJ
Phenanthrene	550 U	7,500 U	400 U	480 UJ	77 J	130 J	1,200 UJ	550 UJ	600 UJ
Phenol	550 U	7,500 U	400 U	480 UJ	450 UJ	1,000 UJ	1,200 UJ	550 UJ	600 UJ
Pyrene	110 J	7,500 U	84 J	480 UJ	290 J	430 J	290 J	90 J	120 J
bis(2-Chloroethoxy)methane	550 U	7,500 U	400 U	480 UJ	450 UJ	1,000 UJ	1,200 UJ	550 UJ	600 UJ
bis(2-Chloroethyl)ether	550 U	7,500 U	400 U	480 UJ	450 UJ	1,000 UJ	1,200 UJ	550 UJ	600 UJ
bis(2-Ethylhexyl)phthalate	550 U	7,500 U	94 B	480 UJ	450 UJ	1,000 UJ	1,200 UJ	550 UJ	600 UJ
n-Nitroso-di-n-propylamine	550 U	7,500 U	400 U	480 UJ	450 UJ	1,000 UJ	1,200 UJ	550 UJ	600 UJ
n-Nitrosodiphenylamine	550 U	7,500 U	400 U	480 UJ	450 UJ	1,000 UJ	1,200 UJ	550 UJ	600 UJ
Pesticide/Polychlorinated Biphenyls (UG/KG)									
4,4'-DDD	5.4 UJ	13 J	1.8 J	2.10 J	4.40 UJ	45	45	5.40 UJ	5.90 UJ
4,4'-DDE	9.8 J	3.1 J	32	1.80 J	4.40 UJ	10 U	12 U	5.40 UJ	5.90 UJ
4,4'-DDT	5.4 UJ	3.7 U	4.9 J	0.920 J	4.40 UJ	6.10 J	5.80 J	5.40 UJ	5.90 UJ
Aldrin	2.8 UJ	1.9 U	1.9 U	2.40 U	2.20 UJ	5.10 U	5.80 U	2.70 UJ	2.90 UJ
Aroclor-1016	54 UJ	37 U	37 U	48 U	44 UJ	100 U	120 U	54 UJ	59 UJ

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
U - Analyte not detected

Appendix H
Subsurface Soil Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-SB01	SJS4-SB02	SJS4-SB03	SJS4-SB04	SJS4-SB05	SJS4-SB06		SJS4-SB07	SJS4-SB08
Sample ID	SJS04-SB01-002	SJS04-SB02-002	SJS04-SB03-002	SJS04-SB04-001	SJS04-SB05-001	SJS04-SB06-001	SJS04-SB06-001P	SJS04-SB07-001	SJS04-SB08-001
Sample Date	06/24/97	06/24/97	06/24/97	04/22/99	04/19/99	04/22/99	04/22/99	04/20/99	04/20/99
Chemical Name									
Aroclor-1221	110 UJ	76 U	75 U	96 U	89 UJ	200 U	230 U	110 UJ	120 UJ
Aroclor-1232	54 UJ	37 U	37 U	48 U	44 UJ	100 U	120 U	54 UJ	59 UJ
Aroclor-1242	54 UJ	37 U	37 U	48 U	44 UJ	100 U	120 U	54 UJ	59 UJ
Aroclor-1248	54 UJ	37 U	37 U	48 U	44 UJ	100 U	120 U	54 UJ	59 UJ
Aroclor-1254	54 UJ	42	37 U	48 U	11 J	100 U	120 U	54 UJ	59 UJ
Aroclor-1260	54 UJ	37 U	37 U	48 U	44 UJ	100 U	120 U	54 UJ	59 UJ
Dieldrin	5.4 UJ	3.7 U	3.7 U	4.80 U	4.40 UJ	10 U	12 U	5.40 UJ	5.90 UJ
Endosulfan I	2.8 UJ	1.9 U	1.9 U	2.40 U	2.20 UJ	5.10 U	5.80 U	2.70 UJ	2.90 UJ
Endosulfan II	5.4 UJ	3.7 U	3.7 U	4.80 U	4.40 UJ	10 U	12 U	5.40 UJ	5.90 UJ
Endosulfan sulfate	5.4 UJ	3.7 U	3.7 U	4.80 U	4.40 UJ	10 U	12 U	5.40 UJ	5.90 UJ
Endrin	5.4 UJ	3.7 U	3.7 U	4.80 U	4.40 UJ	10 U	12 U	5.40 UJ	5.90 UJ
Endrin aldehyde	5.4 UJ	3.7 U	3.7 U	4.80 U	4.40 UJ	10 U	12 U	5.40 UJ	5.90 UJ
Endrin ketone	5.4 UJ	3.7 U	3.7 U	4.80 U	4.40 UJ	10 U	12 U	5.40 UJ	5.90 UJ
Heptachlor	2.8 UJ	1.9 U	1.9 U	2.40 U	2.20 UJ	5.10 U	5.80 U	2.70 UJ	2.90 UJ
Heptachlor epoxide	2.8 UJ	1.9 U	1.9 U	2.40 U	2.20 UJ	5.10 U	5.80 U	2.70 UJ	2.90 UJ
Methoxychlor	28 UJ	19 U	19 U	24 U	22 UJ	51 U	58 U	27 UJ	29 UJ
Toxaphene	280 UJ	190 U	190 U	240 U	220 UJ	510 U	580 U	270 UJ	290 UJ
alpha-BHC	2.8 UJ	1.9 U	1.9 U	2.40 U	2.20 UJ	5.10 U	5.80 U	2.70 UJ	2.90 UJ
alpha-Chlordane	2.8 UJ	1.9 U	1.9 U	2.40 U	2.20 UJ	5.10 U	5.80 U	2.70 UJ	2.90 UJ
beta-BHC	2.8 UJ	1.9 U	1.9 U	2.40 U	2.20 UJ	5.10 U	5.80 U	2.70 UJ	2.90 UJ
delta-BHC	2.8 UJ	1.9 U	1.9 U	2.40 U	2.20 UJ	5.10 U	5.80 U	2.70 UJ	2.90 UJ
gamma-BHC (Lindane)	2.8 UJ	1.9 U	1.9 U	2.40 U	2.20 UJ	5.10 U	5.80 U	2.70 UJ	2.90 UJ
gamma-Chlordane	2.8 UJ	1.9 U	1.9 U	2.40 U	2.20 UJ	5.10 U	5.80 U	2.70 UJ	2.90 UJ
Total Metals (MG/KG)									
Aluminum	18,100	4,530	14,900	8,450	9,800	3,670	8,210	16,000 J	17,800 J
Antimony	NA	1.2 B	NA	0.960 J	0.610 U	53.5	18.4 J	0.820 U	0.970 U
Arsenic	9.9 L	23.5 L	7.9 L	9.80	8	236	24.7	14.9	12.4
Barium	43.8 J	262	61.9	30.1 J	34.6 J	348	257	47.8 J	50.8 J
Beryllium	0.41 B	1.3	1.7	1 J	0.460 J	0.340 J	0.670 J	0.440 J	0.680 J
Cadmium	0.17 U	0.12 U	0.12 U	0.310 J	0.210 J	3.10	1.10 J	0.150 J	0.180 J
Calcium	490 J	1,100 J	21,000	2,670	2,150	16,800	13,700	2,570 J	841 J
Chromium	37.1	10.6	24.6	13.2	19.4	20.8	31.7	38.3	38.7
Cobalt	6.5 J	4.2 J	13.9	3.5 J	4.70 J	16.2 J	7.20 J	4.5 J	5.30 J
Copper	24.7	105	23.8	151	26	117	198	22.8	39.7
Cyanide	0.87 U	0.67 U	0.65 U	0.279 U	0.310 U	0.565 U	0.460 U	0.390 U	0.410 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Subsurface Soil Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-SB01	SJS4-SB02	SJS4-SB03	SJS4-SB04	SJS4-SB05	SJS4-SB06		SJS4-SB07	SJS4-SB08
Sample ID	SJS04-SB01-002	SJS04-SB02-002	SJS04-SB03-002	SJS04-SB04-001	SJS04-SB05-001	SJS04-SB06-001	SJS04-SB06-001P	SJS04-SB07-001	SJS04-SB08-001
Sample Date	06/24/97	06/24/97	06/24/97	04/22/99	04/19/99	04/22/99	04/22/99	04/20/99	04/20/99
Chemical Name									
Iron	46,900	10,800	23,200	17,800	20,300	36,500	18,400	40,500	31,300
Lead	46.2 J	77 J	27.2 J	180	53	802	479	44.1 J	50.7 J
Magnesium	3,650	478 J	2,750	1,020 J	1,650	3,990	3,840	3,590	3,420
Manganese	122	72.8	252	115	145	83.2	142	117	122
Mercury	0.39	0.62	0.56	0.630	0.220	0.950	0.880	0.400 J	0.690 J
Nickel	10.9 B	12 B	22.3	14.3	9	30.9	24.1 J	11.4 J	12.4 J
Potassium	3,520	912 J	1,770	759 J	1,700	1,280 J	2,070 J	3,690	3,060 L
Selenium	0.99 UL	2.6 K	0.7 UL	0.970 J	0.580 U	2.80	1.70 U	0.790 U	0.970 J
Silver	0.63 B	0.57 B	1.2 B	0.210 U	0.200 U	0.600 J	0.590 U	0.270 U	0.320 U
Sodium	228 B	315 B	704 B	162 J	242 J	8,220	7,640	568 L	89.1 L
Thallium	3.3 J	0.68 J	2 J	0.740 U	0.720 U	1.70 U	2.10 U	0.980 U	1.20 U
Vanadium	47	28	26.9	19.7	27.1	26.9 J	33.4	45.6	41.5
Zinc	66.3 L	135 L	131 L	243	72.7	2,130	593	62.9	79.8
Wet Chemistry (MG/KG)									
% Solids	NA	NA	NA	69.4	74.3	32.8	28.9	61.3	55.8
Phosphorus	5.5	28.5	11.2	NA	NA	NA	NA	4.94 UL	4.60 UL
pH	NA	NA	NA	7.53	6.56	7.23	7.22	5.21	4.19

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
U - Analyte not detected

Appendix H
Shallow GW Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-MW01S			SJS4-MW02S			SJS4-MW03S		
Sample ID	SJS04-GW1S-001	SJS04-GW1S-002	SJS04-GW1S-003	SJS04-GW2S-001	SJS04-GW2S-002	SJS04-GW2S-003	SJS04-GW3S-001	SJS04-GW3S-002	SJS04-GW3S-003
Sample Date	07/21/97	11/03/97	05/18/99	07/23/97	11/04/97	05/18/99	07/21/97	11/03/97	05/18/99
Chemical Name									
Volatile Organic Compounds (UG/L)									
1,1,1-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromo-3-chloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	5 U	NA	NA	NA	NA	NA	5 U	NA	NA
2-Hexanone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	8	NA	NA	3 B	5 U	NA	12	17 B	NA
Benzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon disulfide	0.4 J	1 U	2.90	1 U	1 U	0.900 J	1 U	1 U	0.5 J
Carbon tetrachloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene chloride	1 B	2 B	0.5 B	0.2 B	3	0.5 J	1 B	2 B	0.5 B
Styrene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl chloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Xylene, total	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Shallow GW Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-MW01S			SJS4-MW02S			SJS4-MW03S		
Sample ID	SJS04-GW1S-001	SJS04-GW1S-002	SJS04-GW1S-003	SJS04-GW2S-001	SJS04-GW2S-002	SJS04-GW2S-003	SJS04-GW3S-001	SJS04-GW3S-002	SJS04-GW3S-003
Sample Date	07/21/97	11/03/97	05/18/99	07/23/97	11/04/97	05/18/99	07/21/97	11/03/97	05/18/99
Chemical Name									
cis-1,2-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Semi-volatile Organic Compounds (UG/L)									
1,2,4-Trichlorobenzene	NA	NA	11 U	NA	NA	11 U	NA	NA	11 U
1,2-Dichlorobenzene	NA	NA	11 U	NA	NA	11 U	NA	NA	11 U
1,3-Dichlorobenzene	NA	NA	11 U	NA	NA	11 U	NA	NA	11 U
1,4-Dichlorobenzene	NA	NA	11 U	NA	NA	11 U	NA	NA	11 U
2,2'-Oxybis(1-chloropropane)	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
2,4,5-Trichlorophenol	25 U	25 U	28 U	25 U	25 U	28 U	25 U	25 U	28 U
2,4,6-Trichlorophenol	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
2,4-Dichlorophenol	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
2,4-Dimethylphenol	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
2,4-Dinitrophenol	25 U	25 U	28 U	25 U	25 U	28 U	25 U	25 UJ	28 U
2,4-Dinitrotoluene	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
2,6-Dinitrotoluene	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
2-Chloronaphthalene	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
2-Chlorophenol	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
2-Methylnaphthalene	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
2-Methylphenol	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
2-Nitroaniline	25 U	25 U	28 U	25 U	25 U	28 U	25 U	25 U	28 U
2-Nitrophenol	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
3,3'-Dichlorobenzidine	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
3-Nitroaniline	25 U	25 U	28 U	25 U	25 U	28 U	25 U	25 UJ	28 U
4,6-Dinitro-2-methylphenol	25 U	25 U	28 U	25 U	25 U	28 U	25 U	25 U	28 U
4-Bromophenyl-phenylether	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
4-Chloro-3-methylphenol	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
4-Chloroaniline	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
4-Chlorophenyl-phenylether	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
4-Methylphenol	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
4-Nitroaniline	25 U	25 U	28 U	25 U	25 U	28 U	25 U	25 UJ	28 U
4-Nitrophenol	25 U	25 U	28 U	25 U	25 U	28 U	25 U	25 U	28 U
Acenaphthene	2 J	5 J	2 J	10 U	10 U	11 U	10 U	10 U	11 U
Acenaphthylene	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
Anthracene	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
Benzo(a)anthracene	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
Benzo(a)pyrene	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Shallow GW Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-MW01S			SJS4-MW02S			SJS4-MW03S		
Sample ID	SJS04-GW1S-001	SJS04-GW1S-002	SJS04-GW1S-003	SJS04-GW2S-001	SJS04-GW2S-002	SJS04-GW2S-003	SJS04-GW3S-001	SJS04-GW3S-002	SJS04-GW3S-003
Sample Date	07/21/97	11/03/97	05/18/99	07/23/97	11/04/97	05/18/99	07/21/97	11/03/97	05/18/99
Chemical Name									
Benzo(b)fluoranthene	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
Benzo(g,h,i)perylene	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
Benzo(k)fluoranthene	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
Butylbenzylphthalate	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
Carbazole	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 UJ	11 U
Chrysene	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
Di-n-butylphthalate	10 U	10 U	1 J	10 U	10 U	11 U	10 U	10 U	11 U
Di-n-octylphthalate	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
Dibenz(a,h)anthracene	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
Dibenzofuran	10 U	2 J	11 U	10 U	10 U	11 U	10 U	10 U	11 U
Diethylphthalate	10 U	10 U	11 U	10 U	10 U	11 U	10 U	2 B	11 U
Dimethyl phthalate	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
Fluoranthene	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
Fluorene	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
Hexachlorobenzene	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
Hexachlorobutadiene	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
Hexachlorocyclopentadiene	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
Hexachloroethane	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
Indeno(1,2,3-cd)pyrene	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
Isophorone	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
Naphthalene	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
Nitrobenzene	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
Pentachlorophenol	25 U	25 U	28 U	25 U	25 U	28 U	25 U	25 U	28 U
Phenanthrene	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
Phenol	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
Pyrene	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
bis(2-Chloroethoxy)methane	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
bis(2-Chloroethyl)ether	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
bis(2-Ethylhexyl)phthalate	10 U	10 U	2 B	10 U	10 U	2 B	10 U	13	1 B
n-Nitroso-di-n-propylamine	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
n-Nitrosodiphenylamine	10 U	10 U	11 U	10 U	10 U	11 U	10 U	10 U	11 U
Pesticide/Polychlorinated Biphenyls (UG/L)									
4,4'-DDD	0.1 U	0.1 U	0.120 U	0.1 U	0.1 U	0.120 U	0.1 U	0.1 U	0.110 U
4,4'-DDE	0.1 U	0.1 U	0.120 U	0.1 U	0.1 U	0.120 U	0.1 U	0.1 U	0.110 U
4,4'-DDT	0.1 U	0.1 U	0.120 U	0.1 U	0.1 U	0.120 U	0.1 U	0.1 U	0.110 U
Aldrin	0.05 U	0.05 U	0.0610 U	0.05 U	0.05 U	0.0600 U	0.05 U	0.05 U	0.0540 U
Aroclor-1016	1 U	1 U	1.20 U	1 U	1 U	1.20 U	1 U	1 U	1.10 U
Aroclor-1221	2 U	2 U	2.40 U	2 U	2 U	2.40 U	2 U	2 U	2.10 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Shallow GW Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-MW01S			SJS4-MW02S			SJS4-MW03S		
Sample ID	SJS04-GW1S-001	SJS04-GW1S-002	SJS04-GW1S-003	SJS04-GW2S-001	SJS04-GW2S-002	SJS04-GW2S-003	SJS04-GW3S-001	SJS04-GW3S-002	SJS04-GW3S-003
Sample Date	07/21/97	11/03/97	05/18/99	07/23/97	11/04/97	05/18/99	07/21/97	11/03/97	05/18/99
Chemical Name									
Aroclor-1232	1 U	1 U	1.20 U	1 U	1 U	1.20 U	1 U	1 U	1.10 U
Aroclor-1242	1 U	1 U	1.20 U	1 U	1 U	1.20 U	1 U	1 U	1.10 U
Aroclor-1248	1 U	1 U	1.20 U	1 U	1 U	1.20 U	1 U	1 U	1.10 U
Aroclor-1254	1 U	1 U	1.20 U	1 U	1 U	1.20 U	1 U	1 U	1.10 U
Aroclor-1260	1 U	1 U	1.20 U	1 U	1 U	1.20 U	1 U	1 U	1.10 U
Dieldrin	0.1 U	0.1 U	0.120 U	0.1 U	0.1 U	0.120 U	0.1 U	0.1 U	0.110 U
Endosulfan I	0.05 U	0.05 U	0.0610 U	0.05 U	0.05 U	0.0600 U	0.05 U	0.05 U	0.0540 U
Endosulfan II	0.1 U	0.1 U	0.120 U	0.1 U	0.1 U	0.120 U	0.1 U	0.1 U	0.110 U
Endosulfan sulfate	0.1 U	0.1 U	0.00900 J	0.1 U	0.1 U	0.00770 J	0.1 U	0.1 U	0.00570 J
Endrin	0.1 U	0.1 U	0.120 U	0.1 U	0.1 U	0.120 U	0.1 U	0.1 U	0.110 U
Endrin aldehyde	0.1 U	0.1 U	0.120 U	0.1 U	0.1 U	0.120 U	0.1 U	0.1 U	0.110 U
Endrin ketone	0.1 U	0.1 U	0.120 U	0.1 U	0.1 U	0.120 U	0.1 U	0.1 U	0.110 U
Heptachlor	0.05 U	0.05 U	0.0610 U	0.05 U	0.05 U	0.0600 U	0.05 U	0.05 U	0.0540 U
Heptachlor epoxide	0.05 U	0.05 U	0.0610 U	0.05 U	0.05 U	0.0600 U	0.05 U	0.05 U	0.0540 U
Methoxychlor	0.5 U	0.5 U	0.610 U	0.5 U	0.5 U	0.600 U	0.5 U	0.5 U	0.540 U
Toxaphene	5 U	5 U	6.10 U	5 U	5 U	6 U	5 U	5 U	5.40 U
alpha-BHC	0.05 U	0.05 U	0.0610 U	0.05 U	0.05 U	0.0600 U	0.05 U	0.05 U	0.0540 U
alpha-Chlordane	0.05 U	0.05 U	0.0610 U	0.05 U	0.05 U	0.0600 U	0.05 U	0.05 U	0.0540 U
beta-BHC	0.05 U	0.05 U	0.0610 U	0.05 U	0.05 U	0.0600 U	0.05 U	0.05 U	0.0540 U
delta-BHC	0.05 U	0.05 U	0.0610 U	0.05 U	0.05 U	0.0600 U	0.05 U	0.05 U	0.0540 U
gamma-BHC (Lindane)	0.05 U	0.05 U	0.0610 U	0.05 U	0.05 U	0.0600 U	0.05 U	0.05 U	0.0540 U
gamma-Chlordane	0.05 U	0.05 U	0.0610 U	0.05 U	0.05 U	0.0600 U	0.05 U	0.05 U	0.0540 U
Total Metals (UG/L)									
Aluminum	2,370 K	349	257	28,000 J	2,900	394	90.9 B	115 B	84.2 J
Antimony	2 U	1.7 U	2.70 U	NA	1.7 U	2.70 U	2 U	4.7 B	3.20 J
Arsenic	3 U	3.2 U	2 U	14.4	3.2 U	2.5 J	3 U	3.2 U	2 U
Barium	49.3 J	22.4 B	22.5 J	65.5 J	33 J	9.30 B	424	59.6 J	386
Beryllium	1 U	0.77 B	0.100 U	2.5 B	3.3 J	0.150 J	1 U	0.77 B	0.100 U
Cadmium	0.5 U	0.4 U	1.30 J	0.5 UL	2.1 J	0.300 U	0.5 U	6.1 K	2.70 J
Calcium	172,000	116,000	159,000	226,000 J	375,000 J	163,000	319,000	96,500	396,000
Chromium	23 B	4.6 UL	7.40 B	46 J	4.6 U	2.5 B	10.9 B	6.1 L	1.30 J
Cobalt	8 U	20 J	0.5 U	12.2 J	88.7	9.80 B	8 U	6 U	1.10 B
Copper	6 U	5.8 UL	8.40 B	16.5 B	8.7 J	4.10 J	6 U	25.2 L	53.6
Cyanide	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Iron	4,730	84,000	90,900	40,400 J	6,490	7,390	6,910	339	359
Lead	1.5 B	2.6 J	1.70 J	23.7 L	1.3 U	1.30 J	1.5 B	2.3 J	30.5
Magnesium	282,000	115,000	145,000	52,600 J	83,900	23,800	144,000	37,300	135,000
Manganese	138	3,590	3,240	1,530 L	3,180	701	449	46.7 B	183

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Shallow GW Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-MW01S			SJS4-MW02S			SJS4-MW03S		
Sample ID	SJS04-GW1S-001	SJS04-GW1S-002	SJS04-GW1S-003	SJS04-GW2S-001	SJS04-GW2S-002	SJS04-GW2S-003	SJS04-GW3S-001	SJS04-GW3S-002	SJS04-GW3S-003
Sample Date	07/21/97	11/03/97	05/18/99	07/23/97	11/04/97	05/18/99	07/21/97	11/03/97	05/18/99
Chemical Name									
Mercury	0.22 B	0.13 U	0.100 U	0.35 B	0.13 U	0.100 U	0.21 B	0.16 U	0.100 U
Nickel	7 U	28.3 J	3.30 J	18 J	110	11.2 B	7 U	6.3 U	8.40 B
Potassium	91,300	43,800	59,100 J	24,700	22,500	10,000 J	58,900	25,500	64,400 J
Selenium	3 U	3.3 U	2.80 B	NA	3.3 U	2.60 U	3 U	3.3 U	2.60 U
Silver	1.5 B	3.6 B	0.900 U	400	1.5 J	0.900 U	1 U	3.8 B	0.900 U
Sodium	1,980,000	274,000	445,000	41,200 J	43,400	31,300	1,170,000	235,000	1,050,000
Thallium	2 U	1.5 U	3.20 U	3.1 J	1.5 U	3.20 U	2 U	1.5 U	3.20 U
Vanadium	14 J	6.8 U	0.600 U	55.9	6.8 U	0.600 U	9 U	6.8 U	2.60 J
Zinc	44 B	19.7 B	25	90.3 B	542	61.9 B	37.7 B	105 B	310
Dissolved Metals (UG/L)									
Aluminum	275 B	38.1 U	58.1 J	72.2 B	2,500	45 B	44 U	38.1 U	38.2 U
Antimony	7.5 B	1.7 U	2.70 U	2 UL	1.7 U	2.70 U	2 U	5 K	2.70 U
Arsenic	3 U	3.2 U	2 U	4.2 L	3.2 U	2 U	3 U	3.2 U	3.5 J
Barium	46.8 J	23.6 B	20.3 J	14.1 B	34.5 J	7.20 B	385	55.1 J	399
Beryllium	1 U	0.77 B	0.100 U	1.1 B	3.5 J	0.110 J	1 U	0.58 U	0.100 U
Cadmium	0.5 U	0.4 U	1.20 J	0.5 UL	2.3 J	0.300 U	0.5 U	5.7 K	2.30 J
Calcium	182,000	133,000	164,000	224,000 J	393,000	152,000	308,000	91,000	415,000
Chromium	9.6 B	4.6 UL	2.5 J	7 U	4.6 U	1.10 U	7 U	4.6 UL	1.10 U
Cobalt	11.3 J	17.7 J	0.5 U	8 U	92.6	8.70 B	8 U	6 U	0.960 B
Copper	6 U	5.8 UL	5.80 B	6 U	8.7 B	5.60 B	6 U	10 L	9.60 B
Iron	1,450	88,800	90,700	2,400 J	6,830	3,250	4,300	211 B	150
Lead	1 U	3	1 U	4 B	1.5 J	1 U	1.1 B	1.3 U	1.40 J
Magnesium	306,000	130,000	149,000	51,500 J	88,500	21,900	146,000	34,300	141,000
Manganese	127	3,760	3,320	1,300 J	3,410	607	437	40.1	177
Mercury	0.19 B	0.12 U	0.100 U	0.16 B	0.13 U	0.100 U	0.19 B	0.13 U	0.100 U
Nickel	7 U	26.1 J	4.60 B	7 U	110	8.80 B	7 U	6.3 U	8.70 B
Potassium	98,800	49,500	61,000	24,000	24,100	9,050	58,100	24,000	66,400
Selenium	3 U	6.6 U	3.60 B	3.3 L	3.3 U	2.60 U	3 U	3.3 U	2.60 U
Silver	1 U	3.7 J	0.900 U	1 U	1.1 U	0.900 U	1.6 B	3.2 J	0.900 U
Sodium	2,120,000	316,000	455,000	44,300 J	45,500	29,300	1,180,000	215,000	1,100,000
Thallium	2.8 B	2.1 K	3.20 U	2 U	1.5 U	3.20 U	2 U	1.5 U	3.20 U
Vanadium	11.5 J	6.8 U	0.600 U	9 U	6.8 U	0.600 U	9 U	8 J	2.10 J
Zinc	24 B	9.6 B	7.70 B	12.7 B	566	46 B	44.8 B	87.8	313
Wet Chemistry (MG/L)									
Phosphate	NA	NA	NA	NA	0.076	NA	NA	NA	NA
Phosphorus	2.9 J	0.307	0.0200 U	0.302	NA	0.0200 U	0.093 J	0.107	0.0200 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Shallow GW Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID		SJS4-MW04S		
Sample ID	SJS04-GW3S-003P	SJS04-GW4S-001	SJS04-GW4S-002	SJS04-GW4S-003
Sample Date	05/18/99	07/21/97	11/04/97	05/18/99
Chemical Name				
Volatile Organic Compounds (UG/L)				
1,1,1-Trichloroethane	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U
1,1-Dichloroethene	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	1 U	1 U	1 U	1 U
1,2-Dibromo-3-chloropropane	1 U	1 U	1 U	1 U
1,2-Dibromoethane	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U
1,2-Dichloroethane	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U
2-Butanone	NA	5 U	NA	NA
2-Hexanone	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone	5 U	5 U	5 U	5 U
Acetone	NA	6	8 B	NA
Benzene	1 U	1 U	1 U	1 U
Bromochloromethane	1 U	1 U	1 U	1 U
Bromodichloromethane	1 U	1 U	1 U	1 U
Bromoform	1 U	1 U	1 U	1 U
Bromomethane	1 U	1 U	1 U	1 U
Carbon disulfide	0.700 J	1 U	1 U	0.5 J
Carbon tetrachloride	1 U	1 U	1 U	1 U
Chlorobenzene	1 U	1 U	1 U	1 U
Chloroethane	1 U	1 U	1 U	1 U
Chloroform	1 U	1 U	1 U	1 U
Chloromethane	1 U	1 U	1 U	1 U
Dibromochloromethane	1 U	1 U	1 U	1 U
Ethylbenzene	1 U	1 U	1 U	1 U
Methylene chloride	0.5 B	1 B	3 B	0.5 J
Styrene	1 U	1 U	1 U	1 U
Tetrachloroethene	1 U	1 U	1 U	1 U
Toluene	1 U	1 U	1 U	1 U
Trichloroethene	1 U	1 U	1 U	1 U
Vinyl chloride	1 U	1 U	1 U	1 U
Xylene, total	1 U	1 U	1 U	1 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Shallow GW Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID		SJS4-MW04S		
Sample ID	SJS04-GW3S-003P	SJS04-GW4S-001	SJS04-GW4S-002	SJS04-GW4S-003
Sample Date	05/18/99	07/21/97	11/04/97	05/18/99
Chemical Name				
cis-1,2-Dichloroethene	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U
Semi-volatile Organic Compounds (UG/L)				
1,2,4-Trichlorobenzene	11 U	NA	NA	11 U
1,2-Dichlorobenzene	11 U	NA	NA	11 U
1,3-Dichlorobenzene	11 U	NA	NA	11 U
1,4-Dichlorobenzene	11 U	NA	NA	11 U
2,2'-Oxybis(1-chloropropane)	11 U	10 U	10 U	11 U
2,4,5-Trichlorophenol	27 U	25 U	25 U	28 U
2,4,6-Trichlorophenol	11 U	10 U	10 U	11 U
2,4-Dichlorophenol	11 U	10 U	10 U	11 U
2,4-Dimethylphenol	11 U	10 U	10 U	11 U
2,4-Dinitrophenol	27 U	25 U	25 U	28 U
2,4-Dinitrotoluene	11 U	10 U	10 U	11 U
2,6-Dinitrotoluene	11 U	10 U	10 U	11 U
2-Chloronaphthalene	11 U	10 U	10 U	11 U
2-Chlorophenol	11 U	10 U	10 U	11 U
2-Methylnaphthalene	11 U	10 U	10 U	11 U
2-Methylphenol	11 U	10 U	10 U	11 U
2-Nitroaniline	27 U	25 U	25 U	28 U
2-Nitrophenol	11 U	10 U	10 U	11 U
3,3'-Dichlorobenzidine	11 U	10 U	10 U	11 U
3-Nitroaniline	27 U	25 U	25 U	28 U
4,6-Dinitro-2-methylphenol	27 U	25 U	25 U	28 U
4-Bromophenyl-phenylether	11 U	10 U	10 U	11 U
4-Chloro-3-methylphenol	11 U	10 U	10 U	11 U
4-Chloroaniline	11 U	10 U	10 U	11 U
4-Chlorophenyl-phenylether	11 U	10 U	10 U	11 U
4-Methylphenol	11 U	10 U	10 U	11 U
4-Nitroaniline	27 U	25 U	25 U	28 U
4-Nitrophenol	27 U	25 U	25 U	28 U
Acenaphthene	11 U	10 U	10 U	11 U
Acenaphthylene	11 U	10 U	10 U	11 U
Anthracene	11 U	10 U	10 U	11 U
Benzo(a)anthracene	11 U	10 U	10 U	11 U
Benzo(a)pyrene	11 U	10 U	10 U	11 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Shallow GW Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID		SJS4-MW04S		
Sample ID	SJS04-GW3S-003P	SJS04-GW4S-001	SJS04-GW4S-002	SJS04-GW4S-003
Sample Date	05/18/99	07/21/97	11/04/97	05/18/99
Chemical Name				
Benzo(b)fluoranthene	11 U	10 U	10 U	11 U
Benzo(g,h,i)perylene	11 U	10 U	10 U	11 U
Benzo(k)fluoranthene	11 U	10 U	10 U	11 U
Butylbenzylphthalate	11 U	10 U	10 U	11 U
Carbazole	11 U	10 U	10 U	11 U
Chrysene	11 U	10 U	10 U	11 U
Di-n-butylphthalate	11 U	10 U	10 U	11 U
Di-n-octylphthalate	11 U	10 U	10 U	11 U
Dibenz(a,h)anthracene	11 U	10 U	10 U	11 U
Dibenzofuran	11 U	10 U	10 U	11 U
Diethylphthalate	11 U	10 U	10 U	11 U
Dimethyl phthalate	11 U	10 U	10 U	11 U
Fluoranthene	11 U	10 U	10 U	11 U
Fluorene	11 U	10 U	10 U	11 U
Hexachlorobenzene	11 U	10 U	10 U	11 U
Hexachlorobutadiene	11 U	10 U	10 U	11 U
Hexachlorocyclopentadiene	11 U	10 U	10 U	11 U
Hexachloroethane	11 U	10 U	10 U	11 U
Indeno(1,2,3-cd)pyrene	11 U	10 U	10 U	11 U
Isophorone	11 U	10 U	10 U	11 U
Naphthalene	11 U	10 U	10 U	11 U
Nitrobenzene	11 U	10 U	10 U	11 U
Pentachlorophenol	27 U	25 U	25 U	28 U
Phenanthrene	11 U	10 U	10 U	11 U
Phenol	11 U	10 U	10 U	11 U
Pyrene	11 U	10 U	10 U	11 U
bis(2-Chloroethoxy)methane	11 U	10 U	10 U	11 U
bis(2-Chloroethyl)ether	11 U	10 U	10 U	11 U
bis(2-Ethylhexyl)phthalate	1 B	10 U	10 U	1 B
n-Nitroso-di-n-propylamine	11 U	10 U	10 U	11 U
n-Nitrosodiphenylamine	11 U	10 U	10 U	11 U
Pesticide/Polychlorinated Biphenyls (UG/L)				
4,4'-DDD	0.110 U	0.1 U	0.1 U	0.110 U
4,4'-DDE	0.110 U	0.1 U	0.1 U	0.110 U
4,4'-DDT	0.110 U	0.1 U	0.1 U	0.110 U
Aldrin	0.0560 U	0.05 U	0.05 U	0.0570 U
Aroclor-1016	1.10 U	1 U	1 U	1.10 U
Aroclor-1221	2.20 U	2 U	2 U	2.30 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Shallow GW Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID		SJS4-MW04S		
Sample ID	SJS04-GW3S-003P	SJS04-GW4S-001	SJS04-GW4S-002	SJS04-GW4S-003
Sample Date	05/18/99	07/21/97	11/04/97	05/18/99
Chemical Name				
Aroclor-1232	1.10 U	1 U	1 U	1.10 U
Aroclor-1242	1.10 U	1 U	1 U	1.10 U
Aroclor-1248	1.10 U	1 U	1 U	1.10 U
Aroclor-1254	1.10 U	1 U	1 U	1.10 U
Aroclor-1260	1.10 U	1 U	1 U	1.10 U
Dieldrin	0.110 U	0.1 U	0.1 U	0.110 U
Endosulfan I	0.0560 U	0.05 U	0.05 U	0.0570 U
Endosulfan II	0.110 U	0.1 U	0.1 U	0.110 U
Endosulfan sulfate	0.00630 J	0.1 U	0.1 U	0.110 U
Endrin	0.110 U	0.1 U	0.1 U	0.110 U
Endrin aldehyde	0.110 U	0.1 U	0.1 U	0.110 U
Endrin ketone	0.110 U	0.1 U	0.1 U	0.110 U
Heptachlor	0.0560 U	0.05 U	0.05 U	0.0570 U
Heptachlor epoxide	0.0560 U	0.05 U	0.05 U	0.0570 U
Methoxychlor	0.560 U	0.5 U	0.5 U	0.570 U
Toxaphene	5.60 U	5 U	5 U	5.70 U
alpha-BHC	0.0560 U	0.05 U	0.05 U	0.0570 U
alpha-Chlordane	0.0560 U	0.05 U	0.05 U	0.0570 U
beta-BHC	0.0560 U	0.05 U	0.05 U	0.0570 U
delta-BHC	0.0560 U	0.05 U	0.05 U	0.0570 U
gamma-BHC (Lindane)	0.0560 U	0.05 U	0.05 U	0.0570 U
gamma-Chlordane	0.0560 U	0.05 U	0.05 U	0.0570 U
Total Metals (UG/L)				
Aluminum	105 J	2,630 K	179 J	97.2 B
Antimony	2.70 U	2.8 B	1.7 U	2.70 U
Arsenic	2.30 J	9.2 J	11	9.5 J
Barium	411	185 J	488	647
Beryllium	0.100 U	1 U	0.58 U	0.100 U
Cadmium	2.80 J	0.5 U	0.4 U	0.330 J
Calcium	424,000	161,000	157,000	181,000
Chromium	1.80 B	47.8	4.6 U	2.10 J
Cobalt	1.10 B	8 U	6 U	0.5 U
Copper	58.6	39.3	6.8 B	3.30 B
Cyanide	5 U	5 U	5 U	5 U
Iron	526	8,520	27,200	21,400
Lead	5.30	9.9	3.2	1 U
Magnesium	144,000	310,000	91,900	84,200
Manganese	212	832	438	495

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Shallow GW Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID		SJS4-MW04S		
Sample ID	SJS04-GW3S-003P	SJS04-GW4S-001	SJS04-GW4S-002	SJS04-GW4S-003
Sample Date	05/18/99	07/21/97	11/04/97	05/18/99
Chemical Name				
Mercury	0.100 U	0.35 B	0.13 U	0.100 U
Nickel	9.70 B	22.6 J	6.3 U	2.20 J
Potassium	68,700 J	105,000	44,300	48,300 J
Selenium	2.60 U	3 U	3.3 U	3.40 B
Silver	0.900 U	1 B	3.2 J	0.900 U
Sodium	1,100,000	2,210,000	361,000	347,000
Thallium	3.20 U	2.4 B	2.2 B	3.20 U
Vanadium	2.70 J	9.2 J	6.8 U	5.60 J
Zinc	340	177	31.5 B	7.90 B
Dissolved Metals (UG/L)				
Aluminum	38.2 U	44 U	38.1 U	38.2 U
Antimony	2.70 U	2 U	1.7 U	2.70 U
Arsenic	2 U	7 J	5.5 J	7.90 B
Barium	442	146 J	499	626
Beryllium	0.100 U	1 U	0.58 U	0.100 U
Cadmium	2.40 J	0.5 U	0.4 U	0.300 U
Calcium	454,000	158,000	160,000	176,000
Chromium	1.20 J	7 U	4.6 U	1.20 J
Cobalt	0.910 B	8 U	6 U	0.5 U
Copper	9.70 B	6 U	5.8 U	3.70 B
Iron	190	2,920	25,700	21,200
Lead	1 U	1 U	1.3 U	1 U
Magnesium	155,000	298,000	105,000	82,400
Manganese	192	758	444	483
Mercury	0.100 U	0.24 B	0.13 U	0.100 U
Nickel	10 B	7 U	6.3 U	1.10 B
Potassium	73,600	102,000	48,800	46,900
Selenium	2.60 U	3 U	3.3 U	2.60 U
Silver	0.900 U	1 B	2.6 B	0.900 U
Sodium	1,190,000	2,120,000	482,000	340,000
Thallium	3.20 U	2 U	1.5 U	3.20 U
Vanadium	1.5 J	9.9 J	6.8 U	0.980 J
Zinc	343	44.2 B	15.3 B	3.80 B
Wet Chemistry (MG/L)				
Phosphate	NA	NA	0.59	NA
Phosphorus	0.0200 U	1.13 J	NA	0.187

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Deep GW Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-MW01D			SJS4-MW03D				
Sample ID	SJS04-GW1D-001	SJS04-GW1D-002	SJS04-GW1D-003	SJS04-GW3D-001	SJS04-GW3D-001P	SJS04-GW3D-002	SJS04-GW3D-002P	SJS04-GW3D-003
Sample Date	07/30/97	11/03/97	05/18/99	07/30/97	07/30/97	11/03/97	11/03/97	05/18/99
Chemical Name								
Volatile Organic Compounds (UG/L)								
1,1,1-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromo-3-chloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Hexanone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	14 B	NA	NA	5 U	18 B	NA	NA	NA
Benzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon disulfide	1 U	0.3 J	0.800 J	1 U	1 U	1 U	1 U	4.5
Carbon tetrachloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	0.6 J	1 U	1 U	8	9	1 U	1 U	1 U
Chloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene chloride	4 B	2 B	0.5 B	2 B	3 B	2 B	2 B	0.600 B
Styrene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	1 U	1 U	1 U	1 U	0.2 J	1 U	1 U	1 U
Trichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl chloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Deep GW Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-MW01D			SJS4-MW03D				
Sample ID	SJS04-GW1D-001	SJS04-GW1D-002	SJS04-GW1D-003	SJS04-GW3D-001	SJS04-GW3D-001P	SJS04-GW3D-002	SJS04-GW3D-002P	SJS04-GW3D-003
Sample Date	07/30/97	11/03/97	05/18/99	07/30/97	07/30/97	11/03/97	11/03/97	05/18/99
Chemical Name								
Xylene, total	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Semi-volatile Organic Compounds (UG/L)								
1,2,4-Trichlorobenzene	NA	NA	11 U	NA	NA	NA	NA	11 U
1,2-Dichlorobenzene	NA	NA	11 U	NA	NA	NA	NA	11 U
1,3-Dichlorobenzene	NA	NA	11 U	NA	NA	NA	NA	11 U
1,4-Dichlorobenzene	NA	NA	11 U	NA	NA	NA	NA	11 U
2,2'-Oxybis(1-chloropropane)	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
2,4,5-Trichlorophenol	NA	25 U	27 U	25 U	25 U	25 U	25 U	27 U
2,4,6-Trichlorophenol	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
2,4-Dichlorophenol	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
2,4-Dimethylphenol	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
2,4-Dinitrophenol	NA	25 U	27 U	25 UJ	25 UJ	25 U	25 U	27 U
2,4-Dinitrotoluene	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
2,6-Dinitrotoluene	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
2-Chloronaphthalene	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
2-Chlorophenol	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
2-Methylnaphthalene	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
2-Methylphenol	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
2-Nitroaniline	NA	25 U	27 U	25 U	25 U	25 U	25 U	27 U
2-Nitrophenol	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
3,3'-Dichlorobenzidine	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
3-Nitroaniline	NA	25 U	27 U	25 U	25 U	25 U	25 U	27 U
4,6-Dinitro-2-methylphenol	NA	25 U	27 U	25 U	25 U	25 U	25 U	27 U
4-Bromophenyl-phenylether	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
4-Chloro-3-methylphenol	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
4-Chloroaniline	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
4-Chlorophenyl-phenylether	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
4-Methylphenol	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
4-Nitroaniline	NA	25 U	27 U	25 U	25 U	25 U	25 U	27 U
4-Nitrophenol	NA	25 U	27 U	25 U	25 U	25 U	25 U	27 U
Acenaphthene	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
Acenaphthylene	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
U - Analyte not detected

Appendix H
Deep GW Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-MW01D			SJS4-MW03D				
Sample ID	SJS04-GW1D-001	SJS04-GW1D-002	SJS04-GW1D-003	SJS04-GW3D-001	SJS04-GW3D-001P	SJS04-GW3D-002	SJS04-GW3D-002P	SJS04-GW3D-003
Sample Date	07/30/97	11/03/97	05/18/99	07/30/97	07/30/97	11/03/97	11/03/97	05/18/99
Chemical Name								
Anthracene	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
Benzo(a)anthracene	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
Benzo(a)pyrene	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
Benzo(b)fluoranthene	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
Benzo(g,h,i)perylene	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
Benzo(k)fluoranthene	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
Butylbenzylphthalate	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
Carbazole	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
Chrysene	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
Di-n-butylphthalate	NA	10 U	1 J	10 U	10 U	10 U	10 U	1 J
Di-n-octylphthalate	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
Dibenz(a,h)anthracene	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
Dibenzofuran	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
Diethylphthalate	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
Dimethyl phthalate	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
Fluoranthene	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
Fluorene	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
Hexachlorobenzene	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
Hexachlorobutadiene	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
Hexachlorocyclopentadiene	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
Hexachloroethane	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
Indeno(1,2,3-cd)pyrene	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
Isophorone	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
Naphthalene	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
Nitrobenzene	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
Pentachlorophenol	NA	25 U	27 U	25 U	25 U	25 U	25 U	27 U
Phenanthrene	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
Phenol	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
Pyrene	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
bis(2-Chloroethoxy)methane	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
bis(2-Chloroethyl)ether	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
bis(2-Ethylhexyl)phthalate	NA	10 U	1 B	10 U	10 U	5 J	10 U	1 B
n-Nitroso-di-n-propylamine	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
n-Nitrosodiphenylamine	NA	10 U	11 U	10 U	10 U	10 U	10 U	11 U
Pesticide/Polychlorinated Biphenyls (UG/L)								
4,4'-DDD	NA	0.1 U	0.110 U	0.1 U	0.1 U	0.1 U	0.1 U	0.110 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Deep GW Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-MW01D			SJS4-MW03D				
Sample ID	SJS04-GW1D-001	SJS04-GW1D-002	SJS04-GW1D-003	SJS04-GW3D-001	SJS04-GW3D-001P	SJS04-GW3D-002	SJS04-GW3D-002P	SJS04-GW3D-003
Sample Date	07/30/97	11/03/97	05/18/99	07/30/97	07/30/97	11/03/97	11/03/97	05/18/99
Chemical Name								
4,4'-DDE	NA	0.1 U	0.110 U	0.1 U	0.1 U	0.1 U	0.1 U	0.110 U
4,4'-DDT	NA	0.1 U	0.110 U	0.1 U	0.1 U	0.1 U	0.1 U	0.110 U
Aldrin	NA	0.05 U	0.0530 U	0.05 U	0.05 U	0.05 U	0.05 U	0.0570 U
Aroclor-1016	NA	1 U	1.10 U	1 U	1 U	1 U	1 U	1.10 U
Aroclor-1221	NA	2 U	2.10 U	2 U	2 U	2 U	2 U	2.30 U
Aroclor-1232	NA	1 U	1.10 U	1 U	1 U	1 U	1 U	1.10 U
Aroclor-1242	NA	1 U	1.10 U	1 U	1 U	1 U	1 U	1.10 U
Aroclor-1248	NA	1 U	1.10 U	1 U	1 U	1 U	1 U	1.10 U
Aroclor-1254	NA	1 U	1.10 U	1 U	1 U	1 U	1 U	1.10 U
Aroclor-1260	NA	1 U	1.10 U	1 U	1 U	1 U	1 U	1.10 U
Dieldrin	NA	0.1 U	0.110 U	0.1 U	0.1 U	0.1 U	0.1 U	0.110 U
Endosulfan I	NA	0.05 U	0.0530 U	0.05 U	0.05 U	0.05 U	0.05 U	0.0570 U
Endosulfan II	NA	0.1 U	0.110 U	0.1 U	0.1 U	0.1 U	0.1 U	0.110 U
Endosulfan sulfate	NA	0.1 U	0.110 U	0.1 U	0.1 U	0.1 U	0.1 U	0.00780 J
Endrin	NA	0.1 U	0.110 U	0.1 U	0.1 U	0.1 U	0.1 U	0.110 U
Endrin aldehyde	NA	0.1 U	0.110 U	0.1 U	0.1 U	0.1 U	0.1 U	0.110 U
Endrin ketone	NA	0.1 U	0.110 U	0.1 U	0.1 U	0.1 U	0.1 U	0.110 U
Heptachlor	NA	0.05 U	0.0530 U	0.05 U	0.05 U	0.05 U	0.05 U	0.0570 U
Heptachlor epoxide	NA	0.05 U	0.0530 U	0.05 U	0.05 U	0.05 U	0.05 U	0.0570 U
Methoxychlor	NA	0.5 U	0.530 U	0.5 U	0.5 U	0.5 U	0.5 U	0.570 U
Toxaphene	NA	5 U	5.30 U	5 U	5 U	5 U	5 U	5.70 U
alpha-BHC	NA	0.05 U	0.0530 U	0.05 U	0.05 U	0.05 U	0.05 U	0.0570 U
alpha-Chlordane	NA	0.05 U	0.0530 U	0.05 U	0.05 U	0.05 U	0.05 U	0.0570 U
beta-BHC	NA	0.05 U	0.0530 U	0.05 U	0.05 U	0.05 U	0.05 U	0.0570 U
delta-BHC	NA	0.05 U	0.0530 U	0.05 U	0.05 U	0.05 U	0.05 U	0.0570 U
gamma-BHC (Lindane)	NA	0.05 U	0.0530 U	0.05 U	0.05 U	0.05 U	0.05 U	0.0570 U
gamma-Chlordane	NA	0.05 U	0.0530 U	0.05 U	0.05 U	0.05 U	0.05 U	0.0570 U
Total Metals (UG/L)								
Aluminum	NA	39.2 B	134 J	1,340	435	38.1 U	38.1 U	38.2 U
Antimony	NA	1.7 U	2.70 U	2 U	2 U	1.7 U	1.7 U	2.70 U
Arsenic	NA	3.2 U	2 U	4.9 J	4.7 J	3.8 J	3.2 U	6.5 J
Barium	NA	404	489	67.3 J	61.2 J	56.5 J	65 J	93.8 J
Beryllium	NA	0.77 B	0.100 U	1 U	1 U	0.77 B	0.58 B	0.100 U
Cadmium	NA	0.4 U	1.10 J	0.5 U	0.5 U	0.4 U	0.4 U	0.360 J
Calcium	NA	218,000	286,000	70,200	73,500	80,000	86,400	119,000
Chromium	NA	5 L	8 B	8.1 B	7 U	4.6 UL	4.6 UL	1.10 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Deep GW Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-MW01D			SJS4-MW03D				
Sample ID	SJS04-GW1D-001	SJS04-GW1D-002	SJS04-GW1D-003	SJS04-GW3D-001	SJS04-GW3D-001P	SJS04-GW3D-002	SJS04-GW3D-002P	SJS04-GW3D-003
Sample Date	07/30/97	11/03/97	05/18/99	07/30/97	07/30/97	11/03/97	11/03/97	05/18/99
Chemical Name								
Cobalt	NA	6 U	0.5 U	8 U	8 U	6 U	6 U	0.5 U
Copper	NA	5.8 UL	4.30 B	6 U	6 U	5.8 UL	5.8 UL	2.60 B
Cyanide	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Iron	NA	38,100	68,500	9,120 K	8,500 K	11,800	12,700	29,700
Lead	NA	1.3 U	1 U	2.6 B	1.5 J	1.3 U	1.3 U	1 U
Magnesium	NA	115,000	151,000	27,300	28,300	32,300	34,600	49,100
Manganese	NA	6,880	12,500	1,840	1,900	2,300	2,490	4,490
Mercury	NA	0.13 U	0.100 U	0.11 U	0.12 U	0.13 U	0.13 U	0.100 U
Nickel	NA	6.3 U	2.10 B	7 U	7 U	6.3 U	6.3 U	0.900 U
Potassium	NA	24,900	33,100 J	9,500	9,790	10,000	10,600	13,400 J
Selenium	NA	3.3 U	2.60 U	3 U	3 U	3.3 U	3.3 U	2.60 U
Silver	NA	3 B	1.60 J	6.3 B	5 B	2.6 B	2.5 B	0.900 U
Sodium	NA	495,000	698,000	112,000	117,000	125,000	134,000	206,000
Thallium	NA	1.5 U	3.20 U	2 U	2 U	1.5 U	1.5 U	3.20 U
Vanadium	NA	6.8 U	0.600 U	9 U	9 U	6.8 U	6.8 U	0.600 U
Zinc	NA	10.1 B	1.90 U	16 B	13.8 B	18.6 B	5.6 B	1.90 U
Dissolved Metals (UG/L)								
Aluminum	NA	38.1 U	88 J	44 U	44 U	38.1 U	38.1 U	49 J
Antimony	NA	1.7 U	2.70 U	2 U	2 U	1.7 U	1.7 U	2.70 U
Arsenic	NA	3.2 U	2 U	5.8 J	4.1 J	3.2 U	3.4 J	7.80 J
Barium	NA	391	461	61.6 J	56.4 J	57.1 J	55.1 J	102 J
Beryllium	NA	0.77 B	0.100 U	1 U	1 U	0.77 B	0.58 U	0.100 U
Cadmium	NA	0.4 U	0.790 J	0.5 U	0.5 U	0.4 U	0.4 U	0.340 J
Calcium	NA	210,000	265,000	76,200	68,700	75,500	79,800	130,000
Chromium	NA	4.6 UL	1.10 U	7 U	7 U	4.6 UL	4.6 UL	1.10 U
Cobalt	NA	6 U	0.5 U	8 U	8 U	6 U	6 U	0.5 U
Copper	NA	5.8 UL	3.20 B	6 U	6 U	5.8 UL	5.8 UL	6.60 B
Iron	NA	36,400	63,900	8,300	7,490	11,100	11,600	32,300
Lead	NA	1.3 J	1.70 J	1.5 J	1 U	1.3 U	1.3 U	1 U
Magnesium	NA	111,000	141,000	29,400	26,600	30,300	32,000	53,800
Manganese	NA	8,530	11,700	2,000	1,800	2,170	2,280	4,890
Mercury	NA	0.13 U	0.100 U	0.13 U	0.12 U	0.13 U	0.13 U	0.100 U
Nickel	NA	6.3 U	0.900 U	7 U	7 U	6.3 U	6.3 U	0.900 U
Potassium	NA	24,600	31,400	10,100	9,070	9,380	9,760	14,700
Selenium	NA	3.3 U	3.10 B	3 U	3 U	3.3 U	3.3 U	2.60 U
Silver	NA	4.3 J	0.900 U	5.8 B	5.4 B	1.6 J	2.3 J	0.900 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Deep GW Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID		SJS4-MW01D			SJS4-MW03D				
Sample ID	SJS04-GW1D-001	SJS04-GW1D-002	SJS04-GW1D-003	SJS04-GW3D-001	SJS04-GW3D-001P	SJS04-GW3D-002	SJS04-GW3D-002P	SJS04-GW3D-003	
Sample Date	07/30/97	11/03/97	05/18/99	07/30/97	07/30/97	11/03/97	11/03/97	05/18/99	
Chemical Name									
Sodium	NA	481,000	643,000	121,000	109,000	117,000	124,000	224,000	
Thallium	NA	1.5 U	3.20 U	2.5 B	3.8 B	1.5 U	1.5 U	3.20 U	
Vanadium	NA	6.8 U	0.600 U	9 U	9 U	6.8 U	6.8 U	0.600 U	
Zinc	NA	8.7 B	1.90 U	5 U	9.5 B	6.4 B	3.9 UL	6.40 B	
Wet Chemistry (MG/L)									
Phosphorus	NA	0.397	0.140	0.455	0.523	0.6	0.69	0.140	

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Surface Water Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-SW01	SJS4-SW02	SJS4-SW03	SJS4-SW04		SJS4-SW06	SJS4-SW07	
Sample ID	SJS04-SW01-001	SJS04-SW02-001	SJS04-SW03-001	SJS04-SW04-000	SJS04-SW04-000P	SJS04-SW06-001	SJS04-SW07-001	SJS04-SW07-001P
Sample Date	04/13/99	04/13/99	04/13/99	07/15/97	07/15/97	04/15/99	04/22/99	04/22/99
Chemical Name								
Volatile Organic Compounds (UG/L)								
1,1,1-Trichloroethane	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U
1,1-Dichloroethane	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U
1,1-Dichloroethene	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	1 U	1 U	1 U	NA	NA	1 U	1 U	1 U
1,2-Dibromo-3-chloropropane	1 U	1 U	1 U	NA	NA	1 U	1 U	1 U
1,2-Dibromoethane	1 U	1 U	1 U	NA	NA	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	1 U	NA	NA	1 U	1 U	1 U
1,2-Dichloroethane	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U
1,2-Dichloroethene (total)	NA	NA	NA	10 U	10 U	NA	NA	NA
1,2-Dichloropropane	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U	1 U	NA	NA	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	NA	NA	1 U	1 U	1 U
2-Butanone	5 U	5 U	5 U	10 U	10 U	5 U	NA	NA
2-Hexanone	5 U	5 U	5 U	10 U	10 U	5 U	5 U	5 U
4-Methyl-2-pentanone	5 U	5 U	5 U	10 U	10 U	5 U	5 U	5 U
Acetone	5 U	5 U	5 U	8 J	10 UJ	5 U	NA	NA
Benzene	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U
Bromochloromethane	1 U	1 U	1 U	NA	NA	1 U	1 U	1 U
Bromodichloromethane	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U
Bromoform	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U
Bromomethane	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U
Carbon disulfide	13.5 J	13.1 J	0.800 J	10 U	10 U	1 U	11.2 B	0.200 B
Carbon tetrachloride	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U
Chlorobenzene	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U
Chloroethane	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U
Chloroform	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U
Chloromethane	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U
Dibromochloromethane	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U
Ethylbenzene	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U
Methylene chloride	0.400 B	0.5 B	0.700 B	6 B	6 B	2 U	2 U	0.5 B
Styrene	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U
Tetrachloroethene	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U
Toluene	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Surface Water Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-SW01	SJS4-SW02	SJS4-SW03	SJS4-SW04		SJS4-SW06	SJS4-SW07	
Sample ID	SJS04-SW01-001	SJS04-SW02-001	SJS04-SW03-001	SJS04-SW04-000	SJS04-SW04-000P	SJS04-SW06-001	SJS04-SW07-001	SJS04-SW07-001P
Sample Date	04/13/99	04/13/99	04/13/99	07/15/97	07/15/97	04/15/99	04/22/99	04/22/99
Chemical Name								
Trichloroethene	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U
Vinyl chloride	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U
Xylene, total	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	1 U	1 U	1 U	NA	NA	1 U	1 U	1 U
cis-1,3-Dichloropropene	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	1 U	1 U	1 U	NA	NA	1 U	1 U	1 U
trans-1,3-Dichloropropene	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U
Semi-volatile Organic Compounds (UG/L)								
1,2,4-Trichlorobenzene	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
1,2-Dichlorobenzene	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
1,3-Dichlorobenzene	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
1,4-Dichlorobenzene	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
2,2'-Oxybis(1-chloropropane)	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
2,4,5-Trichlorophenol	29 U	27 U	26 U	25 U	25 U	28 U	28 U	29 U
2,4,6-Trichlorophenol	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
2,4-Dichlorophenol	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
2,4-Dimethylphenol	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
2,4-Dinitrophenol	29 U	27 U	26 U	25 U	25 U	28 U	28 U	29 U
2,4-Dinitrotoluene	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
2,6-Dinitrotoluene	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
2-Chloronaphthalene	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
2-Chlorophenol	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
2-Methylnaphthalene	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
2-Methylphenol	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
2-Nitroaniline	29 U	27 U	26 U	25 U	25 U	28 U	28 U	29 U
2-Nitrophenol	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
3,3'-Dichlorobenzidine	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
3-Nitroaniline	29 U	27 U	26 U	25 U	25 U	28 U	28 U	29 U
4,6-Dinitro-2-methylphenol	29 U	27 U	26 U	25 U	25 U	28 U	28 U	29 U
4-Bromophenyl-phenylether	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
4-Chloro-3-methylphenol	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
4-Chloroaniline	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
4-Chlorophenyl-phenylether	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
4-Methylphenol	11 U	11 U	10 U	13	10 U	11 U	11 U	11 U
4-Nitroaniline	29 U	27 U	26 U	25 U	25 U	28 U	28 U	29 U
4-Nitrophenol	29 U	27 U	26 U	25 U	25 U	28 U	28 U	29 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Surface Water Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-SW01	SJS4-SW02	SJS4-SW03	SJS4-SW04		SJS4-SW06	SJS4-SW07	
Sample ID	SJS04-SW01-001	SJS04-SW02-001	SJS04-SW03-001	SJS04-SW04-000	SJS04-SW04-000P	SJS04-SW06-001	SJS04-SW07-001	SJS04-SW07-001P
Sample Date	04/13/99	04/13/99	04/13/99	07/15/97	07/15/97	04/15/99	04/22/99	04/22/99
Chemical Name								
Acenaphthene	11 U	11 U	10 U	10 U	10 U	11 U	2 J	2 J
Acenaphthylene	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
Anthracene	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
Benzo(a)anthracene	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
Benzo(a)pyrene	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
Benzo(b)fluoranthene	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
Benzo(g,h,i)perylene	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
Benzo(k)fluoranthene	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
Butylbenzylphthalate	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
Carbazole	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
Chrysene	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
Di-n-butylphthalate	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
Di-n-octylphthalate	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
Dibenz(a,h)anthracene	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
Dibenzofuran	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
Diethylphthalate	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
Dimethyl phthalate	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
Fluoranthene	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
Fluorene	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
Hexachlorobenzene	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
Hexachlorobutadiene	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
Hexachlorocyclopentadiene	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
Hexachloroethane	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
Indeno(1,2,3-cd)pyrene	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
Isophorone	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
Naphthalene	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
Nitrobenzene	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
Pentachlorophenol	29 U	27 U	26 U	25 U	25 U	28 U	28 U	29 U
Phenanthrene	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
Phenol	11 U	11 U	10 U	2 J	10 U	11 U	11 U	11 U
Pyrene	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
bis(2-Chloroethoxy)methane	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
bis(2-Chloroethyl)ether	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
bis(2-Ethylhexyl)phthalate	11 U	11 U	10 U	10 U	10 U	11 U	11 U	1 B
n-Nitroso-di-n-propylamine	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U
n-Nitrosodiphenylamine	11 U	11 U	10 U	10 U	10 U	11 U	11 U	11 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Surface Water Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-SW01	SJS4-SW02	SJS4-SW03	SJS4-SW04		SJS4-SW06	SJS4-SW07	
Sample ID	SJS04-SW01-001	SJS04-SW02-001	SJS04-SW03-001	SJS04-SW04-000	SJS04-SW04-000P	SJS04-SW06-001	SJS04-SW07-001	SJS04-SW07-001P
Sample Date	04/13/99	04/13/99	04/13/99	07/15/97	07/15/97	04/15/99	04/22/99	04/22/99
Chemical Name								
Pesticide/Polychlorinated Biphenyls (UG/L)								
4,4'-DDD	0.110 U	0.110 U	0.110 U	0.1 U	0.1 U	0.110 U	0.110 U	0.120 U
4,4'-DDE	0.110 U	0.110 U	0.110 U	0.1 U	0.1 U	0.110 U	0.110 U	0.120 U
4,4'-DDT	0.110 U	0.110 U	0.110 U	0.1 U	0.1 U	0.110 U	0.110 U	0.120 U
Aldrin	0.0540 U	0.0570 U	0.0560 U	0.05 U	0.05 U	0.0560 U	0.0560 U	0.0600 U
Aroclor-1016	1.10 U	1.10 U	1.10 U	1 U	1 U	1.10 U	1.10 U	1.20 U
Aroclor-1221	2.20 U	2.30 U	2.20 U	2 U	2 U	2.20 U	2.20 U	2.40 U
Aroclor-1232	1.10 U	1.10 U	1.10 U	1 U	1 U	1.10 U	1.10 U	1.20 U
Aroclor-1242	1.10 U	1.10 U	1.10 U	1 U	1 U	1.10 U	1.10 U	1.20 U
Aroclor-1248	1.10 U	1.10 U	1.10 U	1 U	1 U	1.10 U	1.10 U	1.20 U
Aroclor-1254	1.10 U	1.10 U	1.10 U	1 U	1 U	1.10 U	1.10 U	1.20 U
Aroclor-1260	1.10 U	1.10 U	1.10 U	1 U	1 U	1.10 U	1.10 U	1.20 U
Dieldrin	0.110 U	0.110 U	0.110 U	0.1 U	0.1 U	0.110 U	0.110 U	0.120 U
Endosulfan I	0.0540 U	0.0570 U	0.0560 U	0.05 U	0.05 U	0.0560 U	0.0560 U	0.0600 U
Endosulfan II	0.110 U	0.110 U	0.110 U	0.1 U	0.1 U	0.110 U	0.110 U	0.120 U
Endosulfan sulfate	0.110 U	0.110 U	0.110 U	0.1 U	0.1 U	0.110 U	0.110 U	0.120 U
Endrin	0.110 U	0.110 U	0.110 U	0.1 U	0.1 U	0.110 U	0.110 U	0.120 U
Endrin aldehyde	0.110 U	0.110 U	0.110 U	0.1 U	0.1 U	0.110 U	0.110 U	0.120 U
Endrin ketone	0.110 U	0.110 U	0.110 U	0.1 U	0.1 U	0.110 U	0.110 U	0.120 U
Heptachlor	0.0540 U	0.0570 U	0.0560 U	0.05 U	0.05 U	0.0560 U	0.0560 U	0.0600 U
Heptachlor epoxide	0.0540 U	0.0570 U	0.0560 U	0.05 U	0.05 U	0.0560 U	0.0560 U	0.0600 U
Methoxychlor	0.540 U	0.570 U	0.560 U	0.5 U	0.5 U	0.560 U	0.560 U	0.600 U
Toxaphene	5.40 U	5.70 U	5.60 U	5 U	5 U	5.60 U	5.60 U	6 U
alpha-BHC	0.0540 U	0.0570 U	0.0560 U	0.05 U	0.05 U	0.0560 U	0.0560 U	0.0600 U
alpha-Chlordane	0.0540 U	0.0570 U	0.0560 U	0.05 U	0.05 U	0.0560 U	0.0560 U	0.0600 U
beta-BHC	0.0540 U	0.0570 U	0.0560 U	0.05 U	0.05 U	0.0560 U	0.0560 U	0.0600 U
delta-BHC	0.0540 U	0.0570 U	0.0560 U	0.05 U	0.05 U	0.0560 U	0.0560 U	0.0600 U
gamma-BHC (Lindane)	0.0540 U	0.0570 U	0.0560 U	0.05 U	0.05 U	0.0560 U	0.0560 U	0.0600 U
gamma-Chlordane	0.0540 U	0.0570 U	0.0560 U	0.05 U	0.05 U	0.0560 U	0.0560 U	0.0600 U
Total Metals (UG/L)								
Aluminum	947 K	138 K	210 K	49,300	50,000	692 K	488	407
Antimony	2.70 U	5.10 B	2.70 U	3.2 J	3.7 J	2.70 U	2.70 U	2.70 U
Arsenic	2 U	8.20 J	9 J	25.3	26.6	2 U	4 J	2 U
Barium	22.3 J	133 J	191 J	313	312	32.8 J	342	356
Beryllium	0.580 J	0.100 U	0.100 U	6	6.8	0.100 U	0.160 J	0.120 J
Cadmium	0.340 J	0.410 J	0.420 J	0.5 U	0.5 U	0.300 U	1 J	0.700 J

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Surface Water Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-SW01	SJS4-SW02	SJS4-SW03	SJS4-SW04		SJS4-SW06	SJS4-SW07	
Sample ID	SJS04-SW01-001	SJS04-SW02-001	SJS04-SW03-001	SJS04-SW04-000	SJS04-SW04-000P	SJS04-SW06-001	SJS04-SW07-001	SJS04-SW07-001P
Sample Date	04/13/99	04/13/99	04/13/99	07/15/97	07/15/97	04/15/99	04/22/99	04/22/99
Chemical Name								
Calcium	270,000	151,000	189,000	288,000	272,000	188,000	317,000	313,000
Chromium	1.10 U	1.10 U	1.10 U	66.6	63.1	1.40 J	1.5 J	1.30 J
Cobalt	22.9 J	1.80 B	14.4 J	34.5 J	43.9 J	0.920 J	1.30 J	1.20 J
Copper	5.60 B	40.2	24.6 J	165	179	9.70 J	65.3	49.1
Cyanide	24.1 L	29.3 L	11 L	5 U	5 U	5 UL	5 U	5 U
Iron	4,150	376	889 J	88,800	93,100	769	12,800	9,520
Lead	1 U	7.60 J	8.5 J	746	822	7.30 J	51.9	39
Magnesium	85,800	15,500	26,400	632,000	598,000	545,000	47,800	47,800
Manganese	2,310	157	734	1,910	1,870	176	1,160	1,120
Mercury	0.100 U	0.160 J	0.100 U	1	1.2	0.100 U	0.370	0.350
Nickel	34.8 J	4.70 J	16.3 J	54.9	64	1.80 J	4.10 J	3.30 J
Potassium	22,300 J	13,500 J	21,200 J	225,000	211,000	202,000 J	22,700	22,500
Selenium	2.60 U	2.60 U	2.60 U	3 U	6 U	2.60 U	2.60 U	2.60 U
Silver	0.900 U	0.900 U	0.900 U	1 U	1 U	0.900 U	0.900 U	0.900 U
Sodium	185,000	16,000	35,700	5,090,000	5,070,000	4,620,000	123,000	120,000
Thallium	3.20 U	3.20 U	3.20 U	2 U	2 U	3.20 U	3.20 U	3.20 U
Vanadium	0.600 U	5.70 B	10.1 J	110	117	4.20 J	2 J	1.70 J
Zinc	124	157	131	1,120	1,160	22.8	224	182
Wet Chemistry (MG/L)								
Alkalinity	NA	NA	NA	498	490	NA	NA	NA
Biological oxygen demand	NA	NA	NA	69	23	NA	NA	NA
Chemical oxygen demand	NA	NA	NA	314	495	NA	NA	NA
Hardness	1,070	338	491	3,320	3,140	1,810	687	675
Phosphorus	0.0220	0.343	0.0200 U	0.05 U	0.21	0.911	0.431	0.424
Total dissolved solids (TDS)	NA	NA	NA	17,300	17,800	NA	NA	NA
Total suspended solids (TSS)	NA	NA	NA	4,780	2,580	NA	NA	NA

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Surface Water Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-SW08	SJS4-SW09	
Sample ID	SJS04-SW08-001	SJS04-SW09-001	SJS04-SW09-001P
Sample Date	04/15/99	10/28/99	10/28/99
Chemical Name			
Volatile Organic Compounds (UG/L)			
1,1,1-Trichloroethane	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U	1 U
1,1-Dichloroethane	1 U	1 U	1 U
1,1-Dichloroethene	1 U	1 U	1 U
1,2,4-Trichlorobenzene	1 U	1 U	1 U
1,2-Dibromo-3-chloropropane	1 U	1 U	1 U
1,2-Dibromoethane	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	1 U
1,2-Dichloroethane	1 U	1 U	1 U
1,2-Dichloroethene (total)	NA	NA	NA
1,2-Dichloropropane	1 U	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U
2-Butanone	5 U	5 U	5 U
2-Hexanone	5 U	5 U	5 U
4-Methyl-2-pentanone	5 U	5 U	5 U
Acetone	5 U	5 U	2.80 B
Benzene	1 U	1 U	1 U
Bromochloromethane	1 U	1 U	1 U
Bromodichloromethane	1 U	1 U	1 U
Bromoform	1 U	1 U	1 U
Bromomethane	1 U	1 U	1 U
Carbon disulfide	1 U	1 U	1 U
Carbon tetrachloride	1 U	1 U	1 U
Chlorobenzene	1 U	1 U	1 U
Chloroethane	1 U	1 U	1 U
Chloroform	1 U	1 U	1 U
Chloromethane	1 U	1 U	1 U
Dibromochloromethane	1 U	1 U	1 U
Ethylbenzene	1 U	1 U	1 U
Methylene chloride	2 U	0.300 B	1 B
Styrene	1 U	1 U	1 U
Tetrachloroethene	1 U	1 U	1 U
Toluene	1 U	1 U	1 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Surface Water Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-SW08		SJS4-SW09			
Sample ID	SJS04-SW08-001		SJS04-SW09-001		SJS04-SW09-001P	
Sample Date	04/15/99		10/28/99		10/28/99	
Chemical Name						
Trichloroethene	1	U	1	U	1	U
Vinyl chloride	1	U	1	U	1	U
Xylene, total	1	U	1	U	1	U
cis-1,2-Dichloroethene	1	U	1	U	1	U
cis-1,3-Dichloropropene	1	U	1	U	1	U
trans-1,2-Dichloroethene	1	U	1	U	1	U
trans-1,3-Dichloropropene	1	U	1	U	1	U
Semi-volatile Organic Compounds (UG/L)						
1,2,4-Trichlorobenzene	12	U	10	U	11	U
1,2-Dichlorobenzene	12	U	10	U	11	U
1,3-Dichlorobenzene	12	U	10	U	11	U
1,4-Dichlorobenzene	12	U	10	U	11	U
2,2'-Oxybis(1-chloropropane)	12	U	10	U	11	U
2,4,5-Trichlorophenol	29	U	26	U	26	U
2,4,6-Trichlorophenol	12	U	10	U	11	U
2,4-Dichlorophenol	12	U	10	U	11	U
2,4-Dimethylphenol	12	U	10	U	11	U
2,4-Dinitrophenol	29	U	26	U	26	U
2,4-Dinitrotoluene	12	U	10	U	11	U
2,6-Dinitrotoluene	12	U	10	U	11	U
2-Chloronaphthalene	12	U	10	U	11	U
2-Chlorophenol	12	U	10	U	11	U
2-Methylnaphthalene	12	U	10	U	11	U
2-Methylphenol	12	U	10	U	11	U
2-Nitroaniline	29	U	26	U	26	U
2-Nitrophenol	12	U	10	U	11	U
3,3'-Dichlorobenzidine	12	U	10	U	11	U
3-Nitroaniline	29	U	26	U	26	U
4,6-Dinitro-2-methylphenol	29	U	26	U	26	U
4-Bromophenyl-phenylether	12	U	10	U	11	U
4-Chloro-3-methylphenol	12	U	10	U	11	U
4-Chloroaniline	12	U	10	U	11	U
4-Chlorophenyl-phenylether	12	U	10	U	11	U
4-Methylphenol	12	U	10	U	11	U
4-Nitroaniline	29	U	26	U	26	U
4-Nitrophenol	29	U	26	U	26	U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Surface Water Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-SW08	SJS4-SW09	
Sample ID	SJS04-SW08-001	SJS04-SW09-001	SJS04-SW09-001P
Sample Date	04/15/99	10/28/99	10/28/99
Chemical Name			
Acenaphthene	12 U	10 U	11 U
Acenaphthylene	12 U	10 U	11 U
Anthracene	12 U	10 U	11 U
Benzo(a)anthracene	12 U	10 U	11 U
Benzo(a)pyrene	12 U	10 U	11 U
Benzo(b)fluoranthene	12 U	10 U	11 U
Benzo(g,h,i)perylene	12 U	10 U	3 J
Benzo(k)fluoranthene	12 U	10 U	11 U
Butylbenzylphthalate	12 U	10 U	11 U
Carbazole	12 U	10 U	11 U
Chrysene	12 U	10 U	11 U
Di-n-butylphthalate	12 U	5 B	5 B
Di-n-octylphthalate	12 U	10 U	11 U
Dibenz(a,h)anthracene	12 U	10 U	3 J
Dibenzofuran	12 U	10 U	11 U
Diethylphthalate	12 U	10 U	11 U
Dimethyl phthalate	12 U	10 U	11 U
Fluoranthene	12 U	10 U	11 U
Fluorene	12 U	10 U	11 U
Hexachlorobenzene	12 U	10 U	11 U
Hexachlorobutadiene	12 U	10 U	11 U
Hexachlorocyclopentadiene	12 U	10 U	11 U
Hexachloroethane	12 U	10 U	11 U
Indeno(1,2,3-cd)pyrene	12 U	10 U	2 J
Isophorone	12 U	10 U	11 U
Naphthalene	12 U	10 U	11 U
Nitrobenzene	12 U	10 U	11 U
Pentachlorophenol	29 U	26 U	26 U
Phenanthrene	12 U	10 U	11 U
Phenol	12 U	10 U	11 U
Pyrene	12 U	10 U	11 U
bis(2-Chloroethoxy)methane	12 U	10 U	11 U
bis(2-Chloroethyl)ether	12 U	10 U	11 U
bis(2-Ethylhexyl)phthalate	12 U	10 U	11 U
n-Nitroso-di-n-propylamine	12 U	10 U	11 U
n-Nitrosodiphenylamine	12 U	10 U	11 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Surface Water Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-SW08	SJS4-SW09	
Sample ID	SJS04-SW08-001	SJS04-SW09-001	SJS04-SW09-001P
Sample Date	04/15/99	10/28/99	10/28/99
Chemical Name			
Pesticide/Polychlorinated Biphenyls (UG/L)			
4,4'-DDD	0.110 U	0.100 U	0.110 U
4,4'-DDE	0.110 U	0.100 U	0.110 U
4,4'-DDT	0.110 U	0.100 U	0.110 U
Aldrin	0.0560 U	0.0520 U	0.0560 U
Aroclor-1016	1.10 U	1 U	1.10 U
Aroclor-1221	2.20 U	2.10 U	2.20 U
Aroclor-1232	1.10 U	1 U	1.10 U
Aroclor-1242	1.10 U	1 U	1.10 U
Aroclor-1248	1.10 U	1 U	1.10 U
Aroclor-1254	1.10 U	1 U	1.10 U
Aroclor-1260	1.10 U	1 U	1.10 U
Dieldrin	0.110 U	0.100 U	0.110 U
Endosulfan I	0.0560 U	0.0520 U	0.0560 U
Endosulfan II	0.110 U	0.100 U	0.110 U
Endosulfan sulfate	0.110 U	0.100 U	0.110 U
Endrin	0.110 U	0.100 U	0.110 U
Endrin aldehyde	0.110 U	0.100 U	0.110 U
Endrin ketone	0.110 U	0.100 U	0.110 U
Heptachlor	0.0560 U	0.0520 U	0.0560 U
Heptachlor epoxide	0.0560 U	0.0520 U	0.0560 U
Methoxychlor	0.560 U	0.520 U	0.560 U
Toxaphene	5.60 U	5.20 U	5.60 U
alpha-BHC	0.0560 U	0.0520 U	0.0560 U
alpha-Chlordane	0.0560 U	0.0520 U	0.0560 U
beta-BHC	0.0560 U	0.0520 U	0.0560 U
delta-BHC	0.0560 U	0.0520 U	0.0560 U
gamma-BHC (Lindane)	0.0560 U	0.0520 U	0.0560 U
gamma-Chlordane	0.0560 U	0.0520 U	0.0560 U
Total Metals (UG/L)			
Aluminum	2,180 K	878	840
Antimony	2.70 U	3 J	2.80 U
Arsenic	2 U	3.70 J	5.40 J
Barium	23.1 J	60.6 J	52.4 J
Beryllium	0.140 J	0.200 U	0.200 U
Cadmium	0.300 U	0.300 U	0.300 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Surface Water Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-SW08	SJS4-SW09	
Sample ID	SJS04-SW08-001	SJS04-SW09-001	SJS04-SW09-001P
Sample Date	04/15/99	10/28/99	10/28/99
Chemical Name			
Calcium	158,000	117,000	118,000
Chromium	3 J	0.600 U	0.600 U
Cobalt	1.80 J	0.950 J	1.40 J
Copper	11.6 J	7.80 J	7.60 J
Cyanide	5 UL	8.5	8.5
Iron	2,990	1,540	1,400
Lead	13.3 J	2.70 J	3.2
Magnesium	175,000	323,000	342,000
Manganese	274	111	96.6
Mercury	0.100 U	0.100 U	0.100 U
Nickel	6.5 J	1 J	1.30 J
Potassium	71,300 J	111,000	115,000
Selenium	2.60 U	3.10 U	3.10 U
Silver	0.900 U	0.700 U	1.10 J
Sodium	1,410,000	2,790,000	2,870,000
Thallium	3.20 U	5.20 U	5.20 U
Vanadium	5.40 J	2.90 J	3.5 J
Zinc	34.2	30.3	32.8
Wet Chemistry (MG/L)			
Alkalinity	NA	NA	NA
Biological oxygen demand	NA	NA	NA
Chemical oxygen demand	NA	NA	NA
Hardness	884	NA	NA
Phosphorus	0.0630	0.0200 U	NA
Total dissolved solids (TDS)	NA	NA	NA
Total suspended solids (TSS)	NA	NA	NA

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Sediment Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-SD01	SJS4-SD02	SJS4-SD03	SJS4-SD04	SJS4-SD05	SJS4-SD06	SJS4-SD07	SJS4-SD08	SJS4-SD09	
Sample ID	SJS04-SD01-000	SJS04-SD02-000	SJS04-SD03-000	SJS04-SD04-000	SJS04-SD05-001	SJS04-SD06-001	SJS04-SD07-001	SJS04-SD08-001	SJS04-SD09-001	SJS04-SD09-001P
Sample Date	07/14/97	06/26/97	07/14/97	07/15/97	04/22/99	04/15/99	04/22/99	04/15/99	10/28/99	10/28/99
Chemical Name										
Volatile Organic Compounds (UG/KG)										
1,1,1-Trichloroethane	13 UJ	10 U	13 UJ	31 U	19 UJ	24 U	20 U	30 U	18 U	20 U
1,1,2,2-Tetrachloroethane	13 UJ	10 U	13 UJ	31 U	19 UJ	24 U	20 U	30 U	18 U	20 U
1,1,2-Trichloroethane	13 UJ	10 U	13 UJ	31 U	19 UJ	24 U	20 U	30 U	18 U	20 U
1,1-Dichloroethane	13 UJ	10 U	13 U	31 U	19 U	24 U	20 U	30 U	18 U	20 U
1,1-Dichloroethene	13 UJ	10 U	13 U	31 U	19 U	24 U	20 U	30 U	18 U	20 U
1,2-Dichloroethane	13 UJ	10 U	13 U	31 U	19 U	24 U	20 U	30 U	18 U	20 U
1,2-Dichloroethene (total)	13 UJ	10 U	13 U	31 U	19 U	24 U	20 U	30 U	18 U	20 U
1,2-Dichloropropane	13 UJ	10 U	13 UJ	31 U	19 UJ	24 U	20 U	30 U	18 U	20 U
2-Butanone	13 UJ	10 U	13 U	31 U	37 B	24 U	32 B	30 U	18 U	20 U
2-Hexanone	13 UJ	10 U	13 UJ	31 U	19 UJ	24 U	20 U	30 U	18 U	20 U
4-Methyl-2-pentanone	13 UJ	10 U	13 UJ	31 U	19 UJ	24 U	20 U	30 U	18 U	20 U
Acetone	13 UJ	7 J	13 UJ	140	52	24 U	16 J	39 J	18 U	NA
Benzene	13 UJ	10 U	13 UJ	31 U	19 UJ	24 U	20 U	30 U	18 U	20 U
Bromodichloromethane	13 UJ	10 U	13 UJ	31 U	19 UJ	24 U	20 U	30 U	18 U	20 U
Bromoform	13 UJ	10 U	13 UJ	31 U	19 UJ	24 U	20 U	30 U	18 U	20 U
Bromomethane	13 UJ	10 U	13 U	31 U	19 U	24 U	20 U	30 U	18 U	20 U
Carbon disulfide	13 UJ	10 U	13 U	19 J	19 U	10 J	7 J	11 J	13 B	15 B
Carbon tetrachloride	13 UJ	10 U	13 UJ	31 U	19 UJ	24 U	20 U	30 U	18 U	20 U
Chlorobenzene	13 UJ	10 U	13 UJ	31 U	19 UJ	24 U	20 U	30 U	18 U	20 U
Chloroethane	13 UJ	10 U	13 U	31 U	19 U	24 U	20 U	30 U	18 U	20 U
Chloroform	13 UJ	10 U	13 U	31 U	19 U	24 U	20 U	30 U	18 U	20 U
Chloromethane	13 UJ	10 U	13 U	31 U	19 U	24 U	20 U	30 U	18 U	20 U
Dibromochloromethane	13 UJ	10 U	13 UJ	31 U	19 UJ	24 U	20 U	30 U	18 U	20 U
Ethylbenzene	13 UJ	10 U	13 UJ	31 U	19 UJ	24 U	20 U	30 U	18 U	20 U
Methylene chloride	57 B	39 B	200 B	64 B	23 B	3 B	26 B	3 B	13 B	11 B
Styrene	13 UJ	10 U	13 UJ	31 U	19 UJ	24 U	20 U	30 U	18 U	20 U
Tetrachloroethene	13 UJ	10 U	13 UJ	31 U	19 UJ	24 U	20 U	30 U	18 U	20 U
Toluene	13 UJ	10 U	13 UJ	31 U	19 UJ	6 J	20 U	15 J	18 U	20 U
Trichloroethene	13 UJ	10 U	13 UJ	31 U	19 UJ	24 U	20 U	30 U	18 U	20 U
Vinyl chloride	13 UJ	10 U	13 U	31 U	19 U	24 U	20 U	30 U	18 U	20 U
Xylene, total	13 UJ	10 U	13 UJ	31 U	19 UJ	24 U	20 U	30 U	18 U	20 U
cis-1,3-Dichloropropene	13 UJ	10 U	13 UJ	31 U	19 UJ	24 U	20 U	30 U	18 U	20 U
trans-1,3-Dichloropropene	13 UJ	10 U	13 UJ	31 U	19 UJ	24 U	20 U	30 U	18 U	20 U
Semi-volatile Organic Compounds (UG/KG)										
1,2,4-Trichlorobenzene	420 U	2,000 U	570 U	570 U	620 UJ	790 U	680 UJ	1,000 U	NA	NA
1,2-Dichlorobenzene	420 U	2,000 U	570 U	570 U	620 UJ	790 U	680 UJ	1,000 U	NA	NA
1,3-Dichlorobenzene	420 U	2,000 U	570 U	570 U	620 UJ	790 U	680 UJ	1,000 U	NA	NA

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
U - Analyte not detected

Appendix H
Sediment Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-SD01	SJS4-SD02	SJS4-SD03	SJS4-SD04	SJS4-SD05	SJS4-SD06	SJS4-SD07	SJS4-SD08	SJS4-SD09	
Sample ID	SJS04-SD01-000	SJS04-SD02-000	SJS04-SD03-000	SJS04-SD04-000	SJS04-SD05-001	SJS04-SD06-001	SJS04-SD07-001	SJS04-SD08-001	SJS04-SD09-001	SJS04-SD09-001P
Sample Date	07/14/97	06/26/97	07/14/97	07/15/97	04/22/99	04/15/99	04/22/99	04/15/99	10/28/99	10/28/99
Chemical Name										
1,4-Dichlorobenzene	420 U	2,000 U	570 U	570 U	620 UJ	790 U	680 UJ	1,000 U	NA	NA
2,2'-Oxybis(1-chloropropane)	420 U	2,000 U	570 U	570 U	620 UJ	790 U	680 UJ	1,000 U	NA	NA
2,4,5-Trichlorophenol	1,000 U	5,100 U	1,400 U	1,400 U	1,500 UJ	2,000 U	1,700 UJ	2,500 U	NA	NA
2,4,6-Trichlorophenol	420 U	2,000 U	570 U	570 U	620 UJ	790 U	680 UJ	1,000 U	NA	NA
2,4-Dichlorophenol	420 U	2,000 U	570 U	570 U	620 UJ	790 U	680 UJ	1,000 U	NA	NA
2,4-Dimethylphenol	420 U	2,000 U	570 U	570 U	620 UJ	790 U	680 UJ	1,000 U	NA	NA
2,4-Dinitrophenol	1,000 U	5,100 U	1,400 U	1,400 U	1,500 UJ	2,000 U	1,700 UJ	2,500 U	NA	NA
2,4-Dinitrotoluene	420 U	2,000 U	570 U	570 U	620 UJ	790 U	680 UJ	1,000 U	NA	NA
2,6-Dinitrotoluene	420 U	2,000 U	570 U	570 U	620 UJ	790 U	680 UJ	1,000 U	NA	NA
2-Chloronaphthalene	420 U	2,000 U	570 U	570 U	620 UJ	790 U	680 UJ	1,000 U	NA	NA
2-Chlorophenol	420 U	2,000 U	570 U	570 U	620 UJ	790 U	680 UJ	1,000 U	NA	NA
2-Methylnaphthalene	48 J	2,000 U	140 J	570 U	620 UJ	790 U	680 UJ	1,000 U	NA	NA
2-Methylphenol	420 U	2,000 U	570 U	570 U	620 UJ	790 U	680 UJ	1,000 U	NA	NA
2-Nitroaniline	1,000 U	5,100 U	1,400 U	1,400 U	1,500 UJ	2,000 U	1,700 UJ	2,500 U	NA	NA
2-Nitrophenol	420 U	2,000 U	570 U	570 U	620 UJ	790 U	680 UJ	1,000 U	NA	NA
3,3'-Dichlorobenzidine	420 UJ	2,000 U	570 UJ	570 UJ	620 UJ	790 U	680 UJ	1,000 U	NA	NA
3-Nitroaniline	1,000 U	5,100 U	1,400 U	1,400 U	1,500 UJ	2,000 U	1,700 UJ	2,500 U	NA	NA
4,6-Dinitro-2-methylphenol	1,000 U	5,100 U	1,400 U	1,400 U	1,500 UJ	2,000 U	1,700 UJ	2,500 U	NA	NA
4-Bromophenyl-phenylether	420 U	2,000 U	570 U	570 U	620 UJ	790 U	680 UJ	1,000 U	NA	NA
4-Chloro-3-methylphenol	420 U	2,000 U	570 U	570 U	620 UJ	790 U	680 UJ	1,000 U	NA	NA
4-Chloroaniline	420 U	2,000 U	570 U	570 U	620 UJ	790 U	680 UJ	1,000 U	NA	NA
4-Chlorophenyl-phenylether	420 U	2,000 U	570 U	570 U	620 UJ	790 U	680 UJ	1,000 U	NA	NA
4-Methylphenol	420 U	2,000 U	570 U	570 U	620 UJ	790 U	680 UJ	1,000 U	NA	NA
4-Nitroaniline	1,000 U	5,100 U	1,400 U	1,400 U	1,500 UJ	2,000 U	1,700 UJ	2,500 U	NA	NA
4-Nitrophenol	1,000 U	5,100 U	1,400 U	1,400 U	1,500 UJ	2,000 U	1,700 UJ	2,500 U	NA	NA
Acenaphthene	420 U	2,000 U	570 U	570 U	620 UJ	790 U	680 UJ	1,000 U	NA	NA
Acenaphthylene	53 J	2,000 U	570 U	70 J	620 UJ	790 U	680 UJ	1,000 U	NA	NA
Anthracene	57 J	2,000 U	570 U	200 J	620 UJ	790 U	680 UJ	1,000 U	NA	110 L
Benzo(a)anthracene	270 J	370 J	200 J	1,300	620 UJ	570 J	78 J	430 J	190 L	510 L
Benzo(a)pyrene	250 J	360 J	210 J	1,200	620 UJ	500 J	71 J	330 J	180 L	430 L
Benzo(b)fluoranthene	780	490 J	300 J	1,900	620 UJ	860	150 J	710 J	300 L	540 L
Benzo(g,h,i)perylene	110 J	240 J	83 J	290 J	620 UJ	340 J	680 UJ	310 J	NA	280 L
Benzo(k)fluoranthene	320 J	200 J	290 J	1,100	620 UJ	380 J	680 UJ	290 J	93 L	230 L
Butylbenzylphthalate	420 U	2,000 U	570 U	58 J	620 UJ	790 U	680 UJ	1,000 U	NA	NA
Carbazole	420 U	2,000 U	570 U	570 U	620 UJ	790 U	680 UJ	1,000 U	NA	NA
Chrysene	440	440 J	290 J	1,200	620 UJ	580 J	110 J	560 J	220 L	530 L
Di-n-butylphthalate	58 J	2,000 U	67 J	570 U	620 UJ	790 U	680 UJ	1,000 U	NA	NA
Di-n-octylphthalate	420 U	2,000 U	570 U	570 U	620 UJ	790 U	680 UJ	1,000 U	120 L	NA
Dibenz(a,h)anthracene	420 U	2,000 U	570 U	150 J	620 UJ	120 J	680 UJ	110 J	NA	110 L
Dibenzofuran	420 U	2,000 U	63 J	570 U	620 UJ	790 U	680 UJ	1,000 U	NA	NA

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Sediment Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-SD01	SJS4-SD02	SJS4-SD03	SJS4-SD04	SJS4-SD05	SJS4-SD06	SJS4-SD07	SJS4-SD08	SJS4-SD09	
Sample ID	SJS04-SD01-000	SJS04-SD02-000	SJS04-SD03-000	SJS04-SD04-000	SJS04-SD05-001	SJS04-SD06-001	SJS04-SD07-001	SJS04-SD08-001	SJS04-SD09-001	SJS04-SD09-001P
Sample Date	07/14/97	06/26/97	07/14/97	07/15/97	04/22/99	04/15/99	04/22/99	04/15/99	10/28/99	10/28/99
Chemical Name										
Diethylphthalate	420 U	300 J	570 U	570 U	620 UJ	790 U	680 UJ	1,000 U	NA	NA
Dimethyl phthalate	420 U	2,000 U	570 U	570 U	620 UJ	790 U	680 UJ	1,000 U	NA	NA
Fluoranthene	320 J	710 J	370 J	2,800	620 UJ	830	200 J	580 J	250 L	NA
Fluorene	420 U	2,000 U	570 U	570 U	620 UJ	790 U	680 UJ	1,000 U	NA	NA
Hexachlorobenzene	420 U	2,000 U	570 U	570 U	620 UJ	790 U	680 UJ	1,000 U	NA	NA
Hexachlorobutadiene	420 U	2,000 U	570 U	570 U	620 UJ	790 U	680 UJ	1,000 U	NA	NA
Hexachlorocyclopentadiene	420 U	2,000 U	570 U	570 U	620 UJ	790 U	680 UJ	1,000 U	NA	NA
Hexachloroethane	420 U	2,000 U	570 U	570 U	620 UJ	790 U	680 UJ	1,000 U	NA	NA
Indeno(1,2,3-cd)pyrene	170 J	230 J	85 J	370 J	620 UJ	350 J	680 UJ	320 J	NA	260 L
Isophorone	420 U	2,000 U	570 U	570 U	620 UJ	790 U	680 UJ	1,000 U	NA	NA
Naphthalene	58 J	2,000 U	100 J	100 J	620 UJ	790 U	680 UJ	1,000 U	NA	NA
Nitrobenzene	420 U	2,000 U	570 U	570 U	620 UJ	790 U	680 UJ	1,000 U	NA	NA
Pentachlorophenol	1,000 U	5,100 U	1,400 U	1,400 U	1,500 UJ	2,000 U	1,700 UJ	2,500 U	NA	NA
Phenanthrene	140 J	400 J	270 J	160 J	620 UJ	790 U	86 J	150 J	120 L	350 L
Phenol	420 U	2,000 U	570 U	570 U	620 UJ	790 U	680 UJ	1,000 U	NA	NA
Pyrene	270 J	790 J	370 J	2,800	620 UJ	580 J	160 J	450 J	290 L	640 L
bis(2-Chloroethoxy)methane	420 U	2,000 U	570 U	570 U	620 UJ	790 U	680 UJ	1,000 U	NA	NA
bis(2-Chloroethyl)ether	420 U	2,000 U	570 U	570 U	620 UJ	790 U	680 UJ	1,000 U	NA	NA
bis(2-Ethylhexyl)phthalate	63 B	960 B	300 B	160 B	620 UJ	790 U	680 UJ	1,000 U	140 L	NA
n-Nitroso-di-n-propylamine	420 U	2,000 U	570 U	570 U	620 UJ	790 U	680 UJ	1,000 U	NA	NA
n-Nitrosodiphenylamine	420 U	2,000 U	570 U	570 U	620 UJ	790 U	680 UJ	1,000 U	NA	NA
Pesticide/Polychlorinated Biphenyls (UG/KG)										
4,4'-DDD	220	4.9	5.7 U	5.7 J	61	8 U	1.40 J	1.70 J	1.70 L	NA
4,4'-DDE	31	18	6.8 J	6.3 J	13	8 U	6.80 U	1.5 J	0.470 L	0.380 L
4,4'-DDT	38 J	6.2 J	5.7 U	5.6 U	6.10 U	8 U	6.80 U	10 U	1.10 L	2.70 L
Aldrin	2.2 U	2.1 U	2.9 U	2.9 U	3.10 U	4 U	3.40 U	5 U	NA	NA
Aroclor-1016	42 U	40 U	57 U	56 U	61 U	80 U	68 U	100 U	NA	NA
Aroclor-1221	85 U	82 U	120 U	110 U	120 U	160 U	140 U	200 U	NA	NA
Aroclor-1232	42 U	40 U	57 U	56 U	61 U	80 U	68 U	100 U	NA	NA
Aroclor-1242	42 U	40 U	57 U	56 U	61 U	80 U	68 U	100 U	NA	NA
Aroclor-1248	42 U	40 U	57 U	56 U	61 U	80 U	68 U	100 U	NA	NA
Aroclor-1254	42 U	40 U	57 U	56 U	61 U	80 U	68 U	100 U	NA	NA
Aroclor-1260	32 J	90 J	72	31 J	61 U	80 U	68 U	100 U	NA	NA
Dieldrin	4.2 U	23	6 J	5.6 U	6.10 U	8 U	6.80 U	10 U	0.630 L	NA
Endosulfan I	2.2 U	2.1 U	2.9 U	2.9 U	3.10 U	4 U	3.40 U	5 U	NA	NA
Endosulfan II	4.2 U	4 U	5.7 U	5.6 U	6.10 U	8 U	6.80 U	10 U	NA	NA
Endosulfan sulfate	4.2 U	4 U	5.7 U	5.6 U	6.10 U	8 U	6.80 U	10 U	NA	NA
Endrin	4.2 U	4 U	5.7 U	5.6 U	6.10 U	8 U	6.80 U	10 U	NA	NA
Endrin aldehyde	4.2 U	4 U	5.7 U	5.6 U	6.10 U	8 U	6.80 U	10 U	NA	NA

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
U - Analyte not detected

Appendix H
Sediment Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-SD01	SJS4-SD02	SJS4-SD03	SJS4-SD04	SJS4-SD05	SJS4-SD06	SJS4-SD07	SJS4-SD08	SJS4-SD09	
Sample ID	SJS04-SD01-000	SJS04-SD02-000	SJS04-SD03-000	SJS04-SD04-000	SJS04-SD05-001	SJS04-SD06-001	SJS04-SD07-001	SJS04-SD08-001	SJS04-SD09-001	SJS04-SD09-001P
Sample Date	07/14/97	06/26/97	07/14/97	07/15/97	04/22/99	04/15/99	04/22/99	04/15/99	10/28/99	10/28/99
Chemical Name										
Endrin ketone	4.2 U	4 U	5.7 U	5.6 U	6.10 U	8 U	6.80 U	10 U	NA	NA
Heptachlor	2.2 U	2.1 U	2.9 U	2.9 U	3.10 U	4 U	3.40 U	5 U	NA	NA
Heptachlor epoxide	2.2 U	2.1 U	2.9 U	2.9 U	3.10 U	4 U	3.40 U	5 U	NA	NA
Methoxychlor	22 U	21 U	29 U	29 U	31 U	40 U	34 U	50 U	NA	NA
Toxaphene	220 U	210 U	290 U	290 U	310 U	400 U	340 U	500 U	NA	NA
alpha-BHC	2.2 U	2.1 U	2.9 U	2.9 U	3.10 U	4 U	3.40 U	5 U	NA	NA
alpha-Chlordane	2.2 U	2.1 U	2.9 U	2.9 U	3.10 U	4 U	3.40 U	5 U	NA	NA
beta-BHC	2.2 U	2.1 U	2.9 U	2.9 U	3.10 U	4 U	3.40 U	5 U	NA	NA
delta-BHC	2.2 U	2.1 U	2.9 U	2.9 U	3.10 U	4 U	3.40 U	5 U	NA	NA
gamma-BHC (Lindane)	2.2 U	2.1 U	2.9 U	2.9 U	3.10 U	4 U	3.40 U	5 U	NA	NA
gamma-Chlordane	2.2 U	2.1 U	2.9 U	2.9 U	3.10 U	4 U	3.40 U	5 U	NA	NA
Total Metals (MG/KG)										
Aluminum	20,300	7,350	10,000	22,100	15,200	14,800	10,200	16,600	6,290	6,430
Antimony	1 B	2.1 L	1.9 B	1.9 B	0.860 U	0.970 U	1 U	1.20 U	0.780 U	0.790 U
Arsenic	3.9	9.7	33.1	16.3	12.9	16.3 J	12.1	14.7 J	7.6	7.3
Barium	57.7	63.2	185	79.2 J	34.4 J	41.7 J	903	74 J	261	340
Beryllium	3.9	0.5 J	1.3 J	2.7 J	3	0.960 J	0.660 J	2.10 J	0.540 J	0.580 J
Cadmium	0.12 U	0.26 J	0.84 J	0.33 U	1.30 J	0.440 J	1.40 J	2 J	0.300 J	0.410 J
Calcium	1,500	8,790 J	18,300	4,390	2,350	1,800	11,000	2,510	1,810	4,310
Chromium	21.5	21.3	31	38.8	13.1	29	23.9	31.4	16.9	16.5
Cobalt	10.6 J	6.3 J	23.3	22.5 J	32.7	8.20 J	6.80 J	15 J	4.70 J	5.20 J
Copper	71.1	191	387	73	33.6	39.8 J	48.8	94.4 J	41.4	58.1
Cyanide	0.65 U	0.63 U	0.84 U	1.7 U	0.396 U	0.570 UL	0.431 U	2.90 L	0.420 U	0.460 U
Iron	56,000	10,500	17,900	48,600	17,500	28,100	31,900	32,600	18,100	19,400
Lead	92.5	155	441	426	38.9	64.3 J	114	122 J	57.8	81.5
Magnesium	1,650	1,220 J	1,970	6,740	988 J	5,050	3,690	5,070	2,670	2,810
Manganese	178 K	75.2	877 K	364 K	201	257	330	232	161	162
Mercury	0.65	2.1	6.4	0.4	0.110	0.450	0.330	0.410	0.23	0.26
Nickel	20.2	17.6	43.9	34.9	41.4	16.2	13.4 J	27.9	9.60 J	10.7 J
Potassium	1,400	779 J	1,280 J	3,850	752 J	2,940	2,070	2,600	1,300 J	1,410
Selenium	0.74 UL	0.6 U	0.89 UL	2.01 UL	0.990 J	1.30 J	1.60 J	1.5 J	1.20 J	0.880 J
Silver	0.44 J	0.47 B	1 J	0.79 J	0.290 U	0.320 U	0.350 J	0.410 U	0.200 U	0.200 U
Sodium	251 J	202 B	239 J	11,800 B	678 J	6,580	3,250	11,000	4,460	4,600
Thallium	0.5 U	0.46 J	0.6 U	1.34 U	1 U	1.20 U	1.20 U	1.5 U	1.40 U	1.5 U
Vanadium	32.1	36.5	88.5	57	16	33.1	30.7	38.8	18.2	19.9
Zinc	270	457 L	624	436	261	147	346	428	149	191
Wet Chemistry (MG/KG)										
% Solids	NA	NA	NA	NA	54.4	41.5	48.7	32.8	NA	NA

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
U - Analyte not detected

Appendix H
Sediment Analytical Results
at
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS4-SD01	SJS4-SD02	SJS4-SD03	SJS4-SD04	SJS4-SD05	SJS4-SD06	SJS4-SD07	SJS4-SD08	SJS4-SD09	
Sample ID	SJS04-SD01-000	SJS04-SD02-000	SJS04-SD03-000	SJS04-SD04-000	SJS04-SD05-001	SJS04-SD06-001	SJS04-SD07-001	SJS04-SD08-001	SJS04-SD09-001	SJS04-SD09-001P
Sample Date	07/14/97	06/26/97	07/14/97	07/15/97	04/22/99	04/15/99	04/22/99	04/15/99	10/28/99	10/28/99
Chemical Name										
Phosphorus	5.1	4.8	8.3	28	NA	96	NA	223	NA	NA
Total organic carbon (TOC)	26,600	28,400 L	159,000	48,300	33,900	31,300	31,300	66,600	NA	NA
pH	NA	NA	NA	NA	7.46	7.29	7.66	7.51	NA	NA

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
U - Analyte not detected

Appendix H
Surface Soil Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SS01	SJS5-SS02	SJS5-SS03	SJS5-SS04	SJS5-SS05	SJS5-SS06	SJS5-SS07		SJS5-SS08	SJS5-SS09
Sample ID	SJS05-SS01-000	SJS05-SS02-000	SJS05-SS03-000	SJS05-SS04-000	SJS05-SS05-000	SJS05-SS06-000	SJS05-SS07-000	SJS05-SS07-000P	SJS05-SS08-000	SJS05-SS09-000
Sample Date	06/24/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97
Chemical Name										
Volatile Organic Compounds (UG/KG)										
1,1,1-Trichloroethane	11 UJ	11 U	11 U	10 U	11 U	10 U	11 U	NA	10 U	11 U
1,1,2,2-Tetrachloroethane	11 UJ	11 U	11 UJ	10 U	11 U	10 U	11 U	NA	10 U	11 UJ
1,1,2-Trichloroethane	11 UJ	11 U	11 U	10 U	11 U	10 U	11 U	NA	10 U	11 U
1,1-Dichloroethane	11 UJ	11 U	11 U	10 U	11 U	10 U	11 U	NA	10 U	11 U
1,1-Dichloroethene	11 UJ	11 U	11 U	10 U	11 U	10 U	11 U	NA	10 U	11 U
1,2-Dichloroethane	11 UJ	11 U	11 U	10 U	11 U	10 U	11 U	NA	10 U	11 U
1,2-Dichloroethene (total)	11 UJ	11 U	11 U	10 U	11 U	10 U	11 U	NA	1 J	11 U
1,2-Dichloropropane	11 UJ	11 U	11 U	10 U	11 U	10 U	11 U	NA	10 U	11 U
2-Butanone	11 UJ	11 U	11 U	10 U	11 U	210	11 U	NA	10 U	28
2-Hexanone	11 UJ	11 U	11 UJ	10 U	11 U	10 U	11 U	NA	10 U	11 UJ
4-Methyl-2-pentanone	11 UJ	11 U	11 UJ	10 U	11 U	10 U	11 U	NA	10 U	11 UJ
Acetone	11 UJ	11 U	12 J	10 U	14 J	28	11 U	NA	11 J	18 J
Benzene	11 UJ	11 U	11 U	10 U	11 U	10 U	11 U	NA	10 U	11 U
Bromodichloromethane	11 UJ	11 U	11 U	10 U	11 U	10 U	11 U	NA	10 U	11 U
Bromoform	11 UJ	11 U	11 U	10 U	11 U	10 U	11 U	NA	10 U	11 U
Bromomethane	11 UJ	11 U	11 U	10 U	11 U	10 U	11 U	NA	10 U	11 U
Carbon disulfide	11 UJ	11 U	11 U	10 U	11 U	10 U	11 U	NA	10 U	11 U
Carbon tetrachloride	11 UJ	11 U	11 U	10 U	11 U	10 U	11 U	NA	10 U	11 U
Chlorobenzene	11 UJ	11 U	11 UJ	10 U	11 U	10 U	11 U	NA	10 U	11 UJ
Chloroethane	11 UJ	11 U	11 U	10 U	11 U	10 U	11 U	NA	10 U	11 U
Chloroform	11 UJ	11 U	11 U	10 U	11 U	10 U	11 U	NA	10 U	11 U
Chloromethane	11 UJ	11 U	11 U	10 U	11 U	10 U	11 U	NA	10 U	11 U
Dibromochloromethane	11 UJ	11 U	11 U	10 U	11 U	10 U	11 U	NA	10 U	11 U
Ethylbenzene	11 UJ	11 U	11 UJ	10 U	11 U	10 U	11 U	NA	10 U	11 UJ
Methylene chloride	56 B	13 B	44 B	22 B	65 B	18 B	120	NA	59 B	48 B
Styrene	11 UJ	11 U	11 UJ	10 U	11 U	10 U	11 U	NA	10 U	11 UJ
Tetrachloroethene	11 UJ	11 U	11 UJ	10 U	2 J	10 U	11 U	NA	1 J	4 J
Toluene	11 UJ	11 U	11 UJ	10 U	2 J	2 J	11 U	NA	3 J	5 J
Trichloroethene	11 UJ	11 U	11 U	10 U	11 U	10 U	11 U	NA	10 U	11 U
Vinyl chloride	11 UJ	11 U	11 U	10 U	11 U	10 U	11 U	NA	10 U	11 U
Xylene, total	11 UJ	11 U	11 UJ	10 U	3 J	10 U	11 U	NA	10 U	11 UJ
cis-1,3-Dichloropropene	11 UJ	11 U	11 U	10 U	11 U	10 U	11 U	NA	10 U	11 U
trans-1,3-Dichloropropene	11 UJ	11 U	11 U	10 U	11 U	10 U	11 U	NA	10 U	11 U
Semi-volatile Organic Compounds (UG/KG)										
1,2,4-Trichlorobenzene	350 U	370 U	2,000 U	350 U	360 U	330 U	360 U	NA	330 U	370 U
1,2-Dichlorobenzene	350 U	370 U	2,000 U	350 U	360 U	330 U	360 U	NA	330 U	370 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

R - Unreliable result
U - Analyte not detected

Appendix H
Surface Soil Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SS01	SJS5-SS02	SJS5-SS03	SJS5-SS04	SJS5-SS05	SJS5-SS06	SJS5-SS07		SJS5-SS08	SJS5-SS09
Sample ID	SJS05-SS01-000	SJS05-SS02-000	SJS05-SS03-000	SJS05-SS04-000	SJS05-SS05-000	SJS05-SS06-000	SJS05-SS07-000	SJS05-SS07-000P	SJS05-SS08-000	SJS05-SS09-000
Sample Date	06/24/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97
Chemical Name										
1,3-Dichlorobenzene	350 U	370 U	2,000 U	350 U	360 U	330 U	360 U	NA	330 U	370 U
1,4-Dichlorobenzene	350 U	370 U	2,000 U	350 U	360 U	330 U	360 U	NA	330 U	370 U
2,2'-Oxybis(1-chloropropane)	350 U	370 U	2,000 U	350 U	360 U	330 U	360 U	NA	330 U	370 U
2,4,5-Trichlorophenol	880 U	930 U	5,000 U	880 U	900 U	830 U	920 U	NA	830 U	930 U
2,4,6-Trichlorophenol	350 U	370 U	2,000 U	350 U	360 U	330 U	360 U	NA	330 U	370 U
2,4-Dichlorophenol	350 U	370 U	2,000 U	350 U	360 U	330 U	360 U	NA	330 U	370 U
2,4-Dimethylphenol	350 U	370 U	2,000 U	350 U	360 U	330 U	360 U	NA	330 U	370 U
2,4-Dinitrophenol	880 U	930 U	2,000 U	880 U	900 U	830 U	920 U	NA	830 U	930 U
2,4-Dinitrotoluene	580	370 U	3,200	180 J	340 J	330 U	280 J	NA	330 U	370 U
2,6-Dinitrotoluene	39 J	370 U	2,000 U	350 U	360 U	330 U	360 U	NA	330 U	370 U
2-Chloronaphthalene	350 U	370 U	2,000 U	350 U	360 U	330 U	360 U	NA	330 U	370 U
2-Chlorophenol	350 U	370 U	2,000 U	350 U	360 U	330 U	360 U	NA	330 U	370 U
2-Methylnaphthalene	42 J	370 U	2,000 U	350 U	360 U	330 U	360 U	NA	330 U	370 U
2-Methylphenol	350 U	370 U	2,000 U	350 U	360 U	330 U	360 U	NA	330 U	370 U
2-Nitroaniline	880 U	930 U	5,000 U	880 U	900 U	830 U	920 U	NA	830 U	930 U
2-Nitrophenol	350 U	370 U	2,000 U	350 U	360 U	330 U	360 U	NA	330 U	370 U
3,3'-Dichlorobenzidine	350 U	370 U	2,000 U	350 U	360 U	330 U	360 U	NA	330 U	370 U
3-Nitroaniline	880 U	930 U	5,000 U	880 U	900 U	830 U	920 U	NA	830 U	930 U
4,6-Dinitro-2-methylphenol	880 U	930 U	2,000 U	880 U	900 U	830 U	920 U	NA	830 U	930 U
4-Bromophenyl-phenylether	350 U	370 U	2,000 U	350 U	360 U	330 U	360 U	NA	330 U	370 U
4-Chloro-3-methylphenol	350 U	370 U	2,000 U	350 U	360 U	330 U	360 U	NA	330 U	370 U
4-Chloroaniline	350 U	370 U	2,000 U	350 U	360 U	330 U	360 U	NA	330 U	370 U
4-Chlorophenyl-phenylether	350 U	370 U	2,000 U	350 U	360 U	330 U	360 U	NA	330 U	370 U
4-Methylphenol	350 U	370 U	2,000 U	350 U	360 U	330 U	360 U	NA	330 U	370 U
4-Nitroaniline	880 U	930 U	5,000 U	880 U	900 U	830 U	920 U	NA	830 U	930 U
4-Nitrophenol	880 U	930 U	5,000 U	880 U	900 U	830 U	920 U	NA	830 U	930 U
Acenaphthene	350 U	370 U	2,000 U	41 J	360 U	330 U	360 U	NA	330 U	370 U
Acenaphthylene	350 U	47 J	2,000 U	350 U	360 U	35 J	44 J	NA	330 U	370 U
Anthracene	54 J	370 U	2,000 U	51 J	360 U	330 U	49 J	NA	330 U	370 U
Benzo(a)anthracene	390	180 J	810 J	330 J	95 J	220 J	230 J	NA	37 J	400
Benzo(a)pyrene	390	140 J	460 J	290 J	73 J	120 J	190 J	NA	330 U	340 J
Benzo(b)fluoranthene	700	570	1,900 J	480	300 J	560	490	NA	92 J	1,100
Benzo(g,h,i)perylene	270 J	120 J	350 J	160 J	66 J	77 J	120 J	NA	330 U	230 J
Benzo(k)fluoranthene	140 J	200 J	700 J	220 J	78 J	150 J	200 J	NA	330 U	330 J
Butylbenzylphthalate	350 U	370 U	2,000 U	350 U	360 U	330 U	360 U	NA	330 U	370 U
Carbazole	40 J	370 U	2,000 U	350 U	360 U	61 J	360 U	NA	330 U	370 U
Chrysene	390	340 J	1,100 J	370	160 J	450	330 J	NA	56 J	610
Di-n-butylphthalate	180 J	370 U	4,700	38 J	210 J	330 U	160 J	NA	43 J	370 U
Di-n-octylphthalate	350 U	370 U	2,000 U	350 U	360 U	330 U	360 U	NA	330 U	370 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
R - Unreliable result
U - Analyte not detected

Appendix H
Surface Soil Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SS01	SJS5-SS02	SJS5-SS03	SJS5-SS04	SJS5-SS05	SJS5-SS06	SJS5-SS07		SJS5-SS08	SJS5-SS09
Sample ID	SJS05-SS01-000	SJS05-SS02-000	SJS05-SS03-000	SJS05-SS04-000	SJS05-SS05-000	SJS05-SS06-000	SJS05-SS07-000	SJS05-SS07-000P	SJS05-SS08-000	SJS05-SS09-000
Sample Date	06/24/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97
Chemical Name										
Dibenz(a,h)anthracene	350 U	370 U	2,000 U	61 J	360 U	330 U	360 U	NA	330 U	370 U
Dibenzofuran	350 U	370 U	2,000 U	350 U	360 U	330 U	360 U	NA	330 U	370 U
Diethylphthalate	350 U	370 U	2,000 U	350 U	360 U	330 U	360 U	NA	330 U	370 U
Dimethyl phthalate	350 U	370 U	2,000 U	350 U	360 U	330 U	360 U	NA	330 U	370 U
Fluoranthene	520	260 J	2,000 J	470	130 J	790	350 J	NA	63 J	500
Fluorene	350 U	370 U	2,000 U	350 U	360 U	330 U	360 U	NA	330 U	370 U
Hexachlorobenzene	350 U	370 U	2,000 U	350 U	360 U	330 U	360 U	NA	330 U	370 U
Hexachlorobutadiene	350 U	370 U	2,000 U	350 U	360 U	330 U	360 U	NA	330 U	370 U
Hexachlorocyclopentadiene	350 U	370 U	2,000 U	350 U	360 U	330 U	360 U	NA	330 U	370 U
Hexachloroethane	350 U	370 U	2,000 U	350 U	360 U	330 U	360 U	NA	330 U	370 U
Indeno(1,2,3-cd)pyrene	270 J	160 J	540 J	170 J	81 J	110 J	150 J	NA	35 J	260 J
Isophorone	350 U	370 U	2,000 U	350 U	360 U	330 U	360 U	NA	330 U	370 U
Naphthalene	50 J	370 U	2,000 U	350 U	360 U	330 U	360 U	NA	330 U	370 U
Nitrobenzene	350 U	370 U	2,000 U	350 U	360 U	330 U	360 U	NA	330 U	370 U
Pentachlorophenol	880 U	930 U	5,000 U	880 U	900 U	830 U	920 U	NA	830 U	930 U
Phenanthrene	270 J	70 J	260 J	330 J	57 J	230 J	250 J	NA	330 U	79 J
Phenol	350 U	370 U	2,000 U	350 U	360 U	330 U	360 U	NA	330 U	370 U
Pyrene	510	220 J	730 J	610	130 J	560	420	NA	81 J	1,200
bis(2-Chloroethoxy)methane	350 U	370 U	2,000 U	350 U	360 U	330 U	360 U	NA	330 U	370 U
bis(2-Chloroethyl)ether	350 U	370 U	2,000 U	350 U	360 U	330 U	360 U	NA	330 U	370 U
bis(2-Ethylhexyl)phthalate	69 B	56 B	2,000 U	80 B	63 B	1,200 B	86 B	NA	140 B	130 B
n-Nitroso-di-n-propylamine	350 U	370 U	2,000 U	350 U	360 U	330 U	360 U	NA	330 U	370 U
n-Nitrosodiphenylamine	120 J	370 U	530 J	150 J	360 U	330 U	360 U	NA	330 U	370 U
Pesticide/Polychlorinated Biphenyls (UG/KG)										
4,4'-DDD	38 J	66 J	3.9 UJ	9	28 J	3.3 U	36	NA	3.3 U	310 J
4,4'-DDE	400	180	220	39	94	3.3 U	210	NA	3.8 J	2,200
4,4'-DDT	110	600	250	13 J	44 J	3.3 U	50	NA	3.3 U	1,200
Aldrin	1.8 U	1.9 U	2 UJ	1.8 U	1.8 U	1.7 U	1.9 U	NA	1.7 U	19 U
Aroclor-1016	35 U	37 U	39 UJ	35 U	36 U	33 U	36 U	NA	33 U	370 U
Aroclor-1221	71 U	76 U	79 UJ	72 U	73 U	67 U	73 U	NA	67 U	760 U
Aroclor-1232	35 U	37 U	39 UJ	35 U	36 U	33 U	36 U	NA	33 U	370 U
Aroclor-1242	35 U	37 U	39 UJ	35 U	36 U	33 U	36 U	NA	33 U	370 U
Aroclor-1248	35 U	37 U	39 UJ	35 U	36 U	33 U	36 U	NA	33 U	370 U
Aroclor-1254	35 U	37 U	39 UJ	35 U	36 U	33 U	36 U	NA	33 U	370 U
Aroclor-1260	35 U	30 J	39 UJ	35 U	36 U	33 U	36 U	NA	39	370 U
Dieldrin	3.5 U	5 J	3.9 UJ	3.5 U	3.6 U	3.3 U	3.6 U	NA	6.8	37 U
Endosulfan I	1.8 U	1.9 U	2 UJ	1.8 U	1.8 U	1.7 U	1.9 U	NA	1.7 U	19 U
Endosulfan II	3.5 U	3.7 U	3.9 UJ	3.5 U	3.6 U	3.3 U	3.6 U	NA	3.3 U	37 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
R - Unreliable result
U - Analyte not detected

Appendix H
Surface Soil Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SS01	SJS5-SS02	SJS5-SS03	SJS5-SS04	SJS5-SS05	SJS5-SS06	SJS5-SS07		SJS5-SS08	SJS5-SS09
Sample ID	SJS05-SS01-000	SJS05-SS02-000	SJS05-SS03-000	SJS05-SS04-000	SJS05-SS05-000	SJS05-SS06-000	SJS05-SS07-000	SJS05-SS07-000P	SJS05-SS08-000	SJS05-SS09-000
Sample Date	06/24/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97
Chemical Name										
Endosulfan sulfate	3.5 U	3.7 U	3.9 UJ	3.5 U	3.6 U	3.3 U	3.6 U	NA	3.3 U	37 U
Endrin	3.5 U	3.7 U	3.9 UJ	3.5 U	3.6 U	3.3 U	3.6 U	NA	3.3 U	37 U
Endrin aldehyde	3.5 U	3.7 U	3.9 UJ	3.5 U	3.6 U	3.3 U	3.6 U	NA	3.3 U	37 U
Endrin ketone	3.5 U	3.7 U	3.9 UJ	3.5 U	3.6 U	3.3 U	3.6 U	NA	3.3 U	37 U
Heptachlor	1.8 U	1.9 U	2 UJ	1.8 U	1.8 U	1.7 U	1.9 U	NA	1.7 U	19 U
Heptachlor epoxide	1.8 U	1.9 U	2 UJ	1.8 U	1.8 U	1.7 U	1.9 U	NA	1.7 U	19 U
Methoxychlor	18 U	19 U	20 UJ	18 U	18 U	17 U	19 U	NA	17 U	190 U
Toxaphene	180 U	190 U	200 UJ	180 U	180 U	170 U	190 U	NA	170 U	1,900 U
alpha-BHC	1.8 U	1.9 U	2 UJ	1.8 U	1.8 U	1.7 U	1.9 U	NA	3.5	19 U
alpha-Chlordane	1.8 U	1.9 U	2 UJ	1.8 U	1.8 U	1.7 U	1.9 U	NA	2.4 J	19 U
beta-BHC	1.8 U	1.9 U	2 UJ	1.8 U	1.8 U	1.7 U	1.9 U	NA	1.7 U	19 U
delta-BHC	1.8 U	1.9 U	2 UJ	1.8 U	1.8 U	1.7 U	1.9 U	NA	1.7 U	19 U
gamma-BHC (Lindane)	1.8 U	1.9 U	2 UJ	1.8 U	1.8 U	1.7 U	1.9 U	NA	1.7 U	19 U
gamma-Chlordane	1.8 U	1.9 U	2 UJ	1.8 U	1.8 U	1.7 U	1.9 U	NA	2.6 J	19 U
Explosives (UG/KG)										
1,3,5-Trinitrobenzene	NA	NA	NA	NA	NA	NA	530 U	540 U	NA	NA
1,3-Dinitrobenzene	NA	NA	NA	NA	NA	NA	530 U	540 U	NA	NA
2,4,6-Trinitrotoluene	NA	NA	NA	NA	NA	NA	530 U	540 U	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	540 U	NA	NA
2,6-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	540 U	NA	NA
2-Amino-4,6-dinitrotoluene	NA	NA	NA	NA	NA	NA	530 U	540 U	NA	NA
2-Nitrotoluene	NA	NA	NA	NA	NA	NA	530 U	540 U	NA	NA
3-Nitrotoluene	NA	NA	NA	NA	NA	NA	530 U	540 U	NA	NA
4-Amino-2,6-dinitrotoluene	NA	NA	NA	NA	NA	NA	530 U	540 U	NA	NA
4-Nitrotoluene	NA	NA	NA	NA	NA	NA	530 U	540 U	NA	NA
HMX	NA	NA	NA	NA	NA	NA	530 U	540 U	NA	NA
Nitrobenzene	NA	NA	NA	NA	NA	NA	NA	540 U	NA	NA
RDX	NA	NA	NA	NA	NA	NA	530 U	540 U	NA	NA
Tetryl	NA	NA	NA	NA	NA	NA	530 U	540 U	NA	NA
Total Metals (MG/KG)										
% Solids	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aluminum	5,880	12,300	20,200	4,760	8,880	5,270	8,490	NA	5,020	10,300
Antimony	35.4 B	NA	NA	0.6 L	1.1 L	NA	0.98 L	NA	0.6 L	0.51 L
Arsenic	14.6 L	13.3 K	22.7 K	3.8 K	29.3 K	2 K	19.6 K	NA	2.6 K	111 K
Barium	1,040	64.7	268	120	1,349	35 J	397	NA	43.5	89
Beryllium	0.88	0.64 J	1.2	0.52 J	0.67 J	0.4 J	0.78 J	NA	0.38 J	0.67 J
Cadmium	6	0.11 U	0.82 B	0.24 J	0.45 J	1.5	0.39 J	NA	0.25 J	0.1 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
R - Unreliable result
U - Analyte not detected

Appendix H
Surface Soil Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SS01	SJS5-SS02	SJS5-SS03	SJS5-SS04	SJS5-SS05	SJS5-SS06	SJS5-SS07		SJS5-SS08	SJS5-SS09
Sample ID	SJS05-SS01-000	SJS05-SS02-000	SJS05-SS03-000	SJS05-SS04-000	SJS05-SS05-000	SJS05-SS06-000	SJS05-SS07-000	SJS05-SS07-000P	SJS05-SS08-000	SJS05-SS09-000
Sample Date	06/24/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97	06/26/97
Chemical Name										
Calcium	8,170	570 J	671 J	2,550 J	1,780 J	7,230 J	2,620 J	NA	10,300 J	706 J
Chromium	74.6	34.8	37.1	10.6	18.7	4.6	20	NA	6.8	16.5
Cobalt	17.7	3.3 J	7.9 J	2.9 J	7.4 J	4.4 J	6.4 J	NA	3 J	2.5 J
Copper	6,470	43.6	89.2	50.2	113	17.1	114	NA	23.5	27.3
Cyanide	0.53 U	0.57 U	1.45 J	0.51 U	0.6	0.5 U	0.56 U	NA	0.49 U	0.55 U
Iron	120,000	32,400	31,500	9,900	14,900	12,800	15,200	NA	10,200	14,600
Lead	7,210 J	85.6	822	127	616	33.5	899	NA	37.6	83.2
Magnesium	3,300	1,880	3,160	2,050	1,870	2,330	1,570	NA	2,020	1,450
Manganese	852	63.4 K	122 K	142 K	293 K	269 K	208 K	NA	236 K	73.8 K
Mercury	0.44	0.25 L	0.42 L	0.17 L	0.98 L	NA	0.93 L	NA	0.08 L	0.21 L
Nickel	91.5	7.9 J	19.2	7.5 B	12.9	2.6 J	13.2	NA	9.4	7.2 J
Potassium	963	1,630	3,800	1,220	1,870	1,440	1,480	NA	1,320	888 J
Selenium	0.47 UL	0.63 U	0.68 U	0.57 U	0.6 U	0.56 U	0.59 U	NA	0.54 U	0.6 U
Silver	3.5	0.26 B	0.4 B	0.21 B	0.53 B	0.54 B	0.23 B	NA	0.76 J	0.2 U
Sodium	764 J	150 B	575 J	94.6 B	205 B	74.2 B	132 B	NA	182 B	83.6 B
Thallium	5.3	2.1 J	2.9	0.64 J	0.83 J	0.37 U	1.4 J	NA	0.45 J	1.3 J
Vanadium	23.6	55.7	52.5	28.6	24.9	12.7	27.7	NA	12.7	37
Zinc	8,490 L	77.8	132	180	242	83.9	318	NA	126	123
pH	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry (MG/KG)										
% Solids	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phosphorus	3.9	8.4	5.6	11.8	3.2	6.5	18.8	NA	2.2	5.2
pH	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
R - Unreliable result
U - Analyte not detected

Appendix H
Surface Soil Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SS10	SJS5-SS11	SJS5-SS12	SJS5-SS13	SJS5-SS14	SJS5-SS15	SJS5-SS16	SJS5-SS17	SJS5-SS18	SJS5-SS19
Sample ID	SJS05-SS10-000	SJS05-SS11-000	SJS05-SS12-000	SJS05-SS13-000	SJS05-SS14-000	SJS05-SS15-000	SJS05-SS16-000	SJS05-SS17-000	SJS05-SS18-000	SJS05-SS19-000
Sample Date	04/21/99	04/21/99	04/22/99	04/21/99	04/22/99	04/21/99	04/22/99	04/22/99	04/22/99	04/22/99
Chemical Name										
Volatile Organic Compounds (UG/KG)										
1,1,1-Trichloroethane	13 U	12 U	16 U	12 U	16 U	10 U	13 U	15 U	22 U	14 U
1,1,2,2-Tetrachloroethane	13 U	12 U	16 U	12 U	16 U	10 U	13 U	15 U	22 U	14 U
1,1,2-Trichloroethane	13 U	12 U	16 U	12 U	16 U	10 U	13 U	15 U	22 U	14 U
1,1-Dichloroethane	13 U	12 U	16 U	12 U	16 U	10 U	13 U	15 U	22 U	14 U
1,1-Dichloroethene	13 U	12 U	16 U	12 U	16 U	10 U	13 U	15 U	22 U	14 U
1,2-Dichloroethane	13 U	12 U	16 U	12 U	16 U	10 U	13 U	15 U	22 U	14 U
1,2-Dichloroethene (total)	13 U	12 U	16 U	12 U	16 U	10 U	13 U	15 U	22 U	14 U
1,2-Dichloropropane	13 U	12 U	16 U	12 U	16 U	10 U	13 U	15 U	22 U	14 U
2-Butanone	13 U	12 U	16 U	12 U	16 U	10 U	13 U	15 U	22 U	14 U
2-Hexanone	13 U	12 U	16 U	12 U	16 U	10 U	13 U	15 U	22 U	14 U
4-Methyl-2-pentanone	13 U	12 U	16 U	12 U	16 U	10 U	13 U	15 U	22 U	14 U
Acetone	13 U	12 U	16 U	12 U	62	10 U	13 U	15 U	22 U	14 U
Benzene	13 U	12 U	16 U	12 U	16 U	10 U	13 U	15 U	22 U	14 U
Bromodichloromethane	13 U	12 U	16 U	12 U	16 U	10 U	13 U	15 U	22 U	14 U
Bromoform	13 U	12 U	16 U	12 U	16 U	10 U	13 U	15 U	22 U	14 U
Bromomethane	13 U	12 U	16 U	12 U	16 U	10 U	13 U	15 U	22 U	14 U
Carbon disulfide	13 U	12 U	16 U	12 U	16 U	10 U	13 U	15 U	11 B	14 U
Carbon tetrachloride	13 U	12 U	16 U	12 U	16 U	10 U	13 U	15 U	22 U	14 U
Chlorobenzene	13 U	12 U	16 U	12 U	16 U	10 U	13 U	15 U	22 U	14 U
Chloroethane	13 U	12 U	16 U	12 U	16 U	10 U	13 U	15 U	22 U	14 U
Chloroform	13 U	12 U	16 U	12 U	16 U	10 U	13 U	15 U	22 U	14 U
Chloromethane	13 U	12 U	16 U	12 U	16 U	10 U	13 U	15 U	22 U	14 U
Dibromochloromethane	13 U	12 U	16 U	12 U	16 U	10 U	13 U	15 U	22 U	14 U
Ethylbenzene	13 U	12 U	16 U	12 U	16 U	10 U	13 U	15 U	22 U	14 U
Methylene chloride	12 B	7 B	171	2 B	49 B	7 B	33 B	45	67	30 B
Styrene	13 U	12 U	16 U	12 U	16 U	10 U	13 U	15 U	22 U	14 U
Tetrachloroethene	13 U	12 U	16 U	12 U	16 U	10 U	13 U	15 U	22 U	14 U
Toluene	13 U	12 U	16 U	12 U	16 U	10 U	13 U	15 U	22 U	14 U
Trichloroethene	13 U	12 U	16 U	12 U	16 U	10 U	13 U	15 U	22 U	14 U
Vinyl chloride	13 U	12 U	16 U	12 U	16 U	10 U	13 U	15 U	22 U	14 U
Xylene, total	13 U	12 U	16 U	12 U	16 U	10 U	13 U	15 U	22 U	14 U
cis-1,3-Dichloropropene	13 U	12 U	16 U	12 U	16 U	10 U	13 U	15 U	22 U	14 U
trans-1,3-Dichloropropene	13 U	12 U	16 U	12 U	16 U	10 U	13 U	15 U	22 U	14 U
Semi-volatile Organic Compounds (UG/KG)										
1,2,4-Trichlorobenzene	420 UJ	420 UJ	540 UJ	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ
1,2-Dichlorobenzene	420 UJ	420 UJ	540 UJ	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
R - Unreliable result
U - Analyte not detected

Appendix H
Surface Soil Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SS10	SJS5-SS11	SJS5-SS12	SJS5-SS13	SJS5-SS14	SJS5-SS15	SJS5-SS16	SJS5-SS17	SJS5-SS18	SJS5-SS19
Sample ID	SJS05-SS10-000	SJS05-SS11-000	SJS05-SS12-000	SJS05-SS13-000	SJS05-SS14-000	SJS05-SS15-000	SJS05-SS16-000	SJS05-SS17-000	SJS05-SS18-000	SJS05-SS19-000
Sample Date	04/21/99	04/21/99	04/22/99	04/21/99	04/22/99	04/21/99	04/22/99	04/22/99	04/22/99	04/22/99
Chemical Name										
1,3-Dichlorobenzene	420 UJ	420 UJ	540 UJ	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ
1,4-Dichlorobenzene	420 UJ	420 UJ	540 UJ	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ
2,2'-Oxybis(1-chloropropane)	420 UJ	420 UJ	540 UJ	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ
2,4,5-Trichlorophenol	1,100 UJ	1,000 UJ	1,300 UJ	1,000 UJ	1,300 UJ	1,000 UJ	1,100 UJ	1,200 UJ	1,900 UJ	1,100 UJ
2,4,6-Trichlorophenol	420 UJ	420 UJ	540 UJ	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ
2,4-Dichlorophenol	420 UJ	420 UJ	540 UJ	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ
2,4-Dimethylphenol	420 UJ	420 UJ	540 UJ	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ
2,4-Dinitrophenol	1,100 UJ	1,000 UJ	1,300 UJ	1,000 UJ	1,300 UJ	1,000 UJ	1,100 UJ	1,200 UJ	1,900 UJ	1,100 UJ
2,4-Dinitrotoluene	420 UJ	420 UJ	540 UJ	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ
2,6-Dinitrotoluene	420 UJ	420 UJ	540 UJ	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ
2-Chloronaphthalene	420 UJ	420 UJ	540 UJ	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ
2-Chlorophenol	420 UJ	420 UJ	540 UJ	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ
2-Methylnaphthalene	420 UJ	420 UJ	540 UJ	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ
2-Methylphenol	420 UJ	420 UJ	540 UJ	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ
2-Nitroaniline	1,100 UJ	1,000 UJ	1,300 UJ	1,000 UJ	1,300 UJ	1,000 UJ	1,100 UJ	1,200 UJ	1,900 UJ	1,100 UJ
2-Nitrophenol	420 UJ	420 UJ	540 UJ	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ
3,3'-Dichlorobenzidine	420 UJ	420 UJ	540 UJ	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ
3-Nitroaniline	1,100 UJ	1,000 UJ	1,300 UJ	1,000 UJ	1,300 UJ	1,000 UJ	1,100 UJ	1,200 UJ	1,900 UJ	1,100 UJ
4,6-Dinitro-2-methylphenol	1,100 UJ	1,000 UJ	1,300 UJ	1,000 UJ	1,300 UJ	1,000 UJ	1,100 UJ	1,200 UJ	1,900 UJ	1,100 UJ
4-Bromophenyl-phenylether	420 UJ	420 UJ	540 UJ	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ
4-Chloro-3-methylphenol	420 UJ	420 UJ	540 UJ	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ
4-Chloroaniline	420 UJ	420 UJ	540 UJ	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ
4-Chlorophenyl-phenylether	420 UJ	420 UJ	540 UJ	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ
4-Methylphenol	420 UJ	420 UJ	540 UJ	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ
4-Nitroaniline	1,100 UJ	1,000 UJ	1,300 UJ	1,000 UJ	1,300 UJ	1,000 UJ	1,100 UJ	1,200 UJ	1,900 UJ	1,100 UJ
4-Nitrophenol	1,100 UJ	1,000 UJ	1,300 UJ	1,000 UJ	1,300 UJ	1,000 UJ	1,100 UJ	1,200 UJ	1,900 UJ	1,100 UJ
Acenaphthene	420 UJ	420 UJ	540 UJ	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ
Acenaphthylene	420 UJ	420 UJ	540 UJ	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ
Anthracene	420 UJ	79 J	540 UJ	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ
Benzo(a)anthracene	420 UJ	380 J	540 UJ	51 J	530 UJ	420 UJ	110 J	170 J	740 UJ	56 J
Benzo(a)pyrene	420 UJ	290 J	540 UJ	67 J	530 UJ	420 UJ	73 J	130 J	740 UJ	460 UJ
Benzo(b)fluoranthene	420 UJ	650 J	540 UJ	110 J	530 UJ	420 UJ	160 J	260 J	740 UJ	74 J
Benzo(g,h,i)perylene	420 UJ	250 J	540 UJ	60 J	530 UJ	420 UJ	72 J	110 J	740 UJ	460 UJ
Benzo(k)fluoranthene	420 UJ	250 J	540 UJ	48 J	530 UJ	420 UJ	54 J	89 J	740 UJ	460 UJ
Butylbenzylphthalate	420 UJ	420 UJ	540 UJ	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ
Carbazole	420 UJ	420 UJ	540 UJ	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ
Chrysene	420 UJ	410 J	540 UJ	49 J	530 UJ	420 UJ	160 J	180 J	740 UJ	62 J
Di-n-butylphthalate	420 UJ	420 UJ	540 UJ	400 UJ	530 UJ	420 UJ	130 J	83 J	740 UJ	140 J
Di-n-octylphthalate	420 UJ	420 UJ	540 UJ	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
R - Unreliable result
U - Analyte not detected

Appendix H
Surface Soil Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SS10	SJS5-SS11	SJS5-SS12	SJS5-SS13	SJS5-SS14	SJS5-SS15	SJS5-SS16	SJS5-SS17	SJS5-SS18	SJS5-SS19
Sample ID	SJS05-SS10-000	SJS05-SS11-000	SJS05-SS12-000	SJS05-SS13-000	SJS05-SS14-000	SJS05-SS15-000	SJS05-SS16-000	SJS05-SS17-000	SJS05-SS18-000	SJS05-SS19-000
Sample Date	04/21/99	04/21/99	04/22/99	04/21/99	04/22/99	04/21/99	04/22/99	04/22/99	04/22/99	04/22/99
Chemical Name										
Dibenz(a,h)anthracene	420 UJ	80 J	540 UJ	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ
Dibenzofuran	420 UJ	420 UJ	540 UJ	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ
Diethylphthalate	420 UJ	420 UJ	170 J	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ
Dimethyl phthalate	420 UJ	420 UJ	63 J	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ
Fluoranthene	420 UJ	660 J	540 UJ	57 J	530 UJ	420 UJ	180 J	230 J	740 UJ	84 J
Fluorene	420 UJ	420 UJ	540 UJ	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ
Hexachlorobenzene	420 UJ	420 UJ	540 UJ	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ
Hexachlorobutadiene	420 UJ	420 UJ	540 UJ	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ
Hexachlorocyclopentadiene	420 UJ	420 UJ	540 UJ	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ
Hexachloroethane	420 UJ	420 UJ	540 UJ	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ
Indeno(1,2,3-cd)pyrene	420 UJ	250 J	540 UJ	43 J	530 UJ	420 UJ	69 J	110 J	740 UJ	460 UJ
Isophorone	420 UJ	420 UJ	540 UJ	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ
Naphthalene	420 UJ	420 UJ	540 UJ	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ
Nitrobenzene	420 UJ	420 UJ	540 UJ	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ
Pentachlorophenol	1,100 UJ	1,000 UJ	1,300 UJ	1,000 UJ	1,300 UJ	1,000 UJ	1,100 UJ	1,200 UJ	1,900 UJ	1,100 UJ
Phenanthrene	420 UJ	340 J	540 UJ	400 UJ	530 UJ	420 UJ	440 UJ	53 J	740 UJ	460 UJ
Phenol	420 UJ	420 UJ	540 UJ	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ
Pyrene	420 UJ	540 J	540 UJ	43 J	530 UJ	420 UJ	110 J	150 J	740 UJ	76 J
bis(2-Chloroethoxy)methane	420 UJ	420 UJ	540 UJ	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ
bis(2-Chloroethyl)ether	420 UJ	420 UJ	540 UJ	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ
bis(2-Ethylhexyl)phthalate	420 UJ	420 UJ	180 J	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ
n-Nitroso-di-n-propylamine	420 UJ	420 UJ	540 UJ	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ
n-Nitrosodiphenylamine	420 UJ	420 UJ	540 UJ	400 UJ	530 UJ	420 UJ	440 UJ	490 UJ	740 UJ	460 UJ
Pesticide/Polychlorinated Biphenyls (UG/KG)										
4,4'-DDD	4.20 UJ	31 J	3.90 J	4 UJ	1.40 J	4.20 UJ	2.60 J	15 J	7.40 UJ	4.5 UJ
4,4'-DDE	13 J	230 J	1.40 J	1,500 J	3.30 J	3.10 J	18 J	49 J	7.40 UJ	4.5 UJ
4,4'-DDT	5.70 J	42 J	4.90 J	340 J	3.70 J	2.60 J	2.20 J	7 J	7.40 UJ	4.5 UJ
Aldrin	2.10 UJ	2.10 UJ	2.70 UJ	2 UJ	2.60 UJ	2.10 UJ	2.20 UJ	2.40 UJ	3.70 UJ	2.30 UJ
Aroclor-1016	42 UJ	42 UJ	54 UJ	40 UJ	52 UJ	42 UJ	44 UJ	48 UJ	74 UJ	45 UJ
Aroclor-1221	84 UJ	83 UJ	110 UJ	81 UJ	100 UJ	83 UJ	88 UJ	97 UJ	150 UJ	91 UJ
Aroclor-1232	42 UJ	42 UJ	54 UJ	40 UJ	52 UJ	42 UJ	44 UJ	48 UJ	74 UJ	45 UJ
Aroclor-1242	42 UJ	42 UJ	54 UJ	40 UJ	52 UJ	42 UJ	44 UJ	48 UJ	74 UJ	45 UJ
Aroclor-1248	42 UJ	42 UJ	54 UJ	40 UJ	52 UJ	42 UJ	44 UJ	48 UJ	74 UJ	45 UJ
Aroclor-1254	42 UJ	42 UJ	54 UJ	40 UJ	52 UJ	42 UJ	44 UJ	48 UJ	74 UJ	45 UJ
Aroclor-1260	42 UJ	42 UJ	54 UJ	40 UJ	52 UJ	42 UJ	44 UJ	48 UJ	74 UJ	45 UJ
Dieldrin	4.20 UJ	4.20 UJ	5.40 UJ	1.30 J	5.20 UJ	4.20 UJ	4.40 UJ	4.80 UJ	7.40 UJ	4.5 UJ
Endosulfan I	2.10 UJ	2.10 UJ	2.70 UJ	2 UJ	2.60 UJ	2.10 UJ	2.20 UJ	2.40 UJ	3.70 UJ	2.30 UJ
Endosulfan II	4.20 UJ	4.20 UJ	5.40 UJ	4 UJ	5.20 UJ	4.20 UJ	4.40 UJ	4.80 UJ	7.40 UJ	4.5 UJ

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

R - Unreliable result
U - Analyte not detected

Appendix H
Surface Soil Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SS10	SJS5-SS11	SJS5-SS12	SJS5-SS13	SJS5-SS14	SJS5-SS15	SJS5-SS16	SJS5-SS17	SJS5-SS18	SJS5-SS19
Sample ID	SJS05-SS10-000	SJS05-SS11-000	SJS05-SS12-000	SJS05-SS13-000	SJS05-SS14-000	SJS05-SS15-000	SJS05-SS16-000	SJS05-SS17-000	SJS05-SS18-000	SJS05-SS19-000
Sample Date	04/21/99	04/21/99	04/22/99	04/21/99	04/22/99	04/21/99	04/22/99	04/22/99	04/22/99	04/22/99
Chemical Name										
Endosulfan sulfate	4.20 UJ	4.20 UJ	5.40 UJ	4 UJ	5.20 UJ	4.20 UJ	4.40 UJ	4.80 UJ	7.40 UJ	4.5 UJ
Endrin	4.20 UJ	4.20 UJ	5.40 UJ	4 UJ	5.20 UJ	4.20 UJ	4.40 UJ	4.80 UJ	7.40 UJ	4.5 UJ
Endrin aldehyde	4.20 UJ	4.20 UJ	5.40 UJ	4 UJ	5.20 UJ	4.20 UJ	4.40 UJ	4.80 UJ	7.40 UJ	4.5 UJ
Endrin ketone	4.20 UJ	4.20 UJ	5.40 UJ	4 UJ	5.20 UJ	4.20 UJ	4.40 UJ	4.80 UJ	7.40 UJ	4.5 UJ
Heptachlor	2.10 UJ	2.10 UJ	2.70 UJ	2 UJ	2.60 UJ	2.10 UJ	2.20 UJ	2.40 UJ	3.70 UJ	2.30 UJ
Heptachlor epoxide	2.10 UJ	2.10 UJ	2.70 UJ	2 UJ	2.60 UJ	2.10 UJ	2.20 UJ	2.40 UJ	3.70 UJ	2.30 UJ
Methoxychlor	21 UJ	21 UJ	27 UJ	20 UJ	26 UJ	21 UJ	22 UJ	24 UJ	37 UJ	23 UJ
Toxaphene	210 UJ	210 UJ	270 UJ	200 UJ	260 UJ	210 UJ	220 UJ	240 UJ	370 UJ	230 UJ
alpha-BHC	2.10 UJ	2.10 UJ	2.70 UJ	2 UJ	2.60 UJ	2.10 UJ	2.20 UJ	2.40 UJ	3.70 UJ	2.30 UJ
alpha-Chlordane	2.10 UJ	0.580 J	2.70 UJ	2 UJ	2.60 UJ	2.10 UJ	2.20 UJ	2.40 UJ	3.70 UJ	2.30 UJ
beta-BHC	2.10 UJ	2.10 UJ	2.70 UJ	2 UJ	2.60 UJ	2.10 UJ	2.20 UJ	2.40 UJ	3.70 UJ	2.30 UJ
delta-BHC	2.10 UJ	2.10 UJ	2.70 UJ	2 UJ	2.60 UJ	2.10 UJ	2.20 UJ	2.40 UJ	3.70 UJ	2.30 UJ
gamma-BHC (Lindane)	2.10 UJ	2.10 UJ	2.70 UJ	2 UJ	2.60 UJ	2.10 UJ	2.20 UJ	2.40 UJ	3.70 UJ	2.30 UJ
gamma-Chlordane	2.10 UJ	2.10 UJ	2.70 UJ	2 UJ	2.60 UJ	2.10 UJ	2.20 UJ	2.40 UJ	3.70 UJ	2.30 UJ
Explosives (UG/KG)										
1,3,5-Trinitrobenzene	238 U	250 U	250 U	250 U	250 U	238 U	238 U	238 U	250 U	250 U
1,3-Dinitrobenzene	238 U	250 U	250 U	250 U	250 U	238 U	238 U	238 U	250 U	250 U
2,4,6-Trinitrotoluene	238 U	250 U	250 U	250 U	250 U	238 U	238 U	238 U	250 U	250 U
2,4-Dinitrotoluene	238 U	250 U	303	250 U	638	238 U	238 U	238 U	250 U	250 U
2,6-Dinitrotoluene	238 U	250 U	250 U	250 U	250 U	238 U	238 U	238 U	250 U	250 U
2-Amino-4,6-dinitrotoluene	238 U	250 U	250 U	250 U	250 U	238 U	238 U	238 U	250 U	250 U
2-Nitrotoluene	477 U	500 U	500 U	500 U	500 U	477 U	477 U	477 U	500 U	500 U
3-Nitrotoluene	477 U	500 U	500 U	500 U	500 U	477 U	477 U	477 U	500 U	500 U
4-Amino-2,6-dinitrotoluene	238 U	250 U	250 U	250 U	250 U	238 U	238 U	238 U	250 U	250 U
4-Nitrotoluene	477 U	500 U	500 U	500 U	500 U	477 U	477 U	477 U	500 U	500 U
HMX	477 U	500 U	500 U	500 U	500 U	477 U	477 U	477 U	500 U	500 U
Nitrobenzene	238 U	250 U	250 U	250 U	250 U	238 U	238 U	238 U	250 U	250 U
RDX	477 U	500 U	500 U	500 U	500 U	477 U	477 U	477 U	500 U	500 U
Tetryl	477 U	500 U	500 U	500 U	500 U	477 U	477 U	477 U	500 U	500 U
Total Metals (MG/KG)										
% Solids	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aluminum	5,750	12,500	8,490	8,500	10,700	1,510	5,560	3,690	12,900	4,970
Antimony	7.80 J	8.10 J	0.740 U	0.600 U	0.810 J	0.630 U	0.5 U	2.60 J	1.10 U	10.8 J
Arsenic	9.10	152	17.9	7.60	17.2	0.960 J	5.30	10.6	11.2	6.30
Barium	2,850	5,970	153	85.3	441	9.10 J	142	88.3	31.2 J	1,220
Beryllium	0.410 J	0.210 J	0.460 J	0.380 J	0.460 J	0.0800 J	0.340 J	0.210 J	1.30 J	0.930 J
Cadmium	2.70	1.20 J	0.160 J	0.0700 U	0.260 J	0.0800 J	0.0600 J	0.720 J	0.240 J	22.7

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
R - Unreliable result
U - Analyte not detected

Appendix H
Surface Soil Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SS10	SJS5-SS11	SJS5-SS12	SJS5-SS13	SJS5-SS14	SJS5-SS15	SJS5-SS16	SJS5-SS17	SJS5-SS18	SJS5-SS19
Sample ID	SJS05-SS10-000	SJS05-SS11-000	SJS05-SS12-000	SJS05-SS13-000	SJS05-SS14-000	SJS05-SS15-000	SJS05-SS16-000	SJS05-SS17-000	SJS05-SS18-000	SJS05-SS19-000
Sample Date	04/21/99	04/21/99	04/22/99	04/21/99	04/22/99	04/21/99	04/22/99	04/22/99	04/22/99	04/22/99
Chemical Name										
Calcium	36,700	4,430	559 J	1,550	468 J	2,070	314 J	2,790	1,610 J	1,130
Chromium	25.3	13.7	19.1	19.6	19.9	2.5	18.1	11.1	26.6	867
Cobalt	3.90 J	1.90 J	2.90 J	3.60 J	2.90 J	0.390 J	1.5 J	2.70 J	11.1 J	6.10 J
Copper	350	377	46.5	18.5	92.2	4.20 J	37.6	86.7	19.3	132
Cyanide	0.239 U	0.256 U	0.380 U	0.201 U	0.320 U	0.329	0.170 U	0.300 U	0.340 U	0.240 U
Iron	17,400	16,000	23,600	17,700	21,300	1,730	13,400	13,200	32,100	10,000
Lead	2,590	275	228	69.7	817	10.4	98.7	61.5	34.3	4,740
Magnesium	2,030	1,990	1,900	2,020	1,750	251 J	905 J	1,250 J	5,080	2,010
Manganese	264	175	79.6	99.6	73.1	32.2	39.6	58.2	307	370
Mercury	0.120	0.130	0.140	0.170	0.200	0.0500	0.150	0.25	0.230	0.160
Nickel	15.5	7 J	6.70 J	9.20	7.60 J	1.5 J	4.80 J	9.30 J	17	8.80
Potassium	877 J	1,020 J	1,770	1,680	1,840	297 J	676 J	832 J	2,950	625 J
Selenium	0.550 U	0.640 J	0.780 J	0.580 U	0.920 J	0.650 J	0.490 U	0.720 U	1.10 U	0.570 U
Silver	1.30 J	0.310 J	0.25 U	0.200 U	0.230 U	0.210 U	0.170 U	0.25 U	0.380 U	0.200 U
Sodium	220 J	139 J	434 J	229 J	227 J	34.8 U	160 J	921 J	6,410	1,240
Thallium	0.670 U	0.75 U	0.880 U	0.720 U	0.830 U	0.75 U	0.600 U	0.890 U	1.40 U	0.700 U
Vanadium	19	19.9	29.5	39.8	33.3	6.30 J	23.4	33.2	32.4	33.8
Zinc	969	831	79.4	76.5	95.2	20	47.6	525	93.5	1,290
pH	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry (MG/KG)										
% Solids	79.2	80.2	62	82.8	63	79.6	75	68.4	44.7	72.8
Phosphorus	2.81 UL	2.97 UL	3.23 U	2.68 UL	4.54 U	3.06 UL	3.10 U	4.06 U	6.78 U	4.04 U
pH	7.91	7.42	3.75	4.97	4.21	7.71	4.14	6.77	5.16	6.69

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

R - Unreliable result
U - Analyte not detected

Appendix H
Surface Soil Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SS20	SJS5-SS21	SJS5-SS22	SJS5-SS23	SJS5-SS24	SJS5-SS25	SJS5-SS26	SJS5-SS27		SJS5-SS28
Sample ID	SJS05-SS20-000	SJS05-SS21-000	SJS05-SS22-000	SJS05-SS23-000	SJS05-SS24-000	SJS05-SS25-000	SJS05-SS26-000	SJS05-SS27-000	SJS05-SS27-000P	SJS05-SS28-000
Sample Date	04/22/99	04/22/99	04/22/99	04/22/99	04/22/99	04/22/99	04/22/99	04/22/99	04/22/99	04/22/99
Chemical Name										
Volatile Organic Compounds (UG/KG)										
1,1,1-Trichloroethane	16 U	16 U	13 U	21 U	22 U	10 U	10 U	11 U	11 U	11 U
1,1,2,2-Tetrachloroethane	16 U	16 U	13 U	21 U	22 U	10 U	10 U	11 U	11 U	11 U
1,1,2-Trichloroethane	16 U	16 U	13 U	21 U	22 U	10 U	10 U	11 U	11 U	11 U
1,1-Dichloroethane	16 U	16 U	13 U	21 U	22 U	10 U	10 U	11 U	11 U	11 U
1,1-Dichloroethene	16 U	16 U	13 U	21 U	22 U	10 U	10 U	11 U	11 U	11 U
1,2-Dichloroethane	16 U	16 U	13 U	21 U	22 U	10 U	10 U	11 U	11 U	11 U
1,2-Dichloroethene (total)	16 U	16 U	13 U	21 U	22 U	10 U	10 U	11 U	11 U	11 U
1,2-Dichloropropane	16 U	16 U	13 U	21 U	22 U	10 U	10 U	11 U	11 U	11 U
2-Butanone	16 U	16 U	13 U	21 U	22 U	10 U	10 U	11 U	11 U	11 U
2-Hexanone	16 U	16 U	13 U	21 U	22 U	10 U	10 U	11 U	11 U	11 U
4-Methyl-2-pentanone	16 U	16 U	13 U	21 U	22 U	10 U	10 U	11 U	11 U	11 U
Acetone	16 U	16 U	13 U	21 U	22 U	10 U	9 J	8 J	13	11 U
Benzene	16 U	16 U	13 U	21 U	22 U	10 U	10 U	11 U	11 U	11 U
Bromodichloromethane	16 U	16 U	13 U	21 U	22 U	10 U	10 U	11 U	11 U	11 U
Bromoform	16 U	16 U	13 U	21 U	22 U	10 U	10 U	11 U	11 U	11 U
Bromomethane	16 U	16 U	13 U	21 U	22 U	10 U	10 U	11 U	11 U	11 U
Carbon disulfide	16 U	16 U	13 U	21 U	22 U	10 U	10 U	11 U	11 U	11 U
Carbon tetrachloride	16 U	16 U	13 U	21 U	22 U	10 U	10 U	11 U	11 U	11 U
Chlorobenzene	16 U	16 U	13 U	21 U	22 U	10 U	10 U	11 U	11 U	11 U
Chloroethane	16 U	16 U	13 U	21 U	22 U	10 U	10 U	11 U	11 U	11 U
Chloroform	16 U	16 U	13 U	21 U	22 U	10 U	2 J	11 U	11 U	11 U
Chloromethane	16 U	16 U	13 U	21 U	22 U	10 U	5 J	11 U	3 J	11 U
Dibromochloromethane	16 U	16 U	13 U	21 U	22 U	10 U	10 U	11 U	11 U	11 U
Ethylbenzene	16 U	16 U	13 U	21 U	22 U	10 U	10 U	11 U	11 U	11 U
Methylene chloride	162	19 B	32 B	25 B	29 B	94	2 J	2 J	2 J	120
Styrene	16 U	16 U	13 U	21 U	22 U	10 U	10 U	11 U	11 U	11 U
Tetrachloroethene	16 U	16 U	13 U	21 U	22 U	10 U	10 U	11 U	11 U	11 U
Toluene	16 U	16 U	13 U	21 U	22 U	10 U	10 U	11 U	4 J	11 U
Trichloroethene	2 J	16 U	13 U	21 U	22 U	5 J	21	58	45	3 J
Vinyl chloride	16 U	16 U	13 U	21 U	22 U	10 U	10 U	11 U	11 U	11 U
Xylene, total	16 U	16 U	13 U	21 U	22 U	10 U	10 U	11 U	2 J	11 U
cis-1,3-Dichloropropene	16 U	16 U	13 U	21 U	22 U	10 U	10 U	11 U	11 U	11 U
trans-1,3-Dichloropropene	16 U	16 U	13 U	21 U	22 U	10 U	10 U	11 U	11 U	11 U
Semi-volatile Organic Compounds (UG/KG)										
1,2,4-Trichlorobenzene	540 UJ	530 UJ	430 UJ	710 UJ	740 U	340 UJ	340 UJ	370 UJ	360 UJ	380 UJ
1,2-Dichlorobenzene	540 UJ	530 UJ	430 UJ	710 UJ	740 U	340 UJ	340 UJ	370 UJ	360 UJ	380 UJ

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
R - Unreliable result
U - Analyte not detected

Appendix H
Surface Soil Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SS20	SJS5-SS21	SJS5-SS22	SJS5-SS23	SJS5-SS24	SJS5-SS25	SJS5-SS26	SJS5-SS27		SJS5-SS28
Sample ID	SJS05-SS20-000	SJS05-SS21-000	SJS05-SS22-000	SJS05-SS23-000	SJS05-SS24-000	SJS05-SS25-000	SJS05-SS26-000	SJS05-SS27-000	SJS05-SS27-000P	SJS05-SS28-000
Sample Date	04/22/99	04/22/99	04/22/99	04/22/99	04/22/99	04/22/99	04/22/99	04/22/99	04/22/99	04/22/99
Chemical Name										
1,3-Dichlorobenzene	540 UJ	530 UJ	430 UJ	710 UJ	740 U	340 UJ	340 UJ	370 UJ	360 UJ	380 UJ
1,4-Dichlorobenzene	540 UJ	530 UJ	430 UJ	710 UJ	740 U	340 UJ	340 UJ	370 UJ	360 UJ	380 UJ
2,2'-Oxybis(1-chloropropane)	540 UJ	530 UJ	430 UJ	710 UJ	740 U	340 UJ	340 UJ	370 UJ	360 UJ	380 UJ
2,4,5-Trichlorophenol	1,300 UJ	1,300 UJ	1,100 UJ	1,800 UJ	1,900 U	840 UJ	850 UJ	930 UJ	900 UJ	960 UJ
2,4,6-Trichlorophenol	540 UJ	530 UJ	430 UJ	710 UJ	740 U	340 UJ	340 UJ	370 UJ	360 UJ	380 UJ
2,4-Dichlorophenol	540 UJ	530 UJ	430 UJ	710 UJ	740 U	340 UJ	340 UJ	370 UJ	360 UJ	380 UJ
2,4-Dimethylphenol	540 UJ	530 UJ	430 UJ	710 UJ	740 U	340 UJ	340 UJ	370 UJ	360 UJ	380 UJ
2,4-Dinitrophenol	1,300 UJ	1,300 UJ	1,100 UJ	1,800 UJ	1,900 U	840 UJ	850 UJ	930 UJ	900 UJ	960 UJ
2,4-Dinitrotoluene	540 UJ	530 UJ	430 UJ	710 UJ	740 U	340 UJ	340 UJ	370 UJ	360 UJ	380 UJ
2,6-Dinitrotoluene	540 UJ	530 UJ	430 UJ	710 UJ	740 U	340 UJ	340 UJ	370 UJ	360 UJ	380 UJ
2-Chloronaphthalene	540 UJ	530 UJ	430 UJ	710 UJ	740 U	340 UJ	340 UJ	370 UJ	360 UJ	380 UJ
2-Chlorophenol	540 UJ	530 UJ	430 UJ	710 UJ	740 U	340 UJ	340 UJ	370 UJ	360 UJ	380 UJ
2-Methylnaphthalene	540 UJ	530 UJ	430 UJ	710 UJ	740 U	340 UJ	340 UJ	370 UJ	360 UJ	380 UJ
2-Methylphenol	540 UJ	530 UJ	430 UJ	710 UJ	740 U	340 UJ	340 UJ	370 UJ	360 UJ	380 UJ
2-Nitroaniline	1,300 UJ	1,300 UJ	1,100 UJ	1,800 UJ	1,900 U	840 UJ	850 UJ	930 UJ	900 UJ	960 UJ
2-Nitrophenol	540 UJ	530 UJ	430 UJ	710 UJ	740 U	340 UJ	340 UJ	370 UJ	360 UJ	380 UJ
3,3'-Dichlorobenzidine	540 UJ	530 UJ	430 UJ	710 UJ	740 U	340 UJ	340 UJ	370 UJ	360 UJ	380 UJ
3-Nitroaniline	1,300 UJ	1,300 UJ	1,100 UJ	1,800 UJ	1,900 U	840 UJ	850 UJ	930 UJ	900 UJ	960 UJ
4,6-Dinitro-2-methylphenol	1,300 UJ	1,300 UJ	1,100 UJ	1,800 UJ	1,900 U	840 UJ	850 UJ	930 UJ	900 UJ	960 UJ
4-Bromophenyl-phenylether	540 UJ	530 UJ	430 UJ	710 UJ	740 U	340 UJ	340 UJ	370 UJ	360 UJ	380 UJ
4-Chloro-3-methylphenol	540 UJ	530 UJ	430 UJ	710 UJ	740 U	340 UJ	340 UJ	370 UJ	360 UJ	380 UJ
4-Chloroaniline	540 UJ	530 UJ	430 UJ	710 UJ	740 U	340 UJ	340 UJ	370 UJ	360 UJ	380 UJ
4-Chlorophenyl-phenylether	540 UJ	530 UJ	430 UJ	710 UJ	740 U	340 UJ	340 UJ	370 UJ	360 UJ	380 UJ
4-Methylphenol	540 UJ	530 UJ	430 UJ	710 UJ	740 U	340 UJ	340 UJ	370 UJ	360 UJ	380 UJ
4-Nitroaniline	1,300 UJ	1,300 UJ	1,100 UJ	1,800 UJ	1,900 U	840 UJ	850 UJ	930 UJ	900 UJ	960 UJ
4-Nitrophenol	1,300 UJ	1,300 UJ	1,100 UJ	1,800 UJ	1,900 U	840 UJ	850 UJ	930 UJ	900 UJ	960 UJ
Acenaphthene	540 UJ	530 UJ	430 UJ	710 UJ	740 U	340 UJ	340 UJ	370 UJ	360 UJ	380 UJ
Acenaphthylene	540 UJ	530 UJ	430 UJ	710 UJ	740 U	340 UJ	340 UJ	370 UJ	360 UJ	380 UJ
Anthracene	540 UJ	530 UJ	430 UJ	710 UJ	740 U	340 UJ	63 J	370 UJ	360 UJ	380 UJ
Benzo(a)anthracene	540 UJ	130 J	430 UJ	240 J	77 J	200 J	1,000 J	370 UJ	360 UJ	90 J
Benzo(a)pyrene	540 UJ	130 J	430 UJ	140 J	740 U	230 J	1,200 J	370 UJ	360 UJ	84 J
Benzo(b)fluoranthene	540 UJ	210 J	93 J	510 J	110 J	290 J	1,600 J	370 UJ	360 UJ	190 J
Benzo(g,h,i)perylene	540 UJ	99 J	430 UJ	150 J	740 U	200 J	960 J	370 UJ	360 UJ	90 J
Benzo(k)fluoranthene	540 UJ	92 J	430 UJ	250 J	740 U	120 J	480 J	370 UJ	360 UJ	62 J
Butylbenzylphthalate	540 UJ	530 UJ	430 UJ	710 UJ	740 U	340 UJ	340 UJ	370 UJ	360 UJ	380 UJ
Carbazole	540 UJ	530 UJ	430 UJ	710 UJ	740 U	340 UJ	69 J	370 UJ	360 UJ	380 UJ
Chrysene	540 UJ	220 J	66 J	350 J	83 J	220 J	1,100 J	370 UJ	360 UJ	140 J
Di-n-butylphthalate	160 J	530 UJ	430 UJ	710 UJ	740 U	340 UJ	340 UJ	370 UJ	360 UJ	380 UJ
Di-n-octylphthalate	540 UJ	530 UJ	430 UJ	710 UJ	740 U	340 UJ	340 UJ	370 UJ	360 UJ	380 UJ

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
R - Unreliable result
U - Analyte not detected

Appendix H
Surface Soil Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SS20	SJS5-SS21	SJS5-SS22	SJS5-SS23	SJS5-SS24	SJS5-SS25	SJS5-SS26	SJS5-SS27		SJS5-SS28
Sample ID	SJS05-SS20-000	SJS05-SS21-000	SJS05-SS22-000	SJS05-SS23-000	SJS05-SS24-000	SJS05-SS25-000	SJS05-SS26-000	SJS05-SS27-000	SJS05-SS27-000P	SJS05-SS28-000
Sample Date	04/22/99	04/22/99	04/22/99	04/22/99	04/22/99	04/22/99	04/22/99	04/22/99	04/22/99	04/22/99
Chemical Name										
Dibenz(a,h)anthracene	540 UJ	530 UJ	430 UJ	710 UJ	740 U	42 J	220 J	370 UJ	360 UJ	380 UJ
Dibenzofuran	540 UJ	530 UJ	430 UJ	710 UJ	740 U	340 UJ	340 UJ	370 UJ	360 UJ	380 UJ
Diethylphthalate	540 UJ	530 UJ	430 UJ	710 UJ	740 U	340 UJ	340 UJ	370 UJ	360 UJ	380 UJ
Dimethyl phthalate	540 UJ	530 UJ	430 UJ	710 UJ	740 U	340 UJ	340 UJ	370 UJ	360 UJ	380 UJ
Fluoranthene	540 UJ	160 J	430 UJ	320 J	110 J	290 J	1,400 J	370 UJ	360 UJ	130 J
Fluorene	540 UJ	530 UJ	430 UJ	710 UJ	740 U	340 UJ	340 UJ	370 UJ	360 UJ	380 UJ
Hexachlorobenzene	540 UJ	530 UJ	430 UJ	710 UJ	740 U	340 UJ	340 UJ	370 UJ	360 UJ	380 UJ
Hexachlorobutadiene	540 UJ	530 UJ	430 UJ	710 UJ	740 U	340 UJ	340 UJ	370 UJ	360 UJ	380 UJ
Hexachlorocyclopentadiene	540 UJ	530 UJ	430 UJ	710 UJ	740 U	340 UJ	340 UJ	370 UJ	360 UJ	380 UJ
Hexachloroethane	540 UJ	530 UJ	430 UJ	710 UJ	740 U	340 UJ	340 UJ	370 UJ	360 UJ	380 UJ
Indeno(1,2,3-cd)pyrene	540 UJ	95 J	430 UJ	170 J	740 U	150 J	760 J	370 UJ	360 UJ	86 J
Isophorone	540 UJ	530 UJ	430 UJ	710 UJ	740 U	340 UJ	340 UJ	370 UJ	360 UJ	380 UJ
Naphthalene	540 UJ	530 UJ	430 UJ	710 UJ	740 U	340 UJ	340 UJ	370 UJ	360 UJ	380 UJ
Nitrobenzene	540 UJ	530 UJ	430 UJ	710 UJ	740 U	340 UJ	340 UJ	370 UJ	360 UJ	380 UJ
Pentachlorophenol	1,300 UJ	1,300 UJ	1,100 UJ	1,800 UJ	1,900 U	840 UJ	850 UJ	930 UJ	900 UJ	960 UJ
Phenanthrene	540 UJ	530 UJ	430 UJ	710 UJ	740 U	71 J	320 J	370 UJ	360 UJ	50 J
Phenol	540 UJ	530 UJ	430 UJ	710 UJ	740 U	340 UJ	340 UJ	370 UJ	360 UJ	380 UJ
Pyrene	540 UJ	120 J	430 UJ	240 J	76 J	260 J	1,300 J	370 UJ	360 UJ	87 J
bis(2-Chloroethoxy)methane	540 UJ	530 UJ	430 UJ	710 UJ	740 U	340 UJ	340 UJ	370 UJ	360 UJ	380 UJ
bis(2-Chloroethyl)ether	540 UJ	530 UJ	430 UJ	710 UJ	740 U	340 UJ	340 UJ	370 UJ	360 UJ	380 UJ
bis(2-Ethylhexyl)phthalate	66 J	530 UJ	66 J	710 UJ	740 U	340 UJ	340 UJ	74 J	360 UJ	380 UJ
n-Nitroso-di-n-propylamine	540 UJ	530 UJ	430 UJ	710 UJ	740 U	340 UJ	340 UJ	370 UJ	360 UJ	380 UJ
n-Nitrosodiphenylamine	540 UJ	530 UJ	430 UJ	710 UJ	740 U	340 UJ	340 UJ	370 UJ	360 UJ	380 UJ
Pesticide/Polychlorinated Biphenyls (UG/KG)										
4,4'-DDD	5.30 UJ	6.10 J	5.20 J	4.5 J	1.10 J	1.20 J	1.90 J	0.460 J	0.230 J	3.5 J
4,4'-DDE	0.530 J	40 J	150 J	7.10 J	3.40 J	5.40 J	3.30 J	2.60 J	1.20 J	31 J
4,4'-DDT	5.30 UJ	12 J	36 J	13 J	7.40 UJ	9.40 J	4.5 J	2.5 J	1.40 J	56 J
Aldrin	2.70 UJ	2.60 UJ	2.10 UJ	3.5 UJ	3.70 UJ	1.70 UJ	1.70 UJ	1.90 UJ	1.80 UJ	1.90 UJ
Aroclor-1016	53 UJ	53 UJ	43 UJ	70 UJ	74 UJ	34 UJ	34 UJ	37 UJ	36 UJ	38 UJ
Aroclor-1221	110 UJ	110 UJ	86 UJ	140 UJ	150 UJ	67 UJ	67 UJ	74 UJ	72 UJ	77 UJ
Aroclor-1232	53 UJ	53 UJ	43 UJ	70 UJ	74 UJ	34 UJ	34 UJ	37 UJ	36 UJ	38 UJ
Aroclor-1242	53 UJ	53 UJ	43 UJ	70 UJ	74 UJ	34 UJ	34 UJ	37 UJ	36 UJ	38 UJ
Aroclor-1248	53 UJ	53 UJ	43 UJ	70 UJ	74 UJ	34 UJ	34 UJ	37 UJ	36 UJ	38 UJ
Aroclor-1254	53 UJ	53 UJ	43 UJ	70 UJ	74 UJ	34 UJ	34 UJ	37 UJ	36 UJ	38 UJ
Aroclor-1260	53 UJ	53 UJ	43 UJ	70 UJ	74 UJ	34 UJ	34 UJ	37 UJ	36 UJ	38 UJ
Dieldrin	5.30 UJ	5.30 UJ	4.30 UJ	7 UJ	7.40 UJ	3.40 UJ	3.40 UJ	3.70 UJ	3.60 UJ	3.80 UJ
Endosulfan I	2.70 UJ	2.60 UJ	2.10 UJ	3.5 UJ	3.70 UJ	1.70 UJ	1.70 UJ	1.90 UJ	1.80 UJ	1.90 UJ
Endosulfan II	5.30 UJ	5.30 UJ	4.30 UJ	7 UJ	7.40 UJ	3.40 UJ	3.40 UJ	3.70 UJ	3.60 UJ	3.80 UJ

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
R - Unreliable result
U - Analyte not detected

Appendix H
Surface Soil Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SS20	SJS5-SS21	SJS5-SS22	SJS5-SS23	SJS5-SS24	SJS5-SS25	SJS5-SS26	SJS5-SS27		SJS5-SS28
Sample ID	SJS05-SS20-000	SJS05-SS21-000	SJS05-SS22-000	SJS05-SS23-000	SJS05-SS24-000	SJS05-SS25-000	SJS05-SS26-000	SJS05-SS27-000	SJS05-SS27-000P	SJS05-SS28-000
Sample Date	04/22/99	04/22/99	04/22/99	04/22/99	04/22/99	04/22/99	04/22/99	04/22/99	04/22/99	04/22/99
Chemical Name										
Endosulfan sulfate	5.30 UJ	5.30 UJ	4.30 UJ	7 UJ	7.40 UJ	3.40 UJ	3.40 UJ	3.70 UJ	3.60 UJ	3.80 UJ
Endrin	5.30 UJ	5.30 UJ	4.30 UJ	7 UJ	7.40 UJ	3.40 UJ	3.40 UJ	3.70 UJ	3.60 UJ	3.80 UJ
Endrin aldehyde	5.30 UJ	5.30 UJ	4.30 UJ	7 UJ	7.40 UJ	3.40 UJ	3.40 UJ	3.70 UJ	3.60 UJ	3.80 UJ
Endrin ketone	5.30 UJ	5.30 UJ	4.30 UJ	7 UJ	7.40 UJ	3.40 UJ	3.40 UJ	3.70 UJ	3.60 UJ	3.80 UJ
Heptachlor	2.70 UJ	2.60 UJ	2.10 UJ	3.5 UJ	3.70 UJ	1.70 UJ	1.70 UJ	1.90 UJ	1.80 UJ	1.90 UJ
Heptachlor epoxide	2.70 UJ	2.60 UJ	2.10 UJ	3.5 UJ	3.70 UJ	1.70 UJ	1.70 UJ	1.90 UJ	1.80 UJ	1.90 UJ
Methoxychlor	27 UJ	26 UJ	21 UJ	35 UJ	37 UJ	17 UJ	17 UJ	19 UJ	18 UJ	19 UJ
Toxaphene	270 UJ	260 UJ	210 UJ	350 UJ	370 UJ	170 UJ	170 UJ	190 UJ	180 UJ	190 UJ
alpha-BHC	2.70 UJ	2.60 UJ	2.10 UJ	3.5 UJ	3.70 UJ	1.70 UJ	1.70 UJ	1.90 UJ	1.80 UJ	1.90 UJ
alpha-Chlordane	2.70 UJ	2.60 UJ	2.10 UJ	3.5 UJ	3.70 UJ	1.70 UJ	0.580 J	1.90 UJ	1.80 UJ	1.90 UJ
beta-BHC	2.70 UJ	2.60 UJ	2.10 UJ	3.5 UJ	3.70 UJ	1.70 UJ	1.70 UJ	1.90 UJ	1.80 UJ	1.90 UJ
delta-BHC	2.70 UJ	2.60 UJ	2.10 UJ	3.5 UJ	3.70 UJ	1.70 UJ	1.70 UJ	1.90 UJ	1.80 UJ	1.90 UJ
gamma-BHC (Lindane)	2.70 UJ	2.60 UJ	2.10 UJ	3.5 UJ	3.70 UJ	1.70 UJ	1.70 UJ	1.90 UJ	1.80 UJ	1.90 UJ
gamma-Chlordane	2.70 UJ	2.60 UJ	2.10 UJ	3.5 UJ	3.70 UJ	1.70 UJ	1.70 UJ	1.90 UJ	1.80 UJ	1.90 UJ
Explosives (UG/KG)										
1,3,5-Trinitrobenzene	250 U	238 U	250 U	250 U	238 U	227 U	250 U	250 U	250 U	250 U
1,3-Dinitrobenzene	250 U	238 U	250 U	250 U	238 U	227 U	250 U	250 U	250 U	250 U
2,4,6-Trinitrotoluene	250 U	238 U	250 U	250 U	238 U	227 U	250 U	250 U	250 U	250 U
2,4-Dinitrotoluene	250 U	238 U	250 U	250 U	238 U	227 U	250 U	250 U	250 U	250 U
2,6-Dinitrotoluene	250 U	238 U	250 U	250 U	238 U	227 U	250 U	250 U	250 U	250 U
2-Amino-4,6-dinitrotoluene	250 U	238 U	250 U	250 U	417	227 U	250 U	250 U	250 U	250 U
2-Nitrotoluene	500 U	477 U	500 U	500 U	477 U	455 U	500 U	500 U	500 U	500 U
3-Nitrotoluene	500 U	477 U	500 U	500 U	477 U	455 U	500 U	500 U	500 U	500 U
4-Amino-2,6-dinitrotoluene	250 U	238 U	250 U	250 U	238 U	227 U	250 U	250 U	250 U	250 U
4-Nitrotoluene	500 U	477 U	500 U	500 U	477 U	455 U	500 U	500 U	500 U	500 U
HMX	500 U	477 U	500 U	500 U	477 U	455 U	500 U	500 U	500 U	500 U
Nitrobenzene	250 U	238 U	250 U	250 U	238 U	227 U	250 U	250 U	250 U	250 U
RDX	500 U	477 U	500 U	500 U	477 U	455 U	500 U	500 U	500 U	500 U
Tetryl	500 U	477 U	500 U	500 U	477 U	455 U	500 U	500 U	500 U	500 U
Total Metals (MG/KG)										
% Solids	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aluminum	13,100	10,000	6,330	14,400	13,000	8,860	3,030	3,050	3,440	7,520
Antimony	0.820 U	1.90 J	1.40 J	1.80 J	1.20 U	0.460 UL	0.540 UL	0.520 UL	0.450 UL	0.580 UL
Arsenic	8.60	12.9	7.90	24.4	10.6	1.60 J	1.10 J	0.840 J	1.40 J	9.30
Barium	58.1 J	194	87.3	271	76.8 J	59.4	15.4 J	14.2 J	16.6 J	49.3
Beryllium	0.510 J	0.450 J	0.510 J	0.520 J	1.30 J	0.320 J	0.100 J	0.100 J	0.110 J	0.210 J
Cadmium	0.130 J	0.650 J	0.450 J	0.510 J	0.440 J	0.410 J	0.720 J	0.270 J	0.280 J	0.160 J

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

R - Unreliable result
U - Analyte not detected

Appendix H
Surface Soil Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SS20	SJS5-SS21	SJS5-SS22	SJS5-SS23	SJS5-SS24	SJS5-SS25	SJS5-SS26	SJS5-SS27		SJS5-SS28
Sample ID	SJS05-SS20-000	SJS05-SS21-000	SJS05-SS22-000	SJS05-SS23-000	SJS05-SS24-000	SJS05-SS25-000	SJS05-SS26-000	SJS05-SS27-000	SJS05-SS27-000P	SJS05-SS28-000
Sample Date	04/22/99	04/22/99	04/22/99	04/22/99	04/22/99	04/22/99	04/22/99	04/22/99	04/22/99	04/22/99
Chemical Name										
Calcium	1,100 J	5,830	3,030	792 J	8,730	1,700	672 J	352 J	375 J	1,040 J
Chromium	29.1	24.5	15.2	30.9	29.6	17.6	6	5.40	5.5	17.7
Cobalt	3.90 J	4.70 J	5 J	3.60 J	8.5 J	6.60 J	1 J	0.600 B	0.520 B	2 J
Copper	27.3	47	28.1	106	65.7	16	5.10	5.70	6	20.5
Cyanide	0.310	0.370 U	0.190 U	0.350 U	0.660	0.210 U	0.190 U	0.220 U	0.270	0.280
Iron	25,700	29,500	14,000	34,200	26,500	15,200	3,160	2,810	3,030	22,100
Lead	74.4	187	105	524	117	70.2	29.7	47.1	55.5	49.3
Magnesium	2,960	2,500	1,620	2,400	3,160	3,640	386 J	225 J	242 J	1,560
Manganese	99.3	428	224	94.2	255	279 K	29.2 K	14.6 K	16 K	62.1 K
Mercury	0.130	0.350	0.150	0.370	0.430	0.0400	0.0300 J	0.0400	0.0400	0.25
Nickel	9.20 J	12.2	9.10	11.6 J	20.9	12.2	2.70 J	1.90 J	2 J	5 J
Potassium	2,410	2,230	830	2,650	2,230	2,990	405 J	211 J	223 J	2,090
Selenium	1 J	1.10	0.490 J	1.60 J	1.10 U	0.440 U	0.520 U	0.5 U	0.440 U	0.560 U
Silver	0.270 U	0.190 U	0.140 U	0.370 U	0.390 U	0.150 U	0.180 U	0.170 U	0.150 U	0.190 U
Sodium	381 J	204 J	63.1 J	488 J	284 J	75.4 J	29.7 U	28.7 U	24.8 U	593 J
Thallium	0.970 U	0.660 U	0.490 U	1.30 U	1.40 U	0.540 U	0.640 U	0.620 U	0.540 U	0.690 U
Vanadium	49.3	44.3	29.1	62.1	51.9	34.1	8 J	8.80 J	10.1	25.8
Zinc	91.2	256	156	93.3	117	78.2	46.2	30.7	34.6	47.6
pH	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry (MG/KG)										
% Solids	56.7	57.3	77.3	47.1	45.3	99	97.8	89.7	92.6	86.7
Phosphorus	4.52 U	5.29 U	2.44 U	6.43 U	6.31 U	3.26 UL	2.49 UL	2.72 UL	2.16 UL	3.30 UL
pH	4.20	6.07	5.34	3.99	6.23	5.43	5.85	4.80	4.80	4.87

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
R - Unreliable result
U - Analyte not detected

Appendix H
Surface Soil Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SS29		SJS5-SS30	SJS5-SS31	SJS5-SS32	SJS5-SS33	SJS5-SS34	SJS5-SS35
Sample ID	SJS05-SS29-000	SJS05-SS29-000P	SJS05-SS30-000	SJS05-SS31-000	SJS05-SS32-000	SJS05-SS33-000	SJS05-SS34-000	SJS05-SS35-000
Sample Date	05/23/99	05/23/99	04/19/99	04/19/99	04/19/99	04/22/99	04/22/99	04/22/99
Chemical Name								
Volatile Organic Compounds (UG/KG)								
1,1,1-Trichloroethane	12 UJ	12 UJ	13 UJ	10 U	11 U	12 U	12 U	18 U
1,1,2,2-Tetrachloroethane	12 UJ	12 UJ	13 UJ	10 U	11 UJ	12 U	12 U	18 U
1,1,2-Trichloroethane	12 UJ	12 UJ	13 UJ	10 U	11 U	12 U	12 U	18 U
1,1-Dichloroethane	12 UJ	12 UJ	13 UJ	10 U	11 U	12 U	12 U	18 U
1,1-Dichloroethene	12 UJ	12 UJ	13 UJ	10 U	11 U	12 U	12 U	18 U
1,2-Dichloroethane	12 UJ	12 UJ	13 UJ	10 U	11 U	12 U	12 U	18 U
1,2-Dichloroethene (total)	12 UJ	12 UJ	13 UJ	10 U	11 U	12 U	12 U	18 U
1,2-Dichloropropane	12 UJ	12 UJ	13 UJ	10 U	11 U	12 U	12 U	18 U
2-Butanone	NA	NA	13 UJ	10 U	11 U	12 U	12 U	18 U
2-Hexanone	12 UJ	12 UJ	13 UJ	10 U	11 UJ	12 U	12 U	18 U
4-Methyl-2-pentanone	12 UJ	12 UJ	13 UJ	10 U	11 UJ	12 U	12 U	18 U
Acetone	NA	NA	55 J	29	11 U	12 U	21	18 U
Benzene	12 UJ	12 UJ	13 UJ	10 U	11 U	12 U	12 U	18 U
Bromodichloromethane	12 UJ	12 UJ	13 UJ	10 U	11 U	12 U	12 U	18 U
Bromoform	12 UJ	12 UJ	13 UJ	10 U	11 U	12 U	12 U	18 U
Bromomethane	12 UJ	12 UJ	13 UJ	10 U	11 U	12 U	12 U	18 U
Carbon disulfide	12 UJ	12 UJ	13 UJ	10 U	11 U	12 U	12 U	18 U
Carbon tetrachloride	12 UJ	12 UJ	13 UJ	10 U	11 U	12 U	12 U	18 U
Chlorobenzene	12 UJ	12 UJ	13 UJ	10 U	11 UJ	12 U	12 U	18 U
Chloroethane	12 UJ	12 UJ	13 UJ	10 U	11 U	12 U	12 U	18 U
Chloroform	2 B	2 B	13 UJ	10 U	11 U	12 U	12 U	18 U
Chloromethane	12 UJ	12 UJ	13 UJ	10 U	11 U	12 U	12 U	18 U
Dibromochloromethane	12 UJ	12 UJ	13 UJ	10 U	11 U	12 U	12 U	18 U
Ethylbenzene	12 UJ	12 UJ	13 UJ	10 U	11 UJ	12 U	12 U	18 U
Methylene chloride	48 B	45 B	24 B	23 B	9 B	100	30 B	34 B
Styrene	12 UJ	12 UJ	13 UJ	10 U	11 UJ	12 U	29	18 U
Tetrachloroethene	12 UJ	12 UJ	13 UJ	10 U	11 UJ	12 U	12 U	18 U
Toluene	12 UJ	12 UJ	13 UJ	10 U	11 UJ	12 U	12 U	18 U
Trichloroethene	12 UJ	12 UJ	20 B	10 J	26	4 J	5 J	8 J
Vinyl chloride	12 UJ	12 UJ	13 UJ	10 U	11 U	12 U	12 U	18 U
Xylene, total	12 UJ	12 UJ	13 UJ	10 U	11 UJ	12 U	12 U	18 U
cis-1,3-Dichloropropene	12 UJ	12 UJ	13 UJ	10 U	11 U	12 U	12 U	18 U
trans-1,3-Dichloropropene	12 UJ	12 UJ	13 UJ	10 U	11 U	12 U	12 U	18 U
Semi-volatile Organic Compounds (UG/KG)								
1,2,4-Trichlorobenzene	410 U	410 U	430 UJ	340 UJ	350 UJ	390 UJ	420 UJ	610 UJ
1,2-Dichlorobenzene	410 U	410 U	430 UJ	340 UJ	350 UJ	390 UJ	420 UJ	610 UJ

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
R - Unreliable result
U - Analyte not detected

Appendix H
Surface Soil Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SS29		SJS5-SS30	SJS5-SS31	SJS5-SS32	SJS5-SS33	SJS5-SS34	SJS5-SS35
Sample ID	SJS05-SS29-000	SJS05-SS29-000P	SJS05-SS30-000	SJS05-SS31-000	SJS05-SS32-000	SJS05-SS33-000	SJS05-SS34-000	SJS05-SS35-000
Sample Date	05/23/99	05/23/99	04/19/99	04/19/99	04/19/99	04/22/99	04/22/99	04/22/99
Chemical Name								
1,3-Dichlorobenzene	410 U	410 U	430 UJ	340 UJ	350 UJ	390 UJ	420 UJ	610 UJ
1,4-Dichlorobenzene	410 U	410 U	430 UJ	340 UJ	350 UJ	390 UJ	420 UJ	610 UJ
2,2'-Oxybis(1-chloropropane)	410 U	410 U	430 UJ	340 UJ	350 UJ	390 UJ	420 UJ	610 UJ
2,4,5-Trichlorophenol	1,000 U	1,000 U	1,100 UJ	840 UJ	890 UJ	980 UJ	1,000 UJ	1,500 UJ
2,4,6-Trichlorophenol	410 U	410 U	430 UJ	340 UJ	350 UJ	390 UJ	420 UJ	610 UJ
2,4-Dichlorophenol	410 U	410 U	430 UJ	340 UJ	350 UJ	390 UJ	420 UJ	610 UJ
2,4-Dimethylphenol	410 U	410 U	430 UJ	340 UJ	350 UJ	390 UJ	420 UJ	610 UJ
2,4-Dinitrophenol	1,000 U	1,000 U	1,100 UJ	840 UJ	890 UJ	980 UJ	1,000 UJ	1,500 UJ
2,4-Dinitrotoluene	410 U	410 U	430 UJ	340 UJ	350 UJ	140 J	43 J	610 UJ
2,6-Dinitrotoluene	410 U	410 U	430 UJ	340 UJ	350 UJ	390 UJ	420 UJ	610 UJ
2-Chloronaphthalene	410 U	410 U	430 UJ	340 UJ	350 UJ	390 UJ	420 UJ	610 UJ
2-Chlorophenol	410 U	410 U	430 UJ	340 UJ	350 UJ	390 UJ	420 UJ	610 UJ
2-Methylnaphthalene	410 U	410 U	430 UJ	340 UJ	350 UJ	390 UJ	420 UJ	610 UJ
2-Methylphenol	410 U	410 U	430 UJ	340 UJ	350 UJ	390 UJ	420 UJ	610 UJ
2-Nitroaniline	1,000 U	1,000 U	1,100 UJ	840 UJ	890 UJ	980 UJ	1,000 UJ	1,500 UJ
2-Nitrophenol	410 U	410 U	430 UJ	340 UJ	350 UJ	390 UJ	420 UJ	610 UJ
3,3'-Dichlorobenzidine	410 U	410 U	430 UJ	340 UJ	350 UJ	390 UJ	420 UJ	610 UJ
3-Nitroaniline	1,000 U	1,000 U	1,100 UJ	840 UJ	890 UJ	980 UJ	1,000 UJ	1,500 UJ
4,6-Dinitro-2-methylphenol	1,000 U	1,000 U	1,100 UJ	840 UJ	890 UJ	980 UJ	1,000 UJ	1,500 UJ
4-Bromophenyl-phenylether	410 U	410 U	430 UJ	340 UJ	350 UJ	390 UJ	420 UJ	610 UJ
4-Chloro-3-methylphenol	410 U	410 U	430 UJ	340 UJ	350 UJ	390 UJ	420 UJ	610 UJ
4-Chloroaniline	410 U	410 U	430 UJ	340 UJ	350 UJ	390 UJ	420 UJ	610 UJ
4-Chlorophenyl-phenylether	410 U	410 U	430 UJ	340 UJ	350 UJ	390 UJ	420 UJ	610 UJ
4-Methylphenol	410 U	410 U	430 UJ	340 UJ	350 UJ	390 UJ	420 UJ	610 UJ
4-Nitroaniline	1,000 U	1,000 U	1,100 UJ	840 UJ	890 UJ	980 UJ	1,000 UJ	1,500 UJ
4-Nitrophenol	1,000 U	1,000 U	1,100 UJ	840 UJ	890 UJ	980 UJ	1,000 UJ	1,500 UJ
Acenaphthene	410 U	410 U	430 UJ	340 UJ	350 UJ	390 UJ	420 UJ	610 UJ
Acenaphthylene	410 U	410 U	430 UJ	340 UJ	350 UJ	390 UJ	420 UJ	110 J
Anthracene	410 U	410 U	430 UJ	340 UJ	350 UJ	390 UJ	420 UJ	140 J
Benzo(a)anthracene	410 U	52 J	220 J	340 UJ	48 J	95 J	140 J	840 J
Benzo(a)pyrene	410 U	47 J	180 J	340 UJ	50 J	110 J	130 J	760 J
Benzo(b)fluoranthene	410 U	61 J	490 J	77 J	110 J	170 J	250 J	2,100 J
Benzo(g,h,i)perylene	410 U	410 U	240 J	70 J	52 J	100 J	120 J	680 J
Benzo(k)fluoranthene	410 U	410 U	140 J	340 UJ	350 UJ	64 J	74 J	580 J
Butylbenzylphthalate	410 U	410 U	430 UJ	340 UJ	350 UJ	390 UJ	420 UJ	610 UJ
Carbazole	410 U	410 U	430 UJ	340 UJ	350 UJ	390 UJ	420 UJ	610 UJ
Chrysene	410 U	54 J	320 J	45 J	73 J	130 J	190 J	1,300 J
Di-n-butylphthalate	52 J	50 J	430 UJ	340 UJ	350 UJ	150 J	420 UJ	610 UJ
Di-n-octylphthalate	410 U	410 U	430 UJ	340 UJ	350 UJ	390 UJ	420 UJ	610 UJ

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
R - Unreliable result
U - Analyte not detected

Appendix H
Surface Soil Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SS29		SJS5-SS30	SJS5-SS31	SJS5-SS32	SJS5-SS33	SJS5-SS34	SJS5-SS35
Sample ID	SJS05-SS29-000	SJS05-SS29-000P	SJS05-SS30-000	SJS05-SS31-000	SJS05-SS32-000	SJS05-SS33-000	SJS05-SS34-000	SJS05-SS35-000
Sample Date	05/23/99	05/23/99	04/19/99	04/19/99	04/19/99	04/22/99	04/22/99	04/22/99
Chemical Name								
Dibenz(a,h)anthracene	410 U	410 U	430 UJ	340 UJ	350 UJ	390 UJ	420 UJ	260 J
Dibenzofuran	410 U	410 U	430 UJ	340 UJ	350 UJ	390 UJ	420 UJ	610 UJ
Diethylphthalate	410 U	410 U	430 UJ	340 UJ	350 UJ	390 UJ	420 UJ	610 UJ
Dimethyl phthalate	410 U	410 U	430 UJ	340 UJ	350 UJ	390 UJ	420 UJ	610 UJ
Fluoranthene	410 U	99 J	330 J	57 J	96 J	140 J	180 J	1,200 J
Fluorene	410 U	410 U	430 UJ	340 UJ	350 UJ	390 UJ	420 UJ	610 UJ
Hexachlorobenzene	410 U	410 U	430 UJ	340 UJ	350 UJ	390 UJ	420 UJ	610 UJ
Hexachlorobutadiene	410 U	410 U	430 UJ	340 UJ	350 UJ	390 UJ	420 UJ	610 UJ
Hexachlorocyclopentadiene	410 U	410 U	430 UJ	340 UJ	350 UJ	390 UJ	420 UJ	610 UJ
Hexachloroethane	410 U	410 U	430 UJ	340 UJ	350 UJ	390 UJ	420 UJ	610 UJ
Indeno(1,2,3-cd)pyrene	410 U	410 U	210 J	46 J	49 J	390 UJ	110 J	680 J
Isophorone	410 U	410 U	430 UJ	340 UJ	350 UJ	390 UJ	420 UJ	610 UJ
Naphthalene	410 U	410 U	430 UJ	340 UJ	350 UJ	390 UJ	420 UJ	90 J
Nitrobenzene	410 U	410 U	430 UJ	340 UJ	350 UJ	390 UJ	420 UJ	610 UJ
Pentachlorophenol	1,000 U	1,000 U	1,100 UJ	840 UJ	890 UJ	980 UJ	1,000 UJ	1,500 UJ
Phenanthrene	410 U	48 J	100 J	340 UJ	38 J	49 J	43 J	230 J
Phenol	410 U	410 U	430 UJ	340 UJ	350 UJ	390 UJ	420 UJ	610 UJ
Pyrene	410 U	77 J	230 J	52 J	68 J	120 J	170 J	840 J
bis(2-Chloroethoxy)methane	410 U	410 U	430 UJ	340 UJ	350 UJ	390 UJ	420 UJ	610 UJ
bis(2-Chloroethyl)ether	410 U	410 U	430 UJ	340 UJ	350 UJ	390 UJ	420 UJ	610 UJ
bis(2-Ethylhexyl)phthalate	410 U	410 U	430 UJ	37 B	350 UJ	390 UJ	420 UJ	610 UJ
n-Nitroso-di-n-propylamine	410 U	410 U	430 UJ	340 UJ	350 UJ	390 UJ	420 UJ	610 UJ
n-Nitrosodiphenylamine	410 U	410 U	430 UJ	340 UJ	350 UJ	390 UJ	420 UJ	610 UJ
Pesticide/Polychlorinated Biphenyls (UG/KG)								
4,4'-DDD	2.40 J	2.90 J	5.70 J	11 J	67 R	5.20 J	4.10 UJ	6 UJ
4,4'-DDE	190 J	210 J	250 J	15 J	1,300 J	56 J	38 J	4,700 J
4,4'-DDT	23 R	33	16 J	25 J	3,100 J	55 J	60 J	3,100 J
Aldrin	2 U	2 U	2.10 UJ	1.70 UJ	1.80 UJ	1.90 UJ	2.10 UJ	3 UJ
Aroclor-1016	41 U	41 U	43 UJ	33 UJ	35 UJ	39 UJ	41 UJ	60 UJ
Aroclor-1221	82 U	82 U	86 UJ	67 UJ	71 UJ	78 UJ	82 UJ	120 UJ
Aroclor-1232	41 U	41 U	43 UJ	33 UJ	35 UJ	39 UJ	41 UJ	60 UJ
Aroclor-1242	41 U	41 U	43 UJ	33 UJ	35 UJ	39 UJ	41 UJ	60 UJ
Aroclor-1248	41 U	41 U	43 UJ	33 UJ	35 UJ	39 UJ	41 UJ	60 UJ
Aroclor-1254	41 U	41 U	43 UJ	33 UJ	35 UJ	39 UJ	41 UJ	60 UJ
Aroclor-1260	41 U	41 U	43 UJ	33 UJ	35 UJ	39 UJ	41 UJ	60 UJ
Dieldrin	4.10 U	4.10 U	4.30 UJ	3.30 UJ	3.5 UJ	3.90 UJ	4.10 UJ	6 UJ
Endosulfan I	2 U	2 U	2.10 UJ	1.70 UJ	1.80 UJ	1.90 UJ	2.10 UJ	3 UJ
Endosulfan II	4.10 U	4.10 U	4.30 UJ	3.30 UJ	3.5 UJ	3.90 UJ	4.10 UJ	6 UJ

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
R - Unreliable result
U - Analyte not detected

Appendix H
Surface Soil Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SS29		SJS5-SS30	SJS5-SS31	SJS5-SS32	SJS5-SS33	SJS5-SS34	SJS5-SS35
Sample ID	SJS05-SS29-000	SJS05-SS29-000P	SJS05-SS30-000	SJS05-SS31-000	SJS05-SS32-000	SJS05-SS33-000	SJS05-SS34-000	SJS05-SS35-000
Sample Date	05/23/99	05/23/99	04/19/99	04/19/99	04/19/99	04/22/99	04/22/99	04/22/99
Chemical Name								
Endosulfan sulfate	4.10 U	4.10 U	4.30 UJ	3.30 UJ	3.5 UJ	3.90 UJ	4.10 UJ	6 UJ
Endrin	4.10 U	4.10 U	4.30 UJ	3.30 UJ	3.5 UJ	3.90 UJ	4.10 UJ	6 UJ
Endrin aldehyde	4.10 U	4.10 U	4.30 UJ	3.30 UJ	3.5 UJ	3.90 UJ	4.10 UJ	6 UJ
Endrin ketone	4.10 U	4.10 U	4.30 UJ	3.30 UJ	3.5 UJ	3.90 UJ	4.10 UJ	6 UJ
Heptachlor	2 U	2 U	2.10 UJ	1.70 UJ	1.80 UJ	1.90 UJ	2.10 UJ	3 UJ
Heptachlor epoxide	2 U	2 U	2.10 UJ	1.70 UJ	1.80 UJ	1.90 UJ	2.10 UJ	3 UJ
Methoxychlor	20 U	20 U	21 UJ	17 UJ	18 UJ	19 UJ	21 UJ	30 UJ
Toxaphene	200 U	200 U	210 UJ	170 UJ	180 UJ	190 UJ	210 UJ	300 UJ
alpha-BHC	2 U	2 U	2.10 UJ	1.70 UJ	1.80 UJ	1.90 UJ	2.10 UJ	3 UJ
alpha-Chlordane	2 U	2 U	2.10 UJ	1.70 UJ	1.80 UJ	1.90 UJ	2.10 UJ	3 UJ
beta-BHC	2 U	2 U	2.10 UJ	1.70 UJ	1.80 UJ	1.90 UJ	2.10 UJ	3 UJ
delta-BHC	2 U	2 U	2.10 UJ	1.70 UJ	1.80 UJ	1.90 UJ	2.10 UJ	3 UJ
gamma-BHC (Lindane)	2 U	2 U	2.10 UJ	1.70 UJ	1.80 UJ	1.90 UJ	2.10 UJ	3 UJ
gamma-Chlordane	2 U	2 U	2.10 UJ	1.70 UJ	1.80 UJ	1.90 UJ	2.10 UJ	3 UJ
Explosives (UG/KG)								
1,3,5-Trinitrobenzene	250 U	250 U	250 U	250 U	238 U	250 U	250 U	238 U
1,3-Dinitrobenzene	250 U	250 U	250 U	250 U	238 U	250 U	250 U	238 U
2,4,6-Trinitrotoluene	250 U	250 U	250 U	250 U	238 U	250 U	250 U	238 U
2,4-Dinitrotoluene	250 U	250 U	250 U	250 U	238 U	250 U	250 U	238 U
2,6-Dinitrotoluene	250 U	250 U	250 U	250 U	238 U	250 U	250 U	238 U
2-Amino-4,6-dinitrotoluene	250 U	250 U	250 U	250 U	238 U	250 U	250 U	238 U
2-Nitrotoluene	500 U	500 U	500 U	500 U	476 U	500 U	500 U	476 U
3-Nitrotoluene	500 U	500 U	500 U	500 U	476 U	500 U	500 U	476 U
4-Amino-2,6-dinitrotoluene	250 U	250 U	250 U	250 U	238 U	250 U	250 U	238 U
4-Nitrotoluene	500 U	500 U	500 U	500 U	476 U	500 U	500 U	476 U
HMX	500 U	500 U	500 U	500 U	476 U	500 U	500 U	476 U
Nitrobenzene	250 U	250 U	250 U	250 U	238 U	250 U	250 U	238 U
RDX	500 U	500 U	500 U	500 U	476 U	500 U	500 U	476 U
Tetryl	500 U	500 U	500 U	500 U	476 U	500 U	500 U	476 U
Total Metals (MG/KG)								
% Solids	81.9	81.6	NA	NA	NA	NA	NA	NA
Aluminum	8,210	8,400	14,500	4,990	7,640	8,430	14,300	20,600
Antimony	4.60 J	5.30 J	0.670 UL	0.520 UL	0.780 L	2.60 L	0.580 UL	0.840 UL
Arsenic	20.1	20	11.1	9.60	81.6	14.7	14.2	17.8
Barium	1,780	1,790	115	63.4	74.6	283	129	102
Beryllium	0.340 J	0.330 J	0.540 J	0.190 J	0.440 J	0.470 J	0.440 J	0.570 J
Cadmium	2.90	3.20	0.280 J	0.220 J	0.170 J	0.940 J	0.260 J	0.450 J

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
R - Unreliable result
U - Analyte not detected

Appendix H
Surface Soil Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SS29		SJS5-SS30	SJS5-SS31	SJS5-SS32	SJS5-SS33	SJS5-SS34	SJS5-SS35
Sample ID	SJS05-SS29-000	SJS05-SS29-000P	SJS05-SS30-000	SJS05-SS31-000	SJS05-SS32-000	SJS05-SS33-000	SJS05-SS34-000	SJS05-SS35-000
Sample Date	05/23/99	05/23/99	04/19/99	04/19/99	04/19/99	04/22/99	04/22/99	04/22/99
Chemical Name								
Calcium	12,300	24,300	1,830	1,230	653 J	3,540	230 J	1,170 J
Chromium	22.9	24.7	28	12.4	11.2	26.9	31.2	44.7
Cobalt	3.30 J	2.90 J	4.20 J	2.40 J	1.70 J	4.5 J	3.80 J	4.80 J
Copper	242	210	63.1	26.4	25.1	162	34.7	40.5
Cyanide	0.25 U	0.240	NA	NA	NA	0.170 U	0.25 U	0.350 U
Iron	11,100	10,300	25,700	9,850	10,400	17,300	32,300	44,400
Lead	285	303	92.3	53.4	59.1	377	250	223
Magnesium	1,450	1,460	2,640	1,610	904 J	1,570	2,540	3,780
Manganese	244	407	153	102	43.7	209 K	92.1 K	189 K
Mercury	0.130	0.140	0.320	0.0500	0.140	1.10	0.290	0.600
Nickel	8.80 J	8.40 J	13	5.90 J	6.80 J	12.6	9.20	14.2
Potassium	1,340	1,290	1,850	2,060	670 J	1,730	2,980	4,430
Selenium	0.590 U	0.580 U	0.920 K	0.640 K	0.520 U	0.530 U	0.550 U	0.810 U
Silver	0.340 J	4.60	0.220 U	0.170 U	0.180 U	0.180 U	0.190 U	0.280 U
Sodium	337 J	401 J	175 J	56.6 J	149 J	163 J	220 J	303 J
Thallium	0.730 U	0.710 U	0.800 U	0.620 U	0.640 U	0.650 U	0.680 U	1 U
Vanadium	27.9	26.7	46.3	22.7	29	31.8	42.3	69.1
Zinc	2,040	1,910	174	126	107	364	70.1	127
pH	7.62	7.5	NA	NA	NA	NA	NA	NA
Wet Chemistry (MG/KG)								
% Solids	NA	NA	77.9	99.3	94.1	85.2	80.2	55.1
Phosphorus	3.70 U	3.71 U	76.5	47.3	58.9	3.45 UL	3.67 UL	7.26 UL
pH	NA	NA	4.99	5.64	4.68	6.64	3.93	4.31

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
R - Unreliable result
U - Analyte not detected

Appendix H
Subsurface Soil Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SB01	SJS5-SB02	SJS5-SB03	SJS5-SB04		SJS5-SB05	SJS5-SB06	SJS5-SB07		SJS5-SB08	SJS5-SB09
Sample ID	SJS05-SB01-003	SJS05-SB02-002	SJS05-SB03-002	SJS05-SB04-002	SJS05-SB04-003	SJS05-SB05-000	SJS05-SB06-002	SJS05-SB07-002	SJS05-SB07-002P	SJS05-SB08-002	SJS05-SB09-002
Sample Date	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	06/25/97	06/24/97	06/24/97	06/24/97	06/25/97	06/24/97
Chemical Name											
Volatile Organic Compounds (UG/KG)											
1,1,1-Trichloroethane	18 U	19 U	16 U	NA	12 U	16 U	12 U	20 U	18 U	21 U	12 U
1,1,2,2-Tetrachloroethane	18 U	19 U	16 U	NA	12 U	16 U	12 U	20 UJ	18 U	21 U	12 U
1,1,2-Trichloroethane	18 U	19 U	16 U	NA	12 U	16 U	12 U	20 U	18 U	21 U	12 U
1,1-Dichloroethane	18 U	19 U	16 U	NA	12 U	16 U	12 U	20 U	18 U	21 U	12 U
1,1-Dichloroethene	18 U	19 U	16 U	NA	12 U	16 U	12 U	20 U	18 U	21 U	12 U
1,2-Dichloroethane	18 U	19 U	16 U	NA	12 U	16 U	12 U	20 U	18 U	21 U	12 U
1,2-Dichloroethene (total)	18 U	19 U	16 U	NA	12 U	16 U	12 U	20 U	18 U	21 U	12 U
1,2-Dichloropropane	18 U	19 U	16 U	NA	12 U	16 U	12 U	20 U	18 U	21 U	12 U
2-Butanone	21	19 U	16 U	NA	12 U	16 U	12 U	83	89	32	12 U
2-Hexanone	18 U	19 U	16 U	NA	12 U	16 U	12 U	20 UJ	18 U	21 U	12 U
4-Methyl-2-pentanone	18 U	19 U	16 U	NA	12 U	16 U	12 U	20 UJ	18 U	21 U	12 U
Acetone	170	84 B	110 B	NA	120 B	62 B	24 B	350 B	240 B	180 B	18
Benzene	18 U	19 U	16 U	NA	12 U	16 U	12 U	20 U	18 U	21 U	12 U
Bromodichloromethane	18 U	19 U	16 U	NA	12 U	16 U	12 U	20 U	18 U	21 U	12 U
Bromoform	18 U	19 U	16 U	NA	12 U	16 U	12 U	20 U	18 U	21 U	12 U
Bromomethane	18 U	19 U	16 U	NA	12 U	16 U	12 U	20 U	18 U	21 U	12 U
Carbon disulfide	18 U	19 U	16 U	NA	2 J	9 B	12 U	17 J	17 J	21 U	12 U
Carbon tetrachloride	18 U	19 U	16 U	NA	12 U	16 U	12 U	20 U	18 U	21 U	12 U
Chlorobenzene	18 U	19 U	16 U	NA	12 U	16 U	12 U	20 UJ	18 U	21 U	12 U
Chloroethane	18 U	19 U	16 U	NA	12 U	16 U	12 U	20 U	18 U	21 U	12 U
Chloroform	18 U	19 U	16 U	NA	12 U	16 U	12 U	20 U	18 U	21 U	12 U
Chloromethane	18 U	19 U	16 U	NA	12 U	16 U	12 U	20 U	18 U	21 U	12 U
Dibromochloromethane	18 U	19 U	16 U	NA	12 U	16 U	12 U	20 U	18 U	21 U	12 U
Ethylbenzene	18 U	19 U	16 U	NA	12 U	16 U	12 U	20 UJ	18 U	21 U	12 U
Methylene chloride	100 B	48 B	72 B	NA	78 B	14 J	57 B	23 B	25 B	57 B	33 B
Styrene	18 U	19 U	16 U	NA	12 U	16 U	12 U	20 UJ	18 U	21 U	12 U
Tetrachloroethene	18 U	19 U	16 U	NA	12 U	2 J	12 U	20 UJ	18 U	3 J	12 U
Toluene	18 U	19 U	16 U	NA	12 U	16 U	12 U	20 UJ	18 U	21 U	12 U
Trichloroethene	18 U	19 U	16 U	NA	12 U	16 U	12 U	20 U	18 U	21 U	12 U
Vinyl chloride	18 U	19 U	16 U	NA	12 U	16 U	12 U	20 U	18 U	21 U	12 U
Xylene, total	18 U	19 U	16 U	NA	12 U	16 U	12 U	20 UJ	18 U	21 U	12 U
cis-1,3-Dichloropropene	18 U	19 U	16 U	NA	12 U	16 U	12 U	20 U	18 U	21 U	12 U
trans-1,3-Dichloropropene	18 U	19 U	16 U	NA	12 U	16 U	12 U	20 U	18 U	21 U	12 U
TCLP Volatile Organic Compounds (MG/L)											
1,1-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Butanone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon tetrachloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

K - Reported value may be biased high
L - Reported value may be biased low
NJ
U - Analyte not detected

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated

Appendix H
Subsurface Soil Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SB01	SJS5-SB02	SJS5-SB03	SJS5-SB04		SJS5-SB05	SJS5-SB06	SJS5-SB07		SJS5-SB08	SJS5-SB09
Sample ID	SJS05-SB01-003	SJS05-SB02-002	SJS05-SB03-002	SJS05-SB04-002	SJS05-SB04-003	SJS05-SB05-000	SJS05-SB06-002	SJS05-SB07-002	SJS05-SB07-002P	SJS05-SB08-002	SJS05-SB09-002
Sample Date	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	06/25/97	06/24/97	06/24/97	06/24/97	06/25/97	06/24/97
Chemical Name											
Chloroform	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semi-volatile Organic Compounds (UG/KG)											
1,2,4-Trichlorobenzene	420 U	570 U	490 U	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 U	410 U
1,2-Dichlorobenzene	420 U	570 U	490 U	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 U	410 U
1,3-Dichlorobenzene	420 U	570 U	490 U	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 U	410 U
1,4-Dichlorobenzene	420 U	570 U	490 U	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 U	410 U
2,2'-Oxybis(1-chloropropane)	420 U	570 U	490 U	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 U	410 U
2,4,5-Trichlorophenol	1,100 U	1,400 U	1,200 U	NA	1,200 UJ	1,300 U	1,100 UJ	1,200 U	1,300 U	1,400 U	1,000 U
2,4,6-Trichlorophenol	420 U	570 U	490 U	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 U	410 U
2,4-Dichlorophenol	420 U	570 U	490 U	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 U	410 U
2,4-Dimethylphenol	420 U	570 U	490 U	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 U	410 U
2,4-Dinitrophenol	1,100 U	1,400 U	1,200 U	NA	1,200 UJ	1,300 U	1,100 UJ	1,200 U	1,300 U	1,400 U	1,000 U
2,4-Dinitrotoluene	420 U	570 U	490 U	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 U	410 U
2,6-Dinitrotoluene	420 U	570 U	490 U	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 U	410 U
2-Chloronaphthalene	420 U	570 U	490 U	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 U	410 U
2-Chlorophenol	420 U	570 U	490 U	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 U	410 U
2-Methylnaphthalene	420 U	570 U	490 U	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 U	410 U
2-Methylphenol	420 U	570 U	490 U	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 U	410 U
2-Nitroaniline	1,100 U	1,400 U	1,200 U	NA	1,200 UJ	1,300 U	1,100 UJ	1,200 U	1,300 U	1,400 U	1,000 U
2-Nitrophenol	420 U	570 U	490 U	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 U	410 U
3,3'-Dichlorobenzidine	420 U	570 U	490 U	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 U	410 U
3-Nitroaniline	1,100 U	1,400 U	1,200 U	NA	1,200 UJ	1,300 U	1,100 UJ	1,200 U	1,300 U	1,400 U	1,000 U
4,6-Dinitro-2-methylphenol	1,100 U	1,400 U	1,200 U	NA	1,200 UJ	1,300 U	1,100 UJ	1,200 U	1,300 U	1,400 UJ	1,000 U
4-Bromophenyl-phenylether	420 U	570 U	490 U	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 UJ	410 U
4-Chloro-3-methylphenol	420 U	570 U	490 U	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 U	410 U
4-Chloroaniline	420 U	570 U	490 U	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 U	410 U
4-Chlorophenyl-phenylether	420 U	570 U	490 U	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 U	410 U
4-Methylphenol	420 U	570 U	490 U	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 U	410 U
4-Nitroaniline	1,100 U	1,400 U	1,200 U	NA	1,200 UJ	1,300 U	1,100 UJ	1,200 U	1,300 U	1,400 U	1,000 U
4-Nitrophenol	1,100 U	1,400 U	1,200 U	NA	1,200 UJ	1,300 U	1,100 UJ	1,200 U	1,300 U	1,400 U	1,000 U
Acenaphthene	420 U	570 U	490 U	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 U	410 U
Acenaphthylene	420 U	570 U	490 U	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 U	410 U
Anthracene	420 U	570 U	170 J	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 UJ	410 U
Benzo(a)anthracene	65 J	570 U	490	NA	460 UJ	130 J	60 J	88 J	220 J	570 U	410 U
Benzo(a)pyrene	60 J	570 U	270 J	NA	460 UJ	82 J	440 UJ	120 J	250 J	67 J	410 U
Benzo(b)fluoranthene	100 J	150 J	510	NA	460 UJ	300 J	440 UJ	230 J	630 J	160 J	410 U
Benzo(g,h,i)perylene	420 U	570 U	110 J	NA	460 UJ	65 J	440 UJ	59 J	160 J	570 U	410 U
Benzo(k)fluoranthene	420 U	570 U	160 J	NA	460 UJ	120 J	440 UJ	71 J	180 J	570 U	410 U
Butylbenzylphthalate	420 U	570 U	490 U	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 U	410 U

K - Reported value may be biased high
L - Reported value may be biased low
NJ
U - Analyte not detected

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated

Appendix H
Subsurface Soil Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SB01	SJS5-SB02	SJS5-SB03	SJS5-SB04		SJS5-SB05	SJS5-SB06	SJS5-SB07		SJS5-SB08	SJS5-SB09
Sample ID	SJS05-SB01-003	SJS05-SB02-002	SJS05-SB03-002	SJS05-SB04-002	SJS05-SB04-003	SJS05-SB05-000	SJS05-SB06-002	SJS05-SB07-002	SJS05-SB07-002P	SJS05-SB08-002	SJS05-SB09-002
Sample Date	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	06/25/97	06/24/97	06/24/97	06/24/97	06/25/97	06/24/97
Chemical Name											
Carbazole	420 U	570 U	490 U	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 UJ	410 U
Chrysene	78 J	110 J	450 J	NA	460 UJ	230 J	190 J	100 J	330 J	110 J	410 U
Di-n-butylphthalate	420 U	570 U	490 U	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 UJ	410 U
Di-n-octylphthalate	420 U	570 U	490 U	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 U	410 U
Dibenz(a,h)anthracene	420 U	570 U	490 U	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 U	410 U
Dibenzofuran	420 U	570 U	490 U	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 U	410 U
Diethylphthalate	420 U	570 U	490 U	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 U	410 U
Dimethyl phthalate	420 U	570 U	490 U	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 U	410 U
Fluoranthene	350 J	130 J	1,500	NA	69 J	170 J	49 J	540 J	940 J	260 J	410 U
Fluorene	420 U	570 U	490 U	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 U	410 U
Hexachlorobenzene	420 U	570 U	490 U	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 UJ	410 U
Hexachlorobutadiene	420 U	570 U	490 U	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 U	410 U
Hexachlorocyclopentadiene	420 U	570 U	490 U	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 U	410 U
Hexachloroethane	420 U	570 U	490 U	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 U	410 U
Indeno(1,2,3-cd)pyrene	420 U	570 U	120 J	NA	460 UJ	120 J	440 UJ	83 J	170 J	570 U	410 U
Isophorone	420 U	570 U	490 U	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 U	410 U
Naphthalene	420 U	570 U	83 J	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 U	410 U
Nitrobenzene	420 U	570 U	490 U	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 U	410 U
Pentachlorophenol	1,100 U	1,400 U	1,200 U	NA	1,200 UJ	1,300 U	1,100 UJ	1,200 U	1,300 U	1,400 UJ	1,000 U
Phenanthrene	420 U	570 U	79 J	NA	460 UJ	530 U	71 J	490 U	500 U	570 UJ	410 U
Phenol	420 U	570 U	490 U	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 U	410 U
Pyrene	330 J	570 U	880	NA	460 UJ	120 J	330 J	400 J	720 J	340 J	410 U
bis(2-Chloroethoxy)methane	420 U	570 U	490 U	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 U	410 U
bis(2-Chloroethyl)ether	420 U	570 U	490 U	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 U	410 U
bis(2-Ethylhexyl)phthalate	51 B	570 U	490 U	NA	79 B	530 U	130 B	490 U	500 U	150 B	58 B
n-Nitroso-di-n-propylamine	420 U	570 U	490 U	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 U	410 U
n-Nitrosodiphenylamine	420 U	570 U	490 U	NA	460 UJ	530 U	440 UJ	490 U	500 U	570 UJ	410 U
TCLP Semi-volatile Organic Compounds (MG/L)											
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,5-Trichlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3- and 4-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pentachlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyridine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pesticide/Polychlorinated Biphenyls (UG/KG)											

K - Reported value may be biased high
L - Reported value may be biased low
NJ
U - Analyte not detected

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated

Appendix H
Subsurface Soil Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SB01	SJS5-SB02	SJS5-SB03	SJS5-SB04		SJS5-SB05	SJS5-SB06	SJS5-SB07		SJS5-SB08	SJS5-SB09
Sample ID	SJS05-SB01-003	SJS05-SB02-002	SJS05-SB03-002	SJS05-SB04-002	SJS05-SB04-003	SJS05-SB05-000	SJS05-SB06-002	SJS05-SB07-002	SJS05-SB07-002P	SJS05-SB08-002	SJS05-SB09-002
Sample Date	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	06/25/97	06/24/97	06/24/97	06/24/97	06/25/97	06/24/97
Chemical Name											
4,4'-DDD	4.2 U	5.6 U	4.9 UJ	NA	4.6 U	33 J	4.4 U	4.9 UL	5 U	5.7 U	4.1 U
4,4'-DDE	4.2 U	5.6 U	4.9 UJ	NA	4.6 U	310	4.4 U	4.9 UL	5 U	5.7 U	4.1 U
4,4'-DDT	4.2 U	5.6 U	4.9 UJ	NA	4.6 U	620	4.4 U	4.9 UL	5 U	5.7 U	4.1 U
Aldrin	2.2 U	2.9 U	2.5 UJ	NA	2.4 U	2.7 U	2.3 U	2.5 UL	2.6 U	2.9 U	2.1 U
Aroclor-1016	42 U	56 U	49 UJ	NA	46 U	53 U	44 U	49 UL	50 U	57 U	41 U
Aroclor-1221	85 U	110 U	100 UJ	NA	93 U	110 U	89 U	100 UL	100 U	120 U	84 U
Aroclor-1232	42 U	56 U	49 UJ	NA	46 U	53 U	44 U	49 UL	50 U	57 U	41 U
Aroclor-1242	42 U	56 U	49 UJ	NA	46 U	53 U	44 U	49 UL	50 U	57 U	41 U
Aroclor-1248	42 U	56 U	49 UJ	NA	46 U	53 U	44 U	49 UL	50 U	57 U	41 U
Aroclor-1254	42 U	56 U	49 UJ	NA	46 U	53 U	44 U	49 UL	50 U	57 U	41 U
Aroclor-1260	42 U	56 U	49 UJ	NA	46 U	53 U	44 U	49 UL	50 U	57 U	41 U
Dieldrin	4.2 U	5.6 U	4.9 UJ	NA	4.6 U	5.3 U	4.4 U	4.9 UL	5 U	5.7 U	4.1 U
Endosulfan I	2.2 U	2.9 U	2.5 UJ	NA	2.4 U	2.7 U	2.3 U	2.5 UL	2.6 U	2.9 U	2.1 U
Endosulfan II	4.2 U	5.6 U	4.9 UJ	NA	4.6 U	5.3 U	4.4 U	4.9 UL	5 U	5.7 U	4.1 U
Endosulfan sulfate	4.2 U	5.6 U	4.9 UJ	NA	4.6 U	5.3 U	4.4 U	4.9 UL	5 U	5.7 U	4.1 U
Endrin	4.2 U	5.6 U	4.9 UJ	NA	4.6 U	5.3 U	4.4 U	4.9 UL	5 U	5.7 U	4.1 U
Endrin aldehyde	4.2 U	5.6 U	4.9 UJ	NA	4.6 U	5.3 U	4.4 U	4.9 UL	5 U	5.7 U	4.1 U
Endrin ketone	4.2 U	5.6 U	4.9 UJ	NA	4.6 U	5.3 U	4.4 U	4.9 UL	5 U	5.7 U	4.1 U
Heptachlor	2.2 U	2.9 U	2.5 UJ	NA	2.4 U	2.7 U	2.3 U	2.5 UL	2.6 U	2.9 U	2.1 U
Heptachlor epoxide	2.2 U	2.9 U	2.5 UJ	NA	2.4 U	2.7 U	2.3 U	2.5 UL	2.6 U	2.9 U	2.1 U
Methoxychlor	22 U	29 U	25 UJ	NA	24 U	27 U	23 U	25 UL	26 U	29 U	21 U
Toxaphene	220 U	290 U	250 UJ	NA	240 U	270 U	230 U	250 UL	260 U	290 U	210 U
alpha-BHC	2.2 U	2.9 U	2.5 UJ	NA	2.4 U	2.7 U	2.3 U	2.5 UL	2.6 U	2.9 U	2.1 U
alpha-Chlordane	2.2 U	2.9 U	2.5 UJ	NA	2.4 U	2.7 U	2.3 U	2.5 UL	2.6 U	2.9 U	2.1 U
beta-BHC	2.2 U	2.9 U	2.5 UJ	NA	2.4 U	2.7 U	2.3 U	2.5 UL	2.6 U	2.9 U	2.1 U
delta-BHC	2.2 U	2.9 U	2.5 UJ	NA	2.4 U	2.7 U	2.3 U	2.5 UL	2.6 U	2.9 U	2.1 U
gamma-BHC (Lindane)	2.2 U	2.9 U	2.5 UJ	NA	2.4 U	2.7 U	2.3 U	2.5 UL	2.6 U	2.9 U	2.1 U
gamma-Chlordane	2.2 U	2.9 U	2.5 UJ	NA	2.4 U	2.7 U	2.3 U	2.5 UL	2.6 U	2.9 U	2.1 U
TCLP Pesticides/PCBs (MG/L)											
Chlordane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor epoxide	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methoxychlor	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toxaphene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
gamma-BHC (Lindane)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TCLP Herbicides (MG/L)											
2,4,5-TP (Silvex)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dioxin/Furans (UG/KG)											

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated

K - Reported value may be biased high
L - Reported value may be biased low
NJ
U - Analyte not detected

Appendix H
Subsurface Soil Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SB01	SJS5-SB02	SJS5-SB03	SJS5-SB04		SJS5-SB05	SJS5-SB06	SJS5-SB07		SJS5-SB08	SJS5-SB09
Sample ID	SJS05-SB01-003	SJS05-SB02-002	SJS05-SB03-002	SJS05-SB04-002	SJS05-SB04-003	SJS05-SB05-000	SJS05-SB06-002	SJS05-SB07-002	SJS05-SB07-002P	SJS05-SB08-002	SJS05-SB09-002
Sample Date	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	06/25/97	06/24/97	06/24/97	06/24/97	06/25/97	06/24/97
Chemical Name											
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	NA	0.116	0.143	0.0346	NA	NA	0.0162	0.127	0.0786	NA	NA
1,2,3,4,6,7,8-Heptachlorodibenzofuran	NA	0.0025 U	0.0025 U	0.0025 U	NA	NA	0.0025 U	0.0026	0.0025 U	NA	NA
1,2,3,4,7,8,9-Heptachlorodibenzofuran	NA	0.0025 U	0.0025 U	0.0025 U	NA	NA	0.0025 U	0.0025 U	0.0025 U	NA	NA
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	NA	0.0025 U	0.0025 U	0.0025 U	NA	NA	0.0025 U	0.0025 U	0.0025 U	NA	NA
1,2,3,4,7,8-Hexachlorodibenzofuran	NA	0.0025 U	0.0025 U	0.0025 U	NA	NA	0.0025 U	0.0025 U	0.0025 U	NA	NA
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	NA	0.00302	0.0025 U	0.0025 U	NA	NA	0.0025 U	0.0025 U	0.0025 U	NA	NA
1,2,3,6,7,8-Hexachlorodibenzofuran	NA	0.0025 U	0.0025 U	0.0025 U	NA	NA	0.0025 U	0.0025 U	0.0025 U	NA	NA
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	NA	0.00844	0.00685	0.0025 U	NA	NA	0.0025 U	0.00532	0.00596	NA	NA
1,2,3,7,8,9-Hexachlorodibenzofuran	NA	0.0025 U	0.0025 U	0.0025 U	NA	NA	0.0025 U	0.0025 U	0.0025 U	NA	NA
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	NA	1.00E-03 U	1.00E-03 U	1.00E-03 U	NA	NA	1.00E-03 U	1.00E-03 U	1.00E-03 U	NA	NA
1,2,3,7,8-Pentachlorodibenzofuran	NA	1.00E-03 U	1.00E-03 U	1.00E-03 U	NA	NA	1.00E-03 U	1.00E-03 U	1.00E-03 U	NA	NA
2,3,4,6,7,8-Hexachlorodibenzofuran	NA	0.0025 U	0.0025 U	0.0025 U	NA	NA	0.0025 U	0.0025 U	0.0025 U	NA	NA
2,3,4,7,8-Pentachlorodibenzofuran	NA	1.00E-03 U	1.00E-03 U	1.00E-03 U	NA	NA	1.00E-03 U	1.00E-03 U	1.00E-03 U	NA	NA
2,3,7,8-TCDD (dioxin)	NA	1.00E-03 U	1.00E-03 U	1.00E-03 U	NA	NA	1.00E-03 U	1.00E-03 U	1.00E-03 U	NA	NA
2,3,7,8-Tetrachlorodibenzofuran	NA	1.00E-03 U	1.00E-03 U	1.00E-03 U	NA	NA	1.00E-03 U	1.00E-03 U	1.00E-03 U	NA	NA
PCDD_S	NA	0.00593	0.00659	0.00161	NA	NA	0.00116	0.00483	0.00485	NA	NA
Total heptachlorodibenzo-p-dioxin	NA	0.67	0.764	0.219	NA	NA	0.0994	0.561	0.592	NA	NA
Total heptachlorodibenzofuran	NA	0.0025 U	0.0025 U	0.0025 U	NA	NA	0.0025 U	0.0026	0.0025 U	NA	NA
Total hexachlorodibenzo-p-dioxin	NA	0.231	0.251	0.0557	NA	NA	0.0204	0.168	0.184	NA	NA
Total hexachlorodibenzofuran	NA	0.0025 U	0.0025 U	0.0025 U	NA	NA	0.0025 U	0.0025 U	0.0025 U	NA	NA
Total octachlorodibenzo-p-dioxin	NA	4.74	4.47	1.26	NA	NA	0.995	3.00	3.29	NA	NA
Total octachlorodibenzofuran	NA	0.00613	0.005 U	0.005 U	NA	NA	0.005 U	0.00714	0.005 U	NA	NA
Total pentachlorodibenzo-p-dioxin	NA	1.00E-03 U	0.0056	1.00E-03 U	NA	NA	1.00E-03 U	0.00965	0.00698	NA	NA
Total pentachlorodibenzofuran	NA	1.00E-03 U	1.00E-03 U	1.00E-03 U	NA	NA	1.00E-03 U	1.00E-03 U	1.00E-03 U	NA	NA
Total tetrachlorodibenzo-p-dioxin	NA	0.0107	0.0333	1.00E-03 U	NA	NA	1.00E-03 U	0.00883	0.0126	NA	NA
Total tetrachlorodibenzofuran	NA	1.00E-03 U	1.00E-03 U	1.00E-03 U	NA	NA	1.00E-03 U	1.00E-03 U	1.00E-03 U	NA	NA
Explosives (UG/KG)											
1,3,5-Trinitrobenzene	580 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dinitrobenzene	580 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,6-Trinitrotoluene	580 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Amino-4,6-dinitrotoluene	580 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitrotoluene	580 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3-Nitrotoluene	580 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Amino-2,6-dinitrotoluene	580 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitrotoluene	580 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
HMX	580 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RDX	580 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetryl	580 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

K - Reported value may be biased high
L - Reported value may be biased low
NJ
U - Analyte not detected

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated

Appendix H
Subsurface Soil Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SB01	SJS5-SB02	SJS5-SB03	SJS5-SB04		SJS5-SB05	SJS5-SB06	SJS5-SB07		SJS5-SB08	SJS5-SB09
Sample ID	SJS05-SB01-003	SJS05-SB02-002	SJS05-SB03-002	SJS05-SB04-002	SJS05-SB04-003	SJS05-SB05-000	SJS05-SB06-002	SJS05-SB07-002	SJS05-SB07-002P	SJS05-SB08-002	SJS05-SB09-002
Sample Date	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	06/25/97	06/24/97	06/24/97	06/24/97	06/25/97	06/24/97
Chemical Name											
Total Metals (MG/KG)											
Aluminum	12,300	27,900 J	15,100 J	NA	3,970 J	11,300	4,660 J	21,400 J	18,800 J	22,000	761
Antimony	0.86 L	0.72 UL	0.63 UL	NA	0.66 UL	0.79 J	0.48 UL	0.71 UL	0.64 L	0.68 J	2.3 L
Arsenic	4.9 L	18.6	6.9	NA	2.5 J	9	2.2 J	10	10.9	16.2	0.7 UL
Barium	44.7 J	52.7 J	28.6 J	NA	14.5 J	85.2	28.2 J	103	39.8 J	52.3 J	2.6 B
Beryllium	0.36 J	1 J	0.91 J	NA	0.33 U	0.39 J	0.24 U	1.5 J	0.8 J	1 J	0.23 U
Cadmium	0.14 U	0.18 U	0.16 U	NA	0.16 U	0.12 U	0.12 U	0.18 U	0.14 U	0.16 U	0.12 U
Calcium	1,120 J	1,620 J	1,290 J	NA	1,390 J	364 B	158 B	1,110 J	804 J	542 B	263 J
Chromium	24.9	49.9	26.3	NA	8.7	24.3	9	36.5	35.5	45.1	1.9 K
Cobalt	5.9 J	36	12.2 J	NA	2.63 U	3.9 J	3.1 J	8.1 J	21.7	11.9 J	1.88 U
Copper	25.1	58.3	13.6	NA	5 B	25	2 B	44.8	20.7	31.2	1.41 U
Cyanide	0.81 U	0.9 U	0.82 U	NA	0.85 U	0.67 U	0.63 U	0.91 U	0.91 U	0.88 U	0.6 U
Iron	19,100	41,600 J	25,000 J	NA	6,130 J	23,700	5,010 J	36,000 J	34,900 J	56,000	767
Lead	88.2 J	61.5 K	30.8 K	NA	9.5 K	89.2	3.7 K	269 K	48.4 K	70.5	3.9 J
Magnesium	3,010	5,910	3,840	NA	1,210 J	1,820	478 J	4,580	4,520	3,850	148 J
Manganese	118	210 J	212 J	NA	76.1 J	66.5	17.6 J	234 J	269 J	189	7
Mercury	0.23	0.09 U	0.18	NA	0.08 U	0.22	0.06 U	0.09	0.28	0.43	0.05 U
Nickel	8.3 B	65.6	15.6 B	NA	2.3 U	7.5 J	4.9 B	14.5 B	30.3	19.4	1.64 U
Potassium	2,300	4,360	2,280	NA	584 J	1,870	267 J	2,980	2,870	3,090	151 J
Selenium	0.87 UL	1.07 U	0.94 U	NA	0.98 U	0.73 U	0.72 U	1.06 U	0.83 U	0.96 U	0.7 UL
Silver	0.86 B	0.96 L	0.89 L	NA	0.4 L	1 B	0.35 L	0.65 L	0.67 L	1.8 B	0.23 U
Sodium	2,610	1,350 J	2,050	NA	975 J	197 B	94.2 B	1,600 J	1,350 J	296 B	35.5 B
Thallium	1.6 B	2.4 K	0.63 U	NA	0.66 U	1.5 J	0.48 U	0.71 U	1.3 K	4	0.47 U
Vanadium	26.7	47	30.7	NA	11.1 J	31.7	10.5 J	41.9	41.9	75.2	2.11 U
Zinc	84.4 L	119	110	NA	12.2 B	63.3	12.2 B	63.7	310	78.1	4 B
TCLP Metals (MG/L)											
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry (MG/KG)											
% Solids	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phosphorus	76.3	366	5.5	NA	18.3	1.6 U	5.2	6.8	5.9	15.9	4.6
pH	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

K - Reported value may be biased high
L - Reported value may be biased low
NJ
U - Analyte not detected

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated

Appendix H
Subsurface Soil Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SB10	SJS5-SB11		SJS5-SB12	SJS5-SB13	SJS5-SB14	SJS5-SB15	SJS5-SB16	SJS5-SB17	SJS5-SB18	SJS5-SB19
Sample ID	SJS05-SB10-002	SJS05-SB11-002	SJS05-SB11-002P	SJS05-SB12-002	SJS05-SB13-002	SJS05-SB14-002	SJS05-SB15-002	SJS05-SB16-001	SJS05-SB17-001	SJS05-SB18-001	SJS05-SB19-001
Sample Date	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	04/21/99	04/21/99	04/22/99	04/21/99
Chemical Name											
Volatile Organic Compounds (UG/KG)											
1,1,1-Trichloroethane	12 U	12 U	12 U	13 U	12 U	12 U	12 U	14 U	14 U	18 U	12 U
1,1,2,2-Tetrachloroethane	12 U	12 U	12 U	13 U	12 U	12 U	12 U	14 U	14 U	18 U	12 U
1,1,2-Trichloroethane	12 U	12 U	12 U	13 U	12 U	12 U	12 U	14 U	14 U	18 U	12 U
1,1-Dichloroethane	12 U	12 U	12 U	13 U	12 U	12 U	12 U	14 U	14 U	18 U	12 U
1,1-Dichloroethene	12 U	12 U	12 U	13 U	12 U	12 U	12 U	14 U	14 U	18 U	12 U
1,2-Dichloroethane	12 U	12 U	12 U	13 U	12 U	12 U	12 U	14 U	14 U	18 U	12 U
1,2-Dichloroethene (total)	12 U	12 U	12 U	13 U	12 U	12 U	12 U	14 U	14 U	18 U	12 U
1,2-Dichloropropane	12 U	12 U	12 U	13 U	12 U	12 U	12 U	14 U	14 U	18 U	12 U
2-Butanone	12 U	12 U	12 U	13 U	12 U	12 U	12 U	14 U	14 U	18 U	12 U
2-Hexanone	12 U	12 U	12 U	13 U	12 U	12 U	12 U	14 U	14 U	18 U	12 U
4-Methyl-2-pentanone	12 U	12 U	12 U	13 U	12 U	12 U	12 U	14 U	14 U	18 U	12 U
Acetone	11 J	23	21	15 B	45 B	14 B	21 B	30	45	18 U	12 U
Benzene	12 U	12 U	12 U	13 U	12 U	12 U	12 U	14 U	14 U	18 U	12 U
Bromodichloromethane	12 U	12 U	12 U	13 U	12 U	12 U	12 U	14 U	14 U	18 U	12 U
Bromoform	12 U	12 U	12 U	13 U	12 U	12 U	12 U	14 U	14 U	18 U	12 U
Bromomethane	12 U	12 U	12 U	13 U	12 U	12 U	12 U	14 U	14 U	18 U	12 U
Carbon disulfide	12 U	12 U	12 U	13 U	12 U	12 U	12 U	8 J	14 U	18 U	12 U
Carbon tetrachloride	12 U	12 U	12 U	13 U	12 U	12 U	12 U	14 U	14 U	18 U	12 U
Chlorobenzene	12 U	12 U	12 U	13 U	12 U	12 U	12 U	14 U	14 U	18 U	12 U
Chloroethane	12 U	12 U	12 U	13 U	12 U	12 U	12 U	14 U	14 U	18 U	12 U
Chloroform	12 U	12 U	12 U	13 U	12 U	12 U	12 U	14 U	14 U	18 U	12 U
Chloromethane	12 U	12 U	12 U	13 U	12 U	12 U	12 U	14 U	14 U	18 U	12 U
Dibromochloromethane	12 U	12 U	12 U	13 U	12 U	12 U	12 U	14 U	14 U	18 U	12 U
Ethylbenzene	12 U	12 U	12 U	13 U	12 U	12 U	12 U	14 U	14 U	18 U	12 U
Methylene chloride	39 B	61 B	54 B	7 B	73 B	20 B	75 B	12 B	10 B	28 B	12 B
Styrene	12 U	12 U	12 U	13 U	12 U	12 U	12 U	14 U	14 U	18 U	12 U
Tetrachloroethene	12 U	12 U	12 U	13 U	12 U	12 U	12 U	14 U	14 U	18 U	12 U
Toluene	12 U	12 U	12 U	13 U	12 U	12 U	12 U	14 U	14 U	18 U	12 U
Trichloroethene	12 U	12 U	12 U	13 U	12 U	12 U	12 U	14 U	14 U	18 U	12 U
Vinyl chloride	12 U	12 U	12 U	13 U	12 U	12 U	12 U	14 U	14 U	18 U	12 U
Xylene, total	12 U	12 U	12 U	13 U	12 U	12 U	12 U	14 U	14 U	18 U	12 U
cis-1,3-Dichloropropene	12 U	12 U	12 U	13 U	12 U	12 U	12 U	14 U	14 U	18 U	12 U
trans-1,3-Dichloropropene	12 U	12 U	12 U	13 U	12 U	12 U	12 U	14 U	14 U	18 U	12 U
TCLP Volatile Organic Compounds (MG/L)											
1,1-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Butanone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon tetrachloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

K - Reported value may be biased high
L - Reported value may be biased low
NJ
U - Analyte not detected

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated

Appendix H
Subsurface Soil Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SB10	SJS5-SB11		SJS5-SB12	SJS5-SB13	SJS5-SB14	SJS5-SB15	SJS5-SB16	SJS5-SB17	SJS5-SB18	SJS5-SB19
Sample ID	SJS05-SB10-002	SJS05-SB11-002	SJS05-SB11-002P	SJS05-SB12-002	SJS05-SB13-002	SJS05-SB14-002	SJS05-SB15-002	SJS05-SB16-001	SJS05-SB17-001	SJS05-SB18-001	SJS05-SB19-001
Sample Date	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	04/21/99	04/21/99	04/22/99	04/21/99
Chemical Name											
Chloroform	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semi-volatile Organic Compounds (UG/KG)											
1,2,4-Trichlorobenzene	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ
1,2-Dichlorobenzene	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ
1,3-Dichlorobenzene	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ
1,4-Dichlorobenzene	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ
2,2'-Oxybis(1-chloropropane)	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ
2,4,5-Trichlorophenol	860 U	950 U	1,700 U	950 U	930 U	990 U	1,100 U	1,200 UJ	1,100 UJ	1,500 UJ	1,000 UJ
2,4,6-Trichlorophenol	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ
2,4-Dichlorophenol	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ
2,4-Dimethylphenol	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ
2,4-Dinitrophenol	860 U	950 U	1,700 U	950 U	930 U	990 U	1,100 U	1,200 UJ	1,100 UJ	1,500 UJ	1,000 UJ
2,4-Dinitrotoluene	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ
2,6-Dinitrotoluene	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ
2-Chloronaphthalene	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ
2-Chlorophenol	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ
2-Methylnaphthalene	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ
2-Methylphenol	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ
2-Nitroaniline	860 U	950 U	1,700 U	950 U	930 U	990 U	1,100 U	1,200 UJ	1,100 UJ	1,500 UJ	1,000 UJ
2-Nitrophenol	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ
3,3'-Dichlorobenzidine	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ
3-Nitroaniline	860 U	950 U	1,700 U	950 U	930 U	990 U	1,100 U	1,200 UJ	1,100 UJ	1,500 UJ	1,000 UJ
4,6-Dinitro-2-methylphenol	860 U	950 U	1,700 U	950 U	930 U	990 U	1,100 U	1,200 UJ	1,100 UJ	1,500 UJ	1,000 UJ
4-Bromophenyl-phenylether	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ
4-Chloro-3-methylphenol	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ
4-Chloroaniline	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ
4-Chlorophenyl-phenylether	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ
4-Methylphenol	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ
4-Nitroaniline	860 U	950 U	1,700 U	950 U	930 U	990 U	1,100 U	1,200 UJ	1,100 UJ	1,500 UJ	1,000 UJ
4-Nitrophenol	860 U	950 U	1,700 U	950 U	930 U	990 U	1,100 U	1,200 UJ	1,100 UJ	1,500 UJ	1,000 UJ
Acenaphthene	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ
Acenaphthylene	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ
Anthracene	340 U	380 U	690 U	380 U	370 U	390 U	44 J	460 UJ	430 UJ	600 UJ	410 UJ
Benzo(a)anthracene	340 U	380 U	690 U	380 U	370 U	390 U	120 J	460 UJ	430 UJ	600 UJ	410 UJ
Benzo(a)pyrene	340 U	380 U	690 U	380 U	370 U	390 U	70 J	460 UJ	430 UJ	600 UJ	410 UJ
Benzo(b)fluoranthene	42 J	380 U	690 U	380 U	370 U	390 U	440	460 UJ	50 J	600 UJ	410 UJ
Benzo(g,h,i)perylene	340 U	380 U	690 U	380 U	370 U	390 U	100 J	460 UJ	430 UJ	600 UJ	410 UJ
Benzo(k)fluoranthene	340 U	380 U	690 U	380 U	370 U	390 U	140 J	460 UJ	430 UJ	600 UJ	410 UJ
Butylbenzylphthalate	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ

K - Reported value may be biased high
L - Reported value may be biased low
NJ
U - Analyte not detected

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated

Appendix H
Subsurface Soil Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SB10	SJS5-SB11		SJS5-SB12	SJS5-SB13	SJS5-SB14	SJS5-SB15	SJS5-SB16	SJS5-SB17	SJS5-SB18	SJS5-SB19
Sample ID	SJS05-SB10-002	SJS05-SB11-002	SJS05-SB11-002P	SJS05-SB12-002	SJS05-SB13-002	SJS05-SB14-002	SJS05-SB15-002	SJS05-SB16-001	SJS05-SB17-001	SJS05-SB18-001	SJS05-SB19-001
Sample Date	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	04/21/99	04/21/99	04/22/99	04/21/99
Chemical Name											
Carbazole	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ
Chrysene	340 U	380 U	690 U	380 U	370 U	390 U	210 J	460 UJ	69 J	600 UJ	410 UJ
Di-n-butylphthalate	340 U	380 U	690 U	380 U	370 U	390 U	420 U	270 J	430 UJ	600 UJ	410 UJ
Di-n-octylphthalate	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ
Dibenz(a,h)anthracene	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ
Dibenzofuran	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ
Diethylphthalate	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ
Dimethyl phthalate	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ
Fluoranthene	340 U	42 J	690 U	380 U	370 U	390 U	110 J	460 UJ	430 UJ	600 UJ	410 UJ
Fluorene	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ
Hexachlorobenzene	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ
Hexachlorobutadiene	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ
Hexachlorocyclopentadiene	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ
Hexachloroethane	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ
Indeno(1,2,3-cd)pyrene	340 U	380 U	690 U	380 U	370 U	390 U	140 J	460 UJ	430 UJ	600 UJ	410 UJ
Isophorone	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ
Naphthalene	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ
Nitrobenzene	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ
Pentachlorophenol	860 U	950 U	1,700 U	950 U	930 U	990 U	1,100 U	1,200 UJ	1,100 UJ	1,500 UJ	1,000 UJ
Phenanthrene	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ
Phenol	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ
Pyrene	340 U	42 J	690 U	380 U	370 U	390 U	81 J	460 UJ	430 UJ	600 UJ	410 UJ
bis(2-Chloroethoxy)methane	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ
bis(2-Chloroethyl)ether	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ
bis(2-Ethylhexyl)phthalate	51 B	150 B	2,900 B	380 U	370 U	390 U	420 U	460 UJ	430 UJ	340 J	410 UJ
n-Nitroso-di-n-propylamine	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ
n-Nitrosodiphenylamine	340 U	380 U	690 U	380 U	370 U	390 U	420 U	460 UJ	430 UJ	600 UJ	410 UJ
TCLP Semi-volatile Organic Compounds (MG/L)											
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,5-Trichlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3- and 4-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pentachlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyridine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pesticide/Polychlorinated Biphenyls (UG/KG)											

K - Reported value may be biased high
L - Reported value may be biased low
NJ
U - Analyte not detected

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated

Appendix H
Subsurface Soil Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SB10	SJS5-SB11		SJS5-SB12	SJS5-SB13	SJS5-SB14	SJS5-SB15	SJS5-SB16	SJS5-SB17	SJS5-SB18	SJS5-SB19
Sample ID	SJS05-SB10-002	SJS05-SB11-002	SJS05-SB11-002P	SJS05-SB12-002	SJS05-SB13-002	SJS05-SB14-002	SJS05-SB15-002	SJS05-SB16-001	SJS05-SB17-001	SJS05-SB18-001	SJS05-SB19-001
Sample Date	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	04/21/99	04/21/99	04/22/99	04/21/99
Chemical Name											
4,4'-DDD	3.4 U	3.8 U	3.5 UJ	2.6 J	3.7 U	3.9 U	110	4.70 UJ	4.30 UJ	0.170 J	4.10 UJ
4,4'-DDE	3.4 U	3.8 U	3.5 UJ	5.9	3.7 U	3.9 U	66 J	0.600 J	0.390 J	0.140 J	4.10 UJ
4,4'-DDT	3.4 U	3.8 U	3.5 UJ	3.7 J	3.7 U	3.9 U	11	1.80 J	1.40 J	0.110 J	4.10 UJ
Aldrin	1.8 U	1.9 U	1.8 UJ	1.9 U	1.9 U	2 U	2.2 U	2.30 UJ	2.10 UJ	2.90 UJ	2.10 UJ
Aroclor-1016	34 U	38 U	35 UJ	38 U	37 U	39 U	42 U	47 UJ	43 UJ	59 UJ	41 UJ
Aroclor-1221	70 U	76 U	71 UJ	76 U	75 U	80 U	86 U	93 UJ	85 UJ	120 UJ	82 UJ
Aroclor-1232	34 U	38 U	35 UJ	38 U	37 U	39 U	42 U	47 UJ	43 UJ	59 UJ	41 UJ
Aroclor-1242	34 U	38 U	35 UJ	38 U	37 U	39 U	42 U	47 UJ	43 UJ	59 UJ	41 UJ
Aroclor-1248	34 U	38 U	35 UJ	38 U	37 U	39 U	42 U	47 UJ	43 UJ	59 UJ	41 UJ
Aroclor-1254	34 U	38 U	35 UJ	38 U	37 U	39 U	42 U	47 UJ	43 UJ	59 UJ	41 UJ
Aroclor-1260	34 U	38 U	35 UJ	38 U	37 U	39 U	42 U	47 UJ	43 UJ	59 UJ	41 UJ
Dieldrin	3.4 U	3.8 U	3.5 UJ	3.8 U	3.7 U	3.9 U	4.2 U	4.70 UJ	4.30 UJ	5.90 UJ	4.10 UJ
Endosulfan I	1.8 U	1.9 U	1.8 UJ	1.9 U	1.9 U	2 U	2.2 U	2.30 UJ	2.10 UJ	2.90 UJ	2.10 UJ
Endosulfan II	3.4 U	3.8 U	3.5 UJ	3.8 U	3.7 U	3.9 U	4.2 U	4.70 UJ	4.30 UJ	5.90 UJ	4.10 UJ
Endosulfan sulfate	3.4 U	3.8 U	3.5 UJ	3.8 U	3.7 U	3.9 U	4.2 U	4.70 UJ	4.30 UJ	5.90 UJ	4.10 UJ
Endrin	3.4 U	3.8 U	3.5 UJ	3.8 U	3.7 U	3.9 U	4.2 U	4.70 UJ	4.30 UJ	5.90 UJ	4.10 UJ
Endrin aldehyde	3.4 U	3.8 U	3.5 UJ	3.8 U	3.7 U	3.9 U	4.2 U	4.70 UJ	4.30 UJ	5.90 UJ	4.10 UJ
Endrin ketone	3.4 U	3.8 U	3.5 UJ	3.8 U	3.7 U	3.9 U	4.2 U	4.70 UJ	4.30 UJ	5.90 UJ	4.10 UJ
Heptachlor	1.8 U	1.9 U	1.8 UJ	1.9 U	1.9 U	2 U	2.2 U	2.30 UJ	2.10 UJ	2.90 UJ	2.10 UJ
Heptachlor epoxide	1.8 U	1.9 U	1.8 UJ	1.9 U	1.9 U	2 U	2.2 U	2.30 UJ	2.10 UJ	2.90 UJ	2.10 UJ
Methoxychlor	18 U	19 U	18 UJ	19 U	19 U	20 U	22 U	23 UJ	21 UJ	29 UJ	21 UJ
Toxaphene	180 U	190 U	180 UJ	190 U	190 U	200 U	220 U	230 UJ	210 UJ	290 UJ	210 UJ
alpha-BHC	1.8 U	1.9 U	1.8 UJ	1.9 U	1.9 U	2 U	2.2 U	2.30 UJ	2.10 UJ	2.90 UJ	2.10 UJ
alpha-Chlordane	1.8 U	1.9 U	1.8 UJ	1.9 U	1.9 U	2 U	2.2 U	2.30 UJ	2.10 UJ	2.90 UJ	2.10 UJ
beta-BHC	1.8 U	1.9 U	1.8 UJ	1.9 U	1.9 U	2 U	2.2 U	2.30 UJ	2.10 UJ	2.90 UJ	2.10 UJ
delta-BHC	1.8 U	1.9 U	1.8 UJ	1.9 U	1.9 U	2 U	2.2 U	2.30 UJ	2.10 UJ	2.90 UJ	2.10 UJ
gamma-BHC (Lindane)	1.8 U	1.9 U	1.8 UJ	1.9 U	1.9 U	2 U	2.2 U	2.30 UJ	2.10 UJ	2.90 UJ	2.10 UJ
gamma-Chlordane	1.8 U	1.9 U	1.8 UJ	1.9 U	1.9 U	2 U	2.2 U	2.30 UJ	2.10 UJ	2.90 UJ	2.10 UJ
TCLP Pesticides/PCBs (MG/L)											
Chlordane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor epoxide	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methoxychlor	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toxaphene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
gamma-BHC (Lindane)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TCLP Herbicides (MG/L)											
2,4,5-TP (Silvex)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dioxin/Furans (UG/KG)											

K - Reported value may be biased high
L - Reported value may be biased low
NJ
U - Analyte not detected

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated

Appendix H
Subsurface Soil Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SB10	SJS5-SB11		SJS5-SB12	SJS5-SB13	SJS5-SB14	SJS5-SB15	SJS5-SB16	SJS5-SB17	SJS5-SB18	SJS5-SB19
Sample ID	SJS05-SB10-002	SJS05-SB11-002	SJS05-SB11-002P	SJS05-SB12-002	SJS05-SB13-002	SJS05-SB14-002	SJS05-SB15-002	SJS05-SB16-001	SJS05-SB17-001	SJS05-SB18-001	SJS05-SB19-001
Sample Date	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	04/21/99	04/21/99	04/22/99	04/21/99
Chemical Name											
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,6,7,8-Heptachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8,9-Heptachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8-Hexachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,6,7,8-Hexachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8,9-Hexachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8-Pentachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,3,4,6,7,8-Hexachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,3,4,7,8-Pentachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,3,7,8-TCDD (dioxin)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,3,7,8-Tetrachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCDD_S	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total heptachlorodibenzo-p-dioxin	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total heptachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total hexachlorodibenzo-p-dioxin	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total hexachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total octachlorodibenzo-p-dioxin	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total octachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total pentachlorodibenzo-p-dioxin	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total pentachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total tetrachlorodibenzo-p-dioxin	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total tetrachlorodibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Explosives (UG/KG)											
1,3,5-Trinitrobenzene	NA	NA	NA	NA	NA	640 U	NA	250 U	250 U	238 U	238 U
1,3-Dinitrobenzene	NA	NA	NA	NA	NA	640 U	NA	250 U	250 U	238 U	238 U
2,4,6-Trinitrotoluene	NA	NA	NA	NA	NA	640 U	NA	250 U	250 U	238 U	238 U
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	566	250 U	238 U	238 U
2,6-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	250 U	250 U	238 U	238 U
2-Amino-4,6-dinitrotoluene	NA	NA	NA	NA	NA	640 U	NA	250 U	250 U	238 U	238 U
2-Nitrotoluene	NA	NA	NA	NA	NA	640 U	NA	500 U	500 U	476 U	477 U
3-Nitrotoluene	NA	NA	NA	NA	NA	640 U	NA	500 U	500 U	476 U	477 U
4-Amino-2,6-dinitrotoluene	NA	NA	NA	NA	NA	640 U	NA	250 U	250 U	238 U	238 U
4-Nitrotoluene	NA	NA	NA	NA	NA	640 U	NA	500 U	500 U	476 U	477 U
HMX	NA	NA	NA	NA	NA	640 U	NA	500 U	500 U	476 U	477 U
Nitrobenzene	NA	NA	NA	NA	NA	NA	NA	250 U	250 U	238 U	238 U
RDX	NA	NA	NA	NA	NA	640 U	NA	500 U	500 U	476 U	477 U
Tetryl	NA	NA	NA	NA	NA	640 U	NA	500 U	500 U	476 U	477 U

K - Reported value may be biased high
L - Reported value may be biased low
NJ
U - Analyte not detected

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated

Appendix H
Subsurface Soil Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SB10	SJS5-SB11		SJS5-SB12	SJS5-SB13	SJS5-SB14	SJS5-SB15	SJS5-SB16	SJS5-SB17	SJS5-SB18	SJS5-SB19
Sample ID	SJS05-SB10-002	SJS05-SB11-002	SJS05-SB11-002P	SJS05-SB12-002	SJS05-SB13-002	SJS05-SB14-002	SJS05-SB15-002	SJS05-SB16-001	SJS05-SB17-001	SJS05-SB18-001	SJS05-SB19-001
Sample Date	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	06/24/97	04/21/99	04/21/99	04/22/99	04/21/99
Chemical Name											
Total Metals (MG/KG)											
Aluminum	547	2,760	1,430	2,860 J	919 J	2,070 J	1,800 J	9,740	2,230	13,900	1,180
Antimony	NA	NA	NA	0.46 UL	0.36 UL	0.4 UL	0.48 UL	0.580 U	0.580 U	0.890 U	0.560 U
Arsenic	0.65 UL	1.9 L	0.69 UL	0.93 J	0.54 U	0.6 U	1.1 J	7.5	2.10 J	11.2	0.550 J
Barium	2.4 B	7 B	4.3 B	8 J	2.3 B	6.9 J	3.4 B	918	7.60 J	55.7 J	4.5 J
Beryllium	0.22 U	0.17 U	0.23 U	0.23 U	0.18 U	0.2 U	0.24 U	0.540 J	0.190 J	0.660 J	0.0900 J
Cadmium	0.11 U	0.08 U	0.12 U	0.12 U	0.09 U	0.1 U	0.12 U	3.20	0.0600 U	0.130 J	0.0600 U
Calcium	266 J	22,300	50,500	579 J	135 B	451 J	382 J	9,900	1,530	1,050 J	402 J
Chromium	2.5 K	5.7	2.6 K	6.6	2.3	4.6	2.6	21.5	5.60	30.5	2.80
Cobalt	1.74 U	2.5 J	1.84 U	2.8 J	1.45 U	1.59 U	2 J	8.90 J	2 J	5.70 J	0.860 J
Copper	2 B	9.1	2.3 B	1.39 U	1.09 U	1.6 B	1.45 U	80.1	2.60 J	22.5	0.900 J
Cyanide	0.58 U	0.59 U	0.61 U	0.61 U	0.59 U	0.62 U	0.6 U	0.275 U	0.208 U	0.310 U	0.237 U
Iron	813	4,780	3,000	4,770 J	990 J	3,520 J	3,400 J	15,400	5,340	37,400	2,370
Lead	1.1 K	12.2 J	1.6 J	3.5 K	1.8 B	2.9 K	3.8 K	113	4.70	68.3	2.10
Magnesium	177 J	818 J	716 J	639 J	87.6 J	412 J	271 J	2,520	647 J	3,790	226 J
Manganese	6.6	60.4	86.4	52.4 J	7 J	41.3 J	30.2 J	124	71.7	231	21.3
Mercury	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.06 U	0.05 U	0.0200 J	0.0200 U	0.0700	0.0200 U
Nickel	1.52 U	3 B	1.61 U	2.7 B	1.27 U	1.39 U	1.8 B	13.2	2.60 J	11.2 J	1.10 J
Potassium	123 J	414 J	276 J	498 J	108 J	365 J	242 J	1,680	403 J	3,190	178 J
Selenium	0.65 UL	0.5 UL	0.69 UL	0.7 U	0.54 U	0.6 U	0.72 U	0.560 U	0.770 J	0.850 U	0.540 U
Silver	0.23 J	0.52 J	0.67 J	0.32 L	0.18 UL	0.2 UL	0.24 UL	0.190 U	0.190 U	0.300 U	0.190 U
Sodium	38.9 B	143 B	318 B	58 B	23.3 B	46.8 B	36.9 B	701 J	32 U	845 J	30.9 U
Thallium	0.43 U	0.33 U	0.46 U	0.46 U	0.36 U	0.4 U	0.48 U	0.690 U	0.690 U	1 U	0.670 U
Vanadium	1.95 U	5.9 J	2.9 B	7.1 J	1.6 J	4.9 J	3.2 J	18.1	8.60 J	37	2.80 J
Zinc	3.8 B	20.2 B	9.5 B	12.8 B	5 B	8.3 B	6.7 B	1,810	13.5	123	6.20
TCLP Metals (MG/L)											
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry (MG/KG)											
% Solids	NA	NA	NA	NA	NA	NA	NA	71.6	78.4	56.4	81.2
Phosphorus	71	49.3	10.8	4.8	5.7	8.9	6.2	3.33 UL	3.19 UL	7.39 U	2.68 UL
pH	NA	NA	NA	NA	NA	NA	NA	8.01	5.79	3.75	8.21

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated

K - Reported value may be biased high
L - Reported value may be biased low
NJ
U - Analyte not detected

Appendix H
Subsurface Soil Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SB20		SJS5-SB21	SJS5-SB22	SJS5-SB24	SJS5-SB25	SJS5-SB26	SJS6-SB01	
Sample ID	SJS05-SB20-001	SJS05-SB20-001P	SJS05-SB21-001	SJS05-SB22-001	SJS05-SB24-001	SJS05-SB25-001	SJS05-SB26-001	SJS06-SB01-001	SJS06-SB01-001P
Sample Date	04/22/99	04/22/99	04/21/99	06/25/01	06/26/01	06/28/01	07/03/01	06/25/01	06/25/01
Chemical Name									
Volatile Organic Compounds (UG/KG)									
1,1,1-Trichloroethane	15 U	15 U	13 U	NA	NA	NA	NA	NA	NA
1,1,2,2-Tetrachloroethane	15 U	15 U	13 U	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	15 U	15 U	13 U	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	15 U	15 U	13 U	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	15 U	15 U	13 U	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	15 U	15 U	13 U	NA	NA	NA	NA	NA	NA
1,2-Dichloroethene (total)	15 U	15 U	13 U	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	15 U	15 U	13 U	NA	NA	NA	NA	NA	NA
2-Butanone	15 U	26	13 U	NA	NA	NA	NA	NA	NA
2-Hexanone	15 U	15 U	13 U	NA	NA	NA	NA	NA	NA
4-Methyl-2-pentanone	15 U	15 U	13 U	NA	NA	NA	NA	NA	NA
Acetone	15 U	15 U	20	NA	NA	NA	NA	NA	NA
Benzene	15 U	15 U	13 U	NA	NA	NA	NA	NA	NA
Bromodichloromethane	15 U	15 U	13 U	NA	NA	NA	NA	NA	NA
Bromoform	15 U	15 U	13 U	NA	NA	NA	NA	NA	NA
Bromomethane	15 U	15 U	13 U	NA	NA	NA	NA	NA	NA
Carbon disulfide	15 U	15 U	13 U	NA	NA	NA	NA	NA	NA
Carbon tetrachloride	15 U	15 U	13 U	NA	NA	NA	NA	NA	NA
Chlorobenzene	15 U	15 U	13 U	NA	NA	NA	NA	NA	NA
Chloroethane	15 U	15 U	13 U	NA	NA	NA	NA	NA	NA
Chloroform	15 U	15 U	13 U	NA	NA	NA	NA	NA	NA
Chloromethane	15 U	15 U	13 U	NA	NA	NA	NA	NA	NA
Dibromochloromethane	15 U	15 U	13 U	NA	NA	NA	NA	NA	NA
Ethylbenzene	15 U	15 U	13 U	NA	NA	NA	NA	NA	NA
Methylene chloride	22 B	142	13 B	NA	NA	NA	NA	NA	NA
Styrene	15 U	15 U	13 U	NA	NA	NA	NA	NA	NA
Tetrachloroethene	15 U	15 U	13 U	NA	NA	NA	NA	NA	NA
Toluene	15 U	15 U	13 U	NA	NA	NA	NA	NA	NA
Trichloroethene	15 U	15 U	13 U	NA	NA	NA	NA	NA	NA
Vinyl chloride	15 U	15 U	13 U	NA	NA	NA	NA	NA	NA
Xylene, total	15 U	15 U	13 U	NA	NA	NA	NA	NA	NA
cis-1,3-Dichloropropene	15 U	15 U	13 U	NA	NA	NA	NA	NA	NA
trans-1,3-Dichloropropene	15 U	15 U	13 U	NA	NA	NA	NA	NA	NA
TCLP Volatile Organic Compounds (MG/L)									
1,1-Dichloroethene	NA	NA	NA	NA	NA	0.005 U	NA	NA	NA
1,2-Dichloroethane	NA	NA	NA	NA	NA	0.005 U	NA	NA	NA
2-Butanone	NA	NA	NA	NA	NA	0.005 U	NA	NA	NA
Benzene	NA	NA	NA	NA	NA	0.005 U	NA	NA	NA
Carbon tetrachloride	NA	NA	NA	NA	NA	0.005 U	NA	NA	NA
Chlorobenzene	NA	NA	NA	NA	NA	0.005 U	NA	NA	NA

K - Reported value may be biased high
L - Reported value may be biased low
NJ
U - Analyte not detected

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated

Appendix H
Subsurface Soil Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SB20		SJS5-SB21	SJS5-SB22	SJS5-SB24	SJS5-SB25	SJS5-SB26	SJS6-SB01	
Sample ID	SJS05-SB20-001	SJS05-SB20-001P	SJS05-SB21-001	SJS05-SB22-001	SJS05-SB24-001	SJS05-SB25-001	SJS05-SB26-001	SJS06-SB01-001	SJS06-SB01-001P
Sample Date	04/22/99	04/22/99	04/21/99	06/25/01	06/26/01	06/28/01	07/03/01	06/25/01	06/25/01
Chemical Name									
Chloroform	NA	NA	NA	NA	NA	0.005 U	NA	NA	NA
Tetrachloroethene	NA	NA	NA	NA	NA	0.0022 J	NA	NA	NA
Trichloroethene	NA	NA	NA	NA	NA	0.005 U	NA	NA	NA
Vinyl chloride	NA	NA	NA	NA	NA	0.005 U	NA	NA	NA
Semi-volatile Organic Compounds (UG/KG)									
1,2,4-Trichlorobenzene	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
2,2'-Oxybis(1-chloropropane)	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
2,4,5-Trichlorophenol	1,200 UJ	1,300 UJ	1,100 UJ	NA	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
2,4-Dichlorophenol	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
2,4-Dimethylphenol	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
2,4-Dinitrophenol	1,200 UJ	1,300 UJ	1,100 UJ	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
2-Chloronaphthalene	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
2-Chlorophenol	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
2-Methylphenol	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
2-Nitroaniline	1,200 UJ	1,300 UJ	1,100 UJ	NA	NA	NA	NA	NA	NA
2-Nitrophenol	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
3-Nitroaniline	1,200 UJ	1,300 UJ	1,100 UJ	NA	NA	NA	NA	NA	NA
4,6-Dinitro-2-methylphenol	1,200 UJ	1,300 UJ	1,100 UJ	NA	NA	NA	NA	NA	NA
4-Bromophenyl-phenylether	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
4-Chloro-3-methylphenol	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
4-Chloroaniline	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
4-Chlorophenyl-phenylether	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
4-Methylphenol	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
4-Nitroaniline	1,200 UJ	1,300 UJ	1,100 UJ	NA	NA	NA	NA	NA	NA
4-Nitrophenol	1,200 UJ	1,300 UJ	1,100 UJ	NA	NA	NA	NA	NA	NA
Acenaphthene	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
Acenaphthylene	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
Anthracene	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	60 J	82 J	420 UJ	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	54 J	63 J	420 UJ	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	120 J	150 J	420 UJ	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	490 UJ	57 J	420 UJ	NA	NA	NA	NA	NA	NA
Butylbenzylphthalate	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA

K - Reported value may be biased high
L - Reported value may be biased low
NJ
U - Analyte not detected

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated

Appendix H
Subsurface Soil Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SB20		SJS5-SB21	SJS5-SB22	SJS5-SB24	SJS5-SB25	SJS5-SB26	SJS6-SB01	
Sample ID	SJS05-SB20-001	SJS05-SB20-001P	SJS05-SB21-001	SJS05-SB22-001	SJS05-SB24-001	SJS05-SB25-001	SJS05-SB26-001	SJS06-SB01-001	SJS06-SB01-001P
Sample Date	04/22/99	04/22/99	04/21/99	06/25/01	06/26/01	06/28/01	07/03/01	06/25/01	06/25/01
Chemical Name									
Carbazole	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
Chrysene	110 J	130 J	420 UJ	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	490 UJ	270 J	87 J	NA	NA	NA	NA	NA	NA
Di-n-octylphthalate	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
Dibenzofuran	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
Diethylphthalate	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
Dimethyl phthalate	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
Fluoranthene	57 J	86 J	420 UJ	NA	NA	NA	NA	NA	NA
Fluorene	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
Hexachlorocyclopentadiene	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
Hexachloroethane	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
Isophorone	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
Naphthalene	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
Nitrobenzene	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
Pentachlorophenol	1,200 UJ	1,300 UJ	1,100 UJ	NA	NA	NA	NA	NA	NA
Phenanthrene	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
Phenol	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
Pyrene	490 UJ	64 J	420 UJ	NA	NA	NA	NA	NA	NA
bis(2-Chloroethoxy)methane	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
bis(2-Chloroethyl)ether	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	50 J	130 J	43 J	NA	NA	NA	NA	NA	NA
n-Nitroso-di-n-propylamine	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
n-Nitrosodiphenylamine	490 UJ	510 UJ	420 UJ	NA	NA	NA	NA	NA	NA
TCLP Semi-volatile Organic Compounds (MG/L)									
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	0.1 U	NA	NA	NA
2,4,5-Trichlorophenol	NA	NA	NA	NA	NA	0.1 U	NA	NA	NA
2,4,6-Trichlorophenol	NA	NA	NA	NA	NA	0.1 U	NA	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	0.1 U	NA	NA	NA
2-Methylphenol	NA	NA	NA	NA	NA	0.1 U	NA	NA	NA
3- and 4-Methylphenol	NA	NA	NA	NA	NA	0.2 U	NA	NA	NA
Hexachlorobenzene	NA	NA	NA	NA	NA	0.1 U	NA	NA	NA
Hexachlorobutadiene	NA	NA	NA	NA	NA	0.1 U	NA	NA	NA
Hexachloroethane	NA	NA	NA	NA	NA	0.1 U	NA	NA	NA
Nitrobenzene	NA	NA	NA	NA	NA	0.1 U	NA	NA	NA
Pentachlorophenol	NA	NA	NA	NA	NA	0.1 U	NA	NA	NA
Pyridine	NA	NA	NA	NA	NA	0.1 U	NA	NA	NA
Pesticide/Polychlorinated Biphenyls (UG/KG)									

K - Reported value may be biased high
L - Reported value may be biased low
NJ
U - Analyte not detected

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated

Appendix H
Subsurface Soil Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SB20		SJS5-SB21	SJS5-SB22	SJS5-SB24	SJS5-SB25	SJS5-SB26	SJS6-SB01	
Sample ID	SJS05-SB20-001	SJS05-SB20-001P	SJS05-SB21-001	SJS05-SB22-001	SJS05-SB24-001	SJS05-SB25-001	SJS05-SB26-001	SJS06-SB01-001	SJS06-SB01-001P
Sample Date	04/22/99	04/22/99	04/21/99	06/25/01	06/26/01	06/28/01	07/03/01	06/25/01	06/25/01
Chemical Name									
4,4'-DDD	6.80 J	2.80 J	4.20 UJ	NA	NA	NA	NA	NA	NA
4,4'-DDE	2.70 J	1.5 J	4.20 UJ	NA	NA	NA	NA	NA	NA
4,4'-DDT	26 J	15 J	4.20 UJ	NA	NA	NA	NA	NA	NA
Aldrin	2.5 UJ	2.60 UJ	2.10 UJ	NA	NA	NA	NA	NA	NA
Aroclor-1016	49 UJ	51 UJ	42 UJ	NA	NA	NA	NA	NA	NA
Aroclor-1221	99 UJ	100 UJ	84 UJ	NA	NA	NA	NA	NA	NA
Aroclor-1232	49 UJ	51 UJ	42 UJ	NA	NA	NA	NA	NA	NA
Aroclor-1242	49 UJ	51 UJ	42 UJ	NA	NA	NA	NA	NA	NA
Aroclor-1248	49 UJ	51 UJ	42 UJ	NA	NA	NA	NA	NA	NA
Aroclor-1254	49 UJ	51 UJ	42 UJ	NA	NA	NA	NA	NA	NA
Aroclor-1260	49 UJ	51 UJ	42 UJ	NA	NA	NA	NA	NA	NA
Dieldrin	4.90 UJ	5.10 UJ	4.20 UJ	NA	NA	NA	NA	NA	NA
Endosulfan I	2.5 UJ	2.60 UJ	2.10 UJ	NA	NA	NA	NA	NA	NA
Endosulfan II	4.90 UJ	5.10 UJ	4.20 UJ	NA	NA	NA	NA	NA	NA
Endosulfan sulfate	4.90 UJ	5.10 UJ	4.20 UJ	NA	NA	NA	NA	NA	NA
Endrin	4.90 UJ	5.10 UJ	4.20 UJ	NA	NA	NA	NA	NA	NA
Endrin aldehyde	4.90 UJ	5.10 UJ	4.20 UJ	NA	NA	NA	NA	NA	NA
Endrin ketone	4.90 UJ	5.10 UJ	4.20 UJ	NA	NA	NA	NA	NA	NA
Heptachlor	2.5 UJ	2.60 UJ	2.10 UJ	NA	NA	NA	NA	NA	NA
Heptachlor epoxide	2.5 UJ	2.60 UJ	2.10 UJ	NA	NA	NA	NA	NA	NA
Methoxychlor	25 UJ	26 UJ	21 UJ	NA	NA	NA	NA	NA	NA
Toxaphene	250 UJ	260 UJ	210 UJ	NA	NA	NA	NA	NA	NA
alpha-BHC	2.5 UJ	2.60 UJ	2.10 UJ	NA	NA	NA	NA	NA	NA
alpha-Chlordane	2.5 UJ	2.60 UJ	2.10 UJ	NA	NA	NA	NA	NA	NA
beta-BHC	2.5 UJ	2.60 UJ	2.10 UJ	NA	NA	NA	NA	NA	NA
delta-BHC	2.5 UJ	2.60 UJ	2.10 UJ	NA	NA	NA	NA	NA	NA
gamma-BHC (Lindane)	2.5 UJ	2.60 UJ	2.10 UJ	NA	NA	NA	NA	NA	NA
gamma-Chlordane	2.5 UJ	2.60 UJ	2.10 UJ	NA	NA	NA	NA	NA	NA
TCLP Pesticides/PCBs (MG/L)									
Chlordane	NA	NA	NA	NA	NA	0.005 U	NA	NA	NA
Endrin	NA	NA	NA	NA	NA	5.00E-04 U	NA	NA	NA
Heptachlor	NA	NA	NA	NA	NA	5.00E-04 U	NA	NA	NA
Heptachlor epoxide	NA	NA	NA	NA	NA	5.00E-04 U	NA	NA	NA
Methoxychlor	NA	NA	NA	NA	NA	5.00E-04 U	NA	NA	NA
Toxaphene	NA	NA	NA	NA	NA	0.005 U	NA	NA	NA
gamma-BHC (Lindane)	NA	NA	NA	NA	NA	5.00E-04 U	NA	NA	NA
TCLP Herbicides (MG/L)									
2,4,5-TP (Silvex)	NA	NA	NA	NA	NA	0.002 U	NA	NA	NA
2,4-D	NA	NA	NA	NA	NA	0.002 U	NA	NA	NA
Dioxin/Furans (UG/KG)									

K - Reported value may be biased high
L - Reported value may be biased low
NJ
U - Analyte not detected

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated

Appendix H
Subsurface Soil Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SB20		SJS5-SB21	SJS5-SB22	SJS5-SB24	SJS5-SB25	SJS5-SB26	SJS6-SB01	
Sample ID	SJS05-SB20-001	SJS05-SB20-001P	SJS05-SB21-001	SJS05-SB22-001	SJS05-SB24-001	SJS05-SB25-001	SJS05-SB26-001	SJS06-SB01-001	SJS06-SB01-001P
Sample Date	04/22/99	04/22/99	04/21/99	06/25/01	06/26/01	06/28/01	07/03/01	06/25/01	06/25/01
Chemical Name									
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	NA	NA	NA	0.139 J	0.0249 J	0.0608 J	0.00869 J	0.00522 J	0.00421 J
1,2,3,4,6,7,8-Heptachlorodibenzofuran	NA	NA	NA	0.0170 J	0.00975 J	0.0123 J	9.30E-05 UJ	1.91E-04 J	5.60E-05 UJ
1,2,3,4,7,8,9-Heptachlorodibenzofuran	NA	NA	NA	0.00138 J	2.07E-04 UJ	8.61E-04 J	1.37E-04 UJ	5.70E-05 UJ	8.30E-05 UJ
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	NA	NA	NA	0.00382 J	0.00119 J	0.00139 J	9.80E-05 UJ	8.60E-05 UJ	9.20E-05 UJ
1,2,3,4,7,8-Hexachlorodibenzofuran	NA	NA	NA	0.00524 J	0.00396 J	0.00486 J	1.23E-04 UJ	5.00E-05 UJ	4.70E-05 UJ
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	NA	NA	NA	0.00617 J	0.002 J	0.00383 J	2.67E-04 J	7.50E-05 UJ	8.00E-05 UJ
1,2,3,6,7,8-Hexachlorodibenzofuran	NA	NA	NA	0.00215 J	0.00299 J	0.00103 J	1.18E-04 UJ	4.80E-05 UJ	4.50E-05 UJ
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	NA	NA	NA	0.0110 J	0.00262 J	0.00491 J	8.03E-04 J	5.17E-04 J	5.45E-04 J
1,2,3,7,8,9-Hexachlorodibenzofuran	NA	NA	NA	5.86E-04 J	3.60E-04 UJ	1.69E-04 UJ	1.65E-04 UJ	6.70E-05 UJ	6.30E-05 UJ
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	NA	NA	NA	0.00252 J	0.00122 J	8.30E-04 J	8.70E-05 UJ	8.20E-05 UJ	8.60E-05 UJ
1,2,3,7,8-Pentachlorodibenzofuran	NA	NA	NA	0.00208 J	0.00222 J	0.00100 J	1.16E-04 UJ	6.00E-05 UJ	7.00E-05 UJ
2,3,4,6,7,8-Hexachlorodibenzofuran	NA	NA	NA	0.00215 J	0.00131 J	0.00149 J	1.32E-04 UJ	5.40E-05 UJ	5.00E-05 UJ
2,3,4,7,8-Pentachlorodibenzofuran	NA	NA	NA	0.00283 J	0.00214 J	0.00151 J	1.11E-04 UJ	5.80E-05 UJ	6.80E-05 UJ
2,3,7,8-TCDD (dioxin)	NA	NA	NA	0.00128 NJ	3.44E-04 J	1.89E-04 NJ	7.90E-05 UJ	6.70E-05 UJ	9.90E-05 UJ
2,3,7,8-Tetrachlorodibenzofuran	NA	NA	NA	0.00693 J	0.00417 J	0.00368 J	9.40E-05 UJ	6.30E-05 UJ	8.90E-05 UJ
PCDD_S	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total heptachlorodibenzo-p-dioxin	NA	NA	NA	0.433 J	0.0855 J	0.127 J	0.0323 J	0.0201 J	0.0168 J
Total heptachlorodibenzofuran	NA	NA	NA	0.0432 J	0.00975 J	0.0137 J	9.30E-05 UJ	1.91E-04 J	5.60E-05 UJ
Total hexachlorodibenzo-p-dioxin	NA	NA	NA	0.226 J	0.0202 J	0.0486 J	0.0161 J	0.0104 J	0.00704 J
Total hexachlorodibenzofuran	NA	NA	NA	0.0325 J	0.0239 J	0.0174 J	1.18E-04 UJ	4.80E-05 UJ	4.50E-05 UJ
Total octachlorodibenzo-p-dioxin	NA	NA	NA	7.25 J	0.380 J	0.447 J	0.226 J	0.0872 J	0.0783 J
Total octachlorodibenzofuran	NA	NA	NA	0.0337 J	0.0126 J	0.00770 J	0.00119 B	5.19E-04 B	5.95E-04 J
Total pentachlorodibenzo-p-dioxin	NA	NA	NA	0.0310 J	0.00495 J	0.00876 J	6.78E-04 J	7.71E-04 J	6.84E-04 J
Total pentachlorodibenzofuran	NA	NA	NA	0.0497 J	0.0264 J	0.0150 J	1.11E-04 UJ	5.80E-05 UJ	6.80E-05 UJ
Total tetrachlorodibenzo-p-dioxin	NA	NA	NA	0.0152 J	0.00621 J	0.00253 J	7.90E-05 UJ	6.70E-05 UJ	9.90E-05 UJ
Total tetrachlorodibenzofuran	NA	NA	NA	0.0456 J	0.0299 J	0.0195 J	9.40E-05 UJ	6.30E-05 UJ	8.90E-05 UJ
Explosives (UG/KG)									
1,3,5-Trinitrobenzene	250 U	250 U	238 U	NA	NA	NA	NA	NA	NA
1,3-Dinitrobenzene	250 U	250 U	238 U	NA	NA	NA	NA	NA	NA
2,4,6-Trinitrotoluene	250 U	250 U	238 U	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	250 U	250 U	238 U	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	250 U	250 U	238 U	NA	NA	NA	NA	NA	NA
2-Amino-4,6-dinitrotoluene	250 U	250 U	238 U	NA	NA	NA	NA	NA	NA
2-Nitrotoluene	500 U	500 U	477 U	NA	NA	NA	NA	NA	NA
3-Nitrotoluene	500 U	500 U	477 U	NA	NA	NA	NA	NA	NA
4-Amino-2,6-dinitrotoluene	250 U	250 U	238 U	NA	NA	NA	NA	NA	NA
4-Nitrotoluene	500 U	500 U	477 U	NA	NA	NA	NA	NA	NA
HMX	500 U	500 U	477 U	NA	NA	NA	NA	NA	NA
Nitrobenzene	250 U	250 U	238 U	NA	NA	NA	NA	NA	NA
RDX	500 U	500 U	477 U	NA	NA	NA	NA	NA	NA
Tetryl	500 U	500 U	477 U	NA	NA	NA	NA	NA	NA

K - Reported value may be biased high
L - Reported value may be biased low
NJ
U - Analyte not detected

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated

Appendix H
Subsurface Soil Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SB20		SJS5-SB21	SJS5-SB22	SJS5-SB24	SJS5-SB25	SJS5-SB26	SJS6-SB01	
Sample ID	SJS05-SB20-001	SJS05-SB20-001P	SJS05-SB21-001	SJS05-SB22-001	SJS05-SB24-001	SJS05-SB25-001	SJS05-SB26-001	SJS06-SB01-001	SJS06-SB01-001P
Sample Date	04/22/99	04/22/99	04/21/99	06/25/01	06/26/01	06/28/01	07/03/01	06/25/01	06/25/01
Chemical Name									
Total Metals (MG/KG)									
Aluminum	11,900	11,100	423	NA	NA	NA	NA	NA	NA
Antimony	0.570 U	0.740 U	0.670 U	NA	NA	NA	NA	NA	NA
Arsenic	11.9	15.5	0.5 U	NA	NA	NA	NA	NA	NA
Barium	51.9	101	2.30 J	NA	NA	NA	NA	NA	NA
Beryllium	0.5 J	0.480 J	0.0200 U	NA	NA	NA	NA	NA	NA
Cadmium	0.0600 U	0.100 J	0.0700 U	NA	NA	NA	NA	NA	NA
Calcium	528 J	479 J	638 J	NA	NA	NA	NA	NA	NA
Chromium	26.4	25.2	1 J	NA	NA	NA	NA	NA	NA
Cobalt	4.20 J	3.90 J	0.310 J	NA	NA	NA	NA	NA	NA
Copper	20.1	37.2	1 J	NA	NA	NA	NA	NA	NA
Cyanide	0.340	0.490	0.185 U	NA	NA	NA	NA	NA	NA
Iron	29,900	30,100	371	NA	NA	NA	NA	NA	NA
Lead	68.9	295	3.20	NA	NA	NA	NA	NA	NA
Magnesium	2,850	2,440	39.2 J	NA	NA	NA	NA	NA	NA
Manganese	112	104	6.80	NA	NA	NA	NA	NA	NA
Mercury	0.140	0.240	0.0200 U	NA	NA	NA	NA	NA	NA
Nickel	9.20	8.30 J	0.540 J	NA	NA	NA	NA	NA	NA
Potassium	3,040	3,860	58.8 J	NA	NA	NA	NA	NA	NA
Selenium	0.630 J	0.710 U	0.650 U	NA	NA	NA	NA	NA	NA
Silver	0.190 U	0.25 U	0.220 U	NA	NA	NA	NA	NA	NA
Sodium	490 J	518 J	36.9 U	NA	NA	NA	NA	NA	NA
Thallium	0.680 U	0.870 U	0.800 U	NA	NA	NA	NA	NA	NA
Vanadium	31	30.6	1.70 J	NA	NA	NA	NA	NA	NA
Zinc	75.6	79.1	2.90 J	NA	NA	NA	NA	NA	NA
TCLP Metals (MG/L)									
Arsenic	NA	NA	NA	NA	NA	0.0075 B*	NA	NA	NA
Barium	NA	NA	NA	NA	NA	0.302	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	6.00E-04 U	NA	NA	NA
Chromium	NA	NA	NA	NA	NA	6.00E-04 B	NA	NA	NA
Lead	NA	NA	NA	NA	NA	0.0255	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	0.002 UN	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	0.0016 U	NA	NA	NA
Silver	NA	NA	NA	NA	NA	0.0017 U	NA	NA	NA
Wet Chemistry (MG/KG)									
% Solids	67.5	65.5	79.4	NA	NA	NA	NA	NA	NA
Phosphorus	4.94 U	3.05 U	2.29 UL	NA	NA	NA	NA	NA	NA
pH	3.67	3.74	7.41	NA	NA	NA	NA	NA	NA

K - Reported value may be biased high
L - Reported value may be biased low
NJ
U - Analyte not detected

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated

Appendix H
Shallow GW Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-MW01S			SJS5-MW02S			SJS5-M	
Sample ID	SJS05-GW1S-001	SJS05-GW1S-002	SJS05-GW1S-003	SJS05-GW2S-001	SJS05-GW2S-002	SJS05-GW2S-003	SJS05-GW3S-001	SJS05-GW3S-001P
Sample Date	07/15/97	11/06/97	05/19/99	07/16/97	11/04/97	05/23/99	07/16/97	07/16/97
Chemical Name								
Volatile Organic Compounds (UG/L)								
1,1,1-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromo-3-chloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	11 L	NA	NA	8 B	9 B	NA	NA	NA
Benzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon disulfide	1 U	1 U	0.400 B	1 U	0.8 J	0.300 B	1 U	0.3 J
Carbon tetrachloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene chloride	3 B	2 B	0.800 B	2 B	2 B	0.400 B	3 B	4 B
Styrene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	0.2 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

NA - Not analyzed
U - Analyte not detected
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

Appendix H
Shallow GW Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-MW01S			SJS5-MW02S			SJS5-M	
Sample ID	SJS05-GW1S-001	SJS05-GW1S-002	SJS05-GW1S-003	SJS05-GW2S-001	SJS05-GW2S-002	SJS05-GW2S-003	SJS05-GW3S-001	SJS05-GW3S-001P
Sample Date	07/15/97	11/06/97	05/19/99	07/16/97	11/04/97	05/23/99	07/16/97	07/16/97
Chemical Name								
Vinyl chloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Xylene, total	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Semi-volatile Organic Compounds (UG/L)								
1,2,4-Trichlorobenzene	NA	NA	12 U	NA	NA	11 U	NA	NA
1,2-Dichlorobenzene	NA	NA	12 U	NA	NA	11 U	NA	NA
1,3-Dichlorobenzene	NA	NA	12 U	NA	NA	11 U	NA	NA
1,4-Dichlorobenzene	NA	NA	12 U	NA	NA	11 U	NA	NA
2,2'-Oxybis(1-chloropropane)	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
2,4,5-Trichlorophenol	25 U	25 U	30 U	25 U	25 U	26 U	25 U	25 U
2,4,6-Trichlorophenol	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
2,4-Dichlorophenol	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
2,4-Dimethylphenol	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
2,4-Dinitrophenol	25 U	25 U	30 U	25 U	25 U	26 U	25 U	25 U
2,4-Dinitrotoluene	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
2,6-Dinitrotoluene	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
2-Chloronaphthalene	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
2-Chlorophenol	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
2-Methylnaphthalene	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
2-Methylphenol	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
2-Nitroaniline	25 U	25 U	30 U	25 U	25 U	26 U	25 U	25 U
2-Nitrophenol	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
3,3'-Dichlorobenzidine	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
3-Nitroaniline	25 U	25 U	30 U	25 U	25 U	26 U	25 U	25 U
4,6-Dinitro-2-methylphenol	25 U	25 U	30 U	25 U	25 U	26 U	25 U	25 U
4-Bromophenyl-phenylether	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
4-Chloro-3-methylphenol	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
4-Chloroaniline	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
4-Chlorophenyl-phenylether	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
4-Methylphenol	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
4-Nitroaniline	25 U	25 U	30 U	25 U	25 U	26 U	25 U	25 U
4-Nitrophenol	25 U	25 U	30 U	25 U	25 U	26 U	25 U	25 U
Acenaphthene	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Shallow GW Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-MW01S			SJS5-MW02S			SJS5-M	
Sample ID	SJS05-GW1S-001	SJS05-GW1S-002	SJS05-GW1S-003	SJS05-GW2S-001	SJS05-GW2S-002	SJS05-GW2S-003	SJS05-GW3S-001	SJS05-GW3S-001P
Sample Date	07/15/97	11/06/97	05/19/99	07/16/97	11/04/97	05/23/99	07/16/97	07/16/97
Chemical Name								
Acenaphthylene	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
Anthracene	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
Benzo(a)anthracene	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
Benzo(a)pyrene	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
Benzo(b)fluoranthene	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
Benzo(g,h,i)perylene	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
Benzo(k)fluoranthene	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
Butylbenzylphthalate	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
Carbazole	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
Chrysene	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
Di-n-butylphthalate	10 U	10 U	3 J	10 U	10 U	11 U	10 U	10 U
Di-n-octylphthalate	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
Dibenz(a,h)anthracene	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
Dibenzofuran	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
Diethylphthalate	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
Dimethyl phthalate	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
Fluoranthene	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
Fluorene	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
Hexachlorobenzene	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
Hexachlorobutadiene	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
Hexachlorocyclopentadiene	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
Hexachloroethane	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
Indeno(1,2,3-cd)pyrene	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
Isophorone	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
Naphthalene	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
Nitrobenzene	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
Pentachlorophenol	25 U	25 U	30 U	25 U	25 U	26 U	25 U	25 U
Phenanthrene	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
Phenol	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
Pyrene	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
bis(2-Chloroethoxy)methane	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
bis(2-Chloroethyl)ether	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
bis(2-Ethylhexyl)phthalate	10 U	1 J	12 U	10 U	10 U	11 U	2 J	1 J
n-Nitroso-di-n-propylamine	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
n-Nitrosodiphenylamine	10 U	10 U	12 U	10 U	10 U	11 U	10 U	10 U
Pesticide/Polychlorinated Biphenyls (UG/L)								

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Shallow GW Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-MW01S			SJS5-MW02S				SJS5-M
Sample ID	SJS05-GW1S-001	SJS05-GW1S-002	SJS05-GW1S-003	SJS05-GW2S-001	SJS05-GW2S-002	SJS05-GW2S-003	SJS05-GW3S-001	SJS05-GW3S-001P
Sample Date	07/15/97	11/06/97	05/19/99	07/16/97	11/04/97	05/23/99	07/16/97	07/16/97
Chemical Name								
4,4'-DDD	0.1 U	0.1 U	0.110 U	0.1 U	0.1 U	0.120 U	0.1 U	0.1 U
4,4'-DDE	0.1 U	0.1 U	0.110 U	0.1 U	0.1 U	0.120 U	0.1 U	0.1 U
4,4'-DDT	0.1 U	0.1 U	0.110 U	0.1 U	0.1 U	0.120 U	0.1 U	0.1 U
Aldrin	0.05 U	0.05 U	0.0550 U	0.05 U	0.05 U	0.0620 U	0.05 U	0.05 U
Aroclor-1016	1 U	1 U	1.10 U	1 U	1 U	1.20 U	1 U	1 U
Aroclor-1221	2 U	2 U	2.20 U	2 U	2 U	2.5 U	2 U	2 U
Aroclor-1232	1 U	1 U	1.10 U	1 U	1 U	1.20 U	1 U	1 U
Aroclor-1242	1 U	1 U	1.10 U	1 U	1 U	1.20 U	1 U	1 U
Aroclor-1248	1 U	1 U	1.10 U	1 U	1 U	1.20 U	1 U	1 U
Aroclor-1254	1 U	1 U	1.10 U	1 U	1 U	1.20 U	1 U	1 U
Aroclor-1260	1 U	1 U	1.10 U	1 U	1 U	1.20 U	1 U	1 U
Dieldrin	0.1 U	0.1 U	0.110 U	0.1 U	0.1 U	0.120 U	0.1 U	0.1 U
Endosulfan I	0.05 U	0.05 U	0.0550 U	0.05 U	0.05 U	0.0620 U	0.05 U	0.05 U
Endosulfan II	0.1 U	0.1 U	0.110 U	0.1 U	0.1 U	0.120 U	0.1 U	0.1 U
Endosulfan sulfate	0.1 U	0.1 U	0.110 U	0.1 U	0.1 U	0.120 U	0.1 U	0.1 U
Endrin	0.1 U	0.1 U	0.110 U	0.1 U	0.1 U	0.120 U	0.1 U	0.1 U
Endrin aldehyde	0.1 U	0.1 U	0.110 U	0.1 U	0.1 U	0.120 U	0.1 U	0.1 U
Endrin ketone	0.1 U	0.1 U	0.110 U	0.1 U	0.1 U	0.120 U	0.1 U	0.1 U
Heptachlor	0.05 U	0.05 U	0.0550 U	0.05 U	0.05 U	0.0620 U	0.05 U	0.05 U
Heptachlor epoxide	0.05 U	0.05 U	0.0550 U	0.05 U	0.05 U	0.0620 U	0.05 U	0.05 U
Methoxychlor	0.5 U	0.5 U	0.550 U	0.5 U	0.5 U	0.620 U	0.5 U	0.5 U
Toxaphene	5 U	5 U	5.5 U	5 U	5 U	6.20 U	5 U	5 U
alpha-BHC	0.05 U	0.05 U	0.0550 U	0.05 U	0.05 U	0.0620 U	0.05 U	0.05 U
alpha-Chlordane	0.05 U	0.05 U	0.0550 U	0.05 U	0.05 U	0.0620 U	0.05 U	0.05 U
beta-BHC	0.05 U	0.05 U	0.0550 U	0.05 U	0.05 U	0.0620 U	0.05 U	0.05 U
delta-BHC	0.05 U	0.05 U	0.0550 U	0.05 U	0.05 U	0.0620 U	0.05 U	0.05 U
gamma-BHC (Lindane)	0.05 U	0.05 U	0.0550 U	0.05 U	0.05 U	0.0620 U	0.05 U	0.05 U
gamma-Chlordane	0.05 U	0.05 U	0.0550 U	0.05 U	0.05 U	0.0620 U	0.05 U	0.05 U
Explosives (UG/L)								
1,3,5-Trinitrobenzene	NA	NA	1.20 U	NA	NA	1.20 U	NA	NA
1,3-Dinitrobenzene	NA	NA	1.20 U	NA	NA	1.20 U	NA	NA
2,4,6-Trinitrotoluene	NA	NA	1.20 U	NA	NA	1.20 U	NA	NA
2,4-Dinitrotoluene	NA	NA	1.20 U	NA	NA	1.20 U	NA	NA
2,6-Dinitrotoluene	NA	NA	1.20 U	NA	NA	1.20 U	NA	NA
2-Amino-4,6-dinitrotoluene	NA	NA	1.20 U	NA	NA	1.20 U	NA	NA
2-Nitrotoluene	NA	NA	2.60 U	NA	NA	2.60 U	NA	NA

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
U - Analyte not detected

Appendix H
Shallow GW Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-MW01S			SJS5-MW02S			SJS5-M	
Sample ID	SJS05-GW1S-001	SJS05-GW1S-002	SJS05-GW1S-003	SJS05-GW2S-001	SJS05-GW2S-002	SJS05-GW2S-003	SJS05-GW3S-001	SJS05-GW3S-001P
Sample Date	07/15/97	11/06/97	05/19/99	07/16/97	11/04/97	05/23/99	07/16/97	07/16/97
Chemical Name								
3-Nitrotoluene	NA	NA	2.60 U	NA	NA	2.60 U	NA	NA
4-Amino-2,6-dinitrotoluene	NA	NA	1.20 U	NA	NA	1.20 U	NA	NA
4-Nitrotoluene	NA	NA	2.60 U	NA	NA	2.60 U	NA	NA
HMX	NA	NA	2.60 U	NA	NA	2.60 U	NA	NA
Nitrobenzene	NA	NA	1.20 U	NA	NA	1.20 U	NA	NA
RDX	NA	NA	2.60 U	NA	NA	2.60 U	NA	NA
Tetryl	NA	NA	2.60 U	NA	NA	2.60 U	NA	NA
Total Metals (UG/L)								
Aluminum	1,630	60 B	89.7 J	1,110	87,400	9,880	27,100	17,100
Antimony	2 U	1.7 U	2.70 U	2 U	1.7 U	2.70 U	3.7 J	6 J
Arsenic	4.8 J	8.8 J	6 B	3 U	12	3.60 J	27.3	18.4
Barium	359	248	249	126 J	14 B	18.4 J	77.8 J	64.1 J
Beryllium	1 U	1.7 J	0.100 U	1 U	18.3	4.5 J	1.2 J	1 U
Cadmium	0.5 U	0.4 U	0.690 J	0.5 U	9	0.940 J	0.5 U	0.5 U
Calcium	117,000	182,000	188,000	97,800	66,300	54,100	53,200	49,700
Chromium	8.5 J	11.4	2 J	7 U	24.6 B	4.40 B	58.7	36.1
Cobalt	8 U	6 U	0.5 U	8 U	257	66.9	41.5 J	33.4 J
Copper	6 U	5.8 U	9.40 B	6 U	124	9.10 B	12.8 J	11.2 J
Cyanide	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Iron	58,700	64,400	74,300	13,500	40,800	89,100	83,700	65,200
Lead	1 U	1.6 B	1.10 J	1.1 J	16.2	4.70	19.2	13.5
Magnesium	190,000	221,000	278,000	156,000	45,700	54,400	49,800	45,000
Manganese	1,300	2,720	3,080	992	4,320	2,640	2,980	2,670
Mercury	0.13 B	0.13 U	0.100 U	0.12 U	0.13 U	0.100 U	0.18 B	0.29 B
Nickel	7 U	6.3 U	0.900 U	14.1 J	360	106	46.5 K	41.1 K
Potassium	39,500	72,300	96,300	49,100	13,000	23,600 J	13,200	11,100
Selenium	3 U	6.6 U	2.60 U	3 UL	3.3 U	2.60 U	3 UL	3 UL
Silver	2.4 B	2.5 B	0.900 U	3.8 B	2.8 J	0.900 U	4.1 B	6.9 B
Sodium	1,200,000 B	1,340,000	1,480,000	1,340,000	79,200	300,000	199,000	186,000
Thallium	2.7 B	1.8 B	10 U	2 U	1.5 U	3.20 U	2 U	2.1 J
Vanadium	11.4 J	6.8 U	0.600 U	9 U	9.9 J	0.630 J	82.8	60.2
Zinc	46.1	30.8 B	8.80 J	23.5 B	2,020	572	153	109
Dissolved Metals (UG/L)								
Aluminum	44 U	38.1 U	187 J	44 U	84,200	9,130	44 U	72.3 B
Antimony	2 U	1.7 U	2.70 U	2 U	1.7 U	2.70 U	2 U	3.1 B

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
U - Analyte not detected

Appendix H
Shallow GW Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-MW01S			SJS5-MW02S			SJS5-M	
Sample ID	SJS05-GW1S-001	SJS05-GW1S-002	SJS05-GW1S-003	SJS05-GW2S-001	SJS05-GW2S-002	SJS05-GW2S-003	SJS05-GW3S-001	SJS05-GW3S-001P
Sample Date	07/15/97	11/06/97	05/19/99	07/16/97	11/04/97	05/23/99	07/16/97	07/16/97
Chemical Name								
Arsenic	3.1 J	8.3 B	8.20 B	3 U	13.3	2 U	3 U	3 U
Barium	371	250	243	120 J	14.8 B	17.9 J	21.5 B	22.9 B
Beryllium	1 U	0.58 J	0.100 U	1 U	17.7	4.40 J	1 U	1 U
Cadmium	0.5 U	0.4 U	0.560 J	0.5 U	8.5	1 J	0.5 U	0.5 U
Calcium	118,000	179,000	188,000	94,800	63,700	52,000	68,400	68,500
Chromium	7 U	9.2 J	2.70 J	7 U	33	4.5 J	7 U	7 U
Cobalt	8 U	36.8 J	0.5 U	8 U	270	65.9	22.3 J	19.2 J
Copper	6 U	5.8 U	5 B	6 U	149	2.10 B	6 U	6 U
Iron	65,100	67,400	74,900	12,300	40,500	85,600	40,700	40,600
Lead	1 U	1.3 U	1 U	1 U	20.2	1 U	1 U	1.3 B
Magnesium	186,000	215,000	276,000	153,000	44,300	52,100	56,900	57,100
Manganese	1,290	2,560	3,080	950	4,200	2,500	3,140	3,150
Mercury	0.13 B	0.13 U	0.100 U	0.13 U	0.13 U	0.100 U	0.12 U	0.12 U
Nickel	7 U	18 J	0.900 U	7.4 K	353	103	13.5 K	14.1 K
Potassium	37,100	68,900	94,700	47,800	12,500	22,500 J	9,250	9,570
Selenium	3 U	3.3 U	2.60 U	3 U	3.3 U	2.60 U	3 U	3 U
Silver	2.1 B	1.3 B	0.900 U	4.5 B	1.1 U	0.900 U	3.7 B	6 B
Sodium	1,170,000	1,310,000	1,450,000	1,290,000	76,300	291,000	249,000	250,000
Thallium	3.8 B	2.1 B	10 U	2 U	1.5 U	3.20 U	2 U	2 U
Vanadium	9 U	6.8 U	0.600 U	9 U	8.8 J	1 J	9 U	9 U
Zinc	36.6 B	60 B	13.9 J	28.5 B	1,980	556	39.9 B	41.5 B
Wet Chemistry (MG/L)								
Phosphate	NA	0.187	NA	NA	0.136	NA	NA	NA
Phosphorus	0.104	NA	0.159	0.309	NA	0.0200 U	0.128	0.251

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Shallow GW Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	IW03S				SJS5-MW04S		SJS5-MW05S	
Sample ID	SJS05-GW3S-002		SJS05-GW3S-003		SJS05-GW4S-001		SJS05-GW5S-001	
Sample Date	11/04/97		05/23/99		05/19/99		05/23/99	
Chemical Name								
Volatile Organic Compounds (UG/L)								
1,1,1-Trichloroethane	1	U	1	U	1	U	1	U
1,1,2,2-Tetrachloroethane	1	U	1	U	1	U	1	U
1,1,2-Trichloroethane	1	U	1	U	1	U	1	U
1,1-Dichloroethane	1	U	1	U	1	U	1	U
1,1-Dichloroethene	1	U	1	U	1	U	1	U
1,2,4-Trichlorobenzene	1	U	1	U	1	U	1	U
1,2-Dibromo-3-chloropropane	1	U	1	U	1	U	1	U
1,2-Dibromoethane	1	U	1	U	1	U	1	U
1,2-Dichlorobenzene	1	U	1	U	1	U	1	U
1,2-Dichloroethane	1	U	1	U	1	U	1	U
1,2-Dichloropropane	1	U	1	U	1	U	1	U
1,3-Dichlorobenzene	1	U	1	U	1	U	1	U
1,4-Dichlorobenzene	1	U	1	U	1	U	1	U
2-Butanone	NA		NA		40.7	L	NA	
2-Hexanone	5	U	5	U	5	U	5	U
4-Methyl-2-pentanone	5	U	5	U	5	U	5	U
Acetone	7	B	NA		40.4	L	NA	
Benzene	1	U	1	U	1	U	1	U
Bromochloromethane	1	U	1	U	1	U	1	U
Bromodichloromethane	1	U	1	U	1	U	1	U
Bromoform	1	U	1	U	1	U	1	U
Bromomethane	1	U	1	U	1	U	1	U
Carbon disulfide	1	U	0.300	B	1.60	B	1	B
Carbon tetrachloride	1	U	1	U	1	U	1	U
Chlorobenzene	1	U	1	U	1	U	1	U
Chloroethane	1	U	1	U	1	U	1	U
Chloroform	1	U	1	U	0.300	B	1	U
Chloromethane	1	U	1	U	1	U	1	U
Dibromochloromethane	1	U	1	U	1	U	1	U
Ethylbenzene	1	U	1	U	1	U	1	U
Methylene chloride	2	B	0.400	B	1	B	1.60	B
Styrene	1	U	1	U	1	U	1	U
Tetrachloroethene	1	U	1	U	1	U	1	U
Toluene	1	U	1	U	1	U	1	U
Trichloroethene	1	U	1	U	1	U	1	U

NA - Not analyzed
U - Analyte not detected
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

Appendix H
Shallow GW Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	IW03S		SJS5-MW04S	SJS5-MW05S
Sample ID	SJS05-GW3S-002	SJS05-GW3S-003	SJS05-GW4S-001	SJS05-GW5S-001
Sample Date	11/04/97	05/23/99	05/19/99	05/23/99
Chemical Name				
Vinyl chloride	1 U	1 U	1 U	1 U
Xylene, total	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U
Semi-volatile Organic Compounds (UG/L)				
1,2,4-Trichlorobenzene	NA	11 U	12 U	12 U
1,2-Dichlorobenzene	NA	11 U	12 U	12 U
1,3-Dichlorobenzene	NA	11 U	12 U	12 U
1,4-Dichlorobenzene	NA	11 U	12 U	12 U
2,2'-Oxybis(1-chloropropane)	10 U	11 U	12 U	12 U
2,4,5-Trichlorophenol	25 U	28 U	29 U	29 U
2,4,6-Trichlorophenol	10 U	11 U	12 U	12 U
2,4-Dichlorophenol	10 U	11 U	12 U	12 U
2,4-Dimethylphenol	10 U	11 U	12 U	12 U
2,4-Dinitrophenol	25 U	28 U	29 U	29 U
2,4-Dinitrotoluene	10 U	11 U	12 U	12 U
2,6-Dinitrotoluene	10 U	11 U	12 U	12 U
2-Chloronaphthalene	10 U	11 U	12 U	12 U
2-Chlorophenol	10 U	11 U	12 U	12 U
2-Methylnaphthalene	10 U	11 U	12 U	12 U
2-Methylphenol	10 U	11 U	12 U	12 U
2-Nitroaniline	25 U	28 U	29 U	29 U
2-Nitrophenol	10 U	11 U	12 U	12 U
3,3'-Dichlorobenzidine	10 U	11 U	12 U	12 U
3-Nitroaniline	25 U	28 U	29 U	29 U
4,6-Dinitro-2-methylphenol	25 U	28 U	29 U	29 U
4-Bromophenyl-phenylether	10 U	11 U	12 U	12 U
4-Chloro-3-methylphenol	10 U	11 U	12 U	12 U
4-Chloroaniline	10 U	11 U	12 U	12 U
4-Chlorophenyl-phenylether	10 U	11 U	12 U	12 U
4-Methylphenol	10 U	11 U	9 U	12 U
4-Nitroaniline	25 U	28 U	29 U	29 U
4-Nitrophenol	25 U	28 U	29 U	29 U
Acenaphthene	10 U	11 U	12 U	12 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Shallow GW Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	IW03S		SJS5-MW04S	SJS5-MW05S
Sample ID	SJS05-GW3S-002	SJS05-GW3S-003	SJS05-GW4S-001	SJS05-GW5S-001
Sample Date	11/04/97	05/23/99	05/19/99	05/23/99
Chemical Name				
Acenaphthylene	10 U	11 U	12 U	12 U
Anthracene	10 U	11 U	12 U	12 U
Benzo(a)anthracene	10 U	11 U	12 U	12 U
Benzo(a)pyrene	10 U	11 U	12 U	12 U
Benzo(b)fluoranthene	10 U	11 U	12 U	12 U
Benzo(g,h,i)perylene	10 U	11 U	12 U	12 U
Benzo(k)fluoranthene	10 U	11 U	12 U	12 U
Butylbenzylphthalate	10 U	11 U	12 U	12 U
Carbazole	10 U	11 U	12 U	12 U
Chrysene	10 U	11 U	12 U	12 U
Di-n-butylphthalate	10 U	11 U	4 J	12 U
Di-n-octylphthalate	10 U	11 U	12 U	12 U
Dibenz(a,h)anthracene	10 U	11 U	12 U	12 U
Dibenzofuran	10 U	11 U	12 U	12 U
Diethylphthalate	10 U	11 U	12 U	12 U
Dimethyl phthalate	10 U	11 U	12 U	12 U
Fluoranthene	10 U	11 U	12 U	12 U
Fluorene	10 U	11 U	12 U	12 U
Hexachlorobenzene	10 U	11 U	12 U	12 U
Hexachlorobutadiene	10 U	11 U	12 U	12 U
Hexachlorocyclopentadiene	10 U	11 U	12 U	12 U
Hexachloroethane	10 U	11 U	12 U	12 U
Indeno(1,2,3-cd)pyrene	10 U	11 U	12 U	12 U
Isophorone	10 U	11 U	12 U	12 U
Naphthalene	10 U	11 U	12 U	12 U
Nitrobenzene	10 U	11 U	12 U	12 U
Pentachlorophenol	25 U	28 U	29 U	29 U
Phenanthrene	10 U	11 U	12 U	12 U
Phenol	10 U	11 U	3 J	12 U
Pyrene	10 U	11 U	12 U	12 U
bis(2-Chloroethoxy)methane	10 U	11 U	12 U	12 U
bis(2-Chloroethyl)ether	10 U	11 U	12 U	12 U
bis(2-Ethylhexyl)phthalate	10 U	11 U	12 U	12 U
n-Nitroso-di-n-propylamine	10 U	11 U	12 U	12 U
n-Nitrosodiphenylamine	10 U	11 U	12 U	12 U
Pesticide/Polychlorinated Biphenyls (UG/L)				

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Shallow GW Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	IW03S		SJS5-MW04S	SJS5-MW05S
Sample ID	SJS05-GW3S-002	SJS05-GW3S-003	SJS05-GW4S-001	SJS05-GW5S-001
Sample Date	11/04/97	05/23/99	05/19/99	05/23/99
Chemical Name				
4,4'-DDD	0.1 U	0.110 U	0.0110 J	0.0120 J
4,4'-DDE	0.1 U	0.110 U	0.120 U	0.110 U
4,4'-DDT	0.1 U	0.110 U	0.120 U	0.00520 J
Aldrin	0.05 U	0.0570 U	0.0590 U	0.0570 U
Aroclor-1016	1 U	1.10 U	1.20 U	1.10 U
Aroclor-1221	2 U	2.30 U	2.40 U	2.30 U
Aroclor-1232	1 U	1.10 U	1.20 U	1.10 U
Aroclor-1242	1 U	1.10 U	1.20 U	1.10 U
Aroclor-1248	1 U	1.10 U	1.20 U	1.10 U
Aroclor-1254	1 U	1.10 U	1.20 U	1.10 U
Aroclor-1260	1 U	1.10 U	1.20 U	1.10 U
Dieldrin	0.1 U	0.110 U	0.120 U	0.110 U
Endosulfan I	0.05 U	0.0570 U	0.0590 U	0.0570 U
Endosulfan II	0.1 U	0.110 U	0.120 U	0.110 U
Endosulfan sulfate	0.1 U	0.110 U	0.120 U	0.110 U
Endrin	0.1 U	0.110 U	0.120 U	0.110 U
Endrin aldehyde	0.1 U	0.110 U	0.120 U	0.110 U
Endrin ketone	0.1 U	0.110 U	0.120 U	0.110 U
Heptachlor	0.05 U	0.0570 U	0.0590 U	0.0570 U
Heptachlor epoxide	0.05 U	0.0570 U	0.0590 U	0.0570 U
Methoxychlor	0.5 U	0.570 U	0.590 U	0.570 U
Toxaphene	5 U	5.70 U	5.90 U	5.70 U
alpha-BHC	0.05 U	0.0570 U	0.0590 U	0.0570 U
alpha-Chlordane	0.05 U	0.0570 U	0.0590 U	0.0570 U
beta-BHC	0.05 U	0.0570 U	0.0590 U	0.0570 U
delta-BHC	0.05 U	0.0570 U	0.0590 U	0.0570 U
gamma-BHC (Lindane)	0.05 U	0.0570 U	0.0590 U	0.0570 U
gamma-Chlordane	0.05 U	0.0570 U	0.0590 U	0.0570 U
Explosives (UG/L)				
1,3,5-Trinitrobenzene	25 U	1.20 U	1.20 U	1.20 U
1,3-Dinitrobenzene	25 U	1.20 U	1.20 U	1.20 U
2,4,6-Trinitrotoluene	25 U	1.20 U	1.20 U	1.20 U
2,4-Dinitrotoluene	NA	1.20 U	1.20 U	1.20 U
2,6-Dinitrotoluene	NA	1.20 U	1.20 U	1.20 U
2-Amino-4,6-dinitrotoluene	25 U	1.20 U	1.20 U	1.20 U
2-Nitrotoluene	25 U	2.60 U	2.60 U	2.60 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Shallow GW Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	IW03S		SJS5-MW04S	SJS5-MW05S
Sample ID	SJS05-GW3S-002	SJS05-GW3S-003	SJS05-GW4S-001	SJS05-GW5S-001
Sample Date	11/04/97	05/23/99	05/19/99	05/23/99
Chemical Name				
3-Nitrotoluene	25 U	2.60 U	2.60 U	2.60 U
4-Amino-2,6-dinitrotoluene	25 U	1.20 U	1.20 U	1.20 U
4-Nitrotoluene	25 U	2.60 U	2.60 U	2.60 U
HMX	25 U	2.60 U	2.60 U	2.60 U
Nitrobenzene	NA	1.20 U	1.20 U	1.20 U
RDX	25 U	2.60 U	2.60 U	2.60 U
Tetryl	25 U	2.60 U	2.60 U	2.60 U
Total Metals (UG/L)				
Aluminum	30,400	16,400	613	362
Antimony	1.7 U	2.70 U	2.70 U	2.70 U
Arsenic	5.7 J	3.90 J	4.80 J	2 U
Barium	22 J	18.5 J	55.2 J	47.7 J
Beryllium	13.5	9.10	0.100 U	0.100 U
Cadmium	11	5.70	0.300 U	0.300 U
Calcium	40,700	37,300	257,000	174,000
Chromium	7.6 B	2.20 B	2.90 J	1.10 U
Cobalt	141	90.2	3.20 J	5.40 J
Copper	62.2	25.1	4 J	6.80 B
Cyanide	5 U	5 U	5 U	5 U
Iron	17,700	24,800	30,200	20,300
Lead	26.1	18	1 U	1.5 J
Magnesium	35,600	35,600	39,000	63,100
Manganese	3,620	3,400	1,360	3,320
Mercury	0.13 U	0.100 U	0.100 U	0.100 U
Nickel	238	160	4.70 J	6.70 B
Potassium	15,000	15,400 J	21,200	9,460 J
Selenium	3.3 U	2.60 U	2.60 U	2.60 U
Silver	1.5 J	0.900 U	0.900 U	0.900 U
Sodium	22,000	21,800	178,000	467,000
Thallium	1.5 U	3.20 U	2 U	3.20 U
Vanadium	6.8 U	0.600 U	0.600 U	0.600 U
Zinc	1,540	1,240	16.5 J	14.2 B
Dissolved Metals (UG/L)				
Aluminum	30,900	17,600	744	71.1 B
Antimony	1.7 U	2.70 U	2.70 U	3.80 J

NA - Not analyzed
U - Analyte not detected
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

Appendix H
Shallow GW Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	IW03S		SJS5-MW04S	SJS5-MW05S
Sample ID	SJS05-GW3S-002	SJS05-GW3S-003	SJS05-GW4S-001	SJS05-GW5S-001
Sample Date	11/04/97	05/23/99	05/19/99	05/23/99
Chemical Name				
Arsenic	5.8 J	2 U	5.30 B	2 U
Barium	22.5 J	19.7 J	54.6 J	50.1 J
Beryllium	14.1	9.70	0.100 U	0.100 U
Cadmium	11.5	6	0.300 U	0.300 U
Calcium	41,100	40,000	211,000	172,000
Chromium	21.8	3.40 J	1.80 J	1.40 J
Cobalt	173	94.9	3.20 J	9.10 J
Copper	89.6	37.3	4.90 B	2.60 B
Iron	18,000	26,800	44,100	16,900
Lead	29.3	20.4	1 U	1 U
Magnesium	36,100	38,000	46,400	60,400
Manganese	3,670	3,640	1,620	3,130
Mercury	0.13 U	0.100 U	0.100 U	0.100 U
Nickel	248	169	3.80 B	11.3 J
Potassium	15,000	18,200 J	21,200	9,680 J
Selenium	3.3 U	2.60 U	2.60 U	2.60 U
Silver	1.1 U	0.900 U	0.900 U	1.40 J
Sodium	22,000	22,700	244,000	447,000
Thallium	1.5 U	3.20 U	2 U	3.20 U
Vanadium	7.6 J	0.600 J	0.600 U	0.600 U
Zinc	1,600	1,330	11.5 J	32.6 B
Wet Chemistry (MG/L)				
Phosphate	0.188	NA	NA	NA
Phosphorus	NA	0.0200 U	0.153	0.0200 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
U - Analyte not detected

Appendix H
Deep GW Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-MW01D			SJS5-MW02D			SJS5-MW04D	
Sample ID	SJS05-GW1D-001	SJS05-GW1D-002	SJS05-GW1D-003	SJS05-GW2D-001	SJS05-GW2D-002	SJS05-GW2D-003	SJS05-GW4D-001	SJS05-GW4D-001P
Sample Date	07/24/97	11/06/97	05/19/99	07/30/97	11/04/97	05/23/99	05/19/99	05/19/99
Chemical Name								
Volatile Organic Compounds (UG/L)								
1,1,1-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromo-3-chloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Hexanone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	5 U	10 B	NA	14 B	64 B	NA	NA	NA
Benzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon disulfide	1 U	0.2 J	2 B	1 U	1 U	0.300 B	6	0.700
Carbon tetrachloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	2	1 U	1 U	5	0.7 B	1 U	1.40 B	1.40 B
Chloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene chloride	2 B	3 B	0.800 B	3 B	2 B	0.400 B	0.700 B	0.700 B
Styrene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl chloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
U - Analyte not detected
UJ - Not detected, quantitation limit may be inaccurate

Appendix H
Deep GW Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-MW01D			SJS5-MW02D			SJS5-MW04D	
Sample ID	SJS05-GW1D-001	SJS05-GW1D-002	SJS05-GW1D-003	SJS05-GW2D-001	SJS05-GW2D-002	SJS05-GW2D-003	SJS05-GW4D-001	SJS05-GW4D-001P
Sample Date	07/24/97	11/06/97	05/19/99	07/30/97	11/04/97	05/23/99	05/19/99	05/19/99
Chemical Name								
Xylene, total	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Semi-volatile Organic Compounds (UG/L)								
1,2,4-Trichlorobenzene	NA	NA	11 UL	NA	NA	12 U	11 U	11 U
1,2-Dichlorobenzene	NA	NA	11 UL	NA	NA	12 U	11 U	11 U
1,3-Dichlorobenzene	NA	NA	11 UL	NA	NA	12 U	11 U	11 U
1,4-Dichlorobenzene	NA	NA	11 UL	NA	NA	12 U	11 U	11 U
2,2'-Oxybis(1-chloropropane)	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
2,4,5-Trichlorophenol	25 U	25 U	29 UL	25 U	25 U	30 U	27 U	27 U
2,4,6-Trichlorophenol	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
2,4-Dichlorophenol	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
2,4-Dimethylphenol	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
2,4-Dinitrophenol	25 U	25 U	29 UL	25 UJ	25 U	30 U	27 U	27 U
2,4-Dinitrotoluene	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
2,6-Dinitrotoluene	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
2-Chloronaphthalene	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
2-Chlorophenol	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
2-Methylnaphthalene	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
2-Methylphenol	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
2-Nitroaniline	25 U	25 U	29 UL	25 U	25 U	30 U	27 U	27 U
2-Nitrophenol	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
3,3'-Dichlorobenzidine	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
3-Nitroaniline	25 U	25 U	29 UL	25 U	25 U	30 U	27 U	27 U
4,6-Dinitro-2-methylphenol	25 U	25 U	29 UL	25 U	25 U	30 U	27 U	27 U
4-Bromophenyl-phenylether	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
4-Chloro-3-methylphenol	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
4-Chloroaniline	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
4-Chlorophenyl-phenylether	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
4-Methylphenol	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
4-Nitroaniline	25 U	25 U	29 UL	25 U	25 U	30 U	27 U	27 U
4-Nitrophenol	25 U	25 U	29 UL	25 U	25 U	30 U	27 U	27 U
Acenaphthene	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
Acenaphthylene	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
U - Analyte not detected
UJ - Not detected, quantitation limit may be inaccurate

Appendix H
Deep GW Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-MW01D			SJS5-MW02D			SJS5-MW04D	
Sample ID	SJS05-GW1D-001	SJS05-GW1D-002	SJS05-GW1D-003	SJS05-GW2D-001	SJS05-GW2D-002	SJS05-GW2D-003	SJS05-GW4D-001	SJS05-GW4D-001P
Sample Date	07/24/97	11/06/97	05/19/99	07/30/97	11/04/97	05/23/99	05/19/99	05/19/99
Chemical Name								
Anthracene	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
Benzo(a)anthracene	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
Benzo(a)pyrene	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
Benzo(b)fluoranthene	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
Benzo(g,h,i)perylene	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
Benzo(k)fluoranthene	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
Butylbenzylphthalate	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
Carbazole	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
Chrysene	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
Di-n-butylphthalate	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
Di-n-octylphthalate	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
Dibenz(a,h)anthracene	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
Dibenzofuran	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
Diethylphthalate	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
Dimethyl phthalate	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
Fluoranthene	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
Fluorene	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
Hexachlorobenzene	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
Hexachlorobutadiene	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
Hexachlorocyclopentadiene	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
Hexachloroethane	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
Indeno(1,2,3-cd)pyrene	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
Isophorone	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
Naphthalene	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
Nitrobenzene	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
Pentachlorophenol	25 U	25 U	29 UL	25 U	25 U	30 U	27 U	27 U
Phenanthrene	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
Phenol	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
Pyrene	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
bis(2-Chloroethoxy)methane	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
bis(2-Chloroethyl)ether	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
bis(2-Ethylhexyl)phthalate	10 U	10 U	11 UL	10 U	10 U	12 U	1 J	2 J
n-Nitroso-di-n-propylamine	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
n-Nitrosodiphenylamine	10 U	10 U	11 UL	10 U	10 U	12 U	11 U	11 U
Pesticide/Polychlorinated Biphenyls (UG/L)								
4,4'-DDD	0.1 U	0.1 U	0.110 U	0.1 U	0.1 U	0.110 U	0.110 U	0.110 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
U - Analyte not detected
UJ - Not detected, quantitation limit may be inaccurate

Appendix H
Deep GW Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-MW01D			SJS5-MW02D			SJS5-MW04D	
Sample ID	SJS05-GW1D-001	SJS05-GW1D-002	SJS05-GW1D-003	SJS05-GW2D-001	SJS05-GW2D-002	SJS05-GW2D-003	SJS05-GW4D-001	SJS05-GW4D-001P
Sample Date	07/24/97	11/06/97	05/19/99	07/30/97	11/04/97	05/23/99	05/19/99	05/19/99
Chemical Name								
4,4'-DDE	0.1 U	0.1 U	0.110 U	0.1 U	0.1 U	0.110 U	0.110 U	0.110 U
4,4'-DDT	0.1 U	0.1 U	0.00570 J	0.1 U	0.1 U	0.110 U	0.110 U	0.110 U
Aldrin	0.05 U	0.05 U	0.0570 U	0.05 U	0.05 U	0.0570 U	0.0540 U	0.0560 U
Aroclor-1016	1 U	1 U	1.10 U	1 U	1 U	1.10 U	1.10 U	1.10 U
Aroclor-1221	2 U	2 U	2.30 U	2 U	2 U	2.30 U	2.20 U	2.20 U
Aroclor-1232	1 U	1 U	1.10 U	1 U	1 U	1.10 U	1.10 U	1.10 U
Aroclor-1242	1 U	1 U	1.10 U	1 U	1 U	1.10 U	1.10 U	1.10 U
Aroclor-1248	1 U	1 U	1.10 U	1 U	1 U	1.10 U	1.10 U	1.10 U
Aroclor-1254	1 U	1 U	1.10 U	1 U	1 U	1.10 U	1.10 U	1.10 U
Aroclor-1260	1 U	1 U	1.10 U	1 U	1 U	1.10 U	1.10 U	1.10 U
Dieldrin	0.1 U	0.1 U	0.110 U	0.1 U	0.1 U	0.110 U	0.110 U	0.110 U
Endosulfan I	0.05 U	0.05 U	0.0570 U	0.05 U	0.05 U	0.0570 U	0.0540 U	0.0560 U
Endosulfan II	0.1 U	0.1 U	0.110 U	0.1 U	0.1 U	0.110 U	0.110 U	0.110 U
Endosulfan sulfate	0.1 U	0.1 U	0.110 U	0.1 U	0.1 U	0.110 U	0.110 U	0.110 U
Endrin	0.1 U	0.1 U	0.110 U	0.1 U	0.1 U	0.110 U	0.110 U	0.110 U
Endrin aldehyde	0.1 U	0.1 U	0.110 U	0.1 U	0.1 U	0.110 U	0.110 U	0.110 U
Endrin ketone	0.1 U	0.1 U	0.110 U	0.1 U	0.1 U	0.110 U	0.110 U	0.110 U
Heptachlor	0.05 U	0.05 U	0.0570 U	0.05 U	0.05 U	0.0570 U	0.0540 U	0.0330 J
Heptachlor epoxide	0.05 U	0.05 U	0.0570 U	0.05 U	0.05 U	0.0570 U	0.0540 U	0.0560 U
Methoxychlor	0.5 U	0.5 U	0.570 U	0.5 U	0.5 U	0.570 U	0.540 U	0.560 U
Toxaphene	5 U	5 U	5.70 U	5 U	5 U	5.70 U	5.40 U	5.60 U
alpha-BHC	0.05 U	0.05 U	0.0570 U	0.05 U	0.05 U	0.0570 U	0.0540 U	0.0560 U
alpha-Chlordane	0.05 U	0.05 U	0.0570 U	0.05 U	0.05 U	0.0570 U	0.0540 U	0.0560 U
beta-BHC	0.05 U	0.05 U	0.0570 U	0.05 U	0.05 U	0.0570 U	0.0540 U	0.0560 U
delta-BHC	0.05 U	0.05 U	0.0570 U	0.05 U	0.05 U	0.0570 U	0.0540 U	0.0560 U
gamma-BHC (Lindane)	0.05 U	0.05 U	0.0570 U	0.05 U	0.05 U	0.0570 U	0.0540 U	0.0560 U
gamma-Chlordane	0.05 U	0.05 U	0.0570 U	0.05 U	0.05 U	0.0570 U	0.0540 U	0.0560 U
Explosives (UG/L)								
1,3,5-Trinitrobenzene	NA	NA	1.20 U	NA	NA	1.20 U	1.20 U	1.20 U
1,3-Dinitrobenzene	NA	NA	1.20 U	NA	NA	1.20 U	1.20 U	1.20 U
2,4,6-Trinitrotoluene	NA	NA	1.20 U	NA	NA	1.20 U	1.20 U	1.20 U
2,4-Dinitrotoluene	NA	NA	1.20 U	NA	NA	1.20 U	1.20 U	1.20 U
2,6-Dinitrotoluene	NA	NA	1.20 U	NA	NA	1.20 U	1.20 U	1.20 U
2-Amino-4,6-dinitrotoluene	NA	NA	1.20 U	NA	NA	1.20 U	1.20 U	1.20 U
2-Nitrotoluene	NA	NA	2.60 U	NA	NA	2.60 U	2.60 U	2.60 U
3-Nitrotoluene	NA	NA	2.60 U	NA	NA	2.60 U	2.60 U	2.60 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
U - Analyte not detected
UJ - Not detected, quantitation limit may be inaccurate

Appendix H
Deep GW Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-MW01D			SJS5-MW02D			SJS5-MW04D	
Sample ID	SJS05-GW1D-001	SJS05-GW1D-002	SJS05-GW1D-003	SJS05-GW2D-001	SJS05-GW2D-002	SJS05-GW2D-003	SJS05-GW4D-001	SJS05-GW4D-001P
Sample Date	07/24/97	11/06/97	05/19/99	07/30/97	11/04/97	05/23/99	05/19/99	05/19/99
Chemical Name								
4-Amino-2,6-dinitrotoluene	NA	NA	1.20 U	NA	NA	1.20 U	1.20 U	1.20 U
4-Nitrotoluene	NA	NA	2.60 U	NA	NA	2.60 U	2.60 U	2.60 U
HMX	NA	NA	2.60 U	NA	NA	2.60 U	2.60 U	2.60 U
Nitrobenzene	NA	NA	1.20 U	NA	NA	1.20 U	1.20 U	1.20 U
RDX	NA	NA	1.60 J	NA	NA	2.60 U	2.60 U	2.60 U
Tetryl	NA	NA	2.60 U	NA	NA	2.60 U	2.60 U	2.60 U
Total Metals (UG/L)								
Aluminum	1,070 J	38.1 U	38.2 U	2,250	177 B	42.3 J	183 J	84.3 J
Antimony	NA	1.7 U	2.70 U	3.1 J	1.7 U	3.20 J	2.70 U	2.70 U
Arsenic	3 U	3.2 U	3 B	4.9 J	3.2 U	2 U	5.5 B	5.30 B
Barium	15 B	12.2 B	24.2 J	26.5 J	22 J	20.6 J	24.4 J	24 J
Beryllium	1.4 B	0.58 U	0.100 U	1.5 K	0.58 U	0.100 U	0.100 U	0.100 U
Cadmium	0.5 UL	0.4 U	0.300 U	0.5 U	0.4 U	0.300 U	0.300 U	0.300 U
Calcium	58,700 J	51,600	78,500	68,700	64,000	85,900	71,900	70,600
Chromium	10.1 J	4.6 U	1.90 J	13 B	4.6 U	1.10 U	1.10 U	1.10 U
Cobalt	8 U	6 U	0.5 U	8 U	6 U	0.5 U	0.5 U	0.5 U
Copper	6 U	5.8 U	4.10 B	6 U	5.8 U	1.90 B	4.30 B	3.70 B
Cyanide	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Iron	1,460 J	109 B	337	4,420 K	1,150	1,120	325	291
Lead	2.7 B	1.3 U	1 U	4.3 B	1.3 U	1 U	1 U	1 U
Magnesium	4,770 J	3,750 J	8,030	10,000	10,500	9,890	11,100	10,900
Manganese	30.7 B	14.4 B	52.4	142	178	192	118	115
Mercury	0.16 B	0.13 U	0.100 U	0.12 U	0.13 U	0.100 U	0.100 U	0.100 U
Nickel	7 U	6.3 U	1.70 B	7 U	6.3 U	0.900 U	1.30 B	1.5 J
Potassium	8,030	7,440	8,570	7,740	7,550	7,170 J	9,070	8,920
Selenium	NA	3.3 U	2.60 U	3 U	3.3 U	2.60 U	2.60 U	2.60 U
Silver	1 U	1.7 B	0.900 U	6.3 B	1.1 U	0.900 U	0.900 U	0.900 U
Sodium	39,000 J	41,200	45,600	43,000	43,800	45,300	53,000	52,100
Thallium	2 U	1.7 B	2 U	2 U	1.8 B	3.20 U	2 U	2 U
Vanadium	9 U	6.8 U	0.600 U	15.6 K	6.8 U	0.600 U	0.600 U	0.600 U
Zinc	11.4 B	4.8 B	2.10 J	14.4 B	14.5 B	3.10 J	4.30 J	4.40 J
Dissolved Metals (UG/L)								
Aluminum	108 B	38.1 U	189 J	56 B	38.1 U	45.4 J	205	38.2 U
Antimony	2 UL	1.7 U	2.70 U	2 J	1.7 U	2.70 U	2.70 U	2.70 U
Arsenic	3 UL	3.6 B	2.20 B	3 U	3.2 U	2 U	4.80 B	6.60 B

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
U - Analyte not detected
UJ - Not detected, quantitation limit may be inaccurate

Appendix H
Deep GW Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-MW01D			SJS5-MW02D			SJS5-MW04D	
Sample ID	SJS05-GW1D-001	SJS05-GW1D-002	SJS05-GW1D-003	SJS05-GW2D-001	SJS05-GW2D-002	SJS05-GW2D-003	SJS05-GW4D-001	SJS05-GW4D-001P
Sample Date	07/24/97	11/06/97	05/19/99	07/30/97	11/04/97	05/23/99	05/19/99	05/19/99
Chemical Name								
Barium	11.6 B	11.4 B	23.9 J	20.4 B	19.4 B	23.3 J	23.6 J	23.2 J
Beryllium	1.1 B	0.58 U	0.100 U	1 U	0.58 U	0.100 U	0.100 U	0.100 U
Cadmium	0.5 UL	0.4 U	0.300 U	0.5 U	0.4 U	0.300 U	0.300 U	0.300 U
Calcium	65,800 J	44,700	76,800	58,900	59,200	74,600	69,500	68,500
Chromium	7 U	4.6 U	1.10 U	7 U	4.6 U	1.10 U	1.10 U	1.10 U
Cobalt	8 U	6 U	0.5 U	8 U	6 U	0.5 U	0.540 J	0.5 U
Copper	6 U	5.8 U	4.20 B	6 U	5.8 U	2.5 B	3.60 B	3.40 B
Iron	40.7 B	67.5 B	286	454	848	1,230	286	257
Lead	1.4 B	1.3 U	1 U	1.7 J	1.8 B	1 U	1 U	1 U
Magnesium	5,240 J	2,820 J	7,910	9,360	9,850	11,200	10,800	10,600
Manganese	10.1 B	13.6 B	50.8	100	166	217	113	106
Mercury	0.19 B	0.13 U	0.100 U	0.13 U	0.13 U	0.100 U	0.100 U	0.100 U
Nickel	7 U	6.3 U	0.900 U	7 U	6.3 U	0.900 U	1.30 J	1.5 J
Potassium	6,860	6,960	8,360	7,590	6,780	8,240 J	8,810	8,880
Selenium	NA	3.3 U	2.60 U	3 U	3.3 U	2.60 U	2.60 U	2.60 U
Silver	1 U	1.1 U	0.900 U	4.5 B	1.1 U	0.900 U	0.900 U	0.900 U
Sodium	44,100 J	37,900	45,400	44,900	41,400	51,400	51,400	51,100
Thallium	2 U	1.5 U	2 U	2 U	2.8 B	3.20 U	2 U	2 U
Vanadium	9 U	6.8 U	0.600 U	9 U	6.8 U	0.600 U	0.600 U	0.600 U
Zinc	55.1 B	8.1 B	1.90 U	13.4 B	10.3 B	4.10 B	3.10 J	7.30 J
Wet Chemistry (MG/L)								
Phosphate	NA	0.485	NA	NA	0.363	NA	NA	NA
Phosphorus	0.376	NA	0.155	1.3 U	NA	0.0420	0.0200 U	0.0200 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
U - Analyte not detected
UJ - Not detected, quantitation limit may be inaccurate

Appendix H
Surface Water Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SW01	SJS5-SW02	SJS5-SW03	SJS5-SW04	SJS5-SW05	SJS5-SW06		SJS5-SW07	
Sample ID	SJS05-SW01-001	SJS05-SW02-001	SJS05-SW03-001	SJS05-SW04-001	SJS05-SW05-001	SJS05-SW06-001P	SJS05-SW06-001	SJS05-SW07-001P	SJS05-SW07-001
Sample Date	04/13/99	04/13/99	04/13/99	04/15/99	04/16/99	04/16/99	04/16/99	10/28/99	10/28/99
Chemical Name									
Volatile Organic Compounds (UG/L)									
1,1,1-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	1 U	1 UJ	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromo-3-chloropropane	1 U	1 UJ	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 UJ	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	1 U	1 UJ	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 UJ	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	5 U	5 U	5 U	5 U	NA	NA	NA	5 U	5 U
2-Hexanone	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 U	5 U
4-Methyl-2-pentanone	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 U	5 U
Acetone	NA	NA	NA	4 L	NA	NA	NA	5 U	5 U
Benzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	1 U	1 UJ	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon disulfide	1.40 J	1.80 J	1 UJ	1.20	0.5 B	11.5	6.10	1 U	1 U
Carbon tetrachloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene chloride	0.5 B	0.700 B	0.400 B	2 U	0.900 B	1 B	0.800 B	0.900 B	0.600 B
Styrene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	1 U	1 U	1 U	0.5 J	0.700 B	0.700 B	0.300 B	1 U	1 U
Trichloroethene	1 U	1 U	1 U	1 U	NA	1 U	NA	1 U	1 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
L - Reported value may be biased low
U - Analyte not detected
UJ - Not detected, quantitation limit may be inaccurate

Appendix H
Surface Water Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SW01	SJS5-SW02	SJS5-SW03	SJS5-SW04	SJS5-SW05	SJS5-SW06		SJS5-SW07	
Sample ID	SJS05-SW01-001	SJS05-SW02-001	SJS05-SW03-001	SJS05-SW04-001	SJS05-SW05-001	SJS05-SW06-001P	SJS05-SW06-001	SJS05-SW07-001P	SJS05-SW07-001
Sample Date	04/13/99	04/13/99	04/13/99	04/15/99	04/16/99	04/16/99	04/16/99	10/28/99	10/28/99
Chemical Name									
Vinyl chloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Xylene, total	1 U	1 U	1 U	0.300 J	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Semi-volatile Organic Compounds (UG/L)									
1,2,4-Trichlorobenzene	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
1,2-Dichlorobenzene	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
1,3-Dichlorobenzene	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
1,4-Dichlorobenzene	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
2,2'-Oxybis(1-chloropropane)	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
2,4,5-Trichlorophenol	26 U	27 U	27 U	32 U	27 U	26 U	29 U	26 U	28 U
2,4,6-Trichlorophenol	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
2,4-Dichlorophenol	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
2,4-Dimethylphenol	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
2,4-Dinitrophenol	26 U	27 U	27 U	32 U	27 U	26 U	29 U	26 U	28 U
2,4-Dinitrotoluene	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
2,6-Dinitrotoluene	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
2-Chloronaphthalene	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
2-Chlorophenol	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
2-Methylnaphthalene	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
2-Methylphenol	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
2-Nitroaniline	26 U	27 U	27 U	32 U	27 U	26 U	29 U	26 U	28 U
2-Nitrophenol	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
3,3'-Dichlorobenzidine	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
3-Nitroaniline	26 U	27 U	27 U	32 U	27 U	26 U	29 U	26 U	28 U
4,6-Dinitro-2-methylphenol	26 U	27 U	27 U	32 U	27 U	26 U	29 U	26 U	28 U
4-Bromophenyl-phenylether	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
4-Chloro-3-methylphenol	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
4-Chloroaniline	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
4-Chlorophenyl-phenylether	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
4-Methylphenol	10 U	11 U	11 U	13 U	11 U	5 J	11 U	10 U	11 U
4-Nitroaniline	26 U	27 U	27 U	32 U	27 U	26 U	29 U	26 U	28 U
4-Nitrophenol	26 U	27 U	27 U	32 U	27 U	26 U	29 U	26 U	28 U
Acenaphthene	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
L - Reported value may be biased low
U - Analyte not detected
UJ - Not detected, quantitation limit may be inaccurate

Appendix H
Surface Water Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SW01	SJS5-SW02	SJS5-SW03	SJS5-SW04	SJS5-SW05	SJS5-SW06		SJS5-SW07	
Sample ID	SJS05-SW01-001	SJS05-SW02-001	SJS05-SW03-001	SJS05-SW04-001	SJS05-SW05-001	SJS05-SW06-001P	SJS05-SW06-001	SJS05-SW07-001P	SJS05-SW07-001
Sample Date	04/13/99	04/13/99	04/13/99	04/15/99	04/16/99	04/16/99	04/16/99	10/28/99	10/28/99
Chemical Name									
Acenaphthylene	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
Anthracene	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
Benzo(a)anthracene	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
Benzo(a)pyrene	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
Benzo(b)fluoranthene	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
Benzo(g,h,i)perylene	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
Benzo(k)fluoranthene	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
Butylbenzylphthalate	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
Carbazole	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
Chrysene	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
Di-n-butylphthalate	10 U	11 U	11 U	13 U	2 B	2 B	2 B	7 B	5 B
Di-n-octylphthalate	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
Dibenz(a,h)anthracene	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
Dibenzofuran	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
Diethylphthalate	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
Dimethyl phthalate	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
Fluoranthene	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
Fluorene	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
Hexachlorobenzene	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
Hexachlorobutadiene	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
Hexachlorocyclopentadiene	10 U	11 U	11 U	13 U	11 UJ	10 UJ	11 UJ	10 U	11 U
Hexachloroethane	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
Indeno(1,2,3-cd)pyrene	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
Isophorone	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
Naphthalene	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
Nitrobenzene	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
Pentachlorophenol	26 U	27 U	27 U	32 U	27 U	26 U	29 U	26 U	28 U
Phenanthrene	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
Phenol	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
Pyrene	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
bis(2-Chloroethoxy)methane	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
bis(2-Chloroethyl)ether	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
bis(2-Ethylhexyl)phthalate	10 U	11 U	11 U	13 U	11 U	1 B	2 B	4 J	11 U
n-Nitroso-di-n-propylamine	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
n-Nitrosodiphenylamine	10 U	11 U	11 U	13 U	11 U	10 U	11 U	10 U	11 U
Pesticide/Polychlorinated Biphenyls (UG/L)									

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
L - Reported value may be biased low
U - Analyte not detected
UJ - Not detected, quantitation limit may be inaccurate

Appendix H
Surface Water Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SW01	SJS5-SW02	SJS5-SW03	SJS5-SW04	SJS5-SW05	SJS5-SW06		SJS5-SW07	
Sample ID	SJS05-SW01-001	SJS05-SW02-001	SJS05-SW03-001	SJS05-SW04-001	SJS05-SW05-001	SJS05-SW06-001P	SJS05-SW06-001	SJS05-SW07-001P	SJS05-SW07-001
Sample Date	04/13/99	04/13/99	04/13/99	04/15/99	04/16/99	04/16/99	04/16/99	10/28/99	10/28/99
Chemical Name									
1,3-Dinitrobenzene	NA	NA	1.20 U	NA	NA	NA	NA	NA	NA
4,4'-DDD	0.110 U	0.100 U	0.110 U	0.110 U	0.110 U	0.110 U	0.01000 J	0.100 U	0.110 U
4,4'-DDE	0.110 U	0.100 U	0.110 U	0.0120 J	0.110 U	0.110 U	0.110 U	0.100 U	0.110 U
4,4'-DDT	0.110 U	0.100 U	0.110 U	0.110 U	0.110 U	0.110 U	0.110 U	0.100 U	0.110 U
Aldrin	0.0530 U	0.0520 U	0.0560 U	0.0570 U	0.0540 U	0.0560 U	0.0570 U	0.0510 U	0.0530 U
Aroclor-1016	1.10 U	1 U	1.10 U	1.10 U	1.10 U	1.10 U	1.10 U	1 U	1.10 U
Aroclor-1221	2.10 U	2.10 U	2.20 U	2.30 U	2.20 U	2.20 U	2.30 U	2 U	2.10 U
Aroclor-1232	1.10 U	1 U	1.10 U	1.10 U	1.10 U	1.10 U	1.10 U	1 U	1.10 U
Aroclor-1242	1.10 U	1 U	1.10 U	1.10 U	1.10 U	1.10 U	1.10 U	1 U	1.10 U
Aroclor-1248	1.10 U	1 U	1.10 U	1.10 U	1.10 U	1.10 U	1.10 U	1 U	1.10 U
Aroclor-1254	1.10 U	1 U	1.10 U	1.10 U	1.10 U	1.10 U	1.10 U	1 U	1.10 U
Aroclor-1260	1.10 U	1 U	1.10 U	1.10 U	1.10 U	1.10 U	1.10 U	1 U	1.10 U
Dieldrin	0.110 U	0.100 U	0.110 U	0.110 U	0.110 U	0.110 U	0.110 U	0.100 U	0.110 U
Endosulfan I	0.0530 U	0.0520 U	0.0560 U	0.0570 U	0.0540 U	0.0560 U	0.0570 U	0.0510 U	0.0530 U
Endosulfan II	0.110 U	0.100 U	0.110 U	0.110 U	0.110 U	0.110 U	0.110 U	0.100 U	0.110 U
Endosulfan sulfate	0.110 U	0.100 U	0.110 U	0.110 U	0.110 U	0.110 U	0.110 U	0.100 U	0.110 U
Endrin	0.110 U	0.100 U	0.110 U	0.110 U	0.110 U	0.110 U	0.110 U	0.100 U	0.110 U
Endrin aldehyde	0.110 U	0.100 U	0.110 U	0.110 U	0.110 U	0.110 U	0.110 U	0.100 U	0.110 U
Endrin ketone	0.110 U	0.100 U	0.110 U	0.110 U	0.110 U	0.110 U	0.110 U	0.100 U	0.110 U
Heptachlor	0.0530 U	0.0520 U	0.0560 U	0.0570 U	0.0540 U	0.0560 U	0.0570 U	0.0510 U	0.0530 U
Heptachlor epoxide	0.0530 U	0.0520 U	0.0560 U	0.0570 U	0.0540 U	0.0560 U	0.0570 U	0.0510 U	0.0530 U
Methoxychlor	0.530 U	0.520 U	0.560 U	0.570 U	0.540 U	0.560 U	0.570 U	0.510 U	0.530 U
Tetryl	NA	2 U	NA	NA	NA	NA	NA	NA	NA
Toxaphene	5.30 U	5.20 U	5.60 U	5.70 U	5.40 U	5.60 U	5.70 U	5.10 U	5.30 U
alpha-BHC	0.0530 U	0.0520 U	0.0560 U	0.0570 U	0.0540 U	0.0560 U	0.0570 U	0.0510 U	0.0530 U
alpha-Chlordane	0.0530 U	0.0520 U	0.0560 U	0.0570 U	0.0540 U	0.0560 U	0.0570 U	0.0510 U	0.0530 U
beta-BHC	0.0530 U	0.0520 U	0.0560 U	0.0570 U	0.0540 U	0.0560 U	0.0570 U	0.0510 U	0.0530 U
delta-BHC	0.0530 U	0.0520 U	0.0560 U	0.0570 U	0.0540 U	0.0560 U	0.0570 U	0.0510 U	0.0530 U
gamma-BHC (Lindane)	0.0530 U	0.0520 U	0.0560 U	0.0570 U	0.0540 U	0.0560 U	0.0570 U	0.0510 U	0.0530 U
gamma-Chlordane	0.0530 U	0.0520 U	0.0560 U	0.0570 U	0.0540 U	0.0560 U	0.0570 U	0.0510 U	0.0530 U
Explosives (UG/L)									
1,3,5-Trinitrobenzene	0.5 U	0.900 U	1.20 U	1.20 U	0.900 U	0.700 U	0.800 U	1.20 U	1.20 U
1,3-Dinitrobenzene	0.5 U	0.900 U	NA	1.20 U	0.900 U	0.700 U	0.800 U	1.20 U	1.20 U
2,4,6-Trinitrotoluene	0.5 U	0.900 U	1.20 U	1.20 U	0.900 U	0.700 U	0.800 U	1.20 U	1.20 U
2,4-Dinitrotoluene	0.5 U	0.900 U	1.20 U	1.20 U	0.900 U	0.700 U	0.800 U	1.20 U	1.20 U
2,6-Dinitrotoluene	0.5 U	0.900 U	1.20 U	1.20 U	0.900 U	0.700 U	0.800 U	1.20 U	1.20 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
L - Reported value may be biased low
U - Analyte not detected
UJ - Not detected, quantitation limit may be inaccurate

Appendix H
Surface Water Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SW01	SJS5-SW02	SJS5-SW03	SJS5-SW04	SJS5-SW05	SJS5-SW06		SJS5-SW07	
Sample ID	SJS05-SW01-001	SJS05-SW02-001	SJS05-SW03-001	SJS05-SW04-001	SJS05-SW05-001	SJS05-SW06-001P	SJS05-SW06-001	SJS05-SW07-001P	SJS05-SW07-001
Sample Date	04/13/99	04/13/99	04/13/99	04/15/99	04/16/99	04/16/99	04/16/99	10/28/99	10/28/99
Chemical Name									
2-Amino-4,6-dinitrotoluene	0.5 U	0.900 U	1.20 U	1.20 U	0.900 U	0.700 U	0.800 U	1.20 U	1.20 U
2-Nitrotoluene	1 U	2 U	2.60 U	2.60 U	1.90 U	1.60 U	1.80 U	2.60 U	2.60 U
3-Nitrotoluene	1 U	2 U	2.60 U	2.60 U	1.90 U	1.60 U	1.80 U	2.60 U	2.60 U
4-Amino-2,6-dinitrotoluene	0.5 U	0.900 U	1.20 U	1.20 U	0.900 U	0.700 U	0.800 U	1.20 U	1.20 U
4-Nitrotoluene	1 U	2 U	2.60 U	2.60 U	1.90 U	1.60 U	1.80 U	2.60 U	2.60 U
HMX	1 U	2 U	2.60 U	2.60 U	1.90 U	1.60 U	1.80 U	2.60 U	2.60 U
Nitrobenzene	0.5 U	0.900 U	1.20 U	1.20 U	0.900 U	0.700 U	0.800 U	1.20 U	1.20 U
RDX	1 U	2 U	2.60 U	2.60 U	1.90 U	1.60 U	1.80 U	2.60 U	2.60 U
Tetryl	1 U	NA	2.60 U	2.60 U	1.90 U	1.60 U	1.80 U	2.60 U	2.60 U
Total Metals (UG/L)									
Aluminum	268	8,800	2,890	1,770	26,100	9,190	175 J	1,090	1,480
Antimony	2.70 U	2.70 U	2.70 U	2.70 U	2.70 U	2.70 U	2.70 U	2.80 U	2.80 U
Arsenic	2 U	2 U	2 U	2 U	12.6	2.70 J	2.90 B	4.5 J	3.60 U
Barium	28.3 J	23 J	17.3 J	19 J	64.8 J	16.7 J	47 J	38 J	37.7 J
Beryllium	0.100 U	3.10 J	1.30 J	0.980 J	12.1	3.40 J	0.100 U	0.200 U	0.200 U
Cadmium	0.470 J	1.80 J	1.10 J	0.300 U	4.40 J	1.60 J	1 J	0.300 U	0.300 U
Calcium	52,600	52,200	59,000	118,000	141,000	92,000	27,400	115,000	114,000
Chromium	1.10 U	1.70 J	1.10 J	1.10 U	2.10 J	2 J	1.80 J	0.600 U	1 J
Cobalt	4 J	43.8 J	26.4 J	29.9 J	146	53.8	0.5 U	1.70 J	3.30 J
Copper	12.1 J	14.8 J	8.30 J	18.9 J	215	19.1 J	10.7 J	6.40 J	6.40 J
Cyanide	18 L	30.2 L	30.2 L	5 UL	5 U	5 U	5 U	5 U	5 U
Iron	3,740	4,080	3,850	26,600	46,900	19,900	1,950	1,670	2,630
Lead	1 U	8.80	1 U	4.70	4,760	12.5	4.20 B	2.40 J	2.40 J
Magnesium	28,900	44,100	36,100	75,500	112,000	72,900	11,600	346,000	327,000
Manganese	400	1,870	1,370	2,490	7,590	2,440	129	128	239
Mercury	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U
Nickel	8.80 J	69.6	37 J	40.8	245	79.4	1.60 J	2.70 J	4.30 J
Potassium	10,600	17,300	15,400	23,100	40,600	28,300	6,200	120,000	111,000
Selenium	2.60 U	2.60 U	2.60 U	2.60 U	2.60 U	2.60 U	2.60 U	3.10 U	3.10 U
Silver	0.900 U	0.900 U	0.910 B	0.900 U	0.900 U	0.900 U	0.900 U	0.700 U	0.700 U
Sodium	136,000	158,000	132,000	307,000	261,000 J	310,000 J	100,000 J	2,990,000	2,770,000
Thallium	3.20 U	3.20 U	3.20 U	3.20 U	3.20 U	3.20 U	3.20 U	5.20 U	5.20 U
Vanadium	0.980 B	0.600 U	0.600 U	1 B	12.6 J	1.60 B	4.20 B	2.80 J	3.20 J
Zinc	368	931	802	662	4,690	1,290	49	43.2 J	56.2 J
Wet Chemistry (MG/L)									

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
L - Reported value may be biased low
U - Analyte not detected
UJ - Not detected, quantitation limit may be inaccurate

Appendix H
Surface Water Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SW01	SJS5-SW02	SJS5-SW03	SJS5-SW04	SJS5-SW05	SJS5-SW06		SJS5-SW07	
Sample ID	SJS05-SW01-001	SJS05-SW02-001	SJS05-SW03-001	SJS05-SW04-001	SJS05-SW05-001	SJS05-SW06-001P	SJS05-SW06-001	SJS05-SW07-001P	SJS05-SW07-001
Sample Date	04/13/99	04/13/99	04/13/99	04/15/99	04/16/99	04/16/99	04/16/99	10/28/99	10/28/99
Chemical Name									
Hardness	230	288	282	577	583	411	140	NA	NA
Phosphorus	0.0220	0.0200 U	0.0200 U	0.217	1.15	0.716	0.720	NA	NA

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
L - Reported value may be biased low
U - Analyte not detected
UJ - Not detected, quantitation limit may be inaccurate

Appendix H
Sediment Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SD01	SJS5-SD02	SJS5-SD03	SJS5-SD04	SJS5-SD05	SJS5-SD06		SJS5-SD07	
Sample ID	SJS05-SD01-000	SJS05-SD02-000	SJS05-SD03-000	SJS05-SD04-001	SJS05-SD05-001	SJS05-SD06-001	SJS05-SD06-001P	SJS05-SD07-001	SJS05-SD07-001P
Sample Date	07/14/97	07/14/97	06/26/97	04/15/99	04/22/99	04/22/99	04/22/99	10/28/99	10/28/99
Chemical Name									
Volatile Organic Compounds (UG/KG)									
1,1,1-Trichloroethane	15 UJ	17 U	21 U	19 U	17 U	18 U	16 U	22 U	24 U
1,1,2,2-Tetrachloroethane	15 UJ	17 U	21 U	19 UJ	17 U	18 U	16 U	22 U	24 UJ
1,1,2-Trichloroethane	15 UJ	17 U	21 U	19 U	17 U	18 U	16 U	22 U	24 U
1,1-Dichloroethane	15 UJ	17 U	21 U	19 U	17 U	18 U	16 U	22 U	24 U
1,1-Dichloroethene	15 UJ	17 U	21 U	19 U	17 U	18 U	16 U	22 U	24 U
1,2-Dichloroethane	15 UJ	17 U	21 U	19 U	17 U	18 U	16 U	22 U	24 U
1,2-Dichloroethene (total)	15 UJ	17 U	21 U	19 U	17 U	18 U	16 U	22 U	24 U
1,2-Dichloropropane	15 UJ	17 U	21 U	19 U	17 U	18 U	16 U	22 U	24 U
2-Butanone	15 UJ	17 U	21 U	19 U	17 U	8 J	14 J	12 J	24 U
2-Hexanone	15 UJ	17 U	21 U	19 UJ	17 U	18 U	16 U	22 U	24 UJ
4-Methyl-2-pentanone	15 UJ	17 U	21 U	19 UJ	17 U	18 U	16 U	22 U	24 UJ
Acetone	15 UJ	17 U	52	19 UJ	9 J	42	73	58 B	33 B
Benzene	15 UJ	17 U	21 U	19 U	17 U	18 U	16 U	22 U	24 U
Bromodichloromethane	15 UJ	17 U	21 U	19 U	17 U	18 U	16 U	22 U	24 U
Bromoform	15 UJ	17 U	21 U	19 U	17 U	18 U	16 U	22 U	24 U
Bromomethane	15 UJ	17 U	21 U	19 U	17 U	18 U	16 U	22 U	24 U
Carbon disulfide	15 UJ	17 U	21 U	19 U	17 U	4 J	7 J	NA	14 J
Carbon tetrachloride	15 UJ	17 U	21 U	19 U	17 U	18 U	16 U	22 U	24 U
Chlorobenzene	15 UJ	17 U	21 U	19 UJ	17 U	18 U	16 U	22 U	24 UJ
Chloroethane	15 UJ	17 U	21 U	19 U	17 U	18 U	16 U	22 U	24 U
Chloroform	15 UJ	3 J	21 U	19 U	17 U	18 U	16 U	22 U	24 U
Chloromethane	15 UJ	17 U	21 U	19 U	17 U	18 U	16 U	22 U	24 U
Dibromochloromethane	15 UJ	17 U	21 U	19 U	17 U	18 U	16 U	22 U	24 U
Ethylbenzene	15 UJ	17 U	21 U	19 UJ	17 U	18 U	16 U	22 U	24 UJ
Methylene chloride	37 B	100 B	69 B	11 B	3 J	3 J	3 J	26 B	18 B
Styrene	15 UJ	17 U	21 U	19 UJ	17 U	18 U	16 U	22 U	24 UJ
Tetrachloroethene	15 UJ	17 U	21 U	19 UJ	17 U	18 U	16 U	22 U	24 UJ
Toluene	15 UJ	17 U	21 U	19 UJ	17 U	18 U	16 U	22 U	24 UJ
Trichloroethene	15 UJ	17 U	21 U	19 U	17 U	18 U	16 U	22 U	24 U
Vinyl chloride	15 UJ	17 U	21 U	19 U	17 U	18 U	16 U	22 U	24 U
Xylene, total	15 UJ	17 U	21 U	19 UJ	17 U	18 U	16 U	22 U	24 UJ
cis-1,3-Dichloropropene	15 UJ	17 U	21 U	19 U	17 U	18 U	16 U	22 U	24 U
trans-1,3-Dichloropropene	15 UJ	17 U	21 U	19 U	17 U	18 U	16 U	22 U	24 U
Semi-volatile Organic Compounds (UG/KG)									

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
U - Analyte not detected

Appendix H
Sediment Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SD01	SJS5-SD02	SJS5-SD03	SJS5-SD04	SJS5-SD05	SJS5-SD06		SJS5-SD07	
Sample ID	SJS05-SD01-000	SJS05-SD02-000	SJS05-SD03-000	SJS05-SD04-001	SJS05-SD05-001	SJS05-SD06-001	SJS05-SD06-001P	SJS05-SD07-001	SJS05-SD07-001P
Sample Date	07/14/97	07/14/97	06/26/97	04/15/99	04/22/99	04/22/99	04/22/99	10/28/99	10/28/99
Chemical Name									
1,2,4-Trichlorobenzene	510 U	620 U	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA
1,2-Dichlorobenzene	510 U	620 U	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA
1,3-Dichlorobenzene	510 U	620 U	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA
1,4-Dichlorobenzene	510 U	620 U	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA
2,2'-Oxybis(1-chloropropane)	510 U	620 U	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA
2,4,5-Trichlorophenol	1,300 U	1,600 U	9,000 U	1,600 UJ	1,400 UJ	1,500 UJ	1,300 UJ	NA	NA
2,4,6-Trichlorophenol	510 U	620 U	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA
2,4-Dichlorophenol	510 U	620 U	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA
2,4-Dimethylphenol	510 U	620 U	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA
2,4-Dinitrophenol	1,300 UJ	1,600 UJ	NA	1,600 UJ	1,400 UJ	1,500 UJ	1,300 UJ	NA	NA
2,4-Dinitrotoluene	470 J	65 J	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA
2,6-Dinitrotoluene	510 U	620 U	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA
2-Chloronaphthalene	510 U	620 U	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA
2-Chlorophenol	510 U	620 U	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA
2-Methylnaphthalene	510 U	620 U	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA
2-Methylphenol	510 U	620 U	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA
2-Nitroaniline	1,300 U	1,600 U	9,000 U	1,600 UJ	1,400 UJ	1,500 UJ	1,300 UJ	NA	NA
2-Nitrophenol	510 U	620 U	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA
3,3'-Dichlorobenzidine	510 U	620 U	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA
3-Nitroaniline	1,300 U	1,600 U	9,000 U	1,600 UJ	1,400 UJ	1,500 UJ	1,300 UJ	NA	NA
4,6-Dinitro-2-methylphenol	1,300 U	1,600 U	9,000 U	1,600 UJ	1,400 UJ	1,500 UJ	1,300 UJ	NA	NA
4-Bromophenyl-phenylether	510 U	620 U	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA
4-Chloro-3-methylphenol	510 U	620 U	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA
4-Chloroaniline	510 U	620 U	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA
4-Chlorophenyl-phenylether	510 U	620 U	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA
4-Methylphenol	510 U	620 U	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA
4-Nitroaniline	1,300 U	1,600 U	9,000 U	1,600 UJ	1,400 UJ	1,500 UJ	1,300 UJ	NA	NA
4-Nitrophenol	1,300 U	1,600 U	9,000 U	1,600 UJ	1,400 UJ	1,500 UJ	1,300 UJ	NA	NA
Acenaphthene	510 U	65 J	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA
Acenaphthylene	140 J	620 U	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA
Anthracene	93 J	99 J	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	100 L
Benzo(a)anthracene	600	300 J	3,600 U	630 UJ	570 UJ	69 J	530 UJ	140 L	350 L
Benzo(a)pyrene	390 J	220 J	3,600 U	630 UJ	570 UJ	63 J	530 UJ	160 L	300 L
Benzo(b)fluoranthene	940	460 J	3,600 U	110 J	570 UJ	110 J	83 J	400 L	430 L
Benzo(g,h,i)perylene	390 J	170 J	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	180 L	160 L
Benzo(k)fluoranthene	360 J	160 J	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	91 L	200 L
Butylbenzylphthalate	510 U	620 U	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Sediment Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SD01	SJS5-SD02	SJS5-SD03	SJS5-SD04	SJS5-SD05	SJS5-SD06		SJS5-SD07	
Sample ID	SJS05-SD01-000	SJS05-SD02-000	SJS05-SD03-000	SJS05-SD04-001	SJS05-SD05-001	SJS05-SD06-001	SJS05-SD06-001P	SJS05-SD07-001	SJS05-SD07-001P
Sample Date	07/14/97	07/14/97	06/26/97	04/15/99	04/22/99	04/22/99	04/22/99	10/28/99	10/28/99
Chemical Name									
Carbazole	510 U	620 U	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA
Chrysene	670	450 J	410 J	89 J	570 UJ	140 J	71 J	240 L	360 L
Di-n-butylphthalate	120 B	370 B	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA
Di-n-octylphthalate	510 U	620 U	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA
Dibenz(a,h)anthracene	160 J	620 U	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA
Dibenzofuran	510 U	620 U	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA
Diethylphthalate	510 U	620 U	720 J	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA
Dimethyl phthalate	510 U	620 U	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA
Fluoranthene	600	620 U	3,600 U	630 UJ	570 UJ	72 J	54 J	190 L	680 L
Fluorene	510 U	63 J	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA
Hexachlorobenzene	510 U	620 U	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA
Hexachlorobutadiene	510 U	620 U	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA
Hexachlorocyclopentadiene	510 UJ	620 UJ	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA
Hexachloroethane	510 U	620 U	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA
Indeno(1,2,3-cd)pyrene	440 J	170 J	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	170 L	170 L
Isophorone	510 U	620 U	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA
Naphthalene	110 J	80 J	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA
Nitrobenzene	510 U	620 U	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA
Pentachlorophenol	1,300 U	1,600 U	9,000 U	1,600 UJ	1,400 UJ	1,500 UJ	1,300 UJ	NA	NA
Phenanthrene	180 J	520 J	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	170 L
Phenol	510 U	620 U	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA
Pyrene	570	680	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	180 L	510 L
bis(2-Chloroethoxy)methane	510 U	620 U	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA
bis(2-Chloroethyl)ether	510 U	620 U	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA
bis(2-Ethylhexyl)phthalate	91 B	140 B	3,600 U	69 J	570 UJ	580 UJ	530 UJ	NA	NA
n-Nitroso-di-n-propylamine	510 U	620 U	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA
n-Nitrosodiphenylamine	78 J	610 J	3,600 U	630 UJ	570 UJ	580 UJ	530 UJ	NA	NA
Pesticide/Polychlorinated Biphenyls (UG/KG)									
4,4'-DDD	160	19	110	130 J	5.80 UJ	5.80 UJ	5.30 UJ	0.760 L	8 UL
4,4'-DDE	320	12	54	14 J	1.90 J	1.5 J	1.10 J	7.30 UL	8 UL
4,4'-DDT	240	26 J	38	16 J	2.40 J	0.740 J	0.670 J	7.30 UL	8 UL
Aldrin	2.6 U	3.2 U	3.6 U	3.10 UJ	2.90 UJ	2.90 UJ	2.60 UJ	3.60 UL	4 UL
Aroclor-1016	51 U	62 U	71 U	63 UJ	58 UJ	58 UJ	53 UJ	73 UL	80 UL
Aroclor-1221	100 U	130 U	140 U	130 UJ	120 UJ	120 UJ	110 UJ	150 UL	160 UL
Aroclor-1232	51 U	62 U	71 U	63 UJ	58 UJ	58 UJ	53 UJ	73 UL	80 UL
Aroclor-1242	51 U	62 U	71 U	63 UJ	58 UJ	58 UJ	53 UJ	73 UL	80 UL

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Sediment Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SD01	SJS5-SD02	SJS5-SD03	SJS5-SD04	SJS5-SD05	SJS5-SD06		SJS5-SD07	
Sample ID	SJS05-SD01-000	SJS05-SD02-000	SJS05-SD03-000	SJS05-SD04-001	SJS05-SD05-001	SJS05-SD06-001	SJS05-SD06-001P	SJS05-SD07-001	SJS05-SD07-001P
Sample Date	07/14/97	07/14/97	06/26/97	04/15/99	04/22/99	04/22/99	04/22/99	10/28/99	10/28/99
Chemical Name									
Aroclor-1248	51 U	62 U	71 U	63 UJ	58 UJ	58 UJ	53 UJ	73 UL	80 UL
Aroclor-1254	51 U	62 U	71 U	63 UJ	58 UJ	58 UJ	53 UJ	73 UL	80 UL
Aroclor-1260	51 U	62 U	71 U	63 UJ	58 UJ	58 UJ	53 UJ	73 UL	80 UL
Dieldrin	5.1 U	6.2 U	21	6.30 UJ	5.80 UJ	5.80 UJ	5.30 UJ	7.30 UL	8 UL
Endosulfan I	2.6 U	3.2 U	3.6 U	3.10 UJ	2.90 UJ	2.90 UJ	2.60 UJ	3.60 UL	4 UL
Endosulfan II	5.1 U	6.2 U	7.1 U	6.30 UJ	5.80 UJ	5.80 UJ	5.30 UJ	7.30 UL	8 UL
Endosulfan sulfate	5.1 U	6.2 U	7.1 U	6.30 UJ	5.80 UJ	5.80 UJ	5.30 UJ	7.30 UL	8 UL
Endrin	5.1 U	6.2 U	7.1 U	6.30 UJ	5.80 UJ	5.80 UJ	5.30 UJ	7.30 UL	8 UL
Endrin aldehyde	5.1 U	8.9 J	7.1 U	6.30 UJ	5.80 UJ	5.80 UJ	5.30 UJ	7.30 UL	8 UL
Endrin ketone	5.1 U	6.2 U	7.1 U	6.30 UJ	5.80 UJ	5.80 UJ	5.30 UJ	7.30 UL	8 UL
Heptachlor	2.6 U	3.2 U	3.6 U	3.10 UJ	2.90 UJ	2.90 UJ	2.60 UJ	3.60 UL	4 UL
Heptachlor epoxide	2.6 U	3.2 U	3.6 U	3.10 UJ	2.90 UJ	2.90 UJ	2.60 UJ	3.60 UL	4 UL
Methoxychlor	26 U	32 U	36 U	31 UJ	29 UJ	29 UJ	26 UJ	36 UL	40 UL
Toxaphene	260 U	320 U	360 U	310 UJ	290 UJ	290 UJ	260 UJ	360 UL	400 UL
alpha-BHC	2.6 U	3.2 U	3.6 U	3.10 UJ	2.90 UJ	2.90 UJ	2.60 UJ	3.60 UL	4 UL
alpha-Chlordane	2.6 U	3.2 U	3.6 U	3.10 UJ	2.90 UJ	2.90 UJ	2.60 UJ	3.60 UL	4 UL
beta-BHC	2.6 U	3.2 U	3.6 U	3.10 UJ	2.90 UJ	2.90 UJ	2.60 UJ	3.60 UL	4 UL
delta-BHC	2.6 U	3.2 U	3.6 U	3.10 UJ	2.90 UJ	2.90 UJ	2.60 UJ	3.60 UL	4 UL
gamma-BHC (Lindane)	2.6 U	3.2 U	3.6 U	3.10 UJ	2.90 UJ	2.90 UJ	2.60 UJ	3.60 UL	4 UL
gamma-Chlordane	2.6 U	3.2 U	3.6 U	3.10 UJ	2.90 UJ	2.90 UJ	2.60 UJ	3.60 UL	4 UL
Explosives (UG/KG)									
1,3,5-Trinitrobenzene	810 U	1,000 U	NA	250 U	250 U	250 U	238 U	250 U	220 U
1,3-Dinitrobenzene	810 U	1,000 U	NA	250 U	250 U	250 U	238 U	250 U	220 U
2,4,6-Trinitrotoluene	810 U	1,000 U	NA	250 U	250 U	250 U	238 U	250 U	220 U
2,4-Dinitrotoluene	NA	NA	NA	250 U	250 U	250 U	238 U	250 U	220 U
2,6-Dinitrotoluene	NA	NA	NA	250 U	250 U	250 U	238 U	250 U	220 U
2-Amino-4,6-dinitrotoluene	810 U	1,000 U	NA	250 U	250 U	250 U	238 U	250 U	220 U
2-Nitrotoluene	810 U	1,000 U	NA	500 U	500 U	500 U	476 U	500 U	430 U
3-Nitrotoluene	810 U	1,000 U	NA	500 U	500 U	500 U	476 U	500 U	430 U
4-Amino-2,6-dinitrotoluene	810 U	1,000 U	NA	250 U	250 U	250 U	238 U	250 U	220 U
4-Nitrotoluene	810 U	1,000 U	NA	500 U	500 U	500 U	476 U	500 U	430 U
HMX	810 U	1,000 U	NA	500 U	500 U	500 U	476 U	500 U	430 U
Nitrobenzene	NA	NA	NA	250 U	250 U	250 U	238 U	250 U	220 U
RDX	810 U	1,000 U	NA	500 U	500 U	500 U	476 U	500 U	430 U
Tetryl	810 U	1,000 U	NA	500 U	500 U	500 U	476 U	500 U	430 U

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low

U - Analyte not detected

Appendix H
Sediment Analytical Results
at
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Station ID	SJS5-SD01	SJS5-SD02	SJS5-SD03	SJS5-SD04	SJS5-SD05	SJS5-SD06		SJS5-SD07	
Sample ID	SJS05-SD01-000	SJS05-SD02-000	SJS05-SD03-000	SJS05-SD04-001	SJS05-SD05-001	SJS05-SD06-001	SJS05-SD06-001P	SJS05-SD07-001	SJS05-SD07-001P
Sample Date	07/14/97	07/14/97	08/26/97	04/15/99	04/22/99	04/22/99	04/22/99	10/28/99	10/28/99
Chemical Name									
Total Metals (MG/KG)									
Aluminum	18,900	13,800	17,000	71.7	18,100	13,400	11,700	12,100	12,400
Antimony	5.2 B	1.9 B	0.94 L	NA	0.850 U	1.5 J	1.20 J	1.20 UL	1.20 L
Arsenic	23.2	0.86 U	12.5	0.0500	11.9	14.8	11.9	12.2	11.9
Barium	2,460	133	53.1 J	0.820	49.3 J	333	248	56.7 J	59.1 J
Beryllium	3.5	0.74 J	2.4	0.01000	0.720 J	1.10 J	0.880 J	1.20 J	1.30 J
Cadmium	0.16 U	0.14 U	0.21 U	NA	0.340 J	1.30 J	0.560 J	0.600 J	0.700 J
Calcium	3,660	1,230 J	1,370 J	3.10 J	1,100 J	686 J	661 J	1,330 J	1,430 J
Chromium	29.6	32.2	17	0.110	37	25.9	25.4	25.4	26.5
Cobalt	46.8	4.3 J	3.29 U	0.01000 J	7.10 J	7.90 J	5.5 J	7.40 J	7.80 J
Copper	256	39.7	39	0.640	23.3	91.1	59.3	60	58.4
Cyanide	0.8 U	1.1 J	1.1 U	0.540 L	0.310 U	0.350 U	0.280 U	0.5 U	0.550 U
Iron	57,600	161,000	29,100	117	44,800	14,100	15,300	22,700	22,100
Lead	377	302	115	1.10	159	278	195	94.1	99.9
Magnesium	2,380	2,090	1,970 J	8	4,770	2,120	2,200	3,460	3,620
Manganese	572 K	76 K	48.1	0.340	279	66.7	68.5	151	155
Mercury	0.44	0.29	0.17 J	0.360	0.0800	0.410	0.320	0.38	0.4
Nickel	33.6	5.3 B	7 J	0.0400	14	17.8	12.9	16.2 J	16.4
Potassium	1,470 J	1,900	1,410 J	7.30	3,680	1,830	1,750	1,970 J	1,990 J
Selenium	0.94 UL	0.86 UL	1.23 U	NA	0.820 U	0.730 U	0.590 U	1.80 J	1.40 J
Silver	1.2 J	1.6 J	0.41 U	NA	0.330 J	0.25 U	0.200 U	0.310 U	0.320 J
Sodium	571 J	1,920	4,740	2.70 J	859 J	1,150 J	1,000 J	5,620 J	6,000 J
Thallium	0.63 U	5.7	0.82 U	NA	1 U	0.900 U	0.720 U	2.30 U	2.10 U
Vanadium	63.8	42.2	37.7	0.220	46	33.3	30.5	35.3	33.8
Zinc	970	124	149 L	0.810	120	366	198	238	252
Wet Chemistry (MG/KG)									
% Solids	NA	NA	NA	53.1	58.1	57.3	62.8	NA	NA
Phosphorus	7.1	128	20.7	229	5.74 UL	8.31 UL	6.63 UL	NA	NA
Total organic carbon (TOC)	77,400	43,100	24,500 L	27,800	NA	NA	NA	NA	NA
pH	NA	NA	NA	4.56	3.53	4.45	4.62	NA	NA

NA - Not analyzed
B - Analyte not detected above associated blank
J - Reported value is estimated
K - Reported value may be biased high
L - Reported value may be biased low
U - Analyte not detected

Water Quality Field Parameters Measured in July 1997, November 1997, and May 1999
St. Juliens Creek Annex
Chesapeake, Virginia

Monitoring Well	pH			Specific Conductance (umhos/cm2)			Temperature (^{0}C)			Dissolved Oxygen (%)		
	Jul-97	Nov-97	May-99	Jul-97	Nov-97	May-99	Jul-97	Nov-97	May-99	Jul-97	Nov-97	May-99
Site 2 Landfill B												
SJS02-MW01S	7.12	6.01	-----	600	778	-----	18.6	19.3	-----	24.7	8.77	-----
SJS02-MW02S	5.43	6.77	-----	6900	4150	-----	22.2	20.7	-----	16.9	3.28	-----
SJS02-MW03S	6.67	6.2	-----	24000	1200	-----	21.1	19.7	-----	15.5	2.4	-----
SJS02-MW04S	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SJS02-MW05S	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SJS02-MW01D	9.35	9.76	-----	300	264	-----	19	17.1	-----	5.6	9.1	-----
SJS02-MW02D	8.31	7.2	-----	-----	390	-----	20.1	17	-----	6.2	2.2	-----
SJS02-MW05D	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Site 3 Landfill C												
SJS03-MW01S	6.97	5.21	-----	-----	1360	-----	21.6	19.4	-----	8.1	7.94	-----
SJS03-MW02S	7.28	6.39	-----	-----	4300	-----	20.3	19	-----	6.9	2.23	-----
SJS03-MW03S	6.38	6.14	-----	2400	2000	-----	18.4	18.3	-----	5.3	8.66	-----
SJS03-MW04S	7.15	6.86	-----	-----	1840	-----	19.9	18.2	-----	9.8	2.08	-----
SJS03-MW05S	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SJS03-MW06S	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SJS03-MW01D	9.21	8.7	-----	640	545	-----	19.2	14.6	-----	6.6	3.81	-----
SJS03-MW02D	8.67	7.41	-----	910	1090	-----	18.4	17.1	-----	10	10.07	-----
Site 4 Landfill D												
SJS04-MW01S	7.12	6.3	6.39	9900	2630	3490	19.7	18.6	18.2	4.6	8.18	-----
SJS04-MW02S[1]	7.36	5.55	6.43	1190	2260	980	16.8	17.7	14.9	51	8.95	-----
SJS04-MW03S	6.69	7.11	6.76	10500	1770	7400	22.2	18.7	16	14.2	10.72	-----
SJS04-MW04S	6.87	6.7	6.74	7000	3380	2670	20.4	21	17.7	4.2	9.47	-----
SJS04-MW01D	7.35	6.49	6.35	300	4520	5480	21	18	17.1	2	10.65	-----
SJS04-MW03D	7.61	7.02	6.53	1120	1310	1980	18.9		17.6	7.5	7.8	-----
Site 5 Burning Grounds												
SJS05-MW01S	6.21	-----	6.27	8000	-----	9.55	22	-----	17.3	20.4	-----	-----
SJS05-MW02S	7.1	2.93	-----	7000	1990	-----	18.4	17.7	-----	14.9	1.55	-----
SJS05-MW03S	5.93	2.76	3.75	1500	925	0.749	19.1	17.5	16.3	20.8	9.82	-----
SJS05-MW04S	-----	-----	6.2	-----	-----	2.15	-----	-----	16.2	-----	-----	-----
SJS05-MW05S	-----	-----	5.7	-----	-----	3.09	-----	-----	16.8	-----	-----	-----
SJS05-MW01D	9.9	9.19	8.05	450	378	0.526	17.8	16.1	17.8	12.3	5.55	-----
SJS05-MW02D	7.49	6.49	7.22	500	550	0.557	16.9	16.8	16.4	11.1	9.94	-----
SJS05-MW04D	-----	-----	7.7	-----	-----	0.564	-----	-----	17.7	-----	-----	-----

----- indicates parameter not measured

[1] - Well purged during July 1997 sampling, Readings may not be indicative of aquifer conditions.

Water Quality Field Parameters Measured in July 1997, November 1997, and May 1999
St. Juliens Creek Annex
Chesapeake, Virginia

Monitoring Well	Salinity (%)			Oxidation/Reduction Potential (mV)			Turbidity (NTU)		
	Jul-97	Nov-97	May-99	Jul-97	Nov-97	May-99	Jul-97	Nov-97	May-99
Site 2 Landfill B									
SJS02-MW01S	-----	-----	-----	-----	-----	-----	62	7	-----
SJS02-MW02S	-----	-----	-----	-----	-----	-----	127	16	-----
SJS02-MW03S	-----	-----	-----	-----	-----	-----	176	0	-----
SJS02-MW04S	-----	-----	-----	-----	-----	-----	-----	-----	-----
SJS02-MW05S	-----	-----	-----	-----	-----	-----	-----	-----	-----
SJS02-MW01D	-----	-----	-----	-----	-----	-----	100	10	-----
SJS02-MW02D	-----	-----	-----	-----	-----	-----	0.6	0	-----
SJS02-MW05D	-----	-----	-----	-----	-----	-----	-----	-----	-----
Site 3 Landfill C									
SJS03-MW01S	-----	-----	-----	-----	-----	-----	1	34	-----
SJS03-MW02S	-----	-----	-----	-----	-----	-----	782	10	-----
SJS03-MW03S	-----	-----	-----	-----	-----	-----	69	10	-----
SJS03-MW04S	-----	-----	-----	-----	-----	-----	160	10	-----
SJS03-MW05S	-----	-----	-----	-----	-----	-----	-----	-----	-----
SJS03-MW06S	-----	-----	-----	-----	-----	-----	-----	-----	-----
SJS03-MW01D	-----	-----	-----	-----	-----	-----	7	10	-----
SJS03-MW02D	-----	-----	-----	-----	-----	-----	46	10	-----
Site 4 Landfill D									
SJS04-MW01S	-----	-----	0.17	-----	-----	-62	114	8	16
SJS04-MW02S[1]	-----	-----	0.04	-----	-----	130	909	33	298
SJS04-MW03S	-----	-----	0.39	-----	-----	170	35	2	20
SJS04-MW04S	-----	-----	0.13	-----	-----	-57	42	30	81
SJS04-MW01D	-----	-----	0.28	-----	-----	-47	76	0	50
SJS04-MW03D	-----	-----	0.09	-----	-----	-----	30	10	0
Site 5 Burning Grounds									
SJS05-MW01S	-----	-----	-----	-----	-----	-70	226	-----	26
SJS05-MW02S	-----	-----	-----	-----	-----	-----	51	10	-----
SJS05-MW03S	-----	-----	-----	-----	-----	225	41	10	4
SJS05-MW04S	-----	-----	-----	-----	-----	-34	-----	-----	46
SJS05-MW05S	-----	-----	-----	-----	-----	-84	-----	-----	15
SJS05-MW01D	-----	-----	-----	-----	-----	-115	45	133	3
SJS05-MW02D	-----	-----	-----	-----	-----	-83	35	6	2
SJS05-MW04D	-----	-----	-----	-----	-----	47	-----	-----	111

----- indicates parameter not measured

[1] - Well purged dru during July 1997 sampling, Readings may not be indicative of aquifer conditions.

Table J-1
Selection of Exposure Pathways
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current / Future	Surface Soil	Surface Soil	At Site 3	Trespasser	Adult	Dermal	On-Site	Quant	Trespassers may have exposed skin surfaces come into contact with soil
						Ingestion	On-Site	Quant	Trespassers may incidentally ingest soil
					Adolescent	Dermal	On-Site	Quant	Trespassers may have exposed skin surfaces come into contact with soil
						Ingestion	On-Site	Quant	Trespassers may incidentally ingest soil
		Air	Emissions from Surface Soil at Site 3	Trespasser	Adult	Inhalation	On-Site	Quant	Trespassers may inhale volatiles/particulates
					Adolescent	Inhalation	On-Site	Quant	Trespassers may inhale volatiles/particulates
	Groundwater	Deep Groundwater	Tap Water	Resident	Adult	Dermal	Off-Site	Quant	Local municipality currently has some uses for groundwater from deep aquifer
						Ingestion	Off-Site	Quant	Local municipality currently has some uses for groundwater from deep aquifer
					Child	Dermal	Off-Site	Quant	Local municipality currently has some uses for groundwater from deep aquifer
						Ingestion	Off-Site	Quant	Local municipality currently has some uses for groundwater from deep aquifer
					Adult/Child	Dermal	Off-Site	Quant	Local municipality currently has some uses for groundwater from deep aquifer
						Ingestion	Off-Site	Quant	Local municipality currently has some uses for groundwater from deep aquifer
		Air	Deep Groundwater - Water Vapors at Showerhead	Resident	Adult	Inhalation	Off-Site	Quant	Local municipality currently has some uses for groundwater from deep aquifer
	Surface Water [2]	Surface Water [2]	Surface Water at Site 3	Trespasser	Adult	Dermal	On-Site	Quant	Trespassers may have exposed skin surfaces come into contact with surface water
						Ingestion	On-Site	None	Ingestion of surface water not expected to be a significant exposure pathway during wading
					Adolescent	Dermal	On-Site	Quant	Trespassers may have exposed skin surfaces come into contact with surface water
						Ingestion	On-Site	None	Ingestion of surface water not expected to be a significant exposure pathway during wading
	Sediment [2]	Sediment [2]	Sediment at Site 3	Trespasser	Adult	Dermal	On-Site	Quant	Trespassers may have exposed skin surfaces come into contact with sediment
						Ingestion	On-Site	Quant	Trespassers may incidentally ingest sediment that has adhered to their hands
					Adolescent	Dermal	On-Site	Quant	Trespassers may have exposed skin surfaces come into contact with sediment
						Ingestion	On-Site	Quant	Trespassers may incidentally ingest sediment that has adhered to their hands

Table J-1
Selection of Exposure Pathways
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Soil[1]	Soil[1]	At Site 3	Resident	Adult	Dermal	On-Site	Quant	Residents may have exposed skin surfaces come into contact with soil
						Ingestion	On-Site	Quant	Residents may incidentally ingest soil
					Child	Dermal	On-Site	Quant	Residents may have exposed skin surfaces come into contact with soil
						Ingestion	On-Site	Quant	Residents may incidentally ingest soil
					Adult/Child	Dermal	On-Site	Quant	Residents may have exposed skin surfaces come into contact with soil
						Ingestion	On-Site	Quant	Residents may incidentally ingest soil
				Construction Worker	Adult	Dermal	On-Site	Quant	Workers may have exposed skin surfaces come into contact with soil
						Ingestion	On-Site	Quant	Workers may incidentally ingest soil
				Other Worker	Adult	Dermal	On-Site	Quant	Workers may have exposed skin surfaces come into contact with soil
						Ingestion	On-Site	Quant	Workers may incidentally ingest soil
		Air	Emissions from Soil at Site 3	Construction Worker	Adult	Inhalation	On-Site	Quant	Workers may inhale volatiles/particulates
	Surface Water [2]	Surface Water [2]	Surface Water at Site 3	Resident	Adult	Dermal	On-Site	Quant	Residents may have exposed skin surfaces come into contact with surface water
						Ingestion	On-Site	None	Ingestion of surface water not expected to be a significant exposure pathway during wading
					Child	Dermal	On-Site	Quant	Residents may have exposed skin surfaces come into contact with surface water
						Ingestion	On-Site	None	Ingestion of surface water not expected to be a significant exposure pathway during wading
					Adult/Child	Dermal	On-Site	Quant	Residents may have exposed skin surfaces come into contact with surface water
						Ingestion	On-Site	None	Ingestion of surface water not expected to be a significant exposure pathway during wading
	Sediment [2]	Sediment [2]	Sediment at Site 3	Resident	Adult	Dermal	On-Site	Quant	Residents may have exposed skin surfaces come into contact with sediment
						Ingestion	On-Site	Quant	Residents may incidentally ingest sediment that has adhered to their hands
					Child	Dermal	On-Site	Quant	Residents may have exposed skin surfaces come into contact with sediment
						Ingestion	On-Site	Quant	Residents may incidentally ingest sediment that has adhered to their hands
					Adult/Child	Dermal	On-Site	Quant	Residents may have exposed skin surfaces come into contact with sediment
						Ingestion	On-Site	Quant	Residents may incidentally ingest sediment that has adhered to their hands
	Groundwater	Shallow Groundwater	Water Table	Construction Worker	Adult	Dermal	On-Site	Quant	Workers may have exposed skin surfaces come into contact with groundwater

[1] Includes both surface soil and subsurface soil.

[2] Surface water and sediment exposure scenarios are for exposure during wading.

Table J-2.1
Occurrence, Distribution, and Selection of COPCs
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: At Site 3

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background (2) Value	Screening (3) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (4) Contaminant Deletion or Selection
	Organics																
72548	4,4'-DDD	0.00091	J	0.043		mg/kg	SS07	9 / 18	0.0034 - 0.0062	0.043	0.0053	24	C	NA	NA	no	BSL
72559	4,4'-DDE	0.0064	J	0.059	J	mg/kg	SS15	10 / 18	0.0034 - 0.0062	0.059	0.009	17	C	NA	NA	no	BSL
50293	4,4'-DDT	0.00067	J	0.13		mg/kg	SS07	13 / 18	0.0034 - 0.0062	0.13	0.021	17	C	NA	NA	no	BSL
5103719	alpha-Chlordane	0.0072	J	0.0072	J	mg/kg	SS12	1 / 18	0.0017 - 0.0031	0.0072	0.0028	16	C	NA	NA	no	BSL
11097691	Aroclor-1254	0.078		0.28	J	mg/kg	SS12	3 / 18	0.034 - 0.062	0.28	ND	2.9	C	NA	NA	no	BSL
11096825	Aroclor-1260	0.069	J	0.091	J	mg/kg	SS09	2 / 18	0.034 - 0.062	0.091	ND	2.9	C	NA	NA	no	BSL
959988	Endosulfan I	0.0038	J	0.0038	J	mg/kg	SS12	1 / 18	0.0017 - 0.0031	3.8	0.0028	1200	N	NA	NA	no	BSL
60571	Dieldrin	0.0053	J	0.0053	J	mg/kg	SS07	1 / 18	0.003 - 0.006	0.0053	0.0053	0.36	C	NA	NA	no	BSL
91576	2-Methylnaphthalene	0.085	J	0.085	J	mg/kg	SS09	1 / 18	0.34 - 0.63	0.085	ND	4100	N	NA	NA	no	BSL
83329	Acenaphthene	0.3	J	0.3	J	mg/kg	SS09	1 / 18	0.34 - 0.63	0.3	0.592	12000	N	NA	NA	no	BSL
208968	Acenaphthylene	0.054	J	0.086	J	mg/kg	SS06	5 / 18	0.34 - 0.63	0.086	0.246	4100	N	NA	NA	no	BSL
120127	Anthracene	0.043	J	1.0	J	mg/kg	SS09	8 / 18	0.34 - 0.63	1	0.462	61000	N	NA	NA	no	BSL
56553	Benzo(a)Anthracene	0.036	J	4	J	mg/kg	SS09	16 / 18	0.34 - 0.63	4	2.03	7.8	C	NA	NA	no	BSL
50328	Benzo(a)Pyrene	0.038	J	4.1	J	mg/kg	SS09	16 / 18	0.34 - 0.63	4.1	1.785	0.78	C	NA	NA	yes	ASL
205992	Benzo(b)Fluoranthene	0.05	J	6.5	J	mg/kg	SS09	17 / 18	0.34 - 1.1	6.5	3.197	7.8	C	NA	NA	no	BSL
191242	Benzo(g,h,i)Perylene	0.088	J	2.6	J	mg/kg	SS09	15 / 18	0.34 - 0.63	2.6	1.655	6100	N	NA	NA	no	BSL
207089	Benzo(k)Fluoranthene	0.061	J	2	J	mg/kg	SS09	15 / 18	0.34 - 0.63	2	2.038	78	C	NA	NA	no	BSL
117817	Bis(2-Ethylhexyl)Phthalate	0.076	J	0.58	J	mg/kg	SS17	2 / 18	0.066 - 0.63	0.58	ND	410	C	NA	NA	no	BSL
86748	Carbazole	0.045	J	0.37	J	mg/kg	SS09	4 / 18	0.34 - 0.63	0.37	ND	290	C	NA	NA	no	BSL
218019	Chrysene	0.041	J	3.6	J	mg/kg	SS09	17 / 18	0.34 - 0.63	3.6	3.487	780	C	NA	NA	no	BSL
84742	Di-n-Butylphthalate	0.043	J	0.26	J	mg/kg	SS10	3 / 18	0.34 - 0.63	0.26	ND	20000	N	NA	NA	no	BSL
53703	Dibenz(a,h)Anthracene	0.21	J	0.29	J	mg/kg	SS17	2 / 18	0.34 - 0.63	0.29	0.714	0.78	C	NA	NA	no	BSL
132649	Dibenzofuran	0.038	J	0.15	J	mg/kg	SS09	3 / 18	0.34 - 0.63	0.15	ND	820	N	NA	NA	no	BSL
84662	Diethylphthalate	0.079	J	0.079	J	mg/kg	SS07	1 / 18	0.34 - 0.63	0.079	ND	160000	N	NA	NA	no	BSL
206440	Fluoranthene	0.063	J	4.1	J	mg/kg	SS09	16 / 18	0.34 - 0.63	4.1	2.766	8200	N	NA	NA	no	BSL
86737	Fluorene	0.048	J	0.26	J	mg/kg	SS09	2 / 18	0.34 - 0.63	0.26	0.602	8200	N	NA	NA	no	BSL
193395	Indeno(1,2,3-cd)Pyrene	0.084	J	2.3	J	mg/kg	SS09	15 / 18	0.34 - 0.63	2.3	1.829	7.8	C	NA	NA	no	BSL
91203	Naphthalene	0.053	J	0.18	J	mg/kg	SS16	5 / 18	0.34 - 0.63	0.18	0.485	4100	N	NA	NA	no	BSL
87865	Pentachlorophenol	0.16	J	0.16	J	mg/kg	SS06	1 / 18	0.84 - 1.6	0.16	ND	48	C	NA	NA	no	BSL
85018	Phenanthrene	0.049	J	3.3	J	mg/kg	SS09	11 / 18	0.34 - 0.63	3.3	0.913	6100	N	NA	NA	no	BSL
129000	Pyrene	0.054	J	3.5	J	mg/kg	SS09	17 / 18	0.34 - 0.63	3.5	2.59	6100	N	NA	NA	no	BSL
67641	Acetone	0.018	J	0.21	J	mg/kg	SS11	7 / 18	0.01 - 0.019	0.21	ND	20000	N	NA	NA	no	BSL
74873	Chloromethane	0.004	J	0.004	J	mg/kg	SS08	1 / 18	0.01 - 0.019	0.004	ND	440	C	NA	NA	no	BSL
127184	Tetrachloroethene	0.002	J	0.002	J	mg/kg	SS01/SS02	2 / 18	0.01 - 0.019	0.002	ND	110	C	NA	NA	no	BSL
108883	Toluene	0.002	J	0.002	J	mg/kg	SS05	1 / 18	0.01 - 0.019	0.002	ND	41000	N	NA	NA	no	BSL

Table J-2.1
Occurrence, Distribution, and Selection of COPCs
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: At Site 3

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background (2) Value	Screening (3) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (4) Contaminant Deletion or Selection
	Inorganics																
14265442	Phosphorus	4		162		mg/kg	SS13	17 / 18	3.81 - 18.4	162	ND	NA		NA	NA	no	NTX
7429905	Aluminum	3310		21400		mg/kg	SS05	18 / 18	7.9 - 11.9	21400	22786	200000	N	NA	NA	no	BSL
7440360	Antimony	2.5	J	162		mg/kg	SS15	4 / 18	0.38 - 0.84	162	1.47	82	N	NA	NA	yes	ASL
7440382	Arsenic	1.3	J	66.1		mg/kg	SS17	18 / 18	0.41 - 0.74	66.1	24	3.8	C	NA	NA	yes	ASL
7440393	Barium	14.6	J	1640		mg/kg	SS17	18 / 18	0.04 - 0.49	1640	98	14000	N	NA	NA	no	BSL
7440417	Beryllium	0.21	J	1.3		mg/kg	SS07	17 / 18	0.02 - 0.25	1.3	1	410	N	NA	NA	no	BSL
7440439	Cadmium	0.32	J	15.3		mg/kg	SS17	7 / 18	0.06 - 0.12	15.3	ND	200	N	NA	NA	no	BSL
7440702	Calcium	288	J	37000		mg/kg	SS12	18 / 18	11.3 - 21.37	37000	3251	NA		NA	NA	no	NUT
7440473	Chromium	6.4		124		mg/kg	SS09	18 / 18	0.23 - 1.72	124	45	610	N	NA	NA	no	BSL
7440484	Cobalt	1.1	J	14.2	J	mg/kg	SS09	17 / 18	0.1 - 1.97	14.2	13	4100	N	NA	NA	no	BSL
7440508	Copper	5.3		1010		mg/kg	SS09	18 / 18	0.21 - 1.47	1010	58	8200	N	NA	NA	no	BSL
7439896	Iron	3,440		126000		mg/kg	SS17	18 / 18	3.2 - 9.6	126000	45805	61000	N	NA	NA	yes	ASL
7439921	Lead	6.7	J	2070		mg/kg	SS09	18 / 18	0.19 - 0.31	2070	147	1000		NA	NA	yes	ASL
7439954	Magnesium	283	J	4690		mg/kg	SS01	17 / 18	5 - 44.47	4690	4507	NA		NA	NA	no	NUT
7439965	Manganese	16		935		mg/kg	SS17	17 / 18	0.06 - 0.49	935	198	4100	N	NA	NA	no	BSL
7439976	Mercury	0.0400	J	0.79		mg/kg	SS13	16 / 18	0.02 - 0.06	0.79	1.3	61	N	NA	NA	no	BSL
7440020	Nickel	2.90	J	77.8		mg/kg	SS09	17 / 18	0.19 - 1.72	77.8	19	4100	N	NA	NA	no	BSL
7440097	Potassium	241	J	4030		mg/kg	SS01	16 / 18	2.8 - 54.54	4030	4577	NA		NA	NA	no	NUT
7782492	Selenium	0.870	J	2.5		mg/kg	SS09	6 / 18	0.54 - 0.81	2.5	2.2	1000	N	NA	NA	no	BSL
7440224	Silver	0.38	J	5.8		mg/kg	SS09	4 / 18	0.19 - 0.28	5.8	0.67	1000	N	NA	NA	no	BSL
7440235	Sodium	90.5	L	681	J	mg/kg	SS09	11 / 18	10.9 - 46.2	681	620	NA		NA	NA	no	NUT
7440280	Thallium	0.69	J	2.5		mg/kg	SS05	3 / 18	0.38 - 1	2.5	ND	14	N	NA	NA	no	BSL
7440622	Vanadium	7.9	J	79.8		mg/kg	SS05	18 / 18	0.12 - 2.21	79.8	70	1400	N	NA	NA	no	BSL
7440666	Zinc	15.5		3760		mg/kg	SS09	18 / 18	0.39 - 1.23	3760	137	61000	N	NA	NA	no	BSL

Table J-2.1
Occurrence, Distribution, and Selection of COPCs
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: At Site 3

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background (2) Value	Screening (3) Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (4) Contaminant Deletion or Selection

(1) Minimum/maximum detected concentration.

(2) Background data is UCL for dredge-fill background soil type from St. Juliens Creek Background Investigation.

(3) Tier II screening: With the exception of lead, all compounds are screened against the Risk-Based Concentration Table (RBC), U.S. EPA Region III, October 9, 2002 for industrial soil (cancer benchmark value = 1e-06; HQ = 0.1). Lead is screened against the EPA screening value of a value of 1000 mg/kg.
When no RBC available, surrogate RBC used as follows:
Acenaphthylene - used naphthalene
Benzo(g,h,i)Perylene, Phenanthrene - used pyrene
alpha-Chlordane - used Chlordane
Endosulfan I - used Endosulfan
Cadmium - used Cadmium - Food
Chromium - used Chromium VI
Mercury - used Mercuric Chloride

(4) Rationale Codes
Selection Reason: Above Screening Level (ASL)
No Toxicity Information (NTX)
Deletion Reason: Essential Nutrient (NUT)
Below Screening Level (BSL)

Surface Soil Samples: SS01 through SS07 - Phase I; SS08 through SS18 - Phase II

Definitions: NA = Not Applicable
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
J = Estimated Value
L = Estimated Value - Biased Low
C = Carcinogenic
N = Non-Carcinogenic

Table J-2.2
Occurrence, Distribution, and Selection of COPCs
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from Surface Soil at Site 3

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background (2) Value	Screening (3) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (4) Contaminant Deletion or Selection
	Organics																
72548	4,4'-DDD	0.00091	J	0.043		mg/kg	SS07	9 / 18	0.0034 - 0.0062	0.043	0.0053	24	C	NA	NA	no	BSL
72559	4,4'-DDE	0.0064	J	0.059	J	mg/kg	SS15	10 / 18	0.0034 - 0.0062	0.059	0.009	17	C	NA	NA	no	BSL
50293	4,4'-DDT	0.00067	J	0.13		mg/kg	SS07	13 / 18	0.0034 - 0.0062	0.13	0.021	17	C	NA	NA	no	BSL
5103719	alpha-Chlordane	0.0072	J	0.0072	J	mg/kg	SS12	1 / 18	0.0017 - 0.0031	0.0072	0.0028	16	C	NA	NA	no	BSL
11097691	Aroclor-1254	0.078		0.28	J	mg/kg	SS12	3 / 18	0.034 - 0.062	0.28	ND	2.9	C	NA	NA	no	BSL
11096825	Aroclor-1260	0.069	J	0.091	J	mg/kg	SS09	2 / 18	0.034 - 0.062	0.091	ND	2.9	C	NA	NA	no	BSL
959988	Endosulfan I	0.0038	J	0.0038	J	mg/kg	SS12	1 / 18	0.0017 - 0.0031	3.8	0.0028	1200	N	NA	NA	no	BSL
60571	Dieldrin	0.0053	J	0.0053	J	mg/kg	SS07	1 / 18	0.0034 - 0.006	0.0053	0.0053	0.36	C	NA	NA	no	BSL
91576	2-Methylnaphthalene	0.085	J	0.085	J	mg/kg	SS09	1 / 18	0.34 - 0.63	0.085	ND	4100	N	NA	NA	no	BSL
83329	Acenaphthene	0.3	J	0.3	J	mg/kg	SS09	1 / 18	0.34 - 0.63	0.3	0.592	12000	N	NA	NA	no	BSL
208968	Acenaphthylene	0.054	J	0.086	J	mg/kg	SS06	5 / 18	0.34 - 0.63	0.086	0.246	4100	N	NA	NA	no	BSL
120127	Anthracene	0.043	J	1	J	mg/kg	SS09	8 / 18	0.34 - 0.63	1	0.462	61000	N	NA	NA	no	BSL
56553	Benzo(a)Anthracene	0.036	J	4	J	mg/kg	SS09	16 / 18	0.34 - 0.63	4	2.03	7.8	C	NA	NA	no	BSL
50328	Benzo(a)Pyrene	0.038	J	4.1	J	mg/kg	SS09	16 / 18	0.34 - 0.63	4.1	1.785	0.78	C	NA	NA	yes	ASL
205992	Benzo(b)Fluoranthene	0.05	J	6.5	J	mg/kg	SS09	17 / 18	0.34 - 1.1	6.5	3.197	7.8	C	NA	NA	no	BSL
191242	Benzo(g,h,i)Perylene	0.088	J	2.6	J	mg/kg	SS09	15 / 18	0.34 - 0.63	2.6	1.655	6100	N	NA	NA	no	BSL
207089	Benzo(k)Fluoranthene	0.061	J	2	J	mg/kg	SS09	15 / 18	0.34 - 0.63	2	2.038	78	C	NA	NA	no	BSL
117817	Bis(2-Ethylhexyl)Phthalate	0.076	J	0.58	J	mg/kg	SS17	2 / 18	0.068 - 0.63	0.58	ND	410	C	NA	NA	no	BSL
86748	Carbazole	0.045	J	0.37	J	mg/kg	SS09	4 / 18	0.34 - 0.63	0.37	ND	290	C	NA	NA	no	BSL
218019	Chrysene	0.041	J	3.6	J	mg/kg	SS09	17 / 18	0.34 - 0.63	3.6	3.487	780	C	NA	NA	no	BSL
84742	Di-n-Butylphthalate	0.043	J	0.26	J	mg/kg	SS10	3 / 18	0.34 - 0.63	0.26	ND	20000	N	NA	NA	no	BSL
53703	Dibenz(a,h)Anthracene	0.21	J	0.29	J	mg/kg	SS17	2 / 18	0.34 - 0.63	0.29	0.714	0.78	C	NA	NA	no	BSL
132649	Dibenzofuran	0.038	J	0.15	J	mg/kg	SS09	3 / 18	0.34 - 0.63	0.15	ND	820	N	NA	NA	no	BSL
84662	Diethylphthalate	0.079	J	0.079	J	mg/kg	SS07	1 / 18	0.34 - 0.63	0.079	ND	160000	N	NA	NA	no	BSL
206440	Fluoranthene	0.063	J	4.1	J	mg/kg	SS09	16 / 18	0.34 - 0.63	4.1	2.766	8200	N	NA	NA	no	BSL
86737	Fluorene	0.048	J	0.26	J	mg/kg	SS09	2 / 18	0.34 - 0.63	0.26	0.602	8200	N	NA	NA	no	BSL
193395	Indeno(1,2,3-cd)Pyrene	0.084	J	2.3	J	mg/kg	SS09	15 / 18	0.34 - 0.63	2.3	1.829	7.8	C	NA	NA	no	BSL
91203	Naphthalene	0.053	J	0.18	J	mg/kg	SS16	5 / 18	0.34 - 0.63	0.18	0.485	4100	N	NA	NA	no	BSL
87865	Pentachlorophenol	0.16	J	0.16	J	mg/kg	SS06	1 / 18	0.84 - 1.6	0.16	ND	48	C	NA	NA	no	BSL
85018	Phenanthrene	0.049	J	3.3	J	mg/kg	SS09	11 / 18	0.34 - 0.63	3.3	0.913	6100	N	NA	NA	no	BSL
129000	Pyrene	0.054	J	3.5	J	mg/kg	SS09	17 / 18	0.34 - 0.63	3.5	2.59	6100	N	NA	NA	no	BSL
67641	Acetone	0.018	J	0.21	J	mg/kg	SS11	7 / 18	0.01 - 0.019	0.21	ND	20000	N	NA	NA	no	BSL

Table J-2.2
Occurrence, Distribution, and Selection of COPCs
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from Surface Soil at Site 3

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background (2) Value	Screening (3) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (4) Contaminant Deletion or Selection
74873	Chloromethane	0.004	J	0.004	J	mg/kg	SS08	1 / 18	0.01 - 0.019	0.004	ND	440	C	NA	NA	no	BSL
127184	Tetrachloroethene	0.002	J	0.002	J	mg/kg	SS01/SS02	2 / 18	0.01 - 0.019	0.002	ND	110	C	NA	NA	no	BSL
108883	Toluene	0.002	J	0.002	J	mg/kg	SS05	1 / 18	0.01 - 0.019	0.002	ND	41000	N	NA	NA	no	BSL
	Inorganics																
14265442	Phosphorus	4		162		mg/kg	SS13	17 / 18	3.81 - 18.4	162	ND	NA		NA	NA	no	NTX
7429905	Aluminum	3310		21400		mg/kg	SS05	18 / 18	7.9 - 11.9	21400	22786	200000	N	NA	NA	no	BSL
7440360	Antimony	2.5	J	162		mg/kg	SS15	4 / 18	0.38 - 0.84	162	1.47	82	N	NA	NA	yes	ASL
7440382	Arsenic	1.3	J	66.1		mg/kg	SS17	18 / 18	0.41 - 0.74	66.1	24	3.8	C	NA	NA	yes	ASL
7440393	Barium	14.6	J	1640		mg/kg	SS17	18 / 18	0.04 - 0.49	1640	98	14000	N	NA	NA	no	BSL
7440417	Beryllium	0.21	J	1.3		mg/kg	SS07	17 / 18	0.02 - 0.25	1.3	1	410	N	NA	NA	no	BSL
7440439	Cadmium	0.32	J	15.3		mg/kg	SS17	7 / 18	0.06 - 0.12	15.3	ND	200	N	NA	NA	no	BSL
7440702	Calcium	288	J	37000		mg/kg	SS12	18 / 18	11.3 - 21.37	37000	3251	NA		NA	NA	no	NUT
7440473	Chromium	6.4		124		mg/kg	SS09	18 / 18	0.23 - 1.72	124	45	610	N	NA	NA	no	BSL
7440484	Cobalt	1.1	J	14.2	J	mg/kg	SS09	17 / 18	0.1 - 1.97	14.2	13	4100	N	NA	NA	no	BSL
7440508	Copper	5.3		1010		mg/kg	SS09	18 / 18	0.21 - 1.47	1010	58	8200	N	NA	NA	no	BSL
7439896	Iron	3.440		126000		mg/kg	SS17	18 / 18	3.2 - 9.6	126000	45805	61000	N	NA	NA	yes	ASL
7439921	Lead	6.7	J	2070		mg/kg	SS09	18 / 18	0.19 - 0.31	2070	147	1000		NA	NA	yes	ASL
7439954	Magnesium	283	J	4690		mg/kg	SS01	17 / 18	5 - 44.47	4690	4507	NA		NA	NA	no	NUT
7439965	Manganese	16		935		mg/kg	SS17	17 / 18	0.06 - 0.49	935	198	4100	N	NA	NA	no	BSL
7439976	Mercury	0.0400	J	0.79		mg/kg	SS13	16 / 18	0.02 - 0.06	0.79	1.3	61	N	NA	NA	no	BSL
7440020	Nickel	2.90	J	77.8		mg/kg	SS09	17 / 18	0.19 - 1.72	77.8	19	4100	N	NA	NA	no	BSL
7440097	Potassium	241	J	4030		mg/kg	SS01	18 / 18	2.8 - 54.54	4030	4577	NA		NA	NA	no	NUT
7782492	Selenium	0.870	J	2.5		mg/kg	SS09	6 / 18	0.54 - 0.81	2.5	2.2	1000	N	NA	NA	no	BSL
7440224	Silver	0.38	J	5.8		mg/kg	SS09	4 / 18	0.19 - 0.28	5.8	0.67	1000	N	NA	NA	no	BSL
7440235	Sodium	90.5	L	681	J	mg/kg	SS09	11 / 18	10.9 - 46.2	681	620	NA		NA	NA	no	NUT
7440280	Thallium	0.69	J	2.5		mg/kg	SS05	3 / 18	0.38 - 1	2.5	ND	14	N	NA	NA	no	BSL
7440622	Vanadium	7.9	J	79.8		mg/kg	SS05	18 / 18	0.12 - 2.21	79.8	70	1400	N	NA	NA	no	BSL
7440666	Zinc	15.5		3760		mg/kg	SS09	18 / 18	0.39 - 1.23	3760	137	61000	N	NA	NA	no	BSL

Table J-2.2
Occurrence, Distribution, and Selection of COPCs
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from Surface Soil at Site 3

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background (2) Value	Screening (3) Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (4) Contaminant Deletion or Selection

(1) Minimum/maximum detected concentration.

(2) Background data is UCL for dredge-fill background soil type from St. Juliens Creek Background Investigation.

(3) Tier II screening: With the exception of lead, all compounds are screened against the Risk-Based Concentration (RBC) Table, U.S. EPA Region III, October 9, 2002 for industrial soil (cancer benchmark value = 1e-06; HQ = 0.1). Lead is screened against the EPA screening value of a value of 1000 mg/kg.
When no RBC available, surrogate RBC used as follows:
Acenaphthylene - used naphthalene
Benzo(g,h,i)Perylene, Phenanthrene - used pyrene
alpha-Chlordane - used Chlordane
Endosulfan I - used Endosulfan
Cadmium - used Cadmium - Food
Chromium - used Chromium VI
Mercury - used Mercuric Chloride

(4) Rationale Codes
Selection Reason: Above Screening Level (ASL)
No Toxicity Information (NTX)
Deletion Reason: Essential Nutrient (NUT)
Below Screening Level (BSL)

Surface Soil Samples: SS01 through SS07 - Phase I; SS08 through SS18 - Phase II

Definitions: NA = Not Applicable
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
J = Estimated Value
L = Estimated Value - Biased Low
C = Carcinogenic
N = Non-Carcinogenic

Table J-2.3
Occurrence, Distribution, and Selection of COPCs
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Deep Groundwater
Exposure Point: Tap Water

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background (2) Value	Screening (3) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (4) Contaminant Deletion or Selection
	Organics																
117817	bis(2-Ethylhexyl)phthalate	1	J	3	J	ug/l	GW1D	2 / 6	10 - 12	3	8.4	4.8	C	6	MCL	no	BSL
75150	Carbon Disulfide	0.2	J	7.6		ug/l	GW2D	3 / 6	1 - 1	7.6	ND	100	N	NA	NA	no	BSL
67663	Chloroform	0.3	J	0.4	J	ug/l	GW1D	2 / 6	1 - 1	0.4	ND	0.063	N	100	MCL	yes	ASL
	Inorganics																
14265442	Phosphorus	70		1170		ug/l	GW2D	6 / 6	20 - 250	1,170	120	NA		NA	NA	no	NTX
7440382	Arsenic	4.2	J	4.2	J	ug/l	GW1D	1 / 6	2 - 3.2	4.2	ND	0.045	C	50	MCL	yes	ASL
7440393	Barium	15.8	J	60.2	J	ug/l	GW2D	6 / 6	0.2 - 1	60.2	44	260	N	2000	MCL	no	BSL
7440702	Calcium	49300	J	110000		ug/l	GW2D	6 / 6	46 - 57.9	110000	96106	NA		NA	NA	no	NUT
7440473	Chromium	1.4	J	2.4	J	ug/l	GW2D	2 / 6	1.1 - 7	2.4	ND	11	N	100	MCL	no	BSL
7439896	Iron	272		788	J	ug/l	GW1D	5 / 6	5 - 30.8	788	2035	1100	N	300	SMCL	no	BSL
7439921	Lead	1	J	1.8	J	ug/l	GW1D	2 / 6	1 - 1.3	1.8	ND	15		15	MCL	no	BSL
7439954	Magnesium	12700		48000		ug/l	GW2D	6 / 6	24 - 45	48000	14980	NA		NA	NA	no	NUT
7439965	Manganese	45.6		612		ug/l	GW2D	6 / 6	0.3 - 1	612	271	73	N	50	SMCL	yes	ASL
7440020	Nickel	1	J	8.1	J	ug/l	GW1D	2 / 6	0.9 - 7	8.1	1.3	73	N	NA	NA	no	BSL
7440097	Potassium	15100		17700		ug/l	GW2D	6 / 6	14 - 97	17700	10649	NA		NA	NA	no	NUT
7440224	Silver	1.2	J	1.2	J	ug/l	GW2D	1 / 6	0.9 - 3	1.2	ND	18	N	100	SMCL	no	BSL
7440235	Sodium	34500		50600		ug/l	GW1D	6 / 6	28 - 148	50600	52872	NA		NA	NA	no	NUT
7440280	Thallium	2.7	J	2.7	J	ug/l	GW1D	1 / 6	2 - 3.2	2.7	1.6	0.26	N	2	MCL	yes	ASL
7440666	Zinc	3.8	J	16.6	J	ug/l	GW2D	2 / 6	1.9 - 3	16.6	5.7	1100	N	5000	SMCL	no	BSL

(1) Minimum/maximum detected concentration.

(2) Background data is UCL for Yorktown Aquifer from St. Juliens Creek Background Investigation.

(3) Tier I screening: With the exception of lead, all compounds are screened against the Risk-Based Concentration (RBC) Table, U.S. EPA Region III, October 9, 2002 for tap water (cancer benchmark value = 1e-06; HQ = 0.1). Lead is screened against the maximum contaminant level (MCL) value of 15 ug/l.
When no RBC available, surrogate RBC used as follows:
Chromium - used Chromium VI

(4) Rationale Codes
Selection Reason: Above Screening Level (ASL)
No Toxicity Information (NTX)
Deletion Reason: Essential Nutrient (NUT)
Below Screening Level (BSL)

Deep Groundwater Samples: GW1D and GW2D - Phase I, Rounds 1 and 2, and Phase II.

Definitions: NA = Not Applicable
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
MCL = Maximum Contaminant Level
SMCL = Secondary Maximum Contaminant Level
J = Estimated Value
C = Carcinogenic
N = Non-Carcinogenic

Table J-2.4
Occurrence, Distribution, and Selection of COPCs
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Deep Groundwater-Water Vapors at Showerhead

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background (2) Value	Screening (3) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (4) Contaminant Deletion or Selection
	Organics																
117817	bis(2-Ethylhexyl)phthalate	1	J	3	J	ug/l	GW1D	2 / 6	10 - 12	3	8.4	4.8	C	6	MCL	no	BSL
75150	Carbon Disulfide	0.2	J	7.6		ug/l	GW2D	3 / 6	1 - 1	7.6	ND	100	N	NA	NA	no	BSL
67663	Chloroform	0.3	J	0.4	J	ug/l	GW1D	2 / 6	1 - 1	0.4	ND	0.063	N	100	MCL	yes	ASL

(1) Minimum/maximum detected concentration.

(2) Background data is UCL for Yorktown Aquifer from St. Julliens Creek Background Investigation.

(3) Tier I screening: With the exception of lead, all compounds are screened against the Risk-Based Concentration (RBC) Table, U.S. EPA Region III, October 9, 2002 for tap water (cancer benchmark value = 1e-06; HQ = 0.1).

(4) Rationale Codes

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

Deletion Reason: Essential Nutrient (NUT)
Below Screening Level (BSL)

Deep Groundwater Samples: GW1D and GW2D - Phase I, Rounds 1 and 2, and Phase II.

Definitions: NA = Not Applicable
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
MCL = Maximum Contaminant Level
SMCL = Secondary Maximum Contaminant Level
J = Estimated Value
C = Carcinogenic
N = Non-Carcinogenic

Table J-2.5
Occurrence, Distribution, and Selection of COPCs
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water at Site 3

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background (2) Value	Screening (3) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (4) Contaminant Deletion or Selection
	Organics																
72548	4,4'-DDD	0.062	J	0.062	J	ug/l	SW03	1 / 7	0.1 - 0.12	0.062	NA	2.8	C	0.0084	VAWQS	no	BSL
72559	4,4'-DDE	0.015	J	0.015	J	ug/l	SW03	1 / 7	0.1 - 0.12	0.015	NA	2	C	0.0059	VAWQS	no	BSL
5103719	alpha-chlordane	0.011	J	0.011	J	ug/l	SW03	1 / 7	0.052 - 0.062	0.011	NA	1.9	C	0.0059	VAWQS	no	BSL
5103742	gamma-chlordane	0.0098	J	0.0098	J	ug/l	SW03	1 / 7	0.052 - 0.062	0.0098	NA	1.9	C	0.0059	VAWQS	no	BSL
117817	Bis(2-ethylhexyl)Phthalate	1	J	1	J	ug/l	SW02/SW03	2 / 7	10 - 12	1	NA	48	C	59	VAWQS	no	BSL
75354	1,1-Dichloroethene	0.1	J	0.1	J	ug/l	SW04	1 / 7	1 - 10	0.1	NA	350	N	17000	VAWQS	no	BSL
75150	Carbon Disulfide	8	J	85.7	J	ug/l	SW08	7 / 7	1 - 10	85.7	NA	1000	N	NA	NA	no	BSL
74873	Chloromethane	9.7		9.7		ug/l	SW03	1 / 7	1 - 10	9.7	NA	21	C	NA	NA	no	BSL
108883	Toluene	0.2	J	0.5	J	ug/l	SW02	2 / 7	1 - 10	0.5	NA	750	N	200000	VAWQS	no	BSL
79016	Trichloroethene	1.1		1.1		ug/l	SW04	1 / 7	1 - 10	1.1	NA	16	C	810	VAWQS	no	BSL
	Inorganics																
14265442	Phosphorus	48		252		ug/l	SW08	5 / 7	20 - 20	252	NA	NA		NA	NA	no	NTX
7429905	Aluminum	162	K	70600	K	ug/l	SW01	7 / 7	38.2 - 38.2	70600	NA	37000	N	NA	NA	yes	ASL
7440360	Antimony	2.7	J	2.7	J	ug/l	SW02	1 / 7	2.7 - 2.7	2.7	NA	15	N	4300	VAWQS	no	BSL
7440382	Arsenic	7.7	J	7.7	J	ug/l	SW01	1 / 7	2 - 2	7.7	NA	0.45	C	NA	NA	yes	ASL
7440393	Barium	19.9	J	72.8	J	ug/l	SW02	6 / 7	0.2 - 0.2	72.8	NA	2600	N	NA	NA	no	BSL
7440417	Beryllium	0.77	J	22.6		ug/l	SW01	4 / 7	0.1 - 0.1	22.6	NA	73	N	NA	NA	no	BSL
7440439	Cadmium	0.63	J	8.4		ug/l	SW01	5 / 7	0.3 - 0.3	8.4	NA	18	N	NA	NA	no	BSL
7440702	Calcium	75000		405000		ug/l	SW02	7 / 7	57.9 - 57.9	405000	NA	NA		NA	NA	no	NUT
7440473	Chromium	3.5	J	8.6	J	ug/l	SW01	2 / 7	1.1 - 1.1	8.6	NA	110	N	NA	NA	no	BSL
7440484	Cobalt	0.94	J	255		ug/l	SW01	7 / 7	0.5 - 0.5	255	NA	730	N	NA	NA	no	BSL
7440508	Copper	10.8	J	32.2		ug/l	SW01	7 / 7	1.1 - 1.1	32.2	NA	1500	N	NA	NA	no	BSL
57125	Cyanide	9.7		25.8	L	ug/l	SW06	3 / 7	5 - 5	25.8	NA	730	N	215000	VAWQS	no	BSL
7439896	Iron	485		66900		ug/l	SW08	7 / 7	30.8 - 30.8	66900	NA	11000	N	NA	NA	yes	ASL
7439921	Lead	2.5	J	27.8	J	ug/l	SW02	6 / 7	1 - 1	27.8	NA	15		NA	NA	yes	ASL
7439954	Magnesium	12800		173000		ug/l	SW02	7 / 7	24.3 - 24.3	173000	NA	NA		NA	NA	no	NUT
7439965	Manganese	40.7		6330		ug/l	SW08	7 / 7	0.3 - 0.3	6330	NA	730	N	NA	NA	yes	ASL
7440020	Nickel	3.8	J	364		ug/l	SW01	7 / 7	0.9 - 0.9	364	NA	730	N	4600	VAWQS	no	BSL

Table J-2.5
Occurrence, Distribution, and Selection of COPCs
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water at Site 3

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background (2) Value	Screening (3) Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (4) Contaminant Deletion or Selection
7440097	Potassium	5450	J	53600	J	ug/l	SW02	7 / 7	13.5 - 13.5	53600	NA	NA	NA	NA	no	NUT
7440224	Silver	1.8	J	1.8	J	ug/l	SW06	1 / 7	0.9 - 0.9	1.8	NA	180 N	NA	NA	no	BSL
7440235	Sodium	30600		514000		ug/l	SW02	7 / 7	148 - 148	514000	NA	NA	NA	NA	no	NUT
7440622	Vanadium	1.2	J	4.5	J	ug/l	SW03	5 / 7	0.6 - 0.6	4.5	NA	260 N	NA	NA	no	BSL
7440666	Zinc	13.7	J	2720		ug/l	SW01	7 / 7	1.9 - 1.9	2720	NA	11000 N	NA	NA	no	BSL

(1) Minimum/maximum detected concentration.

(2) No background study has been completed for the St. Juliens Creek Annex surface water.

(3) Tier I screening: With the exception of lead, all compounds are screened against 10 times the Risk-Based Concentration (RBC) Table, U.S. EPA Region III, October 9, 2002 for tap water (10 times the cancer benchmark value = 1e-06; 10 times the HQ = 0.1). Lead is screened against the EPA screening value of a value of 15 ug/l.
When no RBC available, surrogate RBC used as follows:
alpha-Chlordane, gamma-Chlordane - used Chlordane
Cadmium - used Cadmium - Water
Chromium - used Chromium VI

(4) Rationale Codes
Selection Reason: Above Screening Level (ASL)
No Toxicity Information (NTX)
Deletion Reason: Essential Nutrient (NUT)
Below Screening Level (BSL)

Surface Water Samples: SW01 through SW04 and SW06 through SW08 - Phase II.

Definitions: NA = Not Applicable
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
VAWQS - Virginia Water Quality Standard
J = Estimated Value
K = Estimated Value - Biased High
L = Estimated Value - Biased Low
C = Carcinogenic
N = Non-Carcinogenic

Table J-2.6
Occurrence, Distribution, and Selection of COPCs
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment at Site 3

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	(2) Background Value	(3) Screening Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(4) Rationale for Contaminant Deletion or Selection
	Organics															
72548	4,4'-DDD	0.0016	J	0.066		mg/kg	SD02	5 / 7	0.003 - 0.01	0.066	NA	240 C	NA	NA	no	BSL
72559	4,4'-DDE	0.002	J	0.078	J	mg/kg	SD03	7 / 7	0.003 - 0.01	0.078	NA	170 C	NA	NA	no	BSL
50293	4,4'-DDT	0.0021	J	0.02		mg/kg	SD03	5 / 7	0.003 - 0.01	0.020	NA	170 C	NA	NA	no	BSL
5103719	alpha-Chlordane	0.00088	J	0.00088	J	mg/kg	SD03	1 / 7	0.002 - 0.005	0.00088	NA	160 C	NA	NA	no	BSL
11096825	Aroclor-1260	0.064	J	0.15		mg/kg	SD02	2 / 7	0.033 - 0.1	0.15	NA	29 C	NA	NA	no	BSL
60571	Dieldrin	0.006	J	0.013	J	mg/kg	SD02	2 / 7	0.003 - 0.01	0.013	NA	4 C	NA	NA	no	BSL
5103742	gamma-Chlordane	0.0033	J	0.0033	J	mg/kg	SD02	1 / 7	0.002 - 0.005	0.0033	NA	160 C	NA	NA	no	BSL
208968	Acenaphthylene	0.055	J	0.066	J	mg/kg	SD03	2 / 7	0.35 - 4.3	0.066	NA	41000 N	NA	NA	no	BSL
120127	Anthracene	0.039	J	0.056	J	mg/kg	SD03	2 / 7	0.35 - 4.3	0.056	NA	610000 N	NA	NA	no	BSL
56553	Benzo(a)Anthracene	0.11	J	0.26	J	mg/kg	SD01	5 / 7	0.35 - 4.3	0.26	NA	78 C	NA	NA	no	BSL
50328	Benzo(a)Pyrene	0.086	J	0.22	J	mg/kg	SD03	4 / 7	0.35 - 4.3	0.22	NA	7.8 C	NA	NA	no	BSL
205992	Benzo(b)Fluoranthene	0.15	J	0.66		mg/kg	SD01	5 / 7	0.35 - 4.3	0.66	NA	78 C	NA	NA	no	BSL
191242	Benzo(g,h,i)Perylene	0.082	J	0.17	J	mg/kg	SD08	4 / 7	0.35 - 4.3	0.17	NA	61000 N	NA	NA	no	BSL
207089	Benzo(k)fluoranthene	0.17	J	0.47	J	mg/kg	SD02	4 / 7	0.35 - 4.3	0.47	NA	780 C	NA	NA	no	BSL
85687	Butylbenzylphthalate	0.055	J	0.055	J	mg/kg	SD01	1 / 7	0.35 - 4.3	0.055	NA	410000 N	NA	NA	no	BSL
218019	Chrysene	0.12	J	0.42		mg/kg	SD01	5 / 7	0.35 - 4.3	0.42	NA	7800 C	NA	NA	no	BSL
53703	Dibenz(a,h)Anthracene	0.066	J	0.066	J	mg/kg	SD03	1 / 7	0.35 - 4.3	0.066	NA	7.8 C	NA	NA	no	BSL
84662	Diethylphthalate	0.075	J	0.34	J	mg/kg	SD06	4 / 7	0.35 - 4.3	0.34	NA	1600000 N	NA	NA	no	BSL
206440	Fluoranthene	0.17	J	0.32	J	mg/kg	SD03	5 / 7	0.35 - 4.3	0.32	NA	82000 N	NA	NA	no	BSL
193395	Indeno(1,2,3-cd)Pyrene	0.078	J	0.2	J	mg/kg	SD01	4 / 7	0.35 - 4.3	0.2	NA	78 C	NA	NA	no	BSL
91203	Naphthalene	0.11	J	0.11	J	mg/kg	SD03	1 / 7	0.35 - 4.3	0.11	NA	41000 N	NA	NA	no	BSL
85018	Phenanthrene	0.076	J	0.12	J	mg/kg	SD03	2 / 7	0.35 - 4.3	0.12	NA	61000 N	NA	NA	no	BSL
129000	Pyrene	0.12	J	0.46	J	mg/kg	SD02	6 / 7	0.35 - 4.4	0.46	NA	61000 N	NA	NA	no	BSL
67641	Acetone	0.045	J	0.051	J	mg/kg	SD07	2 / 7	0.011 - 0.031	0.051	NA	200000 N	NA	NA	no	BSL
75150	Carbon Disulfide	0.004	J	0.004	J	mg/kg	SD08	1 / 7	0.011 - 0.031	0.004	NA	200000 N	NA	NA	no	BSL
67663	Chloroform	0.004	J	0.004	J	mg/kg	SD04	1 / 7	0.011 - 0.031	0.004	NA	9400 C	NA	NA	no	BSL
75092	Methylene Chloride	0.1		0.11	J	mg/kg	SD02	2 / 7	0.011 - 0.031	0.11	NA	7600 C	NA	NA	no	BSL
108883	Toluene	0.004	J	0.004	J	mg/kg	SD06	1 / 7	0.011 - 0.031	0.004	NA	410000 N	NA	NA	no	BSL

Table J-2.6
Occurrence, Distribution, and Selection of COPCs
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment at Site 3

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	(2) Background Value	(3) Screening Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(4) Rationale for Contaminant Deletion or Selection
	Inorganics																
14265442	Phosphorus	3.2		239		mg/kg	SD04	7 / 7	1.3 - 33.4	239	NA	NA		NA	NA	no	NTX
7429905	Aluminum	3970		46500		mg/kg	SD04	7 / 7	8.54 - 15.8	46500	NA	2000000	N	NA	NA	no	BSL
7440360	Antimony	2.4	L	173	J	mg/kg	SD08	2 / 7	0.39 - 1.1	173	NA	820	N	NA	NA	no	BSL
7440382	Arsenic	3.8		26.3	J	mg/kg	SD08	7 / 7	0.58 - 0.98	26.3	NA	38	C	NA	NA	no	BSL
7440393	Barium	18.6	J	300		mg/kg	SD02	7 / 7	0.06 - 0.65	300	NA	140000	N	NA	NA	no	BSL
7440417	Beryllium	0.4	J	7.9		mg/kg	SD04	6 / 7	0.03 - 0.33	7.9	NA	4100	N	NA	NA	no	BSL
7440439	Cadmium	0.77	J	2.5		mg/kg	SD02	5 / 7	0.09 - 0.16	2.5	NA	2000	N	NA	NA	no	BSL
7440702	Calcium	157	J	5330		mg/kg	SD04	7 / 7	16.89 - 28.34	5330	NA	NA		NA	NA	no	NUT
7440473	Chromium	8.3		63.3		mg/kg	SD02	7 / 7	0.33 - 2.28	63.3	NA	6100	N	NA	NA	no	BSL
7440484	Cobalt	3.7	J	24.7		mg/kg	SD04	6 / 7	0.15 - 2.61	24.7	NA	41000	N	NA	NA	no	BSL
7440508	Copper	8.3		139	J	mg/kg	SD08	7 / 7	0.33 - 1.95	139	NA	82000	N	NA	NA	no	BSL
57125	Cyanide	1.1	L	1.1	L	mg/kg	SD08	1 / 7	0.41 - 0.8	1.1	NA	41000	N	NA	NA	no	BSL
7439896	Iron	4580		91000		mg/kg	SD08	7 / 7	3.3 - 12.7	91000	NA	610000	N	NA	NA	no	BSL
7439921	Lead	14.5		1050	J	mg/kg	SD08	7 / 7	0.19 - 0.41	1050	NA	1000		NA	NA	yes	ASL
7439954	Magnesium	365	J	3290		mg/kg	SD08	7 / 7	7.4 - 58.96	3290	NA	NA		NA	NA	no	NUT
7439965	Manganese	15.7	K	367		mg/kg	SD04	7 / 7	0.09 - 0.65	367	NA	41000	N	NA	NA	no	BSL
7439976	Mercury	0.13		0.59		mg/kg	SD08	6 / 7	0.03 - 0.08	0.59	NA	610	N	NA	NA	no	BSL
7440020	Nickel	8.1		55.1		mg/kg	SD04	6 / 7	0.27 - 2.28	55.1	NA	41000	N	NA	NA	no	BSL
7440097	Potassium	339	J	2420		mg/kg	SD08	7 / 7	4.1 - 72.31	2420	NA	NA		NA	NA	no	NUT
7782492	Selenium	1.8	J	2.4		mg/kg	SD04	2 / 7	0.58 - 1.1	2.4	NA	10000	N	NA	NA	no	BSL
7440224	Silver	0.37	J	0.44	J	mg/kg	SD08	2 / 7	0.19 - 0.37	0.44	NA	10000	N	NA	NA	no	BSL
7440235	Sodium	195	J	1740		mg/kg	SD07	4 / 7	11.26 - 61.1	1740	NA	NA		NA	NA	no	NUT
7440622	Vanadium	12.1		41		mg/kg	SD08	7 / 7	0.18 - 2.93	41	NA	14000	N	NA	NA	no	BSL
7440666	Zinc	21.9		577		mg/kg	SD02	7 / 7	0.58 - 1.63	577	NA	610000	N	NA	NA	no	BSL

Table J-2.6
Occurrence, Distribution, and Selection of COPCs
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment at Site 3

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	(2) Background Value	(3) Screening Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(4) Rationale for Contaminant Deletion or Selection

(1) Minimum/maximum detected concentration.

(2) No background study has been completed for the St. Juliens Creek Annex sediment.

(3) Tier II screening: With the exception of lead, all compounds are screened against 10 times the Risk-Based Concentration (RBC) Table, U.S. EPA Region III, October 9, 2002 for industrial soil (10 times the cancer benchmark value = 1e-06; 10 times the HQ = 0.1). Lead is screened against the EPA screening value of 1000 mg/kg.
When no RBC available, surrogate RBC used as follows:
Acenaphthylene - used naphthalene
Benzo(g,h,i)Perylene, Phenanthrene - used pyrene
alpha-Chlordane, gamma-Chlordane - used Chlordane
Cadmium - used Cadmium - Food
Chromium - used Chromium VI
Mercury - used Mercuric Chloride

(4) Rationale Codes

Selection Reason:	Above Screening Level (ASL)
	No Toxicity Information (NTX)
Deletion Reason:	Essential Nutrient (NUT)
	Below Screening Level (BSL)

Sediment samples: SD01 through SD03, SD06 - Phase I; SD04, SD07, and SD08 - Phase II

Definitions: N/A = Not Applicable
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
J = Estimated Value
K = Estimated value - Biased High
L = Estimated Value - Biased Low
C = Carcinogenic
N = Non-Carcinogenic

Table J-2.7
Occurrence, Distribution, and Selection of COPCs
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 3

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
	Organics															
72548	4,4'-DDD	0.00043	J	0.065		mg/kg	SB17	14 / 38	0.003 - 0.0062	0.065	0.0053	2.7 C	NA	NA	no	BSL
72559	4,4'-DDE	0.0038	J	0.059	J	mg/kg	SS09	14 / 38	0.003 - 0.0062	0.059	0.009	1.9 C	NA	NA	no	BSL
50293	4,4'-DDT	0.00061	J	0.13		mg/kg	SS07	16 / 38	0.003 - 0.0062	0.13	0.009	1.9 C	NA	NA	no	BSL
5103719	alpha-Chlordane	0.007	J	0.0095		mg/kg	SB17	2 / 38	0.002 - 0.0031	0.0095	0.0028	1.8 C	NA	NA	no	BSL
11097691	Aroclor-1254	0.078		0.28	J	mg/kg	SS12	3 / 38	0.034 - 0.062	0.28	ND	0.16 N	NA	NA	yes	ASL
11096825	Aroclor-1260	0.069	J	0.091	J	mg/kg	SS09	2 / 38	0.034 - 0.062	0.091	ND	0.32 C	NA	NA	no	BSL
60571	Dieldrin	0.0043	J	0.0053	J	mg/kg	SS07	2 / 38	0.003 - 0.0062	0.0053	0.0053	0.04 C	NA	NA	no	BSL
959988	Endosulfan I	0.0038	J	0.0038	J	mg/kg	SS12	1 / 38	0.002 - 0.0031	0.0038	0.0028	47 N	NA	NA	no	BSL
5103742	gamma-Chlordane	0.0089		0.0089		mg/kg	SB17	1 / 38	0.002 - 0.0031	0.0089	0.0028	1.8 C	NA	NA	no	BSL
91576	2-Methylnaphthalene	0.085	J	0.72		mg/kg	SB09	2 / 38	0.34 - 0.63	0.72	ND	160 N	NA	NA	no	BSL
83329	Acenaphthene	0.049	J	0.58		mg/kg	SB15	4 / 38	0.34 - 0.63	0.58	0.592	470 N	NA	NA	no	BSL
208968	Acenaphthylene	0.054	J	0.1	J	mg/kg	SB05	6 / 38	0.34 - 0.63	0.1	0.131	160 N	NA	NA	no	BSL
120127	Anthracene	0.043	J	1.0	J	mg/kg	SS09	18 / 38	0.34 - 0.63	1	0.462	2300 N	NA	NA	no	BSL
56553	Benzo(a)Anthracene	0.036	J	4.0	J	mg/kg	SS09	32 / 38	0.34 - 0.63	4	2.027	0.87 N	NA	NA	yes	ASL
50328	Benzo(a)Pyrene	0.038	J	4.1	J	mg/kg	SS09	32 / 38	0.34 - 0.63	4.1	1.785	0.087 N	NA	NA	yes	ASL
205992	Benzo(b)Fluoranthene	0.045	J	6.5	J	mg/kg	SS09	34 / 38	0.34 - 1.1	6.5	2.335	0.87 N	NA	NA	yes	ASL
191242	Benzo(g,h,i)Perylene	0.042	J	2.6	J	mg/kg	SS09	30 / 38	0.34 - 0.63	2.6	1.655	230 N	NA	NA	no	BSL
207089	Benzo(k)Fluoranthene	0.051	J	2	J	mg/kg	SS09	31 / 38	0.34 - 0.63	2	2.038	8.7 C	NA	NA	no	BSL
117817	Bis(2-Ethylhexyl)Phthalate	0.049	J	0.58	J	mg/kg	SS17	5 / 38	0.066 - 0.63	0.58	ND	46 C	NA	NA	no	BSL
86748	Carbazole	0.045	J	0.37	J	mg/kg	SS09	5 / 38	0.34 - 0.63	0.37	ND	32 C	NA	NA	no	BSL
218019	Chrysene	0.041	J	3.6	J	mg/kg	SS09	33 / 38	0.34 - 0.63	3.6	3.487	87 C	NA	NA	no	BSL
84742	Di-n-Butylphthalate	0.043	J	0.26	J	mg/kg	SS10	7 / 38	0.34 - 0.63	0.26	ND	780 N	NA	NA	no	BSL
117840	Di-n-Octyl Phthalate	0.1	J	0.1	J	mg/kg	SB19	1 / 38	0.34 - 0.63	0.1	ND	160 N	NA	NA	no	BSL
53703	Dibenz(a,h)Anthracene	0.067	J	0.29	J	mg/kg	SS17	5 / 38	0.34 - 0.63	0.29	0.708	0.087 C	NA	NA	yes	ASL
132649	Dibenzofuran	0.038	J	0.15	J	mg/kg	SS09	5 / 38	0.34 - 0.63	0.15	ND	31 C	NA	NA	no	BSL
84662	Diethylphthalate	0.079	J	0.079	J	mg/kg	SS07	1 / 38	0.34 - 0.63	0.079	ND	6300 N	NA	NA	no	BSL
206440	Fluoranthene	0.059	J	4.1	J	mg/kg	SS09	32 / 38	0.34 - 0.63	4.1	2.766	310 N	NA	NA	no	BSL
86737	Fluorene	0.048	J	0.28	J	mg/kg	SB10	4 / 38	0.34 - 0.63	0.28	0.602	310 N	NA	NA	no	BSL
193395	Indeno(1,2,3-cd)Pyrene	0.043	J	2.3	J	mg/kg	SS09	31 / 38	0.34 - 0.63	2.3	1.768	0.87 C	NA	NA	yes	ASL
91203	Naphthalene	0.042	J	0.18	J	mg/kg	SS16	10 / 38	0.34 - 0.63	0.18	0.485	160 N	NA	NA	no	BSL
87865	Pentachlorophenol	0.16	J	0.16	J	mg/kg	SS06	1 / 38	0.84 - 1.6	0.16	ND	5.3 C	NA	NA	no	BSL

Table J-2.7
Occurrence, Distribution, and Selection of COPCs
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 3

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	(2) Background Value	(3) Screening Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(4) Rationale for Contaminant Deletion or Selection
85018	Phenanthrene	0.049	J	3.3	J	mg/kg	SS09	22 / 38	0.34 - 0.63	3.3	0.913	230 N	NA	NA	no	BSL
129000	Pyrene	0.054	J	3.5	J	mg/kg	SS09	34 / 38	0.34 - 0.63	3.5	2.59	230 N	NA	NA	no	BSL
78933	2-Butanone	0.006	J	0.032	J	mg/kg	SB19	6 / 38	0.01 - 0.019	0.032	ND	4700 N	NA	NA	no	BSL
67641	Acetone	0.011	J	0.23	J	mg/kg	SB19	11 / 38	0.01 - 0.019	0.23	ND	780 N	NA	NA	no	BSL
75150	Carbon Disulfide	0.005	J	0.018		mg/kg	SB20	3 / 38	0.01 - 0.019	0.018	ND	780 N	NA	NA	no	BSL
67663	Chloroform	0.002	J	0.002	J	mg/kg	SB19	1 / 38	0.01 - 0.019	0.002	ND	78 N	NA	NA	no	BSL
74873	Chloromethane	0.004	J	0.004	J	mg/kg	SS08	1 / 38	0.01 - 0.019	0.004	ND	49 C	NA	NA	no	BSL
75092	Methylene Chloride	0.002	J	0.012	J	mg/kg	SB03	2 / 38	0.01 - 0.019	0.012	ND	85 C	NA	NA	no	BSL
127184	Tetrachloroethene	0.002	J	0.005	J	mg/kg	SB01	4 / 38	0.01 - 0.019	0.005	ND	12 C	NA	NA	no	BSL
108883	Toluene	0.002	J	0.003	J	mg/kg	SB06	4 / 38	0.01 - 0.019	0.003	ND	1600 N	NA	NA	no	BSL
1746016	Total Dioxins (2,3,7,8-TCDD equivalent)**	0.000008		0.00006		mg/kg	SB26	3 / 3		0.00006	NS	0.0000043 C	NA	NA	yes	ASL
	Inorganics															
14265442	Phosphorous	3.4		162		mg/kg	SS13	28 / 38	1.2 - 19	162	ND	NA	NA	NA	no	NTX
7429905	Aluminum	963		23700		mg/kg	SB20	38 / 38	6.4 - 12.83	23700	18839	7800 N	NA	NA	yes	ASL
7440360	Antimony	0.38	J	162		mg/kg	SS15	8 / 35	0.38 - 0.84	162.0	1.47	3.1 N	NA	NA	yes	ASL
7440382	Arsenic	0.79	J	66.1		mg/kg	SS17	38 / 38	0.33 - 0.87	66.1	14	0.43 C	NA	NA	yes	ASL
7440393	Barium	9	J	1640		mg/kg	SS17	37 / 38	0.03 - 0.58	1640	50	550 N	NA	NA	yes	ASL
7440417	Beryllium	0.14	J	3.1	J	mg/kg	SB09	32 / 38	0.02 - 0.29	3.1	0.81	16 N	NA	NA	no	BSL
7440439	Cadmium	0.2	J	15.3		mg/kg	SS17	12 / 38	0.05 - 0.15	15.3	ND	7.8 N	NA	NA	yes	ASL
7440702	Calcium	197	J	37000		mg/kg	SS12	38 / 38	9.7 - 25.37	37000	3251	NA	NA	NA	no	NUT
7440473	Chromium	3		124		mg/kg	SS09	37 / 38	0.18 - 2.04	124	39	23 N	NA	NA	yes	ASL
7440484	Cobalt	1.1	J	14.2	J	mg/kg	SS09	36 / 38	0.08 - 2.33	14.2	13	160 N	NA	NA	no	BSL
7440508	Copper	3.100	J	8190		mg/kg	SB09	35 / 38	0.18 - 1.75	8190	40	310 N	NA	NA	yes	ASL
7439896	Iron	2030		126000		mg/kg	SS17	38 / 38	3.2 - 9.6	126000	36585	2300 N	NA	NA	yes	ASL
7439921	Lead	6.6	J	2990	J	mg/kg	SB17	38 / 38	0.17 - 0.31	2990	86	400	NA	NA	yes	ASL
7439954	Magnesium	203	J	5750		mg/kg	SB20	37 / 38	4.1 - 52.77	5750	3847	NA	NA	NA	no	NUT
7439965	Manganese	16		935		mg/kg	SS17	38 / 38	0.05 - 0.58	935	151	160 N	NA	NA	yes	ASL
7439976	Mercury	0.04000	J	0.88		mg/kg	SB06	34 / 38	0.02 - 0.07	0.88	0.62	2.3 N	NA	NA	no	BSL
7440020	Nickel	1.8	J	77.8		mg/kg	SS09	32 / 38	0.15 - 2.04	77.8	15	160 N	NA	NA	no	BSL
7440097	Potassium	162	J	4030		mg/kg	SS01	38 / 38	2.3 - 64.72	4030	3465	NA	NA	NA	no	NUT
7782492	Selenium	0.5	J	2.5		mg/kg	SS09	10 / 38	0.43 - 0.87	2.5	1.5	39 N	NA	NA	no	BSL
7440224	Silver	0.38	J	5.8		mg/kg	SS09	8 / 38	0.15 - 0.29	5.8	0.67	39 N	NA	NA	no	BSL

Table J-2.7
Occurrence, Distribution, and Selection of COPCs
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 3

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	(2) Background Value	(3) Screening Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(4) Rationale for Contaminant Deletion or Selection
7440235	Sodium	53.2	L	1230	J	mg/kg	SB20	22 / 38	10.9 - 46.2	1230	203	NA	NA	NA	no	NUT
7440280	Thallium	0.69	J	2.8		mg/kg	SB06	6 / 38	0.38 - 1	2.8	ND	0.55 N	NA	NA	yes	ASL
7440622	Vanadium	2	J	79.8		mg/kg	SS05	37 / 38	0.1 - 2.62	79.8	42	55 N	NA	NA	yes	ASL
7440666	Zinc	13.2		3760		mg/kg	SS09	35 / 38	0.32 - 1.46	3760	87	2300 N	NA	NA	yes	ASL

* Surface soil & subsurface soil combined

(1) Minimum/maximum detected concentration.

(2) Background data is UCL for dredge-fill background soil type from St. Juliens Creek Background Investigation.

(3) Tier I screening: With the exception of lead, all compounds are screened against the Risk-Based Concentration (RBC) Table, U.S. EPA Region III, October 9, 2002 for residential soil (cancer benchmark value = 1e-06; HQ = 0.1). Lead is screened against the EPA screening value of a value of 400 mg/kg.
When no RBC available, surrogate RBC used as follows:
Acenaphthylene - used naphthalene
Benzo(g,h,i)Perylene, Phenanthrene - used pyrene
alpha-Chlordane, gamma-Chlordane - used Chlordane
Endosulfan Sulfate, Endosulfan I - used Endosulfan
Cadmium - used Cadmium - Food
Chromium - used Chromium VI
Mercury - used Mercuric Chloride

(4) Rationale Codes
Selection Reason: Above Screening Level (ASL)
No Toxicity Information (NTX)
Deletion Reason: Essential Nutrient (NUT)
Below Screening Level (BSL)

Definitions: NA = Not Applicable
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
J = Estimated Value
L = Estimated Value - Biased Low
C = Carcinogenic
N = Non-Carcinogenic

Surface and Subsurface Soil Samples: Phase I - SS01 to SS07, SB01 to SB07; Phase II - SS08 to SS18, SB08 to SB20, SB21, SB23, and SB26

Table J-2.8
Occurrence, Distribution, and Selection of COPCs
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 3

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	(2) Background Value	(3) Screening Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(4) Rationale for Contaminant Deletion or Selection
	Organics															
72548	4,4'-DDD	0.00043	J	0.065		mg/kg	SB17	14 / 38	0.003 - 0.006	0.065	0.0053	24 C	NA	NA	no	BSL
72559	4,4'-DDE	0.0038	J	0.059	J	mg/kg	SS09	14 / 38	0.003 - 0.006	0.059	0.009	17 C	NA	NA	no	BSL
50293	4,4'-DDT	0.00061	J	0.13		mg/kg	SS07	16 / 38	0.003 - 0.006	0.13	0.009	17 C	NA	NA	no	BSL
5103719	alpha-Chlordane	0.007	J	0.0095		mg/kg	SB17	2 / 38	0.002 - 0.003	0.0095	0.0028	16 C	NA	NA	no	BSL
11097691	Aroclor-1254	0.078		0.28	J	mg/kg	SS12	3 / 38	0.034 - 0.062	0.28	ND	2.9 C	NA	NA	no	BSL
11096825	Aroclor-1260	0.069	J	0.091	J	mg/kg	SS09	2 / 38	0.034 - 0.062	0.091	ND	2.9 C	NA	NA	no	BSL
60571	Dieldrin	0.004	J	0.0053	J	mg/kg	SS07	2 / 38	0.003 - 0.006	0.0053	0.0053	0.36 C	NA	NA	no	BSL
959988	Endosulfan I	0.004	J	0.0038	J	mg/kg	SS12	1 / 38	0.002 - 0.003	0.0038	0.0028	1200 N	NA	NA	no	BSL
5103742	gamma-Chlordane	0.009		0.0089		mg/kg	SB17	1 / 38	0.002 - 0.003	0.0089	0.0028	16 C	NA	NA	no	BSL
91576	2-Methylnaphthalene	0.085	J	0.72		mg/kg	SB09	2 / 38	0.34 - 0.63	0.72	ND	4100 N	NA	NA	no	BSL
83329	Acenaphthene	0.049	J	0.58		mg/kg	SB15	4 / 38	0.34 - 0.63	0.58	0.592	12000 N	NA	NA	no	BSL
208968	Acenaphthylene	0.054	J	0.1	J	mg/kg	SB05	6 / 38	0.34 - 0.63	0.1	0.131	4100 N	NA	NA	no	BSL
120127	Anthracene	0.043	J	1.0	J	mg/kg	SS09	18 / 38	0.34 - 0.63	1	0.462	61000 N	NA	NA	no	BSL
56553	Benzo(a)Anthracene	0.036	J	4.0	J	mg/kg	SS09	32 / 38	0.34 - 0.63	4	2.027	7.8 C	NA	NA	no	BSL
50328	Benzo(a)Pyrene	0.038	J	4.1	J	mg/kg	SS09	32 / 38	0.34 - 0.63	4.1	1.785	0.78 C	NA	NA	yes	ASL
205992	Benzo(b)Fluoranthene	0.045	J	6.5	J	mg/kg	SS09	34 / 38	0.34 - 1.1	6.5	2.335	7.8 C	NA	NA	no	BSL
191242	Benzo(g,h,i)Perylene	0.042	J	2.6	J	mg/kg	SS09	30 / 38	0.34 - 0.63	2.6	1.655	6100 N	NA	NA	no	BSL
207089	Benzo(k)Fluoranthene	0.051	J	2	J	mg/kg	SS09	31 / 38	0.34 - 0.63	2	2.038	78 C	NA	NA	no	BSL
117817	Bis(2-Ethylhexyl)Phthalate	0.049	J	0.58	J	mg/kg	SS17	5 / 38	0.066 - 0.63	0.58	ND	410 C	NA	NA	no	BSL
86748	Carbazole	0.045	J	0.37	J	mg/kg	SS09	5 / 38	0.34 - 0.63	0.37	ND	290 C	NA	NA	no	BSL
218019	Chrysene	0.041	J	3.6	J	mg/kg	SS09	33 / 38	0.34 - 0.63	3.6	3.487	780 C	NA	NA	no	BSL
84742	Di-n-Butylphthalate	0.043	J	0.26	J	mg/kg	SS10	7 / 38	0.34 - 0.63	0.26	ND	20000 N	NA	NA	no	BSL
117840	Di-n-Octyl Phthalate	0.1	J	0.1	J	mg/kg	SB19	1 / 38	0.34 - 0.63	0.1	ND	4100 N	NA	NA	no	BSL
53703	Dibenz(a,h)Anthracene	0.067	J	0.29	J	mg/kg	SS17	5 / 38	0.34 - 0.63	0.29	0.708	0.78 C	NA	NA	no	BSL
132649	Dibenzofuran	0.038	J	0.15	J	mg/kg	SS09	5 / 38	0.34 - 0.63	0.15	ND	820 N	NA	NA	no	BSL
84662	Diethylphthalate	0.079	J	0.079	J	mg/kg	SS07	1 / 38	0.34 - 0.63	0.079	ND	160000 N	NA	NA	no	BSL
206440	Fluoranthene	0.059	J	4.1	J	mg/kg	SS09	32 / 38	0.34 - 0.63	4.1	2.766	8200 N	NA	NA	no	BSL
86737	Fluorene	0.048	J	0.28	J	mg/kg	SB10	4 / 38	0.34 - 0.63	0.28	0.602	8200 N	NA	NA	no	BSL
193395	Indeno(1,2,3-cd)Pyrene	0.043	J	2.3	J	mg/kg	SS09	31 / 38	0.34 - 0.63	2.3	1.768	7.8 C	NA	NA	no	BSL
91203	Naphthalene	0.042	J	0.18	J	mg/kg	SS16	10 / 38	0.34 - 0.63	0.18	0.485	4100 N	NA	NA	no	BSL
87865	Pentachlorophenol	0.16	J	0.16	J	mg/kg	SS06	1 / 38	0.84 - 1.6	0.16	ND	48 C	NA	NA	no	BSL

Table J-2.8
Occurrence, Distribution, and Selection of COPCs
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 3

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	(2) Background Value	(3) Screening Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(4) Rationale for Contaminant Deletion or Selection
85018	Phenanthrene	0.049	J	3.3	J	mg/kg	SS09	22 / 38	0.34 - 0.63	3.3	0.913	6100 N	NA	NA	no	BSL
129000	Pyrene	0.054	J	3.5	J	mg/kg	SS09	34 / 38	0.34 - 0.63	3.5	2.59	6100 N	NA	NA	no	BSL
78933	2-Butanone	0.006	J	0.032	J	mg/kg	SB19	6 / 38	0.01 - 0.019	0.032	ND	120000 N	NA	NA	no	BSL
67641	Acetone	0.011	J	0.23	J	mg/kg	SB19	11 / 38	0.01 - 0.019	0.23	ND	20000 N	NA	NA	no	BSL
75150	Carbon Disulfide	0.005	J	0.018		mg/kg	SB20	3 / 38	0.01 - 0.019	0.018	ND	20000 N	NA	NA	no	BSL
67663	Chloroform	0.002	J	0.002	J	mg/kg	SB19	1 / 38	0.01 - 0.019	0.002	ND	940 N	NA	NA	no	BSL
74873	Chloromethane	0.004	J	0.004	J	mg/kg	SS08	1 / 38	0.01 - 0.019	0.004	ND	440 C	NA	NA	no	BSL
75092	Methylene Chloride	0.002	J	0.012	J	mg/kg	SB03	2 / 38	0.01 - 0.019	0.012	ND	760 C	NA	NA	no	BSL
127184	Tetrachloroethene	0.002	J	0.005	J	mg/kg	SB01	4 / 38	0.01 - 0.019	0.005	ND	110 C	NA	NA	no	BSL
108883	Toluene	0.002	J	0.003	J	mg/kg	SB06	4 / 38	0.01 - 0.019	0.003	ND	41000 N	NA	NA	no	BSL
1746016	Total Dioxins (2,3,7,8-TCDD equivalent)**	0.000008		0.00006		mg/kg	SB26	3 / 3		0.00006	NS	0.000038 C	NA	NA	yes	ASL
	Inorganics															
14265442	Phosphorous	3.4		162		mg/kg	SS13	28 / 38	1.2 - 19	162	ND	NA	NA	NA	no	NTX
7429905	Aluminum	963		23700		mg/kg	SB20	38 / 38	6.4 - 12.83	23700	18839	200000 N	NA	NA	no	BSL
7440360	Antimony	0.38	J	162		mg/kg	SS15	8 / 35	0.38 - 0.84	162	1.47	82 N	NA	NA	yes	ASL
7440382	Arsenic	0.79	J	66.1		mg/kg	SS17	38 / 38	0.33 - 0.87	66.1	14	3.8 C	NA	NA	yes	ASL
7440393	Barium	9	J	1640		mg/kg	SS17	37 / 38	0.03 - 0.58	1640	50	14000 N	NA	NA	no	BSL
7440417	Beryllium	0.14	J	3.1	J	mg/kg	SB09	32 / 38	0.02 - 0.29	3.1	0.81	410 N	NA	NA	no	BSL
7440439	Cadmium	0.2	J	15.3		mg/kg	SS17	12 / 38	0.05 - 0.15	15.3	ND	200 N	NA	NA	no	BSL
7440702	Calcium	197	J	37000		mg/kg	SS12	38 / 38	9.7 - 25.37	37000	3251	NA	NA	NA	no	NUT
7440473	Chromium	3		124		mg/kg	SS09	37 / 38	0.18 - 2.04	124	39	610 N	NA	NA	no	BSL
7440484	Cobalt	1.1	J	14.2	J	mg/kg	SS09	36 / 38	0.08 - 2.33	14.2	13	4100 N	NA	NA	no	BSL
7440508	Copper	3.100	J	8190		mg/kg	SB09	35 / 38	0.18 - 1.75	8190	40	8200 N	NA	NA	no	BSL
7439896	Iron	2030		126000		mg/kg	SS17	38 / 38	3.2 - 9.6	126000	36585	61000 N	NA	NA	yes	ASL
7439921	Lead	6.6	J	2990	J	mg/kg	SB17	38 / 38	0.17 - 0.31	2990	86	1000	NA	NA	yes	ASL
7439954	Magnesium	203	J	5750		mg/kg	SB20	37 / 38	4.1 - 52.77	5750	3847	NA	NA	NA	no	NUT
7439965	Manganese	16		935		mg/kg	SS17	38 / 38	0.05 - 0.58	935	151	4100 N	NA	NA	no	BSL
7439976	Mercury	0.04000	J	0.88		mg/kg	SB06	34 / 38	0.02 - 0.07	0.88	0.62	61 N	NA	NA	no	BSL
7440020	Nickel	1.8	J	77.8		mg/kg	SS09	32 / 38	0.15 - 2.04	77.8	15	4100 N	NA	NA	no	BSL

Table J-2.8
Occurrence, Distribution, and Selection of COPCs
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 3

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	(2) Background Value	(3) Screening Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(4) Rationale for Contaminant Deletion or Selection
7440097	Potassium	162	J	4030		mg/kg	SS01	38 / 38	2.3 - 64.72	4030	3465	NA	NA	NA	no	NUT
7782492	Selenium	0.5	J	2.5		mg/kg	SS09	10 / 38	0.43 - 0.87	2.5	1.5	1000 N	NA	NA	no	BSL
7440224	Silver	0.38	J	5.8		mg/kg	SS09	8 / 38	0.15 - 0.29	5.8	0.67	1000 N	NA	NA	no	BSL
7440235	Sodium	53.2	L	1230	J	mg/kg	SB20	22 / 38	10.9 - 46.2	1230	203	NA	NA	NA	no	NUT
7440280	Thallium	0.69	J	2.8		mg/kg	SB06	6 / 38	0.38 - 1	2.8	ND	14 N	NA	NA	no	BSL
7440622	Vanadium	2	J	79.8		mg/kg	SS05	37 / 38	0.1 - 2.62	79.8	42	1400 N	NA	NA	no	BSL
7440666	Zinc	13.2		3760		mg/kg	SS09	35 / 38	0.32 - 1.46	3760	87	61000 N	NA	NA	no	BSL

* Surface soil & subsurface soil combined

(1) Minimum/maximum detected concentration.

(2) Background data is UCL for dredge-fill background soil type from St. Julliens Creek Background Investigation.

(3) Tier II screening: With the exception of lead, all compounds are screened against the Risk-Based Concentration (RBC) Table, U.S. EPA Region III, October 9, 2002 for industrial soil (cancer benchmark value = 1e-06; HQ = 0.1). Lead is screened against the EPA screening value of a value of 1000 mg/kg.
When no RBC available, surrogate RBC used as follows:
Acenaphthylene - used naphthalene
Benzo(g,h,i)Perylene, Phenanthrene - used pyrene
alpha-Chlordane, gamma-Chlordane - used Chlordane
Endosulfan Sulfate, Endosulfan I - used Endosulfan
Cadmium - used Cadmium - Food
Chromium - used Chromium VI
Mercury - used Mercuric Chloride

(4) Rationale Codes
Selection Reason: Above Screening Level (ASL)
No Toxicity Information (NTX)
Deletion Reason: Essential Nutrient (NUT)
Below Screening Level (BSL)

Definitions: NA = Not Applicable
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
J = Estimated Value
L = Estimated Value - Biased Low
C = Carcinogenic
N = Non-Carcinogenic

Surface and Subsurface Soil Samples: Phase I - SS01 to SS07, SB01 to SB07; Phase II - SS08 to SS18, SB08 to SB20, SB21, SB23, and SB26

Table J-2.9
Occurrence, Distribution, and Selection of COPCs
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Air
Exposure Point: Emissions from Soil at Site 3

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	(2) Background Value	(3) Screening Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(4) Rationale for Contaminant Deletion or Selection
	Organics															
72548	4,4'-DDD	0.00043	J	0.065		mg/kg	SB17	14 / 38	0.003 - 0.006	0.065	0.0053	24 C	NA	NA	no	BSL
72559	4,4'-DDE	0.0038	J	0.059	J	mg/kg	SS09	14 / 38	0.003 - 0.006	0.059	0.009	17 C	NA	NA	no	BSL
50293	4,4'-DDT	0.00061	J	0.13		mg/kg	SS07	16 / 38	0.003 - 0.006	0.13	0.009	17 C	NA	NA	no	BSL
5103719	alpha-Chlordane	0.007	J	0.0095		mg/kg	SB17	2 / 38	0.002 - 0.003	0.0095	0.0028	16 C	NA	NA	no	BSL
11097691	Aroclor-1254	0.078		0.28	J	mg/kg	SS12	3 / 38	0.034 - 0.062	0.28	ND	2.9 C	NA	NA	no	BSL
11096825	Aroclor-1260	0.069	J	0.091	J	mg/kg	SS09	2 / 38	0.034 - 0.062	0.091	ND	2.9 C	NA	NA	no	BSL
60571	Dieldrin	0.0043	J	0.0053	J	mg/kg	SS07	2 / 38	0.003 - 0.006	0.0053	0.0053	0.36 C	NA	NA	no	BSL
959988	Endosulfan I	0.0038	J	0.0038	J	mg/kg	SS12	1 / 38	0.002 - 0.003	0.0038	0.0028	1200 N	NA	NA	no	BSL
5103742	gamma-Chlordane	0.0089		0.0089		mg/kg	SB17	1 / 38	0.002 - 0.003	0.0089	0.0028	16 C	NA	NA	no	BSL
91576	2-Methylnaphthalene	0.085	J	0.72		mg/kg	SB09	2 / 38	0.34 - 0.63	0.72	ND	4100 N	NA	NA	no	BSL
83329	Acenaphthene	0.049	J	0.58		mg/kg	SB15	4 / 38	0.34 - 0.63	0.58	0.592	12000 N	NA	NA	no	BSL
208968	Acenaphthylene	0.054	J	0.1	J	mg/kg	SB05	6 / 38	0.34 - 0.63	0.1	0.131	4100 N	NA	NA	no	BSL
120127	Anthracene	0.043	J	1.0	J	mg/kg	SS09	18 / 38	0.34 - 0.63	1	0.462	61000 N	NA	NA	no	BSL
56553	Benzo(a)Anthracene	0.036	J	4.0	J	mg/kg	SS09	32 / 38	0.34 - 0.63	4	2.027	7.8 C	NA	NA	no	BSL
50328	Benzo(a)Pyrene	0.038	J	4.1	J	mg/kg	SS09	32 / 38	0.34 - 0.63	4.1	1.785	0.78 C	NA	NA	yes	ASL
205992	Benzo(b)Fluoranthene	0.045	J	6.5	J	mg/kg	SS09	34 / 38	0.34 - 1.1	6.5	2.335	7.8 C	NA	NA	no	BSL
191242	Benzo(g,h,i)Perylene	0.042	J	2.6	J	mg/kg	SS09	30 / 38	0.34 - 0.63	2.6	1.655	6100 N	NA	NA	no	BSL
207089	Benzo(k)Fluoranthene	0.051	J	2	J	mg/kg	SS09	31 / 38	0.34 - 0.63	2	2.038	78 C	NA	NA	no	BSL
117817	Bis(2-Ethylhexyl)Phthalate	0.049	J	0.58	J	mg/kg	SS17	5 / 38	0.066 - 0.63	0.58	ND	410 C	NA	NA	no	BSL
86748	Carbazole	0.045	J	0.37	J	mg/kg	SS09	5 / 38	0.34 - 0.63	0.37	ND	290 C	NA	NA	no	BSL
218019	Chrysene	0.041	J	3.6	J	mg/kg	SS09	33 / 38	0.34 - 0.63	3.6	3.487	780 C	NA	NA	no	BSL
84742	Di-n-Butylphthalate	0.043	J	0.26	J	mg/kg	SS10	7 / 38	0.34 - 0.63	0.26	ND	20000 N	NA	NA	no	BSL
117840	Di-n-Octyl Phthalate	0.1	J	0.1	J	mg/kg	SB19	1 / 38	0.34 - 0.63	0.1	ND	4100 N	NA	NA	no	BSL
53703	Dibenz(a,h)Anthracene	0.067	J	0.29	J	mg/kg	SS17	5 / 38	0.34 - 0.63	0.29	0.708	0.78 C	NA	NA	no	BSL
132649	Dibenzofuran	0.038	J	0.15	J	mg/kg	SS09	5 / 38	0.34 - 0.63	0.15	ND	820 N	NA	NA	no	BSL
84662	Diethylphthalate	0.079	J	0.079	J	mg/kg	SS07	1 / 38	0.34 - 0.63	0.079	ND	160000 N	NA	NA	no	BSL
206440	Fluoranthene	0.059	J	4.1	J	mg/kg	SS09	32 / 38	0.34 - 0.63	4.1	2.766	8200 N	NA	NA	no	BSL
86737	Fluorene	0.048	J	0.28	J	mg/kg	SB10	4 / 38	0.34 - 0.63	0.28	0.602	8200 N	NA	NA	no	BSL
193395	Indeno(1,2,3-cd)Pyrene	0.043	J	2.3	J	mg/kg	SS09	31 / 38	0.34 - 0.63	2.3	1.768	7.8 C	NA	NA	no	BSL
91203	Naphthalene	0.042	J	0.18	J	mg/kg	SS16	10 / 38	0.34 - 0.63	0.18	0.485	4100 N	NA	NA	no	BSL
87865	Pentachlorophenol	0.16	J	0.16	J	mg/kg	SS06	1 / 38	0.84 - 1.6	0.16	ND	48 C	NA	NA	no	BSL

Table J-2.9
Occurrence, Distribution, and Selection of COPCs
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Air
Exposure Point: Emissions from Soil at Site 3

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	(2) Background Value	(3) Screening Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(4) Rationale for Contaminant Deletion or Selection
85018	Phenanthrene	0.049	J	3.3	J	mg/kg	SS09	22 / 38	0.34 - 0.63	3.3	0.913	6100 N	NA	NA	no	BSL
129000	Pyrene	0.054	J	3.5	J	mg/kg	SS09	34 / 38	0.34 - 0.63	3.5	2.59	6100 N	NA	NA	no	BSL
78933	2-Butanone	0.006	J	0.032	J	mg/kg	SB19	6 / 38	0.01 - 0.019	0.032	ND	120000 N	NA	NA	no	BSL
67641	Acetone	0.011	J	0.23	J	mg/kg	SB19	11 / 38	0.01 - 0.019	0.23	ND	20000 N	NA	NA	no	BSL
75150	Carbon Disulfide	0.005	J	0.018		mg/kg	SB20	3 / 38	0.01 - 0.019	0.018	ND	20000 N	NA	NA	no	BSL
67663	Chloroform	0.002	J	0.002	J	mg/kg	SB19	1 / 38	0.01 - 0.019	0.002	ND	940 N	NA	NA	no	BSL
74873	Chloromethane	0.004	J	0.004	J	mg/kg	SS08	1 / 38	0.01 - 0.019	0.004	ND	440 C	NA	NA	no	BSL
75092	Methylene Chloride	0.002	J	0.012	J	mg/kg	SB03	2 / 38	0.01 - 0.019	0.012	ND	760 C	NA	NA	no	BSL
127184	Tetrachloroethene	0.002	J	0.005	J	mg/kg	SB01	4 / 38	0.01 - 0.019	0.005	ND	110 C	NA	NA	no	BSL
108883	Toluene	0.002	J	0.003	J	mg/kg	SB06	4 / 38	0.01 - 0.019	0.003	ND	41000 N	NA	NA	no	BSL
1746016	Total Dioxins (2,3,7,8-TCDD equivalent)**	0.000008		0.00006		mg/kg	SB26	3 / 3		0.00006	NS	0.000038 C	NA	NA	yes	ASL
	Inorganics															
14265442	Phosphorous	3.4		162		mg/kg	SS13	28 / 38	1.2 - 19	162	ND	NA	NA	NA	no	NTX
7429905	Aluminum	963		23700		mg/kg	SB20	38 / 38	6.4 - 12.83	23700	18839	200000 N	NA	NA	no	BSL
7440360	Antimony	0.38	J	162		mg/kg	SS15	8 / 35	0.38 - 0.84	162	1.47	82 N	NA	NA	yes	ASL
7440382	Arsenic	0.79	J	66.1		mg/kg	SS17	38 / 38	0.33 - 0.87	66.1	14	3.8 C	NA	NA	yes	ASL
7440393	Barium	9	J	1640		mg/kg	SS17	37 / 38	0.03 - 0.58	1640	50	14000 N	NA	NA	no	BSL
7440417	Beryllium	0.14	J	3.1	J	mg/kg	SB09	32 / 38	0.02 - 0.29	3.1	0.81	410 N	NA	NA	no	BSL
7440439	Cadmium	0.2	J	15.3		mg/kg	SS17	12 / 38	0.05 - 0.15	15.3	ND	200 N	NA	NA	no	BSL
7440702	Calcium	197	J	37000		mg/kg	SS12	38 / 38	9.7 - 25.37	37000	3251	NA	NA	NA	no	NUT
7440473	Chromium	3		124		mg/kg	SS09	37 / 38	0.18 - 2.04	124	39	610 N	NA	NA	no	BSL
7440484	Cobalt	1.1	J	14.2	J	mg/kg	SS09	36 / 38	0.08 - 2.33	14.2	13	4100 N	NA	NA	no	BSL
7440508	Copper	3.100	J	8190		mg/kg	SB09	35 / 38	0.18 - 1.75	8190	40	8200 N	NA	NA	no	BSL
7439896	Iron	2030		126000		mg/kg	SS17	38 / 38	3.2 - 9.6	126000	36585	61000 N	NA	NA	yes	ASL
7439921	Lead	6.6	J	2990	J	mg/kg	SB17	38 / 38	0.17 - 0.31	2990	86	1000	NA	NA	yes	ASL
7439954	Magnesium	203	J	5750		mg/kg	SB20	37 / 38	4.1 - 52.77	5750	3847	NA	NA	NA	no	NUT
7439965	Manganese	16		935		mg/kg	SS17	38 / 38	0.05 - 0.58	935	151	4100 N	NA	NA	no	BSL
7439976	Mercury	0.04000	J	0.88		mg/kg	SB06	34 / 38	0.02 - 0.07	0.88	0.62	61 N	NA	NA	no	BSL
7440020	Nickel	1.8	J	77.8		mg/kg	SS09	32 / 38	0.15 - 2.04	77.8	15	4100 N	NA	NA	no	BSL
7440097	Potassium	162	J	4030		mg/kg	SS01	38 / 38	2.3 - 64.72	4030	3465	NA	NA	NA	no	NUT
7782492	Selenium	0.5	J	2.5		mg/kg	SS09	10 / 38	0.43 - 0.87	2.5	1.5	1000 N	NA	NA	no	BSL
7440224	Silver	0.36	J	5.8		mg/kg	SS09	8 / 38	0.15 - 0.29	5.8	0.67	1000 N	NA	NA	no	BSL

Table J-2.9
Occurrence, Distribution, and Selection of COPCs
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Air
Exposure Point: Emissions from Soil at Site 3

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	(2) Background Value	(3) Screening Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(4) Rationale for Contaminant Deletion or Selection
7440235	Sodium	53.2	L	1230	J	mg/kg	SB20	22 / 38	10.9 - 46.2	1230	203	NA	NA	NA	no	NUT
7440280	Thallium	0.69	J	2.8		mg/kg	SB06	6 / 38	0.38 - 1	2.8	ND	14 N	NA	NA	no	BSL
7440622	Vanadium	2	J	79.8		mg/kg	SS05	37 / 38	0.1 - 2.62	79.8	42	1400 N	NA	NA	no	BSL
7440666	Zinc	13.2		3760		mg/kg	SS09	35 / 38	0.32 - 1.46	3760	87	61000 N	NA	NA	no	BSL

* Surface soil & subsurface soil combined

(1) Minimum/maximum detected concentration.

(2) Background data is UCL for dredge-fill background soil type from St. Juliens Creek Background Investigation.

(3) Tier II screening: With the exception of lead, all compounds are screened against the Risk-Based Concentration (RBC) Table, U.S. EPA Region III, October 9, 2002 for industrial soil (cancer benchmark value = 1e-06; HQ = 0.1). Lead is screened against the EPA screening value of a value of 1000 mg/kg.
When no RBC available, surrogate RBC used as follows:
Acenaphthylene - used naphthalene
Benzo(g,h,i)Perylene, Phenanthrene - used pyrene
alpha-Chlordane, gamma-Chlordane - used Chlordane
Endosulfan Sulfate, Endosulfan I - used Endosulfan
Cadmium - used Cadmium - Food
Chromium - used Chromium VI
Mercury - used Mercuric Chloride

(4) Rationale Codes
Selection Reason: Above Screening Level (ASL)
No Toxicity Information (NTX)
Deletion Reason: Essential Nutrient (NUT)
Below Screening Level (BSL)

Definitions: NA = Not Applicable
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
J = Estimated Value
L = Estimated Value - Biased Low
C = Carcinogenic
N = Non-Carcinogenic

Surface and Subsurface Soil Samples: Phase I - SS01 to SS07, SB01 to SB07; Phase II - SS08 to SS18, SB08 to SB20, SB21, SB23, and SB26

Table J-2.10
Occurrence, Distribution, and Selection of COPCs
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water at Site 3

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background (2) Value	Screening (3) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (4) Contaminant Deletion or Selection
	Organics																
72548	4,4'-DDD	0.062	J	0.062	J	ug/l	SW03	1 / 7	0.1 - 0.12	0.062	NA	2.8	C	0.0084	VAWQS	no	BSL
72559	4,4'-DDE	0.015	J	0.015	J	ug/l	SW03	1 / 7	0.1 - 0.12	0.015	NA	2	C	0.0059	VAWQS	no	BSL
5103719	alpha-chlordane	0.011	J	0.011	J	ug/l	SW03	1 / 7	0.052 - 0.062	0.011	NA	1.9	C	0.0059	VAWQS	no	BSL
5103742	gamma-chlordane	0.0098	J	0.0098	J	ug/l	SW03	1 / 7	0.052 - 0.062	0.0098	NA	1.9	C	0.0059	VAWQS	no	BSL
117817	Bis(2-ethylhexyl)Phthalate	1	J	1	J	ug/l	SW02/SW03	2 / 7	10 - 12	1	NA	48	C	59	VAWQS	no	BSL
75354	1,1-Dichloroethene	0.1	J	0.1	J	ug/l	SW04	1 / 7	1 - 10	0.1	NA	0.44	C	17000	VAWQS	no	BSL
75150	Carbon Disulfide	8	J	85.7	J	ug/l	SW08	7 / 7	1 - 10	85.7	NA	1000	N	NA	NA	no	BSL
74873	Chloromethane	9.7		9.7		ug/l	SW03	1 / 7	1 - 10	9.7	NA	21	C	NA	NA	no	BSL
108883	Toluene	0.2	J	0.5	J	ug/l	SW02	2 / 7	1 - 10	0.5	NA	750	N	200000	VAWQS	no	BSL
79016	Trichloroethene	1.1		1.1		ug/l	SW04	1 / 7	1 - 10	1.1	NA	0.26	C	810	VAWQS	yes	ASL
	Inorganics																
14265442	Phosphorus	48		252		ug/l	SW08	5 / 7	20 - 20	252	NA	NA		NA	NA	no	NTX
7429905	Aluminum	162	K	70600	K	ug/l	SW01	7 / 7	38.2 - 38.2	70600	NA	37000	N	NA	NA	yes	ASL
7440360	Antimony	2.7	J	2.7	J	ug/l	SW02	1 / 7	2.7 - 2.7	2.7	NA	15	N	4300	VAWQS	no	BSL
7440382	Arsenic	7.7	J	7.7	J	ug/l	SW01	1 / 7	2 - 2	7.7	NA	0.45	C	NA	NA	yes	ASL
7440393	Barium	19.9	J	72.8	J	ug/l	SW02	6 / 7	0.2 - 0.2	72.8	NA	2600	N	NA	NA	no	BSL
7440417	Beryllium	0.77	J	22.6		ug/l	SW01	4 / 7	0.1 - 0.1	22.6	NA	73	N	NA	NA	no	BSL
7440439	Cadmium	0.63	J	8.4		ug/l	SW01	5 / 7	0.3 - 0.3	8.4	NA	18	N	NA	NA	no	BSL
7440702	Calcium	75000		405000		ug/l	SW02	7 / 7	57.9 - 57.9	405000	NA	NA		NA	NA	no	NUT
7440473	Chromium	3.5	J	8.6	J	ug/l	SW01	2 / 7	1.1 - 1.1	8.6	NA	110	N	NA	NA	no	BSL
7440484	Cobalt	0.94	J	255		ug/l	SW01	7 / 7	0.5 - 0.5	255	NA	1500	N	NA	NA	no	BSL
7440508	Copper	10.8	J	32.2		ug/l	SW01	7 / 7	1.1 - 1.1	32.2	NA	1500	N	NA	NA	no	BSL
57125	Cyanide	9.7		25.8	L	ug/l	SW06	3 / 7	5 - 5	25.8	NA	730	N	215000	VAWQS	no	BSL
7439896	Iron	485		66900		ug/l	SW08	7 / 7	30.8 - 30.8	66900	NA	11000	N	NA	NA	yes	ASL
7439921	Lead	2.5	J	27.8	J	ug/l	SW02	6 / 7	1 - 1	27.8	NA	15		NA	NA	yes	ASL
7439954	Magnesium	12800		173000		ug/l	SW02	7 / 7	24.3 - 24.3	173000	NA	NA		NA	NA	no	NUT
7439965	Manganese	40.7		6330		ug/l	SW08	7 / 7	0.3 - 0.3	6330	NA	730	N	NA	NA	yes	ASL
7440020	Nickel	3.8	J	364		ug/l	SW01	7 / 7	0.9 - 0.9	364	NA	730	N	4600	VAWQS	no	BSL

Table J-2.10
Occurrence, Distribution, and Selection of COPCs
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water at Site 3

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background (2) Value	Screening (3) Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (4) Contaminant Deletion or Selection
7440097	Potassium	5450	J	53600	J	ug/l	SW02	7 / 7	13.5 - 13.5	53600	NA	NA	NA	NA	no	NUT
7440224	Silver	1.8	J	1.8	J	ug/l	SW06	1 / 7	0.9 - 0.9	1.8	NA	180 N	NA	NA	no	BSL
7440235	Sodium	30600		514000		ug/l	SW02	7 / 7	148 - 148	514000	NA	NA	NA	NA	no	NUT
7440622	Vanadium	1.2	J	4.5	J	ug/l	SW03	5 / 7	0.6 - 0.6	4.5	NA	260 N	NA	NA	no	BSL
7440666	Zinc	13.7	J	2720		ug/l	SW01	7 / 7	1.9 - 1.9	2720	NA	11000 N	NA	NA	no	BSL

(1) Minimum/maximum detected concentration.

(2) No background study has been completed for the St. Juliens Creek Annex surface water.

(3) Tier I screening: With the exception of lead, all compounds are screened against 10 times the Risk-Based Concentration (RBC) Table, U.S. EPA Region III, October 9, 2002 for tap water (10 times the cancer benchmark value = 1e-06; 10 times the HQ = 0.1). Lead is screened against the EPA screening value of a value of 15 ug/l.
When no RBC available, surrogate RBC used as follows:
alpha-Chlordane, gamma-Chlordane - used Chlordane
Cadmium - used Cadmium - Water
Chromium - used Chromium VI

(4) Rationale Codes
Selection Reason: Above Screening Level (ASL)
No Toxicity Information (NTX)
Deletion Reason: Essential Nutrient (NUT)
Below Screening Level (BSL)

Surface Water Samples: SW01 through SW04 and SW06 through SW08 - Phase II.

Definitions: NA = Not Applicable
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
VAWQS - Virginia Water Quality Standard
J = Estimated Value
K = Estimated Value - Biased High
L = Estimated Value - Biased Low
C = Carcinogenic
N = Non-Carcinogenic

Table J-2.11
Occurrence, Distribution, and Selection of COPCs
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment at Site 3

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
	Organics															
72548	4,4'-DDD	0.0016	J	0.066		mg/kg	SD02	5 / 7	0.003 - 0.01	0.066	NA	27 C	NA	NA	no	BSL
72559	4,4'-DDE	0.002	J	0.078	J	mg/kg	SD03	7 / 7	0.003 - 0.01	0.078	NA	19 C	NA	NA	no	BSL
50293	4,4'-DDT	0.0021	J	0.02		mg/kg	SD03	5 / 7	0.003 - 0.01	0.02	NA	19 C	NA	NA	no	BSL
5103719	alpha-Chlordane	0.00088	J	0.00088	J	mg/kg	SD03	1 / 7	0.002 - 0.0051	0.00088	NA	18 C	NA	NA	no	BSL
11096825	Aroclor-1260	0.064	J	0.15		mg/kg	SD02	2 / 7	0.033 - 0.1	0.15	NA	3.2 C	NA	NA	no	BSL
60571	Dieldrin	0.006	J	0.013	J	mg/kg	SD02	2 / 7	0.003 - 0.01	0.01	NA	0.4 C	NA	NA	no	BSL
5103742	gamma-Chlordane	0.0033	J	0.0033	J	mg/kg	SD02	1 / 7	0.002 - 0.0051	0.003	NA	18 C	NA	NA	no	BSL
208968	Acenaphthylene	0.055	J	0.066	J	mg/kg	SD03	2 / 7	0.35 - 4.3	0.07	NA	1600 N	NA	NA	no	BSL
120127	Anthracene	0.039	J	0.056	J	mg/kg	SD03	2 / 7	0.35 - 4.3	0.06	NA	23000 N	NA	NA	no	BSL
56553	Benzo(a)Anthracene	0.11	J	0.26	J	mg/kg	SD01	5 / 7	0.35 - 4.3	0.3	NA	8.7 C	NA	NA	no	BSL
50328	Benzo(a)Pyrene	0.086	J	0.22	J	mg/kg	SD03	4 / 7	0.35 - 4.3	0.2	NA	0.87 C	NA	NA	no	BSL
205992	Benzo(b)Fluoranthene	0.15	J	0.66		mg/kg	SD01	5 / 7	0.35 - 4.3	1	NA	8.7 C	NA	NA	no	BSL
191242	Benzo(g,h,i)Perylene	0.082	J	0.17	J	mg/kg	SD08	4 / 7	0.35 - 4.3	0.17	NA	2300 N	NA	NA	no	BSL
207089	Benzo(k)fluoranthene	0.17	J	0.47	J	mg/kg	SD02	4 / 7	0.35 - 4.3	0.47	NA	87 C	NA	NA	no	BSL
85687	Butylbenzylphthalate	0.055	J	0.055	J	mg/kg	SD01	1 / 7	0.35 - 4.3	0.06	NA	16000 N	NA	NA	no	BSL
218019	Chrysene	0.12	J	0.42		mg/kg	SD01	5 / 7	0.35 - 4.3	0.42	NA	870 C	NA	NA	no	BSL
53703	Dibenz(a,h)Anthracene	0.066	J	0.066	J	mg/kg	SD03	1 / 7	0.35 - 4.3	0.066	NA	0.87 C	NA	NA	no	BSL
84662	Diethylphthalate	0.075	J	0.34	J	mg/kg	SD06	4 / 7	0.35 - 4.3	0.34	NA	63000 N	NA	NA	no	BSL
206440	Fluoranthene	0.17	J	0.32	J	mg/kg	SD03	5 / 7	0.35 - 4.3	0.32	NA	3100 N	NA	NA	no	BSL
193395	Indeno(1,2,3-cd)Pyrene	0.078	J	0.2	J	mg/kg	SD01	4 / 7	0.35 - 4.3	0.2	NA	8.7 C	NA	NA	no	BSL
91203	Naphthalene	0.11	J	0.11	J	mg/kg	SD03	1 / 7	0.35 - 4.3	0.11	NA	1600 N	NA	NA	no	BSL
85018	Phenanthrene	0.076	J	0.12	J	mg/kg	SD03	2 / 7	0.35 - 4.3	0.12	NA	2300 N	NA	NA	no	BSL
129000	Pyrene	0.12	J	0.46	J	mg/kg	SD02	6 / 7	0.35 - 4.4	0.46	NA	2300 N	NA	NA	no	BSL
67641	Acetone	0.045	J	0.051	J	mg/kg	SD07	2 / 7	0.011 - 0.031	0.051	NA	7800 N	NA	NA	no	BSL
75150	Carbon Disulfide	0.004	J	0.004	J	mg/kg	SD08	1 / 7	0.011 - 0.031	0.004	NA	7800 N	NA	NA	no	BSL
67663	Chloroform	0.004	J	0.004	J	mg/kg	SD04	1 / 7	0.011 - 0.031	0.004	NA	780 C	NA	NA	no	BSL
75092	Methylene Chloride	0.1		0.11	J	mg/kg	SD02	2 / 7	0.011 - 0.031	0.11	NA	850 C	NA	NA	no	BSL
108883	Toluene	0.004	J	0.004	J	mg/kg	SD06	1 / 7	0.011 - 0.031	0.004	NA	16000 N	NA	NA	no	BSL
	Inorganics															
14265442	Phosphorus	3.2		239		mg/kg	SD04	7 / 7	1.3 - 33.4	239	NA	NA	NA	NA	no	NTX
7429905	Aluminum	3970		46500		mg/kg	SD04	7 / 7	8.54 - 15.8	46500	NA	78000 N	NA	NA	no	BSL
7440360	Antimony	2.4	L	173	J	mg/kg	SD08	2 / 7	0.39 - 1.1	173	NA	31 N	NA	NA	yes	ASL
7440382	Arsenic	3.8		26.3	J	mg/kg	SD08	7 / 7	0.58 - 0.98	26.3	NA	4.3 C	NA	NA	yes	ASL
7440393	Barium	18.6	J	300		mg/kg	SD02	7 / 7	0.06 - 0.65	300	NA	5500 N	NA	NA	no	BSL
7440417	Beryllium	0.4	J	7.9		mg/kg	SD04	6 / 7	0.03 - 0.33	7.9	NA	160 N	NA	NA	no	BSL

Table J-2.11
Occurrence, Distribution, and Selection of COPCs
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment at Site 3

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
7440439	Cadmium	0.77	J	2.5		mg/kg	SD02	5 / 7	0.09 - 0.16	2.5	NA	78 N	NA	NA	no	BSL
7440702	Calcium	157	J	5330		mg/kg	SD04	7 / 7	16.89 - 28.34	5330	NA	NA	NA	NA	no	NUT
7440473	Chromium	8.3		63.3		mg/kg	SD02	7 / 7	0.33 - 2.28	63.3	NA	230 N	NA	NA	no	BSL
7440484	Cobalt	3.7	J	24.7		mg/kg	SD04	6 / 7	0.15 - 2.61	24.7	NA	1600 N	NA	NA	no	BSL
7440508	Copper	8.3		139	J	mg/kg	SD08	7 / 7	0.33 - 1.95	139	NA	3100 N	NA	NA	no	BSL
57125	Cyanide	1.1	L	1.1	L	mg/kg	SD08	1 / 7	0.41 - 0.8	1.1	NA	1600 N	NA	NA	no	BSL
7439896	Iron	4580		91000		mg/kg	SD08	7 / 7	3.3 - 12.7	91000	NA	23000 N	NA	NA	yes	ASL
7439921	Lead	14.5		1050	J	mg/kg	SD08	7 / 7	0.19 - 0.41	1050	NA	400	NA	NA	yes	ASL
7439954	Magnesium	365	J	3290		mg/kg	SD08	7 / 7	7.4 - 58.96	3290	NA	NA	NA	NA	no	NUT
7439965	Manganese	15.7	K	367		mg/kg	SD04	7 / 7	0.09 - 0.65	367	NA	1600 N	NA	NA	no	BSL
7439976	Mercury	0.13		0.59		mg/kg	SD08	6 / 7	0.03 - 0.08	0.59	NA	23 N	NA	NA	no	BSL
7440020	Nickel	8.1		55.1		mg/kg	SD04	6 / 7	0.27 - 2.28	55.1	NA	1600 N	NA	NA	no	BSL
7440097	Potassium	339	J	2420		mg/kg	SD08	7 / 7	4.1 - 72.31	2420	NA	NA	NA	NA	no	NUT
7782492	Selenium	1.8	J	2.4		mg/kg	SD04	2 / 7	0.58 - 1.1	2.4	NA	390 N	NA	NA	no	BSL
7440224	Silver	0.37	J	0.44	J	mg/kg	SD08	2 / 7	0.19 - 0.37	0.44	NA	390 N	NA	NA	no	BSL
7440235	Sodium	195	J	1740		mg/kg	SD07	4 / 7	11.26 - 61.1	1740	NA	NA	NA	NA	no	NUT
7440622	Vanadium	12.1		41		mg/kg	SD08	7 / 7	0.18 - 2.93	41	NA	550 N	NA	NA	no	BSL
7440666	Zinc	21.9		577		mg/kg	SD02	7 / 7	0.58 - 1.63	577	NA	23000 N	NA	NA	no	BSL

(1) Minimum/maximum detected concentration.

(2) No background study has been completed for the St. Juliens Creek Annex sediment.

(3) Tier I screening: With the exception of lead, all compounds are screened against 10 times the Risk-Based Concentration (RBC) Table, U.S. EPA Region III, October 9, 2002 for residential soil (10 times the cancer benchmark value = 1e-06; 10 times the HQ = 0.1). Lead is screened against the EPA screening value of 400 mg/kg.
When no RBC available, surrogate RBC used as follows:
Acenaphthylene - used naphthalene
Benzo(g,h,i)Perylene, Phenanthrene - used pyrene
alpha-Chlordane, gamma-Chlordane - used Chlordane
Cadmium - used Cadmium - Food
Chromium - used Chromium VI
Mercury - used Mercuric Chloride

(4) Rationale Codes
Selection Reason: Above Screening Level (ASL)
No Toxicity Information (NTX)
Deletion Reason: Essential Nutrient (NUT)
Below Screening Level (BSL)

Sediment Samples: SD01 through SD03, SD06 - Phase I; SD04, SD07, and SD08 - Phase II.

Definitions: NA = Not Applicable
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
J = Estimated Value
K = Estimated value - Biased High
L = Estimated Value - Biased Low
C = Carcinogenic
N = Non-Carcinogenic

Table J-2.12
Occurrence, Distribution, and Selection of COPCs
Site 3
St. Julliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Shallow Groundwater
Exposure Point: Water Table

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background (2) Value	Screening (3) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (4) Contaminant Deletion or Selection
	Organics																
76448	Heptachlor	0.024	J	0.024	J	ug/l	GW2S	1 / 14	0.05 - 0.057	0.024	NA	0.015	C	0.4	MCL	yes	ASL
91576	2-Methylnaphthalene	1	J	1	J	ug/l	GW1S	1 / 14	10 - 11	1	ND	12	N	NA	NA	no	BSL
106445	4-Methylphenol	2	J	2	J	ug/l	GW6S	1 / 14	10 - 11	2	ND	18	N	NA	NA	no	BSL
83329	Acenaphthene	2	J	15		ug/l	GW1S	6 / 14	10 - 11	15	ND	37	N	NA	NA	no	BSL
117817	Bis(2-Ethylhexyl)Phthalate	1	J	25		ug/l	GW4S	3 / 14	10 - 11	25	ND	4.8	C	6	MCL	yes	ASL
86748	Carbazole	2	J	2	J	ug/l	GW1S	1 / 14	10 - 11	2	ND	3.3	C	NA	NA	no	BSL
132649	Dibenzofuran	1	J	8	J	ug/l	GW1S	2 / 14	10 - 11	8	ND	2.4	N	NA	NA	yes	ASL
206440	Fluoranthene	1	J	1	J	ug/l	GW1S	1 / 14	10 - 11	1	ND	150	N	NA	NA	no	BSL
86737	Fluorene	9	J	9	J	ug/l	GW1S	1 / 14	10 - 11	9	ND	24	N	NA	NA	no	BSL
91203	Naphthalene	19		19		ug/l	GW1S	1 / 14	10 - 11	19	ND	0.65	N	NA	NA	yes	ASL
85018	Phenanthrene	5	J	5	J	ug/l	GW1S	1 / 14	10 - 11	5	ND	18	N	NA	NA	no	BSL
108952	Phenol	2	J	2	J	ug/l	GW6S	1 / 14	10 - 11	2	ND	2200	N	NA	NA	no	BSL
67641	Acetone	5	J	24		ug/l	GW1S	5 / 9	5 - 5	24	26	61	N	NA	NA	no	BSL
100414	Ethylbenzene	0.6	J	0.6	J	ug/l	GW1S	1 / 14	1 - 1	0.6	ND	3.3	N	700	MCL	no	BSL
108883	Toluene	0.2	J	0.2	J	ug/l	GW1S	1 / 14	1 - 1	0.2	ND	75	N	1000	MCL	no	BSL
1330207	Total Xylenes	1		1		ug/l	GW1S	1 / 14	1 - 1	1	ND	1200	N	10,000	MCL	no	BSL
	Inorganics																
14265442	Phosphorus	32		78		ug/l	GW3S	14 / 14	20 - 20	78	ND	NA		NA	NA	no	NTX
7429905	Aluminum	56.8	J	19200	K	ug/l	GW2S	10 / 14	29 - 38.2	19200	331	3700	N	50 - 200	SMCL	yes	ASL
7440360	Antimony	2.3	J	2.3	J	ug/l	GW1S	1 / 14	1 - 2.7	2.3	ND	1.5	N	6	MCL	yes	ASL
7440382	Arsenic	3.4	J	5.8	J	ug/l	GW6S	6 / 14	2 - 3.2	5.8	1.8	0.045	C	50	MCL	yes	ASL
7440393	Barium	12.6	J	176	J	ug/l	GW1S	14 / 14	0.2 - 1	176	74	260	N	2000	MCL	no	BSL
7440417	Beryllium	0.42	J	4	J	ug/l	GW2S	8 / 14	0.1 - 1	4	0.23	7.3	N	4	MCL	no	BSL
7440439	Cadmium	0.35	J	1.1	J	ug/l	GW2S	4 / 14	0.3 - 0.5	1.1	ND	1.8	N	5	MCL	no	BSL
7440702	Calcium	92000		539000		ug/l	GW2S	14 / 14	46 - 116	539000	123732	NA		NA	NA	no	NUT
7440473	Chromium	1.6	J	56.7		ug/l	GW2S	5 / 14	1.1 - 4.6	56.7	ND	11	N	100	MCL	yes	ASL
7440484	Cobalt	2.3	J	59.7		ug/l	GW2S	9 / 14	0.5 - 8	59.7	14	73	N	NA	NA	no	BSL
7440508	Copper	5.5	J	9	J	ug/l	GW4S	3 / 14	1.1 - 5.8	9	ND	150	N	1300	MCL	no	BSL
7439896	Iron	16900		45000		ug/l	GW3S	14 / 14	5 - 30.8	45000	16704	1100	N	300	SMCL	yes	ASL
7439921	Lead	1.4	J	9		ug/l	GW2S	9 / 14	1 - 1.3	9	1.8	15		15	MCL	no	BSL

Table J-2.12
Occurrence, Distribution, and Selection of COPCs
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Shallow Groundwater
Exposure Point: Water Table

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background (2) Value	Screening (3) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (4) Contaminant Deletion or Selection
7439954	Magnesium	15000		310000		ug/l	GW6S	14 / 14	24.3 - 45	310000	19702	NA		NA	NA	no	NUT
7439965	Manganese	890		5440		ug/l	GW2S	14 / 14	0.3 - 1	5440	825	73	N	50	SMCL	yes	ASL
7440020	Nickel	1.7	J	84.8		ug/l	GW2S	9 / 14	0.9 - 7	84.8	14	73	N	NA	NA	yes	ASL
7440097	Potassium	13900		83400		ug/l	GW6S	14 / 14	13.5 - 97	83400	5003	NA		NA	NA	no	NUT
7782492	Selenium	3.3	K	3.3	K	ug/l	GW2S	1 / 14	2.6 - 3.3	3.3	ND	18	N	50	MCL	no	BSL
7440224	Silver	1.3	J	2	J	ug/l	GW4S	3 / 14	0.9 - 3	2	ND	18	N	100	SMCL	no	BSL
7440235	Sodium	20800		1740000		ug/l	GW6S	14 / 14	28 - 1480	1740000	59614	NA		NA	NA	no	NUT
7440622	Vanadium	0.65	J	43	J	ug/l	GW2S	8 / 14	0.6 - 6.8	43	0.99	26	N	NA	NA	yes	ASL
7440666	Zinc	5.4	J	397		ug/l	GW2S	8 / 14	1.9 - 3	397	86	1100	N	5000	SMCL	no	BSL

(1) Minimum/maximum detected concentration.

(2) Background data is UCL for Columbia Aquifer from St. Juliens Creek Background Investigation.

(3) Tier I screening: With the exception of lead, all compounds are screened against the Risk-Based Concentration (RBC) Table, U.S. EPA Region III, October 9, 2002 for tap water (cancer benchmark value = 1e-06; HQ = 0.1). Lead is screened against the maximum contaminant level (MCL) value of 15 ug/l.
When no RBC available, surrogate RBC used as follows:
Phenanthrene - used Pyrene
Cadmium - used Cadmium - Water
Chromium - used Chromium VI

(4) Rationale Codes
Selection Reason: Above Screening Level (ASL)
No Toxicity Information (NTX)
Deletion Reason: Essential Nutrient (NUT)
Below Screening Level (BSL)

Shallow Groundwater Samples: GW1S, GW2S, GW3S, GW4S - Phase I, Rounds 1 and 2 and Phase II; GW5S and GW6S - Phase II

Definitions:
NA = Not Applicable
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
MCL = Maximum Contaminant Level
SMCL = Secondary Maximum Contaminant Level
J = Estimated Value
L = Estimated Value - Biased Low
C = Carcinogenic
N = Non-Carcinogenic

Table J-3.1
Medium-Specific Exposure Point Concentration Summary
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: At Site 3

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Benzo(a)Pyrene	ug/kg	516	906	4100	J	ug/kg	906	95% UCL-N	W - Test (4)	516	Mean-N	W - Test (4)
Antimony	mg/kg	13	59	162	-	mg/kg	59	95% UCL-N	W - Test (4)	13	Mean-N	W - Test (4)
Arsenic	mg/kg	17	36	66.1	-	mg/kg	36	95% UCL-T	W - Test (2)	10	Mean-T	W - Test (2)
Iron	mg/kg	35050	67358	126000	-	mg/kg	67358	95% UCL-T	W - Test (2)	23535	Mean-T	W - Test (2)
Lead	mg/kg	330	1186	2070	J	mg/kg	1186	95% UCL-T	W - Test (2)	115	Mean-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). J = Estimated Value

(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(2) Shapiro-Wilk W Test indicates data are lognormally distributed.

(3) Shapiro-Wilk W Test indicates data are normally distributed.

(4) Shapiro-Wilk W Test inconclusive. Higher of UCL for normally and lognormally distributed data used for the RME EPC. Higher of mean value for normally and lognormally distributed data used for CT EPC.

Note: The arithmetic mean is calculated using one-half the sample quantitation limit for non-detects and is normally distributed. When calculated in this way, it is possible for the mean to exceed the maximum detected value is used as the EPC. In such cases, the maximum detected value. The 95% UCL of Data is based on the conclusive distribution (lognormal or normal) or the maximum UCL value when inconclusive.

Table J-3.2
Medium-Specific Exposure Point Concentration Summary
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from Surface Soil at Site 3

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Benzo(a)Pyrene	ug/kg	516	906	4100	J	ug/kg	906	95% UCL-N	W - Test (4)	516	Mean-N	W - Test (4)
Antimony	mg/kg	13	59	162	-	mg/kg	59	95% UCL-N	W - Test (4)	13	Mean-N	W - Test (4)
Arsenic	mg/kg	17	36	66.1	-	mg/kg	36	95% UCL-T	W - Test (2)	10	Mean-T	W - Test (2)
Iron	mg/kg	35050	67358	126000	-	mg/kg	67358	95% UCL-T	W - Test (2)	23535	Mean-T	W - Test (2)
Lead	mg/kg	330	1186	2070	J	mg/kg	1186	95% UCL-T	W - Test (2)	115	Mean-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). J = Estimated Value

(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(2) Shapiro-Wilk W Test indicates data are lognormally distributed.

(3) Shapiro-Wilk W Test indicates data are normally distributed.

(4) Shapiro-Wilk W Test inconclusive. Higher of UCL for normally and lognormally distributed data used for the RME EPC. Higher of mean value for normally and lognormally distributed data used for CT EPC.

Note: The arithmetic mean is calculated using one-half the sample quantitation limit for non-detects and is normally distributed. When calculated in this way, it is possible for the mean to exceed the maximum detected value is used as the EPC. In such cases, the maximum detected value. The 95% UCL of Data is based on the conclusive distribution (lognormal or normal) or the maximum UCL value when inconclusive.

Table J-3.3
Medium-Specific Exposure Point Concentration Summary
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Deep Groundwater
Exposure Point: Tap Water

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Chloroform	ug/L	0.45	0.55	0.40	J	ug/L	0.4	Max	W - Test (4,1)	0.4	Max	W - Test (4,5)
Arsenic	ug/L	1.9	3.4	4.2	J	ug/L	3.4	95% UCL-T	W - Test (4)	1.9	Mean-N	W - Test (4)
Manganese	ug/L	251	1791	612	-	ug/L	612	Max	W - Test (4,1)	251	Mean-N	W - Test (4)
Thallium	ug/L	1.5	2.5	2.7	J	ug/L	2.5	95% UCL-T	W - Test (4)	1.5	Mean-N	W - Test (4)

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). J = Estimated Value

(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(2) Shapiro-Wilk W Test indicates data are lognormally distributed.

(3) Shapiro-Wilk W Test indicates data are normally distributed.

(4) Shapiro-Wilk W Test inconclusive. Higher of UCL for normally and lognormally distributed data used for the RME EPC. Higher of mean value for normally and lognormally distributed data used for CT EPC.

(5) Mean exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

Note: The arithmetic mean is calculated using one-half the sample quantitation limit for non-detects and is normally distributed. When calculated in this way, it is possible for the mean to exceed the maximum detected value is used as the EPC. In such cases, the maximum detected value. The 95% UCL of Data is based on the conclusive distribution (lognormal or normal) or the maximum UCL value when inconclusive.

Table J-3.4
Medium-Specific Exposure Point Concentration Summary
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Deep Groundwater - Water Vapors at Showerhead

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Chloroform	ug/L	0.45	0.55	0.40	J	ug/L	0.4	Max	W - Test (4,1)	0.4	Max	W - Test (4,5)

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).

J = Estimated Value

(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.
(2) Shapiro-Wilk W Test indicates data are lognormally distributed.
(3) Shapiro-Wilk W Test indicates data are normally distributed.
(4) Shapiro-Wilk W Test inconclusive. Higher of UCL for normally and lognormally distributed data used for the RME EPC. Higher of mean value for normally and lognormally distributed data used for CT EPC.
(5) Mean exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

Note: The arithmetic mean is calculated using one-half the sample quantitation limit for non-detects and is normally distributed. When calculated in this way, it is possible for the mean to exceed the maximum detected value is used as the EPC. In such cases, the maximum detected value. The 95% UCL of Data is based on the conclusive distribution (lognormal or normal) or the maximum UCL value when inconclusive.

Table J-3.5
Medium-Specific Exposure Point Concentration Summary
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water at Site 3

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Aluminum	ug/l	11489	2552894	70600	K	ug/l	70600	Max	W - Test (2,1)	1901	Mean-T	W - Test (2)
Arsenic	ug/l	2.0	4.8	7.7	J	ug/l	4.8	95% UCL-T	W - Test (4)	2.0	Mean-N	W - Test (4)
Iron	ug/l	19334	1211571	66900	-	ug/l	66900	Max	W - Test (2,1)	7785	Mean-T	W - Test (2)
Lead	ug/l	8.7	43.8	27.8	J	ug/l	27.8	Max	W - Test (2,1)	5.7	Mean-T	W - Test (2)
Manganese	ug/l	2638	446443	6330	-	ug/l	6330	Max	W - Test (4,1)	2638	Mean-N	W - Test (4)

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).

J = Estimated Value
K = Estimated Value - Biased High

(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.
(2) Shapiro-Wilk W Test indicates data are lognormally distributed.
(3) Shapiro-Wilk W Test indicates data are normally distributed.
(4) Shapiro-Wilk W Test inconclusive. Higher of UCL for normally and lognormally distributed data used for the RME EPC. Higher of mean value for normally and lognormally distributed data used for CT EPC.

Note: The arithmetic mean is calculated using one-half the sample quantitation limit for non-detects and is normally distributed. When calculated in this way, it is possible for the mean to exceed the maximum detected value. In such cases, the maximum detected value. The 95% UCL of Data is based on the conclusive distribution (lognormal or normal) or the maximum UCL value when inconclusive.

Table J-3.6
Medium-Specific Exposure Point Concentration Summary
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment at Site 3

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Lead	mg/kg	310	10860	1050	J	mg/kg	1050	Max	W - Test (2,1)	126	Mean-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). J = Estimated Value

(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(2) Shapiro-Wilk W Test indicates data are lognormally distributed.

(3) Shapiro-Wilk W Test indicates data are normally distributed.

(4) Shapiro-Wilk W Test inconclusive. Higher of UCL for normally and lognormally distributed data used for the RME EPC. Higher of mean value for normally and lognormally distributed data used for CT EPC.

Note: The arithmetic mean is calculated using one-half the sample quantitation limit for non-detects and is normally distributed. When calculated in this way, it is possible for the mean to exceed the maximum detected value. In such cases, the maximum detected value. The 95% UCL of Data is based on the conclusive distribution (lognormal or normal) or the maximum UCL value when inconclusive.

Table J-3.7
Medium-Specific Exposure Point Concentration Summary
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 3

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Aroclor-1254	ug/kg	33	45	280	J	ug/kg	45	95% UCL-N	W - Test (4)	33	Mean-N	W - Test (4)
Benzo(a)Anthracene	ug/kg	388	569	4000	J	ug/kg	569	95% UCL-N	W - Test (4)	388	Mean-N	W - Test (4)
Benzo(a)Pyrene	ug/kg	376	559	4100	J	ug/kg	559	95% UCL-N	W - Test (4)	376	Mean-N	W - Test (4)
Benzo(b)Fluoranthene	ug/kg	728	1107	6500	J	ug/kg	1107	95% UCL-T	W - Test (2)	417	Mean-T	W - Test (2)
Dibenz(a,h)Anthracene	ug/kg	220	238	290	J	ug/kg	238	95% UCL-N	W - Test (4)	220	Mean-N	W - Test (4)
Indeno(1,2,3-cd)Pyrene	ug/kg	286	389	2300	J	ug/kg	389	95% UCL-N	W - Test (4)	286	Mean-N	W - Test (4)
Total Dioxins (2,3,7,8-TCDD equivalent)	ug/kg	0.034	NA	0.06	-	ug/kg	0.06	Max.	W-Test (5)	0.034	Mean-N	W - Test (6)
Aluminum	mg/kg	8873	12068	23700	-	mg/kg	12068	95% UCL-T	W - Test (4)	8873	Mean-N	W - Test (4)
Antimony	mg/kg	7.3	15.3	162	-	mg/kg	15.3	95% UCL-N	W - Test (4)	7.3	Mean-N	W - Test (4)
Arsenic	mg/kg	12	18	66.1	-	mg/kg	18	95% UCL-T	W - Test (4)	11.8	Mean-N	W - Test (4)
Barium	mg/kg	157	255	1640	-	mg/kg	255	95% UCL-N	W - Test (4)	157	Mean-N	W - Test (4)
Cadmium	mg/kg	1.4	2.6	15.3	-	mg/kg	2.6	95% UCL-T	W - Test (4)	1.4	Mean-N	W - Test (4)
Chromium	mg/kg	28	41	124	-	mg/kg	41	95% UCL-T	W - Test (2)	19	Mean-T	W - Test (2)
Copper	mg/kg	326	692	8190	-	mg/kg	692	95% UCL-N	W - Test (4)	326	Mean-N	W - Test (4)
Iron	mg/kg	28300	46040	126000	-	mg/kg	46040	95% UCL-T	W - Test (2)	18571	Mean-T	W - Test (2)
Lead	mg/kg	276	465	2990	J	mg/kg	465	95% UCL-T	W - Test (4)	276	Mean-N	W - Test (4)
Manganese	mg/kg	176	264	935	-	mg/kg	264	95% UCL-T	W - Test (4)	176	Mean-N	W - Test (4)
Thallium	mg/kg	0.62	0.79	2.8	-	mg/kg	0.79	95% UCL-N	W - Test (4)	0.62	Mean-N	W - Test (4)
Vanadium	mg/kg	30	46	79.8	-	mg/kg	46	95% UCL-T	W - Test (4)	29.7	Mean-N	W - Test (4)
Zinc	mg/kg	382	726	3760	-	mg/kg	726	95% UCL-T	W - Test (4)	382	Mean-N	W - Test (4)

*Subsurface and Surface Soil Combined.

NA - sample set less than 5 samples.

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).

J = Estimated Value

(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(2) Shapiro-Wilk W Test indicates data are lognormally distributed.

(3) Shapiro-Wilk W Test indicates data are normally distributed.

(4) Shapiro-Wilk W Test inconclusive. Higher of UCL for normally and lognormally distributed data used for the RME EPC. Higher of mean value for normally and lognormally distributed data used for CT EPC.

(5) Maximum detected concentration used because sample size is less than 5.

(6) Mean value used because sample size is less than 5.

Note: The arithmetic mean is calculated using one-half the sample quantitation limit for non-detects and is normally distributed. When calculated in this way, it is possible for the mean to exceed the maximum detected value. In such cases, the maximum detected value. The 95% UCL of Data is based on the conclusive distribution (lognormal or normal) or the maximum UCL value when inconclusive.

Table J-3.8
Medium-Specific Exposure Point Concentration Summary
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 3

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Benzo(a)Pyrene	ug/kg	376	559	4100	J	ug/kg	559	95% UCL-N	W - Test (4)	376	Mean-N	W - Test (4)
Total Dioxins (2,3,7,8-TCDD equivalent)	ug/kg	0.034	NA	0.06	-	ug/kg	0.06	Max.	W-Test (5)	0.034	Mean-N	W - Test (6)
Antimony	mg/kg	7.3	15.3	162	-	mg/kg	15.3	95% UCL-N	W - Test (4)	7.3	Mean-N	W - Test (4)
Arsenic	mg/kg	12	18	66.1	-	mg/kg	18	95% UCL-T	W - Test (4)	11.8	Mean-N	W - Test (4)
Iron	mg/kg	28300	46040	126000	-	mg/kg	46040	95% UCL-T	W - Test (2)	18571	Mean-T	W - Test (2)
Lead	mg/kg	276	465	2990	J	mg/kg	465	95% UCL-T	W - Test (4)	276	Mean-N	W - Test (4)

*Subsurface and Surface Soil Combined.

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).

J = Estimated Value

(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(2) Shapiro-Wilk W Test indicates data are lognormally distributed.

(3) Shapiro-Wilk W Test indicates data are normally distributed.

(4) Shapiro-Wilk W Test inconclusive. Higher of UCL for normally and lognormally distributed data used for the RME EPC. Higher of mean value for normally and lognormally distributed data used for CT EPC.

(5) Maximum detected concentration used because sample size is less than 5.

(6) Mean value used because sample size is less than 5.

Note: The arithmetic mean is calculated using one-half the sample quantitation limit for non-detects and is normally distributed. When calculated in this way, it is possible for the mean to exceed the maximum detected value. In such cases, the maximum detected value. The 95% UCL of Data is based on the conclusive distribution (lognormal or normal) or the maximum UCL value when inconclusive.

Table J-3.9
Medium-Specific Exposure Point Concentration Summary
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Air
Exposure Point: Emissions from Soil at Site 3

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Benzo(a)Pyrene	ug/kg	376	559	4100	J	ug/kg	559	95% UCL-N	W - Test (4)	376	Mean-N	W - Test (4)
Total Dioxins (2,3,7,8-TCDD equivalent)	ug/kg	0.034	NA	0.06	-	ug/kg	0.06	Max.	W-Test (5)	0.034	Mean-N	W - Test (6)
Antimony	mg/kg	7.3	15.3	162	-	mg/kg	15.3	95% UCL-N	W - Test (4)	7.3	Mean-N	W - Test (4)
Arsenic	mg/kg	12	18	66.1	-	mg/kg	18	95% UCL-T	W - Test (4)	11.8	Mean-N	W - Test (4)
Iron	mg/kg	28300	46040	126000	-	mg/kg	46040	95% UCL-T	W - Test (2)	18571	Mean-T	W - Test (2)
Lead	mg/kg	276	465	2990	J	mg/kg	465	95% UCL-T	W - Test (4)	276	Mean-N	W - Test (4)

*Subsurface and Surface Soil Combined.

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).

J = Estimated Value

(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(2) Shapiro-Wilk W Test indicates data are lognormally distributed.

(3) Shapiro-Wilk W Test indicates data are normally distributed.

(4) Shapiro-Wilk W Test inconclusive. Higher of UCL for normally and lognormally distributed data used for the RME EPC. Higher of mean value for normally and lognormally distributed data used for CT EPC.

(5) Maximum detected concentration used because sample size is less than 5.

(6) Mean value used because sample size is less than 5.

Note: The arithmetic mean is calculated using one-half the sample quantitation limit for non-detects and is normally distributed. When calculated in this way, it is possible for the mean to exceed the maximum detected value is used as the EPC. In such cases, the maximum detected value. The 95% UCL of Data is based on the conclusive distribution (lognormal or normal) or the maximum UCL value when inconclusive.

Table J-3.10
Medium-Specific Exposure Point Concentration Summary
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water at Site 3

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Aluminum	ug/l	11489	2552894	70600	K	ug/l	70600	Max	W - Test (2,1)	1901	Mean-T	W - Test (2)
Arsenic	ug/l	2.0	4.8	7.7	J	ug/l	4.8	95% UCL-T	W - Test (4)	2.0	Mean-N	W - Test (4)
Iron	ug/l	19334	1211571	66900	-	ug/l	66900	Max	W - Test (2,1)	7785	Mean-T	W - Test (2)
Lead	ug/l	8.7	43.8	27.8	J	ug/l	27.8	Max	W - Test (2,1)	5.7	Mean-T	W - Test (2)
Manganese	ug/l	2638	446443	6330	-	ug/l	6330	Max	W - Test (4,1)	2638	Mean-N	W - Test (4)

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).

J = Estimated Value
K = Estimated Value - Biased High

(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.
(2) Shapiro-Wilk W Test indicates data are lognormally distributed.
(3) Shapiro-Wilk W Test indicates data are normally distributed.
(4) Shapiro-Wilk W Test inconclusive. Higher of UCL for normally and lognormally distributed data used for the RME EPC. Higher of mean value for normally and lognormally distributed data used for CT EPC.

Note: The arithmetic mean is calculated using one-half the sample quantitation limit for non-detects and is normally distributed. When calculated in this way, it is possible for the mean to exceed the maximum detected value is used as the EPC. In such cases, the maximum detected value. The 95% UCL of Data is based on the conclusive distribution (lognormal or normal) or the maximum UCL value when inconclusive.

Table J-3.11
Medium-Specific Exposure Point Concentration Summary
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment at Site 3

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Antimony	mg/kg	26	25848	173	J	mg/kg	173	Max	W - Test (4,1)	25	Mean-N	W - Test (4)
Arsenic	mg/kg	11	24	26.3	J	mg/kg	24	95% UCL-T	W - Test (4)	11	Mean-N	W - Test (4)
Iron	mg/kg	30613	177719	91000	-	mg/kg	91000	Max	W - Test (2,1)	18958	Mean-T	W - Test (2)
Lead	mg/kg	310	10860	1050	J	mg/kg	1050	Max	W - Test (2,1)	126	Mean-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). J = Estimated Value

(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(2) Shapiro-Wilk W Test indicates data are lognormally distributed.

(3) Shapiro-Wilk W Test indicates data are normally distributed.

(4) Shapiro-Wilk W Test inconclusive. Higher of UCL for normally and lognormally distributed data used for the RME EPC. Higher of mean value for normally and lognormally distributed data used for CT EPC.

Note: The arithmetic mean is calculated using one-half the sample quantitation limit for non-detects and is normally distributed. When calculated in this way, it is possible for the mean to exceed the maximum detected value is used as the EPC. In such cases, the maximum detected value. The 95% UCL of Data is based on the conclusive distribution (lognormal or normal) or the maximum UCL value when inconclusive.

Table J-3.12
Medium-Specific Exposure Point Concentration Summary
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Shallow Groundwater
Exposure Point: Water Table

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Heptachlor	ug/L	0.026	0.026	0.024	J	ug/L	0.024	Max	W - Test (4,1)	0.024	Max	W - Test (4,5)
Bis(2-Ethylhexyl)Phthalate	ug/L	6.3	9.8	25	-	ug/L	9.8	95% UCL-T	W - Test (4)	6.3	Mean-N	W - Test (4)
Dibenzofuran	ug/L	5.1	7.0	8	J	ug/L	7.0	95% UCL-T	W - Test (4)	5.1	Mean-N	W - Test (4)
Naphthalene	ug/L	6.2	8.0	19	-	ug/L	8.0	95% UCL-N	W - Test (4)	6.2	Mean-N	W - Test (4)
Aluminum	ug/L	4165	467874	19200	K	ug/L	19200	Max	W - Test (2,1)	832	Mean-T	W - Test (2)
Antimony	ug/L	1.2	1.4	2.3	J	ug/L	1.4	95% UCL-T	W - Test (4)	1.2	Mean-N	W - Test (4)
Arsenic	ug/L	2.7	4.1	5.8	J	ug/L	4.1	95% UCL-T	W - Test (4)	2.7	Mean-N	W - Test (4)
Chromium	ug/L	9.4	39	56.7	-	ug/L	39	95% UCL-T	W - Test (2)	3.4	Mean-T	W - Test (2)
Iron	ug/L	28486	33266	45000	-	ug/L	33266	95% UCL-T	W - Test (4)	28486	Mean-N	W - Test (4)
Manganese	ug/L	2316	3212	5440	-	ug/L	3212	95% UCL-T	W - Test (2)	1994	Mean-T	W - Test (2)
Nickel	ug/L	16.0	69.6	84.8	-	ug/L	69.6	95% UCL-T	W - Test (2)	6.8	Mean-T	W - Test (2)
Vanadium	ug/L	8.7	90	43	J	ug/L	43	Max	W - Test (2,1)	2.8	Mean-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).

J = Estimated Value
K = Estimated Value - Biased High

(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.
(2) Shapiro-Wilk W Test indicates data are lognormally distributed.
(3) Shapiro-Wilk W Test indicates data are normally distributed.
(4) Shapiro-Wilk W Test inconclusive. Higher of UCL for normally and lognormally distributed data used for the RME EPC. Higher of mean value for normally and lognormally distributed data used for CT EPC.
(5) Mean exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

Note: The arithmetic mean is calculated using one-half the sample quantitation limit for non-detects and is normally distributed. When calculated in this way, it is possible for the mean to exceed the maximum detected value is used as the EPC. In such cases, the maximum detected value. The 95% UCL of Data is based on the conclusive distribution (lognormal or normal) or the maximum UCL value when inconclusive.

Table J-4.1
Values Used for Daily Intake Calculations
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: At Site 3
Receptor Population: Trespasser
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	See Table 3.1	--	See Table 3.1	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR-S	Ingestion Rate of Soil	mg/day	100	EPA, 1991	50	EPA, 1997	CS x IR x EF x ED x CF1 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	
	ED	Exposure Duration	years	30	EPA, 1991	15 [1]	Professional judgment	
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	10,950	EPA, 1989	5,475	EPA, 1989	
Dermal	CS	Chemical Concentration in Soil	mg/kg	See Table 3.1	--	See Table 3.1	--	CDI (mg/kg-day)=
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	CS x CF1 x SA x AF x AB x EF x ED x 1/BW x 1/AT
	SA	Skin Surface Area Available for Contact	cm^2	5,000	EPA, 1997	1,000	EPA, 1997	
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.19	EPA, 1997	0.19	EPA, 1997	
	AB	Absorption Factor	unitless	Chemical Specific	EPA, 1995	Chemical Specific	EPA, 1995	
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	
	ED	Exposure Duration	years	30	EPA, 1991	15 [1]	Professional judgment	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	10,950	EPA, 1989	5,475	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,

EPA, 1995: Assessing Dermal Exposure from Soil, Technical Guidance Manual, Region III, EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The RME skin surface area is obtained from Table 6-14, central tendency surface area for outdoor soil contact (assumes 25% of total surface area).

The CT surface area assumes exposure to hands and feet and is obtained by averaging both male and female hands and feet mean values found on Table 6-4.

CT soil ingestion rate found on Table 4-23. Soil to Skin Adherence Factor calculated from Table 6-12 by averaging hand values for gardeners no. 1 an 2. (No trespasser activity on Table 6-12).

TBD = To Be Determined

NA = Not Available

Note:

1. For RME values, assumes trespassing one hour per day, one day per week for 52 weeks per year. For CT values, assumes one-half of RME values.

Table J-4.2
Values Used for Daily Intake Calculations
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: At Site 3
Receptor Population: Trespasser
Receptor Age: Adolescent

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	See Table 3.1	--	See Table 3.1	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR-S	Ingestion Rate of Soil	mg/day	100	EPA, 1991	50	EPA, 1997	CS x IR x EF x ED x CF1 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	52 [1]	Professional judgement	26 [1]	Professional judgement	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	
	BW	Body Weight	kg	56	EPA, 1997	56	EPA, 1997	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	2,190	EPA, 1989	2,190	EPA, 1989	
Dermal	CS	Chemical Concentration in Soil	mg/kg	See Table 3.1	--	See Table 3.1	--	CDI (mg/kg-day)=
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	CS x CF1 x SA x AF x AB x EF x ED x 1/BW x 1/AT
	SA	Skin Surface Area Available for Contact	cm^2	4,000	EPA, 1997	2,000	EPA, 1997	
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.11	EPA, 1997	0.11	EPA, 1997	
	AB	Absorption Factor	unitless	Chemical Specific	EPA, 1995	Chemical Specific	EPA, 1995	
	EF	Exposure Frequency	days/year	52 [1]	Professional judgement	26 [1]	Professional judgement	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	
	BW	Body Weight	kg	56	EPA, 1997	56	EPA, 1997	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	2,190	EPA, 1989	2,190	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,

EPA, 1993: Superfund Standard Default Exposure Factors for Central Tendency and Reasonable Maximum Exposures.

EPA, 1995: Assessing Dermal Exposure from Soil, Technical Guidance manual, Region III, EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The skin surface area presented in this table includes hands, forearms, lower legs, and feet (assumes 25% of total surface area) and is obtained by averaging the 50 percentile total body surface area of male and female children ages 12 through 17 and dividing by 4.

The CT skin surface area is for hands and feet and is calculated by averaging the mean percentage of total surface body area for hands and feet (approximately 13%) for children ages 12 through 17 found on Table 6-8, then multiplying by total surface body area (16,000 cm^2).

Mean body weight for adolescent derived by averaging the mean (12 to 17 years) boy and girl values (see Table 7-3).

Soil to Skin Adherence Factor obtained from Table 6-12 for the Soccer No. 1 activity (most conservative) for hands.

TBD = To Be Determined

NA = Not Available

Note:

1. For RME values, assumes trespassing one hour per day, one day per week for 52 weeks per year. For CT values, assumes one-half of RME values.

Table J-4.3
Values Used for Daily Intake Calculations
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from Surface Soil at Site 3
Receptor Population: Trespasser
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Inhalation	CS	Chemical Concentration in Soil	mg/kg	See Table 3.2	--	See Table 3.2	--	Chronic Daily Intake (CDI) (mg/kg-day) =
	CA	Chemical Concentration in Air	mg/m^3	Calculated	--	Calculated	--	CA x IR x ET x EF x ED x 1/BW x 1/AT
	IR	Inhalation Rate	m^3/hour	1.6	EPA, 1997	1	EPA, 1997	
	PEF	Particulate Emissions Factor	m^3/kg	1.32E+09	--	1.32E+09	--	CA (mg/m^3) = CS (1/PEF + 1/VF)
	VF	Volatilization Factor for Volatile Constituents	m^3/kg	Calculated [2]	--	Calculated [2]	--	
	ET	Exposure Time	hr/day	1 [1]	Professional judgment	0.5 [1]	Professional judgment	
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	
	ED	Exposure Duration	years	30	EPA, 1991	15 [1]	Professional judgment	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	10,950	EPA, 1989	5,475	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

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

Inhalation rates are based on adult values assuming moderate activity for the RME and light activity for the CT (Table 5-23 of EPA, 1997).

TBD = To Be Determined

Notes:

1. For RME values, assumes trespassing one hour per day, one day per week for 52 weeks per year. For CT values, assumes one-half of RME values.
2. See RAGS Part D Standard Tables 7 and 8 for calculation.

Table J-4.4
Values Used for Daily Intake Calculations
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from Surface Soil at Site 3
Receptor Population: Trespasser
Receptor Age: Adolescent

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Inhalation	CS	Chemical Concentration in Soil	mg/kg	See Table 3.2	--	See Table 3.2	--	Chronic Daily Intake (CDI) (mg/kg-day) =
	CA	Chemical Concentration in Air	mg/m^3	Calculated	--	Calculated	--	CA x IR x ET x EF x ED x 1/BW x 1/AT
	IR	Inhalation Rate	m^3/hour	1.4	EPA, 1997	1	EPA, 1997	
	PEF	Particulate Emissions Factor	m^3/kg	1.32E+09	--	1.32E+09	--	CA (mg/m^3) = CS (1/PEF + 1/VF)
	VF	Volatilization Factor for Volatile Constituents	m^3/kg	Calculated [2]	--	Calculated [2]	--	
	ET	Exposure Time	hr/day	1 [1]	Professional judgment	0.5 [1]	Professional judgment	
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	
	BW	Body Weight	kg	56	EPA, 1991	56	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989	2,190	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

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

Inhalation rates are based on averaging the adult and child values assuming moderate activity for the RME and light activity for the CT (Table 5-23 of EPA, 1997).

Mean body weight for adolescent derived by averaging the mean (12 to 17 years) boy and girl values (see Table 7-3).

TBD = To Be Determined

Notes:

1. For RME values, assumes trespassing one hour per day, one day per week for 52 weeks per year. For CT values, assumes one-half of RME values.
2. See RAGS Part D Standard Tables 7 and 8 for calculation.

Table J-4.5
Values Used for Daily Intake Calculations
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Deep Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CW	Chemical Concentration in Water	mg/l	See Table 3.3	--	See Table 3.3	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR-W	Ingestion Rate of Water	l/day	2	EPA, 1991	1.4	EPA, 1989	CW x IR-W x EF x ED x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	8,760	EPA, 1989	3,285	EPA, 1989	
Dermal	CW	Chemical Concentration in Water	mg/l	See Table 3.3	--	See Table 3.3	--	CDI (mg/kg-day)=
	DAevent	Dermally Absorbed Dose per Event	mg/cm^2-day	Calculated	EPA, 1992	Calculated	EPA, 1992	DAevent x SA x EF x ED x 1/BW x 1/AT
	PC	Permeability Constant	cm/hr	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	t	Lag Time	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	Inorganics: DAevent (mg/cm2-day) =
	t*	Time to Reach Steady-state	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	PC x CW x ET x CF1
	B	Ratio of Permeability of Stratum Corneum to Epidermis	dimensionless	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	ET	Exposure Time	hours	0.25	EPA, 1997	0.17 [1]	Professional judgment	Organics :
	CF1	Conversion Factor 1	l/cm^3	0.001	--	0.001	--	ET<t*: DAevent (mg/cm2-day) =
	SA	Skin Surface Area	cm^2	20,000	EPA, 1997	17,000	EPA, 1997	2 x PC x CW x (sqrt((6 x t x ET)/3.1415)) x CF1
	EF	Exposure Frequency	events/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	ET>t*: DAevent (mg/cm2-day) =
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x CF1
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	8,760	EPA, 1989	3,285	EPA, 1989	

Sources:
EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.
EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,
EPA, 1992: Dermal Exposure Assessment: Principles and Applications. EPA/600/8-91/011B. The CT skin surface area is the lower range value.
EPA, 1993: Superfund Standard Default Exposure Factors for Central Tendency and Reasonable Maximum Exposures.
EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The RME skin surface area is obtained from Table 6-14.
TBD = To Be Determined

Table J-4.6
Values Used for Daily Intake Calculations
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Deep Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CW	Chemical Concentration in Water	mg/l	See Table 3.3	--	See Table 3.3	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR-W	Ingestion Rate of Water	l/day	1	EPA, 1989b	0.87	EPA, 1997	CW x IR-W x EF x ED x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1993	
	BW	Body Weight	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989a	25,550	EPA, 1989a	
	AT-N	Averaging Time - Non-Cancer	days	2,190	EPA, 1989a	2,190	EPA, 1989a	
Dermal	CW	Chemical Concentration in Water	mg/l	See Table 3.3	--	See Table 3.3	--	CDI (mg/kg-day)=
	DAevent	Dermally Absorbed Dose per Event	mg/cm^2-day	Calculated	EPA, 1992	Calculated	EPA, 1992	DAevent x SA x EF x ED x 1/BW x 1/AT
	PC	Permeability Constant	cm/hr	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	t	Lag Time	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	Inorganics: DAevent (mg/cm2-day) =
	t*	Time to Reach Steady-state	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	PC x CW x ET x CF1
	B	Ratio of Permeability of Stratum Corneum to Epidermis	dimensionless	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	ET	Exposure Time	hours	0.33	EPA, 1997	0.25 [1]	Professional judgment	Organics :
	CF1	Conversion Factor 1	l/cm^3	0.001	--	0.001	--	ET<t*: DAevent (mg/cm2-day) =
	SA	Skin Surface Area	cm^2	7,200	EPA, 1997	7,200	EPA, 1997	2 x PC x CW x (sqrt((6 x t x ET)/3.1415)) x CF1
	EF	Exposure Frequency	events/year	350	EPA, 1991	234	EPA, 1991	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	ET>t*: DAevent (mg/cm2-day) =
	BW	Body Weight	kg	15	EPA, 1991	15	EPA, 1991	PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x CF1
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989a	25,550	EPA, 1989a	
	AT-N	Averaging Time - Non-Cancer	days	2,190	EPA, 1989a	2,190	EPA, 1989a	

Sources:
EPA, 1989a: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.
EPA, 1989b: Exposure Factors Handbook, July 1989, EPA/600/8-89/043.
EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,
EPA, 1992: Dermal Exposure Assessment: Principles and Applications. EPA/600/8-91/011B.
EPA, 1993: Superfund Standard Default Exposure Factors for Central Tendency and Reasonable Maximum Exposure
EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. CT ingestion rate value is obtained from Table 3-30 for 3-5 year child mean value. The skin surface area presented in this table was derived by averaging the mean child (2 to 7 years) values from Tables 6-6 and 6-7.
TBD = To Be Determined

Table J-4.7
Values Used for Daily Intake Calculations
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Deep Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CW	Chemical Concentration in Water	mg/l	See Table 3.3	--	See Table 3.3	--	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-W-A	Ingestion Rate of Water, Adult	liters/day	2	EPA, 1991	1.4	EPA, 1989	CW x IR-W-Adj x EF x 1/AT
	IR-W-C	Ingestion Rate of Water, Child	liters/day	1	EPA, 1989b	0.87	EPA, 1997	
	IR-W-Adj	Ingestion Rate of Water, Age-adjusted	liter-year/kg-day	1.09	calculated	0.58	calculated	IR-W-Adj (liter-year/kg-day) =
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	(ED-C x IR-W-C / BW-C) + (ED-A x IR-W-A / BW-A)
	ED-A	Exposure Duration, Adult	years	24	EPA, 1991	9	EPA, 1993	
	ED-C	Exposure Duration, Child	years	6	EPA, 1991	6	EPA, 1991	
	BW-A	Body Weight , Adult	kg	70	EPA, 1991	70	EPA, 1991	
	BW-C	Body Weight, Child	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
Dermal Absorption	CW	Chemical Concentration in Water	mg/l	See Table 3.3	--	See Table 3.3	--	CDI (mg/kg-day) = DA-Adj x EF x 1/AT
	DAevent-A	Dermally Absorbed Dose per Event, Adult	mg/cm^2-event	Calculated	EPA, 1992	Calculated	EPA, 1992	
	DAevent-C	Dermally Absorbed Dose per Event, Child	mg/cm^2-event	Calculated	EPA, 1992	Calculated	EPA, 1992	DA-Adj = (Daevent-A x SA-A x ED-A x 1/BW-A)
	DA-Adj	Dermally Absorbed Dose, Age-adjusted	mg-year/event-kg	Calculated		Calculated		+ (Daevent-C x SA-C x ED-C x 1/BW-C)
	PC	Permeability Constant	cm/hr	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	t	Lag Time	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	Inorganics:
	t*	Time to Reach Steady-state	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	DAevent-A (mg/cm2-event) = PC x CW x ET-A x CF1
	B	Ratio of Permeability of Stratum Corneum to Epidermis	dimensionless	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	DAevent-C (mg/cm2-event) = PC x CW x ET-C x CF1
	ET-A	Exposure Time, Adult	hr/day	0.25	EPA, 1997	0.17 [1]	Professional judgment	
	ET-C	Exposure Time, Child	hr/day	0.33	EPA, 1997	0.25 [1]	Professional judgment	Organics, ET<t*:
	CF1	Conversion Factor 1	l/cm^3	0.001	--	0.001	--	DAevent-A (mg/cm2-event) =
	SA-A	Skin Surface Area, Adult	cm^2	20,000	EPA, 1997	17,000	EPA, 1997	2 x PC x CW x (sqrt((6 x t x ET-A)/3.1415)) x CF1
	SA-C	Skin Surface Area, Child	cm^2	7,200	EPA, 1997	7,200	EPA, 1997	DAevent-C (mg/cm2-event) =
	EF	Exposure Frequency	events/year	350	EPA, 1991	234	EPA, 1993	2 x PC x CW x (sqrt((6 x t x ET-C)/3.1415)) x CF1
	ED-A	Exposure Duration, Adult	years	24	EPA, 1991	9	EPA, 1993	
	ED-C	Exposure Duration, Child	years	6	EPA, 1991	6	EPA, 1991	Organics, ET>t*:
	BW-A	Body Weight , Adult	kg	70	EPA, 1991	70	EPA, 1991	Daevent-A (mg/cm2-event) =
	BW-C	Body Weight, Child	kg	15	EPA, 1991	15	EPA, 1991	PC x CW x (ET-A/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x CF1
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	Daevent-C (mg/cm2-event) =
								PC x CW x (ET-C/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x CF1

Sources:

EPA, 1989a: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.
EPA, 1989b: Exposure Factors Handbook, July 1989, EPA/600/8-89/043.
EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.
EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.
EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.
EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa.

Notes:
1. CT value for adult assumes showering for 10 minutes .CT value for child assumes an exposure time of 15 minutes while bathing.

Table J-4.8
Values Used for Daily Intake Calculations
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Deep Groundwater - Water Vapor at Showerhead
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Inhalation	InhExp	Inhalation Exposure per Shower	mg/kg-shower	Calculated	--	Calculated	--	Foster & Chrostowski Shower Inhalation Model will be used to calculate InhExp
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	Chronic Daily Intake (CDI) (mg/kg-day) =
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	InhExp x EF x ED x 1/AT
	AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA. 1989	3,285	EPA. 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

Table J-4.9
Values Used for Daily Intake Calculations
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage Features
Receptor Population: Trespasser
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Dermal	CW	Chemical Concentration in Water	mg/l	See Table 3.5	--	See Table 3.5	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	DAevent	Dermally Absorbed Dose per Event	mg/cm^2-day	Calculated	EPA, 1992	Calculated	EPA, 1992	DAevent x SA x EF x ED x 1/BW x 1/AT
	PC	Permeability Constant	cm/hr	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	t	Lag Time	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	Inorganics: DAevent (mg/cm2-day) =
	t*	Time to Reach Steady-state	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	PC x CW x ET x CF1
	B	Ratio of Permeability of Stratum Corneum to Epidermis	dimensionless	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	ET	Exposure Time	hours	1 [1]	Professional judgment	0.5 [1]	Professional judgment	Organics :
	CF1	Conversion Factor 1	l/cm^3	0.001	- -	0.001	- -	ET<t*: DAevent (mg/cm2-day) =
	SA	Skin Surface Area	cm^2	5,000	EPA, 1997	1,000	EPA, 1997	2 x PC x CW x (sqrt((6 x t x ET)/3.1415)) x CF1
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	
	ED	Exposure Duration	years	30	EPA, 1991	15 [1]	Professional judgment	ET>t*: DAevent (mg/cm2-day) =
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x CF1
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	10,950	EPA, 1989	5,475	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,

EPA, 1992: Dermal Exposure Assessment: Principles and Applications. EPA/600/8-91/011B.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The RME skin surface area assumes 25% of total surface area of 20,000.

The CT surface area assumes exposure to hands and feet and is obtained by averaging both male and female hands and feet mean values found on Table 6-4.

TBD = To Be Determined

Table J-4.10
Values Used for Daily Intake Calculations
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage Features
Receptor Population: Trespasser
Receptor Age: Adolescent

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Dermal	CW	Chemical Concentration in Water	mg/l	See Table 3.5	--	See Table 3.5	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	DAevent	Dermally Absorbed Dose per Event	mg/cm^2-day	Calculated	EPA, 1992	Calculated	EPA, 1992	DAevent x SA x EF x ED x 1/BW x 1/AT
	PC	Permeability Constant	cm/hr	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	t	Lag Time	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	Inorganics: DAevent (mg/cm2-day) =
	t*	Time to Reach Steady-state	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	PC x CW x ET x CF1
	B	Ratio of Permeability of Stratum Corneum to Epidermis	dimensionless	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	ET	Exposure Time	hours	1 [1]	Professional judgment	0.5 [1]	Professional judgment	Organics :
	CF1	Conversion Factor 1	l/cm^3	0.001	--	0.001	--	ET<t*: DAevent (mg/cm2-day) =
	SA	Skin Surface Area	cm^2	4,000	EPA, 1997	2,000	EPA, 1997	2 x PC x CW x (sqrt((6 x t x ET)/3.1415)) x CF1
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	ET>t*: DAevent (mg/cm2-day) =
	BW	Body Weight	kg	56	EPA, 1997	56	EPA, 1997	PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x CF1
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	2,190	EPA, 1989	2,190	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,

EPA, 1992: Dermal Exposure Assessment: Principles and Applications. EPA/600/8-91/011B.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The RME skin surface area assumes 25% of total surface area of 20,000.

The CT surface area assumes exposure to hands and feet and is obtained by averaging both male and female hands and feet mean values found on Table 6-4.

TBD = To Be Determined

Notes:

1. For RME values, assumes trespassing one hour per day, one day per week for 52 weeks per year. For CT values, assumes one-half of RME values.

Table J-4.11
Values Used for Daily Intake Calculations
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage Features
Receptor Population: Trespasser
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Sediment	mg/kg	See Table 3.6	--	See Table 3.6	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR-S	Ingestion Rate of Sediment	mg/day	100	EPA, 1991	50	EPA, 1997	CS x IR x EF x ED x CF1 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	
	ED	Exposure Duration	years	30	EPA, 1991	15 [1]	Professional judgment	
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	10,950	EPA, 1989	5,475	EPA, 1989	
Dermal	CS	Chemical Concentration in Sediment	mg/kg	See Table 3.6	--	See Table 3.6	--	CDI (mg/kg-day)=
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	CS x CF1 x SA x AF x AB x EF x ED x 1/BW x 1/AT
	SA	Skin Surface Area Available for Contact	cm^2	5,000	EPA, 1997	1,000	EPA, 1997	
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.19	EPA, 1997	0.19	EPA, 1997	
	AB	Absorption Factor	unitless	Chemical Specific	EPA, 1995	Chemical Specific	EPA, 1995	
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	
	ED	Exposure Duration	years	30	EPA, 1991	15 [1]	Professional judgment	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	10,950	EPA, 1989	5,475	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,

EPA, 1995: Assessing Dermal Exposure from Soil, Technical Guidance Manual, Region III, EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The RME skin surface area assumes 25% of total surface area of 20,000.

The CT surface area assumes exposure to hands and feet and is obtained by averaging both male and female hands and feet mean values found on Table 6-4.

CT soil ingestion rate found on Table 4-23. Soil to Skin Adherence Factor calculated from Table 6-12 by averaging hand values for gardeners no. 1 an 2. (No trespasser activity on Table 6-12).

TBD = To Be Determined

NA = Not Available

Note:

1. For RME values, assumes trespassing one hour per day, one day per week for 52 weeks per year. For CT values, assumes one-half of RME values.

Table J-4.12
Values Used for Daily Intake Calculations
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage Features
Receptor Population: Trespasser
Receptor Age: Adolescent

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Sediment	mg/kg	See Table 3.6	--	See Table 3.6	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR-S	Ingestion Rate of Sediment	mg/day	100	EPA, 1991	50	EPA, 1997	CS x IR x EF x ED x CF1 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	52 [1]	Professional judgement	26 [1]	Professional judgement	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	
	BW	Body Weight	kg	56	EPA, 1997	56	EPA, 1997	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	2,190	EPA, 1989	2,190	EPA, 1989	
Dermal	CS	Chemical Concentration in Sediment	mg/kg	See Table 3.6	--	See Table 3.6	--	CDI (mg/kg-day)=
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	CS x CF1 x SA x AF x AB x EF x ED x 1/BW x 1/AT
	SA	Skin Surface Area Available for Contact	cm^2	4,000	EPA, 1997	2,000	EPA, 1997	
	AF	Soil to Skin Adherence Factor	mg/cm^2	6.7	EPA, 1997	6.7	EPA, 1997	
	AB	Absorption Factor	unitless	Chemical Specific	EPA, 1995	Chemical Specific	EPA, 1995	
	EF	Exposure Frequency	days/year	52 [1]	Professional judgement	26 [1]	Professional judgement	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	
	BW	Body Weight	kg	56	EPA, 1997	56	EPA, 1997	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	2,190	EPA, 1989	2,190	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,

EPA, 1993: Superfund Standard Default Exposure Factors for Central Tendency and Reasonable Maximum Exposures.

EPA, 1992: Dermal Exposure Assessment: Principles and Applications. EPA/600/8-91/011B.

EPA, 1995: Assessing Dermal Exposure from Soil, Technical Guidance manual, Region III, EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The skin surface area presented in this table includes hands, forearms, lower legs, and feet (assumes 25% of total surface area) and is obtained by averaging the 50 percentile total body surface area of male and female children ages 12 through 17 and dividing by 4.

The CT skin surface area is for hands and feet and is calculated by averaging the mean percentage of total surface body area for hands and feet (approximately 13%) for children ages 12 through 17 found on Table 6-8, then multiplying by total surface body area (16,000 cm^2).

Mean body weight for adolescent derived by averaging the mean (12 to 17 years) boy and girl values (see Table 7-3).

Soil to Skin Adherence Factor from Table 6-12 for Kids in Mud No. 2 using feet value which is conservative considering the surface water will wash some of the sediment off.

TBD = To Be Determined

NA = Not Available

Notes:

1. For RME values, assume trespassing one hour per day, one day per week for 52 weeks per year. For CT values, assume one-half of RME values.

Table J-4.13
Values Used for Daily Intake Calculations
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 3
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	See Table 3.7	--	See Table 3.7	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR-S	Ingestion Rate of Soil	mg/day	100	EPA, 1991	50	EPA, 1997	CS x IR x EF x ED x CF1 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	8,760	EPA, 1989	3,285	EPA, 1989	
Dermal	CS	Chemical Concentration in Soil	mg/kg	See Table 3.7	--	See Table 3.7	--	CDI (mg/kg-day)=
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	CS x CF1 x SA x AF x AB x EF x ED x 1/BW x 1/AT
	SA	Skin Surface Area Available for Contact	cm^2	5,000	EPA, 1997	1,000	EPA, 1997	
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.19	EPA, 1997	0.19	EPA, 1997	
	AB	Absorption Factor	unitless	Chemical Specific	EPA, 1995	Chemical Specific	EPA, 1995	
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1997	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	8,760	EPA, 1989	3,285	EPA, 1989	

*Surface and subsurface soil combined.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1993: Superfund Standard Default Exposure Factors for Central Tendency and Reasonable Maximum Exposures.

EPA, 1995: Assessing Dermal Exposure from Soil, Technical Guidance manual, Region III, EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The RME skin surface area is obtained from Table 6-14, central tendency surface area for outdoor soil contact (assumes 25% of total surface area).

The CT surface area assumes exposure to hands and feet and is obtained by averaging both male and female hands and feet mean values found on Table 6-4.

CT soil ingestion rate found on Table 4-23. Soil to Skin Adherence Factor calculated from Table 6-12 by averaging hand values for gardeners no. 1 and 2.

TBD = To Be Determined

NA = Not Available

Table J-4.14
Values Used for Daily Intake Calculations
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 3
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	See Table 3.7	--	See Table 3.7	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR-S	Ingestion Rate of Soil	mg/day	200	EPA, 1991	100	EPA, 1997	CS x IR x EF x ED x CF1 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	
	BW	Body Weight	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	2,190	EPA, 1989	2,190	EPA, 1989	
Dermal	CS	Chemical Concentration in Soil	mg/kg	See Table 3.7	--	See Table 3.7	--	CDI (mg/kg-day)=
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	CS x CF1 x SA x AF x AB x EF x ED x 1/BW x 1/AT
	SA	Skin Surface Area Available for Contact	cm^2	3,600	EPA, 1997	864	EPA, 1997	
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.11	EPA, 1997	0.11	EPA, 1997	
	AB	Absorption Factor	unitless	Chemical Specific	EPA, 1995	Chemical Specific	EPA, 1995	
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	
	BW	Body Weight	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	2,190	EPA, 1989	2,190	EPA, 1989	

*Surface and subsurface soil combined.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,

EPA, 1993: Superfund Standard Default Exposure Factors for Central Tendency and Reasonable Maximum Exposures.

EPA, 1995: Assessing Dermal Exposure from Soil, Technical Guidance Manual, Region III, EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The RME skin surface area is for hands, arms, legs, and feet (assumes 50% of total surface area) and is obtained by averaging the 50% values of male and female chil from age 2 through 7 years found on Table 6-6 and 6-7 and dividing by 2. The CT skin surface area is for hands and feet and is calculated by averaging the mean percentage of total surface body area for hands and feet (approximately 12%) children ages 1 through 7 found on Table 6-8, then multiplying by the total surface body area (7,200 cm^2).

CT soil ingestion rate found on Table 4-23. Soil to Skin Adherence Factor obtained from Table 6-12 for the Soccer No. 1 activity (most conservative) for hands.

TBD = To Be Determined

NA = Not Available

Table J-4.15
Values Used for Daily Intake Calculations
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 3
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	See Table 3.7	--	See Table 3.7	see Table 3	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S-A	Ingestion Rate of Soil, Adult	mg/day	100	EPA, 1991	50	EPA, 1997	CS x IR-S-Adj x EF x CF3 x 1/AT
	IR-S-C	Ingestion Rate of Soil, Child	mg/day	200	EPA, 1991	100	EPA, 1997	
	IR-S-Adj	Ingestion Rate of Soil, Age-adjusted	mg-year/kg-day	114.29	Calculated	46.43	Calculated	IR-S-Adj (mg-year/kg-day) =
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	(ED-C x IR-S-C / BW-C) + (ED-A x IR-S-A / BW-A)
	ED-A	Exposure Duration, Adult	years	24	EPA, 1991	9	EPA, 1993	
	ED-C	Exposure Duration, Child	years	6	EPA, 1991	6	EPA, 1991	
	CF3	Conversion Factor 3	kg/mg	0.000001	--	0.000001	--	
	BW-A	Body Weight , Adult	kg	70	EPA, 1991	70	EPA, 1991	
	BW-C	Body Weight, Child	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg	See Table 3.7	--	See Table 3.7	see Table 3	CDI (mg/kg-day) =
	SA-A	Skin Surface Area Available for Contact, Adult	cm^2	5,000	EPA, 1997	1,000	EPA, 1997	CS x DA-Adj x DABS x CF3 x EF x 1/AT
	SA-C	Skin Surface Area Available for Contact, Child	cm^2	3,600	EPA, 1997	864	EPA, 1997	
	SSAF-A	Soil to Skin Adherence Factor	mg/cm^2-day	0.19	EPA, 1997	0.19	EPA, 1997	DA-Adj (mg-year/kg-day) =
	SSAF-C	Soil to Skin Adherence Factor	mg/cm^2-day	0.11	EPA, 1997	0.11	EPA, 1997	[(ED-C x SA-C x SSAF-C / BW-C) +
	DA-Adj	Dermal Absorption, Age-adjusted	mg-year/kg-day	484	calculated	62.4	calculated	(ED-A x SA-A x SSAF-A / BW-A)]
	AB	Absorption Factor	unitless	Chemical Specific	EPA, 1995	Chemical Specific	EPA, 1995	
	CF3	Conversion Factor 3	kg/mg	0.000001	--	0.000001	--	
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED-A	Exposure Duration, Adult	years	24	EPA, 1991	9	EPA, 1993	
	ED-C	Exposure Duration, Child	years	6	EPA, 1991	6	EPA, 1991	
	BW-A	Body Weight , Adult	kg	70	EPA, 1991	70	EPA, 1991	
	BW-C	Body Weight, Child	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	

*Surface and subsurface soil combined.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa.

Table J-4.16
Values Used for Daily Intake Calculations
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 3
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	See Table 3.8	--	See Table 3.8	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR-S	Ingestion Rate of Soil	mg/day	480	EPA, 1993	240 [1]	Professional judgment	CS x IR x EF x ED x CF1 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	250	EPA, 1991	219	EPA, 1993	
	ED	Exposure Duration	years	0.5	VADEQ, 1997	0.25 [1]	Professional judgment	
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	183	EPA, 1989	91	EPA, 1989	
Dermal	CS	Chemical Concentration in Soil	mg/kg	See Table 3.8	--	See Table 3.8	--	CDI (mg/kg-day)=
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	CS x CF1 x SA x AF x AB x EF x ED x 1/BW x 1/AT
	SA	Skin Surface Area Available for Contact	cm^2	5,000	EPA, 1997	1,000	EPA, 1997	
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.24	EPA, 1997	0.24	EPA, 1997	
	AB	Absorption Factor	unitless	Chemical Specific	EPA, 1995	Chemical Specific	EPA, 1995	
	EF	Exposure Frequency	days/year	250	EPA, 1991	219	EPA, 1993	
	ED	Exposure Duration	years	0.5	VADEQ, 1997	0.25 [1]	Professional judgment	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	183	EPA, 1989	91	EPA, 1989	

*Surface and subsurface soil combined.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,

EPA, 1993: Superfund Standard Default Exposure Factors for Central Tendency and Reasonable Maximum Exposures.

EPA, 1995: Assessing Dermal Exposure from Soil, Technical Guidance manual, Region III, EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The RME skin surface area assumes 25% of total surface area of 20,000.

The CT surface area assumes exposure to hands and feet and is obtained by averaging both male and female hands and feet mean values found on Table 6-4.

The RME and CT Soil to Skin Adherence Factor is calculated from Table 6-12 for construction worker's hands.

VADEQ, 1997: Value provided by Pat McMurray, Virginia Department of Environmental Quality, during St. Juliens Creek risk assessment assumptions conference call on November 20, 1997.

TBD = To Be Determined

NA = Not Available

Note:

1. CT value assumes one-half the RME value.

Table J-4.17
Values Used for Daily Intake Calculations
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil *
Exposure Medium: Soil*
Exposure Point: At Site 3
Receptor Population: Other Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	See Table 3.8	--	See Table 3.8	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR-S	Ingestion Rate of Soil	mg/day	50	VADEQ, 1997	25 [1]	Professional judgment	CS x IR x EF x ED x CF1 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	250	EPA, 1991	219	EPA, 1993	
	ED	Exposure Duration	years	25	EPA, 1991	5	EPA, 1993	
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	9,125	EPA, 1989	1,825	EPA, 1989	
Dermal	CS	Chemical Concentration in Soil	mg/kg	See Table 3.8	--	See Table 3.8	--	CDI (mg/kg-day)=
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	CS x CF1 x SA x AF x AB x EF x ED x 1/BW x 1/AT
	SA	Skin Surface Area Available for Contact	cm^2	5,000	EPA, 1997	1,000	EPA, 1997	
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.071	EPA, 1997	0.071	EPA, 1997	
	AB	Absorption Factor	unitless	chemical-specific	EPA, 1995	chemical-specific	EPA, 1995	
	EF	Exposure Frequency	days/year	250	EPA, 1991	219	EPA, 1993	
	ED	Exposure Duration	years	25	EPA, 1991	5	EPA, 1993	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	9,125	EPA, 1989	1,825	EPA, 1989	

*Surface and subsurface soil combined.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,

EPA, 1993: Superfund Standard default Exposure Factors for Central Tendency and Reasonable Maximum Exposures.

EPA, 1995: Assessing Dermal Exposure from Soil, Technical Guidance manual, Region III, EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The RME skin surface area assumes 25% of total surface area of 20,000.

The CT surface area assumes exposure to hands and feet and is obtained by averaging both male and female hands and feet mean values found on Table 6-4.

The RME and CT Soil to Skin Adherence Factor is calculated from Table 6-12 using the average of the five groundskeepers' values for hands.

VADEQ, 1997: Value provided by Pat McMurray, Virginia Department of Environmental Quality, during St. Juliens Creek risk assessment assumptions conference call on November 20, 1997.

TBD = To Be Determined

NA = Not Available

Note:

1. CT value assumes one-half the RME value.

Table J-4.18
Values Used for Daily Intake Calculations
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Air
Exposure Point: Emissions from Soil at Site 3
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Inhalation	CS	Chemical Concentration in Soil	mg/kg	See Table 3.9	--	See Table 3.9	--	Chronic Daily Intake (CDI) (mg/kg-day) =
	CA	Chemical Concentration in Air	mg/m^3	Calculated	--	Calculated	--	CA x IR x ET x EF x ED x 1/BW x 1/AT
	IR	Inhalation Rate	m^3/hour	2.5	EPA, 1997	1.5	EPA, 1997	
	PEF	Particulate Emissions Factor	m^3/kg	1.32E+09	--	1.32E+09	--	$CA (mg/m^3) = CS (1/PEF + 1/VF)$
	VF	Volatilization Factor for Volatile Constituents	m^3/kg	Calculated [3]	--	Calculated [3]	--	
	ET	Exposure Time	hr/day	8 [1]	Professional judgment	4 [1]	Professional judgment	
	EF	Exposure Frequency	days/year	250	EPA,1991	219	EPA, 1993	
	ED	Exposure Duration	years	0.5	VADEQ, 1997	0.25 [2]	Professional judgment	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	183	EPA, 1989	91	EPA, 1989	

Surface and subsurface soil combined.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1993: Superfund Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

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

Inhalation rates are based on values for the outdoor worker assuming heavy activity for the RME and moderate activity for the CT (Table 5-23 of EPA, 1997).

VADEQ, 1997: Value provided by Pat McMurray, Virginia Department of Environmental Quality, during St. Juliens Creek risk assessment assumptions conference call on November 20, 1997.

TBD = To Be Determined

Notes:

1. Professional Judgement based on activities that would occur 8 hrs per day for the RME and 1/2 of a day for the CT.

2. For CT value, assumes one-half of the RME value.

3. See Appendix F for VF calculations.

Table J-4.19
Values Used for Daily Intake Calculations
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage Features
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Dermal	CW	Chemical Concentration in Water	mg/l	See Table 3.10	--	See Table 3.10	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	DAevent	Dermally Absorbed Dose per Event	mg/cm^2-day	Calculated	EPA, 1992	Calculated	EPA, 1992	DAevent x SA x EF x ED x 1/BW x 1/AT
	PC	Permeability Constant	cm/hr	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	t	Lag Time	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	Inorganics: DAevent (mg/cm2-day) =
	t*	Time to Reach Steady-state	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	PC x CW x ET x CF1
	B	Ratio of Permeability of Stratum Corneum to Epidermis	dimensionless	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	ET	Exposure Time	hours/day	2 [1]	Professional judgment	1 [1]	Professional judgment	Organics :
	CF1	Conversion Factor 1	l/cm^3	0.001	- -	0.001	- -	ET<t*: DAevent (mg/cm2-day) =
	SA	Skin Surface Area	cm^2	5,000	EPA, 1997	1,000	EPA, 1997	2 x PC x CW x (sqrt((6 x t x ET)/3.1415)) x CF1
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	ET>t*: DAevent (mg/cm2-day) =
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x CF1
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	8,760	EPA, 1989	3,285	EPA, 1993	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,

EPA, 1992: Dermal Exposure Assessment: Principles and Applications. EPA/600/8-91/011B.

EPA, 1993: Superfund Standard Default Exposure Factors for Central Tendency and Reasonable Maximum Exposures.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The RME skin surface area assumes 25% of total surface area of 20,000.

The CT surface area assumes exposure to hands and feet and is obtained by averaging both male and female hands and feet mean values found on Table 6-4.

TBD = To Be Determined

Table J-4.20
Values Used for Daily Intake Calculations
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage Features
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Dermal	CW	Chemical Concentration in Water	mg/l	See Table 3.10	--	See Table 3.10	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	DAevent	Dermally Absorbed Dose per Event	mg/cm^2-day	Calculated	EPA, 1992	Calculated	EPA, 1992	DAevent x SA x EF x ED x 1/BW x 1/AT
	PC	Permeability Constant	cm/hr	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	t	Lag Time	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	Inorganics: DAevent (mg/cm2-day) =
	t*	Time to Reach Steady-state	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	PC x CW x ET x CF1
	B	Ratio of Permeability of Stratum Corneum to Epidermis	dimensionless	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	ET	Exposure Time	hours/day	2 [1]	Professional judgment	1 [1]	Professional judgment	Organics :
	CF1	Conversion Factor 1	l/cm^3	0.001	--	0.001	--	ET<t*: DAevent (mg/cm2-day) =
	SA	Skin Surface Area	cm^2	3,600	EPA, 1997	864	EPA, 1997	2 x PC x CW x (sqrt((6 x t x ET)/3.1415)) x CF1
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	ET>t*: DAevent (mg/cm2-day) =
	BW	Body Weight	kg	15	EPA, 1991	15	EPA, 1991	PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x CF1
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	2,190	EPA, 1989	2,190	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,

EPA, 1992: Dermal Exposure Assessment: Principles and Applications. EPA/600/8-91/011B.

EPA, 1993: Superfund Standard Default Exposure Factors for Central Tendency and Reasonable Maximum Exposures.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The RME skin surface area is for hands, arms, legs, and feet (assumes 50% of total surface area) and is obtained by averaging the 50% values of male and female children from age 2 through 7 years found on Table 6-6 and 6-7 and dividing by 2. The CT skin surface area is for hands and feet and is calculated by aveaging the mean percentage of total surafce body area for hands and feet (approximately 12%) for children ages 1 through 7 found on Table 6-8, then multiplying by the total surface body area (7,200 cm^2).

TBD = To Be Determined

Table J-4.21
Values Used for Daily Intake Calculations
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage Features and Ponded Area
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Dermal Absorption	CW	Chemical Concentration in Water	mg/l	See Table 3.10	--	See Table 3.10	--	CDI (mg/kg-day) = DA-Adj x EF x 1/AT
	DAevent-A	Dermally Absorbed Dose per Event, Adult	mg/cm^2-event	Calculated	EPA, 1992	Calculated	EPA, 1992	
	DAevent-C	Dermally Absorbed Dose per Event, Child	mg/cm^2-event	Calculated	EPA, 1992	Calculated	EPA, 1992	DA-Adj = (Daevent-A x SA-A x ED-A x 1/BW-A) + (Daevent-C x SA-C x ED-C x 1/BW-C)
	DA-Adj	Dermally Absorbed Dose, Age-adjusted	mg-year/event-kg	Calculated		Calculated		
	PC	Permeability Constant	cm/hr	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	t	Lag Time	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	Inorganics:
	t*	Time to Reach Steady-state	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	DAevent-A (mg/cm2-event) = PC x CW x ET-A x CF1
	B	Ratio of Permeability of Stratum Corneum to Epidermis	dimensionless	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	DAevent-C (mg/cm2-event) = PC x CW x ET-C x CF1
	ET-A	Exposure Time, Adult	hours/day	2 [1]	Professional judgmen	1 [1]	Professional judgment	
	ET-C	Exposure Time, Child	hours/day	2 [1]	Professional judgmen	1 [1]	Professional judgment	Organics, ET<t*:
	CF1	Conversion Factor 1	l/cm^3	0.001	- -	0.001	- -	DAevent-A (mg/cm2-event) =
	SA-A	Skin Surface Area, Adult	cm^2	5,000	EPA, 1997	1,000	EPA, 1997	2 x PC x CW x (sqrt((6 x t x ET-A)/3.1415)) x CF1
	SA-C	Skin Surface Area, Child	cm^2	3,600	EPA, 1997	864	EPA, 1997	DAevent-C (mg/cm2-event) =
	EF	Exposure Frequency	events/year	52 [1]	Professional judgmen	26 [1]	Professional judgment	2 x PC x CW x (sqrt((6 x t x ET-C)/3.1415)) x CF1
	ED-A	Exposure Duration, Adult	years	24	EPA, 1991	9	EPA, 1993	
	ED-C	Exposure Duration, Child	years	6	EPA, 1991	6	EPA, 1991	Organics, ET>t*:
	BW-A	Body Weight , Adult	kg	70	EPA, 1991	70	EPA, 1991	Daevent-A (mg/cm2-event) =
	BW-C	Body Weight, Child	kg	15	EPA, 1991	15	EPA, 1991	PC x CW x (ET-A/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x CF1
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	Daevent-C (mg/cm2-event) =
								PC x CW x (ET-C/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x CF1

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.
EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.
EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.
EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.
EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa.

Notes:
1. For RME value, assumes residents recreate two hours per day, one day per week for 52 weeks per year. For CT value, assumes one-half of RME values.

Table J-4.22
Values Used for Daily Intake Calculations
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage Features
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Sediment	mg/kg	See Table 3.11	--	See Table 3.11	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR-S	Ingestion Rate of Sediment	mg/day	100	EPA, 1991	50	EPA, 1997	CS x IR x EF x ED x CF1 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	8,760	EPA, 1989	3,285	EPA, 1989	
Dermal	CS	Chemical Concentration in Sediment	mg/kg	See Table 3.11	--	See Table 3.11	--	CDI (mg/kg-day)=
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	CS x CF1 x SA x AF x AB x EF x ED x 1/BW x 1/AT
	SA	Skin Surface Area Available for Contact	cm^2	5,000	EPA, 1997	1,000	EPA, 1997	
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.19	EPA, 1997	0.19	EPA, 1997	
	AB	Absorption Factor	unitless	chemical-specific	EPA, 1995	chemical-specific	EPA, 1995	
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	8,760	EPA, 1989	3,285	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,

EPA, 1993: Superfund Standard Default Exposure Factors for Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil, Technical Guidance manual, Region III, EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The RME skin surface area assumes 25% of total surface area of 20,000.

The CT surface area assumes exposure to hands and feet and is obtained by averaging both male and female hands and feet mean values found on Table 6-4.

CT soil ingestion rate found on Table 4-23. Soil to Skin Adherence Factor calculated from Table 6-12 by averaging hand values for gardeners no.1 and 2.

TBD = To Be Determined

NA = Not Available

Notes:

1. For RME value, assumes residents recreate two hours per day, one day per week for 52 weeks per year. For CT value, assumes one-half of RME values.

Table J-4.23
Values Used for Daily Intake Calculations
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage Features
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Sediment	mg/kg	See Table 3.11	--	See Table 3.11	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR-S	Ingestion Rate of Sediment	mg/day	200	EPA, 1991	100	EPA, 1997	CS x IR x EF x ED x CF1 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	
	BW	Body Weight	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	2,190	EPA, 1989	2,190	EPA, 1989	
Dermal	CS	Chemical Concentration in Sediment	mg/kg	See Table 3.11	--	See Table 3.11	--	CDI (mg/kg-day)=
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	CS x CF1 x SA x AF x AB x EF x ED x 1/BW x 1/AT
	SA	Skin Surface Area Available for Contact	cm^2	3,600	EPA, 1997	864	EPA, 1997	
	AF	Soil to Skin Adherence Factor	mg/cm^2	6.7	EPA, 1997	6.7	EPA, 1997	
	AB	Absorption Factor	unitless	chemical-specific	EPA, 1995	chemical-specific	EPA, 1995	
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [3]	Professional judgment	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	
	BW	Body Weight	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	2,190	EPA, 1989	2,190	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,

EPA, 1993: Superfund Standard Default Exposure Factors for Central Tendency and Reasonable Maximum Exposures.

EPA, 1995: Assessing Dermal Exposure from Soil, Technical Guidance manual, Region III, EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The RME skin surface area is for hands, arms, legs, and feet (assumes 50% of total surface area) and is obtained by averaging the 50% values of male and female children from age 2 through 7 years found on Table 6-6 and 6-7 and dividing by 2. The CT skin surface area is for hands and feet and is calculated by averaging the mean percentage of total surface body area for hands and feet (approximately 12%) for children ages 1 through 7 found on Table 6-8, then multiplying by the total surface body area (7,200 cm^2).

Soil to Skin Adherence Factor from Table 6-12 for Kids in Mud No. 2 using feet value which is conservative considering the surface water will wash some of the sediment off.

CT soil ingestion rate found on Table 4-23.

TBD = To Be Determined

NA = Not Available

Notes:

1. For RME value, assumes residents recreate two hours per day, one day per week for 52 weeks per year. For CT value, assumes one-half of RME values.

Table J-4.24
Values Used for Daily Intake Calculations
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage Features and Ponded Area
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	See Table 3.11	--	See Table 3.11	see Table 3	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S-A	Ingestion Rate of Soil, Adult	mg/day	100	EPA, 1991	50	EPA, 1997	CS x IR-S-Adj x EF x CF3 x 1/AT
	IR-S-C	Ingestion Rate of Soil, Child	mg/day	200	EPA, 1991	100	EPA, 1997	
	IR-S-Adj	Ingestion Rate of Soil, Age-adjusted	mg-year/kg-day	114.29	Calculated	46.43	Calculated	IR-S-Adj (mg-year/kg-day) =
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	(ED-C x IR-S-C / BW-C) + (ED-A x IR-S-A / BW-A)
	ED-A	Exposure Duration, Adult	years	24	EPA, 1991	9	EPA, 1993	
	ED-C	Exposure Duration, Child	years	6	EPA, 1991	6	EPA, 1991	
	CF3	Conversion Factor 3	kg/mg	0.000001	--	0.000001	--	
	BW-A	Body Weight , Adult	kg	70	EPA, 1991	70	EPA, 1991	
	BW-C	Body Weight, Child	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg	See Table 3.7	--	See Table 3.7	see Table 3	CDI (mg/kg-day) =
	SA-A	Skin Surface Area Available for Contact, Adult	cm^2	5,000	EPA, 1997	1,000	EPA, 1997	CS x DA-Adj x DABS x CF3 x EF x 1/AT
	SA-C	Skin Surface Area Available for Contact, Child	cm^2	3,600	EPA, 1997	864	EPA, 1997	
	SSAF-A	Soil to Skin Adherence Factor	mg/cm^2-day	0.19	EPA, 1997	0.19	EPA, 1997	DA-Adj (mg-year/kg-day) =
	SSAF-C	Soil to Skin Adherence Factor	mg/cm^2-day	6.7	EPA, 1997	6.7	EPA, 1997	[(ED-C x SA-C x SSAF-C / BW-C) +
	DA-Adj	Dermal Absorption, Age-adjusted	mg-year/kg-day	9,974	calculated	2,340	calculated	(ED-A x SA-A x SSAF-A / BW-A)]
	AB	Absorption Factor	unitless	Chemical Specific	EPA, 1995	Chemical Specific	EPA, 1995	
	CF3	Conversion Factor 3	kg/mg	0.000001	--	0.000001	--	
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	
	ED-A	Exposure Duration, Adult	years	24	EPA, 1991	9	EPA, 1993	
	ED-C	Exposure Duration, Child	years	6	EPA, 1991	6	EPA, 1991	
	BW-A	Body Weight , Adult	kg	70	EPA, 1991	70	EPA, 1991	
	BW-C	Body Weight, Child	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa.

Notes:

1. For RME value, assumes residents recreate two hours per day, one day per week for 52 weeks per year. For CT value, assumes one-half of RME values.

Table J-4.25
Values Used for Daily Intake Calculations
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Shallow Groundwater
Exposure Point: Water Table
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Dermal	CW	Chemical Concentration in Water	mg/l	See Table 3.12	--	See Table 3.12	--	CDI (mg/kg-day)=
	DAevent	Dermally Absorbed Dose per Event	mg/cm^2-day	Calculated	EPA, 1992	Calculated	EPA, 1992	DAevent x SA x EF x ED x 1/BW x 1/AT
	PC	Permeability Constant	cm/hr	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	t	Lag Time	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	Inorganics: DAevent (mg/cm2-day) =
	t*	Time to Reach Steady-state	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	PC x CW x ET x CF1
	B	Ratio of Permeability of Stratum Corneum to Epidermis	dimensionless	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	ET	Exposure Time	hours	2 [1]	Professional judgment	1 [1]	Professional judgment	Organics :
	CF1	Conversion Factor 1	l/cm^3	0.001	- -	0.001	- -	ET<t*: DAevent (mg/cm2-day) =
	SA	Skin Surface Area	cm^2	5,000	EPA, 1997	1,000	EPA, 1997	2 x PC x CW x (sqrt((6 x t x ET)/3.1415)) x CF1
	EF	Exposure Frequency	events/year	63 [1]	Professional judgment	31 [1]	Professional judgment	
	ED	Exposure Duration	years	0.5	VADEQ, 1997	0.25 [1]	Professional judgment	ET>t*: DAevent (mg/cm2-day) =
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x CF1
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	183	EPA, 1989	91	EPA, 1989	

Sources:
EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.
EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,
EPA, 1992: Dermal Exposure Assessment: Principles and Applications. EPA/600/8-91/011B.
EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The RME skin surface area assumes 25% of total surface area of 20,000.
The CT surface area assumes exposure to hands and feet and is obtained by averaging both male and female hands and feet mean values found on Table 6-4.
VADEQ, 1997: Value provided by Pat McMurray, Virginia Department of Environmental Quality, during St. Juliens Creek risk assessment assumptions conference call on November 20, 1997.
TBD = To Be Determined

Note:
1. For RME values, assumes workers spend two hours per day exposed to shallow groundwater during excavation and construction activities (i.e. basement or footer construction), one-quarter of the RME exposure frequency

Table J-5.1
Non-Cancer Toxicity Data -- Oral/Dermal
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD Value	Oral RfD Units	Oral to Dermal Adjustment Factor (1)	Adjusted Dermal RfD (2)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ (MM/DD/YY)
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	Chronic	2.0E-02	mg/kg/day	0.55	1.1E-02	mg/kg/day	Liver	1000	IRIS	05/04/01
Bis(2-ethylhexyl)phthalate	Subchronic	2.0E-02	mg/kg/day	0.55	1.1E-02	mg/kg/day	Liver	1000	HEAST	07/01/97
Chloroform	Chronic	1.0E-02	mg/kg/day	1	1.0E-02	mg/kg/day	Liver	1000	IRIS	05/04/01
Chloroform	Subchronic	1.0E-02	mg/kg/day	1	1.0E-02	mg/kg/day	Liver	1000	HEAST	07/01/97
Dibenzofuran	Chronic	4.0E-03	mg/kg/day	0.7	2.8E-03	mg/kg/day	Kidney	3000	NCEA	08/29/94
Heptachlor	Chronic	5.0E-04	mg/kg/day	0.5	2.5E-04	mg/kg/day	Liver	300	IRIS	05/04/01
Heptachlor	Subchronic	5.0E-04	mg/kg/day	0.5	2.5E-04	mg/kg/day	Liver	300	HEAST	07/01/97
Naphthalene	Chronic	2.0E-02	mg/kg/day	0.8	1.6E-02	mg/kg/day	Body weight	3000	IRIS	05/04/01
2,3,7,8-TCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aluminum	Chronic	1.0E+00	mg/kg/day	0.27	2.7E-01	mg/kg/day	Central Nervous System	100	NCEA	08/26/96
Antimony	Chronic	4.0E-04	mg/kg/day	0.10	4.0E-05	mg/kg/day	Longevity, Blood	1000	IRIS	05/04/01
Antimony	Subchronic	4.0E-04	mg/kg/day	0.10	4.0E-05	mg/kg/day	Longevity, Blood	1000	HEAST	07/01/97
Arsenic	Chronic	3.0E-04	mg/kg/day	0.95	2.9E-04	mg/kg/day	Skin	3	IRIS	05/04/01
Arsenic	Subchronic	3.0E-04	mg/kg/day	0.95	2.9E-04	mg/kg/day	Skin	3	HEAST	07/01/97
Barium	Chronic	7.0E-02	mg/kg/day	1	7.0E-02	mg/kg/day	Heart	3	IRIS	05/04/01
Barium	Subchronic	7.0E-02	mg/kg/day	1	7.0E-02	mg/kg/day	Heart	3	HEAST	07/01/97
Cadmium (food)	Chronic	1.0E-03	mg/kg/day	0.025	2.5E-05	mg/kg/day	Kidney	10	IRIS	05/04/01
Cadmium (nonfood)	Chronic	5.0E-04	mg/kg/day	0.05	2.5E-05	mg/kg/day	Kidney	10	IRIS	05/04/01
Chromium (VI)	Chronic	3.0E-03	mg/kg/day	0.01	3.0E-05	mg/kg/day	NOAEL	300	IRIS	05/04/01
Chromium (VI)	Subchronic	2.0E-02	mg/kg/day	0.01	2.0E-04	mg/kg/day	NOAEL	100	HEAST	07/01/97
Copper	Chronic	3.7E-02	mg/kg/day	0.60	2.2E-02	mg/kg/day	Gastrointestinal	NA	HEAST	07/01/97
Copper	Subchronic	3.7E-02	mg/kg/day	0.60	2.2E-02	mg/kg/day	Gastrointestinal	NA	HEAST	07/01/97
Iron	Chronic	3.0E-01	mg/kg/day	0.20	6.0E-02	mg/kg/day	Gastrointestinal	1	NCEA	07/23/96

Table J-5.1
Non-Cancer Toxicity Data -- Oral/Dermal
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD Value	Oral RfD Units	Oral to Dermal Adjustment Factor (1)	Adjusted Dermal RfD (2)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ (MM/DD/YY)
Manganese (nonfood)	Chronic	2.0E-02	mg/kg/day	0.35	7.0E-03	mg/kg/day	Central Nervous System	1	IRIS	05/04/01
Manganese(food)	Chronic	1.4E-01	mg/kg/day	0.05	2.0E-04	mg/kg/day	Central Nervous System	1	IRIS	05/04/01
Nickel	Chronic	2.0E-02	mg/kg/day	0.10	2.0E-04	mg/kg/day	Body weight	300	IRIS	05/04/01
Nickel	Subchronic	2.0E-02	mg/kg/day	0.10	2.0E-04	mg/kg/day	Body weight	300	HEAST	07/01/97
Phosphorous	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	Chronic	7.0E-05	mg/kg/day	1	7.0E-05	mg/kg/day	Liver	NA	RBC	10/09/02
Vanadium	Chronic	7.0E-03	mg/kg/day	0.02	1.4E-04	mg/kg/day	NOAEL	100	HEAST	07/01/97
Vanadium	Subchronic	7.0E-03	mg/kg/day	0.02	1.4E-04	mg/kg/day	NOAEL	100	HEAST	07/01/97
Zinc	Chronic	3.0E-01	mg/kg/day	0.25	7.5E-02	mg/kg/day	Blood	3	IRIS	05/04/01
Zinc	Subchronic	3.0E-01	mg/kg/day	0.25	7.5E-02	mg/kg/day	Blood	3	HEAST	07/01/97

NOAEL = No-Observed-Adverse-Effect Level

NA = Not Available

IRIS = Integrated Risk Information System

HEAST = Health Effects Assessment Summary Tables, July 1997

RBC = Region III Risk-Based Concentration Table, October 9, 2002

NCEA = National Center for Environmental Assessment

(1) Oral to Dermal Adjustment Factor from oral ABS values for oral to dermal extrapolation per RAGS Appendix A, USEPA Update, April 8, 1999.
If oral ABS value not available, used default value of 80% for VOCs, 50% for SVOCs, and 20% for inorganics.

(2) Adjusted Dermal RfD (mg/kg/day) = Oral RfD (mg/kg/day)x Oral to Dermal Adjustment Factor

Table J-5.2
Non-Cancer Toxicity Data -- Inhalation
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Chronic/ Subchronic	Value Inhalation RfC	Units	Adjusted Inhalation RfD (1)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfC:RfD: Target Organ	Dates (MM/DD/YY)
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	Chronic	3.0E-04	mg/m3	8.6E-05	mg/kg/day	Nasal	1000	NCEA	12/01/97
Chloroform	Subchronic	3.0E-03	mg/m3	8.6E-04	mg/kg/day	Nasal	100	NCEA	12/01/97
Heptachlor	NA	NA	NA	4.5E+00	mg/kg/day	NA	NA	RBC	10/09/02
Naphthalene	Chronic	3.0E-03	mg/m^3	8.6E-04	mg/kg/day	Respiratory	3000	IRIS	05/04/01
2,3,7,8-TCDD	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aluminum	Chronic	5.0E-03	mg/m3	1.4E-03	mg/kg/day	CNS	300	NCEA	06/20/97
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium (VI)	Chronic	1.0E-04	mg/m^3	2.9E-05	mg/kg/day	Lung	300	IRIS	05/04/01
Chromium (VI)	Subchronic	1.0E-03	mg/m^3	2.9E-04	mg/kg/day	Lung	30	IRIS	05/04/01
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese (food)	Chronic	5.0E-05	mg/m^3	1.4E-05	mg/kg/day	CNS	1000	IRIS	05/04/01
Manganese (nonfood)	Chronic	5.0E-05	mg/m^3	1.4E-05	mg/kg/day	CNS	1000	IRIS	05/04/01
Phosphorous	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA

CNS = Central Nervous System

NA = Not Available

IRIS = Integrated Risk Information System

HEAST = Health Effects Assessment Summary Tables, July 1997

RBC = Region III Risk-Based Concentration Table, October 9, 2002

NCEA = National Center for Environmental Assessment

(1) Adjusted Inhalation RfD (mg/kg/day) = Inhalation RfC (mg/m^3) x 20 (m^3/day) / 70 (kg)

Table J-6.1
Cancer Toxicity Data -- Oral/Dermal
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Oral Cancer Slope Factor	Oral to Dermal Adjustment Factor (1)	Adjusted Dermal Cancer Slope Factor (2)	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date (MM/DD/YY)
Benzo(a)pyrene	7.3E+00	NA	NA	1/mg/kg/day	B2	IRIS	05/04/01
Bis(2-ethylhexyl)phthalate	1.4E-02	0.55	2.5E-02	1/mg/kg/day	B2	IRIS	05/04/01
Chloroform	6.1E-03	1	6.1E-03	1/mg/kg/day	B2	IRIS	05/04/01
Heptachlor	4.5E+00	0.5	9.0E+00	1/mg/kg/day	B2	IRIS	05/04/01
Naphthalene	NA	NA	NA	NA	NA	NA	NA
Dioxin (as 2,3,7,8-TCDD)	1.5E+05	0.5	3.0E+05	1/mg/kg/day	B2	HEAST	07/01/1997
Aluminum	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA
Arsenic	1.5E+00	0.95	1.6E+00	1/mg/kg/day	A	IRIS	05/04/01
Chromium VI	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA
Manganese (food)	NA	NA	NA	NA	NA	NA	NA
Manganese (nonfood)	NA	NA	NA	NA	NA	NA	NA
Phosphorous	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA

NA = Not Available

IRIS = Integrated Risk Information System

HEAST = Health Effects Assessment Summary Tables, July 1997

RBC = Region III Risk-Based Concentration Table, October 9, 2002

NCEA = National Center for Environmental Assessment

(1) Oral to Dermal Adjustment Factor from oral ABS values for oral to dermal extrapolation per RAGS Appendix A, USEPA Update, April 8, 1999. If oral ABS value not available, used default value of value of 80% for VOCs, 50% for SVOCs, and 20% for inorganics.

(2) Adjusted Dermal Cancer Slope Factor (1/mg/kg/day) = Oral Cancer Slope Factor (1/mg/kg/day) / Oral to Dermal Adjustment Factor

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

Weight of Evidence:

Known/Likely

Cannot be Determined

Not Likely

Table J-6.2
Cancer Toxicity Data -- Inhalation
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Unit Risk	Units	Adjustment	Inhalation Cancer Slope Factor	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date (MM/DD/YY)
Benzo(a)pyrene	8.9E-04	1/ug/m^3	(1)	3.1E+00	1/mg/kg/day	B2	NCEA	07/08/93
Bis(2-ethylhexyl)phthalate	4.0E-06	1/ug/m^3	(1)	1.4E-02	1/mg/kg/day	B2	NCEA	07/08/93
Chloroform	2.3E-05	1/ug/m^3	(1)	8.1E-02	1/mg/kg/day	B2	IRIS	05/04/01
Heptachlor	1.3E-03	1/ug/m^3	(1)	4.5E+00	1/mg/kg/day	B2	IRIS	05/04/01
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA
Dioxin (as 2,3,7,8-TCDD)	3.3E-05	1/pg/m3	(2)	1.5E+05	1/mg/kg/day	B2	HEAST	07/01/1997
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	4.3E-03	1/ug/m^3	(1)	1.5E+01	1/mg/kg/day	A	IRIS	05/04/01
Chromium VI	1.2E-02	1/ug/m^3	(1)	4.1E+01	1/mg/kg/day	A	IRIS	05/04/01
Iron	NA	NA	NA	NA	NA	NA	NA	NA
Manganese (food)	NA	NA	NA	NA	NA	NA	NA	NA
Manganese (nonfood)	NA	NA	NA	NA	NA	NA	NA	NA
Phosphorous	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA

NA - Not Available

IRIS = Integrated Risk Information System

HEAST = Health Effects Assessment Summary Tables

RBC = Region III Risk-Based Concentration Table, October 9, 2002

NCEA = National Center for Environmental Assessment

(1) Inhalation Cancer Slope Factor (1/mg/kg/day) = Unit Risk (1/ug/m^3) x 70 kg / 20 m^3/day x 1000 ug/mg

(2) Inhalation Cancer Slope Factor (1/mg/kg/day) = Unit Risk (1/pg/m^3) x 70 kg / 20 m^3/day x 1,000,000,000 ug/mg

(3) Toxicity equivalent factors from NCEA Risk Assessment Issue Paper: Status of Inhalation Cancer Unit Risk for Benzo(a)pyrene, 1994.

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

Weight of Evidence:

Known/Likely

Cannot be Determined

Not Likely

Table J-7.1
Calculation of Non-Cancer Hazards - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: At Site 3
Receptor Population: Trespasser
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)Pyrene	0.906	mg/kg	0.906	mg/kg	M	1.8E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Antimony	59	mg/kg	59	mg/kg	M	1.2E-05	mg/kg/day	4.0E-04	mg/kg/day	NA	NA	0.03
	Arsenic	36	mg/kg	36	mg/kg	M	7.3E-06	mg/kg/day	3.0E-04	mg/kg/day	NA	NA	0.02
	Iron	67358	mg/kg	67358	mg/kg	M	1.4E-02	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	0.05
												Total	0.10
Dermal	Benzo(a)Pyrene	0.906	mg/kg	0.906	mg/kg	M	1.8E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Antimony	59	mg/kg	59	mg/kg	M	1.1E-06	mg/kg/day	4.0E-05	mg/kg/day	NA	NA	0.03
	Arsenic	36	mg/kg	36	mg/kg	M	2.2E-06	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.01
	Iron	67358	mg/kg	67358	mg/kg	M	1.3E-03	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.02
												Total	0.06
												Total Hazard Index Across All Exposure Routes/Pathways	0.2

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table J-7.2
Calculation of Non-Cancer Hazards - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: At Site 3
Receptor Population: Trespasser
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)Pyrene	0.906	mg/kg	0.9	mg/kg	M	2.3E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Antimony	59	mg/kg	59	mg/kg	M	1.5E-05	mg/kg/day	4.0E-04	mg/kg/day	NA	NA	0.04
	Arsenic	36	mg/kg	36	mg/kg	M	9.1E-06	mg/kg/day	3.0E-04	mg/kg/day	NA	NA	0.03
	Iron	67358	mg/kg	67358	mg/kg	M	1.7E-02	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	0.06
													0.1
Dermal	Benzo(a)Pyrene	0.9	mg/kg	0.9	mg/kg	M	1.0E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Antimony	59	mg/kg	59	mg/kg	M	6.6E-07	mg/kg/day	4.0E-05	mg/kg/day	NA	NA	0.017
	Arsenic	36	mg/kg	36	mg/kg	M	1.3E-06	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.004
	Iron	67358	mg/kg	67358	mg/kg	M	7.5E-04	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.01
												Total	0.03
												Total Hazard Index Across All Exposure Routes/Pathways	0.2

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table J-7.3
Calculation of Non-Cancer Hazards - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from Surface Soil at Site 3
Receptor Population: Trespasser
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value (1)	Route EPC Units	EPC Selected for Hazard Calculation (2)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Benzo(a)Pyrene	0.906	mg/kg	0.0000000007	mg/m^3	R	2.2E-12	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Antimony	39	mg/kg	0.00000003	mg/m^3	R	9.7E-11	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Arsenic	39	mg/kg	0.00000003	mg/m^3	R	9.7E-11	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Iron	78114	mg/kg	0.00006	mg/m^3	R	1.9E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
												Total	NA
												Total Hazard Index Across All Exposure Routes/Pathways	NA

(1) Route-specific EPC value is equal to the medium EPC value multiplied by 1/PEF (PEF = 1.32E+09mg3/kg).

(2) Route-Specific (R) EPC selected for hazard calculation.

Table J-7.4
Calculation of Non-Cancer Hazards - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from Surface Soil at Site 3
Receptor Population: Trespasser
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value (1)	Route EPC Units	EPC Selected for Hazard Calculation (2)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Benzo(a)Pyrene	0.906	mg/kg	0.0000000007	mg/m^3	R	2.4E-12	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Antimony	39	mg/kg	0.00000003	mg/m^3	R	1.1E-10	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Arsenic	39	mg/kg	0.00000003	mg/m^3	R	1.1E-10	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Iron	78114	mg/kg	0.00006	mg/m^3	R	2.1E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
												Total	NA
												Total Hazard Index Across All Exposure Routes/Pathways	NA

(1) Route-specific EPC value is equal to the medium EPC value multilplied by 1/PEF (PEF = 1.32E+09mg3/kg).
(2) Route-Specific (R) EPC selected for hazard calculation.

Table J-7.5
Calculation of Non-Cancer Hazards - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Deep Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Chloroform	0.4	ug/l	0.4	ug/l	M	1.1E-05	mg/kg/day	1.0E-02	mg/kg/day	NA	NA	0.001
	Arsenic	3.4	ug/l	3.4	ug/l	M	9.2E-05	mg/kg/day	3.0E-04	mg/kg/day	NA	NA	0.3
	Manganese	612	ug/l	612	ug/l	M	1.7E-02	mg/kg/day	2.0E-02	mg/kg/day	NA	NA	0.8
	Thallium	2.5	ug/l	2.5	ug/l	M	6.9E-05	mg/kg/day	7.0E-05	mg/kg/day	NA	NA	1.0
												Total	2
Dermal	Chloroform	0.4	ug/l	0.4	ug/l	M	9.2E-07	mg/kg/day	1.0E-02	mg/kg/day	NA	NA	0.00009
	Arsenic	3.4	ug/l	3.4	ug/l	M	2.3E-07	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.0008
	Manganese	612	ug/l	612	ug/l	M	4.2E-05	mg/kg/day	7.0E-03	mg/kg/day	NA	NA	0.006
	Thallium	2.5	ug/l	2.5	ug/l	M	1.7E-07	mg/kg/day	7.0E-05	mg/kg/day	NA	NA	0.002
												Total	0.009
												Total Hazard Index Across All Exposure Routes/Pathways	2

(1) Medium-Specific (M) EPC selected for hazard calculation.
Dermally absorbed dose per exposure event calculated in Table 7.5 RME Supplement

Table J-7.5 RME Supplement
Calculation of Daevent, Adult Resident
Deep Groundwater/Tap Water
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC)	Lag Time (t)	B (dimensionless)	Duration of Event (ET)	t*	Eq	DAevent
Chloroform	4.0E-01	µg/l	8.9E-03	4.7E-01	9.3E-03	0.25	1.1E+00	2	3.4E-09
Arsenic	3.4E+00	µg/l	1.0E-03	N/A	N/A	0.25	N/A	1	8.4E-10
Manganese	6.1E+02	µg/l	1.0E-03	N/A	N/A	0.25	N/A	1	1.5E-07
Thallium	2.5E+00	µg/l	1.0E-03	N/A	N/A	0.25	N/A	1	6.3E-10

Inorganics: DAevent (mg/cm2-event) =
PC x EPC x ET x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
ET<t*: DAevent (mg/cm2-event) =
2 x PC x EPC x (sqrt((6 x t x ET)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:
Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

Table J-7.6
Calculation of Non-Cancer Hazards - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Deep Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Chloroform	0.4	ug/l	0.4	ug/l	M	2.6E-05	mg/kg/day	1.0E-02	mg/kg/day	NA	NA	0.003
	Arsenic	3.4	ug/l	3.4	ug/l	M	2.1E-04	mg/kg/day	3.0E-04	mg/kg/day	NA	NA	0.7
	Manganese	612	ug/l	612	ug/l	M	3.9E-02	mg/kg/day	2.0E-02	mg/kg/day	NA	NA	2
	Thallium	2.5	ug/l	2.5	ug/l	M	1.6E-04	mg/kg/day	7.0E-05	mg/kg/day	NA	NA	2
												Total	5
Dermal	Chloroform	0.4	ug/l	0.4	ug/l	M	1.8E-06	mg/kg/day	1.0E-02	mg/kg/day	NA	NA	0.0002
	Arsenic	3.4	ug/l	3.4	ug/l	M	5.1E-07	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.002
	Manganese	612	ug/l	612	ug/l	M	9.3E-05	mg/kg/day	7.0E-03	mg/kg/day	NA	NA	0.01
	Thallium	2.5	ug/l	2.5	ug/l	M	3.8E-07	mg/kg/day	7.0E-05	mg/kg/day	NA	NA	0.005
												Total	0.02
												Total Hazard Index Across All Exposure Routes/Pathways	5

(1) Medium-Specific (M) EPC selected for hazard calculation.
Dermally absorbed dose per exposure event calculated in Table 7.6 RME Supplement

Table J-7.6 RME Supplement
Calculation of Daevent, Child Resident
Deep Groundwater - Tap Water
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC)	Lag Time (t)	B (dimensionless)	Duration of Event (ET)	t*	Eq	DAevent
Chloroform	4.0E-01	µg/l	8.9E-03	4.7E-01	9.3E-03	0.33	1.1E+00	2	3.9E-09
Arsenic	3.4E+00	µg/l	1.0E-03	N/A	N/A	0.33	N/A	1	1.1E-09
Manganese	6.1E+02	µg/l	1.0E-03	N/A	N/A	0.33	N/A	1	2.0E-07
Thallium	2.5E+00	µg/l	1.0E-03	N/A	N/A	0.33	N/A	1	8.3E-10

Inorganics: DAevent (mg/cm2-event) =
PC x EPC x ET x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
ET<t*: DAevent (mg/cm2-event) =
2 x PC x EPC x (sqrt((6 x t x ET)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:
Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

Table J-7.7
Calculation of Non-Cancer Hazards - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Deep Groundwater - Water Vapors at Shower Head
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Chloroform	0.4	ug/l	2.2E-05	mg/kg-shower	R	2.1E-05	mg/kg/day	8.6E-05	mg/kg/day	3.0E-04	mg/m3	0.2
												Total	0.2
												Total Hazard Index Across All Exposure Routes/Pathways	0.2

(1) Route-Specific (R) EPC selected for hazard calculation.
Route EPC calculated using Foster and Chrostowski Shower Model (Table 7.7 RME Supplement)

Table J-7.7 RME Supplement
Inhalation Exposure Concentrations from Foster and Chrostowski Shower Model
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical	Exposure Point Concentration Cwo (µg/l)	Molecular weight (HH) (g/mole)	Henry's Law Constant (H) (atm-m^3/mole)	Kg (VOC) (cm/hr)	Kl(VOC) (cm/hr)	KL (cm/hr)	Kal (cm/hr)	Cwd (µg/l)	S (µg/m^3-min)	Calculated Inhalation Exposure (Einh) (mg/kg/shower)
Chloroform	4.0E-01	1.2E+02	4.4E-03	1.16E+03	1.21E+01	1.15E+01	1.55E+01	1.61E-01	1.08E+00	2.20E-05

Variables	Units	Exposure Assumptions	Source
Kg(VOC) = gas-film mass transfer coefficient	cm/hr	Solved by Eq 1	NA
Kl(VOC) = liquid-film mass transfer coefficient	cm/hr	Solved by Eq 2	NA
KL = overall mass transfer coefficient	cm/hr	Solved by Eq 3	NA
Kal = adjusted overall mass transfer coeff.	cm/hr	Solved by Eq 4	NA
Tl = Calibration temp. of water	K (20C +273)	293	F&C
Ts = Shower water temperature	k (45C)	318	F&C
Us = water viscosity at Ts	centipoise	0.596	F&C
Ul = water viscosity at Tl	cp	1.002	F&C
Cwd = conc. leaving droplets after time sdt	ug/l	Solved by Eq 5	NA
sdt = shower droplet drop time	sec	2	F&C
d = shower droplet diameter	mm	1	F&C
FR = shower water flow rate	l/min	20	F&C
SV = shower room air volume	m^3	3	F&C
S = indoor VOC generation rate	ug/m^3-min	Solved by Eq 6	NA
VR = ventilation rate	l/min	13.8	JSEPA, 1991
BW = body weight	kg	70	JSEPA, 1991
Ds = duration of shower	min	12	JSEPA, 1989
Dt = total duration in shower room	min	15	
R = air exchange rate	min^{-1}	0.0083	F&C
Ca = indoor air concentration of VOCs	ug/m^3	Solved by Eq 7	NA
Einh = inhalation exposure per shower	mg/kg/shower	Solved by Eq 8	NA

Equation 1:	Kg(VOC) =	$3000 * (18 / HH)^{0.5}$
Equation 2:	Kl(VOC) =	$20 * (44 / HH)^{0.5}$
Equation 3:	KL =	$((1 / Kl(VOC)) + (0.024 / (Kg\ (VOC) * H)))^{-1}$
Equation 4:	Kal =	$(KL * (((Tl * Us) / (Ts * Ul))^{-0.5}))$
Equation 5:	Cwd =	(Cwo * (1-EXP((-1 * Kal * sdt)/(60 * d))))
Equation 6:	S =	(Cwd * FR / SV)
Equation 7:	see time series example on Table I-GW-5	
Equation 8:	**Einh =**	**If t>Ds** (((VR * S) / (BW * R * 1000000)) * ((Ds + (EXP(-R * Dt) / R)-(EXP(R * (Ds - Dt))) / R)))

Henry's Law Constant from USEPA's *Superfund Public Health Evaluation Manual.* USEPA/540/1-86/060, October 1986.

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual. Interim Final. OSWER Directive 9285.6-03.

USEPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

F&C. Foster, S. A. and P. C. Chrostowski. 1987. Inhalation Exposures to Volatile Organic Contaminants in the Shower. ICF-Clement Associates, Inc. Washington, D.C.

Table J-7.8
Calculation of Non-Cancer Hazards - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water at Site 3
Receptor Population: Trespasser
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	Aluminum	70600	ug/l	70600	ug/l	M	7.2E-04	mg/kg/day	2.7E-01	mg/kg/day	NA	NA	0.003
	Arsenic	4.8	ug/l	4.8	ug/l	M	4.8E-08	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.0002
	Iron	66900	ug/l	66900	ug/l	M	6.8E-04	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.01
	Manganese	6330	ug/l	6330	ug/l	M	6.4E-05	mg/kg/day	7.0E-03	mg/kg/day	NA	NA	0.009
												Total	0.02
												Total Hazard Index Across All Exposure Routes/Pathways	0.02

(1) Medium-Specific (M) EPC selected for hazard calculation.
Dermally absorbed dose per exposure event calculated in Table 7.8 RME Supplement

Table J-7.8 RME Supplement
Calculation of Daevent, Adult and Adolescent Trespasser
Surface Water
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC)	Lag Time (t)	B (dimensionless)	Duration of Event (ET)	t*	Eq	DAevent
Aluminum	7.1E+04	µg/l	1.0E-03	N/A	N/A	1	N/A	1	7.1E-05
Arsenic	4.8E+00	µg/l	1.0E-03	N/A	N/A	1	N/A	1	4.8E-09
Iron	6.7E+04	µg/l	1.0E-03	N/A	N/A	1	N/A	1	6.7E-05
Manganese	6.3E+03	µg/l	1.0E-03	N/A	N/A	1	N/A	1	6.3E-06

Inorganics: DAevent (mg/cm2-event) =
PC x EPC x ET x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
ET<t*: DAevent (mg/cm2-event) =
2 x PC x EPC x (sqrt((6 x t x ET)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:
Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

Table J-7.9
Calculation of Non-Cancer Hazards - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water at Site 3
Receptor Population: Trespasser
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	Aluminum	70600	ug/l	70600	ug/l	M	7.2E-04	mg/kg/day	2.7E-01	mg/kg/day	NA	NA	0.003
	Arsenic	4.8	ug/l	4.8	ug/l	M	4.8E-08	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.0002
	Iron	66900	ug/l	66900	ug/l	M	6.8E-04	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.01
	Manganese	6330	ug/l	6330	ug/l	M	6.4E-05	mg/kg/day	7.0E-03	mg/kg/day	NA	NA	0.009
												Total	0.02
												Total Hazard Index Across All Exposure Routes/Pathways	0.02

(1) Medium-Specific (M) EPC selected for hazard calculation.
Dermally absorbed dose per exposure event calculated in Table 7.8 RME Supplement

Table J-7.10
Calculation of Non-Cancer Hazards - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 3
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1254	0.045	mg/kg	0.045	mg/kg	M	6.2E-08	mg/kg/day	2.0E-05	mg/kg/day	NA	NA	0.003
	Benzo(a)Anthracene	0.569	mg/kg	0.569	mg/kg	M	7.8E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(a)Pyrene	0.559	mg/kg	0.559	mg/kg	M	7.7E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(b)Fluoranthene	1.107	mg/kg	1.107	mg/kg	M	1.5E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Dibenz(a,h)Anthracene	0.238	mg/kg	0.238	mg/kg	M	3.3E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Indeno(1,2,3-cd)Pyrene	0.389	mg/kg	0.389	mg/kg	M	5.3E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Total Dioxins	0.00006	mg/kg	0.00006	mg/kg	M	8.2E-11	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Aluminum	12068	mg/kg	12068	mg/kg	M	1.7E-02	mg/kg/day	1.0E+00	mg/kg/day	NA	NA	0.02
	Antimony	15	mg/kg	15	mg/kg	M	2.1E-05	mg/kg/day	4.0E-04	mg/kg/day	NA	NA	0.05
	Arsenic	18	mg/kg	18	mg/kg	M	2.5E-05	mg/kg/day	3.0E-04	mg/kg/day	NA	NA	0.1
	Barium	255	mg/kg	255	mg/kg	M	3.5E-04	mg/kg/day	7.0E-02	mg/kg/day	NA	NA	0.005
	Cadmium	3	mg/kg	3	mg/kg	M	3.5E-06	mg/kg/day	1.0E-03	mg/kg/day	NA	NA	0.004
	Chromium	41	mg/kg	41	mg/kg	M	5.6E-05	mg/kg/day	3.0E-03	mg/kg/day	NA	NA	0.02
	Copper	692	mg/kg	692	mg/kg	M	9.5E-04	mg/kg/day	3.7E-02	mg/kg/day	NA	NA	0.03
	Iron	46040	mg/kg	46040	mg/kg	M	6.3E-02	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	0.2
	Manganese	264	mg/kg	264	mg/kg	M	3.6E-04	mg/kg/day	2.0E-02	mg/kg/day	NA	NA	0.02
	Thallium	0.8	mg/kg	0.8	mg/kg	M	1.1E-06	mg/kg/day	7.0E-05	mg/kg/day	NA	NA	0.02
	Vanadium	46	mg/kg	46	mg/kg	M	6.3E-05	mg/kg/day	7.0E-03	mg/kg/day	NA	NA	0.01
	Zinc	726	mg/kg	726	mg/kg	M	9.9E-04	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	0.003
												Total	0.5

Table J-7.10
Calculation of Non-Cancer Hazards - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 3
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	Aroclor-1254	0.045	mg/kg	0.045	mg/kg	M	3.5E-08	mg/kg/day	1.8E-05	mg/kg/day	NA	NA	0.002
	Benzo(a)Anthracene	0.569	mg/kg	0.569	mg/kg	M	7.4E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(a)Pyrene	0.559	mg/kg	0.559	mg/kg	M	7.3E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(b)Fluoranthene	1.107	mg/kg	1.107	mg/kg	M	1.4E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Dibenz(a,h)Anthracene	0.238	mg/kg	0.238	mg/kg	M	3.1E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Indeno(1,2,3-cd)Pyrene	0.389	mg/kg	0.389	mg/kg	M	5.1E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Total Dioxins	0.00006	mg/kg	0.00006	mg/kg	M	2.3E-11	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Aluminum	12068	mg/kg	12068	mg/kg	M	1.6E-03	mg/kg/day	2.7E-01	mg/kg/day	NA	NA	0.006
	Antimony	15	mg/kg	15	mg/kg	M	2.0E-06	mg/kg/day	4.0E-05	mg/kg/day	NA	NA	0.05
	Arsenic	18	mg/kg	18	mg/kg	M	7.7E-06	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.03
	Barium	255	mg/kg	255	mg/kg	M	3.3E-05	mg/kg/day	7.0E-02	mg/kg/day	NA	NA	0.0005
	Cadmium	3	mg/kg	3	mg/kg	M	3.3E-07	mg/kg/day	2.5E-05	mg/kg/day	NA	NA	0.01
	Chromium	41	mg/kg	41	mg/kg	M	5.3E-06	mg/kg/day	3.0E-05	mg/kg/day	NA	NA	0.2
	Copper	692	mg/kg	692	mg/kg	M	9.0E-05	mg/kg/day	2.2E-02	mg/kg/day	NA	NA	0.004
	Iron	46040	mg/kg	46040	mg/kg	M	6.0E-03	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.1
	Manganese	264	mg/kg	264	mg/kg	M	3.4E-05	mg/kg/day	7.0E-03	mg/kg/day	NA	NA	0.005
	Thallium	0.8	mg/kg	0.8	mg/kg	M	1.0E-07	mg/kg/day	7.0E-05	mg/kg/day	NA	NA	0.001
	Vanadium	46	mg/kg	46	mg/kg	M	5.9E-06	mg/kg/day	1.4E-04	mg/kg/day	NA	NA	0.04
	Zinc	726	mg/kg	726	mg/kg	M	9.4E-05	mg/kg/day	7.5E-02	mg/kg/day	NA	NA	0.001
												Total	0.4
												Total Hazard Index Across All Exposure Routes/Pathways	0.9

*Subsurface and Surface Soil Combined.
(1) Medium-Specific (M) EPC selected for hazard calculation.

Table J-7.11
Calculation of Non-Cancer Hazards - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 3
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1254	0.045	mg/kg	0.045	mg/kg	M	5.8E-07	mg/kg/day	2.0E-05	mg/kg/day	NA	NA	0.03
	Benzo(a)Anthracene	0.569	mg/kg	0.569	mg/kg	M	7.3E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(a)Pyrene	0.559	mg/kg	0.559	mg/kg	M	7.1E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(b)Fluoranthene	1.107	mg/kg	1.107	mg/kg	M	1.4E-05	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Dibenz(a,h)Anthracene	0.238	mg/kg	0.238	mg/kg	M	3.0E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Indeno(1,2,3-cd)Pyrene	0.389	mg/kg	0.389	mg/kg	M	5.0E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Total Dioxins	0.00006	mg/kg	0.00006	mg/kg	M	7.7E-10	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Aluminum	12068	mg/kg	12068	mg/kg	M	1.5E-01	mg/kg/day	1.0E+00	mg/kg/day	NA	NA	0.2
	Antimony	15	mg/kg	15	mg/kg	M	2.0E-04	mg/kg/day	4.0E-04	mg/kg/day	NA	NA	0.5
	Arsenic	18	mg/kg	18	mg/kg	M	2.4E-04	mg/kg/day	3.0E-04	mg/kg/day	NA	NA	0.8
	Barium	255	mg/kg	255	mg/kg	M	3.3E-03	mg/kg/day	7.0E-02	mg/kg/day	NA	NA	0.05
	Cadmium	3	mg/kg	3	mg/kg	M	3.3E-05	mg/kg/day	1.0E-03	mg/kg/day	NA	NA	0.03
	Chromium	41	mg/kg	41	mg/kg	M	5.2E-04	mg/kg/day	2.0E-02	mg/kg/day	NA	NA	0.03
	Copper	692	mg/kg	692	mg/kg	M	8.8E-03	mg/kg/day	3.7E-02	mg/kg/day	NA	NA	0.2
	Iron	46040	mg/kg	46040	mg/kg	M	5.9E-01	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	2
	Manganese	264	mg/kg	264	mg/kg	M	3.4E-03	mg/kg/day	2.0E-02	mg/kg/day	NA	NA	0.2
	Thallium	0.8	mg/kg	0.8	mg/kg	M	1.0E-05	mg/kg/day	7.0E-05	mg/kg/day	NA	NA	0.1
	Vanadium	46	mg/kg	46	mg/kg	M	5.8E-04	mg/kg/day	7.0E-03	mg/kg/day	NA	NA	0.1
	Zinc	726	mg/kg	726	mg/kg	M	9.3E-03	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	0.03
												Total	4

Table J-7.11
Calculation of Non-Cancer Hazards - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 3
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	Aroclor-1254	0.045	mg/kg	0.045	mg/kg	M	6.8E-08	mg/kg/day	1.8E-05	mg/kg/day	NA	NA	0.004
	Benzo(a)Anthracene	0.569	mg/kg	0.569	mg/kg	M	1.4E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(a)Pyrene	0.559	mg/kg	0.559	mg/kg	M	1.4E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(b)Fluoranthene	1.107	mg/kg	1.107	mg/kg	M	2.8E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Dibenz(a,h)Anthracene	0.238	mg/kg	0.238	mg/kg	M	6.0E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Indeno(1,2,3-cd)Pyrene	0.389	mg/kg	0.389	mg/kg	M	9.8E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Total Dioxins	0.00006	mg/kg	0.00006	mg/kg	M	4.6E-11	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Aluminum	12068	mg/kg	12068	mg/kg	M	3.1E-03	mg/kg/day	2.7E-01	mg/kg/day	NA	NA	0.01
	Antimony	15	mg/kg	15	mg/kg	M	3.9E-06	mg/kg/day	4.0E-05	mg/kg/day	NA	NA	0.10
	Arsenic	18	mg/kg	18	mg/kg	M	1.5E-05	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.05
	Barium	255	mg/kg	255	mg/kg	M	6.5E-05	mg/kg/day	7.0E-02	mg/kg/day	NA	NA	0.001
	Cadmium	3	mg/kg	3	mg/kg	M	6.5E-07	mg/kg/day	2.5E-05	mg/kg/day	NA	NA	0.03
	Chromium	41	mg/kg	41	mg/kg	M	1.0E-05	mg/kg/day	2.0E-04	mg/kg/day	NA	NA	0.1
	Copper	692	mg/kg	692	mg/kg	M	1.8E-04	mg/kg/day	2.2E-02	mg/kg/day	NA	NA	0.008
	Iron	46040	mg/kg	46040	mg/kg	M	1.2E-02	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.2
	Manganese	264	mg/kg	264	mg/kg	M	6.7E-05	mg/kg/day	7.0E-03	mg/kg/day	NA	NA	0.01
	Thallium	0.8	mg/kg	0.8	mg/kg	M	2.0E-07	mg/kg/day	7.0E-05	mg/kg/day	NA	NA	0.003
	Vanadium	46	mg/kg	46	mg/kg	M	1.2E-05	mg/kg/day	1.4E-04	mg/kg/day	NA	NA	0.1
	Zinc	726	mg/kg	726	mg/kg	M	1.8E-04	mg/kg/day	7.5E-02	mg/kg/day	NA	NA	0.002
												Total	0.5
												Total Hazard Index Across All Exposure Routes/Pathways	5

*Subsurface and Surface Soil Combined.

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table J-7.12
Calculation of Non-Cancer Hazards - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 3
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)Pyrene	0.559	mg/kg	0.559	mg/kg	M	2.6E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Total Dioxins	0.00006	mg/kg	0.00006	mg/kg	M	2.8E-10	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Antimony	15	mg/kg	15	mg/kg	M	7.2E-05	mg/kg/day	4.0E-04	mg/kg/day	NA	NA	0.2
	Arsenic	18	mg/kg	18	mg/kg	M	8.6E-05	mg/kg/day	3.0E-04	mg/kg/day	NA	NA	0.3
	Iron	46040	mg/kg	46040	mg/kg	M	2.2E-01	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	0.7
												Total	1
Dermal	Benzo(a)Pyrene	0.559	mg/kg	0.559	mg/kg	M	6.5E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Total Dioxins	0.00006	mg/kg	0.00006	mg/kg	M	2.1E-11	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Antimony	15	mg/kg	15	mg/kg	M	1.8E-06	mg/kg/day	4.0E-05	mg/kg/day	NA	NA	0.04
	Arsenic	18	mg/kg	18	mg/kg	M	6.9E-06	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.02
	Iron	46040	mg/kg	46040	mg/kg	M	5.4E-03	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.09
												Total	0.2
												Total Hazard Index Across All Exposure Routes/Pathways	1

*Subsurface and Surface Soil Combined.

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table J-7.13
Calculation of Non-Cancer Hazards - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 3
Receptor Population: Other Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)Pyrene	0.559	mg/kg	0.559	mg/kg	M	2.7E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Total Dioxins	0.00006	mg/kg	0.00006	mg/kg	M	2.9E-11	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Antimony	15	mg/kg	15	mg/kg	M	7.5E-06	mg/kg/day	4.0E-04	mg/kg/day	NA	NA	0.02
	Arsenic	18	mg/kg	18	mg/kg	M	9.0E-06	mg/kg/day	3.0E-04	mg/kg/day	NA	NA	0.03
	Iron	46040	mg/kg	46040	mg/kg	M	2.3E-02	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	0.08
												Total	0.1
Dermal	Benzo(a)Pyrene	0.559	mg/kg	0.559	mg/kg	M	1.9E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Total Dioxins	0.00006	mg/kg	0.00006	mg/kg	M	6.2E-12	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Antimony	15	mg/kg	15	mg/kg	M	5.3E-07	mg/kg/day	4.0E-05	mg/kg/day	NA	NA	0.01
	Arsenic	18	mg/kg	18	mg/kg	M	2.0E-06	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.007
	Iron	46040	mg/kg	46040	mg/kg	M	1.6E-03	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.03
												Total	0.05
												Total Hazard Index Across All Exposure Routes/Pathways	0.2

*Subsurface and Surface Soil Combined.
(1) Medium-Specific (M) EPC selected for hazard calculation.

Table J-7.14
Calculation of Non-Cancer Hazards - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Air
Exposure Point: Emissions from Soil at Site 3
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value (1)	Route EPC Units	EPC Selected for Hazard Calculation (2)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Benzo(a)Pyrene	0.559	mg/kg	0.0000000004	mg/m^3	R	8.3E-11	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Total Dioxins	0.00006	mg/kg	0.00000000000005	mg/m^3	R	8.9E-15	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Antimony	15	mg/kg	0.00000001	mg/m^3	R	2.3E-09	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Arsenic	18	mg/kg	0.00000001	mg/m^3	R	2.7E-09	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Iron	46040	mg/kg	0.00003	mg/m^3	R	6.8E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
												Total	NA
												Total Hazard Index Across All Exposure Routes/Pathways	NA

*Subsurface and Surface Soil Combined.

(1) Route-specific EPC value is equal to the medium EPC value multiplied by 1/PEF (PEF = 1.32E+09mg3/kg).

(2) Route-Specific (R) EPC selected for hazard calculation.

Table J-7.15
Calculation of Non-Cancer Hazards - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water at Site 3
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	Aluminum	70600	ug/l	70600	ug/l	M	1.4E-03	mg/kg/day	2.7E-01	mg/kg/day	NA	NA	0.005
	Arsenic	4.8	ug/l	4.8	ug/l	M	9.7E-08	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.0003
	Iron	66900	ug/l	66900	ug/l	M	1.4E-03	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.02
	Manganese	6330	ug/l	6330	ug/l	M	1.3E-04	mg/kg/day	7.0E-03	mg/kg/day	NA	NA	0.02
												Total	0.05
												Total Hazard Index Across All Exposure Routes/Pathways	0.05

(1) Medium-Specific (M) EPC selected for hazard calculation.
Dermally absorbed dose per exposure event calculated in Table 7.15 RME Supplement

Table J-7.15 RME Supplement
Calculation of Daevent, Adult and Child Resident
Surface Water
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC)	Lag Time (t)	B (dimensionless)	Duration of Event (ET)	t*	Eq	DAevent
Aluminum	7.1E+04	µg/l	1.0E-03	N/A	N/A	2	N/A	1	1.4E-04
Arsenic	4.8E+00	µg/l	1.0E-03	N/A	N/A	2	N/A	1	9.5E-09
Iron	6.7E+04	µg/l	1.0E-03	N/A	N/A	2	N/A	1	1.3E-04
Manganese	6.3E+03	µg/l	1.0E-03	N/A	N/A	2	N/A	1	1.3E-05

Inorganics: DAevent (mg/cm2-event) =
PC x EPC x ET x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
ET<t*: DAevent (mg/cm2-event) =
2 x PC x EPC x (sqrt((6 x t x ET)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:
Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

Table J-7.16
Calculation of Non-Cancer Hazards - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water at Site 3
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	Aluminum	70600	ug/l	70600	ug/l	M	4.8E-03	mg/kg/day	2.7E-01	mg/kg/day	NA	NA	0.02
	Arsenic	4.8	ug/l	4.8	ug/l	M	3.3E-07	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.001
	Iron	66900	ug/l	66900	ug/l	M	4.6E-03	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.08
	Manganese	6330	ug/l	6330	ug/l	M	4.3E-04	mg/kg/day	7.0E-03	mg/kg/day	NA	NA	0.06
												Total	0.2
												Total Hazard Index Across All Exposure Routes/Pathways	0.2

(1) Medium-Specific (M) EPC selected for hazard calculation.
Dermally absorbed dose per exposure event calculated in Table 7.15 RME Supplement

Table J-7.17
Calculation of Non-Cancer Hazards - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment at Site 3
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Antimony	173	mg/kg	173	mg/kg	M	3.5E-05	mg/kg/day	4.0E-04	mg/kg/day	NA	NA	0.09
	Arsenic	24	mg/kg	24	mg/kg	M	4.9E-06	mg/kg/day	3.0E-04	mg/kg/day	NA	NA	0.02
	Iron	91000	mg/kg	91000	mg/kg	M	1.9E-02	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	0.06
												Total	0.2
Dermal	Antimony	173	mg/kg	173	mg/kg	M	3.3E-06	mg/kg/day	4.0E-05	mg/kg/day	NA	NA	0.08
	Arsenic	24	mg/kg	24	mg/kg	M	1.5E-06	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.005
	Iron	91000	mg/kg	91000	mg/kg	M	1.8E-03	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.03
												Total	0.1
												Total Hazard Index Across All Exposure Routes/Pathways	0.3

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table J-7.18
Calculation of Non-Cancer Hazards - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment at Site 3
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Antimony	173	mg/kg	173	mg/kg	M	3.3E-04	mg/kg/day	4.0E-04	mg/kg/day	NA	NA	0.8
	Arsenic	24	mg/kg	24	mg/kg	M	4.6E-05	mg/kg/day	3.0E-04	mg/kg/day	NA	NA	0.2
	Iron	91000	mg/kg	91000	mg/kg	M	1.7E-01	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	0.6
												Total	2
Dermal	Antimony	173	mg/kg	173	mg/kg	M	4.0E-04	mg/kg/day	4.0E-05	mg/kg/day	NA	NA	10
	Arsenic	24	mg/kg	24	mg/kg	M	1.8E-04	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.6
	Iron	91000	mg/kg	91000	mg/kg	M	2.1E-01	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	3
												Total	14
												Total Hazard Index Across All Exposure Routes/Pathways	16

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table J-7.19
Calculation of Non-Cancer Hazards - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Shallow Groundwater
Exposure Point: Water Table
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	Heptachlor	0.024	ug/l	0.024	ug/l	M	5.2E-08	mg/kg/day	2.5E-04	mg/kg/day	NA	NA	0.0002
	Bis(2-Ethylhexyl)Phthalate	9.8	ug/l	9.8	ug/l	M	7.1E-05	mg/kg/day	1.1E-02	mg/kg/day	NA	NA	0.006
	Dibenzofuran	7.0	ug/l	7.0	ug/l	M	3.5E-05	mg/kg/day	2.8E-03	mg/kg/day	NA	NA	0.01
	Naphthalene	8.0	ug/l	8.0	ug/l	M	1.9E-05	mg/kg/day	1.6E-02	mg/kg/day	NA	NA	0.001
	Aluminum	19200	ug/l	19200	ug/l	M	4.7E-04	mg/kg/day	2.7E-01	mg/kg/day	NA	NA	0.002
	Antimony	1.4	ug/l	1.4	ug/l	M	3.5E-08	mg/kg/day	4.0E-05	mg/kg/day	NA	NA	0.0009
	Arsenic	4.1	ug/l	4.1	ug/l	M	1.0E-07	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.0004
	Chromium	39	ug/l	39	ug/l	M	9.5E-07	mg/kg/day	2.0E-04	mg/kg/day	NA	NA	0.005
	Iron	33266	ug/l	33266	ug/l	M	8.2E-04	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.01
	Manganese	3212	ug/l	3212	ug/l	M	7.9E-05	mg/kg/day	7.0E-03	mg/kg/day	NA	NA	0.01
	Nickel	69.6	ug/l	70	ug/l	M	1.7E-07	mg/kg/day	2.0E-04	mg/kg/day	NA	NA	0.0009
	Vanadium	43	ug/l	43	ug/l	M	1.1E-06	mg/kg/day	1.4E-04	mg/kg/day	NA	NA	0.008
												Total	0.06
												Total Hazard Index Across All Exposure Routes/Pathways	0.06

(1) Medium-Specific (M) EPC selected for hazard calculation.
Dermally absorbed dose per exposure event calculated in Table 7.19 RME Supplement A

Table J-7.19 RME Supplement A
Calculation of Daevent, Adult Construction Worker
Shallow Groundwater
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC)	Lag Time (t)	B (dimensionless)	Duration of Event (ET)	t*	Eq	DAevent
Heptachlor	2.4E-02	µg/l	1.1E-02	1.7E+01	1.9E+00	2	9.4E+01	2	4.3E-09
Bis(2-Ethylhexyl)Phthalate	9.8E+00	µg/l	3.3E-02	2.1E+01	1.3E+01	2	1.0E+02	2	5.8E-06
Dibenzofuran	7.0E+00	µg/l	1.1E-01	9.3E-01	8.1E-01	2	1.7E+01	2	2.8E-06
Naphthalene	8.0E+00	µg/l	6.9E-02	5.3E-01	2.0E-01	2	2.2E+00	2	1.6E-06
Aluminum	1.9E+04	µg/l	1.0E-03	N/A	N/A	2	N/A	1	3.8E-05
Antimony	1.4E+00	µg/l	1.0E-03	N/A	N/A	2	N/A	1	2.8E-09
Arsenic	4.1E+00	µg/l	1.0E-03	N/A	N/A	2	N/A	1	8.1E-09
Chromium	3.9E+01	µg/l	1.0E-03	N/A	N/A	2	N/A	1	7.7E-08
Iron	3.3E+04	µg/l	1.0E-03	N/A	N/A	2	N/A	1	6.7E-05
Manganese	3.2E+03	µg/l	1.0E-03	N/A	N/A	2	N/A	1	6.4E-06
Nickel	7.0E+01	µg/l	1.0E-04	N/A	N/A	2	N/A	1	1.4E-08
Vanadium	4.3E+01	µg/l	1.0E-03	N/A	N/A	2	N/A	1	8.6E-08

Inorganics: DAevent (mg/cm2-event) =
PC x EPC x ET x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
ET<t*: DAevent (mg/cm2-event) =
2 x PC x EPC x (sqrt((6 x t x ET)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:
Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

Table J-7.19 RME Supplement B
Calculation of Daevent
Shallow Groundwater
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical	MW	log Kow	Kow	log Kp[1]	Kp (cm/hr)	B[1]	log Dsc/lsc[1]	lsc (cm)	log Dsc[1]	Dsc (cm^2/hr)	Tau[1] (hr)	c[1]	b[1]	T*[1] (hr)
Dibenzofuran	168.19	3.91	8.13E+03	-9.70E-01	1.07E-01	8.13E-01	-3.75E+00	1.00E-03	-6.75E+00	1.79E-07	9.29E-01	1.15E+00	9.46E-01	1.66E+01

1. Equations from *Dermal Exposure Assessment: Principles and Applications*. EPA/600/8-91/011B. January 1992.

Table J-7.20
Calculation of Non-Cancer Hazards - CT
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Deep Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Chloroform	0.4	ug/l	0.4	ug/l	M	5.1E-06	mg/kg/day	1.0E-02	mg/kg/day	NA	NA	0.0005
	Arsenic	1.9	ug/l	1.9	ug/l	M	2.4E-05	mg/kg/day	3.0E-04	mg/kg/day	NA	NA	0.08
	Manganese	251	ug/l	251	ug/l	M	3.2E-03	mg/kg/day	2.0E-02	mg/kg/day	NA	NA	0.2
	Thallium	1.5	ug/l	1.5	ug/l	M	1.9E-05	mg/kg/day	7.0E-05	mg/kg/day	NA	NA	0.3
												Total	0.5
Dermal	Chloroform	0.4	ug/l	0.4	ug/l	M	4.3E-07	mg/kg/day	1.0E-02	mg/kg/day	NA	NA	0.00004
	Arsenic	1.9	ug/l	1.9	ug/l	M	5.0E-08	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.0002
	Manganese	251	ug/l	251	ug/l	M	6.6E-06	mg/kg/day	7.0E-03	mg/kg/day	NA	NA	0.0009
	Thallium	1.5	ug/l	1.5	ug/l	M	3.9E-08	mg/kg/day	7.0E-05	mg/kg/day	NA	NA	0.0006
												Total	0.002
												Total Hazard Index Across All Exposure Routes/Pathways	0.5

(1) Medium-Specific (M) EPC selected for hazard calculation.
Dermally absorbed dose per exposure event calculated in Table 7.20 CT Supplement

Table J-7.20 CT Supplement
Calculation of Daevent, Adult Resident
Deep Groundwater - Tap Water
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC)	Lag Time (t)	B (dimensionless)	Duration of Event (ET)	t*	Eq	DAevent
Chloroform	4.0E-01	µg/l	8.9E-03	4.7E-01	9.3E-03	0.17	1.1E+00	2	2.8E-09
Arsenic	1.9E+00	µg/l	1.0E-03	N/A	N/A	0.17	N/A	1	3.2E-10
Manganese	2.5E+02	µg/l	1.0E-03	N/A	N/A	0.17	N/A	1	4.3E-08
Thallium	1.5E+00	µg/l	1.0E-03	N/A	N/A	0.17	N/A	1	2.5E-10

Inorganics: DAevent (mg/cm2-event) =
PC x EPC x ET x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
ET<t*: DAevent (mg/cm2-event) =
2 x PC x EPC x (sqrt((6 x t x ET)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:
Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

Table J-7.21
Calculation of Non-Cancer Hazards - CT
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Deep Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Chloroform	0.4	ug/l	0.4	ug/l	M	1.5E-05	mg/kg/day	1.0E-02	mg/kg/day	NA	NA	0.001
	Arsenic	1.9	ug/l	1.9	ug/l	M	7.1E-05	mg/kg/day	3.0E-04	mg/kg/day	NA	NA	0.2
	Manganese	251	ug/l	251	ug/l	M	9.3E-03	mg/kg/day	2.0E-02	mg/kg/day	NA	NA	0.5
	Thallium	1.5	ug/l	1.5	ug/l	M	5.5E-05	mg/kg/day	7.0E-05	mg/kg/day	NA	NA	0.8
												Total	1
Dermal	Chloroform	0.4	ug/l	0.4	ug/l	M	1.0E-06	mg/kg/day	1.0E-02	mg/kg/day	NA	NA	0.0001
	Arsenic	1.9	ug/l	1.9	ug/l	M	1.5E-07	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.0005
	Manganese	251	ug/l	251	ug/l	M	1.9E-05	mg/kg/day	7.0E-03	mg/kg/day	NA	NA	0.003
	Thallium	1.5	ug/l	1.5	ug/l	M	1.1E-07	mg/kg/day	7.0E-05	mg/kg/day	NA	NA	0.002
												Total	0.005
												Total Hazard Index Across All Exposure Routes/Pathways	1

(1) Medium-Specific (M) EPC selected for hazard calculation.
Dermally absorbed dose per exposure event calculated in Table 7.21 CT Supplement

Table J-7.21 CT Supplement
Calculation of Daevent, Child Resident
Deep Groundwater - Tap Water
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC)	Lag Time (t)	B (dimensionless)	Duration of Event (ET)	t*	Eq	DAevent
Chloroform	4.0E-01	µg/l	8.9E-03	4.7E-01	9.3E-03	0.25	1.1E+00	2	3.4E-09
Arsenic	1.9E+00	µg/l	1.0E-03	N/A	N/A	0.25	N/A	1	4.7E-10
Manganese	2.5E+02	µg/l	1.0E-03	N/A	N/A	0.25	N/A	1	6.3E-08
Thallium	1.5E+00	µg/l	1.0E-03	N/A	N/A	0.25	N/A	1	3.7E-10

Inorganics: DAevent (mg/cm2-event) =
PC x EPC x ET x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
ET<t*: DAevent (mg/cm2-event) =
2 x PC x EPC x (sqrt((6 x t x ET)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:
Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

Table J-7.22
Calculation of Non-Cancer Hazards - CT
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 3
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1254	0.033	mg/kg	0.033	mg/kg	M	1.4E-07	mg/kg/day	2.0E-05	mg/kg/day	NA	NA	0.007
	Benzo(a)Anthracene	0.388	mg/kg	0.388	mg/kg	M	1.7E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(a)Pyrene	0.376	mg/kg	0.376	mg/kg	M	1.6E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(b)Fluoranthene	0.417	mg/kg	0.417	mg/kg	M	1.8E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Dibenz(a,h)Anthracene	0.220	mg/kg	0.220	mg/kg	M	9.4E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Indeno(1,2,3-cd)Pyrene	0.286	mg/kg	0.286	mg/kg	M	1.2E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Total Dioxins	0.00003	mg/kg	0.00003	mg/kg	M	1.5E-10	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Aluminum	8873	mg/kg	8873	mg/kg	M	3.8E-02	mg/kg/day	1.0E+00	mg/kg/day	NA	NA	0.04
	Antimony	7.3	mg/kg	7.3	mg/kg	M	3.1E-05	mg/kg/day	4.0E-04	mg/kg/day	NA	NA	0.08
	Arsenic	11.8	mg/kg	11.8	mg/kg	M	5.0E-05	mg/kg/day	3.0E-04	mg/kg/day	NA	NA	0.2
	Barium	157	mg/kg	157	mg/kg	M	6.7E-04	mg/kg/day	7.0E-02	mg/kg/day	NA	NA	0.010
	Cadmium	1.4	mg/kg	1.4	mg/kg	M	5.9E-06	mg/kg/day	1.0E-03	mg/kg/day	NA	NA	0.006
	Chromium	19	mg/kg	19	mg/kg	M	8.3E-05	mg/kg/day	2.0E-02	mg/kg/day	1.0E-03	NA	0.004
	Copper	326	mg/kg	326	mg/kg	M	1.4E-03	mg/kg/day	3.7E-02	mg/kg/day	NA	NA	0.04
	Iron	18571	mg/kg	18571	mg/kg	M	7.9E-02	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	0.3
	Manganese	176	mg/kg	176	mg/kg	M	7.5E-04	mg/kg/day	2.0E-02	mg/kg/day	NA	NA	0.04
	Thallium	0.62	mg/kg	0.6	mg/kg	M	2.6E-06	mg/kg/day	7.0E-05	mg/kg/day	NA	NA	0.04
	Vanadium	29.7	mg/kg	30	mg/kg	M	1.3E-04	mg/kg/day	7.0E-03	mg/kg/day	NA	NA	0.02
	Zinc	382	mg/kg	382	mg/kg	M	1.6E-03	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	0.005
												Total	0.7

Table J-7.22
Calculation of Non-Cancer Hazards - CT
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 3
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	Aroclor-1254	0.033	mg/kg	0.033	mg/kg	M	8.0E-09	mg/kg/day	1.8E-05	mg/kg/day	NA	NA	0.0005
	Benzo(a)Anthracene	0.388	mg/kg	0.388	mg/kg	M	1.6E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(a)Pyrene	0.376	mg/kg	0.376	mg/kg	M	1.5E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(b)Fluoranthene	0.417	mg/kg	0.417	mg/kg	M	1.7E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Dibenz(a,h)Anthracene	0.220	mg/kg	0.220	mg/kg	M	8.9E-08	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Indeno(1,2,3-cd)Pyrene	0.286	mg/kg	0.286	mg/kg	M	1.2E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Total Dioxins	0.00003	mg/kg	0.00003	mg/kg	M	4.1E-12	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Aluminum	8873	mg/kg	8873	mg/kg	M	3.6E-04	mg/kg/day	2.7E-01	mg/kg/day	NA	NA	0.001
	Antimony	7.3	mg/kg	7.3	mg/kg	M	2.9E-07	mg/kg/day	4.0E-05	mg/kg/day	NA	NA	0.007
	Arsenic	11.8	mg/kg	11.8	mg/kg	M	1.5E-06	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.005
	Barium	157	mg/kg	157	mg/kg	M	6.4E-06	mg/kg/day	7.0E-02	mg/kg/day	NA	NA	0.00009
	Cadmium	1.4	mg/kg	1.4	mg/kg	M	5.6E-08	mg/kg/day	2.5E-05	mg/kg/day	NA	NA	0.002
	Chromium	19	mg/kg	19	mg/kg	M	7.9E-07	mg/kg/day	2.0E-04	mg/kg/day	1.0E-03	NA	0.00
	Copper	326	mg/kg	326	mg/kg	M	1.3E-05	mg/kg/day	2.2E-02	mg/kg/day	NA	NA	0.0006
	Iron	18571	mg/kg	18571	mg/kg	M	7.5E-04	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.01
	Manganese	176	mg/kg	176	mg/kg	M	7.2E-06	mg/kg/day	7.0E-03	mg/kg/day	NA	NA	0.0010
	Thallium	0.6	mg/kg	0.6	mg/kg	M	2.5E-08	mg/kg/day	7.0E-05	mg/kg/day	NA	NA	0.0004
	Vanadium	30	mg/kg	30	mg/kg	M	1.2E-06	mg/kg/day	1.4E-04	mg/kg/day	NA	NA	0.009
	Zinc	382	mg/kg	382	mg/kg	M	1.6E-05	mg/kg/day	7.5E-02	mg/kg/day	NA	NA	0.00021
												Total	0.04
												Total Hazard Index Across All Exposure Routes/Pathways	0.8

*Subsurface and Surface Soil Combined.
(1) Medium-Specific (M) EPC selected for hazard calculation.

Table J-7.23
Calculation of Non-Cancer Hazards - CT
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment at Site 3
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Antimony	25	mg/kg	25	mg/kg	M	1.2E-05	mg/kg/day	4.0E-04	mg/kg/day	NA	NA	0.03
	Arsenic	11	mg/kg	11	mg/kg	M	5.0E-06	mg/kg/day	3.0E-04	mg/kg/day	NA	NA	0.02
	Iron	18958	mg/kg	18958	mg/kg	M	9.0E-03	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	0.03
												Total	0.08
Dermal	Antimony	25	mg/kg	25	mg/kg	M	7.0E-06	mg/kg/day	4.0E-05	mg/kg/day	NA	NA	0.2
	Arsenic	11	mg/kg	11	mg/kg	M	9.3E-06	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.03
	Iron	18958	mg/kg	18958	mg/kg	M	5.2E-03	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.09
												Total	0.3
												Total Hazard Index Across All Exposure Routes/Pathways	0.4

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table J-8.1
Calculation of Cancer Risks - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: At Site 3
Receptor Population: Trespasser
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Benzo(a)Pyrene	0.906	mg/kg	0.906	mg/kg	M	7.9E-08	1/mg/kg/day	7.3E+00	1/mg/kg/day	6E-07
	Antimony	59	mg/kg	59	mg/kg	M	5.2E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	36	mg/kg	36	mg/kg	M	3.1E-06	1/mg/kg/day	1.5E+00	1/mg/kg/day	5E-06
	Iron	67358	mg/kg	67358	mg/kg	M	5.9E-03	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	5E-06
Dermal	Benzo(a)Pyrene	0.9	mg/kg	0.9	mg/kg	M	7.5E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
	Antimony	59	mg/kg	59	mg/kg	M	4.9E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	36	mg/kg	36	mg/kg	M	9.5E-07	1/mg/kg/day	1.6E+00	1/mg/kg/day	1E-06
	Iron	67358	mg/kg	67358	mg/kg	M	5.6E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	1E-06
										Total Risk Across All Exposure Routes/Pathways	7E-06

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table J-8.2
Calculation of Cancer Risks - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: At Site 3
Receptor Population: Trespasser
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Benzo(a)Pyrene	0.906	mg/kg	0.9	mg/kg	M	2.0E-08	1/mg/kg/day	7.3E+00	1/mg/kg/day	1E-07
	Antimony	59	mg/kg	59	mg/kg	M	1.3E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	36	mg/kg	36	mg/kg	M	7.8E-07	1/mg/kg/day	1.5E+00	1/mg/kg/day	1E-06
	Iron	67358	mg/kg	67358	mg/kg	M	1.5E-03	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	1E-06
Dermal	Benzo(a)Pyrene	0.9	mg/kg	0.9	mg/kg	M	8.7E-09	1/mg/kg/day	NA	1/mg/kg/day	NA
	Antimony	59	mg/kg	59	mg/kg	M	5.7E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	36	mg/kg	36	mg/kg	M	1.1E-07	1/mg/kg/day	1.6E+00	1/mg/kg/day	2E-07
	Iron	67358	mg/kg	67358	mg/kg	M	6.5E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	2E-07
										Total Risk Across All Exposure Routes/Pathways	1E-06

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table J-8.3
Calculation of Cancer Risks - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from Surface Soil at Site 3
Receptor Population: Trespasser
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value (1)	Route EPC Units	EPC Selected for Hazard Calculation (2)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Benzo(a)Pyrene	0.906	mg/kg	0.0000000007	mg/m^3	R	9.6E-13	1/mg/kg/day	3.1E+00	1/mg/kg/day	3E-12
	Antimony	59	mg/kg	0.00000004	mg/m^3	R	6.3E-11	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	36	mg/kg	0.00000003	mg/m^3	R	3.8E-11	1/mg/kg/day	1.5E+01	1/mg/kg/day	6E-10
	Iron	67358	mg/kg	0.00005	mg/m^3	R	7.1E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	6E-10
										Total Risk Across All Exposure Routes/Pathways	6E-10

(1) Route-specific EPC value is equal to the medium EPC value multilplied by 1/PEF (PEF = 1.32E+09mg3/kg).

(2) Route-Specific (R) EPC selected for hazard calculation.

Table J-8.4
Calculation of Cancer Risks - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from Surface Soil at Site 3
Receptor Population: Trespasser
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value (1)	Route EPC Units	EPC Selected for Hazard Calculation (2)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Benzo(a)Pyrene	0.906	mg/kg	0.0000000007	mg/m^3	R	2.1E-13	1/mg/kg/day	3.1E+00	1/mg/kg/day	6E-13
	Antimony	59	mg/kg	0.00000004	mg/m^3	R	1.4E-11	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	36	mg/kg	0.00000003	mg/m^3	R	8.3E-12	1/mg/kg/day	1.5E+01	1/mg/kg/day	1E-10
	Iron	67358	mg/kg	0.00005	mg/m^3	R	1.6E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	1E-10
										Total Risk Across All Exposure Routes/Pathways	1E-10

(1) Route-specific EPC value is equal to the medium EPC value multilplied by 1/PEF (PEF = 1.32E+09mg3/kg).

(2) Route-Specific (R) EPC selected for hazard calculation.

Table J-8.5
Calculation of Cancer Risks - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Deep Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Chloroform	0.4	ug/l	0.4	ug/l	M	6.0E-06	1/mg/kg/day	6.1E-03	1/mg/kg/day	4E-08
	Arsenic	3.4	ug/l	3.4	ug/l	M	5.0E-05	1/mg/kg/day	1.5E+00	1/mg/kg/day	8E-05
	Manganese	612	ug/l	612	ug/l	M	9.1E-03	1/mg/kg/day	NA	1/mg/kg/day	NA
	Thallium	2.5	ug/l	2.5	ug/l	M	3.7E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	8E-05
Dermal	Chloroform	0.4	ug/l	0.4	ug/l	M	4.7E-07	1/mg/kg/day	6.1E-03	1/mg/kg/day	3E-09
	Arsenic	3.4	ug/l	3.4	ug/l	M	1.2E-07	1/mg/kg/day	1.6E+00	1/mg/kg/day	2E-07
	Manganese	612	ug/l	612	ug/l	M	2.2E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Thallium	2.5	ug/l	2.5	ug/l	M	9.1E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	2E-07
										Total Risk Across All Exposure Routes/Pathways	8E-05

(1) Medium-Specific (M) EPC selected for risk calculation.
Dermally absorbed dose per exposure event calculated in Table 8.5 RME Supplement

Table J-8.5 RME Supplement
Calculation of Daevent, Adult and Child Resident
Deep Groundwater - Tap Water
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC)	Lag Time (t)	B	Duration of Event Adult (ETa)	Duration of Event Child (ETc)	t*	Eq	DAevent Adult	DAevent Child
Chloroform	4.0E-01	µg/l	8.9E-03	4.7E-01	9.3E-03	0.25	0.33	1.1E+00	2	3.4E-09	3.9E-09
Arsenic	3.4E+00	µg/l	1.0E-03	N/A	N/A	0.25	0.33	N/A	1	8.4E-10	1.1E-09
Manganese	6.1E+02	µg/l	1.0E-03	N/A	N/A	0.25	0.33	N/A	1	1.5E-07	2.0E-07
Thallium	2.5E+00	µg/l	1.0E-03	N/A	N/A	0.25	0.33	N/A	1	6.3E-10	8.3E-10

Inorganics: DAevent (mg/cm2-event) =
PC x EPC x ET x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
ET<t*: DAevent (mg/cm2-event) =
2 x PC x EPC x (sqrt((6 x t x ET)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:
Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

Table J-8.6
Calculation of Cancer Risks - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Deep Groundwater - Water Vapors at Shower Head
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Chloroform	0.4	ug/l	0.0E+00	mg/kg-shower	R	0.0E+00	1/mg/kg/day	8.1E-02	1/mg/kg/day	0E+00
										Total	0E+00
										Total Risk Across All Exposure Routes/Pathways	0E+00

(1) Route-Specific (R) EPC selected for risk calculation.
Route EPC calculated using Foster and Chrostowski Shower Model (Table 8.6 RME Supplement)

Table J-8.6 RME Supplement
Inhalation Exposure Concentrations from Foster and Chrostowski Shower Model
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical	Exposure Point Concentration Cwo (µg/l)	Molecular weight (HH) (g/mole)	Henry's Law Constant (H) (atm-m^3/mole)	Kg (VOC) (cm/hr)	Kl(VOC) (cm/hr)	KL (cm/hr)	Kal (cm/hr)	Cwd (µg/l)	S (µg/m^3-min)	Calculated Inhalation Exposure (Einh) (mg/kg/shower)
Chioroform	0.0E+00	1.2E+02	4.4E-03	1.16E+03	1.21E+01	1.15E+01	1.55E+01	0.00E+00	0.00E+00	0.00E+00

Variables	Units	Exposure Assumptions	Source
Kg(VOC) = gas-film mass transfer coefficient	cm/hr	Solved by Eq 1	NA
Kl(VOC) = liquid-film mass transfer coefficient	cm/hr	Solved by Eq 2	NA
KL = overall mass transfer coefficient	cm/hr	Solved by Eq 3	NA
Kal = adjusted overall mass transfer coeff.	cm/hr	Solved by Eq 4	NA
Tl = Calibration temp. of water	K (20C +273)	293	F&C
Ts = Shower water temperature	k (45C)	318	F&C
Us = water viscosity at Ts	centipoise	0.596	F&C
Ul = water viscosity at Tl	cp	1.002	F&C
Cwd = conc. leaving droplets after time sdt	ug/l	Solved by Eq 5	NA
sdt = shower droplet drop time	sec	2	F&C
d = shower droplet diameter	mm	1	F&C
FR = shower water flow rate	l/min	20	F&C
SV = shower room air volume	m^3	3	F&C
S = indoor VOC generation rate	ug/m^3-min	Solved by Eq 6	NA
VR = ventilation rate	l/min	13.8	JSEPA, 1991
BW = body weight	kg	70	JSEPA, 1991
Ds = duration of shower	min	12	JSEPA, 1989
Dt = total duration in shower room	min	15	
R = air exchange rate	min^{-1}	0.0083	F&C
Ca = Indoor air concentration of VOCs	ug/m^3	Solved by Eq 7	NA
Einh = inhalation exposure per shower	mg/kg/shower	Solved by Eq 8	NA

Equation 1:	Kg(VOC) =	$3000 * (18 / HH)^{0.5}$
Equation 2:	Kl(VOC) =	$20 * (44 / HH)^{0.5}$
Equation 3:	KL =	$((1 / Kl(VOC)) + (0.024 / (Kg (VOC) * H)))^{-1}$
Equation 4:	Kal =	$(KL * (((Tl * Us) / (Ts * Ul))^{-0.5}))$
Equation 5:	Cwd =	(Cwo * (1-EXP((-1 * Kal * sdt)/(60 * d))))
Equation 6:	S =	(Cwd * FR / SV)
Equation 7:	see time series example on Table I-GW-5	
Equation 8:	**Einh =**	**If t>Ds** (((VR * S) / (BW * R * 1000000)) * ((Ds + (EXP(-R * Dt) / R)-(EXP(R * (Ds - Dt))) / R)))

Henry's Law Constant from USEPA's *Superfund Public Health Evaluation Manual.* USEPA/540/1-86/060, October 1986.

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual. Interim Final. OSWER Directive 9285.6-03.

USEPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

F&C. Foster, S. A. and P. C. Chrostowski. 1987. Inhalation Exposures to Volatile Organic Contaminants in the Shower. ICF-Clement Associates, Inc. Washington, D.C.

Table J-8.7
Calculation of Cancer Risks - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water at Site 3
Receptor Population: Trespasser
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	Aluminum	70600	ug/l	70600	ug/l	M	3.1E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	4.8	ug/l	4.8	ug/l	M	2.1E-08	1/mg/kg/day	1.6E+00	1/mg/kg/day	3E-08
	Iron	66900	ug/l	66900	ug/l	M	2.9E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
	Manganese	6330	ug/l	6330	ug/l	M	2.8E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	3E-08
										Total Risk Across All Exposure Routes/Pathways	3E-08

(1) Medium-Specific (M) EPC selected for risk calculation.
Dermally absorbed dose per exposure event calculated in Table 8.7 RME Supplement

Table J-8.7 RME Supplement
Calculation of Daevent, Adult and Adolescent Trespasser
Surface Water
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC)	Lag Time (t)	B (dimensionless)	Duration of Event (ET)	t*	Eq	DAevent
Aluminum	7.1E+04	µg/l	1.0E-03	N/A	N/A	1	N/A	1	7.1E-05
Arsenic	4.8E+00	µg/l	1.0E-03	N/A	N/A	1	N/A	1	4.8E-09
Iron	6.7E+04	µg/l	1.0E-03	N/A	N/A	1	N/A	1	6.7E-05
Manganese	6.3E+03	µg/l	1.0E-03	N/A	N/A	1	N/A	1	6.3E-06

Inorganics: DAevent (mg/cm2-event) =
PC x EPC x ET x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
ET<t*: DAevent (mg/cm2-event) =
2 x PC x EPC x (sqrt((6 x t x ET)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:
Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

Table J-8.8
Calculation of Cancer Risks - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water at Site 3
Receptor Population: Trespasser
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	Aluminum	70600	ug/l	70600	ug/l	M	6.2E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	4.8	ug/l	4.8	ug/l	M	4.1E-09	1/mg/kg/day	1.6E+00	1/mg/kg/day	7E-09
	Iron	66900	ug/l	66900	ug/l	M	5.8E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Manganese	6330	ug/l	6330	ug/l	M	5.5E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	7E-09
										Total Risk Across All Exposure Routes/Pathways	7E-09

(1) Medium-Specific (M) EPC selected for risk calculation.
Dermally absorbed dose per exposure event calculated in Table 8.7 RME Supplement

Table J-8.9
Calculation of Cancer Risks - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 3
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aroclor-1254	0.045	mg/kg	0.045	mg/kg	M	7.0E-08	1/mg/kg/day	2.0E+00	1/mg/kg/day	1E-07
	Benzo(a)Anthracene	0.569	mg/kg	0.569	mg/kg	M	8.9E-07	1/mg/kg/day	7.3E-01	1/mg/kg/day	6E-07
	Benzo(a)Pyrene	0.559	mg/kg	0.559	mg/kg	M	8.7E-07	1/mg/kg/day	7.3E+00	1/mg/kg/day	6E-06
	Benzo(b)Fluoranthene	1.107	mg/kg	1.107	mg/kg	M	1.7E-06	1/mg/kg/day	7.3E-01	1/mg/kg/day	1E-06
	Dibenz(a,h)Anthracene	0.238	mg/kg	0.238	mg/kg	M	3.7E-07	1/mg/kg/day	7.3E+00	1/mg/kg/day	3E-06
	Indeno(1,2,3-cd)Pyrene	0.389	mg/kg	0.389	mg/kg	M	6.1E-07	1/mg/kg/day	7.3E-01	1/mg/kg/day	4E-07
	Total Dioxins	0.00006	mg/kg	0.00006	mg/kg	M	9.4E-11	1/mg/kg/day	1.5E+05	1/mg/kg/day	1E-05
	Aluminum	12068	mg/kg	12068	mg/kg	M	1.9E-02	1/mg/kg/day	NA	1/mg/kg/day	NA
	Antimony	15	mg/kg	15	mg/kg	M	2.4E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	18	mg/kg	18	mg/kg	M	2.9E-05	1/mg/kg/day	1.5E+00	1/mg/kg/day	4E-05
	Barium	255	mg/kg	255	mg/kg	M	4.0E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
	Cadmium	3	mg/kg	3	mg/kg	M	4.0E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Chromium	41	mg/kg	41	mg/kg	M	6.4E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Copper	692	mg/kg	692	mg/kg	M	1.1E-03	1/mg/kg/day	NA	1/mg/kg/day	NA
	Iron	46040	mg/kg	46040	mg/kg	M	7.2E-02	1/mg/kg/day	NA	1/mg/kg/day	NA
	Manganese	264	mg/kg	264	mg/kg	M	4.1E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
	Thallium	0.8	mg/kg	0.8	mg/kg	M	1.2E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Vanadium	46	mg/kg	46	mg/kg	M	7.1E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Zinc	726	mg/kg	726	mg/kg	M	1.1E-03	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	7E-05

Table J-8.9
Calculation of Cancer Risks - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 3
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	Aroclor-1254	0.045	mg/kg	0.045	mg/kg	M	1.8E-08	1/mg/kg/day	2.2E+00	1/mg/kg/day	4E-08
	Benzo(a)Anthracene	0.569	mg/kg	0.569	mg/kg	M	3.8E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Benzo(a)Pyrene	0.559	mg/kg	0.559	mg/kg	M	3.7E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Benzo(b)Fluoranthene	1.107	mg/kg	1.107	mg/kg	M	7.3E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Dibenz(a,h)Anthracene	0.238	mg/kg	0.238	mg/kg	M	1.6E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Indeno(1,2,3-cd)Pyrene	0.389	mg/kg	0.389	mg/kg	M	2.6E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Total Dioxins	0.00006	mg/kg	0.00006	mg/kg	M	1.2E-11	1/mg/kg/day	3.0E+05	1/mg/kg/day	4E-06
	Aluminum	12068	mg/kg	12068	mg/kg	M	8.0E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
	Antimony	15	mg/kg	15	mg/kg	M	1.0E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	18	mg/kg	18	mg/kg	M	3.9E-06	1/mg/kg/day	1.6E+00	1/mg/kg/day	6E-06
	Barium	255	mg/kg	255	mg/kg	M	1.7E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Cadmium	3	mg/kg	3	mg/kg	M	1.7E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Chromium	41	mg/kg	41	mg/kg	M	2.7E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Copper	692	mg/kg	692	mg/kg	M	4.6E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Iron	46040	mg/kg	46040	mg/kg	M	3.1E-03	1/mg/kg/day	NA	1/mg/kg/day	NA
	Manganese	264	mg/kg	264	mg/kg	M	1.7E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Thallium	0.8	mg/kg	0.8	mg/kg	M	5.3E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
	Vanadium	46	mg/kg	46	mg/kg	M	3.0E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Zinc	726	mg/kg	726	mg/kg	M	4.8E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	1E-05
										Total Risk Across All Exposure Routes/Pathways	8E-05

*Subsurface and Surface Soil Combined.

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table J-8.10
Calculation of Cancer Risks - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 3
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Benzo(a)Pyrene	0.559	mg/kg	0.559	mg/kg	M	1.9E-08	1/mg/kg/day	7.3E+00	1/mg/kg/day	1E-07
	Total Dioxins	0.00006	mg/kg	0.00006	mg/kg	M	2.0E-12	1/mg/kg/day	1.5E+05	1/mg/kg/day	3E-07
	Antimony	15	mg/kg	15	mg/kg	M	5.1E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	18	mg/kg	18	mg/kg	M	6.2E-07	1/mg/kg/day	1.5E+00	1/mg/kg/day	9E-07
	Iron	46040	mg/kg	46040	mg/kg	M	1.5E-03	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	1E-06
Dermal	Benzo(a)Pyrene	0.559	mg/kg	0.559	mg/kg	M	4.7E-09	1/mg/kg/day	NA	1/mg/kg/day	NA
	Total Dioxins	0.00006	mg/kg	0.00006	mg/kg	M	1.5E-13	1/mg/kg/day	3.0E+05	1/mg/kg/day	5E-08
	Antimony	15	mg/kg	15	mg/kg	M	1.3E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	18	mg/kg	18	mg/kg	M	4.9E-08	1/mg/kg/day	1.6E+00	1/mg/kg/day	8E-08
	Iron	46040	mg/kg	46040	mg/kg	M	3.9E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	1E-07
										Total Risk Across All Exposure Routes/Pathways	1E-06

*Subsurface and Surface Soil Combined.

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table J-8.11
Calculation of Cancer Risks - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 3
Receptor Population: Other Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Benzo(a)Pyrene	0.559	mg/kg	0.559	mg/kg	M	9.8E-08	1/mg/kg/day	7.3E+00	1/mg/kg/day	7E-07
	Total Dioxins	0.00006	mg/kg	0.00006	mg/kg	M	1.0E-11	1/mg/kg/day	1.5E+05	1/mg/kg/day	2E-06
	Antimony	15	mg/kg	15	mg/kg	M	2.7E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	18	mg/kg	18	mg/kg	M	3.2E-06	1/mg/kg/day	1.5E+00	1/mg/kg/day	5E-06
	Iron	46040	mg/kg	46040	mg/kg	M	8.0E-03	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	7E-06
Dermal	Benzo(a)Pyrene	0.559	mg/kg	0.559	mg/kg	M	6.9E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
	Total Dioxins	0.00006	mg/kg	0.00006	mg/kg	M	2.2E-12	1/mg/kg/day	3.0E+05	1/mg/kg/day	7E-07
	Antimony	15	mg/kg	15	mg/kg	M	1.9E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	18	mg/kg	18	mg/kg	M	7.3E-07	1/mg/kg/day	1.6E+00	1/mg/kg/day	1E-06
	Iron	46040	mg/kg	46040	mg/kg	M	5.7E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	2E-06
										Total Risk Across All Exposure Routes/Pathways	9E-06

*Subsurface and Surface Soil Combined.

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table J-8.12
Calculation of Cancer Risks - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Air
Exposure Point: Emissions from Soil at Site 3
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value (1)	Route EPC Units	EPC Selected for Hazard Calculation (2)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Benzo(a)Pyrene	0.559	mg/kg	0.0000000004	mg/m3	R	5.9E-13	1/mg/kg/day	3.1E+00	1/mg/kg/day	2E-12
	Total Dioxins	0.00006	mg/kg	4.5E-14	mg/m3	R	6.4E-17	1/mg/kg/day	1.5E+05	1/mg/kg/day	1E-11
	Antimony	15	mg/kg	0.00000001	mg/m3	R	1.6E-11	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	18	mg/kg	0.00000001	mg/m3	R	1.9E-11	1/mg/kg/day	1.5E+01	1/mg/kg/day	3E-10
	Iron	46040	mg/kg	0.00003	mg/m3	R	4.9E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	3E-10
										Total Risk Across All Exposure Routes/Pathways	3E-10

*Subsurface and Surface Soil Combined.

(1) Route-specific EPC value is equal to the medium EPC value multiplied by 1/PEF (PEF = 1.32E+09mg3/kg).

(2) Route-Specific (R) EPC selected for hazard calculation.

Table J-8.13
Calculation of Cancer Risks - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Surface Water at Site 3
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	Aluminum	70600	ug/l	70600	ug/l	M	9.1E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	4.8	ug/l	4.8	ug/l	M	6.1E-08	1/mg/kg/day	1.6E+00	1/mg/kg/day	1E-07
	Iron	66900	ug/l	66900	ug/l	M	8.6E-01	1/mg/kg/day	NA	1/mg/kg/day	NA
	Manganese	6330	ug/l	6330	ug/l	M	8.1E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	1E-07
										Total Risk Across All Exposure Routes/Pathways	1E-07

(1) Medium-Specific (M) EPC selected for risk calculation.
Dermally absorbed dose per exposure event calculated in Table 8.13 RME Supplement

Table J-8.13 RME Supplement
Calculation of Daevent, Adult and Child Resident
Surface Water
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC)	Lag Time (t)	B	Duration of Event Adult (ETa)	Duration of Event Child (ETc)	t*	Eq	DAevent Adult	DAevent Child
Aluminum	7.1E+04	µg/l	1.0E-03	N/A	N/A	2	2	N/A	1	1.4E-04	1.4E-04
Arsenic	4.8E+00	µg/l	1.0E-03	N/A	N/A	2	2	N/A	1	9.5E-09	9.5E-09
Iron	6.7E+04	µg/l	1.0E+00	N/A	N/A	2	2	N/A	2	1.3E-01	1.3E-01
Manganese	6.3E+03	µg/l	1.0E-03	N/A	N/A	2	2	N/A	1	1.3E-05	1.3E-05

Inorganics: DAevent (mg/cm2-event) =
PC x EPC x ET x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
ET<t*: DAevent (mg/cm2-event) =
2 x PC x EPC x (sqrt((6 x t x ET)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:
Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

Table J-8.14
Calculation of Cancer Risks - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment at Site 3
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Antimony	173	mg/kg	173	mg/kg	M	4.0E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	24	mg/kg	24	mg/kg	M	5.7E-06	1/mg/kg/day	1.5E+00	1/mg/kg/day	9E-06
	Iron	91000	mg/kg	91000	mg/kg	M	2.1E-02	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	9E-06
Dermal	Antimony	173	mg/kg	173	mg/kg	M	3.5E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	24	mg/kg	24	mg/kg	M	1.6E-05	1/mg/kg/day	1.6E+00	1/mg/kg/day	3E-05
	Iron	91000	mg/kg	91000	mg/kg	M	1.8E-02	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	3E-05
										Total Risk Across All Exposure Routes/Pathways	3E-05

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table J-8.15
Calculation of Cancer Risks - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Shallow Groundwater
Exposure Point: Water Table
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	Heptachlor	0.024	ug/l	0.024	ug/l	M	3.7E-10	1/mg/kg/day	9.0E+00	1/mg/kg/day	3E-09
	Bis(2-Ethylhexyl)Phthalate	9.8	ug/l	9.8	ug/l	M	5.1E-07	1/mg/kg/day	2.5E-02	1/mg/kg/day	1E-08
	Dibenzofuran	7.0	ug/l	7.0	ug/l	M	2.5E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Naphthalene	8.0	ug/l	8.0	ug/l	M	1.4E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Aluminum	19200	ug/l	19200	ug/l	M	3.4E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Antimony	1.4	ug/l	1.4	ug/l	M	2.5E-10	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	4.1	ug/l	4.1	ug/l	M	7.2E-10	1/mg/kg/day	1.6E+00	1/mg/kg/day	1E-09
	Chromium	39	ug/l	39	ug/l	M	6.8E-09	1/mg/kg/day	NA	1/mg/kg/day	NA
	Iron	33266	ug/l	33266	ug/l	M	5.9E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Manganese	3212	ug/l	3212	ug/l	M	5.7E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Nickel	69.6	ug/l	70	ug/l	M	1.2E-09	1/mg/kg/day	NA	1/mg/kg/day	NA
	Vanadium	43	ug/l	43	ug/l	M	7.6E-09	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	2E-08
										Total Risk Across All Exposure Routes/Pathways	2E-08

(1) Medium-Specific (M) EPC selected for risk calculation.

Dermally absorbed dose per exposure event calculated in Table 8.15 RME Supplement A

Table J-8.15 RME Supplement A
Calculation of Daevent, Adult Construction Worker
Shallow Groundwater
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC)	Lag Time (t)	B (dimensionless)	Duration of Event (ET)	t*	Eq	DAevent
Heptachlor	2.4E-02	µg/l	1.1E-02	1.7E+01	1.9E+00	2	9.4E+01	2	4.3E-09
Bis(2-Ethylhexyl)Phthalate	9.8E+00	µg/l	3.3E-02	2.1E+01	1.3E+01	2	1.0E+02	2	5.8E-06
Dibenzofuran	7.0E+00	µg/l	1.1E-01	9.3E-01	8.1E-01	2	1.7E+01	2	2.8E-06
Naphthalene	8.0E+00	µg/l	6.9E-02	5.3E-01	2.0E-01	2	2.2E+00	2	1.6E-06
Aluminum	1.9E+04	µg/l	1.0E-03	N/A	N/A	2	N/A	1	3.8E-05
Antimony	1.4E+00	µg/l	1.0E-03	N/A	N/A	2	N/A	1	2.8E-09
Arsenic	4.1E+00	µg/l	1.0E-03	N/A	N/A	2	N/A	1	8.1E-09
Chromium	3.9E+01	µg/l	1.0E-03	N/A	N/A	2	N/A	1	7.7E-08
Iron	3.3E+04	µg/l	1.0E-03	N/A	N/A	2	N/A	1	6.7E-05
Manganese	3.2E+03	µg/l	1.0E-03	N/A	N/A	2	N/A	1	6.4E-06
Nickel	7.0E+01	µg/l	1.0E-04	N/A	N/A	2	N/A	1	1.4E-08
Vanadium	4.3E+01	µg/l	1.0E-03	N/A	N/A	2	N/A	1	8.6E-08

Inorganics: DAevent (mg/cm2-event) =
PC x EPC x ET x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
ET<t*: DAevent (mg/cm2-event) =
2 x PC x EPC x (sqrt((6 x t x ET)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:
Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

Table J-8.15 RME Supplement B
Calculation of Daevent
Shallow Groundwater
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical	MW	log Kow	Kow	log Kp[1]	Kp (cm/hr)	B[1]	log Dsc/lsc[1]	lsc (cm)	log Dsc[1]	Dsc (cm^2/hr)	Tau[1] (hr)	c[1]	b[1]	T*[1] (hr)
Dibenzofuran	168.19	3.91	8.13E+03	-9.70E-01	1.07E-01	8.13E-01	-3.75E+00	1.00E-03	-6.75E+00	1.79E-07	9.29E-01	1.15E+00	9.46E-01	1.66E+01

1. Equations from *Dermal Exposure Assessment: Principles and Applications*. EPA/600/8-91/011B. January 1992.

Table J-8.16
Calculation of Cancer Risks - CT
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Deep Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Chloroform	0.4	ug/l	0.4	ug/l	M	2.1E-06	1/mg/kg/day	6.1E-03	1/mg/kg/day	1E-08
	Arsenic	1.9	ug/l	1.9	ug/l	M	1.0E-05	1/mg/kg/day	1.5E+00	1/mg/kg/day	2E-05
	Manganese	251	ug/l	251	ug/l	M	1.3E-03	1/mg/kg/day	NA	1/mg/kg/day	NA
	Thallium	1.5	ug/l	1.5	ug/l	M	7.9E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	2E-05
Dermal	Chloroform	0.4	ug/l	0.4	ug/l	M	1.4E-07	1/mg/kg/day	6.1E-03	1/mg/kg/day	9E-10
	Arsenic	1.9	ug/l	1.9	ug/l	M	1.9E-08	1/mg/kg/day	1.6E+00	1/mg/kg/day	3E-08
	Manganese	251	ug/l	251	ug/l	M	2.5E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Thallium	1.5	ug/l	1.5	ug/l	M	1.5E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	3E-08
										Total Risk Across All Exposure Routes/Pathways	2E-05

(1) Medium-Specific (M) EPC selected for risk calculation.
Dermally absorbed dose per exposure event calculated in Table 8.16 CT Supplement

Table J-8.16 CT Supplement
Calculation of Daevent, Adult and Child Resident
Deep Groundwater - Tap Water
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC)	Lag Time (t)	B	Duration of Event Adult (ETa)	Duration of Event Child (ETc)	t*	Eq	DAevent Adult	DAevent Child
Chloroform	4.0E-01	µg/l	8.9E-03	4.7E-01	9.3E-03	0.17	0.25	1.1E+00	2	2.8E-09	3.4E-09
Arsenic	1.9E+00	µg/l	1.0E-03	N/A	N/A	0.17	0.25	N/A	1	3.2E-10	4.7E-10
Manganese	2.5E+02	µg/l	1.0E-03	N/A	N/A	0.17	0.25	N/A	1	4.3E-08	6.3E-08
Thallium	1.5E+00	µg/l	1.0E-03	N/A	N/A	0.17	0.25	N/A	1	2.5E-10	3.7E-10

Inorganics: DAevent (mg/cm2-event) =
PC x EPC x ET x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
ET<t*: DAevent (mg/cm2-event) =
2 x PC x EPC x (sqrt((6 x t x ET)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:
Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

Table J-8.17
Calculation of Cancer Risks - CT
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 3
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aroclor-1254	0.033	mg/kg	0.033	mg/kg	M	1.4E-08	1/mg/kg/day	2.0E+00	1/mg/kg/day	3E-08
	Benzo(a)Anthracene	0.388	mg/kg	0.388	mg/kg	M	1.7E-07	1/mg/kg/day	7.3E-01	1/mg/kg/day	1E-07
	Benzo(a)Pyrene	0.376	mg/kg	0.376	mg/kg	M	1.6E-07	1/mg/kg/day	7.3E+00	1/mg/kg/day	1E-06
	Benzo(b)Fluoranthene	0.417	mg/kg	0.417	mg/kg	M	1.8E-07	1/mg/kg/day	7.3E-01	1/mg/kg/day	1E-07
	Dibenz(a,h)Anthracene	0.220	mg/kg	0.220	mg/kg	M	9.4E-08	1/mg/kg/day	7.3E+00	1/mg/kg/day	7E-07
	Indeno(1,2,3-cd)Pyrene	0.286	mg/kg	0.286	mg/kg	M	1.2E-07	1/mg/kg/day	7.3E-01	1/mg/kg/day	9E-08
	Total Dioxins	0.00003	mg/kg	0.000	mg/kg	M	1.4E-11	1/mg/kg/day	1.5E+05	1/mg/kg/day	2E-06
	Aluminum	8873	mg/kg	8873	mg/kg	M	3.8E-03	1/mg/kg/day	NA	1/mg/kg/day	NA
	Antimony	7.3	mg/kg	7.3	mg/kg	M	3.1E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	11.8	mg/kg	11.8	mg/kg	M	5.0E-06	1/mg/kg/day	1.5E+00	1/mg/kg/day	8E-06
	Barium	157	mg/kg	157	mg/kg	M	6.7E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Cadmium	1.4	mg/kg	1.4	mg/kg	M	5.9E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Chromium	19	mg/kg	19	mg/kg	M	8.2E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Copper	326	mg/kg	326	mg/kg	M	1.4E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
	Iron	18571	mg/kg	18571	mg/kg	M	7.9E-03	1/mg/kg/day	NA	1/mg/kg/day	NA
	Manganese	176	mg/kg	176	mg/kg	M	7.5E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Thallium	0.62	mg/kg	0.6	mg/kg	M	2.6E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Vanadium	29.7	mg/kg	30	mg/kg	M	1.3E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Zinc	382	mg/kg	382	mg/kg	M	1.6E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	1E-05

Table J-8.17
Calculation of Cancer Risks - CT
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 3
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	Aroclor 1254	0.033	mg/kg	0.033	mg/kg	M	1.9E-09	1/mg/kg/day	1.8E+00	1/mg/kg/day	3E-09
	Benzo(a)Anthracene	0.388	mg/kg	0.388	mg/kg	M	2.2E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
	Benzo(a)Pyrene	0.376	mg/kg	0.376	mg/kg	M	2.1E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
	Benzo(b)Fluoranthene	0.417	mg/kg	0.417	mg/kg	M	2.4E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
	Dibenz(a,h)Anthracene	0.220	mg/kg	0.220	mg/kg	M	1.3E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
	Indeno(1,2,3-cd)Pyrene	0.286	mg/kg	0.286	mg/kg	M	1.6E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
	Total Dioxins	0.000	mg/kg	0.000	mg/kg	M	1.9E-12	1/mg/kg/day	3.00E+05	1/mg/kg/day	6E-07
	Aluminum	8873	mg/kg	8873	mg/kg	M	5.1E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Antimony	7.3	mg/kg	7.3	mg/kg	M	4.1E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	11.8	mg/kg	11.8	mg/kg	M	2.2E-07	1/mg/kg/day	1.6E+00	1/mg/kg/day	3E-07
	Barium	157	mg/kg	157	mg/kg	M	9.0E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Cadmium	1.4	mg/kg	1.4	mg/kg	M	7.9E-09	1/mg/kg/day	NA	1/mg/kg/day	NA
	Chromium	19	mg/kg	19	mg/kg	M	1.1E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Copper	326	mg/kg	326	mg/kg	M	1.9E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Iron	18571	mg/kg	18571	mg/kg	M	1.1E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
	Manganese	176	mg/kg	176	mg/kg	M	1.0E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Thallium	0.6	mg/kg	0.6	mg/kg	M	3.5E-09	1/mg/kg/day	NA	1/mg/kg/day	NA
	Vanadium	30	mg/kg	30	mg/kg	M	1.7E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Zinc	382	mg/kg	382	mg/kg	M	2.2E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	9E-07
										Total Risk Across All Exposure Routes/Pathways	1E-05

*Subsurface and Surface Soil Combined.

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table J-8.18
Calculation of Cancer Risks - CT
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 3
Receptor Population: Other Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Benzo(a)Pyrene	0.376	mg/kg	0.376	mg/kg	M	6.6E-08	1/mg/kg/day	7.3E+00	1/mg/kg/day	5E-07
	Total Dioxins	0.00003	mg/kg	0.00003	mg/kg	M	5.9E-12	1/mg/kg/day	1.5E+05	1/mg/kg/day	9E-07
	Antimony	7.3	mg/kg	7.3	mg/kg	M	1.3E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	11.8	mg/kg	12	mg/kg	M	2.1E-06	1/mg/kg/day	1.5E+00	1/mg/kg/day	3E-06
	Iron	18571	mg/kg	18571	mg/kg	M	3.2E-03	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	4E-06
Dermal	Benzo(a)Pyrene	0.376	mg/kg	0.376	mg/kg	M	4.7E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
	Total Dioxins	0.00003	mg/kg	0.00003	mg/kg	M	1.3E-12	1/mg/kg/day	3.0E+05	1/mg/kg/day	4E-07
	Antimony	7.3	mg/kg	7.3	mg/kg	M	9.0E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	12	mg/kg	12	mg/kg	M	4.7E-07	1/mg/kg/day	1.6E+00	1/mg/kg/day	7E-07
	Iron	18571	mg/kg	18571	mg/kg	M	2.3E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	1E-06
										Total Risk Across All Exposure Routes/Pathways	6E-06

*Subsurface and Surface Soil Combined.

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table J-8.19
Calculation of Cancer Risks - CT
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Sediment at Site 3
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Antimony	25	mg/kg	25	mg/kg	M	1.2E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	11	mg/kg	11	mg/kg	M	5.0E-07	1/mg/kg/day	1.5E+00	1/mg/kg/day	7E-07
	Iron	18958	mg/kg	18958	mg/kg	M	9.0E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	7E-07
Dermal	Antimony	25	mg/kg	25	mg/kg	M	6.0E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	11	mg/kg	11	mg/kg	M	8.0E-07	1/mg/kg/day	1.6E+00	1/mg/kg/day	1E-06
	Iron	18958	mg/kg	18958	mg/kg	M	4.5E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	1E-06
										Total Risk Across All Exposure Routes/Pathways	2E-06

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table J-9.1
Summary of Receptor Risks and Hazards for COPCs - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Receptor Population: Trespasser
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	At Site 3	Benzo(a)Pyrene	6E-07	NA	NA	6E-07	Benzo(a)Pyrene	NA	0.03	NA	0.0	NA
			Antimony	NA	NA	NA	NA	Antimony	Longevity,Blood	0.01	NA	0.00	0.01
			Arsenic	5E-06	NA	1E-06	6E-06	Arsenic	Skin	0.02	NA	0.000	0.02
			Iron	NA	NA	NA	NA	Iron	Gastrointestinal	0.06	NA	0.00	0.06
			(Total)	5E-06	NA	1E-06	7E-06	(Total)		0.12	NA	0.00	0.1
			Total Risk Across Surface Soil at Site 3				7E-06	Total Hazard Index Across Surface Soil at Site 3					0.1
	Air	Emissions from Surface Soil at Site 3	Benzo(a)Pyrene	NA	3E-12	NA	3E-12	Benzo(a)Pyrene	NA	NA	0.00	NA	NA
			Antimony	NA	NA	NA	NA	Antimony	NA	NA	0.00	NA	NA
			Arsenic	NA	6E-10	NA	6E-10	Arsenic	NA	NA	0.00	NA	NA
			Iron	NA	NA	NA	NA	Iron	NA	NA	0.00	NA	NA
			(Total)	NA	6E-10	NA	6E-10	(Total)		NA	NA	NA	0.0
			Total Risk Across Emissions from Surface Soil at Site 3				6E-10	Total Hazard Index Across Emissions from Surface Soil at Site 3					0.0
			Total Risk Across Surface Soil				7E-06	Total Hazard Index Across Surface Soil					0.1
Surface Water	Surface Water	Surface Water at Site 3	Aluminum	NA	NA	NA	NA	Aluminum	CNS	NA	NA	0.000	0.000
			Arsenic	NA	NA	3E-08	3E-08	Arsenic	Skin	NA	NA	0.0000	0.0000
			Iron	NA	NA	NA	NA	Iron	Gastrointestinal	NA	NA	0.00	0.00
			Manganese	NA	NA	NA	NA	Manganese	CNS	NA	NA	0.000	0.000
			(Total)	NA	NA	3E-08	3E-08	(Total)		NA	NA	0.00	0.00
			Total Risk Across Surface Water				3E-08	Total Hazard Index Across Surface Water					0.00
			Total Risk Across All Media and All Exposure Routes				7E-06	Total Hazard Index Across All Media and All Exposure Routes					0.1

Total Blood HI =	0.01
Total CNS HI =	0.00
Total Gastrointestinal HI =	0.06
Total Longevity HI =	0.01
Total Skin HI =	0.02

Table J-9.2
Summary of Receptor Risks and Hazards for COPCs - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	At Site 3	Benzo(a)Pyrene	1E-07	NA	NA	1E-07	Benzo(a)Pyrene	NA	0.02	NA	0.0	NA
			Antimony	NA	NA	NA	NA	Antimony	Longevity,Blood	0.00	NA	0.00	0.00
			Arsenic	1E-06	NA	2E-07	1E-06	Arsenic	Skin	0.01	NA	0.000	0.01
			Iron	NA	NA	NA	NA	Iron	Gastrointestinal	0.03	NA	0.00	0.03
			(Total)	1E-06	NA	2E-07	1E-06	(Total)		0.1	NA	0.00	0.1
			Total Risk Across Surface Soil at Site 3				1E-06	Total Hazard Index Across Surface Soil at Site 3					0.1
	Air	Emissions from Surface Soil at Site 3	Benzo(a)Pyrene	NA	6E-13	NA	6E-13	Benzo(a)Pyrene	NA	NA	0.00	NA	NA
			Antimony	NA	NA	NA	NA	Antimony	NA	NA	0.00	NA	NA
			Arsenic	NA	1E-10	NA	1E-10	Arsenic	NA	NA	0.00	NA	NA
			Iron	NA	NA	NA	NA	Iron	NA	NA	0.00	NA	NA
			(Total)	NA	1E-10	NA	1E-10	(Total)		NA	NA	NA	NA
			Total Risk Across Emissions from Surface Soil at Site 3				1E-10	Total Hazard Index Across Emissions from Surface Soil at Site 3					NA
			Total Risk Across Surface Soil				1E-06	Total Hazard Index Across Surface Soil					0.1
Surface Water	Surface Water	Surface Water at Site 3	Aluminum	NA	NA	NA	NA	Aluminum	CNS	NA	NA	0.000	0.000
			Arsenic	NA	NA	7E-09	7E-09	Arsenic	Skin	NA	NA	0.0000	0.0000
			Iron	NA	NA	NA	NA	Iron	Gastrointestinal	NA	NA	0.00	0.00
			Manganese	NA	NA	NA	NA	Manganese	CNS	NA	NA	0.000	0.000
			(Total)	NA	NA	7E-09	7E-09	(Total)		NA	NA	0.00	0.00
			Total Risk Across Surface Water				7E-09	Total Hazard Index Across Surface Water					0.00
			Total Risk Across All Media and All Exposure Routes				1E-06	Total Hazard Index Across All Media and All Exposure Routes					0.1

Total Blood HI =	0.00
Total CNS HI =	0.00
Total Gastrointestinal HI =	0.03
Total Longevity HI =	0.00
Total Skin HI =	0.01

Table J-9.3
Summary of Receptor Risks and Hazards for COPCs - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water						Chloroform	Liver	0.001	NA	0.00000	0.001
								Arsenic	Skin	0.0	NA	0.0000	0.0
								Manganese	CNS	0.0	NA	0.000	0.0
								Thallium	Liver	0.0	NA	0.000	0.0
			(Total)					(Total)		0.0	NA	0.000	0.0
			Total Risk Across Tap water				0E+00	Total Hazard Index Across Tap water					0.0
	Air	Deep Groundwater - Water Vapors at Showerhead	Chloroform	NA	0E+00	NA	0E+00	Chloroform	Nasal	NA	0.0	NA	0.0
			(Total)	NA	0E+00	NA	0E+00	(Total)		NA	0.0	NA	0.0
			Total Risk Across Vapors at Showerhead				0E+00	Total Hazard Index Across Vapors at Showerhead					0.0
			Total Risk Across All Media and All Exposure Routes				0E+00	Total Hazard Index Across All Media and All Exposure Routes					0.0

Total CNS HI =	0.0
Total Liver HI =	0.0
Total Nasal HI =	0.0
Total Skin HI =	0.0

Table J-9.4
Summary of Receptor Risks and Hazards for COPCs - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water						Chloroform	Liver	0.002	NA	0.0000	0.002
								Arsenic	Skin	0.0	NA	0.000	0.0
								Manganese	CNS	0	NA	0.00	0
								Thallium	Liver	0	NA	0.000	0
			(Total)					(Total)		0	NA	0.00	0
			Total Risk Across Tap water				0E+00	Total Hazard Index Across Tap water					0
			Total Risk Across All Media and All Exposure Routes				0E+00	Total Hazard Index Across All Media and All Exposure Routes					0

Total CNS HI =	0
Total Liver HI =	0
Total Skin HI =	0.0

Table J-9.5
Summary of Receptor Risks and Hazards for COPCs - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current
Receptor Population: Resident
Receptor Age: Adult/Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water	Chloroform	4E-08	NA	3E-09	4E-08						
			Arsenic	8E-05	NA	2E-07	8E-05						
			Manganese	NA	NA	NA	NA						
			Thallium	NA	NA	NA	NA						
			(Total)	8E-05	NA	2E-07	8E-05	(Total)					
			Total Risk Across Tap water				8E-05	Total Hazard Index Across Tap water					0
	Air	Deep Groundwater - Water Vapors at Showerhead	Chloroform	NA	0E+00	NA	0E+00						
			(Total)	NA	0E+00	NA	0E+00	(Total)					
			Total Risk Across Vapors at Showerhead				0E+00	Total Hazard Index Across Vapors at Showerhead					0
			Total Risk Across All Media and All Exposure Routes				8E-05	Total Hazard Index Across All Media and All Exposure Routes					0

Table J-9.6
Summary of Receptor Risks and Hazards for COPCs - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water						Chloroform	Liver	0.001	NA	0.00000	0.001
								Arsenic	Skin	0.0	NA	0.0000	0.0
								Manganese	CNS	0.0	NA	0.000	0.0
								Thallium	Liver	0.0	NA	0.000	0.0
			(Total)					(Total)		0	NA	0.000	0
			Total Risk Across Tap water				0E+00	Total Hazard Index Across Tap water					0
	Air	Deep Groundwater - Water Vapors at Showerhead	Chloroform	NA	0E+00	NA	0E+00	Chloroform	Nasal	NA	0.0	NA	0.0
			(Total)	NA	0E+00	NA	0E+00	(Total)		NA	0.0	NA	0.0
			Total Risk Across Vapors at Showerhead				0E+00	Total Hazard Index Across Vapors at Showerhead					0.0
			Total Risk Across Groundwater				0E+00	Total Hazard Index Across Groundwater					0
Soil*	Soil*	At Site 3						Aroclor-1254	Ocular	NA	NA	NA	0.000
								Benzo(a)Anthracene	NA	0.02	NA	0.0	NA
								Benzo(a)Pyrene	NA	0.05	NA	0.0	NA
								Benzo(b)Fluoranthene	NA	0.08	NA	0.0	NA
								Dibenz(a,h)Anthracene	NA	0.00	NA	0.0	NA
								Indeno(1,2,3-cd)Pyrene	NA	0.00	NA	0.0	NA
								Total Dioxins	NA	0.02	NA	0.2	NA
								Aluminum	CNS	0.03	NA	0.004	0.03
								Antimony	Longevity, Blood	0.21	NA	0.10	0.31
								Arsenic	Skin	0.0	NA	0.00	0.0
								Barium	Heart	0.016	NA	0.001	0.017
								Cadmium	Kidney	0.009	NA	0.04	0.05
								Chromium	NOAEL	0.00	NA	0.0	0.0
								Copper	Gastrointestinal	0.46	NA	0.428	0.89
								Iron	Gastrointestinal	0.0	NA	0.9	0.9
								Manganese	CNS	NA	NA	0.00	0.00
								Thallium	Liver	NA	NA	0.000	0.00
								Vanadium	NOAEL	NA	NA	0.00	0.00
								Zinc	Blood	NA	NA	0.000	0.000
			(Total)				0E+00	(Total)		0.9	NA	1.7	2.2
			Total Risk Across Soil* at Site 3				0E+00	Total Hazard Index Across Soil* at Site 3					2.2
Surface Water	Surface Water	Surface Water at Site 3						Aluminum	CNS	NA	NA	0.000	0.000
								Arsenic	Skin	NA	NA	0.0000	0.0000
								Iron	Gastrointestinal	NA	NA	0.00	0.00
								Manganese	CNS	NA	NA	0.00	0.00
			(Total)					(Total)		NA	NA	0.00	0.00
			Total Risk Across Surface Water				0E+00	Total Hazard Index Across Surface Water					0.00

Table J-9.6
Summary of Receptor Risks and Hazards for COPCs - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Sediment	Sediment	Sediment at Site 3					
			(Total)				
						Total Risk Across Sediment	0E+00
						Total Risk Across All Media and All Exposure Routes	0E+00

Chemical	Non-Carcinogenic Hazard Quotient				
	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Antimony	Longevity, Blood	0.03	NA	0.00	0.0
Arsenic	Skin	0.12	NA	0.000	0.12
Iron	Gastrointestinal	0.28	NA	0.00	0.28
(Total)		0.4	NA	0.0	0.4
				Total Hazard Index Across Sediment	0.4
				Total Hazard Index Across All Media and All Exposure Routes	3

* Includes both surface and subsurface soil.

Total Blood HI =	0.3
Total CNS HI =	0.0
Total Gastrointestinal HI =	2.1
Total Heart HI =	0.017
Total Kidney HI =	0.05
Total Liver HI =	0.0
Total Longevity HI =	0.3
Total NOAEL HI =	0.0
Total Nasal HI =	0.0
Total Ocular HI =	0.000
Total Skin HI =	0.1

Table J-9.7
Summary of Receptor Risks and Hazards for COPCs - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water						Chloroform	Liver	0.002	NA	0.0000	0.002
								Arsenic	Skin	0.0	NA	0.000	0.0
								Manganese	CNS	0	NA	0.00	0
								Thallium	Liver	0	NA	0.000	0
			(Total)					(Total)		0	NA	0.00	0
			Total Risk Across Tap water				0E+00	Total Hazard Index Across Tap water					0
Soil*	Soil*	At Site 3						Aroclor-1254	Ocular	NA	NA	NA	0.00
								Benzo(a)Anthracene	NA	0.15	NA	0.0	NA
								Benzo(a)Pyrene	NA	0.49	NA	0.1	NA
								Benzo(b)Fluoranthene	NA	0.78	NA	0.1	NA
								Dibenz(a,h)Anthracene	NA	0.05	NA	0.0	NA
								Indeno(1,2,3-cd)Pyrene	NA	0.03	NA	0.0	NA
								Total Dioxins	NA	0.03	NA	0.1	NA
								Aluminum	CNS	0.2	NA	0.01	0.2
								Antimony	Longevity, Blood	2.0	NA	0.19	2.2
								Arsenic	Skin	0.2	NA	0.01	0
								Barium	Heart	0.15	NA	0.003	0.15
								Cadmium	Kidney	0.08	NA	0.08	0.17
								Chromium	NOAEL	0.03	NA	0.00	0.03
								Copper	Gastrointestinal	4.2	NA	0.542	4.7
								Iron	Gastrointestinal	0	NA	4.73	5
								Manganese	CNS	NA	NA	0.00	0.0
								Thallium	Liver	NA	NA	0.000	0.0
								Vanadium	NOAEL	NA	NA	0.00	0.0
								Zinc	Blood	NA	NA	0.000	0.00
			(Total)				0E+00	(Total)		8	NA	5.8	12
			Total Risk Across Soil* at Site 3				0E+00	Total Hazard Index Across Soil* at Site 3					12
Surface Water	Surface Water	Surface Water at Site 3						Aluminum	CNS	NA	NA	0.00	0.00
								Arsenic	Skin	NA	NA	0.000	0.000
								Iron	Gastrointestinal	NA	NA	0.00	0.00
								Manganese	CNS	NA	NA	0.00	0.00
			(Total)					(Total)		NA	NA	0.0	0.0
			Total Risk Across Surface Water				0E+00	Total Hazard Index Across Surface Water					0.0

Table J-9.7
Summary of Receptor Risks and Hazards for COPCs - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sediment	Sediment	Sediment at Site 3						Antimony	Longevity, Blood	3.5	NA	0	3
								Arsenic	Skin	14.0	NA	0.0	14.0
								Iron	Gastrointestinal	15.6	NA	0	16
			(Total)					(Total)		33	NA	0	33
			Total Risk Across Sediment				0E+00	Total Hazard Index Across Sediment					33
			Total Risk Across All Media and All Exposure Routes				0E+00	Total Hazard Index Across All Media and All Exposure Routes					45

* Includes both surface and subsurface soil.

Total Blood HI =	6
Total CNS HI =	0
Total Gastrointestinal HI =	25
Total Heart HI =	0.1
Total Kidney HI =	0.17
Total Liver HI =	0
Total Longevity HI =	6
Total NOAEL HI =	0.0
Total Ocular HI =	0.00
Total Skin HI =	14

Table J-9.8
Summary of Receptor Risks and Hazards for COPCs - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water	Chloroform	4E-08	NA	3E-09	4E-08						
			Arsenic	8E-05	NA	2E-07	8E-05						
			Manganese	NA	NA	NA	NA						
			Thallium	NA	NA	NA	NA						
			(Total)	8E-05	NA	2E-07	8E-05	(Total)					
			Total Risk Across Tap water				8E-05	Total Hazard Index Across Tap water					0
	Air	Deep Groundwater - Water Vapors at Showerhead	Chloroform	NA	0E+00	NA	0E+00						
			(Total)	NA	0E+00	NA	0E+00	(Total)					
			Total Risk Across Vapors at Showerhead				0E+00	Total Hazard Index Across Vapors at Showerhead					0
			Total Risk Across Groundwater				8E-05	Total Hazard Index Across Groundwater					0
Soil*	Soil*	At Site 3	Aroclor-1254	1E-07	NA	4E-08	2E-07						
			Benzo(a)Anthracene	6E-07	NA	NA	6E-07						
			Benzo(a)Pyrene	6E-06	NA	NA	6E-06						
			Benzo(b)Fluoranthene	1E-06	NA	NA	1E-06						
			Dibenz(a,h)Anthracene	3E-06	NA	NA	3E-06						
			Indeno(1,2,3-cd)Pyrene	4E-07	NA	NA	4E-07						
			Total Dioxins	1E-05	NA	4E-06	2E-05						
			Aluminum	NA	NA	NA	NA						
			Antimony	NA	NA	NA	NA						
			Arsenic	4E-05	NA	6E-06	5E-05						
			Barium	NA	NA	NA	NA						
			Cadmium	NA	NA	NA	NA						
			Chromium	NA	NA	NA	NA						
			Copper	NA	NA	NA	NA						
			Iron	NA	NA	NA	NA						
			Manganese	NA	NA	NA	NA						
			Thallium	NA	NA	NA	NA						
			Vanadium	NA	NA	NA	NA						
			Zinc	NA	NA	NA	NA						
			(Total)	7E-05	NA	1E-05	8E-05	(Total)					0
			Total Risk Across Soil* at Site 3				8E-05	Total Hazard Index Across Soil* at Site 3					0

Table J-9.8
Summary of Receptor Risks and Hazards for COPCs - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Surface Water at Site 3	Aluminum	NA	NA	NA	NA						
			Arsenic	NA	NA	1E-07	1E-07						
			Iron	NA	NA	NA	NA						
			Manganese	NA	NA	NA	NA						
			(Total)	NA	NA	1E-07	1E-07	(Total)					0
			Total Risk Across Surface Water				1E-07	Total Hazard Index Across Surface Water					0
Sediment	Sediment	Sediment at Site 3	Antimony	NA	NA	NA	NA						
			Arsenic	9E-06	NA	3E-05	3E-05						
			Iron	NA	NA	NA	NA						
			(Total)	9E-06	NA	3E-05	3E-05	(Total)					0
			Total Risk Across Sediment				3E-05	Total Hazard Index Across Sediment					0
			Total Risk Across All Media and All Exposure Routes				2E-04	Total Hazard Index Across All Media and All Exposure Routes					0

* Includes both surface and subsurface soil.

Table J-9.9
Summary of Receptor Risks and Hazards for COPCs - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil*	Soil*	At Site 3	Benzo(a)Pyrene	1E-07	NA	NA	1E-07	Benzo(a)Pyrene	NA	NA	NA	1.3	NA
			Total Dioxins	3E-07	NA	5E-08	3E-07	Total Dioxins	NA	NA	NA	1.3	NA
			Antimony	NA	NA	NA	NA	Antimony	Longevity, Blood	0.0	NA	0.0	0.0
			Arsenic	9E-07	NA	8E-08	1E-06	Arsenic	Skin	0.0	NA	0.00	0.0
			Iron	NA	NA	NA	NA	Iron	Gastrointestinal	0.1	NA	0.00	0.1
			(Total)	1E-06	NA	1E-07	1E-06	(Total)		0	NA	2.7	0
			Total Risk Across Soil* at Site 3				1E-06	Total Hazard Index Across Soil* at Site 3					0
	Air	Emissions from Soil at Site 3	Benzo(a)Pyrene	NA	2E-12	NA	2E-12	Benzo(a)Pyrene	NA	NA	NA	NA	NA
			Total Dioxins	NA	1E-11	NA	1E-11	Total Dioxins	NA	NA	0.00	NA	NA
			Antimony	NA	NA	NA	NA	Antimony	NA	NA	0.00	NA	NA
			Arsenic	NA	3E-10	NA	3E-10	Arsenic	NA	NA	0.00	NA	NA
			Iron	NA	NA	NA	NA	Iron	NA	NA	0.00	NA	NA
			(Total)	NA	3E-10	NA	3E-10	(Total)		NA	NA	NA	NA
			Total Risk Across Emissions from Soil at Site 3				3E-10	Total Hazard Index Across Emissions from Soil at Site 3					NA
					Total Risk Across Soil		1E-06	Total Hazard Index Across Soil					0
Groundwater	Shallow Groundwater	Water Table	Heptachlor	NA	NA	3E-09	3E-09	Heptachlor	Liver	NA	NA	0.0004	0.0004
			Bis(2-Ethylhexyl)Phthalate	NA	NA	1E-08	1E-08	Bis(2-Ethylhexyl)Phthalate	Liver	NA	NA	0.005	0.005
			Dibenzofuran	NA	NA	NA	NA	Dibenzofuran	Kidney	NA	NA	0.01	0.01
			Naphthalene	NA	NA	NA	NA	Naphthalene	Body weight	NA	NA	0.011	0.011
			Aluminum	NA	NA	NA	NA	Aluminum	CNS	NA	NA	0.001	0.001
			Antimony	NA	NA	NA	NA	Antimony	Longevity, Blood	NA	NA	0.0076	0.008
			Arsenic	NA	NA	1E-09	1E-09	Arsenic	Skin	NA	NA	0.0614	0.0614
			Chromium	NA	NA	NA	NA	Chromium	NOAEL	NA	NA	0.061	0.061
			Iron	NA	NA	NA	NA	Iron	Gastrointestinal	NA	NA	0.00	0.00
			Manganese	NA	NA	NA	NA	Manganese	CNS	NA	NA	0.00	0.00
			Nickel	NA	NA	NA	NA	Nickel	Body weight	NA	NA	0.0000	0.0000
			Vanadium	NA	NA	NA	NA	Vanadium	NOAEL	NA	NA	0.000	0.000
			(Total)	NA	NA	2E-08	2E-08	(Total)		NA	NA	0.16	0.16
			Total Risk Across Surface Water				2E-08	Total Hazard Index Across Surface Water					0.16
			Total Risk Across All Media and All Exposure Routes				2E-06	Total Hazard Index Across All Media and All Exposure Routes					0

* Includes both surface and subsurface soil.

Total Blood HI =	0.1
Total Body Weight HI =	0.011
Total CNS HI =	0.00
Total Gastrointestinal HI =	0.1
Total Kidney HI =	0.01
Total Liver HI =	0.005
Total Longevity HI =	0.1
Total NOAEL HI =	0.06
Total Skin HI =	0.1

Table J-9.10
Summary of Receptor Risks and Hazards for COPCs - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil*	Soil*	At Site 3	Benzo(a)Pyrene	7E-07	NA	NA	7E-07	Benzo(a)Pyrene	NA	NA	NA	0.2	NA
			Total Dioxins	2E-06	NA	7E-07	2E-06	Total Dioxins	NA	NA	NA	0.0	NA
			Antimony	NA	NA	NA	0E+00	Antimony	Longevity, Blood	0.01	NA	0.00	0.01
			Arsenic	5E-06	NA	1E-06	6E-06	Arsenic	Skin	0.01	NA	0.000	0.01
			Iron	NA	NA	NA	0E+00	Iron	Gastrointestinal	0.03	NA	0.00	0.0
			(Total)	7E-06	NA	2E-06	9E-06	(Total)		0.0	NA	0.17	0.0
			Total Risk Across Soil* at Site 3				9E-06	Total Hazard Index Across Soil* at Site 3					0.0
			Total Risk Across All Media and All Exposure Routes				9E-06	Total Hazard Index Across All Media and All Exposure Routes					0.0

* Includes both surface and subsurface soil.

Total Gastrointestinal HI =	0.0
Total Skin HI =	0.01

Table J-9.11
Summary of Receptor Risks and Hazards for COPCs - CT
Site 3
St. Julliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water						Chloroform	Liver	0.0002	NA	0.00000	0.0002
								Arsenic	Skin	0.00	NA	0.0000	0.00
								Manganese	CNS	0.0	NA	0.0000	0.0
								Thallium	Liver	0.0	NA	0.0000	0.0
			(Total)					(Total)		0.0	NA	0.000	0.0
			Total Risk Across Tap water				0E+00	Total Hazard Index Across Tap water					0.0
			Total Risk Across All Media and All Exposure Routes				0E+00	Total Hazard Index Across All Media and All Exposure Routes					0.0

Total CNS HI =	0.0
Total Liver HI =	0.0
Total Skin HI =	0.00

Table J-9.12
Summary of Receptor Risks and Hazards for COPCs - CT
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water					
			(Total)				
						Total Risk Across Tap water	0E+00
						Total Risk Across All Media and All Exposure Routes	0E+00

Chemical	Non-Carcinogenic Hazard Quotient				
	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Chloroform	Liver	0.001	NA	0.0000	0.001
Arsenic	Skin	0.0	NA	0.0000	0.0
Manganese	CNS	0.0	NA	0.000	0.0
Thallium	Liver	0.0	NA	0.000	0.0
(Total)		0	NA	0.000	0
				Total Hazard Index Across Tap water	0
				Total Hazard Index Across All Media and All Exposure Routes	0

Total CNS HI =	0.0
Total Liver HI =	0.0
Total Skin HI =	0.0

Table J-9.13
Summary of Receptor Risks and Hazards for COPCs - CT
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current
Receptor Population: Resident
Receptor Age: Adult/Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water	Chloroform	1E-08	NA	9E-10	1E-08						
			Arsenic	2E-05	NA	3E-08	2E-05						
			Manganese	NA	NA	NA	NA						
			Thallium	NA	NA	NA	NA						
			(Total)	2E-05	NA	3E-08	2E-05	(Total)					0.0
							Total Risk Across Tap water	2E-05					Total Hazard Index Across Tap water	0.0
							Total Risk Across All Media and All Exposure Routes	2E-05					Total Hazard Index Across All Media and All Exposure Routes	0.0

Table J-9.14
Summary of Receptor Risks and Hazards for COPCs - CT
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water						Chloroform	Liver	0.0002	NA	0.00000	0.0002
								Arsenic	Skin	0.00	NA	0.0000	0.00
								Manganese	CNS	0.0	NA	0.0000	0.0
								Thallium	Liver	0.0	NA	0.0000	0.0
			(Total)					(Total)		0.0	NA	0.000	0.0
			Total Risk Across Tap water				0E+00	Total Hazard Index Across Tap water					0.0
			Total Risk Across Groundwater				0E+00	Total Hazard Index Across Groundwater					0.0
			Total Risk Across All Media and All Exposure Routes				0E+00	Total Hazard Index Across All Media and All Exposure Routes					0.0

* Includes both surface and subsurface soil.

Total CNS HI =	0.0
Total Liver HI =	0.0
Total Skin HI =	0.00

Table J-9.15
Summary of Receptor Risks and Hazards for COPCs - CT
Site 3
St. Julians Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water						Chloroform	Liver	0.001	NA	0.0000	0.001
								Arsenic	Skin	0.0	NA	0.0000	0.0
								Manganese	CNS	0.0	NA	0.000	0.0
								Thallium	Liver	0.0	NA	0.000	0.0
			(Total)					(Total)		0	NA	0.000	0
			Total Risk Across Tap water				0E+00	Total Hazard Index Across Tap water					0
Soil*	Soil*	At Site 3						Aroclor-1254	Ocular	NA	NA	NA	0.000
								Benzo(a)Anthracene	NA	0.04	NA	0.0013	NA
								Benzo(a)Pyrene	NA	0.08	NA	0.0074	NA
								Benzo(b)Fluoranthene	NA	0.17	NA	0.0054	NA
								Dibenz(a,h)Anthracene	NA	0.01	NA	0.0001	NA
								Indeno(1,2,3-cd)Pyrene	NA	0.01	NA	0.0023	NA
								Total Dioxins	NA	0.00	NA	0.0039	NA
								Aluminum	CNS	0.04	NA	0.001	0.04
								Antimony	Longevity, Blood	0.26	NA	0.013	0.28
								Arsenic	Skin	0.0	NA	0.001	0.0
								Barium	Heart	0.038	NA	0.00036	0.038
								Cadmium	Kidney	0.02	NA	0.009	0.027
								Chromium	NOAEL	0.005	NA	0.000	0.006
								Copper	Gastrointestinal	0.71	NA	0.044	0.76
								Iron	Gastrointestinal	0.00	NA	0.76	0.8
								Manganese	CNS	NA	NA	0.000	0.00
								Thallium	Liver	NA	NA	0.0000	0.00
								Vanadium	NOAEL	NA	NA	0.000	0.00
								Zinc	Blood	NA	NA	0.0000	0.000
			(Total)				0E+00	(Total)		1.4	NA	0.84	1.9
			Total Risk Across Soil* at Site 3				0E+00	Total Hazard Index Across Soil* at Site 3					1.9
Sediment	Sediment	Sediment at Site 3						Antimony	Longevity, Blood	0.09	NA	0.0	0.1
								Arsenic	Skin	0.29	NA	0.00	0.29
								Iron	Gastrointestinal	0.37	NA	0.00	0.4
			(Total)					(Total)		0.75	NA	0.0	0.8
			Total Risk Across Sediment				0E+00	Total Hazard Index Across Sediment					0.8
			Total Risk Across All Media and All Exposure Routes				0E+00	Total Hazard Index Across All Media and All Exposure Routes					3

Total Blood HI =	0.4
Total CNS HI =	0.0
Total Gastrointestinal HI =	1.5

* Includes both surface and subsurface soil.

Table J-9.15
Summary of Receptor Risks and Hazards for COPCs - CT
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
												Total Heart HI =	0.038
												Total Kidney HI =	0.027
												Total Liver HI =	0.0
												Total Longevity HI =	0.4
												Total NOAEL HI =	0.01
												Total Ocular HI =	0.000
												Total Skin HI =	0.0

Table J-9.16
Summary of Receptor Risks and Hazards for COPCs - CT
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water	Chloroform	1E-08	NA	9E-10	1E-08						
			Arsenic	2E-05	NA	3E-08	2E-05						
			Manganese	NA	NA	NA	NA						
			Thallium	NA	NA	NA	NA						
			(Total)	2E-05	NA	3E-08	2E-05	(Total)					
			Total Risk Across Tap water				2E-05	Total Hazard Index Across Tap water					0
			Total Risk Across Groundwater				2E-05	Total Hazard Index Across Groundwater					0
Soil*	Soil*	At Site 3	Aroclor-1254	3E-08	NA	3E-09	3E-08						
			Benzo(a)Anthracene	1E-07	NA	NA	1E-07						
			Benzo(a)Pyrene	1E-06	NA	NA	1E-06						
			Benzo(b)Fluoranthene	1E-07	NA	NA	1E-07						
			Dibenz(a,h)Anthracene	7E-07	NA	NA	7E-07						
			Indeno(1,2,3-cd)Pyrene	9E-08	NA	NA	9E-08						
			Total Dioxins	2E-06	NA	6E-07	3E-06						
			Aluminum	NA	NA	NA	NA						
			Antimony	NA	NA	NA	NA						
			Arsenic	8E-06	NA	3E-07	8E-06						
			Barium	NA	NA	NA	NA						
			Cadmium	NA	NA	NA	NA						
			Chromium	NA	NA	NA	NA						
			Copper	NA	NA	NA	NA						
			Iron	NA	NA	NA	NA						
			Manganese	NA	NA	NA	NA						
			Thallium	NA	NA	NA	NA						
			Vanadium	NA	NA	NA	NA						
			Zinc	NA	NA	NA	NA						
			(Total)	1E-05	NA	9E-07	1E-05	(Total)					0
			Total Risk Across Soil* at Site 3				1E-05	Total Hazard Index Across Soil* at Site 3					0
Sediment	Sediment	Sediment at Site 3	Antimony	NA	NA	NA	NA						
			Arsenic	7E-07	NA	1E-06	2E-06						
			Iron	NA	NA	NA	NA						
			(Total)	7E-07	NA	1E-06	2E-06	(Total)					0
			Total Risk Across Sediment				2E-06	Total Hazard Index Across Sediment					0
			Total Risk Across All Media and All Exposure Routes				3E-05	Total Hazard Index Across All Media and All Exposure Routes					0

* Includes both surface and subsurface soil.

Table J-10.1
Risk Assessment Summary - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water						Arsenic	Skin	0.0	NA	0.0000	0.0
								Manganese	CNS	0.0	NA	0.000	0.0
								Thallium	Liver	0.0	NA	0.000	0.0
			(Total)					(Total)		0.0	NA	0.000	0.0
			Total Risk Across Tap water				0E+00	Total Hazard Index Across Tap water					0.0
	Air	Deep Groundwater - Water Vapors at Showerhead						Chloroform	Nasal	NA	0.0	NA	0.0
			(Total)	NA	0E+00	NA	0E+00	(Total)		NA	0.0	NA	0.0
			Total Risk Across Vapors at Showerhead				0E+00	Total Hazard Index Across Vapors at Showerhead					0.0
			Total Risk Across All Media and All Exposure Routes				0E+00	Total Hazard Index Across All Media and All Exposure Routes					0.0

Total CNS HI =	0.0
Total Liver HI =	0.0
Total Nasal HI =	0.0
Total Skin HI =	0.0

Table J-10.2
Risk Assessment Summary - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water						Arsenic	Skin	0.0	NA	0.000	0.0
								Manganese	CNS	0	NA	0.00	0
								Thallium	Liver	0	NA	0.000	0
			(Total)					(Total)		0	NA	0.00	0
			Total Risk Across Tap water				0E+00	Total Hazard Index Across Tap water					0
			Total Risk Across All Media and All Exposure Routes				0E+00	Total Hazard Index Across All Media and All Exposure Routes					0

Total CNS HI =	0
Total Liver HI =	0
Total Skin HI =	0.0

Table J-10.3
Risk Assessment Summary - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current
Receptor Population: Resident
Receptor Age: Adult/Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water	Arsenic	8E-05	NA	2E-07	8E-05						
			(Total)	8E-05	NA	2E-07	8E-05	(Total)					
			Total Risk Across Tap water				8E-05	Total Hazard Index Across Tap water					0
	Air	Deep Groundwater - Water Vapors at Showerhead	Chloroform										
			(Total)	NA	0E+00	NA	0E+00	(Total)					
			Total Risk Across Vapors at Showerhead				0E+00	Total Hazard Index Across Vapors at Showerhead					0
			Total Risk Across All Media and All Exposure Routes				8E-05	Total Hazard Index Across All Media and All Exposure Routes					0

Table J-10.4
Risk Assessment Summary - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water						Arsenic	Skin	0.0	NA	0.0000	0.0
								Manganese	CNS	0.0	NA	0.000	0.0
								Thallium	Liver	0.0	NA	0.000	0.0
			(Total)					(Total)		0	NA	0.000	0
			Total Risk Across Tap water				0E+00	Total Hazard Index Across Tap water					0
	Air	Deep Groundwater - Water Vapors at Showerhead						Chloroform	Nasal	NA	0.0	NA	0.0
			(Total)	NA	0E+00	NA	0E+00	(Total)		NA	0.0	NA	0.0
			Total Risk Across Vapors at Showerhead				0E+00	Total Hazard Index Across Vapors at Showerhead					0.0
			Total Risk Across Groundwater				0E+00	Total Hazard Index Across Groundwater					0
Soil*	Soil*	At Site 3						Antimony	Longevity, Blood	0.21	NA	0.10	0.31
								Arsenic	Skin	0.0	NA	0.00	0.0
								Chromium	NOAEL	0.00	NA	0.0	0.0
								Iron	Gastrointestinal	0.0	NA	0.9	0.9
			(Total)				0E+00	(Total)		0.2	NA	1.0	1.2
			Total Risk Across Soil* at Site 3				0E+00	Total Hazard Index Across Soil* at Site 3					1.2
Sediment	Sediment	Sediment at Site 3						Antimony	Longevity, Blood	0.03	NA	0.00	0.0
			(Total)					(Total)		0.0	NA	0.0	0.0
			Total Risk Across Sediment				0E+00	Total Hazard Index Across Sediment					0.0
			Total Risk Across All Media and All Exposure Routes				0E+00	Total Hazard Index Across All Media and All Exposure Routes					1

* Includes both surface and subsurface soil.

Total Blood HI =	0.3
Total CNS HI =	0.0
Total Gastrointestinal HI =	0.9
Total Liver HI =	0.0
Total Longevity HI =	0.3
Total NOAEL HI =	0.0
Total Nasal HI =	0.0
Total Skin HI =	0.0

Table J-10.5
Risk Assessment Summary - RME
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water						Arsenic	Skin	0.0	NA	0.000	0.0
								Manganese	CNS	0	NA	0.00	0
								Thallium	Liver	0	NA	0.000	0
			(Total)					(Total)		0	NA	0.00	0
			Total Risk Across Tap water				0E+00			Total Hazard Index Across Tap water			0
Soil*	Soil*	At Site 3						Aluminum	CNS	0.2	NA	0.01	0.2
								Antimony	Longevity, Blood	2.0	NA	0.19	2.2
								Arsenic	Skin	0.2	NA	0.01	0
								Chromium	NOAEL	0.03	NA	0.00	0.0
								Copper	Gastrointestinal	4.2	NA	0.542	4.7
								Iron	Gastrointestinal	0	NA	4.73	5
								Manganese	CNS	NA	NA	0.00	0.0
								Thallium	Liver	NA	NA	0.000	0.0
								Vanadium	NOAEL	NA	NA	0.00	0.0
			(Total)				0E+00	(Total)		7	NA	5.5	12
			Total Risk Across Soil* at Site 3				0E+00			Total Hazard Index Across Soil* at Site 3			12
Sediment	Sediment	Sediment at Site 3						Antimony	Longevity, Blood	3.5	NA	0	3
								Arsenic	Skin	14.0	NA	0.0	14.0
								Iron	Gastrointestinal	15.6	NA	0	16
			(Total)					(Total)		33	NA	0	33
			Total Risk Across Sediment				0E+00			Total Hazard Index Across Sediment			33
			Total Risk Across All Media and All Exposure Routes				0E+00			Total Hazard Index Across All Media and All Exposure Routes			45

* Includes both surface and subsurface soil.

Total Blood HI =	6
Total CNS HI =	0
Total GastroIntestinal HI =	25
Total Liver HI =	0
Total Longevity HI =	6
Total NOAEL HI =	0.0
Total Skin HI =	14

Table J-10.6
Risk Assessment Summary - RME
Site 3
St. Julians Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water	Arsenic	8E-05	NA	2E-07	8E-05						
			(Total)	8E-05	NA	2E-07	8E-05	(Total)					
			Total Risk Across Tap water				8E-05	Total Hazard Index Across Tap water					0
	Air	Deep Groundwater - Water Vapors at Showerhead	Chloroform										
			(Total)	NA	0E+00	NA	0E+00	(Total)					
			Total Risk Across Vapors at Showerhead				0E+00	Total Hazard Index Across Vapors at Showerhead					0
			Total Risk Across Groundwater				8E-05	Total Hazard Index Across Groundwater					0
Soil*	Soil*	At Site 3	Benzo(a)Pyrene	6E-06	NA	NA	6E-06						
			Benzo(b)Fluoranthene	1E-06	NA	NA	1E-06						
			Dibenz(a,h)Anthracene	3E-06	NA	NA	3E-06						
			Total Dioxins	1E-05	NA	4E-06	2E-05						
			Arsenic	4E-05	NA	6E-06	5E-05						
			(Total)	7E-05	NA	1E-05	8E-05	(Total)					0
			Total Risk Across Soil* at Site 3				8E-05	Total Hazard Index Across Soil* at Site 3					0
Sediment	Sediment	Sediment at Site 3	Arsenic	9E-06	NA	3E-05	3E-05						
			(Total)	9E-06	NA	3E-05	3E-05	(Total)					0
			Total Risk Across Sediment				3E-05	Total Hazard Index Across Sediment					0
			Total Risk Across All Media and All Exposure Routes				2E-04	Total Hazard Index Across All Media and All Exposure Routes					#REF!

* Includes both surface and subsurface soil.

Table J-10.7
Risk Assessment Summary - CT
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water					
			(Total)				
			Total Risk Across Tap water				0E+00
Soil*	Soil*	At Site 3					
			(Total)				0E+00
			Total Risk Across Soil* at Site 3				0E+00
Sediment	Sediment	Sediment at Site 3					
			(Total)				
			Total Risk Across Sediment				0E+00
			Total Risk Across All Media and All Exposure Routes				0E+00

Chemical	Non-Carcinogenic Hazard Quotient				
	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Arsenic	Skin	0.0	NA	0.0000	0.0
Manganese	CNS	0.0	NA	0.000	0.0
Thallium	Liver	0.0	NA	0.000	0.0
(Total)		0	NA	0.000	0
Total Hazard Index Across Tap water					0
Arsenic	Skin	0.0	NA	0.001	0.0
Iron	Gastrointestinal	0.00	NA	0.76	0.8
(Total)		0.0	NA	0.76	0.8
Total Hazard Index Across Soil* at Site 3					0.8
Antimony	Longevity, Blood	0.09	NA	0.0	0.1
Iron	Gastrointestinal	0.37	NA	0.00	0.4
(Total)		0.46	NA	0.0	0.5
Total Hazard Index Across Sediment					0.5
Total Hazard Index Across All Media and All Exposure Routes					1

* Includes both surface and subsurface soil.

Total Blood HI =	0.1
Total CNS HI =	0.0
Total Gastrointestinal HI =	0.8
Total Liver HI =	0.0
Total Longevity HI =	0.1
Total Skin HI =	0.0

Table J-10.8
Risk Assessment Summary - CT
Site 3
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water	Arsenic	2E-05	NA	3E-08	2E-05						
			(Total)	2E-05	NA	3E-08	2E-05	(Total)					
			Total Risk Across Tap water				2E-05	Total Hazard Index Across Tap water					0
			Total Risk Across Groundwater				2E-05	Total Hazard Index Across Groundwater					0
Soil*	Soil*	At Site 3	Benzo(a)Pyrene	1E-06	NA	NA	1E-06						
			Total Dioxins	2E-06	NA	6E-07	3E-06						
			Arsenic	8E-06	NA	3E-07	8E-06						
			(Total)	1E-05	NA	9E-07	1E-05	(Total)					0
			Total Risk Across Soil* at Site 3				1E-05	Total Hazard Index Across Soil* at Site 3					0
Sediment	Sediment	Sediment at Site 3	Arsenic	7E-07	NA	1E-06	2E-06						
			(Total)	7E-07	NA	1E-06	2E-06	(Total)					0
			Total Risk Across Sediment				2E-06	Total Hazard Index Across Sediment					0
			Total Risk Across All Media and All Exposure Routes				3E-05	Total Hazard Index Across All Media and All Exposure Routes					0

* Includes both surface and subsurface soil.

Table K-1
Selection of Exposure Pathways
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current / Future	Surface Soil	Surface Soil	At Site 4	Trespasser	Adult	Dermal	On-Site	Quant	Trespassers may have exposed skin surfaces come into contact with soil
						Ingestion	On-Site	Quant	Trespassers may incidentally ingest soil
					Adolescent	Dermal	On-Site	Quant	Trespassers may have exposed skin surfaces come into contact with soil
						Ingestion	On-Site	Quant	Trespassers may incidentally ingest soil
		Air	Emissions from Surface Soil at Site 4	Trespasser	Adult	Inhalation	On-Site	Quant	Trespassers may inhale volatiles/particulates
					Adolescent	Inhalation	On-Site	Quant	Trespassers may inhale volatiles/particulates
	Groundwater	Deep Groundwater	Tap Water	Resident	Adult	Dermal	Off-Site	Quant	Local municipality currently has some uses for groundwater from deep aquifer
						Ingestion	Off-Site	Quant	Local municipality currently has some uses for groundwater from deep aquifer
					Child	Dermal	Off-Site	Quant	Local municipality currently has some uses for groundwater from deep aquifer
						Ingestion	Off-Site	Quant	Local municipality currently has some uses for groundwater from deep aquifer
					Adult/Child	Dermal	Off-Site	Quant	Local municipality currently has some uses for groundwater from deep aquifer
						Ingestion	Off-Site	Quant	Local municipality currently has some uses for groundwater from deep aquifer
		Air	Deep Groundwater - Water Vapors at Showerhead	Resident	Adult	Inhalation	Off-Site	Quant	Local municipality currently has some uses for groundwater from deep aquifer
	Surface Water [2]	Surface Water [2]	Drainage Features	Trespasser	Adult	Dermal	On-Site	Quant	Trespassers may have exposed skin surfaces come into contact with surface water
						Ingestion	On-Site	None	Ingestion of surface water not expected to be a significant exposure pathway during wading
					Adolescent	Dermal	On-Site	Quant	Trespassers may have exposed skin surfaces come into contact with surface water
						Ingestion	On-Site	None	Ingestion of surface water not expected to be a significant exposure pathway during wading
	Sediment [2]	Sediment [2]	Drainage Features	Trespasser	Adult	Dermal	On-Site	Quant	Trespassers may have exposed skin surfaces come into contact with sediment
						Ingestion	On-Site	Quant	Trespassers may incidentally ingest sediment that had adhered to their hands
					Adolescent	Dermal	On-Site	Quant	Trespassers may have exposed skin surfaces come into contact with sediment
						Ingestion	On-Site	Quant	Trespassers may incidentally ingest sediment that has adhered to their hands

Table K-1
Selection of Exposure Pathways
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Soil[1]	Soil[1]	At Site 4	Resident	Adult	Dermal	On-Site	Quant	Residents may have exposed skin surfaces come into contact with soil
						Ingestion	On-Site	Quant	Residents may incidentally ingest soil
					Child	Dermal	On-Site	Quant	Residents may have exposed skin surfaces come into contact with soil
						Ingestion	On-Site	Quant	Residents may incidentally ingest soil
					Adult/Child	Dermal	On-Site	Quant	Residents may have exposed skin surfaces come into contact with soil
						Ingestion	On-Site	Quant	Residents may incidentally ingest soil
				Construction Worker	Adult	Dermal	On-Site	Quant	Workers may have exposed skin surfaces come into contact with soil
						Ingestion	On-Site	Quant	Workers may incidentally ingest soil
				Other Worker	Adult	Dermal	On-Site	Quant	Workers may have exposed skin surfaces come into contact with soil
						Ingestion	On-Site	Quant	Workers may incidentally ingest soil
		Air	Emissions from Soil at Site 4	Construction Worker	Adult	Inhalation	On-Site	Quant	Workers may inhale volatiles/particulates
	Surface Water[2]	Surface Water[2]	Drainage Features	Resident	Adult	Dermal	On-Site	Quant	Residents may have exposed skin surfaces come into contact with surface water
						Ingestion	On-Site	None	Ingestion of surface water not expected to be a significant exposure pathway during wading
					Child	Dermal	On-Site	Quant	Residents may have exposed skin surfaces come into contact with surface water
						Ingestion	On-Site	None	Ingestion of surface water not expected to be a significant exposure pathway during wading
					Adult/Child	Dermal	On-Site	Quant	Residents may have exposed skin surfaces come into contact with surface water
						Ingestion	On-Site	None	Ingestion of surface water not expected to be a significant exposure pathway during wading
	Sediment[2]	Sediment[2]	Drainage Features	Resident	Adult	Dermal	On-Site	Quant	Residents may have exposed skin surfaces come into contact with sediment
						Ingestion	On-Site	Quant	Residents may incidentally ingest sediment that has adhered to their hands
					Child	Dermal	On-Site	Quant	Residents may have exposed skin surfaces come into contact with sediment
						Ingestion	On-Site	Quant	Residents may incidentally ingest sediment that has adhered to their hands
					Adult/Child	Dermal	On-Site	Quant	Residents may have exposed skin surfaces come into contact with sediment
						Ingestion	On-Site	Quant	Residents may incidentally ingest sediment that has adhered to their hands
	Groundwater	Shallow Groundwater	Water Table	Construction Worker	Adult	Dermal	On-Site	Quant	Workers may have exposed skin surfaces come into contact with groundwater

[1] Includes both surface soil and subsurface soil.

[2] Surface water and sediment exposure scenarios are for waders.

Table K-2.1
Occurrence, Distribution, and Selection of COPCs
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: At Site 4

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	(2) Background Value	(3) Screening Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(4) Rationale for Contaminant Deletion or Selection
	Organics															
72548	4,4'-DDD	0.0016	J	0.015	J	mg/kg	SS05	6 / 18	0.0033 - 0.021	0.015	0.0053	24 C	NA	NA	no	BSL
72559	4,4'-DDE	0.0013	J	0.037		mg/kg	SS05	10 / 18	0.0033 - 0.021	0.037	0.009	17 C	NA	NA	no	BSL
50293	4,4'-DDT	0.0021	J	0.04	J	mg/kg	SS05	13 / 18	0.0033 - 0.021	0.04	0.021	17 C	NA	NA	no	BSL
5103719	alpha-Chlordane	0.0036	J	0.042		mg/kg	SS08	4 / 18	0.0017 - 0.011	0.042	0.0028	16 C	NA	NA	no	BSL
11097691	Aroclor-1254	0.011	J	0.012	J	mg/kg	SS16	3 / 18	0.033 - 0.21	0.012	ND	2.9 C	NA	NA	no	BSL
11096825	Aroclor-1260	0.022	J	6.3		mg/kg	SS08	6 / 18	0.033 - 1.7	6.3	ND	2.9 C	NA	NA	yes	ASL
60571	Dieldrin	0.0034	J	0.072	J	mg/kg	SS08	6 / 18	0.0033 - 0.021	0.072	0.0053	0.36 C	NA	NA	no	BSL
72208	Endrin	0.0039	J	0.0039	J	mg/kg	SS10	1 / 18	0.0033 - 0.021	0.004	0.0054	61 N	NA	NA	no	BSL
7421934	Endrin Aldehyde	0.16	J	0.16	J	mg/kg	SS08	1 / 18	0.0033 - 0.021	0.16	0.0054	61 N	NA	NA	no	BSL
53494705	Endrin Ketone	0.083	J	0.083	J	mg/kg	SS08	1 / 18	0.0033 - 0.021	0.08	ND	61 N	NA	NA	no	BSL
5103742	gamma-Chlordane	0.0023	J	0.033		mg/kg	SS08	5 / 18	0.0017 - 0.011	0.033	0.0028	16 C	NA	NA	no	BSL
91576	2-Methylnaphthalene	0.2	J	0.2	J	mg/kg	SS11	1 / 18	0.34 - 40	0.2	ND	4100 N	NA	NA	no	BSL
83329	Acenaphthene	0.054	J	0.67		mg/kg	SS11	2 / 18	0.34 - 40	0.67	0.592	12000 N	NA	NA	no	BSL
208968	Acenaphthylene	0.068	J	0.13	J	mg/kg	SS18	5 / 18	0.34 - 40	0.13	0.246	4100 N	NA	NA	no	BSL
120127	Anthracene	0.053	J	0.95	J	mg/kg	SS11	9 / 18	0.34 - 40	0.95	0.462	61000 N	NA	NA	no	BSL
56553	Benzo(a)Anthracene	0.039	J	3	J	mg/kg	SS11	17 / 18	0.34 - 40	3	2.027	7.8 C	NA	NA	no	BSL
50328	Benzo(a)Pyrene	0.035	J	2.3	J	mg/kg	SS11	17 / 18	0.34 - 40	2.3	1.785	0.78 C	NA	NA	yes	ASL
205992	Benzo(b)Fluoranthene	0.079	J	3	J	mg/kg	SS11	17 / 18	0.34 - 40	3	3.197	7.8 C	NA	NA	no	BSL
191242	Benzo(g,h,i)Perylene	0.055	J	1.4	J	mg/kg	SS11	15 / 18	0.34 - 40	1.4	1.655	6100 N	NA	NA	no	BSL
207089	Benzo(k)Fluoranthene	0.037	J	0.82		mg/kg	SS01	14 / 18	0.34 - 40	0.82	2.038	78 C	NA	NA	no	BSL
117817	Bis(2-Ethylhexyl)Phthalate	0.043	J	0.11	J	mg/kg	SS11	3 / 18	0.34 - 40	0.11	ND	410 C	NA	NA	no	BSL
85687	Butylbenzylphthalate	0.035	J	0.035	J	mg/kg	SS07	1 / 18	0.34 - 40	0.035	ND	41000 N	NA	NA	no	BSL
86748	Carbazole	0.053	J	0.3	J	mg/kg	SS05	3 / 17	0.34 - 40	0.3	ND	290 C	NA	NA	no	BSL
218019	Chrysene	0.039	J	2.9	J	mg/kg	SS11	16 / 18	0.34 - 40	2.9	3.487	780 C	NA	NA	no	BSL
84742	Di-n-Butylphthalate	0.2	J	0.2	J	mg/kg	SS16	1 / 18	0.34 - 40	0.2	ND	20000 N	NA	NA	no	BSL
53703	Dibenz(a,h)Anthracene	0.25	J	0.32	J	mg/kg	SS11	2 / 18	0.34 - 40	0.32	0.714	0.78 C	NA	NA	no	BSL
132649	Dibenzofuran	0.047	J	0.19	J	mg/kg	SS11	2 / 18	0.34 - 40	0.19	ND	820 N	NA	NA	no	BSL
84662	Diethylphthalate	0.36	J	0.62	J	mg/kg	SS09	3 / 18	0.34 - 40	0.62	ND	160000 N	NA	NA	no	BSL
206440	Fluoranthene	0.049	J	4	J	mg/kg	SS11	17 / 18	0.34 - 40	4	2.766	8200 N	NA	NA	no	BSL
86737	Fluorene	0.047	J	0.57	J	mg/kg	SS11	2 / 18	0.34 - 40	0.57	0.602	8200 N	NA	NA	no	BSL
193395	Indeno(1,2,3-cd)Pyrene	0.046	J	1.1	J	mg/kg	SS11	15 / 18	0.34 - 40	1.1	1.829	7.8 C	NA	NA	no	BSL

Table K-2.1
Occurrence, Distribution, and Selection of COPCs
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: At Site 4

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	(2) Background Value	(3) Screening Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(4) Rationale for Contaminant Deletion or Selection
91203	Naphthalene	0.083	J	0.25	J	mg/kg	SS11	2 / 18	0.34 - 40	0.25	0.485	4100 N	NA	NA	no	BSL
85018	Phenanthrene	0.048	J	6.3	J	mg/kg	SS11	15 / 18	0.34 - 40	6.3	0.913	6100 N	NA	NA	no	BSL
129000	Pyrene	0.056	J	7.5	J	mg/kg	SS11	16 / 18	0.34 - 40	7.5	2.59	6100 N	NA	NA	no	BSL
78933	2-Butanone	0.011		0.028		mg/kg	SS04	2 / 18	0.01 - 0.017	0.028	ND	120000 N	NA	NA	no	BSL
108101	4-Methyl-2-Pentanone	0.002	J	0.002	J	mg/kg	SS03	1 / 18	0.01 - 0.017	0.002	ND	16000 N	NA	NA	no	BSL
67641	Acetone	0.008	J	0.079	J	mg/kg	SS08	12 / 18	0.01 - 0.017	0.079	ND	20000 N	NA	NA	no	BSL
67663	Chloroform	0.002	J	0.002	J	mg/kg	SS11	1 / 18	0.01 - 0.017	0.002	ND	940 C	NA	NA	no	BSL
108883	Toluene	0.001	J	0.002	J	mg/kg	SS10	2 / 18	0.01 - 0.017	0.002	ND	41000 N	NA	NA	no	BSL
	Inorganics															
14265442	Phosphorus	2.3		11.8		mg/kg	SS07	10 / 12	1.2 - 1.5	11.8	NA	NA	NA	NA	no	NTX
7429905	Aluminum	3910		17800		mg/kg	SS01	18 / 18	6.53 - 12.5	17800	22786	200000 N	NA	NA	no	BSL
7440360	Antimony	0.67	J	18.5	J	mg/kg	SS11	11 / 17	0.31 - 0.86	18.5	1.47	82 N	NA	NA	no	BSL
7440382	Arsenic	1.9		22.9		mg/kg	SS14	18 / 18	0.42 - 0.65	22.9	24	3.8 C	NA	NA	yes	ASL
7440393	Barium	19.4	J	991		mg/kg	SS11	18 / 18	0.04 - 0.43	991	98	14000 N	NA	NA	no	BSL
7440417	Beryllium	0.19	J	5.5		mg/kg	SS11	15 / 18	0.02 - 0.22	5.5	1	410 N	NA	NA	no	BSL
7440439	Cadmium	0.08	J	9.7		mg/kg	SS11	12 / 18	0.06 - 0.11	9.7	ND	200 N	NA	NA	no	BSL
7440702	Calcium	493	J	49100		mg/kg	SS11	18 / 18	12.2 - 18.9	49100	3251	NA	NA	NA	no	NUT
7440473	Chromium	7.2		680		mg/kg	SS05	18 / 18	0.23 - 1.52	680	45	610 N	NA	NA	yes	ASL
7440484	Cobalt	3.4	J	12	J	mg/kg	SS11	17 / 18	0.11 - 1.74	12	13	12000 N	NA	NA	no	BSL
7440508	Copper	7		874		mg/kg	SS11	18 / 18	0.23 - 1.3	874	58	8200 N	NA	NA	no	BSL
7439896	Iron	2920		65100		mg/kg	SS11	18 / 18	2.56 - 9.8	65100	45805	61000 N	NA	NA	yes	ASL
7439921	Lead	19.4		1110		mg/kg	SS11	18 / 18	0.15 - 0.33	1110	147	1000	NA	NA	yes	ASL
7439954	Magnesium	744	J	3210		mg/kg	SS18	18 / 18	5.1 - 39.31	3210	4507	NA	NA	NA	no	NUT
7439965	Manganese	38.6		883		mg/kg	SS11	18 / 18	0.06 - 0.43	883	198	4100 N	NA	NA	no	BSL
7439976	Mercury	0.06	J	1.3		mg/kg	SS06	17 / 18	0.01 - 0.06	1.3	1.3	61 N	NA	NA	no	BSL
7440020	Nickel	3.7	J	546		mg/kg	SS05	18 / 18	0.19 - 1.52	546	19	4100 N	NA	NA	no	BSL
7440097	Potassium	393	J	3470		mg/kg	SS18	18 / 18	2.8 - 48.22	3470	4577	NA	NA	NA	no	NUT
7782492	Selenium	0.83	J	1.3	J	mg/kg	SS16	6 / 18	0.45 - 0.83	1.3	2.2	1000 N	NA	NA	no	BSL
7440224	Silver	0.32	J	2.2	J	mg/kg	SS11	3 / 18	0.15 - 0.29	2.2	0.67	1000 N	NA	NA	no	BSL

Table K-2.1
Occurrence, Distribution, and Selection of COPCs
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: At Site 4

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
7440235	Sodium	112	J	954	J	mg/kg	SS11	9 / 18	8.74 - 48.4	954	620	NA	NA	NA	no	NUT
7440280	Thallium	0.5	J	3.4		mg/kg	SS01	3 / 18	0.3 - 1	3.4	ND	14 N	NA	NA	no	BSL
7440622	Vanadium	11.2		354		mg/kg	SS04	18 / 18	0.13 - 1.95	354	70	1400 N	NA	NA	no	BSL
7440666	Zinc	26.4		3880		mg/kg	SS11	18 / 18	0.4 - 1.09	3880	137	61000 N	NA	NA	no	BSL

(1) Minimum/maximum detected concentration.

(2) Background data is UCL for dredge-fill background soil type from St. Juliens Creek Background Investigation.

(3) Tier II screening: With the exception of lead, all compounds are screened against the Risk-Based Concentration (RBC) Table, U.S. EPA Region III, October 9, 2002 for industrial soil (cancer benchmark value = 1e-06; HQ = 0.1). Lead is screened against the EPA screening value of 1000 mg/kg.
When no RBC available, surrogate RBC used as follows:
Acenaphthylene - used naphthalene
Benzo(g,h,i)Perylene, Phenanthrene - used pyrene
alpha-Chlordane, gamma-Chlordane - used Chlordane
Endrin Aldehyde, Endrin Ketone - used Endrin
Cadmium - used Cadmium - Food
Chromium - used Chromium VI
Mercury - used Mercuric Chloride

(4) Rationale Codes
Selection Reason: Above Screening Level (ASL)
No Toxicity Information (NTX)
Deletion Reason: Essential Nutrient (NUT)
Below Screening Level (BSL)

Definitions: NA = Not Applicable
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
J = Estimated Value

Surface Soil Samples: SS01 to SS10 - Phase I; SS11 to SS18 - Phase II

Table K-2.2
Occurrence, Distribution, and Selection of COPCs
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from Surface Soil at Site 4

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	(2) Background Value	(3) Screening Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(4) Rationale for Contaminant Deletion or Selection
	Organics															
72548	4,4'-DDD	0.0016	J	0.015	J	mg/kg	SS05	6 / 18	0.0033 - 0.021	0.015	0.0053	24 C	NA	NA	no	BSL
72559	4,4'-DDE	0.0013	J	0.037		mg/kg	SS05	10 / 18	0.0033 - 0.021	0.037	0.009	17 C	NA	NA	no	BSL
50293	4,4'-DDT	0.0021	J	0.04	J	mg/kg	SS05	13 / 18	0.0033 - 0.021	0.04	0.021	17 C	NA	NA	no	BSL
5103719	alpha-Chlordane	0.0036	J	0.042		mg/kg	SS08	4 / 18	0.0017 - 0.011	0.042	0.0028	16 C	NA	NA	no	BSL
11097691	Aroclor-1254	0.011	J	0.012	J	mg/kg	SS16	3 / 18	0.033 - 0.21	0.012	ND	2.9 C	NA	NA	no	BSL
11096825	Aroclor-1260	0.022	J	6.3		mg/kg	SS08	6 / 18	0.033 - 1.7	6.3	ND	2.9 C	NA	NA	yes	ASL
60571	Dieldrin	0.0034	J	0.072	J	mg/kg	SS08	6 / 18	0.0033 - 0.021	0.072	0.0053	0.36 C	NA	NA	no	BSL
72208	Endrin	0.0039	J	0.0039	J	mg/kg	SS10	1 / 18	0.0033 - 0.021	0.004	0.0054	61 N	NA	NA	no	BSL
7421934	Endrin Aldehyde	0.16	J	0.16	J	mg/kg	SS08	1 / 18	0.0033 - 0.021	0.16	0.0054	61 N	NA	NA	no	BSL
53494705	Endrin Ketone	0.083	J	0.083	J	mg/kg	SS08	1 / 18	0.0033 - 0.021	0.08	ND	61 N	NA	NA	no	BSL
5103742	gamma-Chlordane	0.0023	J	0.033		mg/kg	SS08	5 / 18	0.0017 - 0.011	0.033	0.0028	16 C	NA	NA	no	BSL
91576	2-Methylnaphthalene	0.2	J	0.2	J	mg/kg	SS11	1 / 18	0.34 - 40	0.2	ND	4100 N	NA	NA	no	BSL
83329	Acenaphthene	0.054	J	0.67		mg/kg	SS11	2 / 18	0.34 - 40	0.67	0.592	12000 N	NA	NA	no	BSL
208968	Acenaphthylene	0.068	J	0.13	J	mg/kg	SS18	5 / 18	0.34 - 40	0.13	0.246	4100 N	NA	NA	no	BSL
120127	Anthracene	0.053	J	0.95	J	mg/kg	SS11	9 / 18	0.34 - 40	0.95	0.462	61000 N	NA	NA	no	BSL
56553	Benzo(a)Anthracene	0.039	J	3	J	mg/kg	SS11	17 / 18	0.34 - 40	3	2.027	7.8 C	NA	NA	no	BSL
50328	Benzo(a)Pyrene	0.035	J	2.3	J	mg/kg	SS11	17 / 18	0.34 - 40	2.3	1.785	0.78 C	NA	NA	yes	ASL
205992	Benzo(b)Fluoranthene	0.079	J	3	J	mg/kg	SS11	17 / 18	0.34 - 40	3	3.197	7.8 C	NA	NA	no	BSL
191242	Benzo(g,h,i)Perylene	0.055	J	1.4	J	mg/kg	SS11	15 / 18	0.34 - 40	1.4	1.655	6100 N	NA	NA	no	BSL
207089	Benzo(k)Fluoranthene	0.037	J	0.82		mg/kg	SS01	14 / 18	0.34 - 40	0.82	2.038	78 C	NA	NA	no	BSL
117817	Bis(2-Ethylhexyl)Phthalate	0.043	J	0.11	J	mg/kg	SS11	3 / 18	0.34 - 40	0.11	ND	410 C	NA	NA	no	BSL
85687	Butylbenzylphthalate	0.035	J	0.035	J	mg/kg	SS07	1 / 18	0.34 - 40	0.035	ND	41000 N	NA	NA	no	BSL
86748	Carbazole	0.053	J	0.3	J	mg/kg	SS05	3 / 17	0.34 - 40	0.3	ND	290 C	NA	NA	no	BSL
218019	Chrysene	0.039	J	2.9	J	mg/kg	SS11	16 / 18	0.34 - 40	2.9	3.487	780 C	NA	NA	no	BSL
84742	Di-n-Butylphthalate	0.2	J	0.2	J	mg/kg	SS16	1 / 18	0.34 - 40	0.2	ND	20000 N	NA	NA	no	BSL
53703	Dibenz(a,h)Anthracene	0.25	J	0.32	J	mg/kg	SS11	2 / 18	0.34 - 40	0.32	0.714	0.78 C	NA	NA	no	BSL
132649	Dibenzofuran	0.047	J	0.19	J	mg/kg	SS11	2 / 18	0.34 - 40	0.19	ND	820 N	NA	NA	no	BSL
84662	Diethylphthalate	0.36	J	0.62	J	mg/kg	SS09	3 / 18	0.34 - 40	0.62	ND	160000 N	NA	NA	no	BSL
206440	Fluoranthene	0.049	J	4	J	mg/kg	SS11	17 / 18	0.34 - 40	4	2.766	8200 N	NA	NA	no	BSL
86737	Fluorene	0.047	J	0.57	J	mg/kg	SS11	2 / 18	0.34 - 40	0.57	0.602	8200 N	NA	NA	no	BSL
193395	Indeno(1,2,3-cd)Pyrene	0.046	J	1.1	J	mg/kg	SS11	15 / 18	0.34 - 40	1.1	1.829	7.8 C	NA	NA	no	BSL

Table K-2.2
Occurrence, Distribution, and Selection of COPCs
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from Surface Soil at Site 4

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
91203	Naphthalene	0.083	J	0.25	J	mg/kg	SS11	2 / 18	0.34 - 40	0.25	0.485	4100 N	NA	NA	no	BSL
85018	Phenanthrene	0.048	J	6.3	J	mg/kg	SS11	15 / 18	0.34 - 40	6.3	0.913	6100 N	NA	NA	no	BSL
129000	Pyrene	0.056	J	7.5	J	mg/kg	SS11	16 / 18	0.34 - 40	7.5	2.59	6100 N	NA	NA	no	BSL
78933	2-Butanone	0.011		0.028		mg/kg	SS04	2 / 18	0.01 - 0.017	0.028	ND	120000 N	NA	NA	no	BSL
108101	4-Methyl-2-Pentanone	0.002	J	0.002	J	mg/kg	SS03	1 / 18	0.01 - 0.017	0.002	ND	16000 N	NA	NA	no	BSL
67641	Acetone	0.008	J	0.079	J	mg/kg	SS08	12 / 18	0.01 - 0.017	0.079	ND	20000 N	NA	NA	no	BSL
67663	Chloroform	0.002	J	0.002	J	mg/kg	SS11	1 / 18	0.01 - 0.017	0.002	ND	940 C	NA	NA	no	BSL
108883	Toluene	0.001	J	0.002	J	mg/kg	SS10	2 / 18	0.01 - 0.017	0.002	ND	41000 N	NA	NA	no	BSL
	Inorganics															
14265442	Phosphorus	2.3		11.8		mg/kg	SS07	10 / 12	1.2 - 1.5	11.8	NA	NA	NA	NA	no	NTX
7429905	Aluminum	3910		17800		mg/kg	SS01	18 / 18	6.6300001 - 12.5	17800	22786	200000 N	NA	NA	no	BSL
7440360	Antimony	0.67	J	18.5	J	mg/kg	SS11	11 / 17	0.31 - 0.86	18.5	1.47	82 N	NA	NA	no	BSL
7440382	Arsenic	1.9		22.9		mg/kg	SS14	18 / 18	0.42 - 0.65	22.9	24	3.8 C	NA	NA	yes	ASL
7440393	Barium	19.4	J	991		mg/kg	SS11	18 / 18	0.04 - 0.43	991	98	14000 N	NA	NA	no	BSL
7440417	Beryllium	0.19	J	5.5		mg/kg	SS11	15 / 18	0.02 - 0.22	5.5	1	410 N	NA	NA	no	BSL
7440439	Cadmium	0.08	J	9.7		mg/kg	SS11	12 / 18	0.06 - 0.11	9.7	ND	200 N	NA	NA	no	BSL
7440702	Calcium	493	J	49100		mg/kg	SS11	18 / 18	12.2 - 18.9	49100	3251	NA	NA	NA	no	NUT
7440473	Chromium	7.2		680		mg/kg	SS05	18 / 18	0.23 - 1.52	680	45	610 N	NA	NA	yes	ASL
7440484	Cobalt	3.4	J	12	J	mg/kg	SS11	17 / 18	0.11 - 1.74	12	13	12000 N	NA	NA	no	BSL
7440508	Copper	7		874		mg/kg	SS11	18 / 18	0.23 - 1.3	874	58	8200 N	NA	NA	no	BSL
7439896	Iron	2920		65100		mg/kg	SS11	18 / 18	2.5599999 - 9.8	65100	45805	61000 N	NA	NA	yes	ASL
7439921	Lead	19.4		1110		mg/kg	SS11	18 / 18	0.15 - 0.33	1110	147	1000	NA	NA	yes	ASL
7439954	Magnesium	744	J	3210		mg/kg	SS18	18 / 18	5.0999999 - 39.31	3210	4507	NA	NA	NA	no	NUT
7439965	Manganese	38.6		883		mg/kg	SS11	18 / 18	0.06 - 0.43	883	198	4100 N	NA	NA	no	BSL
7439976	Mercury	0.06	J	1.3		mg/kg	SS06	17 / 18	0.01 - 0.06	1.3	1.3	61 N	NA	NA	no	BSL
7440020	Nickel	3.7	J	546		mg/kg	SS05	18 / 18	0.19 - 1.52	546	19	4100 N	NA	NA	no	BSL
7440097	Potassium	393	J	3470		mg/kg	SS18	18 / 18	2.8 - 48.22	3470	4577	NA	NA	NA	no	NUT
7782492	Selenium	0.83	J	1.3	J	mg/kg	SS16	6 / 18	0.45 - 0.83	1.3	2.2	1000 N	NA	NA	no	BSL
7440224	Silver	0.32	J	2.2	J	mg/kg	SS11	3 / 18	0.15 - 0.29	2.2	0.67	1000 N	NA	NA	no	BSL
7440235	Sodium	112	J	954	J	mg/kg	SS11	9 / 18	8.74 - 48.4	954	620	NA	NA	NA	no	NUT

Table K-2.2
Occurrence, Distribution, and Selection of COPCs
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from Surface Soil at Site 4

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
7440280	Thallium	0.5	J	3.4		mg/kg	SS01	3 / 18	0.3 - 1	3.4	ND	14 N	NA	NA	no	BSL
7440622	Vanadium	11.2		354		mg/kg	SS04	18 / 18	0.13 - 1.95	354	70	1400 N	NA	NA	no	BSL
7440666	Zinc	26.4		3880		mg/kg	SS11	18 / 18	0.4 - 1.09	3880	137	61000 N	NA	NA	no	BSL

(1) Minimum/maximum detected concentration.

(2) Background data is UCL for dredge-fill background soil type from St. Juliens Creek Background Investigation.

(3) Tier II screening: With the exception of lead, all compounds are screened against the Risk-Based Concentration (RBC) Table, U.S. EPA Region III, October 9, 2002 for industrial soil (cancer benchmark value = 1e-06; HQ = 0.1). Lead is screened against the EPA screening value of 1000 mg/kg.
When no RBC available, surrogate RBC used as follows:
Acenaphthylene - used naphthalene
Benzo(g,h,i)Perylene, Phenanthrene - used pyrene
alpha-Chlordane, gamma-Chlordane - used Chlordane
Endrin Aldehyde, Endrin Ketone - used Endrin
Cadmium - used Cadmium - Food
Chromium - used Chromium VI
Mercury - used Mercuric Chloride

(4) Rationale Codes
Selection Reason: Above Screening Level (ASL)
No Toxicity Information (NTX)
Deletion Reason: Essential Nutrient (NUT)
Below Screening Level (BSL)

Surface Soil Samples: SS01 to SS10 - Phase I; SS11 to SS18 - Phase II

Definitions: NA = Not Applicable
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
J = Estimated Value

Table K-2.3
Occurrence, Distribution, and Selection of COPCs
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Deep Groundwater
Exposure Point: Tap Water

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	(2) Background Value	(3) Screening Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(4) Rationale for Contaminant Deletion or Selection
	Organic															
1031078	Endosulfan Sulfate	0.0078	J	0.0078	J	ug/l	GW3D	1 / 5	0.1 - 0.11	0.0078	NA	22 N	NA	NA	no	BSL
117817	Bis(2-ethylhexyl)phthalate	5	J	5	J	ug/l	GW3D	1 / 5	7 - 11	5	8.4	4.8 C	6	MCL	yes	ASL
75150	Carbon Disulfide	0.3	J	4.5		ug/l	GW3D	3 / 6	1 - 1	4.5	ND	100 N	NA	NA	no	BSL
67663	Chloroform	0.6	J	9		ug/l	GW3D	2 / 6	1 - 1	9	ND	0.063 N	100	MCL	yes	ASL
108883	Toluene	0.2	J	0.2	J	ug/l	GW3D	1 / 6	1 - 1	0.2	ND	75 N	1,000	MCL	no	BSL
	Inorganic															
14265442	Phosphorus	140		690		ug/l	GW3D	3 / 5	20 - 130	690	120	NA	NA	NA	no	NTX
7429905	Aluminum	134	J	1340		ug/l	GW3D	2 / 5	29 - 38.2	1340	167	3700 N	50 - 200	SMCL	no	BSL
7440382	Arsenic	3.8	J	6.5	J	ug/l	GW3D	3 / 5	2 - 3.2	6.5	ND	0.045 C	50	MCL	yes	ASL
7440393	Barium	65	J	489		ug/l	GW1D	5 / 5	0.2 - 1	489	44	260 N	2,000	MCL	yes	ASL
7440439	Cadmium	0.36	J	1.1	J	ug/l	GW1D	2 / 5	0.3 - 0.5	1.1	ND	1.8 N	5	MCL	no	BSL
7440702	Calcium	73500		286000		ug/l	GW1D	5 / 5	46 - 57.9	286000	96106	NA	NA	NA	no	NUT
7440473	Chromium	5	L	5	L	ug/l	GW1D	1 / 5	1.1 - 4.6	5	ND	11 N	100	MCL	no	BSL
7439896	Iron	9120	K	68500		ug/l	GW1D	5 / 5	5 - 30.8	68500	2035	1100 N	300	SMCL	yes	ASL
7439921	Lead	1.5	J	1.5	J	ug/l	GW3D	1 / 5	1 - 1.3	1.5	ND	15	15	MCL	no	BSL
7439954	Magnesium	28300		151000		ug/l	GW1D	5 / 5	24.3 - 45	151000	14980	NA	NA	NA	no	NUT
7439965	Manganese	1900		12500		ug/l	GW1D	5 / 5	0.3 - 1	12500	271	73 N	50	SMCL	yes	ASL
7440097	Potassium	9790		33100	J	ug/l	GW1D	5 / 5	13.5 - 97	33100	10649	NA	NA	NA	no	NUT
7440224	Silver	1.6	J	1.6	J	ug/l	GW1D	1 / 5	0.9 - 3	1.6	ND	18 N	100	SMCL	no	BSL
7440235	Sodium	117000		698000		ug/l	GW1D	5 / 5	28 - 296	698000	52872	NA	NA	NA	no	NUT

(1) Minimum/maximum detected concentration.

(2) Background data is UCL for Yorktown Aquifer from St. Julliens Creek Background Investigation.

(3) Tier I screening: With the exception of lead, all compounds are screened against the Risk-Based Concentration (RBC) Table, U.S. EPA Region III, October 9, 2002 for tap water (cancer benchmark value = 1e-06; HQ = 0.1). Lead is screened against the MCL value of 15 ug/l.
When no RBC available, surrogate RBC used as follows:
Endosulfan Sulfate, Endosulfan I - used Endosulfan
Cadmium - used Cadmium - Water
Chromium - used Chromium VI

(4) Rationale Codes
Selection Reason: Above Screening Level (ASL)
No Toxicity Information (NTX)
Deletion Reason: Essential Nutrient (NUT)
Below Screening Level (BSL)

Definitions: N/A = Not Applicable
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
K = Estimated Value - Biased High
L = Estimated Value - Biased Low

Deep Groundwater Samples: GW1D and GW3D - Phase I, Rounds 1 and 2 and Phase II

Table K-2.4
Occurrence, Distribution, and Selection of COPCs
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Deep Groundwater - Water Vapor at Showerhead

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
	Organic															
1031078	Endosulfan Sulfate	0.0078	J	0.0078	J	ug/l	GW3D	1 / 5	0.1 - 0.11	0.0078	NA	22 N	NA	NA	no	BSL
117817	Bis(2-ethylhexyl)phthalate	5	J	5	J	ug/l	GW3D	1 / 5	7 - 11	5	8.4	4.8 C	6	MCL	yes	ASL
75150	Carbon Disulfide	0.3	J	4.5		ug/l	GW3D	3 / 6	1 - 1	4.5	ND	100 N	NA	NA	no	BSL
67663	Chloroform	0.6	J	9		ug/l	GW3D	2 / 6	1 - 1	9	ND	0.063 N	100	MCL	yes	ASL
108883	Toluene	0.2	J	0.2	J	ug/l	GW3D	1 / 6	1 - 1	0.2	ND	75 N	1,000	MCL	no	BSL

(1) Minimum/maximum detected concentration.

(2) Background data is UCL for Yorktown Aquifer from St. Juliens Creek Background Investigation.

(3) Tier I screening: With the exception of lead, all compounds are screened against the Risk-Based Concentration (RBC) Table, U.S. EPA Region III, October 9, 2002 for tap water (cancer benchmark value = 1e-06; HQ = 0.1). Lead is screened against the MCL value of 15 ug/l.
When no RBC available, surrogate RBC used as follows:
Endosulfan Sulfate, Endosulfan I - used Endosulfan
Cadmium - used Cadmium - Water
Chromium - used Chromium VI

(4) Rationale Codes
Selection Reason: Above Screening Level (ASL)
No Toxicity Information (NTX)
Deletion Reason: Essential Nutrient (NUT)
Below Screening Level (BSL)

Deep Groundwater Samples: GW1D and GW3D - Phase I, Rounds 1 and 2 and Phase II

Definitions: N/A = Not Applicable
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
K = Estimated Value - Biased High
L = Estimated Value - Biased Low

Table K-2.5
Occurrence, Distribution, and Selection of COPCs
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage Features

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	(2) Background Value	(3) Screening Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(4) Rationale for Contaminant Deletion or Selection
	Organics															
106445	4-Methylphenol	13		13		ug/l	SW04	1 / 8	10 - 12	13	NA	180 N	NA	NA	no	BSL
83329	Acenaphthene	2	J	2	J	ug/l	SW07	1 / 8	10 - 12	2	NA	370 N	2700	VAWQS	no	BSL
191242	Benzo(g,h,i)perylene	3	J	3	J	ug/l	SW09	1 / 8	10 - 12	3	NA	180 N	NA	NA	no	BSL
53703	Dibenz(a,h)anthracene	3	J	3	J	ug/l	SW09	1 / 8	10 - 12	3	NA	0.092 C	0.49	VAWQS	yes	ASL
193395	Indeno(1,2,3-cd)pyrene	2	J	2	J	ug/l	SW09	1 / 8	10 - 12	2	NA	0.92 C	0.49	VAWQS	yes	ASL
108952	Phenol	2	J	2	J	ug/l	SW04	1 / 8	10 - 12	2	NA	22000 N	4600000	VAWQS	no	BSL
75150	Carbon Disulfide	0.8	J	13.5	J	ug/l	SW01	3 / 8	1 - 10	13.5	NA	1000 N	NA	NA	no	BSL
67641	Acetone	8	J	8	J	ug/l	SW04	1 / 7	5 - 10	8	NA	610 N	NA	NA	no	BSL
	Inorganics															
14265442	Phosphorus	22		911		ug/l	SW06	7 / 8	20 - 50	911	NA	NA	NA	NA	no	NTX
7429905	Aluminum	138	K	50000		ug/l	SW04	8 / 8	18.7 - 38.2	50000	NA	37000 N	NA	NA	yes	ASL
7440360	Antimony	3	J	3.7	J	ug/l	SW04	2 / 8	1 - 2.8	3.7	NA	15 N	4300	VAWQS	no	BSL
7440382	Arsenic	4	J	26.6		ug/l	SW04	5 / 8	2 - 3.6	26.6	NA	0.45 C	NA	NA	yes	ASL
7440393	Barium	22.3	J	356		ug/l	SW07	8 / 8	0.2 - 1	356	NA	2600 N	NA	NA	no	BSL
7440417	Beryllium	0.14	J	6.8		ug/l	SW04	4 / 8	0.1 - 1	6.8	NA	73 N	NA	NA	no	BSL
7440439	Cadmium	0.34	J	1	J	ug/l	SW07	4 / 8	0.3 - 0.5	1	NA	18 N	NA	NA	no	BSL
7440702	Calcium	118000		317000		ug/l	SW07	8 / 8	31.1 - 57.9	317000	NA	NA	NA	NA	no	NUT
7440473	Chromium	1.4	J	66.6		ug/l	SW04	4 / 8	0.6 - 4	66.6	NA	110 N	NA	NA	no	BSL
7440484	Cobalt	0.92	J	43.9	J	ug/l	SW04	7 / 8	0.5 - 3	43.9	NA	730 N	NA	NA	no	BSL
7440508	Copper	7.8	J	179		ug/l	SW04	7 / 8	0.8 - 2	179	NA	1500 N	NA	NA	no	BSL
57125	Cyanide	8.5	L	29.3	L	ug/l	SW02	4 / 8	5 - 5	29.3	NA	730 N	215000	VAWQS	no	BSL
7439896	Iron	376		93100		ug/l	SW04	8 / 8	5 - 30.8	93100	NA	11000 N	NA	NA	yes	ASL
7439921	Lead	3.2		822		ug/l	SW04	7 / 8	1 - 1.4	822	NA	15	NA	NA	yes	ASL
7439954	Magnesium	15500		632000		ug/l	SW04	8 / 8	24.3 - 243	632000	NA	NA	NA	NA	no	NUT
7439965	Manganese	111		2310		ug/l	SW01	8 / 8	0.3 - 1	2310	NA	730 N	NA	NA	yes	ASL
7439976	Mercury	0.16	J	1.2		ug/l	SW04	3 / 8	0.1 - 0.1	1.2	NA	11 N	0.053	VAWQS	no	BSL
7440020	Nickel	1.3	J	64		ug/l	SW04	8 / 8	0.9 - 4	64	NA	730 N	4600	VAWQS	no	BSL
7440097	Potassium	13500	J	225000		ug/l	SW04	8 / 8	13.5 - 167	225000	NA	NA	NA	NA	no	NUT
7440224	Silver	1.1	J	1.1	J	ug/l	SW09	1 / 8	0.7 - 1	1.1	NA	180 N	NA	NA	no	BSL

Table K-2.5
Occurrence, Distribution, and Selection of COPCs
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage Features

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
7440235	Sodium	16000		5090000		ug/l	SW04	8 / 8	28 - 2040	5090000	NA	NA	NA	NA	no	NUT
7440622	Vanadium	2	J	117		ug/l	SW04	6 / 8	0.6 - 4	117	NA	260 N	NA	NA	no	BSL
7440666	Zinc	22.8		1160		ug/l	SW04	8 / 8	0.7 - 3	1160	NA	11000 N	NA	NA	no	BSL

(1) Minimum/maximum detected concentration.

(2) No background study has been completed for the St. Juliens Creek Annex surface water.

(3) Tier I screening: With the exception of lead, all compounds are screened against 10 times the Risk-Based Concentration (RBC) Table, U.S. EPA Region III, October 9, 2002 for tap water (10 times the cancer benchmark value = 1e-06; 10 times the HQ = 0.1). Lead is screened against the MCL value of 15 ug/l.
When no RBC available, surrogate RBC used as follows:
Benzo(g,h,i)Perylene, Phenanthrene - used pyrene
Cadmium - used Cadmium - Water
Chromium - used Chromium VI
Mercury - used Mercuric Chloride

(4) Rationale Codes
Selection Reason: Above Screening Level (ASL)
No Toxicity Information (NTX)
Deletion Reason: Essential Nutrient (NUT)
Below Screening Level (BSL)

Surface Water Samples: SW04 - Round I ; SW01 through SW03 and SW06 through SW09 - Round II.

Definitions: NA = Not Applicable
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
VAWQS = Virginia Water Quality Standard
J = Estimated Value
L = Estimated Value - Biased Low
K = Estimated Value - Biased High

Table K-2.6
Occurrence, Distribution, and Selection of COPCs
Site 4
St. Julens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage Features

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
	Organic															
72548	4,4'-DDD	0.0014	J	0.22		mg/kg	SD01	7 / 9	0.004 - 0.042	0.22	NA	240 C	NA	NA	no	BSL
72559	4,4'-DDE	0.00047	L	0.031		mg/kg	SD01	7 / 9	0.004 - 0.01	0.03	NA	170 C	NA	NA	no	BSL
50293	4,4'-DDT	0.0027	L	0.038	J	mg/kg	SD01	3 / 9	0.004 - 0.01	0.04	NA	170 C	NA	NA	no	BSL
11096825	Aroclor-1260	0.031	J	0.09	J	mg/kg	SD02	4 / 8	0.04 - 0.1	0.09	NA	29 C	NA	NA	no	BSL
60571	Dieldrin	0.00063	L	0.023		mg/kg	SD02	3 / 9	0.004 - 0.01	0.02	NA	4 C	NA	NA	no	BSL
91576	2-Methylnaphthalene	0.048	J	0.14	J	mg/kg	SD03	2 / 8	0.42 - 2.0	0.14	NA	41000 N	NA	NA	no	BSL
208968	Acenaphthylene	0.053	J	0.07	J	mg/kg	SD04	2 / 8	0.42 - 2.0	0.07	NA	41000 N	NA	NA	no	BSL
120127	Anthracene	0.057	J	0.2	J	mg/kg	SD04	3 / 9	0.42 - 2.0	0.2	NA	610000 N	NA	NA	no	BSL
56553	Benzo(a)Anthracene	0.078	J	1.3		mg/kg	SD04	8 / 9	0.42 - 2.0	1.3	NA	78 C	NA	NA	no	BSL
50328	Benzo(a)Pyrene	0.071	J	1.2		mg/kg	SD04	8 / 9	0.42 - 2.0	1.2	NA	8 C	NA	NA	no	BSL
205992	Benzo(b)Fluoranthene	0.15	J	1.9		mg/kg	SD04	8 / 9	0.42 - 2.0	1.9	NA	78 C	NA	NA	no	BSL
191242	Benzo(g,h,i)Perylene	0.083	J	0.34	J	mg/kg	SD06	7 / 9	0.42 - 2.0	0.34	NA	61000 N	NA	NA	no	BSL
207089	Benzo(k)fluoranthene	0.2	J	1.1		mg/kg	SD04	7 / 9	0.42 - 2.0	1.1	NA	780 C	NA	NA	no	BSL
117817	Bis(2-Ethylhexyl)Phthalate	0.14	L	0.14	L	mg/kg	SD09	1 / 9	0.42 - 2.0	0.14	NA	4100 C	NA	NA	no	BSL
85687	Butylbenzylphthalate	0.058	J	0.058	J	mg/kg	SD04	1 / 8	0.42 - 2.0	0.058	NA	410000 N	NA	NA	no	BSL
218019	Chrysene	0.11	J	1.2		mg/kg	SD04	8 / 9	0.42 - 2.0	1.2	NA	7800 C	NA	NA	no	BSL
84742	Di-n-Butylphthalate	0.058	J	0.067	J	mg/kg	SD03	2 / 8	0.42 - 2.0	0.067	NA	200000 N	NA	NA	no	BSL
117840	di-n-Octylphthalate	0.12	L	0.12	L	mg/kg	SD09	1 / 9	0.42 - 2.0	0.12	NA	41000 N	NA	NA	no	BSL
53703	Dibenz(a,h)Anthracene	0.11	J	0.15	J	mg/kg	SD04	4 / 9	0.42 - 2.0	0.15	NA	8 C	NA	NA	no	BSL
132649	Dibenzofuran	0.063	J	0.063	J	mg/kg	SD03	1 / 8	0.42 - 2.0	0.063	NA	8200 N	NA	NA	no	BSL
84662	Diethylphthalate	0.3	J	0.3	J	mg/kg	SD02	1 / 8	0.42 - 2.0	0.3	NA	1600000 N	NA	NA	no	BSL
206440	Fluoranthene	0.2	J	2.8		mg/kg	SD04	8 / 9	0.42 - 2.0	2.8	NA	82000 N	NA	NA	no	BSL
193395	Indeno(1,2,3-cd)Pyrene	0.085	J	0.37	J	mg/kg	SD04	7 / 9	0.42 - 2.0	0.37	NA	78 C	NA	NA	no	BSL
91203	Naphthalene	0.058	J	0.1	J	mg/kg	SD03/SD04	3 / 8	0.42 - 2.0	0.1	NA	41000 N	NA	NA	no	BSL
85018	Phenanthrene	0.086	J	0.4	J	mg/kg	SD02	7 / 9	0.42 - 2.0	0.4	NA	61000 N	NA	NA	no	BSL
129000	Pyrene	0.16	J	2.8		mg/kg	SD04	8 / 9	0.42 - 2.0	2.8	NA	61000 N	NA	NA	no	BSL
67641	Acetone	0.007	J	0.14		mg/kg	SD04	5 / 9	0.01 - 0.031	0.14	NA	200000 N	NA	NA	no	BSL
75150	Carbon Disulfide	0.007	J	0.019	J	mg/kg	SD04	4 / 9	0.01 - 0.031	0.019	NA	200000 N	NA	NA	no	BSL
108883	Toluene	0.006	J	0.015	J	mg/kg	SD08	2 / 9	0.01 - 0.031	0.015	NA	410000 N	NA	NA	no	BSL
	Inorganic															
14265442	Phosphorus	4.8		245		mg/kg	SD09	7 / 7	1.6 - 25.4	245	NA	NA	NA	NA	no	NTX
7429905	Aluminum	6430		22100		mg/kg	SD04	9 / 9	5.3 - 29.44	22100	NA	2000000 N	NA	NA	no	BSL
7440360	Antimony	2.1	L	2.1	L	mg/kg	SD02	1 / 9	0.4 - 1.34	2.1	NA	820 N	NA	NA	no	BSL

Table K-2.6
Occurrence, Distribution, and Selection of COPCs
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage Features

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
7440382	Arsenic	3.9		33.1		mg/kg	SD03	9 / 9	0.6 - 2.01	33.1	NA	38 C	NA	NA	no	BSL
7440393	Barium	34.4	J	903		mg/kg	SD07	9 / 9	0.06 - 1.34	903	NA	140000 N	NA	NA	no	BSL
7440417	Beryllium	0.5	J	3.9		mg/kg	SD01	9 / 9	0.03 - 0.67	3.9	NA	4100 N	NA	NA	no	BSL
7440439	Cadmium	0.26	J	2	J	mg/kg	SD08	7 / 9	0.08 - 0.33	2	NA	2000 N	NA	NA	no	BSL
7440702	Calcium	1500		18300		mg/kg	SD03	9 / 9	8.8 - 58.2	18300	NA	NA	NA	NA	no	NUT
7440473	Chromium	13.1		38.8		mg/kg	SD04	9 / 9	0.17 - 4.68	38.8	NA	6100 N	NA	NA	no	BSL
7440484	Cobalt	5.2	J	32.7		mg/kg	SD05	9 / 9	0.16 - 5.35	32.7	NA	120000 N	NA	NA	no	BSL
7440508	Copper	33.6		387		mg/kg	SD03	9 / 9	0.23 - 4.01	387	NA	82000 N	NA	NA	no	BSL
57125	Cyanide	2.9	L	2.9	L	mg/kg	SD08	1 / 8	0.396 - 1.7	2.9	NA	41000 N	NA	NA	no	BSL
7439896	Iron	10500		56000		mg/kg	SD01	9 / 9	3.38 - 14.1	56000	NA	610000 N	NA	NA	no	BSL
7439921	Lead	38.9		441		mg/kg	SD03	9 / 9	0.2 - 0.67	441	NA	1000	NA	NA	no	BSL
7439954	Magnesium	988	J	6740		mg/kg	SD04	9 / 9	7.4 - 121.09	6740	NA	NA	NA	NA	no	NUT
7439965	Manganese	75.2		877	K	mg/kg	SD03	9 / 9	0.1 - 1.34	877	NA	41000 N	NA	NA	no	BSL
7439976	Mercury	0.11		6.4		mg/kg	SD03	9 / 9	0.03 - 0.15	6.4	NA	610 N	NA	NA	no	BSL
7440020	Nickel	10.7	J	43.9		mg/kg	SD03	9 / 9	0.25 - 4.68	43.9	NA	41000 N	NA	NA	no	BSL
7440097	Potassium	752	J	3850		mg/kg	SD04	9 / 9	4.3 - 148.51	3850	NA	NA	NA	NA	no	NUT
7782492	Selenium	0.99	J	1.6	J	mg/kg	SD07	5 / 9	0.6 - 2.01	1.6	NA	10000 N	NA	NA	no	BSL
7440224	Silver	0.35	J	1	J	mg/kg	SD03	4 / 9	0.2 - 0.67	1	NA	10000 N	NA	NA	no	BSL
7440235	Sodium	239	J	11000		mg/kg	SD08	7 / 9	11.54 - 67.9	11000	NA	NA	NA	NA	no	NUT
7440280	Thallium	0.46	J	0.46	J	mg/kg	SD02	1 / 9	0.4 - 1.5	0.46	NA	140 N	NA	NA	no	BSL
7440622	Vanadium	16		88.5		mg/kg	SD03	9 / 9	0.19 - 6.02	88.5	NA	14000 N	NA	NA	no	BSL
7440666	Zinc	147		624		mg/kg	SD03	9 / 9	0.2 - 3.34	624	NA	610000 N	NA	NA	no	BSL

Table K-2.6
Occurrence, Distribution, and Selection of COPCs
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage Features

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)

(1) Minimum/maximum detected concentration.

(2) No background study has been completed for the St. Juliens Creek Annex sediment.

(3) Tier II screening: With the exception of lead, all compounds are screened against 10 times the Risk-Based Concentration (RBC) Table, U.S. EPA Region III, October 9, 2002 for industrial soil (10 times the cancer benchmark value = 1e-06; 10 times the HQ = 0.1).
Lead is screened against the EPA screening value of 1000 mg/kg.
When no RBC available, surrogate RBC used as follows:
Acenaphthylene - used naphthalene
Benzo(g,h,i)Perylene, Phenanthrene - used pyrene
Cadmium - used Cadmium - Food
Chromium - used Chromium VI
Mercury - used Mercuric Chloride

(4) Rationale Codes
Selection Reason: Above Screening Level (ASL)
No Toxicity Information (NTX)
Deletion Reason: Essential Nutrient (NUT)
Below Screening Level (BSL)

Sediment Samples: SD01 to SD04 - Phase I; SD05 to SD09 - Phase II

Definitions: NA = Not Applicable
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
J = Estimated Value
K = Estimated Value - Biased High
L = Estimated Value - Biased Low

Table K-2.7
Occurrence, Distribution, and Selection of COPCs
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 4

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	(2) Background Value	(3) Screening Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(4) Rationale for Contaminant Deletion or Selection
	Organic															
72548	4,4'-DDD	0.0016	J	0.045		mg/kg	SB06	10 / 26	0.003 - 0.021	0.045	0.0053	2.7 C	NA	NA	no	BSL
72559	4,4'-DDE	0.0013	J	0.037		mg/kg	SS05	14 / 26	0.003 - 0.021	0.037	0.009	1.9 C	NA	NA	no	BSL
50293	4,4'-DDT	0.00092	J	0.04	J	mg/kg	SS05	16 / 26	0.003 - 0.021	0.04	0.009	1.9 C	NA	NA	no	BSL
5103719	alpha-Chlordane	0.004	J	0.042		mg/kg	SS08	4 / 26	0.002 - 0.011	0.042	0.0028	1.8 C	NA	NA	no	BSL
11097691	Aroclor-1254	0.011	J	0.042		mg/kg	SB02	5 / 26	0.033 - 0.21	0.042	ND	0.16 N	NA	NA	no	BSL
11096825	Aroclor-1260	0.022	J	6.3		mg/kg	SS08	6 / 26	0.033 - 1.7	6.3	ND	0.32 C	NA	NA	yes	ASL
60571	Dieldrin	0.003	J	0.072	J	mg/kg	SS08	6 / 26	0.003 - 0.021	0.07	0.0053	0.04 C	NA	NA	yes	ASL
72208	Endrin	0.004	J	0.0039	J	mg/kg	SS10	1 / 26	0.003 - 0.021	0.004	0.0054	2.3 N	NA	NA	no	BSL
7421934	Endrin Aldehyde	0.16	J	0.16	J	mg/kg	SS08	1 / 26	0.003 - 0.021	0.16	0.0054	2.3 N	NA	NA	no	BSL
53494705	Endrin Ketone	0.083	J	0.083	J	mg/kg	SS08	1 / 26	0.003 - 0.021	0.083	ND	2.3 N	NA	NA	no	BSL
5103742	gamma-Chlordane	0.0023	J	0.033		mg/kg	SS08	5 / 26	0.002 - 0.011	0.033	0.0028	1.8 C	NA	NA	no	BSL
91576	2-Methylnaphthalene	0.2	J	0.2	J	mg/kg	SS11	1 / 26	0.34 - 40	0.2	ND	160 N	NA	NA	no	BSL
83329	Acenaphthene	0.054	J	0.67		mg/kg	SS11	2 / 26	0.34 - 40	1	0.592	470 N	NA	NA	no	BSL
208968	Acenaphthylene	0.068	J	0.13	J	mg/kg	SS18	6 / 26	0.34 - 40	0.1	0.131	160 N	NA	NA	no	BSL
120127	Anthracene	0.053	J	0.95	J	mg/kg	SS11	10 / 26	0.34 - 40	0.95	0.462	2300 N	NA	NA	no	BSL
56553	Benzo(a)Anthracene	0.039	J	3	J	mg/kg	SS11	23 / 26	0.34 - 40	3	2.027	0.87 C	NA	NA	yes	ASL
50328	Benzo(a)Pyrene	0.035	J	2.3	J	mg/kg	SS11	23 / 26	0.34 - 40	2.3	1.785	0.087 C	NA	NA	yes	ASL
205992	Benzo(b)Fluoranthene	0.079	J	3	J	mg/kg	SS11	23 / 26	0.34 - 40	3	2.335	0.87 C	NA	NA	yes	ASL
191242	Benzo(g,h,i)Perylene	0.055	J	1.4	J	mg/kg	SS11	21 / 26	0.34 - 40	1.4	1.655	230 N	NA	NA	no	BSL
207089	Benzo(k)Fluoranthene	0.037	J	0.82		mg/kg	SS01	20 / 26	0.34 - 40	0.82	2.038	8.7 C	NA	NA	no	BSL
117817	Bis(2-Ethylhexyl)Phthalate	0.043	J	0.11	J	mg/kg	SS11	3 / 26	0.34 - 40	0.11	ND	46 C	NA	NA	no	BSL
85687	Butylbenzylphthalate	0.035	J	0.035	J	mg/kg	SS07	1 / 26	0.34 - 40	0.035	ND	1600 N	NA	NA	no	BSL
86748	Carbazole	0.053	J	0.3	J	mg/kg	SS05	3 / 25	0.34 - 40	0.3	ND	32 C	NA	NA	no	BSL
218019	Chrysene	0.039	J	2.9	J	mg/kg	SS11	22 / 26	0.34 - 40	2.9	3.487	87 C	NA	NA	no	BSL
84742	Di-n-Butylphthalate	0.2	J	0.2	J	mg/kg	SS16	1 / 26	0.34 - 40	0.2	ND	780 N	NA	NA	no	BSL
53703	Dibenz(a,h)Anthracene	0.1	J	0.32	J	mg/kg	SS11	3 / 26	0.34 - 40	0.32	0.708	0.087 C	NA	NA	yes	ASL
132649	Dibenzofuran	0.047	J	0.19	J	mg/kg	SS11	2 / 26	0.34 - 40	0.19	ND	31 N	NA	NA	no	BSL
84662	Diethylphthalate	0.36	J	0.62	J	mg/kg	SS09	3 / 26	0.34 - 40	0.62	ND	6300 N	NA	NA	no	BSL
206440	Fluoranthene	0.049	J	4	J	mg/kg	SS11	23 / 26	0.34 - 40	4	2.766	310 N	NA	NA	no	BSL
86737	Fluorene	0.047	J	0.57	J	mg/kg	SS11	2 / 26	0.34 - 40	0.57	0.602	310 N	NA	NA	no	BSL
193395	Indeno(1,2,3-cd)Pyrene	0.046	J	1.1	J	mg/kg	SS11	21 / 26	0.34 - 40	1.1	1.769	0.87 C	NA	NA	yes	ASL
91203	Naphthalene	0.083	J	0.25	J	mg/kg	SS11	2 / 26	0.34 - 40	0.25	0.485	160 N	NA	NA	no	BSL
85018	Phenanthrene	0.048	J	6.3	J	mg/kg	SS11	17 / 26	0.34 - 40	6.3	0.913	230 N	NA	NA	no	BSL

Table K-2.7
Occurrence, Distribution, and Selection of COPCs
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 4

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
129000	Pyrene	0.056	J	7.5	J	mg/kg	SS11	22 / 26	0.34 - 40	7.5	2.59	230 N	NA	NA	no	BSL
78933	2-Butanone	0.011		0.599		mg/kg	SB06	3 / 26	0.01 - 0.03	0.599	ND	4700 N	NA	NA	no	BSL
108101	4-Methyl-2-Pentanone	0.002	J	0.002	J	mg/kg	SS03	1 / 26	0.01 - 0.03	0.002	ND	630 N	NA	NA	no	BSL
67641	Acetone	0.008	J	0.457		mg/kg	SB06	15 / 26	0.01 - 0.03	0.457	ND	780 N	NA	NA	no	BSL
75150	Carbon Disulfide	0.006	J	0.006	J	mg/kg	SB06	1 / 26	0.01 - 0.03	0.006	ND	780 N	NA	NA	no	BSL
67663	Chloroform	0.002	J	0.002	J	mg/kg	SS11	1 / 26	0.01 - 0.03	0.002	ND	78 N	NA	NA	no	BSL
127184	Tetrachloroethene	0.002	J	0.005	J	mg/kg	SB01	3 / 26	0.01 - 0.03	0.005	ND	12 C	NA	NA	no	BSL
108883	Toluene	0.001	J	0.003	J	mg/kg	SB01	3 / 26	0.01 - 0.03	0.003	ND	1600 N	NA	NA	no	BSL
	Inorganic															
14265442	Phosporus	2.3		28.5		mg/kg	SB02	13 / 17	1.2 - 4.94	28.5	ND	NA	NA	NA	no	NTX
7429905	Aluminum	3910		18100		mg/kg	SB01	26 / 26	6.63 - 25.2	18100	18839	7800 N	NA	NA	yes	ASL
7440360	Antimony	0.67	J	53.5		mg/kg	SB06	13 / 23	0.31 - 1.5	53.5	1.47	3.1 N	NA	NA	yes	ASL
7440382	Arsenic	1.9		236		mg/kg	SB06	26 / 26	0.42 - 1.1	236	14	0.43 C	NA	NA	yes	ASL
7440393	Barium	19.4	J	991		mg/kg	SS11	26 / 26	0.04 - 0.66	991	50	550 N	NA	NA	yes	ASL
7440417	Beryllium	0.19	J	5.5		mg/kg	SS11	22 / 26	0.02 - 0.33	5.5	0.81	16 N	NA	NA	no	BSL
7440439	Cadmium	0.08	J	9.7		mg/kg	SS11	16 / 26	0.06 - 0.17	9.7	ND	7.8 N	NA	NA	yes	ASL
7440702	Calcium	490	J	49100		mg/kg	SS11	26 / 26	12.2 - 31.2	49100	3251	NA	NA	NA	no	NUT
7440473	Chromium	7.2		680		mg/kg	SS05	26 / 26	0.23 - 2.32	680	39	23 N	NA	NA	yes	ASL
7440484	Cobalt	3.4	J	16.2	J	mg/kg	SB06	25 / 26	0.11 - 2.65	16.2	13	470 N	NA	NA	no	BSL
7440508	Copper	7		874		mg/kg	SS11	26 / 26	0.23 - 1.98	874	40	310 N	NA	NA	yes	ASL
7439896	Iron	2920		65100		mg/kg	SS11	26 / 26	2.56 - 16.6	65100	36585	2300 N	NA	NA	yes	ASL
7439921	Lead	19.4		1110		mg/kg	SS11	26 / 26	0.15 - 0.54	1110	86	400	NA	NA	yes	ASL
7439954	Magnesium	478	J	3990		mg/kg	SB06	26 / 26	5.1 - 59.88	3990	3847	NA	NA	NA	no	NUT
7439965	Manganese	38.6		883		mg/kg	SS11	26 / 26	0.06 - 0.66	883	151	160 N	NA	NA	yes	ASL
7439976	Mercury	0.06	J	1.3		mg/kg	SS06	25 / 26	0.01 - 0.09	1.3	0.62	2.3 N	NA	NA	no	BSL
7440020	Nickel	3.7	J	546		mg/kg	SS05	24 / 26	0.19 - 2.32	546	15	160 N	NA	NA	yes	ASL
7440097	Potassium	393	J	3690		mg/kg	SB07	26 / 26	2.8 - 73.44	3690	3465	NA	NA	NA	no	NUT
7782492	Selenium	0.83	J	2.8		mg/kg	SB06	10 / 26	0.45 - 1.4	2.8	1.5	39 N	NA	NA	no	BSL
7440224	Silver	0.32	J	2.2	J	mg/kg	SS11	4 / 26	0.15 - 0.49	2.2	0.67	39 N	NA	NA	no	BSL

Table K-2.7
Occurrence, Distribution, and Selection of COPCs
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 4

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	(2) Background Value	(3) Screening Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(4) Rationale for Contaminant Deletion or Selection
7440235	Sodium	89.1	L	8220		mg/kg	SB06	14 / 26	8.74 - 79.9	8220	203	NA	NA	NA	no	NUT
7440280	Thallium	0.5	J	3.4		mg/kg	SS01	6 / 26	0.3 - 1.7	3.4	ND	0.55 N	NA	NA	yes	ASL
7440622	Vanadium	11.2		354		mg/kg	SS04	26 / 26	0.13 - 2.98	354	42	55 N	NA	NA	yes	ASL
7440666	Zinc	26.4		3880		mg/kg	SS11	26 / 26	0.4 - 1.65	3880	87	2300 N	NA	NA	yes	ASL

* Surface soil & subsurface soil combined

(1) Minimum/maximum detected concentration.

(2) Background data is UCL for dredge-fill background soil type from St. Juliens Creek Background Investigation.

(3) Tier I screening: With the exception of lead, all compounds are screened against the Risk-Based Concentration (RBC) Table, U.S. EPA Region III, October 9, 2002 for residential soil (cancer benchmark value = 1e-06; HQ = 0.1). Lead is screened against the EPA screening value of a value of 400 mg/kg.
When no RBC available, surrogate RBC used as follows:
Acenaphthylene - used naphthalene
Benzo(g,h,i)Perylene, Phenanthrene - used pyrene
alpha-Chlordane, gamma-Chlordane - used Chlordane
Endrin Aldehyde, Endrin Ketone - used Endrin
Cadmium - used Cadmium - Food
Chromium - used Chromium VI
Mercury - used Mercuric Chloride

(4) Rationale Codes
Selection Reason: Above Screening Level (ASL)
No Toxicity Information (NTX)
Deletion Reason: Essential Nutrient (NUT)
Below Screening Level (BSL)

Surface and Subsurface Soil Samples: Phase I - SS01 to SS10, SB01, SB02, and SB03; Phase II - SS11 to SS18, SB04 to SB08

Definitions: NA = Not Applicable
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
J = Estimated Value
L = Estimated Value - Biased Low

Table K-2.8
Occurrence, Distribution, and Selection of COPCs
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 4

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	(2) Background Value	(3) Screening Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(4) Rationale for Contaminant Deletion or Selection
	Organics															
72548	4,4'-DDD	0.0016	J	0.045		mg/kg	SB06	10 / 26	0.003 - 0.021	0.045	0.0053	24 C	NA	NA	no	BSL
72559	4,4'-DDE	0.0013	J	0.037		mg/kg	SS05	14 / 26	0.003 - 0.021	0.037	0.009	17 C	NA	NA	no	BSL
50293	4,4'-DDT	0.00092	J	0.04	J	mg/kg	SS05	16 / 26	0.003 - 0.021	0.04	0.009	17 C	NA	NA	no	BSL
5103719	alpha-Chlordane	0.004	J	0.042		mg/kg	SS08	4 / 26	0.002 - 0.011	0.042	0.0028	16 C	NA	NA	no	BSL
11097691	Aroclor-1254	0.011	J	0.042		mg/kg	SB02	5 / 26	0.033 - 0.21	0.042	ND	2.9 C	NA	NA	no	BSL
11096825	Aroclor-1260	0.022	J	6.3		mg/kg	SS08	6 / 26	0.033 - 1.7	6.3	ND	2.9 C	NA	NA	yes	ASL
60571	Dieldrin	0.003	J	0.072	J	mg/kg	SS08	6 / 26	0.003 - 0.021	0.07	0.0053	0.36 C	NA	NA	no	BSL
72208	Endrin	0.004	J	0.0039	J	mg/kg	SS10	1 / 26	0.003 - 0.021	0.004	0.0054	61 N	NA	NA	no	BSL
7421934	Endrin Aldehyde	0.16	J	0.16	J	mg/kg	SS08	1 / 26	0.003 - 0.021	0.16	0.0054	61 N	NA	NA	no	BSL
53494705	Endrin Ketone	0.083	J	0.083	J	mg/kg	SS08	1 / 26	0.003 - 0.021	0.083	ND	61 N	NA	NA	no	BSL
5103742	gamma-Chlordane	0.0023	J	0.033		mg/kg	SS08	5 / 26	0.002 - 0.011	0.033	0.0028	16 C	NA	NA	no	BSL
91576	2-Methylnaphthalene	0.2	J	0.2	J	mg/kg	SS11	1 / 26	0.34 - 40	0.2	ND	4100 N	NA	NA	no	BSL
83329	Acenaphthene	0.054	J	0.67		mg/kg	SS11	2 / 26	0.34 - 40	1	0.592	12000 N	NA	NA	no	BSL
208968	Acenaphthylene	0.068	J	0.13	J	mg/kg	SS18	6 / 26	0.34 - 40	0.1	0.131	4100 N	NA	NA	no	BSL
120127	Anthracene	0.053	J	0.95	J	mg/kg	SS11	10 / 26	0.34 - 40	0.95	0.462	61000 N	NA	NA	no	BSL
56553	Benzo(a)Anthracene	0.039	J	3	J	mg/kg	SS11	23 / 26	0.34 - 40	3	2.027	7.8 C	NA	NA	no	BSL
50328	Benzo(a)Pyrene	0.035	J	2.3	J	mg/kg	SS11	23 / 26	0.34 - 40	2.3	1.785	0.78 C	NA	NA	yes	ASL
205992	Benzo(b)Fluoranthene	0.079	J	3	J	mg/kg	SS11	23 / 26	0.34 - 40	3	2.335	7.8 C	NA	NA	no	BSL
191242	Benzo(g,h,i)Perylene	0.055	J	1.4	J	mg/kg	SS11	21 / 26	0.34 - 40	1.4	1.655	6100 N	NA	NA	no	BSL
207089	Benzo(k)Fluoranthene	0.037	J	0.82		mg/kg	SS01	20 / 26	0.34 - 40	0.82	2.038	78 C	NA	NA	no	BSL
117817	Bis(2-Ethylhexyl)Phthalate	0.043	J	0.11	J	mg/kg	SS11	3 / 26	0.34 - 40	0.11	ND	410 C	NA	NA	no	BSL
85687	Butylbenzylphthalate	0.035	J	0.035	J	mg/kg	SS07	1 / 26	0.34 - 40	0.035	ND	41000 N	NA	NA	no	BSL
86748	Carbazole	0.053	J	0.3	J	mg/kg	SS05	3 / 25	0.34 - 40	0.3	ND	290 C	NA	NA	no	BSL
218019	Chrysene	0.039	J	2.9	J	mg/kg	SS11	22 / 26	0.34 - 40	2.9	3.487	780 C	NA	NA	no	BSL
84742	Di-n-Butylphthalate	0.2	J	0.2	J	mg/kg	SS16	1 / 26	0.34 - 40	0.2	ND	20000 N	NA	NA	no	BSL
53703	Dibenz(a,h)Anthracene	0.1	J	0.32	J	mg/kg	SS11	3 / 26	0.34 - 40	0.32	0.708	0.78 C	NA	NA	no	BSL
132649	Dibenzofuran	0.047	J	0.19	J	mg/kg	SS11	2 / 26	0.34 - 40	0.19	ND	820 N	NA	NA	no	BSL
84662	Diethylphthalate	0.36	J	0.62	J	mg/kg	SS09	3 / 26	0.34 - 40	0.62	ND	160000 N	NA	NA	no	BSL
206440	Fluoranthene	0.049	J	4	J	mg/kg	SS11	23 / 26	0.34 - 40	4	2.766	8200 N	NA	NA	no	BSL
86737	Fluorene	0.047	J	0.57	J	mg/kg	SS11	2 / 26	0.34 - 40	0.57	0.602	8200 N	NA	NA	no	BSL
193395	Indeno(1,2,3-cd)Pyrene	0.046	J	1.1	J	mg/kg	SS11	21 / 26	0.34 - 40	1.1	1.769	7.8 C	NA	NA	no	BSL
91203	Naphthalene	0.083	J	0.25	J	mg/kg	SS11	2 / 26	0.34 - 40	0.25	0.485	4100 N	NA	NA	no	BSL
85018	Phenanthrene	0.048	J	6.3	J	mg/kg	SS11	17 / 26	0.34 - 40	6.3	0.913	6100 N	NA	NA	no	BSL

Table K-2.8
Occurrence, Distribution, and Selection of COPCs
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 4

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	(2) Background Value	(3) Screening Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(4) Rationale for Contaminant Deletion or Selection
129000	Pyrene	0.056	J	7.5	J	mg/kg	SS11	22 / 26	0.34 - 40	7.5	2.59	6100 N	NA	NA	no	BSL
78933	2-Butanone	0.011		0.599		mg/kg	SB06	3 / 26	0.01 - 0.03	0.599	ND	120000 N	NA	NA	no	BSL
108101	4-Methyl-2-Pentanone	0.002	J	0.002	J	mg/kg	SS03	1 / 26	0.01 - 0.03	0.002	ND	16000 N	NA	NA	no	BSL
67641	Acetone	0.008	J	0.457		mg/kg	SB06	15 / 26	0.01 - 0.03	0.457	ND	20000 N	NA	NA	no	BSL
75150	Carbon Disulfide	0.006	J	0.006	J	mg/kg	SB06	1 / 26	0.01 - 0.03	0.006	ND	940 C	NA	NA	no	BSL
67663	Chloroform	0.002	J	0.002	J	mg/kg	SS11	1 / 26	0.01 - 0.03	0.002	ND	41000 N	NA	NA	no	BSL
127184	Tetrachloroethene	0.002	J	0.005	J	mg/kg	SB01	3 / 26	0.01 - 0.03	0.005	ND	110000 C	NA	NA	no	BSL
108883	Toluene	0.001	J	0.003	J	mg/kg	SB01	3 / 26	0.01 - 0.03	0.003	ND	41000000 N	NA	NA	no	BSL
	Inorganics															
14265442	Phosphorus	2.3		28.5		mg/kg	SB02	13 / 17	1.2 - 4.94	28.5	ND	NA	NA	NA	no	NTX
7429905	Aluminum	3910		18100		mg/kg	SB01	26 / 26	6.83 - 25.2	18100	18839	200000 N	NA	NA	no	BSL
7440360	Antimony	0.67	J	53.5		mg/kg	SB06	13 / 23	0.31 - 1.5	53.5	1.47	82 N	NA	NA	no	BSL
7440382	Arsenic	1.9		236		mg/kg	SB06	26 / 26	0.42 - 1.1	236	14	3.8 C	NA	NA	yes	ASL
7440393	Barium	19.4	J	991		mg/kg	SS11	26 / 26	0.04 - 0.66	991	50	14000 N	NA	NA	no	BSL
7440417	Beryllium	0.19	J	5.5		mg/kg	SS11	22 / 26	0.02 - 0.33	5.5	0.81	410 N	NA	NA	no	BSL
7440439	Cadmium	0.08	J	9.7		mg/kg	SS11	16 / 26	0.06 - 0.17	9.7	ND	200 N	NA	NA	no	BSL
7440702	Calcium	490	J	49100		mg/kg	SS11	26 / 26	12.2 - 31.2	49100	3251	NA	NA	NA	no	NUT
7440473	Chromium	7.2		680		mg/kg	SS05	26 / 26	0.23 - 2.32	680	39	610 N	NA	NA	yes	ASL
7440484	Cobalt	3.4	J	16.2	J	mg/kg	SB06	25 / 26	0.11 - 2.65	16.2	13	12000 N	NA	NA	no	BSL
7440508	Copper	7		874		mg/kg	SS11	26 / 26	0.23 - 1.98	874	40	8200 N	NA	NA	no	BSL
7439896	Iron	2920		65100		mg/kg	SS11	26 / 26	2.56 - 16.6	65100	36585	61000 N	NA	NA	yes	ASL
7439921	Lead	19.4		1110		mg/kg	SS11	26 / 26	0.15 - 0.54	1110	86	1000	NA	NA	yes	ASL
7439954	Magnesium	478	J	3990		mg/kg	SB06	26 / 26	5.1 - 59.88	3990	3847	NA	NA	NA	no	NUT
7439965	Manganese	38.6		883		mg/kg	SS11	26 / 26	0.06 - 0.66	883	151	4100 N	NA	NA	no	BSL
7439976	Mercury	0.06	J	1.3		mg/kg	SS06	25 / 26	0.01 - 0.09	1.3	0.62	61 N	NA	NA	no	BSL
7440020	Nickel	3.7	J	546		mg/kg	SS05	24 / 26	0.19 - 2.32	546	15	4100 N	NA	NA	no	BSL
7440097	Potassium	393	J	3690		mg/kg	SB07	26 / 26	2.8 - 73.44	3690	3465	NA	NA	NA	no	NUT
7782492	Selenium	0.83	J	2.8		mg/kg	SB06	10 / 26	0.45 - 1.4	2.8	1.5	1000 N	NA	NA	no	BSL
7440224	Silver	0.32	J	2.2	J	mg/kg	SS11	4 / 26	0.15 - 0.49	2.2	0.67	1000 N	NA	NA	no	BSL

Table K-2.8
Occurrence, Distribution, and Selection of COPCs
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 4

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
7440235	Sodium	89.1	L	8220		mg/kg	SB06	14 / 26	8.74 - 79.9	8220	203	NA	NA	NA	no	NUT
7440280	Thallium	0.5	J	3.4		mg/kg	SS01	6 / 26	0.3 - 1.7	3.4	ND	14 N	NA	NA	no	BSL
7440622	Vanadium	11.2		354		mg/kg	SS04	26 / 26	0.13 - 2.98	354	42	1400 N	NA	NA	no	BSL
7440666	Zinc	26.4		3880		mg/kg	SS11	26 / 26	0.4 - 1.65	3880	87	61000 N	NA	NA	no	BSL

* Surface soil & subsurface soil combined

(1) Minimum/maximum detected concentration.

(2) Background data is UCL for dredge-fill background soil type from St. Juliens Creek Background Investigation.

(3) Tier II screening: With the exception of lead, all compounds are screened against the Risk-Based Concentration (RBC) Table, U.S. EPA Region III, October 9, 2002 for industrial soil (cancer benchmark value = 1e-06; HQ = 0.1). Lead is screened against the EPA screening value of a value of 1000 mg/kg.
When no RBC available, surrogate RBC used as follows:
Acenaphthylene - used naphthalene
Benzo(g,h,i)Perylene, Phenanthrene - used pyrene
alpha-Chlordane, gamma-Chlordane - used Chlordane
Endrin Aldehyde, Endrin Ketone - used Endrin
Cadmium - used Cadmium - Food
Chromium - used Chromium VI
Mercury - used Mercuric Chloride

(4) Rationale Codes
Selection Reason: Above Screening Level (ASL)
No Toxicity Information (NTX)
Deletion Reason: Essential Nutrient (NUT)
Below Screening Level (BSL)

Surface and Subsurface Soil Samples: Phase I - SS01 to SS10, SB01,SB02, SB03; Phase II - SS11 to SS18, SB04 to SB08

Definitions: NA = Not Applicable
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
J = Estimated Value
L = Estimated Value - Biased Low

Table K-2.9
Occurrence, Distribution, and Selection of COPCs
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Air
Exposure Point: Emissions from Soil at Site 4

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
	Organics																
72548	4,4'-DDD	0.0016	J	0.045		mg/kg	SB06	10 / 26	0.003 - 0.021	0.045	0.0053	24	C	NA	NA	no	BSL
72559	4,4'-DDE	0.0013	J	0.037		mg/kg	SS05	14 / 26	0.003 - 0.021	0.037	0.009	17	C	NA	NA	no	BSL
50293	4,4'-DDT	0.00092	J	0.04	J	mg/kg	SS05	16 / 26	0.003 - 0.021	0.04	0.009	17	C	NA	NA	no	BSL
5103719	alpha-Chlordane	0.004	J	0.042		mg/kg	SS08	4 / 26	0.002 - 0.011	0.042	0.0028	16	C	NA	NA	no	BSL
11097691	Aroclor-1254	0.011	J	0.042		mg/kg	SB02	5 / 26	0.033 - 0.21	0.042	ND	2.9	C	NA	NA	no	BSL
11096825	Aroclor-1260	0.022	J	6.3		mg/kg	SS08	6 / 26	0.033 - 1.7	6.3	ND	2.9	C	NA	NA	yes	ASL
60571	Dieldrin	0.003	J	0.072	J	mg/kg	SS08	6 / 26	0.003 - 0.021	0.07	0.0053	0.36	C	NA	NA	no	BSL
72208	Endrin	0.004	J	0.0039	J	mg/kg	SS10	1 / 26	0.003 - 0.021	0.004	0.0054	61	N	NA	NA	no	BSL
7421934	Endrin Aldehyde	0.16	J	0.16	J	mg/kg	SS08	1 / 26	0.003 - 0.021	0.16	0.0054	61	N	NA	NA	no	BSL
53494705	Endrin Ketone	0.083	J	0.083	J	mg/kg	SS08	1 / 26	0.003 - 0.021	0.083	ND	61	N	NA	NA	no	BSL
5103742	gamma-Chlordane	0.0023	J	0.033		mg/kg	SS08	5 / 26	0.002 - 0.011	0.033	0.0028	16	C	NA	NA	no	BSL
91576	2-Methylnaphthalene	0.2	J	0.2	J	mg/kg	SS11	1 / 26	0.34 - 40	0.2	ND	4100	N	NA	NA	no	BSL
83329	Acenaphthene	0.054	J	0.67		mg/kg	SS11	2 / 26	0.34 - 40	1	0.592	12000	N	NA	NA	no	BSL
208968	Acenaphthylene	0.068	J	0.13	J	mg/kg	SS18	6 / 26	0.34 - 40	0.1	0.131	4100	N	NA	NA	no	BSL
120127	Anthracene	0.053	J	0.95	J	mg/kg	SS11	10 / 26	0.34 - 40	0.95	0.462	61000	N	NA	NA	no	BSL
56553	Benzo(a)Anthracene	0.039	J	3	J	mg/kg	SS11	23 / 26	0.34 - 40	3	2.027	7.8	C	NA	NA	no	BSL
50328	Benzo(a)Pyrene	0.035	J	2.3	J	mg/kg	SS11	23 / 26	0.34 - 40	2.3	1.785	0.78	C	NA	NA	yes	ASL
205992	Benzo(b)Fluoranthene	0.079	J	3	J	mg/kg	SS11	23 / 26	0.34 - 40	3	2.335	7.8	C	NA	NA	no	BSL
191242	Benzo(g,h,i)Perylene	0.055	J	1.4	J	mg/kg	SS11	21 / 26	0.34 - 40	1.4	1.655	6100	N	NA	NA	no	BSL
207089	Benzo(k)Fluoranthene	0.037	J	0.82		mg/kg	SS01	20 / 26	0.34 - 40	0.82	2.038	78	C	NA	NA	no	BSL
117817	Bis(2-Ethylhexyl)Phthalate	0.043	J	0.11	J	mg/kg	SS11	3 / 26	0.34 - 40	0.11	ND	410	C	NA	NA	no	BSL
85687	Butylbenzylphthalate	0.035	J	0.035	J	mg/kg	SS07	1 / 26	0.34 - 40	0.035	ND	41000	N	NA	NA	no	BSL
86748	Carbazole	0.053	J	0.3	J	mg/kg	SS05	3 / 25	0.34 - 40	0.3	ND	290	C	NA	NA	no	BSL
218019	Chrysene	0.039	J	2.9	J	mg/kg	SS11	22 / 26	0.34 - 40	2.9	3.487	780	C	NA	NA	no	BSL
84742	Di-n-Butylphthalate	0.2	J	0.2	J	mg/kg	SS16	1 / 26	0.34 - 40	0.2	ND	20000	N	NA	NA	no	BSL
53703	Dibenz(a,h)Anthracene	0.1	J	0.32	J	mg/kg	SS11	3 / 26	0.34 - 40	0.32	0.708	0.78	C	NA	NA	no	BSL
132649	Dibenzofuran	0.047	J	0.19	J	mg/kg	SS11	2 / 26	0.34 - 40	0.19	ND	820	N	NA	NA	no	BSL
84662	Diethylphthalate	0.36	J	0.62	J	mg/kg	SS09	3 / 26	0.34 - 40	0.62	ND	160000	N	NA	NA	no	BSL
206440	Fluoranthene	0.049	J	4	J	mg/kg	SS11	23 / 26	0.34 - 40	4	2.766	8200	N	NA	NA	no	BSL
86737	Fluorene	0.047	J	0.57	J	mg/kg	SS11	2 / 26	0.34 - 40	0.57	0.602	8200	N	NA	NA	no	BSL
193395	Indeno(1,2,3-cd)Pyrene	0.046	J	1.1	J	mg/kg	SS11	21 / 26	0.34 - 40	1.1	1.769	7.8	C	NA	NA	no	BSL
91203	Naphthalene	0.083	J	0.25	J	mg/kg	SS11	2 / 26	0.34 - 40	0.25	0.485	4100	N	NA	NA	no	BSL
85018	Phenanthrene	0.048	J	6.3	J	mg/kg	SS11	17 / 26	0.34 - 40	6.3	0.913	6100	N	NA	NA	no	BSL

Table K-2.9
Occurrence, Distribution, and Selection of COPCs
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Air
Exposure Point: Emissions from Soil at Site 4

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	(2) Background Value	(3) Screening Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(4) Rationale for Contaminant Deletion or Selection
129000	Pyrene	0.056	J	7.5	J	mg/kg	SS11	22 / 26	0.34 - 40	7.5	2.59	6100 N	NA	NA	no	BSL
78933	2-Butanone	0.011		0.599		mg/kg	SB06	3 / 26	0.01 - 0.03	0.599	ND	120000 N	NA	NA	no	BSL
108101	4-Methyl-2-Pentanone	0.002	J	0.002	J	mg/kg	SS03	1 / 26	0.01 - 0.03	0.002	ND	16000 N	NA	NA	no	BSL
67641	Acetone	0.008	J	0.457		mg/kg	SB06	15 / 26	0.01 - 0.03	0.457	ND	20000 N	NA	NA	no	BSL
75150	Carbon Disulfide	0.006	J	0.006	J	mg/kg	SB06	1 / 26	0.01 - 0.03	0.006	ND	940 C	NA	NA	no	BSL
67663	Chloroform	0.002	J	0.002	J	mg/kg	SS11	1 / 26	0.01 - 0.03	0.002	ND	41000 N	NA	NA	no	BSL
127184	Tetrachloroethene	0.002	J	0.005	J	mg/kg	SB01	3 / 26	0.01 - 0.03	0.005	ND	110000 C	NA	NA	no	BSL
108883	Toluene	0.001	J	0.003	J	mg/kg	SB01	3 / 26	0.01 - 0.03	0.003	ND	41000000 N	NA	NA	no	BSL
	Inorganics															
14265442	Phosphorus	2.3		28.5		mg/kg	SB02	13 / 17	1.2 - 4.94	28.5	ND	NA	NA	NA	no	NTX
7429905	Aluminum	3910		18100		mg/kg	SB01	26 / 26	6.63 - 25.2	18100	18839	200000 N	NA	NA	no	BSL
7440360	Antimony	0.67	J	53.5		mg/kg	SB06	13 / 23	0.31 - 1.5	53.5	1.47	82 N	NA	NA	no	BSL
7440382	Arsenic	1.9		236		mg/kg	SB06	26 / 26	0.42 - 1.1	236	14	3.8 C	NA	NA	yes	ASL
7440393	Barium	19.4	J	991		mg/kg	SS11	26 / 26	0.04 - 0.66	991	50	14000 N	NA	NA	no	BSL
7440417	Beryllium	0.19	J	5.5		mg/kg	SS11	22 / 26	0.02 - 0.33	5.5	0.81	410 N	NA	NA	no	BSL
7440439	Cadmium	0.08	J	9.7		mg/kg	SS11	16 / 26	0.06 - 0.17	9.7	ND	200 N	NA	NA	no	BSL
7440702	Calcium	490	J	49100		mg/kg	SS11	26 / 26	12.2 - 31.2	49100	3251	NA	NA	NA	no	NUT
7440473	Chromium	7.2		680		mg/kg	SS05	26 / 26	0.23 - 2.32	680	39	610 N	NA	NA	yes	ASL
7440484	Cobalt	3.4	J	16.2	J	mg/kg	SB06	25 / 26	0.11 - 2.65	16.2	13	12000 N	NA	NA	no	BSL
7440508	Copper	7		874		mg/kg	SS11	26 / 26	0.23 - 1.98	874	40	8200 N	NA	NA	no	BSL
7439896	Iron	2920		65100		mg/kg	SS11	26 / 26	2.56 - 16.6	65100	36585	61000 N	NA	NA	yes	ASL
7439921	Lead	19.4		1110		mg/kg	SS11	26 / 26	0.15 - 0.54	1110	86	1000	NA	NA	yes	ASL
7439954	Magnesium	478	J	3990		mg/kg	SB06	26 / 26	5.1 - 59.88	3990	3847	NA	NA	NA	no	NUT
7439965	Manganese	38.6		883		mg/kg	SS11	26 / 26	0.06 - 0.66	883	151	4100 N	NA	NA	no	BSL
7439976	Mercury	0.06	J	1.3		mg/kg	SS06	25 / 26	0.01 - 0.09	1.3	0.62	61 N	NA	NA	no	BSL
7440020	Nickel	3.7	J	546		mg/kg	SS05	24 / 26	0.19 - 2.32	546	15	4100 N	NA	NA	no	BSL
7440097	Potassium	393	J	3690		mg/kg	SB07	26 / 26	2.8 - 73.44	3690	3465	NA	NA	NA	no	NUT
7782492	Selenium	0.83	J	2.8		mg/kg	SB06	10 / 26	0.45 - 1.4	2.8	1.5	1000 N	NA	NA	no	BSL

Table K-2.9
Occurrence, Distribution, and Selection of COPCs
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Air
Exposure Point: Emissions from Soil at Site 4

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	(2) Background Value	(3) Screening Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(4) Rationale for Contaminant Deletion or Selection
7440224	Silver	0.32	J	2.2	J	mg/kg	SS11	4 / 26	0.15 - 0.49	2.2	0.67	1000 N	NA	NA	no	BSL
7440235	Sodium	89.1	L	8220		mg/kg	SB06	14 / 26	8.74 - 79.9	8220	203	NA	NA	NA	no	NUT
7440280	Thallium	0.5	J	3.4		mg/kg	SS01	6 / 26	0.3 - 1.7	3.4	ND	14 N	NA	NA	no	BSL
7440622	Vanadium	11.2		354		mg/kg	SS04	26 / 26	0.13 - 2.98	354	42	1400 N	NA	NA	no	BSL
7440666	Zinc	26.4		3880		mg/kg	SS11	26 / 26	0.4 - 1.65	3880	87	61000 N	NA	NA	no	BSL

* Surface soil & subsurface soil combined

(1) Minimum/maximum detected concentration.

(2) Background data is UCL for dredge-fill background soil type from St. Juliens Creek Background Investigation.

(3) Tier II screening: With the exception of lead, all compounds are screened against the Risk-Based Concentration (RBC) Table, U.S. EPA Region III, October 9, 2002 for industrial soil (cancer benchmark value = 1e-06; HQ = 0.1). Lead is screened against the EPA screening value of a value of 1000 mg/kg.
When no RBC available, surrogate RBC used as follows:
Acenaphthylene - used naphthalene
Benzo(g,h,i)Perylene, Phenanthrene - used pyrene
alpha-Chlordane, gamma-Chlordane - used Chlordane
Endrin Aldehyde, Endrin Ketone - used Endrin
Cadmium - used Cadmium - Food
Chromium - used Chromium VI
Mercury - used Mercuric Chloride

(4) Rationale Codes
Selection Reason: Above Screening Level (ASL)
No Toxicity Information (NTX)
Deletion Reason: Essential Nutrient (NUT)
Below Screening Level (BSL)

Definitions: NA = Not Applicable
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
J = Estimated Value
L = Estimated Value - Biased Low

Surface and Subsurface Soil Samples: Phase I - SS01 to SS10, SB01,SB02, SB03; Phase II - SS11 to SS18, SB04 to SB08

Table K-2.10
Occurrence, Distribution, and Selection of COPCs
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage Features

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	(2) Background Value	(3) Screening Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(4) Rationale for Contaminant Deletion or Selection
	Organics															
106445	4-Methylphenol	13		13		ug/l	SW04	1 / 8	10 - 12	13	NA	180 N	NA	NA	no	BSL
83329	Acenaphthene	2	J	2	J	ug/l	SW07	1 / 8	10 - 12	2	NA	370 N	2700	VAWQS	no	BSL
191242	Benzo(g,h,i)perylene	3	J	3	J	ug/l	SW09	1 / 8	10 - 12	3	NA	180 N	NA	NA	no	BSL
53703	Dibenz(a,h)anthracene	3	J	3	J	ug/l	SW09	1 / 8	10 - 12	3	NA	0.092 C	0.49	VAWQS	yes	ASL
193395	Indeno(1,2,3-cd)pyrene	2	J	2	J	ug/l	SW09	1 / 8	10 - 12	2	NA	0.92 C	0.49	VAWQS	yes	ASL
108952	Phenol	2	J	2	J	ug/l	SW04	1 / 8	10 - 12	2	NA	22000 N	4600000	VAWQS	no	BSL
75150	Carbon Disulfide	0.8	J	13.5	J	ug/l	SW01	3 / 8	1 - 10	13.5	NA	1000 N	NA	NA	no	BSL
67641	Acetone	8	J	8	J	ug/l	SW04	1 / 7	5 - 10	8	NA	610 N	NA	NA	no	BSL
	Inorganics															
14265442	Phosphorus	22		911		ug/l	SW06	7 / 8	20 - 50	911	NA	NA	NA	NA	no	NTX
7429905	Aluminum	138	K	50000		ug/l	SW04	8 / 8	18.7 - 38.2	50000	NA	37000 N	NA	NA	yes	ASL
7440360	Antimony	3	J	3.7	J	ug/l	SW04	2 / 8	1 - 2.8	3.7	NA	15 N	4300	VAWQS	no	BSL
7440382	Arsenic	4	J	26.6		ug/l	SW04	5 / 8	2 - 3.6	26.6	NA	0.45 C	NA	NA	yes	ASL
7440393	Barium	22.3	J	356		ug/l	SW07	8 / 8	0.2 - 1	356	NA	2600 N	NA	NA	no	BSL
7440417	Beryllium	0.14	J	6.8		ug/l	SW04	4 / 8	0.1 - 1	6.8	NA	73 N	NA	NA	no	BSL
7440439	Cadmium	0.34	J	1	J	ug/l	SW07	4 / 8	0.3 - 0.5	1	NA	18 N	NA	NA	no	BSL
7440702	Calcium	118000		317000		ug/l	SW07	8 / 8	31.1 - 57.9	317000	NA	NA	NA	NA	no	NUT
7440473	Chromium	1.4	J	66.6		ug/l	SW04	4 / 8	0.6 - 4	66.6	NA	110 N	NA	NA	no	BSL
7440484	Cobalt	0.92	J	43.9	J	ug/l	SW04	7 / 8	0.5 - 3	43.9	NA	730 N	NA	NA	no	BSL
7440508	Copper	7.8	J	179		ug/l	SW04	7 / 8	0.8 - 2	179	NA	1500 N	NA	NA	no	BSL
57125	Cyanide	8.5	L	29.3	L	ug/l	SW02	4 / 8	5 - 5	29.3	NA	730 N	215000	VAWQS	no	BSL
7439896	Iron	376		93100		ug/l	SW04	8 / 8	5 - 30.8	93100	NA	11000 N	NA	NA	yes	ASL
7439921	Lead	3.2		822		ug/l	SW04	7 / 8	1 - 1.4	822	NA	15	NA	NA	yes	ASL
7439954	Magnesium	15500		632000		ug/l	SW04	8 / 8	24.3 - 243	632000	NA	NA	NA	NA	no	NUT
7439965	Manganese	111		2310		ug/l	SW01	8 / 8	0.3 - 1	2310	NA	730 N	NA	NA	yes	ASL
7439976	Mercury	0.16	J	1.2		ug/l	SW04	3 / 8	0.1 - 0.1	1.2	NA	11 N	0.053	VAWQS	no	BSL
7440020	Nickel	1.3	J	64		ug/l	SW04	8 / 8	0.9 - 4	64	NA	730 N	4600	VAWQS	no	BSL
7440097	Potassium	13500	J	225000		ug/l	SW04	8 / 8	13.5 - 167	225000	NA	NA	NA	NA	no	NUT
7440224	Silver	1.1	J	1.1	J	ug/l	SW09	1 / 8	0.7 - 1	1.1	NA	180 N	NA	NA	no	BSL

Table K-2.10
Occurrence, Distribution, and Selection of COPCs
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage Features

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
7440235	Sodium	16000		5090000		ug/l	SW04	8 / 8	28 - 2040	5090000	NA	NA	NA	NA	no	NUT
7440622	Vanadium	2	J	117		ug/l	SW04	6 / 8	0.6 - 4	117	NA	260 N	NA	NA	no	BSL
7440666	Zinc	22.8		1160		ug/l	SW04	8 / 8	0.7 - 3	1160	NA	11000 N	NA	NA	no	BSL

(1) Minimum/maximum detected concentration.

(2) No background study has been completed for the St. Juliens Creek Annex surface water.

(3) Tier I screening: With the exception of lead, all compounds are screened against 10 times the Risk-Based Concentration (RBC) Table, U.S. EPA Region III, October 9, 2002 for tap water (10 times the cancer benchmark value = 1e-06; 10 times the HQ = 0.1). Lead is screened against the MCL value of 15 ug/l.
When no RBC available, surrogate RBC used as follows:
Benzo(g,h,i)Perylene, Phenanthrene - used pyrene
Cadmium - used Cadmium - Water
Chromium - used Chromium VI
Mercury - used Mercuric Chloride

(4) Rationale Codes
Selection Reason: Above Screening Level (ASL)
No Toxicity Information (NTX)
Deletion Reason: Essential Nutrient (NUT)
Below Screening Level (BSL)

Surface Water Samples: SW04 - Round I ; SW01 through SW03 and SW06 through SW09 - Round II.

Definitions: NA = Not Applicable
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
VAWQS = Virginia Water Quality Standard
J = Estimated Value
L = Estimated Value - Biased Low
K = Estimated Value - Biased High

Table K-2.11
Occurrence, Distribution, and Selection of COPCs
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage Features

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	(2) Background Value	(3) Screening Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(4) Rationale for Contaminant Deletion or Selection
	Organic															
72548	4,4'-DDD	0.0014	J	0.22		mg/kg	SD01	7 / 9	0.004 - 0.042	0.22	NA	27 C	NA	NA	no	BSL
72559	4,4'-DDE	0.00047	L	0.031		mg/kg	SD01	7 / 9	0.004 - 0.01	0.03	NA	19 C	NA	NA	no	BSL
50293	4,4'-DDT	0.0027	L	0.038	J	mg/kg	SD01	3 / 9	0.004 - 0.01	0.04	NA	19 C	NA	NA	no	BSL
11096825	Aroclor-1260	0.031	J	0.09	J	mg/kg	SD02	4 / 8	0.04 - 0.1	0.09	NA	3.2 C	NA	NA	no	BSL
60571	Dieldrin	0.00063	L	0.023		mg/kg	SD02	3 / 9	0.004 - 0.01	0.02	NA	0.4 C	NA	NA	no	BSL
91576	2-Methylnaphthalene	0.048	J	0.14	J	mg/kg	SD03	2 / 8	0.42 - 2.0	0.14	NA	1600 N	NA	NA	no	BSL
208968	Acenaphthylene	0.053	J	0.07	J	mg/kg	SD04	2 / 8	0.42 - 2.0	0.07	NA	1600 N	NA	NA	no	BSL
120127	Anthracene	0.057	J	0.2	J	mg/kg	SD04	3 / 9	0.42 - 2.0	0.2	NA	23000 N	NA	NA	no	BSL
56553	Benzo(a)Anthracene	0.078	J	1.3		mg/kg	SD04	8 / 9	0.42 - 2.0	1.3	NA	8.7 C	NA	NA	no	BSL
50328	Benzo(a)Pyrene	0.071	J	1.2		mg/kg	SD04	8 / 9	0.42 - 2.0	1.2	NA	0.87 C	NA	NA	yes	ASL
205992	Benzo(b)Fluoranthene	0.15	J	1.9		mg/kg	SD04	8 / 9	0.42 - 2.0	1.9	NA	8.7 C	NA	NA	no	BSL
191242	Benzo(g,h,i)Perylene	0.083	J	0.34	J	mg/kg	SD06	7 / 9	0.42 - 2.0	0.34	NA	2300 N	NA	NA	no	BSL
207089	Benzo(k)fluoranthene	0.2	J	1.1		mg/kg	SD04	7 / 9	0.42 - 2.0	1.1	NA	87 C	NA	NA	no	BSL
117817	Bis(2-Ethylhexyl)Phthalate	0.14	L	0.14	L	mg/kg	SD09	1 / 9	0.42 - 2.0	0.14	NA	460 C	NA	NA	no	BSL
85687	Butylbenzylphthalate	0.058	J	0.058	J	mg/kg	SD04	1 / 8	0.42 - 2.0	0.058	NA	16000 N	NA	NA	no	BSL
218019	Chrysene	0.11	J	1.2		mg/kg	SD04	8 / 9	0.42 - 2.0	1.2	NA	870 C	NA	NA	no	BSL
84742	Di-n-Butylphthalate	0.058	J	0.067	J	mg/kg	SD03	2 / 8	0.42 - 2.0	0.067	NA	7800 N	NA	NA	no	BSL
117840	di-n-Octylphthalate	0.12	L	0.12	L	mg/kg	SD09	1 / 9	0.42 - 2.0	0.12	NA	1600 N	NA	NA	no	BSL
53703	Dibenz(a,h)Anthracene	0.11	J	0.15	J	mg/kg	SD04	4 / 9	0.42 - 2.0	0.15	NA	0.87 C	NA	NA	no	BSL
132649	Dibenzofuran	0.063	J	0.063	J	mg/kg	SD03	1 / 8	0.42 - 2.0	0.063	NA	310 N	NA	NA	no	BSL
84662	Diethylphthalate	0.3	J	0.3	J	mg/kg	SD02	1 / 8	0.42 - 2.0	0.3	NA	63000 N	NA	NA	no	BSL
206440	Fluoranthene	0.2	J	2.8		mg/kg	SD04	8 / 9	0.42 - 2.0	2.8	NA	3100 N	NA	NA	no	BSL
193395	Indeno(1,2,3-cd)Pyrene	0.085	J	0.37	J	mg/kg	SD04	7 / 9	0.42 - 2.0	0.37	NA	8.7 C	NA	NA	no	BSL
91203	Naphthalene	0.058	J	0.1	J	mg/kg	SD03/SD04	3 / 8	0.42 - 2.0	0.1	NA	1600 N	NA	NA	no	BSL
85018	Phenanthrene	0.086	J	0.4	J	mg/kg	SD02	7 / 9	0.42 - 2.0	0.4	NA	2300 N	NA	NA	no	BSL
129000	Pyrene	0.16	J	2.8		mg/kg	SD04	8 / 9	0.42 - 2.0	2.8	NA	2300 N	NA	NA	no	BSL
67641	Acetone	0.007	J	0.14		mg/kg	SD04	5 / 9	0.01 - 0.031	0.14	NA	7800 N	NA	NA	no	BSL
75150	Carbon Disulfide	0.007	J	0.019	J	mg/kg	SD04	4 / 9	0.01 - 0.031	0.019	NA	7800 N	NA	NA	no	BSL
108883	Toluene	0.006	J	0.015	J	mg/kg	SD08	2 / 9	0.01 - 0.031	0.015	NA	16000 N	NA	NA	no	BSL
	Inorganic															
14265442	Phosphorus	4.8		245		mg/kg	SD09	7 / 7	1.6 - 25.4	245	NA	NA	NA	NA	no	NTX
7429905	Aluminum	6430		22100		mg/kg	SD04	9 / 9	5.3 - 29.44	22100	NA	78000 N	NA	NA	no	BSL
7440360	Antimony	2.1	L	2.1	L	mg/kg	SD02	1 / 9	0.4 - 1.34	2.1	NA	31 N	NA	NA	no	BSL
7440382	Arsenic	3.9		33.1		mg/kg	SD03	9 / 9	0.6 - 2.01	33.1	NA	4.3 C	NA	NA	yes	ASL
7440393	Barium	34.4	J	903		mg/kg	SD07	9 / 9	0.06 - 1.34	903	NA	5500 N	NA	NA	no	BSL
7440417	Beryllium	0.5	J	3.9		mg/kg	SD01	9 / 9	0.03 - 0.67	3.9	NA	160 N	NA	NA	no	BSL

Table K-2.11
Occurrence, Distribution, and Selection of COPCs
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage Features

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
7440439	Cadmium	0.26	J	2	J	mg/kg	SD08	7 / 9	0.08 - 0.33	2	NA	78 N	NA	NA	no	BSL
7440702	Calcium	1500		18300		mg/kg	SD03	9 / 9	8.8 - 58.2	18300	NA	NA	NA	NA	no	NUT
7440473	Chromium	13.1		38.8		mg/kg	SD04	9 / 9	0.17 - 4.68	38.8	NA	230 N	NA	NA	no	BSL
7440484	Cobalt	5.2	J	32.7		mg/kg	SD05	9 / 9	0.16 - 5.35	32.7	NA	4700 N	NA	NA	no	BSL
7440508	Copper	33.6		387		mg/kg	SD03	9 / 9	0.23 - 4.01	387	NA	3100 N	NA	NA	no	BSL
57125	Cyanide	2.9	L	2.9	L	mg/kg	SD08	1 / 8	0.396 - 1.7	2.9	NA	1600 N	NA	NA	no	BSL
7439896	Iron	10500		56000		mg/kg	SD01	9 / 9	3.38 - 14.1	56000	NA	23000 N	NA	NA	yes	ASL
7439921	Lead	38.9		441		mg/kg	SD03	9 / 9	0.2 - 0.67	441	NA	400	NA	NA	yes	ASL
7439954	Magnesium	988	J	6740		mg/kg	SD04	9 / 9	7.4 - 121.09	6740	NA	NA	NA	NA	no	NUT
7439965	Manganese	75.2		877	K	mg/kg	SD03	9 / 9	0.1 - 1.34	877	NA	1600 N	NA	NA	no	BSL
7439976	Mercury	0.11		6.4		mg/kg	SD03	9 / 9	0.03 - 0.15	6.4	NA	23 N	NA	NA	no	BSL
7440020	Nickel	10.7	J	43.9		mg/kg	SD03	9 / 9	0.25 - 4.68	43.9	NA	1600 N	NA	NA	no	BSL
7440097	Potassium	752	J	3850		mg/kg	SD04	9 / 9	4.3 - 148.51	3850	NA	NA	NA	NA	no	NUT
7782492	Selenium	0.99	J	1.6	J	mg/kg	SD07	5 / 9	0.6 - 2.01	1.6	NA	390 N	NA	NA	no	BSL
7440224	Silver	0.35	J	1	J	mg/kg	SD03	4 / 9	0.2 - 0.67	1	NA	390 N	NA	NA	no	BSL
7440235	Sodium	239	J	11000		mg/kg	SD08	7 / 9	11.54 - 67.9	11000	NA	NA	NA	NA	no	NUT
7440280	Thallium	0.46	J	0.46	J	mg/kg	SD02	1 / 9	0.4 - 1.5	0.46	NA	5.5 N	NA	NA	no	BSL
7440622	Vanadium	16		88.5		mg/kg	SD03	9 / 9	0.19 - 6.02	88.5	NA	550 N	NA	NA	no	BSL
7440666	Zinc	147		624		mg/kg	SD03	9 / 9	0.2 - 3.34	624	NA	23000 N	NA	NA	no	BSL

(1) Minimum/maximum detected concentration.

(2) No background study has been completed for the St. Juliens Creek Annex sediment.

(3) Tier I screening: With the exception of lead, all compounds are screened against 10 times the Risk-Based Concentration (RBC) Table, U.S. EPA Region III, October 9, 2002 for residential soil (10 times the cancer benchmark value = 1e-06; 10 times the HQ = 0.1).
Lead is screened against the EPA screening value of 400 mg/kg.
When no RBC available, surrogate RBC used as follows:
Acenaphthylene - used naphthalene
Benzo(g,h,i)Perylene, Phenanthrene - used pyrene
Cadmium - used Cadmium - Food
Chromium - used Chromium VI
Mercury - used Mercuric Chloride

(4) Rationale Codes
Selection Reason: Above Screening Level (ASL)
No Toxicity Information (NTX)
Deletion Reason: Essential Nutrient (NUT)
Below Screening Level (BSL)

Sediment Samples: SD01 to SD04 - Phase I; SD05 to SD09 - Phase II

Definitions: NA = Not Applicable
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
J = Estimated Value
K = Estimated Value - Biased High
L = Estimated Value - Biased Low

Table K-2.12
Occurrence, Distribution, and Selection of COPCs
Site 4
St. Julians Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Shallow Groundwater
Exposure Point: Water Table

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	(2) Background Value	(3) Screening Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(4) Rationale for Contaminant Deletion or Selection
	Organic																
83329	Acenaphthene	2	J	5	J	ug/l	GW1S	3 / 12	10 - 11	5	ND	37	N	NA	NA	no	BSL
117817	Bis(2-Ethylhexyl)Phthalate	13		13		ug/l	GW3S	1 / 12	7 - 11	13	ND	4.8	C	6	MCL	yes	ASL
84742	Di-n-butylphthalate	1	J	1	J	ug/l	GW1S, GW3S	2 / 12	10 - 11	365	ND	365	N	NA	NA	no	BSL
132649	Dibenzofuran	2	J	2	J	ug/l	GW1S	1 / 12	10 - 11	2	ND	2.4	N	NA	NA	no	BSL
1031078	Endosulfan Sulfate	0.0063	J	0.008	J	ug/l	GW1S	3 / 12	0.1 - 0.12	0.008	NA	22	N	NA	NA	no	BSL
67641	Acetone	6		12		ug/l	GW3S	3 / 7	5 - 5	12	26	61	N	NA	NA	no	BSL
75150	Carbon Disulfide	0.4	J	2.9		ug/l	GW1S	5 / 12	1 - 1	2.9	ND	100	N	NA	NA	no	BSL
75092	Methylene Chloride	0.5	J	3		ug/l	GW2S	3 / 12	1 - 2	3	ND	4.1	C	NA	NA	no	BSL
	Inorganic																
14265442	Phosphorus	76		2900		ug/l	GW1S	9 / 12	20 - 1300	2900	ND	NA		NA	NA	no	NTX
7429905	Aluminum	105	J	28000	J	ug/l	GW2S	9 / 12	29 - 38.2	28000	331	3700	N	50 - 200	SMCL	yes	ASL
7440360	Antimony	3.2	J	3.2	J	ug/l	GW3S	1 / 11	1 - 2.7	3.2	ND	1.5	N	6	MCL	yes	ASL
7440382	Arsenic	2.3	J	14.4		ug/l	GW2S	6 / 12	2 - 3.2	14.4	1.8	0.045	C	50	MCL	yes	ASL
7440393	Barium	22.5	J	647		ug/l	GW4S	10 / 12	0.2 - 1	647	74	260	N	2000	MCL	yes	ASL
7440417	Beryllium	0.15	J	3.3	J	ug/l	GW2S	2 / 12	0.1 - 1	3.3	0.23	7.3	N	4	MCL	no	BSL
7440439	Cadmium	0.33	J	6.1	K	ug/l	GW3S	5 / 12	0.3 - 0.5	6.1	ND	1.8	N	5	MCL	yes	ASL
7440702	Calcium	96500		424000		ug/l	GW3S	12 / 12	46 - 57.9	424000	123732	NA		NA	NA	no	NUT
7440473	Chromium	1.3	J	47.8		ug/l	GW4S	5 / 12	1.1 - 4.6	47.8	ND	11	N	100	MCL	yes	ASL
7440484	Cobalt	12.2	J	88.7		ug/l	GW2S	3 / 12	0.5 - 8	88.7	14	73	N	NA	NA	yes	ASL
7440508	Copper	4.1	J	58.6		ug/l	GW3S	5 / 12	1.1 - 6	58.6	ND	150	N	1300	MCL	no	BSL
7439896	Iron	339		90900		ug/l	GW1S	12 / 12	5 - 30.8	90900	16704	1100	N	300	SMCL	yes	ASL
7439921	Lead	1.3	J	30.5		ug/l	GW3S	8 / 12	1 - 1.3	30.5	1.8	15		15	MCL	yes	ASL
7439954	Magnesium	23800		310000		ug/l	GW4S	12 / 12	24.3 - 45	310000	19702	NA		NA	NA	no	NUT
7439965	Manganese	138		3590		ug/l	GW1S	11 / 12	0.3 - 1	3590	825	73	N	50	SMCL	yes	ASL
7440020	Nickel	2.2	J	110		ug/l	GW2S	6 / 12	0.9 - 7	110	14	73	N	NA	NA	yes	ASL
7440097	Potassium	10000	J	105000		ug/l	GW4S	12 / 12	13.5 - 97	105000	5003	NA		NA	NA	no	NUT
7440224	Silver	1.5	J	400		ug/l	GW2S	3 / 12	0.9 - 3	400	ND	18	N	100	SMCL	yes	ASL

Table K-2.12
Occurrence, Distribution, and Selection of COPCs
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Shallow Groundwater
Exposure Point: Water Table

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	(2) Background Value	(3) Screening Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(4) Rationale for Contaminant Deletion or Selection
7440235	Sodium	31300		2210000		ug/l	GW4S	12 / 12	28 - 1480	2210000	59614	NA	NA	NA	no	NUT
7440280	Thallium	3.1	J	3.1	J	ug/l	GW2S	1 / 12	1.5 - 3.2	3.1	NA	0.26 N	2	MCL	yes	ASL
7440622	Vanadium	2.7	J	55.9		ug/l	GW2S	5 / 12	0.6 - 9	55.9	0.99	26 N	NA	NA	yes	ASL
7440666	Zinc	25		542		ug/l	GW2S	4 / 12	1.9 - 3	542	85.6	1100 N	5000	SMCL	no	BSL

(1) Minimum/maximum detected concentration.

(2) Background data is UCL for Columbia Aquifer from St. Juliens Creek Background Investigation.

(3) Tier I screening: With the exception of lead, all compounds are screened against the Risk-Based Concentration (RBC) Table, U.S. EPA Region III, October 9, 2002 for tap water (cancer benchmark value = 1e-06; HQ = 0.1). Lead is screened against the MCL value of 15 ug/l.
When no RBC available, surrogate RBC used as follows:
Endosulfan Sulfate, Endosulfan I - used Endosulfan
Cadmium - used Cadmium - Water
Chromium - used Chromium VI

(4) Rationale Codes
Selection Reason: Above Screening Level (ASL)
No Toxicity Information (NTX)
Deletion Reason: Essential Nutrient (NUT)
Below Screening Level (BSL)

Shallow Groundwater Samples: GW1S,GW2S, GW3S, and GW4S - Phase I, Rounds 1 and 2 and Phase II

Definitions: NA = Not Applicable
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
MCL = Maximum Contaminant Level
SMCL = Secondary Maximum Contaminant Level
J = Estimated Value
K = Estimated Value - Biased High

Table K-3.1
Medium-Specific Exposure Point Concentration Summary
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: At Site 4

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Aroclor-1260	ug/kg	386	991	6300	-	ug/kg	991	95% UCL-N	W - Test (4)	386	Mean-N	W - Test (4)
Benzo(a)Pyrene	ug/kg	1551	3006	2300	J	ug/kg	2300	Max	W - Test (2,1)	354	Mean-T	W - Test (2)
Arsenic	mg/kg	9.97	16.8	22.9	-	mg/kg	16.8	95% UCL-T	W - Test (2)	8	Mean-T	W - Test (2)
Chromium	mg/kg	66	129	680	-	mg/kg	128.9	95% UCL-N	W - Test (4)	66	Mean-N	W - Test (4)
Iron	mg/kg	22059	33173	65100	-	mg/kg	33173	95% UCL-T	W - Test (2)	18215	Mean-T	W - Test (2)
Lead	mg/kg	204	322	1110	-	mg/kg	322	95% UCL-T	W - Test (4)	204	Mean-N	W - Test (4)

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). J = Estimated Value

(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(2) Shapiro-Wilk W Test indicates data are lognormally distributed.

(3) Shapiro-Wilk W Test indicates data are normally distributed.

(4) Shapiro-Wilk W Test inconclusive. Higher of UCL for normally and lognormally distributed data used for the RME EPC. Higher of mean value for normally and lognormally distributed data used for CT EPC.

Note: The arithmetic mean is calculated using one-half the sample quantitation limit for non-detects and is normally distributed. When calculated in this way, it is possible for the mean to exceed the maximum detected value. In such cases, the maximum detected value is used as the EPC value. The 95% UCL of Data is based on the conclusive distribution (lognormal or normal) or the maximum UCL value when inconclusive.

Table K-3.2
Medium-Specific Exposure Point Concentration Summary
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from Surface Soil at Site 4

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Aroclor-1260	ug/kg	386	991	6300	-	ug/kg	991	95% UCL-N	W - Test (4)	386	Mean-N	W - Test (4)
Benzo(a)Pyrene	ug/kg	1551	3006	2300	J	ug/kg	2300	Max	W - Test (2,1)	354	Mean-T	W - Test (2)
Arsenic	mg/kg	9.97	16.8	22.9	-	mg/kg	16.8	95% UCL-T	W - Test (2)	8	Mean-T	W - Test (2)
Chromium	mg/kg	66	129	680	-	mg/kg	128.9	95% UCL-N	W - Test (4)	66	Mean-N	W - Test (4)
Iron	mg/kg	22059	33173	65100	-	mg/kg	33173	95% UCL-T	W - Test (2)	18215	Mean-T	W - Test (2)
Lead	mg/kg	204	322	1110	-	mg/kg	322	95% UCL-T	W - Test (4)	204	Mean-N	W - Test (4)

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). J = Estimated Value

(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(2) Shapiro-Wilk W Test indicates data are lognormally distributed.

(3) Shapiro-Wilk W Test indicates data are normally distributed.

(4) Shapiro-Wilk W Test inconclusive. Higher of UCL for normally and lognormally distributed data used for the RME EPC. Higher of mean value for normally and lognormally distributed data used for CT EPC.

Note: The arithmetic mean is calculated using one-half the sample quantitation limit for non-detects and is normally distributed. When calculated in this way, it is possible for the mean to exceed the maximum detected value. In such cases, the maximum detected value is used as the EPC value. The 95% UCL of Data is based on the conclusive distribution (lognormal or normal) or the maximum UCL value when inconclusive.

Table K-3.3
Medium-Specific Exposure Point Concentration Summary
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Deep Groundwater
Exposure Point: Tap Water

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
bis(2-Ethylhexyl)phthalate	ug/L	3.2	199.6	5	J	ug/L	5	Max	W - Test (4,1)	3.2	Mean-N	W - Test (4)
Chloroform	ug/L	1.9	21.5	9	-	ug/L	9	Max	W - Test (4,1)	1.9	Mean-N	W - Test (4)
Arsenic	ug/L	3.6	19.1	6.5	J	ug/L	19.1	95% UCL-T	W - Test (4)	3.6	Mean-N	W - Test (4)
Barium	ug/L	224	2776	489	-	ug/L	489	Max	W - Test (4,1)	224	Mean-N	W - Test (4)
Iron	ug/L	31624	188881	68500	-	ug/L	68500	Max	W - Test (4,1)	31624	Mean-N	W - Test (4)
Manganese	ug/L	6052	33449	12500	-	ug/L	12500	Max	W - Test (4,1)	6052	Mean-N	W - Test (4)

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). J = Estimated Value

(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(2) Shapiro-Wilk W Test indicates data are lognormally distributed.

(3) Shapiro-Wilk W Test indicates data are normally distributed.

(4) Shapiro-Wilk W Test inconclusive. Higher of UCL for normally and lognormally distributed data used for the RME EPC. Higher of mean value for normally and lognormally distributed data used for CT EPC.

Note: The arithmetic mean is calculated using one-half the sample quantitation limit for non-detects and is normally distributed. When calculated in this way, it is possible for the mean to exceed the maximum detected value. In such cases, the maximum detected value is used as the EPC value. The 95% UCL of Data is based on the conclusive distribution (lognormal or normal) or the maximum UCL value when inconclusive.

Table K-3.4
Medium-Specific Exposure Point Concentration Summary
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Deep Groundwater - Water Vapor at Showerhead

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
bis(2-Ethylhexyl)phthalate	ug/L	3.2	199.6	5	J	ug/L	5	Max	W - Test (4,1)	3	Mean-N	W - Test (4)
Chloroform	ug/L	1.9	21.5	9	-	ug/L	9	Max	W - Test (4,1)	1.9	Mean-N	W - Test (4)

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). J = Estimated Value

(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(2) Shapiro-Wilk W Test indicates data are lognormally distributed.

(3) Shapiro-Wilk W Test indicates data are normally distributed.

(4) Shapiro-Wilk W Test inconclusive. Higher of UCL for normally and lognormally distributed data used for the RME EPC. Higher of mean value for normally and lognormally distributed data used for CT EPC.

Note: The arithmetic mean is calculated using one-half the sample quantitation limit for non-detects and is normally distributed. When calculated in this way, it is possible for the mean to exceed the maximum detected value. In such cases, the maximum detected value is used as the EPC value. The 95% UCL of Data is based on the conclusive distribution (lognormal or normal) or the maximum UCL value when inconclusive.

Table K-3.5
Medium-Specific Exposure Point Concentration Summary
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage Features

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Dibenz(a,h)anthracene	ug/l	5.1	6.1	3	J	ug/l	3	Max	W - Test (4,1)	3	Max	W - Test (4,5)
Indeno(1,2,3-cd)pyrene	ug/l	5.0	6.8	2	J	ug/l	2	Max	W - Test (4,1)	2	Max	W - Test (4,5)
Aluminum	ug/l	7808	1300099	50000	-	ug/l	50000	Max	W - Test (2,1)	1002	Mean-T	W - Test (2)
Arsenic	ug/l	7.0	54.6	26.6	-	ug/l	26.6	Max	W - Test (2,1)	3.8	Mean-T	W - Test (2)
Iron	ug/l	16439	2870062	93100	-	ug/l	93100	Max	W - Test (2,1)	3262	Mean-T	W - Test (2)
Lead	ug/l	114	32354	822	-	ug/l	822	Max	W - Test (2,1)	12	Mean-T	W - Test (2)
Manganese	ug/l	960	7195	2310	-	ug/l	2310	Max	W - Test (4,1)	960	Mean-N	W - Test (4)

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). J = Estimated Value

(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(2) Shapiro-Wilk W Test indicates data are lognormally distributed.

(3) Shapiro-Wilk W Test indicates data are normally distributed.

(4) Shapiro-Wilk W Test inconclusive. Higher of UCL for normally and lognormally distributed data used for the RME EPC. Higher of mean value for normally and lognormally distributed data used for CT EPC.

(5) Mean exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

Note: The arithmetic mean is calculated using one-half the sample quantitation limit for non-detects and is normally distributed. When calculated in this way, it is possible for the mean to exceed the maximum detected value. In such cases, the maximum detected value is used as the EPC value. The 95% UCL of Data is based on the conclusive distribution (lognormal or normal) or the maximum UCL value when inconclusive.

Table K-3.6
Medium-Specific Exposure Point Concentration Summary
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 4

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Aroclor-1260	ug/kg	276	687	6300	-	ug/kg	687	95% UCL-N	W - Test (4)	276	Mean-N	W - Test (4)
Dieldrin	ug/kg	7.1	12	72	J	ug/kg	12	95% UCL-N	W - Test (4)	7.1	Mean-N	W - Test (4)
Benzo(a)Anthracene	ug/kg	1343	2106	3000	J	ug/kg	2106	95% UCL-T	W - Test (2)	351	Mean-T	W - Test (2)
Benzo(a)Pyrene	ug/kg	1271	2579	2300	J	ug/kg	2300	Max	W - Test (4,1)	1271	Mean-N	W - Test (4)
Benzo(b)Fluoranthene	ug/kg	1629	2571	3000	J	ug/kg	2571	95% UCL-T	W - Test (2)	652	Mean-T	W - Test (2)
Dibenz(a,h)Anthracene	ug/kg	1278	2579	320	J	ug/kg	320	Max	W - Test (4,1)	320	Max	W - Test (5)
Indeno(1,2,3-cd)Pyrene	ug/kg	1254	1802	1100	J	ug/kg	1100	Max	W - Test (2,1)	330	Mean-T	W - Test (2)
Aluminum	mg/kg	9686	12013	18100	-	mg/kg	12013	95% UCL-N	W - Test (4)	9686	Mean-N	W - Test (4)
Antimony	mg/kg	4.3	8.4	53.5	-	mg/kg	8.4	95% UCL-N	W - Test (4)	4.3	Mean-N	W - Test (4)
Arsenic	mg/kg	19	34	236	-	mg/kg	34	95% UCL-N	W - Test (4)	19	Mean-N	W - Test (4)
Barium	mg/kg	129	174	991	-	mg/kg	174	95% UCL-T	W - Test (2)	79	Mean-T	W - Test (2)
Cadmium	mg/kg	0.7	1.4	9.7	-	mg/kg	1.4	95% UCL-N	W - Test (4)	0.7	Mean-N	W - Test (4)
Chromium	mg/kg	54	97	680	-	mg/kg	97	95% UCL-N	W - Test (4)	54	Mean-N	W - Test (4)
Copper	mg/kg	154	294	874	-	mg/kg	294	95% UCL-T	W - Test (2)	81	Mean-T	W - Test (2)
Iron	mg/kg	24014	32512	65100	-	mg/kg	32512	95% UCL-T	W - Test (4)	24014	Mean-N	W - Test (4)
Lead	mg/kg	183	276	1110	-	mg/kg	276	95% UCL-T	W - Test (2)	120	Mean-T	W - Test (2)
Manganese	mg/kg	186	243	883	-	mg/kg	243	95% UCL-N	W - Test (4)	186	Mean-N	W - Test (4)
Nickel	mg/kg	47	83	546	-	mg/kg	83	95% UCL-N	W - Test (4)	47	Mean-N	W - Test (4)
Thallium	mg/kg	0.8	1.1	3.4	-	mg/kg	1.1	95% UCL-N	W - Test (4)	0.8	Mean-N	W - Test (4)
Vanadium	mg/kg	55	77	354	-	mg/kg	77	95% UCL-N	W - Test (4)	55	Mean-N	W - Test (4)
Zinc	mg/kg	437	707	3880	-	mg/kg	707	95% UCL-T	W - Test (2)	200	Mean-T	W - Test (2)

*Surface soil and subsurface soil combined.

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). J = Estimated Value

(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(2) Shapiro-Wilk W Test indicates data are lognormally distributed.

(3) Shapiro-Wilk W Test indicates data are normally distributed.

(4) Shapiro-Wilk W Test inconclusive. Higher of UCL for normally and lognormally distributed data used for the RME EPC. Higher of mean value for normally and lognormally distributed data used for CT EPC.

(5) Mean exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

Note: The arithmetic mean is calculated using one-half the sample quantitation limit for non-detects and is normally distributed. When calculated in this way, it is possible for the mean to exceed the maximum detected value. In such cases, the maximum detected value is used as the EPC value. The 95% UCL of Data is based on the conclusive distribution (lognormal or normal) or the maximum UCL value when inconclusive.

Table K-3.7
Medium-Specific Exposure Point Concentration Summary
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 4

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Aroclor-1260	ug/kg	276	687	6300	-	ug/kg	687	95% UCL-N	W - Test (4)	276	Mean-N	W - Test (4)
Benzo(a)Pyrene	ug/kg	1271	2579	2300	J	ug/kg	2300	Max	W - Test (4,1)	1271	Mean-N	W - Test (4)
Arsenic	mg/kg	19	34	236	-	mg/kg	34	95% UCL-N	W - Test (4)	19	Mean-N	W - Test (4)
Chromium	mg/kg	54	97	680	-	mg/kg	97	95% UCL-N	W - Test (4)	54	Mean-N	W - Test (4)
Iron	mg/kg	24014	32512	65100	-	mg/kg	32512	95% UCL-T	W - Test (4)	24014	Mean-N	W - Test (4)
Lead	mg/kg	183	276	1110	-	mg/kg	276	95% UCL-T	W - Test (2)	120	Mean-T	W - Test (2)

*Surface soil and subsurface soil combined.

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).

J = Estimated Value

(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(2) Shapiro-Wilk W Test indicates data are lognormally distributed.

(3) Shapiro-Wilk W Test indicates data are normally distributed.

(4) Shapiro-Wilk W Test inconclusive. Higher of UCL for normally and lognormally distributed data used for the RME EPC. Higher of mean value for normally and lognormally distributed data used for CT EPC.

Note: The arithmetic mean is calculated using one-half the sample quantitation limit for non-detects and is normally distributed. When calculated in this way, it is possible for the mean to exceed the maximum detected value. In such cases, the maximum detected value is used as the EPC value. The 95% UCL of Data is based on the conclusive distribution (lognormal or normal) or the maximum UCL value when inconclusive.

Table K-3.8
Medium-Specific Exposure Point Concentration Summary
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Air
Exposure Point: Emissions from Soil at Site 4

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Arocior-1260	ug/kg	276	687	6300	-	ug/kg	687	95% UCL-N	W - Test (4)	276	Mean-N	W - Test (4)
Benzo(a)Pyrene	ug/kg	1271	2579	2300	J	ug/kg	2300	Max	W - Test (4,1)	1271	Mean-N	W - Test (4)
Arsenic	mg/kg	19	34	236	-	mg/kg	34	95% UCL-N	W - Test (4)	19	Mean-N	W - Test (4)
Chromium	mg/kg	54	97	680	-	mg/kg	97	95% UCL-N	W - Test (4)	54	Mean-N	W - Test (4)
Iron	mg/kg	24014	32512	65100	-	mg/kg	32512	95% UCL-T	W - Test (4)	24014	Mean-N	W - Test (4)
Lead	mg/kg	183	276	1110	-	mg/kg	276	95% UCL-T	W - Test (2)	120	Mean-T	W - Test (2)

*Surface soil and subsurface soil combined.

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). J = Estimated Value

(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(2) Shapiro-Wilk W Test indicates data are lognormally distributed.

(3) Shapiro-Wilk W Test indicates data are normally distributed.

(4) Shapiro-Wilk W Test inconclusive. Higher of UCL for normally and lognormally distributed data used for the RME EPC. Higher of mean value for normally and lognormally distributed data used for CT EPC.

Note: The arithmetic mean is calculated using one-half the sample quantitation limit for non-detects and is normally distributed. When calculated in this way, it is possible for the mean to exceed the maximum detected value. In such cases, the maximum detected value is used as the EPC value. The 95% UCL of Data is based on the conclusive distribution (lognormal or normal) or the maximum UCL value when inconclusive.

Table K-3.9
Medium-Specific Exposure Point Concentration Summary
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage Features

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Dibenz(a,h)anthracene	ug/l	5.1	6.1	3	J	ug/l	3	Max	W - Test (4,1)	3.0	Max	W - Test (4,5)
Indeno(1,2,3-cd)pyrene	ug/l	5.0	6.8	2	J	ug/l	2	Max	W - Test (4,1)	2.0	Max	W - Test (4,5)
Aluminum	ug/l	7808	1300099	50000	-	ug/l	50000	Max	W - Test (2,1)	1002	Mean-T	W - Test (2)
Arsenic	ug/l	7.0	54.6	26.6	-	ug/l	26.6	Max	W - Test (2,1)	3.8	Mean-T	W - Test (2)
Iron	ug/l	16439	2870062	93100	-	ug/l	93100	Max	W - Test (2,1)	3262	Mean-T	W - Test (2)
Lead	ug/l	114	32354	822	-	ug/l	822	Max	W - Test (2,1)	12	Mean-T	W - Test (2)
Manganese	ug/l	960	7195	2310	-	ug/l	2310	Max	W - Test (4,1)	960	Mean-N	W - Test (4)

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). J = Estimated Value

(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(2) Shapiro-Wilk W Test indicates data are lognormally distributed.

(3) Shapiro-Wilk W Test indicates data are normally distributed.

(4) Shapiro-Wilk W Test inconclusive. Higher of UCL for normally and lognormally distributed data used for the RME EPC. Higher of mean value for normally and lognormally distributed data used for CT EPC.

(5) Mean exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

Note: The arithmetic mean is calculated using one-half the sample quantitation limit for non-detects and is normally distributed. When calculated in this way, it is possible for the mean to exceed the maximum detected value. In such cases, the maximum detected value is used as the EPC value. The 95% UCL of Data is based on the conclusive distribution (lognormal or normal) or the maximum UCL value when inconclusive.

Table K-3.10
Medium-Specific Exposure Point Concentration Summary
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage Features

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Benzo(a)Pyrene	ug/kg	407	888	1200	-	ug/kg	888	95% UCL-T	W - Test (2)	321	Mean-T	W - Test (2)
Arsenic	mg/kg	15	28	33.1	-	mg/kg	28	95% UCL-T	W - Test (4)	15	Mean-N	W - Test (4)
Iron	mg/kg	30388	53013	56000	-	mg/kg	53013	95% UCL-T	W - Test (4)	30388	Mean-N	W - Test (4)
Lead	mg/kg	182	515	441	-	mg/kg	441	Max	W - Test (2,1)	132	Mean-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). J = Estimated Value

(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(2) Shapiro-Wilk W Test indicates data are lognormally distributed.

(3) Shapiro-Wilk W Test indicates data are normally distributed.

(4) Shapiro-Wilk W Test inconclusive. Higher of UCL for normally and lognormally distributed data used for the RME EPC. Higher of mean value for normally and lognormally distributed data used for CT EPC.

Note: The arithmetic mean is calculated using one-half the sample quantitation limit for non-detects and is normally distributed. When calculated in this way, it is possible for the mean to exceed the maximum detected value. In such cases, the maximum detected value is used as the EPC value. The 95% UCL of Data is based on the conclusive distribution (lognormal or normal) or the maximum UCL value when inconclusive.

Table K-3.11
Medium-Specific Exposure Point Concentration Summary
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Shallow Groundwater
Exposure Point: Water Table

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Bis(2-Ethylhexyl)Phthalate	ug/L	4.3	13.7	13.0	-	ug/L	13.0	Max	W - Test (4,1)	4.3	Mean-N	W - Test (4)
Aluminum	ug/L	3111	64686	28000	J	ug/L	28000	Max	W - Test (2,1)	433	Mean-T	W - Test (2)
Antimony	ug/L	1.4	1.9	3.2	J	ug/L	1.9	95% UCL-T	W - Test (2)	1.3	Mean-T	W - Test (2)
Arsenic	ug/L	4.8	11	14	-	ug/L	11	95% UCL-T	W - Test (4)	4.8	Mean-N	W - Test (4)
Barium	ug/L	200	2186	647	-	ug/L	647	Max	W - Test (1)	81	Mean-T	W - Test (2)
Cadmium	ug/L	1.2	4.2	6.1	K	ug/L	4.2	95% UCL-T	W - Test (4)	1.2	Mean-N	W - Test (4)
Chromium	ug/L	11	37	48	-	ug/L	37	95% UCL-T	W - Test (4)	11.0	Mean-N	W - Test (4)
Cobalt	ug/L	12	142	89	-	ug/L	89	Max	W - Test (2,1)	3.4	Mean-T	W - Test (2)
Iron	ug/L	24900	460742	90900	-	ug/L	90900	Max	W - Test (2,1)	9321	Mean-T	W - Test (2)
Lead	ug/L	6.5	30	31	-	ug/L	30	95% UCL-T	W - Test (2)	2.5	Mean-T	W - Test (2)
Manganese	ug/L	1236	9730	3590	-	ug/L	3590	Max	W - Test (2,1)	602	Mean-T	W - Test (2)
Nickel	ug/L	17	52	110	-	ug/L	52	95% UCL-T	W - Test (4)	17	Mean-N	W - Test (4)
Silver	ug/L	34	140	400	-	ug/L	140	95% UCL-T	W - Test (4)	34	Mean-N	W - Test (4)
Thallium	ug/L	1.3	1.7	3.1	J	ug/L	1.7	95% UCL-T	W - Test (2)	1.2	Mean-T	W - Test (2)
Vanadium	ug/L	8.8	54	56	-	ug/L	54	95% UCL-T	W - Test (2)	3.7	Mean-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).

J = Estimated Value
K = Estimated Value - Biased High

(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(2) Shapiro-Wilk W Test indicates data are lognormally distributed.

(3) Shapiro-Wilk W Test indicates data are normally distributed.

(4) Shapiro-Wilk W Test inconclusive. Higher of UCL for normally and lognormally distributed data used for the RME EPC. Higher of mean value for normally and lognormally distributed data used for CT EPC.

Note: The arithmetic mean is calculated using one-half the sample quantitation limit for non-detects and is normally distributed. When calculated in this way, it is possible for the mean to exceed the maximum detected value. In such cases, the maximum detected value is used as the EPC value. The 95% UCL of Data is based on the conclusive distribution (lognormal or normal) or the maximum UCL value when inconclusive.

Table K-4.1
Values Used for Daily Intake Calculations
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: At Site 4
Receptor Population: Trespasser
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	See Table 3.1	--	See Table 3.1	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR-S	Ingestion Rate of Soil	mg/day	100	EPA, 1991	50	EPA, 1997	CS x IR x EF x ED x CF1 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	
	ED	Exposure Duration	years	30	EPA, 1991	15 [1]	Professional judgment	
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	10,950	EPA, 1989	5,475	EPA, 1989	
Dermal	CS	Chemical Concentration in Soil	mg/kg	See Table 3.1	--	See Table 3.1	--	CDI (mg/kg-day)=
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	CS x CF1 x SA x AF x AB x EF x ED x 1/BW x 1/AT
	SA	Skin Surface Area Available for Contact	cm^2	5,000	EPA, 1997	1,000	EPA, 1997	
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.19	EPA, 1997	0.19	EPA, 1997	
	AB	Absorption Factor	unitless	Chemical Specific	EPA, 1995	Chemical Specific	EPA, 1995	
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	
	ED	Exposure Duration	years	30	EPA, 1991	15 [1]	Professional judgment	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	10,950	EPA, 1989	5,475	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,

EPA, 1995: Assessing Dermal Exposure from Soil, Technical Guidance Manual, Region III, EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The RME skin surface area is obtained from Table 6-14, central tendency surface area for outdoor soil contact (assumes 25% of total surface area).

The CT surface area assumes exposure to hands and feet and is obtained by averaging both male and female hands and feet mean values found on Table 6-4.

CT soil ingestion rate found on Table 4-23. Soil to Skin Adherence Factor calculated from Table 6-12 by averaging hand values for gardeners no. 1 an 2. (No trespasser activity on Table 6-12).

TBD = To Be Determined

NA = Not Available

Note:

1. For RME values, assumes trespassing one hour per day, one day per week for 52 weeks per year. For CT values, assumes one-half of RME values.

Table K-4.2
Values Used for Daily Intake Calculations
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: At Site 4
Receptor Population: Trespasser
Receptor Age: Adolescent

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	See Table 3.1	--	See Table 3.1	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR-S	Ingestion Rate of Soil	mg/day	100	EPA, 1991	50	EPA, 1997	CS x IR x EF x ED x CF1 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	52 [1]	Professional judgement	26 [1]	Professional judgement	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	
	BW	Body Weight	kg	56	EPA, 1997	56	EPA, 1997	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	2,190	EPA, 1989	2,190	EPA, 1989	
Dermal	CS	Chemical Concentration in Soil	mg/kg	See Table 3.1	--	See Table 3.1	--	CDI (mg/kg-day)=
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	CS x CF1 x SA x AF x AB x EF x ED x 1/BW x 1/AT
	SA	Skin Surface Area Available for Contact	cm^2	4,000	EPA, 1997	2,000	EPA, 1997	
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.11	EPA, 1997	0.11	EPA, 1997	
	AB	Absorption Factor	unitless	Chemical Specific	EPA, 1995	Chemical Specific	EPA, 1995	
	EF	Exposure Frequency	days/year	52 [1]	Professional judgement	26 [1]	Professional judgement	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	
	BW	Body Weight	kg	56	EPA, 1997	56	EPA, 1997	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	2,190	EPA, 1989	2,190	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,

EPA, 1993: Superfund Standard Default Exposure Factors for Central Tendency and Reasonable Maximum Exposures.

EPA, 1995: Assessing Dermal Exposure from Soil, Technical Guidance manual, Region III, EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The skin surface area presented in this table includes hands, forearms, lower legs, and feet (assumes 25% of total surface area) and is obtained by averaging the 50 percentile total body surface area of male and female children ages 12 through 17 and dividing by 4.

The CT skin surface area is for hands and feet and is calculated by averaging the mean percentage of total surface body area for hands and feet (approximately 13%) for children ages 12 through 17 found on Table 6-8, then multiplying by total surface body area (16,000 cm^2).

Mean body weight for adolescent derived by averaging the mean (12 to 17 years) boy and girl values (see Table 7-3).

Soil to Skin Adherence Factor obtained from Table 6-12 for the Soccer No. 1 activity (most conservative) for hands.

TBD = To Be Determined

NA = Not Available

Note:

1. For RME values, assumes trespassing one hour per day, one day per week for 52 weeks per year. For CT values, assumes one-half of RME values.

Table K-4.3
Values Used for Daily Intake Calculations
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from Surface Soil at Site 4
Receptor Population: Trespasser
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Inhalation	CS	Chemical Concentration in Soil	mg/kg	See Table 3.2	--	See Table 3.2	--	Chronic Daily Intake (CDI) (mg/kg-day) =
	CA	Chemical Concentration in Air	mg/m^3	Calculated	--	Calculated	--	CA x IR x ET x EF x ED x 1/BW x 1/AT
	IR	Inhalation Rate	m^3/hour	1.6	EPA, 1997	1	EPA, 1997	
	PEF	Particulate Emissions Factor	m^3/kg	1.32E+09	--	1.32E+09	--	CA (mg/m^3) = CS (1/PEF + 1/VF)
	VF	Volatilization Factor for Volatile Constituents	m^3/kg	Calculated [2]	--	Calculated [2]	--	
	ET	Exposure Time	hr/day	1 [1]	Professional judgment	0.5 [1]	Professional judgment	
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	
	ED	Exposure Duration	years	30	EPA, 1991	15 [1]	Professional judgment	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	10,950	EPA, 1989	5,475	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

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

Inhalation rates are based on adult values assuming moderate activity for the RME and light activity for the CT (Table 5-23 of EPA, 1997).

TBD = To Be Determined

Notes:

1. For RME values, assumes trespassing one hour per day, one day per week for 52 weeks per year. For CT values, assumes one-half of RME values.
2. See RAGS Part D Standard Tables 7 and 8 for calculation.

Table K-4.4
Values Used for Daily Intake Calculations
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from Surface Soil at Site 4
Receptor Population: Trespasser
Receptor Age: Adolescent

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Inhalation	CS	Chemical Concentration in Soil	mg/kg	See Table 3.2	--	See Table 3.2	--	Chronic Daily Intake (CDI) (mg/kg-day) =
	CA	Chemical Concentration in Air	mg/m^3	Calculated	--	Calculated	--	CA x IR x ET x EF x ED x 1/BW x 1/AT
	IR	Inhalation Rate	m^3/hour	1.4	EPA, 1997	1	EPA, 1997	
	PEF	Particulate Emissions Factor	m^3/kg	1.32E+09	--	1.32E+09	--	CA (mg/m^3) = CS (1/PEF + 1/VF)
	VF	Volatilization Factor for Volatile Constituents	m^3/kg	Calculated [2]	--	Calculated [2]	--	
	ET	Exposure Time	hr/day	1 [1]	Professional judgment	0.5 [1]	Professional judgment	
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	
	BW	Body Weight	kg	56	EPA, 1991	56	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989	2,190	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

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

Inhalation rates are based on averaging the adult and child values assuming moderate activity for the RME and light activity for the CT (Table 5-23 of EPA, 1997).

Mean body weight for adolescent derived by averaging the mean (12 to 17 years) boy and girl values (see Table 7-3).

TBD = To Be Determined

Notes:

1. For RME values, assumes trespassing one hour per day, one day per week for 52 weeks per year. For CT values, assumes one-half of RME values.

2. See RAGS Part D Standard Tables 7 and 8 for calculation.

Table K-4.5
Values Used for Daily Intake Calculations
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Deep Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CW	Chemical Concentration in Water	mg/l	See Table 3.3	--	See Table 3.3	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR-W	Ingestion Rate of Water	l/day	2	EPA, 1991	1.4	EPA, 1989	CW x IR-W x EF x ED x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	8,760	EPA, 1989	3,285	EPA, 1989	
Dermal	CW	Chemical Concentration in Water	mg/l	See Table 3.3	--	See Table 3.3	--	CDI (mg/kg-day)=
	DAevent	Dermally Absorbed Dose per Event	mg/cm^2-day	Calculated	EPA, 1992	Calculated	EPA, 1992	DAevent x SA x EF x ED x 1/BW x 1/AT
	PC	Permeability Constant	cm/hr	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	t	Lag Time	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	Inorganics: DAevent (mg/cm2-day) =
	t*	Time to Reach Steady-state	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	PC x CW x ET x CF1
	B	Ratio of Permeability of Stratum Corneum to Epidermis	dimensionless	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	ET	Exposure Time	hours	0.25	EPA, 1997	0.17 [1]	Professional judgment	Organics :
	CF1	Conversion Factor 1	l/cm^3	0.001	--	0.001	--	ET<t*: DAevent (mg/cm2-day) =
	SA	Skin Surface Area	cm^2	20,000	EPA, 1997	17,000	EPA, 1997	2 x PC x CW x (sqrt((6 x t x ET)/3.1415)) x CF1
	EF	Exposure Frequency	events/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	ET>t*: DAevent (mg/cm2-day) =
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x CF1
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	8,760	EPA, 1989	3,285	EPA, 1989	

Sources:
EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.
EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,
EPA, 1992: Dermal Exposure Assessment: Principles and Applications. EPA/600/8-91/011B. The CT skin surface area is the lower range value.
EPA, 1993: Superfund Standard Default Exposure Factors for Central Tendency and Reasonable Maximum Exposures.
EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The RME skin surface area is obtained from Table 6-14.
TBD = To Be Determined

Table K-4.6
Values Used for Daily Intake Calculations
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Deep Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CW	Chemical Concentration in Water	mg/l	See Table 3.3	--	See Table 3.3	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR-W	Ingestion Rate of Water	l/day	1	EPA, 1989b	0.87	EPA, 1997	CW x IR-W x EF x ED x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1993	
	BW	Body Weight	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989a	25,550	EPA, 1989a	
	AT-N	Averaging Time - Non-Cancer	days	2,190	EPA, 1989a	2,190	EPA, 1989a	
Dermal	CW	Chemical Concentration in Water	mg/l	See Table 3.3	--	See Table 3.3	--	CDI (mg/kg-day)=
	DAevent	Dermally Absorbed Dose per Event	mg/cm^2-day	Calculated	EPA, 1992	Calculated	EPA, 1992	DAevent x SA x EF x ED x 1/BW x 1/AT
	PC	Permeability Constant	cm/hr	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	t	Lag Time	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	Inorganics: DAevent (mg/cm2-day) =
	t*	Time to Reach Steady-state	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	PC x CW x ET x CF1
	B	Ratio of Permeability of Stratum Corneum to Epidermis	dimensionless	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	ET	Exposure Time	hours	0.33	EPA, 1997	0.25 [1]	Professional judgment	Organics :
	CF1	Conversion Factor 1	l/cm^3	0.001	--	0.001	--	ET<t*: DAevent (mg/cm2-day) =
	SA	Skin Surface Area	cm^2	7,200	EPA, 1997	7,200	EPA, 1997	2 x PC x CW x (sqrt((6 x t x ET)/3.1415)) x CF1
	EF	Exposure Frequency	events/year	350	EPA, 1991	234	EPA, 1991	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	ET>t*: DAevent (mg/cm2-day) =
	BW	Body Weight	kg	15	EPA, 1991	15	EPA, 1991	PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x CF1
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989a	25,550	EPA, 1989a	
	AT-N	Averaging Time - Non-Cancer	days	2,190	EPA, 1989a	2,190	EPA, 1989a	

Sources:
EPA, 1989a: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.
EPA, 1989b: Exposure Factors Handbook, July 1989, EPA/600/8-89/043.
EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,
EPA, 1992: Dermal Exposure Assessment: Principles and Applications. EPA/600/8-91/011B.
EPA, 1993: Superfund Standard Default Exposure Factors for Central Tendency and Reasonable Maximum Exposure
EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. CT ingestion rate value is obtained from Table 3-30 for 3-5 year child mean value. The skin surface area presented in this table was derived by averaging the mean child (2 to 7 years) values from Tables 6-6 and 6-7.
TBD = To Be Determined

Table K-4.7
Values Used for Daily Intake Calculations
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Deep Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CW	Chemical Concentration in Water	mg/l	See Table 3.3	--	See Table 3.3	--	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-W-A	Ingestion Rate of Water, Adult	liters/day	2	EPA, 1991	1.4	EPA, 1989	CW x IR-W-Adj x EF x 1/AT
	IR-W-C	Ingestion Rate of Water, Child	liters/day	1	EPA, 1989b	0.87	EPA, 1997	
	IR-W-Adj	Ingestion Rate of Water, Age-adjusted	liter-year/kg-day	1.09	calculated	0.58	calculated	IR-W-Adj (liter-year/kg-day) =
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	(ED-C x IR-W-C / BW-C) + (ED-A x IR-W-A / BW-A)
	ED-A	Exposure Duration, Adult	years	24	EPA, 1991	9	EPA, 1993	
	ED-C	Exposure Duration, Child	years	6	EPA, 1991	6	EPA, 1991	
	BW-A	Body Weight , Adult	kg	70	EPA, 1991	70	EPA, 1991	
	BW-C	Body Weight, Child	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
Dermal Absorption	CW	Chemical Concentration in Water	mg/l	See Table 3.3	--	See Table 3.3	--	CDI (mg/kg-day) = DA-Adj x EF x 1/AT
	DAevent-A	Dermally Absorbed Dose per Event, Adult	mg/cm^2-event	Calculated	EPA, 1992	Calculated	EPA, 1992	
	DAevent-C	Dermally Absorbed Dose per Event, Child	mg/cm^2-event	Calculated	EPA, 1992	Calculated	EPA, 1992	DA-Adj = (Daevent-A x SA-A x ED-A x 1/BW-A)
	DA-Adj	Dermally Absorbed Dose, Age-adjusted	mg-year/event-kg	Calculated		Calculated		+ (Daevent-C x SA-C x ED-C x 1/BW-C)
	PC	Permeability Constant	cm/hr	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	t	Lag Time	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	Inorganics:
	t*	Time to Reach Steady-state	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	DAevent-A (mg/cm2-event) = PC x CW x ET-A x CF1
	B	Ratio of Permeability of Stratum Corneum to Epidermis	dimensionless	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	DAevent-C (mg/cm2-event) = PC x CW x ET-C x CF1
	ET-A	Exposure Time, Adult	hr/day	0.25	EPA, 1997	0.17 [1]	Professional judgment	
	ET-C	Exposure Time, Child	hr/day	0.33	EPA, 1997	0.25 [1]	Professional judgment	Organics, ET<t*:
	CF1	Conversion Factor 1	l/cm^3	0.001	--	0.001	--	DAevent-A (mg/cm2-event) =
	SA-A	Skin Surface Area, Adult	cm^2	20,000	EPA, 1997	17,000	EPA, 1997	2 x PC x CW x (sqrt((6 x t x ET-A)/3.1415)) x CF1
	SA-C	Skin Surface Area, Child	cm^2	7,200	EPA, 1997	7,200	EPA, 1997	DAevent-C (mg/cm2-event) =
	EF	Exposure Frequency	events/year	350	EPA, 1991	234	EPA, 1993	2 x PC x CW x (sqrt((6 x t x ET-C)/3.1415)) x CF1
	ED-A	Exposure Duration, Adult	years	24	EPA, 1991	9	EPA, 1993	
	ED-C	Exposure Duration, Child	years	6	EPA, 1991	6	EPA, 1991	Organics, ET>t*:
	BW-A	Body Weight , Adult	kg	70	EPA, 1991	70	EPA, 1991	Daevent-A (mg/cm2-event) =
	BW-C	Body Weight, Child	kg	15	EPA, 1991	15	EPA, 1991	PC x CW x (ET-A/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x CF1
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	Daevent-C (mg/cm2-event) =
								PC x CW x (ET-C/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x CF1

Sources:
EPA, 1989a: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.
EPA, 1989b: Exposure Factors Handbook, July 1989, EPA/600/8-89/043.
EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.
EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.
EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.
EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa.

Notes:
1. CT value for adult assumes showering for 10 minutes .CT value for child assumes an exposure time of 15 minutes while bathing.

Table K-4.8
Values Used for Daily Intake Calculations
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Deep Groundwater - Water Vapor at Showerhead
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Inhalation	InhExp	Inhalation Exposure per Shower	mg/kg-shower	Calculated	--	Calculated	--	Foster & Chrostowski Shower Inhalation Model will be used to calculate InhExp
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	Chronic Daily Intake (CDI) (mg/kg-day) =
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	InhExp x EF x ED x 1/AT
	AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA. 1989	3,285	EPA. 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

Table K-4.9
Values Used for Daily Intake Calculations
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage Features
Receptor Population: Trespasser
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Dermal	CW	Chemical Concentration in Water	mg/l	See Table 3.5	--	See Table 3.5	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	DAevent	Dermally Absorbed Dose per Event	mg/cm^2-day	Calculated	EPA, 1992	Calculated	EPA, 1992	DAevent x SA x EF x ED x 1/BW x 1/AT
	PC	Permeability Constant	cm/hr	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	t	Lag Time	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	Inorganics: DAevent (mg/cm2-day) =
	t*	Time to Reach Steady-state	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	PC x CW x ET x CF1
	B	Ratio of Permeability of Stratum Corneum to Epidermis	dimensionless	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	ET	Exposure Time	hours	1 [1]	Professional judgment	0.5 [1]	Professional judgment	Organics :
	CF1	Conversion Factor 1	l/cm^3	0.001	--	0.001	--	ET<t*: DAevent (mg/cm2-day) =
	SA	Skin Surface Area	cm^2	5,000	EPA, 1997	1,000	EPA, 1997	2 x PC x CW x (sqrt((6 x t x ET)/3.1415)) x CF1
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	
	ED	Exposure Duration	years	30	EPA, 1991	15 [1]	Professional judgment	ET>t*: DAevent (mg/cm2-day) =
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x CF1
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	10,950	EPA, 1989	5,475	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,

EPA, 1992: Dermal Exposure Assessment: Principles and Applications. EPA/600/8-91/011B.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The RME skin surface area assumes 25% of total surface area of 20,000.

The CT surface area assumes exposure to hands and feet and is obtained by averaging both male and female hands and feet mean values found on Table 6-4.

TBD = To Be Determined

Table K-4.10
Values Used for Daily Intake Calculations
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage Features
Receptor Population: Trespasser
Receptor Age: Adolescent

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Dermal	CW	Chemical Concentration in Water	mg/l	See Table 3.5	--	See Table 3.5	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	DAevent	Dermally Absorbed Dose per Event	mg/cm^2-day	Calculated	EPA, 1992	Calculated	EPA, 1992	DAevent x SA x EF x ED x 1/BW x 1/AT
	PC	Permeability Constant	cm/hr	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	t	Lag Time	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	Inorganics: DAevent (mg/cm2-day) =
	t*	Time to Reach Steady-state	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	PC x CW x ET x CF1
	B	Ratio of Permeability of Stratum Corneum to Epidermis	dimensionless	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	ET	Exposure Time	hours	1 [1]	Professional judgment	0.5 [1]	Professional judgment	Organics :
	CF1	Conversion Factor 1	l/cm^3	0.001	- -	0.001	- -	ET<t*: DAevent (mg/cm2-day) =
	SA	Skin Surface Area	cm^2	4,000	EPA, 1997	2,000	EPA, 1997	2 x PC x CW x (sqrt((6 x t x ET)/3.1415)) x CF1
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	ET>t*: DAevent (mg/cm2-day) =
	BW	Body Weight	kg	56	EPA, 1997	56	EPA, 1997	PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x CF1
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	2,190	EPA, 1989	2,190	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,

EPA, 1992: Dermal Exposure Assessment: Principles and Applications. EPA/600/8-91/011B.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The RME skin surface area assumes 25% of total surface area of 20,000.

The CT surface area assumes exposure to hands and feet and is obtained by averaging both male and female hands and feet mean values found on Table 6-4.

TBD = To Be Determined

Notes:

1. For RME values, assumes trespassing one hour per day, one day per week for 52 weeks per year. For CT values, assumes one-half of RME values.

Table K-4.11
Values Used for Daily Intake Calculations
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage Features
Receptor Population: Trespasser
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Sediment	mg/kg	See Table 3.6	--	See Table 3.6	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR-S	Ingestion Rate of Sediment	mg/day	100	EPA, 1991	50	EPA, 1997	CS x IR x EF x ED x CF1 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	
	ED	Exposure Duration	years	30	EPA, 1991	15 [1]	Professional judgment	
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	10,950	EPA, 1989	5,475	EPA, 1989	
Dermal	CS	Chemical Concentration in Sediment	mg/kg	See Table 3.6	--	See Table 3.6	--	CDI (mg/kg-day)=
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	CS x CF1 x SA x AF x AB x EF x ED x 1/BW x 1/AT
	SA	Skin Surface Area Available for Contact	cm^2	5,000	EPA, 1997	1,000	EPA, 1997	
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.19	EPA, 1997	0.19	EPA, 1997	
	AB	Absorption Factor	unitless	Chemical Specific	EPA, 1995	Chemical Specific	EPA, 1995	
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	
	ED	Exposure Duration	years	30	EPA, 1991	15 [1]	Professional judgment	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	10,950	EPA, 1989	5,475	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,

EPA, 1995: Assessing Dermal Exposure from Soil, Technical Guidance Manual, Region III, EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The RME skin surface area assumes 25% of total surface area of 20,000.

The CT surface area assumes exposure to hands and feet and is obtained by averaging both male and female hands and feet mean values found on Table 6-4.

CT soil ingestion rate found on Table 4-23. Soil to Skin Adherence Factor calculated from Table 6-12 by averaging hand values for gardeners no. 1 an 2. (No trespasser activity on Table 6-12).

TBD = To Be Determined

NA = Not Available

Note:

1. For RME values, assumes trespassing one hour per day, one day per week for 52 weeks per year. For CT values, assumes one-half of RME values.

Table K-4.12
Values Used for Daily Intake Calculations
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage Features
Receptor Population: Trespasser
Receptor Age: Adolescent

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Sediment	mg/kg	See Table 3.6	--	See Table 3.6	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR-S	Ingestion Rate of Sediment	mg/day	100	EPA, 1991	50	EPA, 1997	CS x IR x EF x ED x CF1 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	52 [1]	Professional judgement	26 [1]	Professional judgement	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	
	BW	Body Weight	kg	56	EPA, 1997	56	EPA, 1997	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	2,190	EPA, 1989	2,190	EPA, 1989	
Dermal	CS	Chemical Concentration in Sediment	mg/kg	See Table 3.6	--	See Table 3.6	--	CDI (mg/kg-day)=
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	CS x CF1 x SA x AF x AB x EF x ED x 1/BW x 1/AT
	SA	Skin Surface Area Available for Contact	cm^2	4,000	EPA, 1997	2,000	EPA, 1997	
	AF	Soil to Skin Adherence Factor	mg/cm^2	6.7	EPA, 1997	6.7	EPA, 1997	
	AB	Absorption Factor	unitless	Chemical Specific	EPA, 1995	Chemical Specific	EPA, 1995	
	EF	Exposure Frequency	days/year	52 [1]	Professional judgement	26 [1]	Professional judgement	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	
	BW	Body Weight	kg	56	EPA, 1997	56	EPA, 1997	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	2,190	EPA, 1989	2,190	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,

EPA, 1993: Superfund Standard Default Exposure Factors for Central Tendency and Reasonable Maximum Exposures.

EPA, 1992: Dermal Exposure Assessment: Principles and Applications. EPA/600/8-91/011B.

EPA, 1995: Assessing Dermal Exposure from Soil, Technical Guidance manual, Region III, EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The skin surface area presented in this table includes hands, forearms, lower legs, and feet (assumes 25% of total surface area) and is obtained by averaging the 50 percentile total body surface area of male and female children ages 12 through 17 and dividing by 4.

The CT skin surface area is for hands and feet and is calculated by averaging the mean percentage of total surface body area for hands and feet (approximately 13%) for children ages 12 through 17 found on Table 6-8, then multiplying by total surface body area (16,000 cm^2).

Mean body weight for adolescent derived by averaging the mean (12 to 17 years) boy and girl values (see Table 7-3).

Soil to Skin Adherence Factor from Table 6-12 for Kids in Mud No. 2 using feet value which is conservative considering the surface water will wash some of the sediment off.

TBD = To Be Determined

NA = Not Available

Notes:

1. For RME values, assume trespassing one hour per day, one day per week for 52 weeks per year. For CT values, assume one-half of RME values.

Table K-4.13
Values Used for Daily Intake Calculations
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 4
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	See Table 3.7	--	See Table 3.7	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR-S	Ingestion Rate of Soil	mg/day	100	EPA, 1991	50	EPA, 1997	CS x IR x EF x ED x CF1 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	8,760	EPA, 1989	3,285	EPA, 1989	
Dermal	CS	Chemical Concentration in Soil	mg/kg	See Table 3.7	--	See Table 3.7	--	CDI (mg/kg-day)=
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	CS x CF1 x SA x AF x AB x EF x ED x 1/BW x 1/AT
	SA	Skin Surface Area Available for Contact	cm^2	5,000	EPA, 1997	1,000	EPA, 1997	
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.18	EPA, 1997	0.18	EPA, 1997	
	AB	Absorption Factor	unitless	Chemical Specific	EPA, 1995	Chemical Specific	EPA, 1995	
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1997	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	8,760	EPA, 1989	3,285	EPA, 1989	

*Surface and subsurface soil combined.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,

EPA, 1993: Superfund Standard Default Exposure Factors for Central Tendency and Reasonable Maximum Exposures.

EPA, 1995: Assessing Dermal Exposure from Soil, Technical Guidance manual, Region III, EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The RME skin surface area is obtained from Table 6-14, central tendency surface area for outdoor soil contact (assumes 25% of total surface area).

The CT surface area assumes exposure to hands and feet and is obtained by averaging both male and female hands and feet mean values found on Table 6-4.

CT soil ingestion rate found on Table 4-23. Soil to Skin Adherence Factor calculated from Table 6-12 by averaging hand values for gardeners no. 1 and 2.

TBD = To Be Determined

NA = Not Available

Table K-4.14
Values Used for Daily Intake Calculations
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 4
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	See Table 3.7	--	See Table 3.7	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR-S	Ingestion Rate of Soil	mg/day	200	EPA, 1991	100	EPA, 1997	CS x IR x EF x ED x CF1 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	
	BW	Body Weight	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	2,190	EPA, 1989	2,190	EPA, 1989	
Dermal	CS	Chemical Concentration in Soil	mg/kg	See Table 3.7	--	See Table 3.7	--	CDI (mg/kg-day)=
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	CS x CF1 x SA x AF x AB x EF x ED x 1/BW x 1/AT
	SA	Skin Surface Area Available for Contact	cm^2	3,600	EPA, 1997	864	EPA, 1997	
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.11	EPA, 1997	0.11	EPA, 1997	
	AB	Absorption Factor	unitless	Chemical Specific	EPA, 1995	Chemical Specific	EPA, 1995	
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	
	BW	Body Weight	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	2,190	EPA, 1989	2,190	EPA, 1989	

*Surface and subsurface soil combined.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,

EPA, 1993: Superfund Standard Default Exposure Factors for Central Tendency and Reasonable Maximum Exposures.

EPA, 1995: Assessing Dermal Exposure from Soil, Technical Guidance Manual, Region III, EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The RME skin surface area is for hands, arms, legs, and feet (assumes 50% of total surface area) and is obtained by averaging the 50% values of male and female childı from age 2 through 7 years found on Table 6-6 and 6-7 and dividing by 2. The CT skin surface area is for hands and feet and is calculated by averaging the mean percentage of total surface body area for hands and feet (approximately 12%).

Table K-4.14
Values Used for Daily Intake Calculations
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

children ages 1 through 7 found on Table 6-8, then multiplying by the total surface body area (7,200 cm^2).

CT soil ingestion rate found on Table 4-23. Soil to Skin Adherence Factor obtained from Table 6-12 for the Soccer No. 1 activity (most conservative) for hands.

TBD = To Be Determined

NA = Not Available

Table K-4.15
Values Used for Daily Intake Calculations
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 4
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	See Table 3.7	--	See Table 3.7	see Table 3	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S-A	Ingestion Rate of Soil, Adult	mg/day	100	EPA, 1991	50	EPA, 1997	CS x IR-S-Adj x EF x CF3 x 1/AT
	IR-S-C	Ingestion Rate of Soil, Child	mg/day	200	EPA, 1991	100	EPA, 1997	
	IR-S-Adj	Ingestion Rate of Soil, Age-adjusted	mg-year/kg-day	114.29	Calculated	46.43	Calculated	IR-S-Adj (mg-year/kg-day) =
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	(ED-C x IR-S-C / BW-C) + (ED-A x IR-S-A / BW-A)
	ED-A	Exposure Duration, Adult	years	24	EPA, 1991	9	EPA, 1993	
	ED-C	Exposure Duration, Child	years	6	EPA, 1991	6	EPA, 1991	
	CF3	Conversion Factor 3	kg/mg	0.000001	--	0.000001	--	
	BW-A	Body Weight , Adult	kg	70	EPA, 1991	70	EPA, 1991	
	BW-C	Body Weight, Child	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg	See Table 3.7	--	See Table 3.7	see Table 3	CDI (mg/kg-day) =
	SA-A	Skin Surface Area Available for Contact, Adult	cm^2	5,000	EPA, 1997	1,000	EPA, 1997	CS x DA-Adj x DABS x CF3 x EF x 1/AT
	SA-C	Skin Surface Area Available for Contact, Child	cm^2	3,600	EPA, 1997	864	EPA, 1997	
	SSAF-A	Soil to Skin Adherence Factor	mg/cm^2-day	0.19	EPA, 1997	0.19	EPA, 1997	DA-Adj (mg-year/kg-day) =
	SSAF-C	Soil to Skin Adherence Factor	mg/cm^2-day	0.11	EPA, 1997	0.11	EPA, 1997	[(ED-C x SA-C x SSAF-C / BW-C) +
	DA-Adj	Dermal Absorption, Age-adjusted	mg-year/kg-day	484	calculated	62.4	calculated	(ED-A x SA-A x SSAF-A / BW-A)]
	AB	Absorption Factor	unitless	Chemical Specific	EPA, 1995	Chemical Specific	EPA, 1995	
	CF3	Conversion Factor 3	kg/mg	0.000001	--	0.000001	--	
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED-A	Exposure Duration, Adult	years	24	EPA, 1991	9	EPA, 1993	
	ED-C	Exposure Duration, Child	years	6	EPA, 1991	6	EPA, 1991	
	BW-A	Body Weight , Adult	kg	70	EPA, 1991	70	EPA, 1991	
	BW-C	Body Weight, Child	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	

*Surface and subsurface soil combined.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa.

Table K-4.16
Values Used for Daily Intake Calculations
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 4
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	See Table 3.8	--	See Table 3.8	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR-S	Ingestion Rate of Soil	mg/day	480	EPA, 1993	240 [1]	Professional judgment	CS x IR x EF x ED x CF1 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	250	EPA, 1991	219	EPA, 1993	
	ED	Exposure Duration	years	0.5	VADEQ, 1997	0.25 [1]	Professional judgment	
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	183	EPA, 1989	91	EPA, 1989	
Dermal	CS	Chemical Concentration in Soil	mg/kg	See Table 3.8	--	See Table 3.8	--	CDI (mg/kg-day)=
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	CS x CF1 x SA x AF x AB x EF x ED x 1/BW x 1/AT
	SA	Skin Surface Area Available for Contact	cm^2	5,000	EPA, 1997	1,000	EPA, 1997	
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.24	EPA, 1997	0.24	EPA, 1997	
	AB	Absorption Factor	unitless	Chemical Specific	EPA, 1995	Chemical Specific	EPA, 1995	
	EF	Exposure Frequency	days/year	250	EPA, 1991	219	EPA, 1993	
	ED	Exposure Duration	years	0.5	VADEQ, 1997	0.25 [1]	Professional judgment	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	183	EPA, 1989	91	EPA, 1989	

*Surface and subsurface soil combined.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,

EPA, 1993: Superfund Standard Default Exposure Factors for Central Tendency and Reasonable Maximum Exposures.

EPA, 1995: Assessing Dermal Exposure from Soil, Technical Guidance manual, Region III, EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The RME skin surface area assumes 25% of total surface area of 20,000.

The CT surface area assumes exposure to hands and feet and is obtained by averaging both male and female hands and feet mean values found on Table 6-4.

The RME and CT Soil to Skin Adherence Factor is calculated from Table 6-12 for construction worker's hands.

VADEQ, 1997: Value provided by Pat McMurray, Virginia Department of Environmental Quality, during St. Juliens Creek risk assessment assumptions conference call on November 20, 1997.

TBD = To Be Determined

NA = Not Available

Note:

1. CT value assumes one-half the RME value.

Table K-4.17
Values Used for Daily Intake Calculations
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil *
Exposure Medium: Soil*
Exposure Point: At Site 4
Receptor Population: Other Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	See Table 3.8	--	See Table 3.8	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR-S	Ingestion Rate of Soil	mg/day	50	VADEQ, 1997	25 [1]	Professional judgment	CS x IR x EF x ED x CF1 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	250	EPA, 1991	219	EPA, 1993	
	ED	Exposure Duration	years	25	EPA, 1991	5	EPA, 1993	
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	9,125	EPA, 1989	1,825	EPA, 1989	
Dermal	CS	Chemical Concentration in Soil	mg/kg	See Table 3.8	--	See Table 3.8	--	CDI (mg/kg-day)=
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	CS x CF1 x SA x AF x AB x EF x ED x 1/BW x 1/AT
	SA	Skin Surface Area Available for Contact	cm^2	5,000	EPA, 1997	1,000	EPA, 1997	
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.071	EPA, 1997	0.071	EPA, 1997	
	AB	Absorption Factor	unitless	chemical-specific	EPA, 1995	chemical-specific	EPA, 1995	
	EF	Exposure Frequency	days/year	250	EPA, 1991	219	EPA, 1993	
	ED	Exposure Duration	years	25	EPA, 1991	5	EPA, 1993	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	9,125	EPA, 1989	1,825	EPA, 1989	

*Surface and subsurface soil combined.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,

EPA, 1993: Superfund Standard default Exposure Factors for Central Tendency and Reasonable Maximum Exposures.

EPA, 1995: Assessing Dermal Exposure from Soil, Technical Guidance manual, Region III, EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The RME skin surface area assumes 25% of total surface area of 20,000.

The CT surface area assumes exposure to hands and feet and is obtained by averaging both male and female hands and feet mean values found on Table 6-4.

The RME and CT Soil to Skin Adherence Factor is calculated from Table 6-12 using the average of the five groundskeepers' values for hands.

VADEQ, 1997: Value provided by Pat McMurray, Virginia Department of Environmental Quality, during St. Juliens Creek risk assessment assumptions conference call on November 20, 1997.

TBD = To Be Determined

NA = Not Available

Note:

1. CT value assumes one-half the RME value.

Table K-4.18
Values Used for Daily Intake Calculations
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Air
Exposure Point: Emissions from Soil at Site 4
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Inhalation	CS	Chemical Concentration in Soil	mg/kg	See Table 3.9	--	See Table 3.9	--	Chronic Daily Intake (CDI) (mg/kg-day) =
	CA	Chemical Concentration in Air	mg/m^3	Calculated	--	Calculated	--	CA x IR x ET x EF x ED x 1/BW x 1/AT
	IR	Inhalation Rate	m^3/hour	2.5	EPA, 1997	1.5	EPA, 1997	
	PEF	Particulate Emissions Factor	m^3/kg	1.32E+09	--	1.32E+09	--	CA (mg/m^3) = CS (1/PEF + 1/VF)
	VF	Volatilization Factor for Volatile Constituents	m^3/kg	Calculated [3]	--	Calculated [3]	--	
	ET	Exposure Time	hr/day	8 [1]	Professional judgment	4 [1]	Professional judgment	
	EF	Exposure Frequency	days/year	250	EPA,1991	219	EPA, 1993	
	ED	Exposure Duration	years	0.5	VADEQ, 1997	0.25 [2]	Professional judgment	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	183	EPA, 1989	91	EPA, 1989	

Surface and subsurface soil combined.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1993: Superfund Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

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

Inhalation rates are based on values for the outdoor worker assuming heavy activity for the RME and moderate activity for the CT (Table 5-23 of EPA, 1997).

VADEQ, 1997: Value provided by Pat McMurray, Virginia Department of Environmental Quality, during St. Juliens Creek risk assessment assumptions conference call on November 20, 1997.

TBD = To Be Determined

Notes:

1. Professional Judgement based on activities that would occur 8 hrs per day for the RME and 1/2 of a day for the CT.
2. For CT value, assumes one-half of the RME value.
3. See Appendix F for VF calculations.

Table K-4.19
Values Used for Daily Intake Calculations
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage Features
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Dermal	CW	Chemical Concentration in Water	mg/l	See Table 3.10	--	See Table 3.10	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	DAevent	Dermally Absorbed Dose per Event	mg/cm^2-day	Calculated	EPA, 1992	Calculated	EPA, 1992	DAevent x SA x EF x ED x 1/BW x 1/AT
	PC	Permeability Constant	cm/hr	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	t	Lag Time	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	Inorganics: DAevent (mg/cm2-day) =
	t*	Time to Reach Steady-state	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	PC x CW x ET x CF1
	B	Ratio of Permeability of Stratum Corneum to Epidermis	dimensionless	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	ET	Exposure Time	hours/day	2 [1]	Professional judgment	1 [1]	Professional judgment	Organics :
	CF1	Conversion Factor 1	l/cm^3	0.001	- -	0.001	- -	ET<t*: DAevent (mg/cm2-day) =
	SA	Skin Surface Area	cm^2	5,000	EPA, 1997	1,000	EPA, 1997	2 x PC x CW x (sqrt((6 x t x ET)/3.1415)) x CF1
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	28 [1]	Professional judgment	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	ET>t*: DAevent (mg/cm2-day) =
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x CF1
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	8,760	EPA, 1989	3,285	EPA, 1993	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,

EPA, 1992: Dermal Exposure Assessment: Principles and Applications. EPA/600/8-91/011B.

EPA, 1993: Superfund Standard Default Exposure Factors for Central Tendency and Reasonable Maximum Exposures.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The RME skin surface area assumes 25% of total surface area of 20,000.

The CT surface area assumes exposure to hands and feet and is obtained by averaging both male and female hands and feet mean values found on Table 6-4.

TBD = To Be Determined

Table K-4.20
Values Used for Daily Intake Calculations
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage Features
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Dermal	CW	Chemical Concentration in Water	mg/l	See Table 3.10	--	See Table 3.10	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	DAevent	Dermally Absorbed Dose per Event	mg/cm^2-day	Calculated	EPA, 1992	Calculated	EPA, 1992	DAevent x SA x EF x ED x 1/BW x 1/AT
	PC	Permeability Constant	cm/hr	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	t	Lag Time	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	Inorganics: DAevent (mg/cm2-day) =
	t*	Time to Reach Steady-state	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	PC x CW x ET x CF1
	B	Ratio of Permeability of Stratum Corneum to Epidermis	dimensionless	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	ET	Exposure Time	hours/day	2 [1]	Professional judgment	1 [1]	Professional judgment	Organics :
	CF1	Conversion Factor 1	l/cm^3	0.001	--	0.001	--	ET<t*: DAevent (mg/cm2-day) =
	SA	Skin Surface Area	cm^2	3,600	EPA, 1997	864	EPA, 1997	2 x PC x CW x (sqrt((6 x t x ET)/3.1415)) x CF1
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	ET>t*: DAevent (mg/cm2-day) =
	BW	Body Weight	kg	15	EPA, 1991	15	EPA, 1991	PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x CF1
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	2,190	EPA, 1989	2,190	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,

EPA, 1992: Dermal Exposure Assessment: Principles and Applications. EPA/600/8-91/011B.

EPA, 1993: Superfund Standard Default Exposure Factors for Central Tendency and Reasonable Maximum Exposures.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The RME skin surface area is for hands, arms, legs, and feet (assumes 50% of total surface area) and is obtained by averaging the 50% values of male and female children from age 2 through 7 years found on Table 6-6 and 6-7 and dividing by 2. The CT skin surface area is for hands and feet and is calculated by aveaging the mean percentage of total surafce body area for hands and feet (approximately 12%) for children ages 1 through 7 found on Table 6-8, then multiplying by the total surface body area (7,200 cm^2).

TBD = To Be Determined

Table K-4.21
Values Used for Daily Intake Calculations
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage Features and Ponded Area
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Dermal Absorption	CW	Chemical Concentration in Water	mg/l	See Table 3.10	--	See Table 3.10	--	CDI (mg/kg-day) = DA-Adj x EF x 1/AT
	DAevent-A	Dermally Absorbed Dose per Event, Adult	mg/cm^2-event	Calculated	EPA, 1992	Calculated	EPA, 1992	
	DAevent-C	Dermally Absorbed Dose per Event, Child	mg/cm^2-event	Calculated	EPA, 1992	Calculated	EPA, 1992	DA-Adj = (Daevent-A x SA-A x ED-A x 1/BW-A) + (Daevent-C x SA-C x ED-C x 1/BW-C)
	DA-Adj	Dermally Absorbed Dose, Age-adjusted	mg-year/event-kg	Calculated		Calculated		
	PC	Permeability Constant	cm/hr	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	t	Lag Time	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	Inorganics:
	t*	Time to Reach Steady-state	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	DAevent-A (mg/cm2-event) = PC x CW x ET-A x CF1
	B	Ratio of Permeability of Stratum Corneum to Epidermis	dimensionless	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	DAevent-C (mg/cm2-event) = PC x CW x ET-C x CF1
	ET-A	Exposure Time, Adult	hours/day	2 [1]	Professional judgmen	1 [1]	Professional judgment	
	ET-C	Exposure Time, Child	hours/day	2 [1]	Professional judgmen	1 [1]	Professional judgment	Organics, ET<t*:
	CF1	Conversion Factor 1	l/cm^3	0.001	- -	0.001	- -	DAevent-A (mg/cm2-event) =
	SA-A	Skin Surface Area, Adult	cm^2	5,000	EPA, 1997	1,000	EPA, 1997	2 x PC x CW x (sqrt((6 x t x ET-A)/3.1415)) x CF1
	SA-C	Skin Surface Area, Child	cm^2	3,600	EPA, 1997	864	EPA, 1997	DAevent-C (mg/cm2-event) =
	EF	Exposure Frequency	events/year	52 [1]	Professional judgmen	26 [1]	Professional judgment	2 x PC x CW x (sqrt((6 x t x ET-C)/3.1415)) x CF1
	ED-A	Exposure Duration, Adult	years	24	EPA, 1991	9	EPA, 1993	
	ED-C	Exposure Duration, Child	years	6	EPA, 1991	6	EPA, 1991	Organics, ET>t*:
	BW-A	Body Weight , Adult	kg	70	EPA, 1991	70	EPA, 1991	Daevent-A (mg/cm2-event) =
	BW-C	Body Weight, Child	kg	15	EPA, 1991	15	EPA, 1991	PC x CW x (ET-A/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x CF1
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	Daevent-C (mg/cm2-event) = PC x CW x (ET-C/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x CF1

Sources:
EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.
EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.
EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.
EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.
EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa.

Notes:
1. For RME value, assumes residents recreate two hours per day, one day per week for 52 weeks per year. For CT value, assumes one-half of RME values.

Table K-4.22
Values Used for Daily Intake Calculations
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage Features
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Sediment	mg/kg	See Table 3.11	--	See Table 3.11	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR-S	Ingestion Rate of Sediment	mg/day	100	EPA, 1991	50	EPA, 1997	CS x IR x EF x ED x CF1 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	8,760	EPA, 1989	3,285	EPA, 1989	
Dermal	CS	Chemical Concentration in Sediment	mg/kg	See Table 3.11	--	See Table 3.11	--	CDI (mg/kg-day)=
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	CS x CF1 x SA x AF x AB x EF x ED x 1/BW x 1/AT
	SA	Skin Surface Area Available for Contact	cm^2	5,000	EPA, 1997	1,000	EPA, 1997	
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.19	EPA, 1997	0.19	EPA, 1997	
	AB	Absorption Factor	unitless	chemical-specific	EPA, 1995	chemical-specific	EPA, 1995	
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	8,760	EPA, 1989	3,285	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A, OERR, EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,

EPA, 1993: Superfund Standard Default Exposure Factors for Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil, Technical Guidance manual, Region III, EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The RME skin surface area assumes 25% of total surface area of 20,000.

The CT surface area assumes exposure to hands and feet and is obtained by averaging both male and female hands and feet mean values found on Table 6-4.

CT soil ingestion rate found on Table 4-23. Soil to Skin Adherence Factor calculated from Table 6-12 by averaging hand values for gardeners no.1 and 2.

TBD = To Be Determined

NA = Not Available

Notes:

1. For RME value, assumes residents recreate two hours per day, one day per week for 52 weeks per year. For CT value, assumes one-half of RME values.

Table K-4.23
Values Used for Daily Intake Calculations
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage Features
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Sediment	mg/kg	See Table 3.11	--	See Table 3.11	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR-S	Ingestion Rate of Sediment	mg/day	200	EPA, 1991	100	EPA, 1997	CS x IR x EF x ED x CF1 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	
	BW	Body Weight	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	2,190	EPA, 1989	2,190	EPA, 1989	
Dermal	CS	Chemical Concentration in Sediment	mg/kg	See Table 3.11	--	See Table 3.11	--	CDI (mg/kg-day)=
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	CS x CF1 x SA x AF x AB x EF x ED x 1/BW x 1/AT
	SA	Skin Surface Area Available for Contact	cm^2	3,600	EPA, 1997	864	EPA, 1997	
	AF	Soil to Skin Adherence Factor	mg/cm^2	6.7	EPA, 1997	6.7	EPA, 1997	
	AB	Absorption Factor	unitless	chemical-specific	EPA, 1995	chemical-specific	EPA, 1995	
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	
	BW	Body Weight	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	2,190	EPA, 1989	2,190	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,

EPA, 1993: Superfund Standard Default Exposure Factors for Central Tendency and Reasonable Maximum Exposures.

EPA, 1995: Assessing Dermal Exposure from Soil, Technical Guidance manual, Region III, EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The RME skin surface area is for hands, arms, legs, and feet (assumes 50% of total surface area) and is obtained by averaging the 50% values of male and female children from age 2 through 7 years found on Table 6-6 and 6-7 and dividing by 2. The CT skin surface area is for hands and feet and is calculated by averaging the mean percentage of total surface body area for hands and feet (approximately 12%) for children ages 1 through 7 found on Table 6-8, then multiplying by the total surface body area (7,200 cm^2).

Soil to Skin Adherence Factor from Table 6-12 for Kids in Mud No. 2 using feet value which is conservative considering the surface water will wash some of the sediment off.

CT soil ingestion rate found on Table 4-23.

TBD = To Be Determined

NA = Not Available

Notes:

1. For RME value, assumes residents recreate two hours per day, one day per week for 52 weeks per year. For CT value, assumes one-half of RME values.

Table K-4.24
Values Used for Daily Intake Calculations
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage Features and Ponded Area
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	See Table 3.11	--	See Table 3.11	see Table 3	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S-A	Ingestion Rate of Soil, Adult	mg/day	100	EPA, 1991	50	EPA, 1997	CS x IR-S-Adj x EF x CF3 x 1/AT
	IR-S-C	Ingestion Rate of Soil, Child	mg/day	200	EPA, 1991	100	EPA, 1997	
	IR-S-Adj	Ingestion Rate of Soil, Age-adjusted	mg-year/kg-day	114.29	Calculated	46.43	Calculated	IR-S-Adj (mg-year/kg-day) =
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	(ED-C x IR-S-C / BW-C) + (ED-A x IR-S-A / BW-A)
	ED-A	Exposure Duration, Adult	years	24	EPA, 1991	9	EPA, 1993	
	ED-C	Exposure Duration, Child	years	6	EPA, 1991	6	EPA, 1991	
	CF3	Conversion Factor 3	kg/mg	0.000001	--	0.000001	--	
	BW-A	Body Weight , Adult	kg	70	EPA, 1991	70	EPA, 1991	
	BW-C	Body Weight, Child	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg	See Table 3.7	--	See Table 3.7	see Table 3	CDI (mg/kg-day) =
	SA-A	Skin Surface Area Available for Contact, Adult	cm^2	5,000	EPA, 1997	1,000	EPA, 1997	CS x DA-Adj x DABS x CF3 x EF x 1/AT
	SA-C	Skin Surface Area Available for Contact, Child	cm^2	3,600	EPA, 1997	864	EPA, 1997	
	SSAF-A	Soil to Skin Adherence Factor	mg/cm^2-day	0.19	EPA, 1997	0.19	EPA, 1997	DA-Adj (mg-year/kg-day) =
	SSAF-C	Soil to Skin Adherence Factor	mg/cm^2-day	6.7	EPA, 1997	6.7	EPA, 1997	[(ED-C x SA-C x SSAF-C / BW-C) +
	DA-Adj	Dermal Absorption, Age-adjusted	mg-year/kg-day	9,974	calculated	2,340	calculated	(ED-A x SA-A x SSAF-A / BW-A)]
	AB	Absorption Factor	unitless	Chemical Specific	EPA, 1995	Chemical Specific	EPA, 1995	
	CF3	Conversion Factor 3	kg/mg	0.000001	--	0.000001	--	
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	
	ED-A	Exposure Duration, Adult	years	24	EPA, 1991	9	EPA, 1993	
	ED-C	Exposure Duration, Child	years	6	EPA, 1991	6	EPA, 1991	
	BW-A	Body Weight , Adult	kg	70	EPA, 1991	70	EPA, 1991	
	BW-C	Body Weight, Child	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa.

Notes:

1. For RME value, assumes residents recreate two hours per day, one day per week for 52 weeks per year. For CT value, assumes one-half of RME values.

Table K-4.25
Values Used for Daily Intake Calculations
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Shallow Groundwater
Exposure Point: Water Table
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Dermal	CW	Chemical Concentration in Water	mg/l	See Table 3.12	--	See Table 3.12	--	CDI (mg/kg-day)=
	DAevent	Dermally Absorbed Dose per Event	mg/cm^2-day	Calculated	EPA, 1992	Calculated	EPA, 1992	DAevent x SA x EF x ED x 1/BW x 1/AT
	PC	Permeability Constant	cm/hr	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	t	Lag Time	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	Inorganics: DAevent (mg/cm2-day) =
	t*	Time to Reach Steady-state	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	PC x CW x ET x CF1
	B	Ratio of Permeability of Stratum Corneum to Epidermis	dimensionless	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	ET	Exposure Time	hours	2 [1]	Professional judgment	1 [1]	Professional judgment	Organics :
	CF1	Conversion Factor 1	l/cm^3	0.001	--	0.001	--	ET<t*: DAevent (mg/cm2-day) =
	SA	Skin Surface Area	cm^2	5,000	EPA, 1997	1,000	EPA, 1997	2 x PC x CW x (sqrt((6 x t x ET)/3.1415)) x CF1
	EF	Exposure Frequency	events/year	63 [1]	Professional judgment	31 [1]	Professional judgment	
	ED	Exposure Duration	years	0.5	VADEQ, 1997	0.25 [1]	Professional judgment	ET>t*: DAevent (mg/cm2-day) =
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x CF1
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	183	EPA, 1989	91	EPA, 1989	

Sources:
EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.
EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,
EPA, 1992: Dermal Exposure Assessment: Principles and Applications. EPA/600/8-91/011B.
EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The RME skin surface area assumes 25% of total surface area of 20,000.
The CT surface area assumes exposure to hands and feet and is obtained by averaging both male and female hands and feet mean values found on Table 6-4.
VADEQ, 1997: Value provided by Pat McMurray, Virginia Department of Environmental Quality, during St. Juliens Creek risk assessment assumptions conference call on November 20, 1997.
TBD = To Be Determined

Note:
1. For RME values, assumes workers spend two hours per day exposed to shallow groundwater during excavation and construction activities (i.e. basement or footer construction), one-quarter of the RME exposure frequency

Table K-5.1
Non-Cancer Toxicity Data -- Oral/Dermal
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD Value	Oral RfD Units	Oral to Dermal Adjustment Factor (1)	Adjusted Dermal RfD (2)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ (MM/DD/YY)
Aroclor 1260	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	Chronic	2.0E-02	mg/kg/day	0.55	1.1E-02	mg/kg/day	Liver	1000	IRIS	05/04/01
Bis(2-ethylhexyl)phthalate	Subchronic	2.0E-02	mg/kg/day	0.55	1.1E-02	mg/kg/day	Liver	1000	HEAST	07/01/97
Chloroform	Chronic	1.0E-02	mg/kg/day	1	1.0E-02	mg/kg/day	Liver	1000	IRIS	05/04/01
Chloroform	Subchronic	1.0E-02	mg/kg/day	1	1.0E-02	mg/kg/day	Liver	1000	HEAST	07/01/97
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dieldrin	Chronic	5.0E-05	mg/kg/day	0.5	2.5E-05	mg/kg/day	Liver	100	IRIS	05/04/01
Dieldrin	Subchronic	5.0E-05	mg/kg/day	0.5	2.5E-05	mg/kg/day	Liver	100	HEAST	07/01/97
Indeno(1,2,3-c,d)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aluminum	Chronic	1.0E+00	mg/kg/day	0.27	2.7E-01	mg/kg/day	Central Nervous System	100	NCEA	08/26/96
Antimony	Chronic	4.0E-04	mg/kg/day	0.10	4.0E-05	mg/kg/day	Longevity, Blood	1000	IRIS	05/04/01
Antimony	Subchronic	4.0E-04	mg/kg/day	0.10	4.0E-05	mg/kg/day	Longevity, Blood	1000	HEAST	07/01/97
Arsenic	Chronic	3.0E-04	mg/kg/day	0.95	2.9E-04	mg/kg/day	Skin	3	IRIS	05/04/01
Arsenic	Subchronic	3.0E-04	mg/kg/day	0.95	2.9E-04	mg/kg/day	Skin	3	HEAST	07/01/97
Barium	Chronic	7.0E-02	mg/kg/day	1	7.0E-02	mg/kg/day	Heart	3	IRIS	05/04/01
Barium	Subchronic	7.0E-02	mg/kg/day	1	7.0E-02	mg/kg/day	Heart	3	HEAST	07/01/97
Cadmium (food)	Chronic	1.0E-03	mg/kg/day	0.025	2.5E-05	mg/kg/day	Kidney	10	IRIS	05/04/01
Cadmium (nonfood)	Chronic	5.0E-04	mg/kg/day	0.05	2.5E-05	mg/kg/day	Kidney	10	IRIS	05/04/01
Chromium (VI)	Chronic	3.0E-03	mg/kg/day	0.01	3.0E-05	mg/kg/day	NOAEL	300	IRIS	05/04/01
Chromium (VI)	Subchronic	2.0E-02	mg/kg/day	0.01	2.0E-04	mg/kg/day	NOAEL	100	HEAST	07/01/97
Cobalt	Chronic	6.0E-02	mg/kg/day	0.30	1.8E-02	mg/kg/day	Sensitizer	NA	NCEA	11/18/91
Copper	Chronic	3.7E-02	mg/kg/day	0.60	2.2E-02	mg/kg/day	Gastrointestinal	NA	HEAST	07/01/97
Copper	Subchronic	3.7E-02	mg/kg/day	0.60	2.2E-02	mg/kg/day	Gastrointestinal	NA	HEAST	07/01/97
Iron	Chronic	3.0E-01	mg/kg/day	0.20	6.0E-02	mg/kg/day	Gastrointestinal	1	NCEA	07/23/96
Manganese (nonfood)	Chronic	2.0E-02	mg/kg/day	0.35	7.0E-03	mg/kg/day	Central Nervous System	1	IRIS	05/04/01
Manganese(food)	Chronic	1.4E-01	mg/kg/day	0.05	2.0E-04	mg/kg/day	Central Nervous System	1	IRIS	05/04/01
Nickel	Chronic	2.0E-02	mg/kg/day	0.10	2.0E-04	mg/kg/day	Body weight	300	IRIS	05/04/01
Nickel	Subchronic	2.0E-02	mg/kg/day	0.10	2.0E-04	mg/kg/day	Body weight	300	HEAST	07/01/97
Silver	Chronic	5.0E-03	mg/kg/day	0.20	1.0E-03	mg/kg/day	Skin	3	IRIS	05/04/01
Silver	Subchronic	5.0E-03	mg/kg/day	0.20	1.0E-03	mg/kg/day	Skin	3	HEAST	07/01/97
Thallium	Chronic	7.0E-05	mg/kg/day	1	7.0E-05	mg/kg/day	Liver	NA	RBC	10/09/02
Vanadium	Chronic	7.0E-03	mg/kg/day	0.02	1.4E-04	mg/kg/day	NOAEL	100	HEAST	07/01/97
Vanadium	Subchronic	7.0E-03	mg/kg/day	0.02	1.4E-04	mg/kg/day	NOAEL	100	HEAST	07/01/97
Zinc	Chronic	3.0E-01	mg/kg/day	0.25	7.5E-02	mg/kg/day	Blood	3	IRIS	05/04/01
Zinc	Subchronic	3.0E-01	mg/kg/day	0.25	7.5E-02	mg/kg/day	Blood	3	HEAST	07/01/97

NOAEL = No-Observed-Adverse-Effect Level

NA = Not Available

IRIS = Integrated Risk Information System

HEAST = Health Effects Assessment Summary Tables, July 1997

RBC = Region III Risk-Based Concentration Table, October 9, 2002

NCEA = National Center for Environmental Assessment

(1) Oral to Dermal Adjustment Factor from oral ABS values for oral to dermal extrapolation per RAGS Appendix A, USEPA Update, April 8, 1999

Table K-5.2
Non-Cancer Toxicity Data – Inhalation
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Chronic/ Subchronic	Value Inhalation RfC	Units	Adjusted Inhalation RfD (1)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfC:RfD: Target Organ	Dates (MM/DD/YY)
Aroclor 1260	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	Chronic	3.0E-04	mg/m3	8.6E-05	mg/kg/day	Nasal	1000	NCEA	12/01/97
Chloroform	Subchronic	3.0E-03	mg/m3	8.6E-04	mg/kg/day	Nasal	100	NCEA	12/01/97
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dieldrin	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-c,d)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aluminum	Chronic	5.0E-03	mg/m3	1.4E-03	mg/kg/day	CNS	300	NCEA	06/20/97
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	Chronic	5.0E-04	mg/m^3	1.4E-04	mg/kg/day	Fetus	1000	HEAST	07/01/97
Barium	Subchronic	5.0E-03	mg/m^3	1.4E-03	mg/kg/day	Fetus	100	HEAST	07/01/97
Cadmium (food)	Chronic	2.0E-04	mg/m^3	5.7E-05	mg/kg/day	Kidney	10	RBC	10/09/02
Cadmium (nonfood)	Chronic	2.0E-04	mg/m^3	5.7E-05	mg/kg/day	Kidney	10	RBC	10/09/02
Chromium (VI)	Chronic	1.0E-04	mg/m^3	2.9E-05	mg/kg/day	Lung	300	IRIS	05/04/01
Chromium (VI)	Subchronic	1.0E-03	mg/m^3	2.9E-04	mg/kg/day	Lung	30	IRIS	05/04/01
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese (food)	Chronic	5.0E-05	mg/m^3	1.4E-05	mg/kg/day	CNS	1000	IRIS	05/04/01
Manganese (nonfood)	Chronic	5.0E-05	mg/m^3	1.4E-05	mg/kg/day	CNS	1000	IRIS	05/04/01
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA

CNS = Central Nervous System

NA = Not Available

IRIS = Integrated Risk Information System

HEAST = Health Effects Assessment Summary Tables, July 1997

RBC = Region III Risk-Based Concentration Table, October 9, 2002

NCEA = National Center for Environmental Assessment

(1) Adjusted Inhalation RfD (mg/kg/day) = Inhalation RfC (mg/m^3) x 20 (m^3/day) / 70 (kg)

Table K-6.1
Cancer Toxicity Data -- Oral/Dermal
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Oral Cancer Slope Factor	Oral to Dermal Adjustment Factor (1)	Adjusted Dermal Cancer Slope Factor (2)	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date (MM/DD/YY)
Aroclor 1260	2.0E+00	0.9	2.2E+00	1/mg/kg/day	B2	RBC	10/09/02
Benzo(a)anthracene	7.3E-01	NA	NA	1/mg/kg/day	B2	RBC	10/09/02
Benzo(a)pyrene	7.3E+00	NA	NA	1/mg/kg/day	B2	IRIS	05/04/01
Benzo(b)fluoranthene	7.3E-01	NA	NA	1/mg/kg/day	B2	RBC	10/05/00
Bis(2-ethylhexyl)phthalate	1.4E-02	0.55	2.5E-02	1/mg/kg/day	B2	IRIS	05/04/01
Chloroform	6.1E-03	1	6.1E-03	1/mg/kg/day	B2	IRIS	05/04/01
Dibenz(a,h)anthracene	7.3E+00	NA	NA	1/mg/kg/day	B2	RBC	10/05/00
Dieldrin	1.6E+01	0.5	3.2E+01	1/mg/kg/day	B2	IRIS	05/04/01
Indeno(1,2,3-c,d)pyrene	7.3E-01	NA	NA	1/mg/kg/day	B2	NCEA	07/01/93
Aluminum	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA
Arsenic	1.5E+00	0.95	1.6E+00	1/mg/kg/day	A	IRIS	05/04/01
Barium	NA	NA	NA	NA	NA	NA	NA
Cadmium (food)	NA	NA	NA	NA	NA	NA	NA
Cadmium (nonfood)	NA	NA	NA	NA	NA	NA	NA
Chromium VI	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA
Manganese (food)	NA	NA	NA	NA	NA	NA	NA
Manganese (nonfood)	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA
Silver	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA

NA = Not Available

IRIS = Integrated Risk Information System

HEAST = Health Effects Assessment Summary Tables, July 1997

RBC = Region III Risk-Based Concentration Table, April 13, 2000

NCEA = National Center for Environmental Assessment

(1) Oral to Dermal Adjustment Factor from oral ABS values for oral to dermal extrapolation per RAGS Appendix A, USEPA Update, April 8, 1999

(2) Adjusted Dermal Cancer Slope Factor (1/mg/kg/day) = Oral Cancer Slope Factor (1/mg/kg/day) / Oral to Dermal Adjustment Factor

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

Weight of Evidence:

Known/Likely

Cannot be Determined

Not Likely

Table K-6.2
Cancer Toxicity Data -- Inhalation
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Unit Risk	Units	Adjustment	Inhalation Cancer Slope Factor	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date (MM/DD/YY)
Aroclor 1260	5.7E-04	1/ug/m^3	(1)	2.0E+00	1/mg/kg/day	B2	RBC	10/09/02
Benzo(a)anthracene	8.9E-05	1/ug/m3	(1)	3.1E-01	1/mg/kg/day	B2	NCEA (3)	01/01/94
Benzo(a)pyrene	8.9E-04	1/ug/m^3	(1)	3.1E+00	1/mg/kg/day	B2	NCEA	07/08/93
Benzo(b)fluoranthene	8.9E-05	1/ug/m3	(1)	3.1E-01	1/mg/kg/day	B2	NCEA (3)	01/01/94
Bis(2-ethylhexyl)phthalate	4.0E-06	1/ug/m^3	(1)	1.4E-02	1/mg/kg/day	B2	NCEA	07/08/93
Chloroform	2.3E-05	1/ug/m^3	(1)	8.1E-02	1/mg/kg/day	B2	IRIS	05/04/01
Dibenz(a,h)anthracene	8.9E-04	1/ug/m^3	(1)	3.1E+00	1/mg/kg/day	B2	NCEA (3)	01/01/94
Dieldrin	4.6E-03	1/ug/m^3	(1)	1.6E+01	1/mg/kg/day	B2	IRIS	05/04/01
Indeno(1,2,3-c,d)pyrene	8.9E-05	1/ug/m3	(1)	3.1E-01	1/mg/kg/day	B2	NCEA (3)	01/01/94
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	4.3E-03	1/ug/m^3	(1)	1.5E+01	1/mg/kg/day	A	IRIS	05/04/01
Barium	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium (food)	1.8E-03	1/ug/m^3	(1)	6.3E+00	1/mg/kg/day	B1	IRIS	05/04/01
Cadmiun (nonfood)	1.8E-03	1/ug/m^3	(1)	6.3E+00	1/mg/kg/day	B1	IRIS	05/04/01
Chromium VI	1.2E-02	1/ug/m^3	(1)	4.1E+01	1/mg/kg/day	A	IRIS	05/04/01
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA
Manganese (food)	NA	NA	NA	NA	NA	NA	NA	NA
Manganese (nonfood)	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA	NA
Silver	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA

NA - Not Available

IRIS = Integrated Risk Information System

HEAST = Health Effects Assessment Summary Tables

RBC = Region III Risk-Based Concentration Table, October 9, 2002

NCEA = National Center for Environmental Assessment

(1) Inhalation Cancer Slope Factor (1/mg/kg/day) = Unit Risk (1/ug/m^3) x 70 kg / 20 m^3/day x 1000 ug/mg

(2) Inhalation Cancer Slope Factor (1/mg/kg/day) = Unit Risk (1/pg/m^3) x 70 kg / 20 m^3/day x 1,000,000,000 ug/mg

(3) Toxicity equivalent factors from NCEA Risk Assessment Issue Paper: Status of Inhalation Cancer Unit Risk for Benzo(a)pyrene, 1994.

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

Weight of Evidence:

Known/Likely

Cannot be Determined

Not Likely

Table K-7.1
Calculation of Non-Cancer Hazards - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: At Site 4
Receptor Population: Trespasser
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1260	0.991	mg/kg	0.991	mg/kg	M	2.0E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(a)Pyrene	2.3	mg/kg	2.3	mg/kg	M	4.7E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Arsenic	16.8	mg/kg	16.8	mg/kg	M	3.4E-06	mg/kg/day	3.0E-04	mg/kg/day	NA	NA	0.01
	Chromium	129	mg/kg	129	mg/kg	M	2.6E-05	mg/kg/day	3.0E-03	mg/kg/day	NA	NA	0.009
	Iron	33173	mg/kg	33173	mg/kg	M	6.8E-03	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	0.02
												Total	0.04
Dermal	Aroclor-1260	0.991	mg/kg	0.991	mg/kg	M	1.9E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(a)Pyrene	2.3	mg/kg	2.3	mg/kg	M	4.4E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Arsenic	16.8	mg/kg	16.8	mg/kg	M	1.0E-06	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.004
	Chromium	129	mg/kg	129	mg/kg	M	2.5E-06	mg/kg/day	3.0E-05	mg/kg/day	NA	NA	0.08
	Iron	33173	mg/kg	33173	mg/kg	M	6.4E-04	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.01
												Total	0.10
												Total Hazard Index Across All Exposure Routes/Pathways	0.14

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table K-7.2
Calculation of Non-Cancer Hazards - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: At Site 4
Receptor Population: Trespasser
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1260	0.991	mg/kg	0.991	mg/kg	M	2.5E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(a)Pyrene	2.3	mg/kg	2.3	mg/kg	M	5.9E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Arsenic	16.8	mg/kg	16.8	mg/kg	M	4.3E-06	mg/kg/day	3.0E-04	mg/kg/day	NA	NA	0.01
	Chromium	129	mg/kg	129	mg/kg	M	3.3E-05	mg/kg/day	2.0E-02	mg/kg/day	NA	NA	0.002
	Iron	33173	mg/kg	33173	mg/kg	M	8.4E-03	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	0.03
												Total	0.04
Dermal	Aroclor-1260	0.991	mg/kg	0.991	mg/kg	M	1.1E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(a)Pyrene	2.3	mg/kg	2.3	mg/kg	M	2.6E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Arsenic	16.8	mg/kg	16.8	mg/kg	M	6.0E-07	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.002
	Chromium	129	mg/kg	129	mg/kg	M	1.4E-06	mg/kg/day	2.0E-04	mg/kg/day	NA	NA	0.007
	Iron	33173	mg/kg	33173	mg/kg	M	3.7E-04	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.006
												Total	0.02
												Total Hazard Index Across All Exposure Routes/Pathways	0.06

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table K-7.3
Calculation of Non-Cancer Hazards - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from Surface Soil at Site 4
Receptor Population: Trespasser
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value (1)	Route EPC Units	EPC Selected for Hazard Calculation (2)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Aroclor-1260	0.991	mg/kg	0.0000000008	mg/m3	R	2.4E-12	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(a)Pyrene	2.300	mg/kg	0.000000002	mg/m3	R	5.7E-12	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Arsenic	17	mg/kg	0.00000001	mg/m3	R	4.1E-11	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Chromium	129	mg/kg	0.0000001	mg/m3	R	3.2E-10	mg/kg/day	2.9E-05	mg/kg/day	1.0E-04	mg/m^3	0.00001
	Iron	33173	mg/kg	0.00002	mg/m3	R	8.1E-08	mg/kg/day	NA	mg/kg/day	NA	NA	NA
												Total	0.00001
												Total Hazard Index Across All Exposure Routes/Pathways	0.00001

(1) Route-specific EPC value is equal to the medium-specific EPC value multiplied by 1/PEF (PEF = 1.32E+09 mg3/kg).
(2) Route-Specific (R) EPC selected for hazard calculation.

Table K-7.4
Calculation of Non-Cancer Hazards - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from Surface Soil at Site 4
Receptor Population: Trespasser
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value (1)	Route EPC Units	EPC Selected for Hazard Calculation (2)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Aroclor-1260	0.991	mg/kg	0.0000000008	mg/m3	R	2.7E-12	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(a)Pyrene	2.300	mg/kg	0.000000002	mg/m3	R	6.2E-12	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Arsenic	17	mg/kg	0.00000001	mg/m3	R	4.4E-11	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Chromium	129	mg/kg	0.0000001	mg/m3	R	3.5E-10	mg/kg/day	2.9E-04	mg/kg/day	1.0E-03	mg/m3	0.000001
	Iron	33173	mg/kg	0.00002	mg/m3	R	8.9E-08	mg/kg/day	NA	mg/kg/day	NA	NA	NA
												Total	0.000001
												Total Hazard Index Across All Exposure Routes/Pathways	0.000001

(1) Route-specific EPC value is equal to the medium-specific EPC value multiplied by 1/PEF (PEF = 1.32E+09 mg3/kg).
(2) Route-Specific (R) EPC selected for hazard calculation.

Table K-7.5
Calculation of Non-Cancer Hazards - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Deep Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	bis(2-Ethylhexyl)phthalate	5	ug/l	5	ug/l	M	1.4E-04	mg/kg/day	2.0E-02	mg/kg/day	NA	NA	0.007
	Chloroform	9	ug/l	9	ug/l	M	2.5E-04	mg/kg/day	1.0E-02	mg/kg/day	NA	NA	0.02
	Arsenic	19.1	ug/l	19.1	ug/l	M	5.2E-04	mg/kg/day	3.0E-04	mg/kg/day	NA	NA	1.7
	Barium	489	ug/l	489	ug/l	M	1.3E-02	mg/kg/day	7.0E-02	mg/kg/day	NA	NA	0.2
	Iron	68500	ug/l	68500	ug/l	M	1.9E+00	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	6.3
	Manganese	12500	ug/l	12500	ug/l	M	3.4E-01	mg/kg/day	2.0E-02	mg/kg/day	NA	NA	17
												Total	25
Dermal	bis(2-Ethylhexyl)phthalate	5	ug/l	5	ug/l	M	9.1E-05	mg/kg/day	1.1E-02	mg/kg/day	NA	NA	0.008
	Chloroform	9	ug/l	9	ug/l	M	2.1E-05	mg/kg/day	1.0E-02	mg/kg/day	NA	NA	0.0021
	Arsenic	19.1	ug/l	19.1	ug/l	M	1.3E-06	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.005
	Barium	489	ug/l	489	ug/l	M	3.3E-05	mg/kg/day	7.0E-02	mg/kg/day	NA	NA	0.0005
	Iron	68500	ug/l	68500	ug/l	M	4.7E-03	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.08
	Manganese	12500	ug/l	12500	ug/l	M	8.6E-04	mg/kg/day	7.0E-03	mg/kg/day	NA	NA	0.1
												Total	0.2
												Total Hazard Index Across All Exposure Routes/Pathways	26

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table K-7.5 RME Supplement
Calculation of Daevent, Adult Resident
Deep Groundwater - Tap Water
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC)	Lag Time (t)	B (dimensionless)	Duration of Event (ET)	t*	Eq	DAevent
bis(2-Ethylhexyl)phthalate	5.0E+00	µg/l	3.30E-02	2.10E+00	1.3E+01	0.25	1.0E+02	2	3.3E-07
Chloroform	9.0E+00	µg/l	8.9E-03	4.7E-01	9.3E-03	0.25	1.1E+00	2	7.6E-08
Arsenic	1.9E+01	µg/l	1.0E-03	N/A	N/A	0.25	N/A	1	4.8E-09
Barium	4.9E+02	µg/l	1.0E-03	N/A	N/A	0.25	N/A	1	1.2E-07
Iron	6.9E+04	µg/l	1.0E-03	N/A	N/A	0.25	N/A	1	1.7E-05
Manganese	1.3E+04	µg/l	1.0E-03	N/A	N/A	0.25	N/A	1	3.1E-06

Inorganics: DAevent (mg/cm2-event) =
PC x EPC x ET x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
ET<t*: DAevent (mg/cm2-event) =
2 x PC x EPC x (sqrt((6 x t x ET)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:
Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

Table K-7.6
Calculation of Non-Cancer Hazards - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Deep Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	bis(2-Ethylhexyl)phthalate	5	ug/l	5	ug/l	M	3.2E-04	mg/kg/day	2.0E-02	mg/kg/day	NA	NA	0.02
	Chloroform	9	ug/l	9	ug/l	M	5.8E-04	mg/kg/day	1.0E-02	mg/kg/day	NA	NA	0.06
	Arsenic	19.1	ug/l	19.1	ug/l	M	1.2E-03	mg/kg/day	3.0E-04	mg/kg/day	NA	NA	4.1
	Barium	489	ug/l	489	ug/l	M	3.1E-02	mg/kg/day	7.0E-02	mg/kg/day	NA	NA	0.4
	Iron	68500	ug/l	68500	ug/l	M	4.4E+00	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	15
	Manganese	12500	ug/l	12500	ug/l	M	8.0E-01	mg/kg/day	2.0E-02	mg/kg/day	NA	NA	40
												Total	59
Dermal	bis(2-Ethylhexyl)phthalate	5	ug/l	5	ug/l	M	1.7E-04	mg/kg/day	1.1E-02	mg/kg/day	NA	NA	0.016
	Chloroform	9	ug/l	9	ug/l	M	4.0E-05	mg/kg/day	1.0E-02	mg/kg/day	NA	NA	0.004
	Arsenic	19.1	ug/l	19.1	ug/l	M	2.9E-06	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.010
	Barium	489	ug/l	489	ug/l	M	7.4E-05	mg/kg/day	7.0E-02	mg/kg/day	NA	NA	0.001
	Iron	68500	ug/l	68500	ug/l	M	1.0E-02	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.2
	Manganese	12500	ug/l	12500	ug/l	M	1.9E-03	mg/kg/day	7.0E-03	mg/kg/day	NA	NA	0.3
												Total	0.5
												Total Hazard Index Across All Exposure Routes/Pathways	60

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table K-7.6 RME Supplement
Calculation of Daevent, Adult Resident
Deep Groundwater - Tap Water
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC)	Lag Time (t)	B (dimensionless)	Duration of Event (ET)	t*	Eq	DAevent
bis(2-Ethylhexyl)phthalate	5.00E+00	µg/l	3.3E-02	2.10E+00	1.3E+01	0.33	1.0E+02	2	3.8E-07
Chloroform	9.0E+00	µg/l	8.9E-03	4.7E-01	9.3E-03	0.33	1.1E+00	2	8.7E-08
Arsenic	1.9E+01	µg/l	1.0E-03	N/A	N/A	0.33	N/A	1	6.3E-09
Barium	4.9E+02	µg/l	1.0E-03	N/A	N/A	0.33	N/A	1	1.6E-07
Iron	6.9E+04	µg/l	1.0E-03	N/A	N/A	0.33	N/A	1	2.3E-05
Manganese	1.3E+04	µg/l	1.0E-03	N/A	N/A	0.33	N/A	1	4.1E-06

Inorganics: DAevent (mg/cm2-event) =
PC x EPC x ET x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
ET<t*: DAevent (mg/cm2-event) =
2 x PC x EPC x (sqrt((6 x t x ET)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:
Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

Table K-7.7
Calculation of Non-Cancer Hazards - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Deep Groundwater - Water Vapors at Showerhead
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Chloroform	5	ug/l	2.7.E-04	ug/l	M	2.6E-04	mg/kg/day	2.7E-04	mg/kg/day	3.0E-04	mg/m3	9.6.E-01
												Total	9.6E-01
												Total Hazard Index Across All Exposure Routes/Pathways	9.6E-01

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table K-7.7 RME Supplement
Inhalation Exposure Concentrations from Foster and Chrostowski Shower Model
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical	Exposure Point Concentration Cwo (µg/l)	Molecular weight (HH) (g/mole)	Henry's Law Constant (H) (atm-m^3/mole)	Kg (VOC) (cm/hr)	Kl(VOC) (cm/hr)	KL (cm/hr)	Kal (cm/hr)	Cwd (µg/l)	S (µg/m^3 - min)	Calculated Inhalation Exposure (Einh) (mg/kg/shower)
Chloroform	5.0E+00	1.2E+02	4.4E-03	1.16E+03	1.21E+01	1.15E+01	1.55E+01	2.02E+00	1.35E+01	2.75E-04

Variables	Units	Exposure Assumptions	Source
Kg(VOC) = gas-film mass transfer coefficient	cm/hr	Solved by Eq 1	NA
Kl(VOC) = liquid-film mass transfer coefficient	cm/hr	Solved by Eq 2	NA
KL = overall mass transfer coefficient	cm/hr	Solved by Eq 3	NA
Kal = adjusted overall mass transfer coeff.	cm/hr	Solved by Eq 4	NA
Tl = Calibration temp. of water	K (20C +273)	293	F&C
Ts = Shower water temperature	k (45C)	318	F&C
Us = water viscosity at Ts	centipoise	0.596	F&C
Ul = water viscosity at Tl	cp	1.002	F&C
Cwd = conc. leaving droplets after time sdt	ug/l	Solved by Eq 5	NA
sdt = shower droplet drop time	sec	2	F&C
d = shower droplet diameter	mm	1	F&C
FR = shower water flow rate	l/min	20	F&C
SV = shower room air volume	m^3	3	F&C
S = indoor VOC generation rate	ug/m^3-min	Solved by Eq 6	NA
VR = ventilation rate	l/min	13.8	USEPA, 1991
BW = body weight	kg	70	USEPA, 1991
Ds = duration of shower	min	12	USEPA, 1989
Dt = total duration in shower room	min	15	
R = air exchange rate	min^{-1}	0.0083	F&C
Ca = indoor air concentration of VOCs	ug/m^3	Solved by Eq 7	NA
Einh = inhalation exposure per shower	mg/kg/shower	Solved by Eq 8	NA

Equation 1:	Kg(VOC) =	$3000 * (18 / HH)^{0.5}$	
Equation 2:	Kl(VOC) =	$20 * (44 / HH)^{0.5}$	
Equation 3:	KL =	$((1 / Kl(VOC)) + (0.024 / (Kg (VOC) * H)))^{-1}$	
Equation 4:	Kal =	$(KL * (((Tl * Us) / (Ts * Ul))^{-0.5}))$	
Equation 5:	Cwd =	(Cwo * (1-EXP((-1 * Kal * sdt)/(60 * d))))	
Equation 6:	S =	(Cwd * FR / SV)	
Equation 7:	see time series example on Table I-GW-5		
Equation 8:	**Einh =**	**If t>Ds**	(((VR * S) / (BW * R * 1000000)) * ((Ds + (EXP(-R * Dt) / R)-(EXP(R * (Ds - Dt))) / R)))

Table K-7.8
Calculation of Non-Cancer Hazards - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage Features
Receptor Population: Trespasser
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	Dibenz(a,h)anthracene	3	ug/l	3	ug/l	M	4.8E-04	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	2	ug/l	2	ug/l	M	2.2E-04	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Aluminum	50000	ug/l	50000	ug/l	M	5.1E-04	mg/kg/day	2.7E-01	mg/kg/day	NA	NA	0.002
	Arsenic	26.6	ug/l	26.6	ug/l	M	2.7E-07	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.0009
	Iron	93100	ug/l	93100	ug/l	M	9.5E-04	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.02
	Manganese	2310	ug/l	2310	ug/l	M	2.4E-05	mg/kg/day	7.0E-03	mg/kg/day	NA	NA	0.003
												Total	0.02
												Total Hazard Index Across All Exposure Routes/Pathways	0.02

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table K-7.8 RME Supplement
Calculation of Daevent, Adult and Adolescent Trespasser
Surface Water
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC)	Lag Time (t)	B (dimensionless)	Duration of Event (ET)	t*	Eq	DAevent
Dibenz(a,h)anthracene	3.0E+00	µg/l	2.7E+00	4.4E+00	6.9E+02	1	2.1E+01	2	4.7E-05
Indeno(1,2,3-cd)pyrene	2.0E+00	µg/l	1.9E+00	4.2E+00	3.8E+02	1	2.0E+01	2	2.2E-05
Aluminum	5.0E+04	µg/l	1.0E-03	N/A	N/A	1	N/A	1	5.0E-05
Arsenic	2.7E+01	µg/l	1.0E-03	N/A	N/A	1	N/A	1	2.7E-08
Iron	9.3E+04	µg/l	1.0E-03	N/A	N/A	1	N/A	1	9.3E-05
Manganese	2.3E+03	µg/l	1.0E-03	N/A	N/A	1	N/A	1	2.3E-06

Inorganics: DAevent (mg/cm2-event) =
PC x EPC x ET x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
ET<t*: DAevent (mg/cm2-event) =
2 x PC x EPC x (sqrt((6 x t x ET)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:
Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

Table K-7.9
Calculation of Non-Cancer Hazards - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage Features
Receptor Population: Trespasser
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	Dibenz(a,h)anthracene	3	ug/l	3	ug/l	M	4.8E-04	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	2	ug/l	2	ug/l	M	2.2E-04	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Aluminum	50000	ug/l	50000	ug/l	M	5.1E-04	mg/kg/day	2.7E-01	mg/kg/day	NA	NA	0.002
	Arsenic	26.6	ug/l	26.6	ug/l	M	2.7E-07	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.0009
	Iron	93100	ug/l	93100	ug/l	M	9.5E-04	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.02
	Manganese	2310	ug/l	2310	ug/l	M	2.4E-05	mg/kg/day	7.0E-03	mg/kg/day	NA	NA	0.003
												Total	0.02
												Total Hazard Index Across All Exposure Routes/Pathways	0.02

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table K-7.10
Calculation of Non-Cancer Hazards - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 4
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1260	0.687	mg/kg	0.687	mg/kg	M	9.4E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Dieldrin	0.012	mg/kg	0.012	mg/kg	M	1.6E-08	mg/kg/day	5.0E-05	mg/kg/day	NA	NA	0.0003
	Benzo(a)Anthracene	2.11	mg/kg	2.11	mg/kg	M	2.9E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(a)Pyrene	2.3	mg/kg	2.3	mg/kg	M	3.2E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(b)Fluoranthene	2.57	mg/kg	2.57	mg/kg	M	3.5E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Dibenz(a,h)Anthracene	0.32	mg/kg	0.32	mg/kg	M	4.4E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Indeno(1,2,3-cd)Pyrene	1.1	mg/kg	1.1	mg/kg	M	1.5E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Aluminum	12013	mg/kg	12013	mg/kg	M	1.6E-02	mg/kg/day	1.0E+00	mg/kg/day	NA	NA	0.02
	Antimony	8.4	mg/kg	8.4	mg/kg	M	1.1E-05	mg/kg/day	4.0E-04	mg/kg/day	NA	NA	0.03
	Arsenic	34	mg/kg	34	mg/kg	M	4.7E-05	mg/kg/day	3.0E-04	mg/kg/day	NA	NA	0.2
	Barium	174	mg/kg	174	mg/kg	M	2.4E-04	mg/kg/day	7.0E-02	mg/kg/day	NA	NA	0.003
	Cadmium	1.4	mg/kg	1.4	mg/kg	M	1.9E-06	mg/kg/day	1.0E-03	mg/kg/day	NA	NA	0.002
	Chromium	97	mg/kg	97	mg/kg	M	1.3E-04	mg/kg/day	3.0E-03	mg/kg/day	NA	NA	0.04
	Copper	294	mg/kg	294	mg/kg	M	4.0E-04	mg/kg/day	3.7E-02	mg/kg/day	NA	NA	0.01
	Iron	32512	mg/kg	32512	mg/kg	M	4.5E-02	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	0.1
	Manganese	243	mg/kg	243	mg/kg	M	3.3E-04	mg/kg/day	1.4E-02	mg/kg/day	NA	NA	0.02
	Nickel	83	mg/kg	83	mg/kg	M	1.1E-04	mg/kg/day	2.0E-02	mg/kg/day	NA	NA	0.006
	Thallium	1.1	mg/kg	1.1	mg/kg	M	1.5E-06	mg/kg/day	7.0E-05	mg/kg/day	NA	NA	0.02
	Vanadium	77	mg/kg	77	mg/kg	M	1.1E-04	mg/kg/day	7.0E-03	mg/kg/day	NA	NA	0.02
	Zinc	707	mg/kg	707	mg/kg	M	9.7E-04	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	0.003
												Total	0.5

Table K-7.10
Calculation of Non-Cancer Hazards - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 4
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	Aroclor-1260	0.687	mg/kg	0.687	mg/kg	M	5.4E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Dieldrin	0.012	mg/kg	0.012	mg/kg	M	1.6E-08	mg/kg/day	2.5E-05	mg/kg/day	NA	NA	0.0006
	Benzo(a)Anthracene	2.11	mg/kg	2.11	mg/kg	M	2.7E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(a)Pyrene	2.3	mg/kg	2.3	mg/kg	M	3.0E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(b)Fluoranthene	2.57	mg/kg	2.57	mg/kg	M	3.3E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Dibenz(a,h)Anthracene	0.32	mg/kg	0.32	mg/kg	M	4.2E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Indeno(1,2,3-cd)Pyrene	1.1	mg/kg	1.1	mg/kg	M	1.4E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Aluminum	12013	mg/kg	12013	mg/kg	M	1.6E-03	mg/kg/day	2.7E-01	mg/kg/day	NA	NA	0.006
	Antimony	8.4	mg/kg	8.4	mg/kg	M	1.1E-06	mg/kg/day	4.0E-05	mg/kg/day	NA	NA	0.03
	Arsenic	34	mg/kg	34	mg/kg	M	1.4E-05	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.05
	Barium	174	mg/kg	174	mg/kg	M	2.3E-05	mg/kg/day	7.0E-02	mg/kg/day	NA	NA	0.0003
	Cadmium	1.4	mg/kg	1.4	mg/kg	M	1.8E-07	mg/kg/day	2.5E-05	mg/kg/day	NA	NA	0.007
	Chromium	97	mg/kg	97	mg/kg	M	1.3E-05	mg/kg/day	3.0E-05	mg/kg/day	NA	NA	0.4
	Copper	294	mg/kg	294	mg/kg	M	3.8E-05	mg/kg/day	2.2E-02	mg/kg/day	NA	NA	0.002
	Iron	32512	mg/kg	32512	mg/kg	M	4.2E-03	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.07
	Manganese	243	mg/kg	243	mg/kg	M	3.2E-05	mg/kg/day	2.0E-04	mg/kg/day	NA	NA	0.2
	Nickel	83	mg/kg	83	mg/kg	M	1.1E-05	mg/kg/day	2.0E-04	mg/kg/day	NA	NA	0.05
	Thallium	1.1	mg/kg	1.1	mg/kg	M	1.4E-07	mg/kg/day	7.0E-05	mg/kg/day	NA	NA	0.002
	Vanadium	77	mg/kg	77	mg/kg	M	1.0E-05	mg/kg/day	1.4E-04	mg/kg/day	NA	NA	0.07
	Zinc	707	mg/kg	707	mg/kg	M	9.2E-05	mg/kg/day	7.5E-02	mg/kg/day	NA	NA	0.001
												Total	0.9
												Total Hazard Index Across All Exposure Routes/Pathways	1

*Surface and surface soil combined.
(1) Medium-Specific (M) EPC selected for hazard calculation.

Table K-7.11
Calculation of Non-Cancer Hazards - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 4
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1260	0.687	mg/kg	0.687	mg/kg	M	8.8E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Dieldrin	0.012	mg/kg	0.012	mg/kg	M	1.5E-07	mg/kg/day	5.0E-05	mg/kg/day	NA	NA	0.003
	Benzo(a)Anthracene	2.11	mg/kg	2.11	mg/kg	M	2.7E-05	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(a)Pyrene	2.3	mg/kg	2.3	mg/kg	M	2.9E-05	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(b)Fluoranthene	2.57	mg/kg	2.57	mg/kg	M	3.3E-05	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Dibenz(a,h)Anthracene	0.32	mg/kg	0.32	mg/kg	M	4.1E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Indeno(1,2,3-cd)Pyrene	1.1	mg/kg	1.1	mg/kg	M	1.4E-05	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Aluminum	12013	mg/kg	12013	mg/kg	M	1.5E-01	mg/kg/day	1.0E+00	mg/kg/day	NA	NA	0.2
	Antimony	8.4	mg/kg	8.4	mg/kg	M	1.1E-04	mg/kg/day	4.0E-04	mg/kg/day	NA	NA	0.3
	Arsenic	34	mg/kg	34	mg/kg	M	4.4E-04	mg/kg/day	3.0E-04	mg/kg/day	NA	NA	1.5
	Barium	174	mg/kg	174	mg/kg	M	2.2E-03	mg/kg/day	7.0E-02	mg/kg/day	NA	NA	0.03
	Cadmium	1.4	mg/kg	1.4	mg/kg	M	1.7E-05	mg/kg/day	1.0E-03	mg/kg/day	NA	NA	0.02
	Chromium	97	mg/kg	97	mg/kg	M	1.2E-03	mg/kg/day	2.0E-02	mg/kg/day	NA	NA	0.06
	Copper	294	mg/kg	294	mg/kg	M	3.8E-03	mg/kg/day	3.7E-02	mg/kg/day	NA	NA	0.1
	Iron	32512	mg/kg	32512	mg/kg	M	4.2E-01	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	1.4
	Manganese	243	mg/kg	243	mg/kg	M	3.1E-03	mg/kg/day	1.4E-02	mg/kg/day	NA	NA	0.2
	Nickel	83	mg/kg	83	mg/kg	M	1.1E-03	mg/kg/day	2.0E-02	mg/kg/day	NA	NA	0.05
	Thallium	1.1	mg/kg	1.1	mg/kg	M	1.4E-05	mg/kg/day	7.0E-05	mg/kg/day	NA	NA	0.2
	Vanadium	77	mg/kg	77	mg/kg	M	9.8E-04	mg/kg/day	7.0E-03	mg/kg/day	NA	NA	0.1
	Zinc	707	mg/kg	707	mg/kg	M	9.0E-03	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	0.03
												Total	4.1

Table K-7.11
Calculation of Non-Cancer Hazards - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 4
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	Aroclor-1260	0.687	mg/kg	0.687	mg/kg	M	1.0E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Dieldrin	0.012	mg/kg	0.012	mg/kg	M	3.0E-08	mg/kg/day	2.5E-05	mg/kg/day	NA	NA	0.001
	Benzo(a)Anthracene	2.11	mg/kg	2.11	mg/kg	M	5.3E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(a)Pyrene	2.3	mg/kg	2.3	mg/kg	M	5.8E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(b)Fluoranthene	2.57	mg/kg	2.57	mg/kg	M	6.5E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Dibenz(a,h)Anthracene	0.32	mg/kg	0.32	mg/kg	M	8.1E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Indeno(1,2,3-cd)Pyrene	1.1	mg/kg	1.1	mg/kg	M	2.8E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Aluminum	12013	mg/kg	12013	mg/kg	M	3.0E-03	mg/kg/day	2.7E-01	mg/kg/day	NA	NA	0.01
	Antimony	8.4	mg/kg	8.4	mg/kg	M	2.1E-06	mg/kg/day	4.0E-05	mg/kg/day	NA	NA	0.05
	Arsenic	34	mg/kg	34	mg/kg	M	2.8E-05	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.1
	Barium	174	mg/kg	174	mg/kg	M	4.4E-05	mg/kg/day	7.0E-02	mg/kg/day	NA	NA	0.0006
	Cadmium	1.4	mg/kg	1.4	mg/kg	M	3.4E-07	mg/kg/day	2.5E-05	mg/kg/day	NA	NA	0.01
	Chromium	97	mg/kg	97	mg/kg	M	2.4E-05	mg/kg/day	2.0E-04	mg/kg/day	NA	NA	0.1
	Copper	294	mg/kg	294	mg/kg	M	7.5E-05	mg/kg/day	2.2E-02	mg/kg/day	NA	NA	0.003
	Iron	32512	mg/kg	32512	mg/kg	M	8.2E-03	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.1
	Manganese	243	mg/kg	243	mg/kg	M	6.2E-05	mg/kg/day	2.0E-04	mg/kg/day	NA	NA	0.3
	Nickel	83	mg/kg	83	mg/kg	M	2.1E-05	mg/kg/day	2.0E-04	mg/kg/day	NA	NA	0.1
	Thallium	1.1	mg/kg	1.1	mg/kg	M	2.7E-07	mg/kg/day	7.0E-05	mg/kg/day	NA	NA	0.004
	Vanadium	77	mg/kg	77	mg/kg	M	1.9E-05	mg/kg/day	1.4E-04	mg/kg/day	NA	NA	0.1
	Zinc	707	mg/kg	707	mg/kg	M	1.8E-04	mg/kg/day	7.5E-02	mg/kg/day	NA	NA	0.002
												Total	1
												Total Hazard Index Across All Exposure Routes/Pathways	5

*Surface and surface soil combined.

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table K-7.12
Calculation of Non-Cancer Hazards - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 4
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1260	0.687	mg/kg	0.687	mg/kg	M	3.2E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(a)Pyrene	2.3	mg/kg	2.3	mg/kg	M	1.1E-05	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Arsenic	34	mg/kg	34	mg/kg	M	1.6E-04	mg/kg/day	3.0E-04	mg/kg/day	NA	NA	0.5
	Chromium	97	mg/kg	97	mg/kg	M	4.5E-04	mg/kg/day	2.0E-02	mg/kg/day	NA	NA	0.02
	Iron	32512	mg/kg	32512	mg/kg	M	1.5E-01	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	0.5
												Total	1
Dermal	Aroclor-1260	0.687	mg/kg	0.687	mg/kg	M	4.8E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(a)Pyrene	2.3	mg/kg	2.3	mg/kg	M	2.7E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Arsenic	34	mg/kg	34	mg/kg	M	1.3E-05	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.05
	Chromium	97	mg/kg	97	mg/kg	M	1.1E-05	mg/kg/day	2.0E-04	mg/kg/day	NA	NA	0.06
	Iron	32512	mg/kg	32512	mg/kg	M	3.8E-03	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.06
												Total	0.2
												Total Hazard Index Across All Exposure Routes/Pathways	1

*Surface and surface soil combined.
(1) Medium-Specific (M) EPC selected for hazard calculation.

Table K-7.13
Calculation of Non-Cancer Hazards - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 4
Receptor Population: Other Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1260	0.687	mg/kg	0.687	mg/kg	M	3.4E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(a)Pyrene	2.3	mg/kg	2.3	mg/kg	M	1.1E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Arsenic	34	mg/kg	34	mg/kg	M	1.7E-05	mg/kg/day	3.0E-04	mg/kg/day	NA	NA	0.06
	Chromium	97	mg/kg	97	mg/kg	M	4.7E-05	mg/kg/day	3.0E-03	mg/kg/day	NA	NA	0.02
	Iron	32512	mg/kg	32512	mg/kg	M	1.6E-02	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	0.05
												Total	0.12
Dermal	Aroclor-1260	0.687	mg/kg	0.687	mg/kg	M	1.4E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(a)Pyrene	2.3	mg/kg	2.3	mg/kg	M	8.0E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Arsenic	34	mg/kg	34	mg/kg	M	3.8E-06	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.01
	Chromium	97	mg/kg	97	mg/kg	M	3.4E-06	mg/kg/day	3.0E-05	mg/kg/day	NA	NA	0.1
	Iron	32512	mg/kg	32512	mg/kg	M	1.1E-03	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.02
												Total	0.1
												Total Hazard Index Across All Exposure Routes/Pathways	0.3

Surface and surface soil combined.
(1) Medium-Specific (M) EPC selected for hazard calculation.

Table K-7.14
Calculation of Non-Cancer Hazards - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Air
Exposure Point: Emissions from Soil at Site 4
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value (1)	Route EPC Units	EPC Selected for Hazard Calculation (2)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Aroclor-1260	0.687	mg/kg	0.0000000005	mg/m3	R	1.0E-10	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(a)Pyrene	2.300	mg/kg	0.000000002	mg/m3	R	3.4E-10	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Arsenic	34	mg/kg	0.00000003	mg/m3	R	5.1E-09	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Chromium	97	mg/kg	0.00000007	mg/m3	R	1.4E-08	mg/kg/day	2.9E-04	mg/kg/day	1.0E-03	mg/m3	0.00005
	Iron	32512	mg/kg	0.00002	mg/m3	R	4.8E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
												Total	0.00005
												Total Hazard Index Across All Exposure Routes/Pathways	0.00005

*Surface and surface soil combined.

(1) Route-specific EPC value is equal to the medium-specific EPC value multiplied by 1/PEF (PEF = 1.32E+09 mg3/kg).

(2) Route-Specific (R) EPC selected for hazard calculation.

Table K-7.15
Calculation of Non-Cancer Hazards - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage Features
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	Dibenz(a,h)anthracene	3	ug/l	3	ug/l	M	6.8E-04	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	2	ug/l	2	ug/l	M	3.1E-04	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Aluminum	50000	ug/l	50000	ug/l	M	1.0E-03	mg/kg/day	2.7E-01	mg/kg/day	NA	NA	0.004
	Arsenic	26.6	ug/l	26.6	ug/l	M	5.4E-07	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.002
	Iron	93100	ug/l	93100	ug/l	M	1.9E-03	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.03
	Manganese	2310	ug/l	2310	ug/l	M	4.7E-05	mg/kg/day	7.0E-03	mg/kg/day	NA	NA	0.007
												Total	0.04
												Total Hazard Index Across All Exposure Routes/Pathways	0.04

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table K-7.15 RME Supplement
Calculation of Daevent, Adult and Child Resident
Surface Water - Drainage Features
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC)	Lag Time (t)	B (dimensionless)	Duration of Event (ET)	t*	Eq	DAevent
Dibenz(a,h)anthracene	3.0E+00	µg/l	2.7E+00	4.40E+00	6.9E+02	2	2.1E+01	2	6.6E-05
Indeno(1,2,3-cd)pyrene	2.0E+00	µg/l	1.9E+00	4.20E+00	3.8E+02	2	2.0E+01	2	3.0E-05
Aluminum	5.0E+04	µg/l	1.0E-03	N/A	N/A	2	N/A	1	1.0E-04
Arsenic	2.7E+01	µg/l	1.0E-03	N/A	N/A	2	N/A	1	5.3E-08
Iron	9.3E+04	µg/l	1.0E-03	N/A	N/A	2	N/A	1	1.9E-04
Manganese	2.3E+03	µg/l	1.0E-03	N/A	N/A	2	N/A	1	4.6E-06

Inorganics: DAevent (mg/cm2-event) =
PC x EPC x ET x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
ET<t*: DAevent (mg/cm2-event) =
2 x PC x EPC x (sqrt((6 x t x ET)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:
Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

Table K-7.16
Calculation of Non-Cancer Hazards - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage Features
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	Dibenz(a,h)anthracene	3	ug/l	3	ug/l	M	2.3E-03	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Indeno(1,2,3-cd)pyrene	2	ug/l	2	ug/l	M	1.0E-03	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Aluminum	50000	ug/l	50000	ug/l	M	3.4E-03	mg/kg/day	2.7E-01	mg/kg/day	NA	NA	0.01
	Arsenic	26.6	ug/l	26.6	ug/l	M	1.8E-06	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.006
	Iron	93100	ug/l	93100	ug/l	M	6.4E-03	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.1
	Manganese	2310	ug/l	2310	ug/l	M	1.6E-04	mg/kg/day	7.0E-03	mg/kg/day	NA	NA	0.02
												Total	0.1
												Total Hazard Index Across All Exposure Routes/Pathways	0.1

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table K-7.17
Calculation of Non-Cancer Hazards - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage Features
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)Pyrene	0.888	mg/kg	0.888	mg/kg	M	1.8E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Arsenic	27.7	mg/kg	27.7	mg/kg	M	5.6E-06	mg/kg/day	3.0E-04	mg/kg/day	NA	NA	0.019
	Iron	53013	mg/kg	53013	mg/kg	M	1.1E-02	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	0.036
												Total	0.055
Dermal	Benzo(a)Pyrene	0.888	mg/kg	0.888	mg/kg	M	1.7E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Arsenic	27.7	mg/kg	27.7	mg/kg	M	1.7E-06	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.006
	Iron	53013	mg/kg	53013	mg/kg	M	1.0E-03	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.02
												Total	0.02
												Total Hazard Index Across All Exposure Routes/Pathways	0.07

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table K-7.18
Calculation of Non-Cancer Hazards - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage Features
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)Pyrene	0.888	mg/kg	0.888	mg/kg	M	1.7E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Arsenic	27.7	mg/kg	27.7	mg/kg	M	5.3E-05	mg/kg/day	3.0E-04	mg/kg/day	NA	NA	0.2
	Iron	53013	mg/kg	53013	mg/kg	M	1.0E-01	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	0.3
												Total	0.5
Dermal	Benzo(a)Pyrene	0.888	mg/kg	0.888	mg/kg	M	2.0E-05	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Arsenic	27.7	mg/kg	27.7	mg/kg	M	2.0E-04	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.7
	Iron	53013	mg/kg	53013	mg/kg	M	1.2E-01	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	2.0
												Total	3
												Total Hazard Index Across All Exposure Routes/Pathways	3

Table K-7.19
Calculation of Non-Cancer Hazards - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Shallow Groundwater
Exposure Point: Water Table
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	Bis(2-Ethylhexyl)Phthalate	13.0	ug/l	13.0	ug/l	M	9.4E-05	mg/kg/day	1.1E-02	mg/kg/day	NA	NA	0.0086
	Aluminum	28000	ug/l	28000	ug/l	M	6.9E-04	mg/kg/day	2.7E-01	mg/kg/day	NA	NA	0.003
	Antimony	1.9	ug/l	1.9	ug/l	M	4.6E-08	mg/kg/day	4.0E-05	mg/kg/day	NA	NA	0.001
	Arsenic	11	ug/l	11	ug/l	M	2.7E-07	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.001
	Barium	647	ug/l	647	ug/l	M	1.6E-05	mg/kg/day	7.0E-02	mg/kg/day	NA	NA	0.0002
	Cadmium	4.2	ug/l	4.2	ug/l	M	1.0E-07	mg/kg/day	2.5E-05	mg/kg/day	NA	NA	0.004
	Chromium	37	ug/l	37	ug/l	M	9.1E-07	mg/kg/day	2.0E-04	mg/kg/day	NA	NA	0.005
	Cobalt	89	ug/l	89	ug/l	M	2.2E-06	mg/kg/day	1.8E-02	mg/kg/day	NA	NA	0.0001
	Iron	90900	ug/l	90900	ug/l	M	2.2E-03	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.04
	Manganese	3590	ug/l	3590	ug/l	M	8.8E-05	mg/kg/day	7.0E-03	mg/kg/day	NA	NA	0.01
	Nickel	52	ug/l	52	ug/l	M	1.3E-07	mg/kg/day	2.0E-04	mg/kg/day	NA	NA	0.001
	Silver	140	ug/l	140	ug/l	M	3.4E-06	mg/kg/day	1.0E-03	mg/kg/day	NA	NA	0.003
	Thallium	1.7	ug/l	1.7	ug/l	M	4.3E-08	mg/kg/day	7.0E-05	mg/kg/day	NA	NA	0.0006
	Vanadium	54	ug/l	54	ug/l	M	1.3E-06	mg/kg/day	1.4E-04	mg/kg/day	NA	NA	0.01
												Total	0.09
												Total Hazard Index Across All Exposure Routes/Pathways	0.09

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table K-7.19 RME Supplement
Calculation of Daevent, Adult Construction Worker
Shallow Groundwater
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC)	Lag Time (t)	B (dimensionless)	Duration of Event (ET)	t*	Eq	DAevent
Bis(2-Ethylhexyl)Phthalate	1.3E+01	µg/l	3.3E-02	2.1E+01	1.3E+01	2	1.0E+02	2	7.7E-06
Aluminum	2.8E+04	µg/l	1.0E-03	N/A	N/A	2	N/A	1	5.6E-05
Antimony	1.9E+00	µg/l	1.0E-03	N/A	N/A	2	N/A	1	3.8E-09
Arsenic	1.1E+01	µg/l	1.0E-03	N/A	N/A	2	N/A	1	2.2E-08
Barium	6.5E+02	µg/l	1.0E-03	N/A	N/A	2	N/A	1	1.3E-06
Cadmium	4.2E+00	µg/l	1.0E-03	N/A	N/A	2	N/A	1	8.3E-09
Chromium	3.7E+01	µg/l	1.0E-03	N/A	N/A	2	N/A	1	7.4E-08
Cobalt	8.9E+01	µg/l	1.0E-03	N/A	N/A	2	N/A	1	1.8E-07
Iron	9.1E+04	µg/l	1.0E-03	N/A	N/A	2	N/A	1	1.8E-04
Manganese	3.6E+03	µg/l	1.0E-03	N/A	N/A	2	N/A	1	7.2E-06
Nickel	5.2E+01	µg/l	1.0E-04	N/A	N/A	2	N/A	1	1.0E-08
Silver	1.4E+02	µg/l	1.0E-03	N/A	N/A	2	N/A	1	2.8E-07
Thallium	1.7E+00	µg/l	1.0E-03	N/A	N/A	2	N/A	1	3.5E-09
Vanadium	5.4E+01	µg/l	1.0E-03	N/A	N/A	2	N/A	1	1.1E-07

Inorganics: DAevent (mg/cm2-event) =
PC x EPC x ET x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
ET<t*: DAevent (mg/cm2-event) =
2 x PC x EPC x (sqrt((6 x t x ET)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:
Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

Table K-7.20
Calculation of Non-Cancer Hazards - CT
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Deep Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	bis(2-Ethylhexyl)phthalate	3	ug/l	3	ug/l	M	4.1E-05	mg/kg/day	2.0E-02	mg/kg/day	NA	NA	0.002
	Chloroform	1.9	ug/l	1.9	ug/l	M	2.5E-05	mg/kg/day	1.0E-02	mg/kg/day	NA	NA	0.002
	Arsenic	3.6	ug/l	3.6	ug/l	M	4.6E-05	mg/kg/day	3.0E-04	mg/kg/day	NA	NA	0.2
	Barium	224	ug/l	224	ug/l	M	2.9E-03	mg/kg/day	7.0E-02	mg/kg/day	NA	NA	0.04
	Iron	31624	ug/l	31624	ug/l	M	4.1E-01	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	1
	Manganese	6052	ug/l	6052	ug/l	M	7.8E-02	mg/kg/day	2.0E-02	mg/kg/day	NA	NA	4
												Total	5
Dermal	bis(2-Ethylhexyl)phthalate	3	ug/l	3	ug/l	M	2.7E-05	mg/kg/day	1.1E-02	mg/kg/day	NA	NA	0.0025
	Chloroform	1.9	ug/l	1.9	ug/l	M	2.1E-06	mg/kg/day	1.0E-02	mg/kg/day	NA	NA	0.0002
	Arsenic	3.6	ug/l	3.6	ug/l	M	9.4E-08	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.0003
	Barium	224	ug/l	224	ug/l	M	5.9E-06	mg/kg/day	7.0E-02	mg/kg/day	NA	NA	0.0001
	Iron	31624	ug/l	31624	ug/l	M	8.4E-04	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.014
	Manganese	6052	ug/l	6052	ug/l	M	1.6E-04	mg/kg/day	7.0E-03	mg/kg/day	NA	NA	0.023
												Total	0.04
												Total Hazard Index Across All Exposure Routes/Pathways	5

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table K-7.20 CT Supplement
Calculation of Daevent, Adult Resident
Deep Groundwater - Tap Water
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC)	Lag Time (t)	B (dimensionless)	Duration of Event (ET)	t*	Eq	DAevent
bis(2-Ethylhexyl)phthalate	3.2E+00	µg/l	3.30E-02	2.10E+00	1.3E+01	0.17	1.0E+02	2	1.7E-07
Chloroform	1.9E+00	µg/l	8.9E-03	4.7E-01	9.3E-03	0.17	1.1E+00	2	1.3E-08
Arsenic	3.6E+00	µg/l	1.0E-03	N/A	N/A	0.17	N/A	1	6.1E-10
Barium	2.2E+02	µg/l	1.0E-03	N/A	N/A	0.17	N/A	1	3.8E-08
Iron	3.2E+04	µg/l	1.0E-03	N/A	N/A	0.17	N/A	1	5.4E-06
Manganese	6.1E+03	µg/l	1.0E-03	N/A	N/A	0.17	N/A	1	1.0E-06

Inorganics: DAevent (mg/cm2-event) =
PC x EPC x ET x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
ET<t*: DAevent (mg/cm2-event) =
2 x PC x EPC x (sqrt((6 x t x ET)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:
Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

Table K-7.21
Calculation of Non-Cancer Hazards - CT
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Deep Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	bis(2-Ethylhexyl)phthalate	3	ug/l	3	ug/l	M	1.2E-04	mg/kg/day	2.0E-02	mg/kg/day	NA	NA	0.006
	Chloroform	1.9	ug/l	1.9	ug/l	M	7.2E-05	mg/kg/day	1.0E-02	mg/kg/day	NA	NA	0.007
	Arsenic	3.6	ug/l	3.6	ug/l	M	1.3E-04	mg/kg/day	3.0E-04	mg/kg/day	NA	NA	0.4
	Barium	224	ug/l	224	ug/l	M	8.3E-03	mg/kg/day	7.0E-02	mg/kg/day	NA	NA	0.12
	Iron	31624	ug/l	31624	ug/l	M	1.2E+00	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	4
	Manganese	6052	ug/l	6052	ug/l	M	2.3E-01	mg/kg/day	2.0E-02	mg/kg/day	NA	NA	11
												Total	16
Dermal	bis(2-Ethylhexyl)phthalate	3	ug/l	3	ug/l	M	6.5E-05	mg/kg/day	1.1E-02	mg/kg/day	NA	NA	0.006
	Chloroform	1.9	ug/l	1.9	ug/l	M	5.0E-06	mg/kg/day	1.0E-02	mg/kg/day	NA	NA	0.0005
	Arsenic	3.6	ug/l	3.6	ug/l	M	2.7E-07	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.0010
	Barium	224	ug/l	224	ug/l	M	1.7E-05	mg/kg/day	7.0E-02	mg/kg/day	NA	NA	0.0002
	Iron	31624	ug/l	31624	ug/l	M	2.4E-03	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.04
	Manganese	6052	ug/l	6052	ug/l	M	4.7E-04	mg/kg/day	7.0E-03	mg/kg/day	NA	NA	0.07
												Total	0.1
												Total Hazard Index Across All Exposure Routes/Pathways	16

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table K-7.21 CT Supplement
Calculation of Daevent, Child Resident
Deep Groundwater - Tap Water
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC)	Lag Time (t)	B (dimensionless)	Duration of Event (ET)	t*	Eq	DAevent
bis(2-Ethylhexyl)phthalate	3.2E+00	µg/l	3.30E-02	2.10E+00	1.3E+01	0.25	1.0E+02	2	2.1E-07
Chloroform	1.9E+00	µg/l	8.9E-03	4.7E-01	9.3E-03	0.25	1.1E+00	2	1.6E-08
Arsenic	3.6E+00	µg/l	1.0E-03	N/A	N/A	0.25	N/A	1	8.9E-10
Barium	2.2E+02	µg/l	1.0E-03	N/A	N/A	0.25	N/A	1	5.6E-08
Iron	3.2E+04	µg/l	1.0E-03	N/A	N/A	0.25	N/A	1	7.9E-06
Manganese	6.1E+03	µg/l	1.0E-03	N/A	N/A	0.25	N/A	1	1.5E-06

Inorganics: DAevent (mg/cm2-event) =
PC x EPC x ET x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
ET<t*: DAevent (mg/cm2-event) =
2 x PC x EPC x (sqrt((6 x t x ET)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:
Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

Table K-7.22
Calculation of Non-Cancer Hazards - CT
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 4
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aroclor-1260	0.276	mg/kg	0.276	mg/kg	M	1.2E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Dieldrin	0.007	mg/kg	0.007	mg/kg	M	3.0E-08	mg/kg/day	5.0E-05	mg/kg/day	NA	NA	0.0006
	Benzo(a)Anthracene	0.351	mg/kg	0.351	mg/kg	M	1.5E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(a)Pyrene	1.271	mg/kg	1.271	mg/kg	M	5.4E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(b)Fluoranthene	0.652	mg/kg	0.652	mg/kg	M	2.8E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Dibenz(a,h)Anthracene	0.320	mg/kg	0.320	mg/kg	M	1.4E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Indeno(1,2,3-cd)Pyrene	0.330	mg/kg	0.330	mg/kg	M	1.4E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Aluminum	9686	mg/kg	9686	mg/kg	M	4.1E-02	mg/kg/day	1.0E+00	mg/kg/day	NA	NA	0.04
	Antimony	4.3	mg/kg	4.3	mg/kg	M	1.8E-05	mg/kg/day	4.0E-04	mg/kg/day	NA	NA	0.05
	Arsenic	19	mg/kg	19	mg/kg	M	8.2E-05	mg/kg/day	3.0E-04	mg/kg/day	NA	NA	0.3
	Barium	79	mg/kg	79	mg/kg	M	3.4E-04	mg/kg/day	7.0E-02	mg/kg/day	NA	NA	0.005
	Cadmium	0.7	mg/kg	0.7	mg/kg	M	3.0E-06	mg/kg/day	1.0E-03	mg/kg/day	NA	NA	0.003
	Chromium	54	mg/kg	54	mg/kg	M	2.3E-04	mg/kg/day	2.0E-02	mg/kg/day	NA	NA	0.01
	Copper	81	mg/kg	81	mg/kg	M	3.5E-04	mg/kg/day	3.7E-02	mg/kg/day	NA	NA	0.009
	Iron	24014	mg/kg	24014	mg/kg	M	1.0E-01	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	0.3
	Manganese	186	mg/kg	186	mg/kg	M	8.0E-04	mg/kg/day	1.4E-02	mg/kg/day	NA	NA	0.06
	Nickel	47.2	mg/kg	47.2	mg/kg	M	2.0E-04	mg/kg/day	2.0E-02	mg/kg/day	NA	NA	0.010
	Thallium	0.8	mg/kg	0.8	mg/kg	M	3.3E-06	mg/kg/day	7.0E-05	mg/kg/day	NA	NA	0.05
	Vanadium	55	mg/kg	55	mg/kg	M	2.4E-04	mg/kg/day	7.0E-03	mg/kg/day	NA	NA	0.03
	Zinc	200	mg/kg	200	mg/kg	M	8.6E-04	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	0.003
												Total	0.9

Table K-7.22
Calculation of Non-Cancer Hazards - CT
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 4
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	Aroclor-1260	0.276	mg/kg	0.276	mg/kg	M	6.7E-08	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Dieldrin	0.007	mg/kg	0.007	mg/kg	M	2.9E-09	mg/kg/day	2.5E-05	mg/kg/day	NA	NA	0.0001
	Benzo(a)Anthracene	0.351	mg/kg	0.351	mg/kg	M	1.4E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(a)Pyrene	1.271	mg/kg	1.271	mg/kg	M	5.2E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(b)Fluoranthene	0.652	mg/kg	0.652	mg/kg	M	2.6E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Dibenz(a,h)Anthracene	0.320	mg/kg	0.320	mg/kg	M	1.3E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Indeno(1,2,3-cd)Pyrene	0.330	mg/kg	0.330	mg/kg	M	1.3E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Aluminum	9686	mg/kg	9686	mg/kg	M	3.9E-04	mg/kg/day	2.7E-01	mg/kg/day	NA	NA	0.001
	Antimony	4.3	mg/kg	4.3	mg/kg	M	1.7E-07	mg/kg/day	4.0E-05	mg/kg/day	NA	NA	0.004
	Arsenic	19	mg/kg	19	mg/kg	M	2.5E-06	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.009
	Barium	79	mg/kg	79	mg/kg	M	3.2E-06	mg/kg/day	7.0E-02	mg/kg/day	NA	NA	0.00005
	Cadmium	0.7	mg/kg	0.7	mg/kg	M	2.9E-08	mg/kg/day	2.5E-05	mg/kg/day	NA	NA	0.001
	Chromium	54	mg/kg	54	mg/kg	M	2.2E-06	mg/kg/day	2.0E-04	mg/kg/day	NA	NA	0.01
	Copper	81	mg/kg	81	mg/kg	M	3.3E-06	mg/kg/day	2.2E-02	mg/kg/day	NA	NA	0.0001
	Iron	24014	mg/kg	24014	mg/kg	M	9.8E-04	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.02
	Manganese	186	mg/kg	186	mg/kg	M	7.6E-06	mg/kg/day	2.0E-04	mg/kg/day	NA	NA	0.04
	Nickel	47.2	mg/kg	47.2	mg/kg	M	1.9E-06	mg/kg/day	2.0E-04	mg/kg/day	NA	NA	0.010
	Thallium	0.8	mg/kg	0.8	mg/kg	M	3.2E-08	mg/kg/day	7.0E-05	mg/kg/day	NA	NA	0.0005
	Vanadium	55	mg/kg	55	mg/kg	M	2.2E-06	mg/kg/day	1.4E-04	mg/kg/day	NA	NA	0.02
	Zinc	200	mg/kg	200	mg/kg	M	8.1E-06	mg/kg/day	7.5E-02	mg/kg/day	NA	NA	0.0001
												Total	0.1
												Total Hazard Index Across All Exposure Routes/Pathways	1

*Surface and surface soil combined.
(1) Medium-Specific (M) EPC selected for hazard calculation.

Table K-7.23
Calculation of Non-Cancer Hazards - CT
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage Features
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)Pyrene	0.321	mg/kg	0.321	mg/kg	M	1.5E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Arsenic	14.9	mg/kg	14.9	mg/kg	M	7.1E-06	mg/kg/day	3.0E-04	mg/kg/day	NA	NA	0.02
	Iron	30388	mg/kg	30388	mg/kg	M	1.4E-02	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	0.05
												Total	0.07
Dermal	Benzo(a)Pyrene	0.321	mg/kg	0.321	mg/kg	M	8.8E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Arsenic	14.9	mg/kg	14.9	mg/kg	M	1.3E-05	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.05
	Iron	30388	mg/kg	30388	mg/kg	M	8.4E-03	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.1
												Total	0.2
												Total Hazard Index Across All Exposure Routes/Pathways	0.3

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table K-8.1
Calculation of Cancer Risks - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: At Site 4
Receptor Population: Trespasser
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aroclor-1260	0.991	mg/kg	0.991	mg/kg	M	8.6E-08	1/mg/kg/day	2.0E+00	1/mg/kg/day	1.7E-07
	Benzo(a)Pyrene	2.3	mg/kg	2.3	mg/kg	M	2.0E-07	1/mg/kg/day	7.3E+00	1/mg/kg/day	1.5E-06
	Arsenic	16.8	mg/kg	16.8	mg/kg	M	1.5E-06	1/mg/kg/day	1.5E+00	1/mg/kg/day	2.2E-06
	Chromium	129	mg/kg	129	mg/kg	M	1.1E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Iron	33173	mg/kg	33173	mg/kg	M	2.9E-03	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	3.8E-06
Dermal	Aroclor-1260	0.991	mg/kg	0.991	mg/kg	M	4.9E-08	1/mg/kg/day	2.2E+00	1/mg/kg/day	1.1E-07
	Benzo(a)Pyrene	2.3	mg/kg	2.3	mg/kg	M	1.9E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	16.8	mg/kg	16.8	mg/kg	M	4.5E-07	1/mg/kg/day	1.6E+00	1/mg/kg/day	7.0E-07
	Chromium	129	mg/kg	129	mg/kg	M	1.1E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Iron	33173	mg/kg	33173	mg/kg	M	2.7E-03	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	8.1E-07
										Total Risk Across All Exposure Routes/Pathways	4.6E-06

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table K-8.2
Calculation of Cancer Risks - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: At Site 4
Receptor Population: Trespasser
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aroclor-1260	0.991	mg/kg	0.991	mg/kg	M	2.2E-08	1/mg/kg/day	2.0E+00	1/mg/kg/day	4.3E-08
	Benzo(a)Pyrene	2.3	mg/kg	2.3	mg/kg	M	5.0E-08	1/mg/kg/day	7.3E+00	1/mg/kg/day	3.7E-07
	Arsenic	16.8	mg/kg	16.8	mg/kg	M	3.7E-07	1/mg/kg/day	1.5E+00	1/mg/kg/day	5.5E-07
	Chromium	129	mg/kg	129	mg/kg	M	2.8E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Iron	33173	mg/kg	33173	mg/kg	M	7.2E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	9.6E-07
Dermal	Aroclor-1260	0.991	mg/kg	0.991	mg/kg	M	5.7E-09	1/mg/kg/day	2.2E+00	1/mg/kg/day	1.3E-08
	Benzo(a)Pyrene	2.3	mg/kg	2.3	mg/kg	M	2.2E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	16.8	mg/kg	16.8	mg/kg	M	5.2E-08	1/mg/kg/day	1.6E+00	1/mg/kg/day	8.1E-08
	Chromium	129	mg/kg	129	mg/kg	M	1.2E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Iron	33173	mg/kg	33173	mg/kg	M	3.2E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	9.4E-08
										Total Risk Across All Exposure Routes/Pathways	1.1E-06

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table K-8.3
Calculation of Cancer Risks - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from Surface Soil at Site 4
Receptor Population: Trespasser
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value (1)	Route EPC Units	EPC Selected for Hazard Calculation (2)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Aroclor-1260	0.991	mg/kg	0.0000000008	mg/m3	R	1.0E-12	1/mg/kg/day	2.0E+00	1/mg/kg/day	2.1E-12
	Benzo(a)Pyrene	2.300	mg/kg	0.000000002	mg/m3	R	2.4E-12	1/mg/kg/day	3.1E+00	1/mg/kg/day	7.5E-12
	Arsenic	17	mg/kg	0.00000001	mg/m3	R	1.7E-11	1/mg/kg/day	1.5E+01	1/mg/kg/day	2.6E-10
	Chromium	129	mg/kg	0.0000001	mg/m3	R	1.4E-10	1/mg/kg/day	4.1E+01	1/mg/kg/day	5.6E-09
	Iron	33173	mg/kg	0.00002	mg/m3	R	3.5E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	5.9E-09
										Total Risk Across All Exposure Routes/Pathways	5.9E-09

(1) Route-specific EPC value is equal to the medium-specific EPC value multiplied by 1/PEF (PEF = 1.32E+09 mg3/kg).
(2) Route-Specific (R) EPC selected for hazard calculation.

Table K-8.4
Calculation of Cancer Risks - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from Surface Soil at Site 4
Receptor Population: Trespasser
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value (1)	Route EPC Units	EPC Selected for Hazard Calculation (2)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Aroclor-1260	0.991	mg/kg	0.0000000008	mg/m3	R	2.3E-13	1/mg/kg/day	2.0E+00	1/mg/kg/day	4.6E-13
	Benzo(a)Pyrene	2.300	mg/kg	0.000000002	mg/m3	R	5.3E-13	1/mg/kg/day	3.1E+00	1/mg/kg/day	1.6E-12
	Arsenic	17	mg/kg	0.00000001	mg/m3	R	3.8E-12	1/mg/kg/day	1.5E+01	1/mg/kg/day	5.7E-11
	Chromium	129	mg/kg	0.0000001	mg/m3	R	3.0E-11	1/mg/kg/day	4.1E+01	1/mg/kg/day	1.2E-09
	Iron	33173	mg/kg	0.00002	mg/m3	R	7.6E-09	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	1.3E-09
										Total Risk Across All Exposure Routes/Pathways	1.3E-09

(1) Route-specific EPC value is equal to the medium-specific EPC value multiplied by 1/PEF (PEF = 1.32E+09 mg3/kg).
(2) Route-Specific (R) EPC selected for hazard calculation.

Table K-8.5
Calculation of Cancer Risks - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Deep Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	bis(2-Ethylhexyl)phthalate	5	ug/l	5	ug/l	M	7.5E-05	1/mg/kg/day	1.4E-02	1/mg/kg/day	1.0E-06
	Chloroform	9	ug/l	9	ug/l	M	1.3E-04	1/mg/kg/day	6.1E-03	1/mg/kg/day	8.2E-07
	Arsenic	19.1	ug/l	19.1	ug/l	M	2.9E-04	1/mg/kg/day	1.5E+00	1/mg/kg/day	4.3E-04
	Barium	489	ug/l	489	ug/l	M	7.3E-03	1/mg/kg/day	NA	1/mg/kg/day	NA
	Iron	68500	ug/l	68500	ug/l	M	1.0E+00	1/mg/kg/day	NA	1/mg/kg/day	NA
	Manganese	12500	ug/l	12500	ug/l	M	1.9E-01	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	4.3E-04
Dermal	bis(2-Ethylhexyl)phthalate	5	ug/l	5	ug/l	M	4.7E-05	1/mg/kg/day	2.5E-02	1/mg/kg/day	1.2E-06
	Chloroform	9	ug/l	9	ug/l	M	1.1E-05	1/mg/kg/day	6.1E-03	1/mg/kg/day	6.5E-08
	Arsenic	19.1	ug/l	19.1	ug/l	M	7.1E-07	1/mg/kg/day	1.6E+00	1/mg/kg/day	1.1E-06
	Barium	489	ug/l	489	ug/l	M	1.8E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Iron	68500	ug/l	68500	ug/l	M	2.5E-03	1/mg/kg/day	NA	1/mg/kg/day	NA
	Manganese	12500	ug/l	12500	ug/l	M	4.6E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	2.4E-06
										Total Risk Across All Exposure Routes/Pathways	4.3E-04

(1) Medium-Specific (M) EPC selected for risk calculation.

Table K-8.5a RME Supplement
Calculation of Daevent, Adult Resident
Deep Groundwater - Tap Water
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC)	Lag Time (t)	B (dimensionless)	Duration of Event (ET)	t*	Eq	DAevent
bis(2-Ethylhexyl)phthalate	5.00E+00	µg/l	3.3E-02	2.10E+00	1.3E+01	0.25	1.0E+02	2	3.3E-07
Chloroform	9.0E+00	µg/l	8.9E-03	4.7E-01	9.3E-03	0.25	1.1E+00	2	7.6E-08
Arsenic	1.9E+01	µg/l	1.0E-03	N/A	N/A	0.25	N/A	1	4.8E-09
Barium	4.9E+02	µg/l	1.0E-03	N/A	N/A	0.25	N/A	1	1.2E-07
Iron	6.9E+04	µg/l	1.0E-03	N/A	N/A	0.25	N/A	1	1.7E-05
Manganese	1.3E+04	µg/l	1.0E-03	N/A	N/A	0.25	N/A	1	3.1E-06

Inorganics: DAevent (mg/cm2-event) =
PC x EPC x ET x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
ET<t*: DAevent (mg/cm2-event) =
2 x PC x EPC x (sqrt((6 x t x ET)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:
Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

Table K-8.5b RME Supplement
Calculation of Daevent, Child Resident
Deep Groundwater - Tap Water
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC)	Lag Time (t)	B (dimensionless)	Duration of Event (ET)	t*	Eq	DAevent
bis(2-Ethylhexyl)phthalate	5.00E+00	µg/l	3.3E-02	2.10E+00	1.3E+01	0.33	1.0E+02	2	3.8E-07
Chloroform	9.0E+00	µg/l	8.9E-03	4.7E-01	9.3E-03	0.33	1.1E+00	2	8.7E-08
Arsenic	1.9E+01	µg/l	1.0E-03	N/A	N/A	0.33	N/A	1	6.3E-09
Barium	4.9E+02	µg/l	1.0E-03	N/A	N/A	0.33	N/A	1	1.6E-07
Iron	6.9E+04	µg/l	1.0E-03	N/A	N/A	0.33	N/A	1	2.3E-05
Manganese	1.3E+04	µg/l	1.0E-03	N/A	N/A	0.33	N/A	1	4.1E-06

Inorganics: DAevent (mg/cm2-event) =
PC x EPC x ET x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
ET<t*: DAevent (mg/cm2-event) =
2 x PC x EPC x (sqrt((6 x t x ET)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:
Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

Table K-8.6
Calculation of Cancer Risks - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Deep Groundwater - Water Vapors at Showerhead
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Chloroform	9	ug/l	4.9E-04	ug/l	M	1.6E-04	1/mg/kg/day	8.1E-02	1/mg/kg/day	1.3E-05
										Total	1.3E-05
										Total Risk Across All Exposure Routes/Pathways	1.3E-05

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table K-8.6 RME Supplement
Inhalation Exposure Concentrations from Foster and Chrostoski Shower Model
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical	Exposure Point Concentration Cwo (µg/l)	Molecular weight (HH) (g/mole)	Henry's Law Constant (H) (atm-m^3/mole)	Kg (VOC) (cm/hr)	Kl(VOC) (cm/hr)	KL (cm/hr)	Kal (cm/hr)	Cwd (µg/l)	S (µg/m^3-min)	Calculated Inhalation Exposure (Einh) (mg/kg/shower)
Chloroform	9.0E+00	1.2E+02	4.4E-03	1.16E+03	1.21E+01	1.15E+01	1.55E+01	3.63E+00	2.42E+01	4.94E-04

Variables	Units	Exposure Assumptions	Source
Kg(VOC) = gas-film mass transfer coefficient	cm/hr	Solved by Eq 1	NA
Kl(VOC) = liquid-film mass transfer coefficient	cm/hr	Solved by Eq 2	NA
KL = overall mass transfer coefficient	cm/hr	Solved by Eq 3	NA
Kal = adjusted overall mass transfer coeff.	cm/hr	Solved by Eq 4	NA
Tl = Calibration temp. of water	K (20C +273)	293	F&C
Ts = Shower water temperature	k (45C)	318	F&C
Us = water viscosity at Ts	centipoise	0.596	F&C
Ul = water viscosity at Tl	cp	1.002	F&C
Cwd = conc. leaving droplets after time sdt	ug/l	Solved by Eq 5	NA
sdt = shower droplet drop time	sec	2	F&C
d = shower droplet diameter	mm	1	F&C
FR = shower water flow rate	l/min	20	F&C
SV = shower room air volume	m^3	3	F&C
S = indoor VOC generation rate	ug/m^3-min	Solved by Eq 6	NA
VR = ventilation rate	l/min	13.8	USEPA, 1991
BW = body weight	kg	70	USEPA, 1991
Ds = duration of shower	min	12	USEPA, 1989
Dt = total duration in shower room	min	15	
R = air exchange rate	min^{-1}	0.0083	F&C
Ca = indoor air concentration of VOCs	ug/m^3	Solved by Eq 7	NA
Einh = inhalation exposure per shower	mg/kg/shower	Solved by Eq 8	NA

Equation 1:	Kg(VOC) =	$3000 * (18 / HH)^{0.5}$	
Equation 2:	Kl(VOC) =	$20 * (44 / HH)^{0.5}$	
Equation 3:	KL =	$((1 / Kl(VOC)) + (0.024 / (Kg (VOC) * H)))^{-1}$	
Equation 4:	Kal =	$(KL * (((Tl * Us) / (Ts * Ul))^{-0.5}))$	
Equation 5:	Cwd =	(Cwo * (1-EXP((-1 * Kal * sdt)/(60 * d))))	
Equation 6:	S =	(Cwd * FR / SV)	
Equation 7:	see time series example on Table I-GW-5		
Equation 8:	**Einh =**	**If t>Ds**	(((VR * S) / (BW * R * 1000000)) * ((Ds + (EXP(-R * Dt) / R)-(EXP(R * (Ds - Dt))) / R)))

Table K-8.7
Calculation of Cancer Risks - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage Features
Receptor Population: Trespasser
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	Dibenz(a,h)anthracene	3	ug/l	3	ug/l	M	2.0E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
	Indeno(1,2,3-cd)pyrene	2	ug/l	2	ug/l	M	9.4E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Aluminum	50000	ug/l	50000	ug/l	M	2.2E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	26.6	ug/l	26.6	ug/l	M	1.2E-07	1/mg/kg/day	1.6E+00	1/mg/kg/day	1.8E-07
	Iron	93100	ug/l	93100	ug/l	M	4.1E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
	Manganese	2310	ug/l	2310	ug/l	M	1.0E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	1.8E-07
										Total Risk Across All Exposure Routes/Pathways	1.8E-07

(1) Medium-Specific (M) EPC selected for risk calculation.

Table K-8.7 RME Supplement
Calculation of Daevent, Adult and Adolescent Trespasser
Surface Water
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC)	Lag Time (t)	B (dimensionless)	Duration of Event (ET)	t*	Eq	DAevent
Dibenz(a,h)anthracene	3.0E+00	µg/l	2.7E+00	4.4E+00	6.9E+02	1	2.1E+01	2	4.7E-05
Indeno(1,2,3-cd)pyrene	2.0E+00	µg/l	1.9E+00	4.2E+00	3.8E+02	1	2.0E+01	2	2.2E-05
Aluminum	5.0E+04	µg/l	1.0E-03	N/A	N/A	1	N/A	1	5.0E-05
Arsenic	2.7E+01	µg/l	1.0E-03	N/A	N/A	1	N/A	1	2.7E-08
Iron	9.3E+04	µg/l	1.0E-03	N/A	N/A	1	N/A	1	9.3E-05
Manganese	2.3E+03	µg/l	1.0E-03	N/A	N/A	1	N/A	1	2.3E-06

Inorganics: DAevent (mg/cm2-event) =
PC x EPC x ET x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
ET<t*: DAevent (mg/cm2-event) =
2 x PC x EPC x (sqrt((6 x t x ET)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:
Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

Table K-8.8
Calculation of Cancer Risks - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage Features
Receptor Population: Trespasser
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	Dibenz(a,h)anthracene	3	ug/l	3	ug/l	M	1.0E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Indeno(1,2,3-cd)pyrene	2	ug/l	2	ug/l	M	4.7E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Aluminum	50000	ug/l	50000	ug/l	M	1.1E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	26.6	ug/l	26.6	ug/l	M	5.8E-09	1/mg/kg/day	1.6E+00	1/mg/kg/day	9.2E-09
	Iron	93100	ug/l	93100	ug/l	M	2.0E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Manganese	2310	ug/l	2310	ug/l	M	5.0E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	9.2E-09
										Total Risk Across All Exposure Routes/Pathways	9.2E-09

(1) Medium-Specific (M) EPC selected for risk calculation.

Table K-8.9
Calculation of Cancer Risks - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 4
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aroclor-1260	0.687	mg/kg	0.687	mg/kg	M	1.1E-06	1/mg/kg/day	2.0E+00	1/mg/kg/day	2.2E-06
	Dieldrin	0.012	mg/kg	0.012	mg/kg	M	1.9E-08	1/mg/kg/day	1.6E+01	1/mg/kg/day	3.0E-07
	Benzo(a)Anthracene	2.11	mg/kg	2.11	mg/kg	M	3.3E-06	1/mg/kg/day	7.3E-01	1/mg/kg/day	2.4E-06
	Benzo(a)Pyrene	2.3	mg/kg	2.3	mg/kg	M	3.6E-06	1/mg/kg/day	7.3E+00	1/mg/kg/day	2.6E-05
	Benzo(b)Fluoranthene	2.57	mg/kg	2.57	mg/kg	M	4.0E-06	1/mg/kg/day	7.3E-01	1/mg/kg/day	2.9E-06
	Dibenz(a,h)Anthracene	0.32	mg/kg	0.32	mg/kg	M	5.0E-07	1/mg/kg/day	7.3E+00	1/mg/kg/day	3.7E-06
	Indeno(1,2,3-cd)Pyrene	1.1	mg/kg	1.1	mg/kg	M	1.7E-06	1/mg/kg/day	7.3E-01	1/mg/kg/day	1.3E-06
	Aluminum	12013	mg/kg	12013	mg/kg	M	1.9E-02	1/mg/kg/day	NA	1/mg/kg/day	NA
	Antimony	8.4	mg/kg	8.4	mg/kg	M	1.3E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	34	mg/kg	34	mg/kg	M	5.4E-05	1/mg/kg/day	1.5E+00	1/mg/kg/day	8.0E-05
	Barium	174	mg/kg	174	mg/kg	M	2.7E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
	Cadmium	1.4	mg/kg	1.4	mg/kg	M	2.1E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Chromium	97	mg/kg	97	mg/kg	M	1.5E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
	Copper	294	mg/kg	294	mg/kg	M	4.6E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
	Iron	32512	mg/kg	32512	mg/kg	M	5.1E-02	1/mg/kg/day	NA	1/mg/kg/day	NA
	Manganese	243	mg/kg	243	mg/kg	M	3.8E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
	Nickel	83	mg/kg	83	mg/kg	M	1.3E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
	Thallium	1.1	mg/kg	1.1	mg/kg	M	1.7E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Vanadium	77	mg/kg	77	mg/kg	M	1.2E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
	Zinc	707	mg/kg	707	mg/kg	M	1.1E-03	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	1.2E-04

Table K-8.9
Calculation of Cancer Risks - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 4
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	Aroclor-1260	0.687	mg/kg	0.687	mg/kg	M	2.7E-07	1/mg/kg/day	2.2E+00	1/mg/kg/day	6.1E-07
	Dieldrin	0.012	mg/kg	0.012	mg/kg	M	7.9E-09	1/mg/kg/day	3.2E+01	1/mg/kg/day	2.5E-07
	Benzo(a)Anthracene	2.11	mg/kg	2.11	mg/kg	M	1.4E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Benzo(a)Pyrene	2.3	mg/kg	2.3	mg/kg	M	1.5E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Benzo(b)Fluoranthene	2.57	mg/kg	2.57	mg/kg	M	1.7E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Dibenz(a,h)Anthracene	0.32	mg/kg	0.32	mg/kg	M	2.1E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Indeno(1,2,3-cd)Pyrene	1.1	mg/kg	1.1	mg/kg	M	7.3E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Aluminum	12013	mg/kg	12013	mg/kg	M	8.0E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
	Antimony	8.4	mg/kg	8.4	mg/kg	M	5.5E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	34	mg/kg	34	mg/kg	M	7.3E-06	1/mg/kg/day	1.6E+00	1/mg/kg/day	1.1E-05
	Barium	174	mg/kg	174	mg/kg	M	1.2E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Cadmium	1.4	mg/kg	1.4	mg/kg	M	9.0E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
	Chromium	97	mg/kg	97	mg/kg	M	6.4E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Copper	294	mg/kg	294	mg/kg	M	2.0E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Iron	32512	mg/kg	32512	mg/kg	M	2.2E-03	1/mg/kg/day	NA	1/mg/kg/day	NA
	Manganese	243	mg/kg	243	mg/kg	M	1.6E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Nickel	83	mg/kg	83	mg/kg	M	5.5E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Thallium	1.1	mg/kg	1.1	mg/kg	M	7.0E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
	Vanadium	77	mg/kg	77	mg/kg	M	5.1E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Zinc	707	mg/kg	707	mg/kg	M	4.7E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	1.2E-05
										Total Risk Across All Exposure Routes/Pathways	1.3E-04

*Surface and surface soil combined.

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table K-8.10
Calculation of Cancer Risks - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 4
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aroclor-1260	0.687	mg/kg	0.687	mg/kg	M	2.3E-08	1/mg/kg/day	2.0E+00	1/mg/kg/day	4.6E-08
	Benzo(a)Pyrene	2.3	mg/kg	2.3	mg/kg	M	7.7E-08	1/mg/kg/day	7.3E+00	1/mg/kg/day	5.6E-07
	Arsenic	34	mg/kg	34	mg/kg	M	1.1E-06	1/mg/kg/day	1.5E+00	1/mg/kg/day	1.7E-06
	Chromium	97	mg/kg	97	mg/kg	M	3.2E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Iron	32512	mg/kg	32512	mg/kg	M	1.1E-03	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	2.3E-06
Dermal	Aroclor-1260	0.687	mg/kg	0.687	mg/kg	M	3.5E-09	1/mg/kg/day	2.2E+00	1/mg/kg/day	7.7E-09
	Benzo(a)Pyrene	2.3	mg/kg	2.3	mg/kg	M	1.9E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	34	mg/kg	34	mg/kg	M	9.2E-08	1/mg/kg/day	1.6E+00	1/mg/kg/day	1.5E-07
	Chromium	97	mg/kg	97	mg/kg	M	8.1E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
	Iron	32512	mg/kg	32512	mg/kg	M	2.7E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	1.5E-07
										Total Risk Across All Exposure Routes/Pathways	2.5E-06

*Surface and surface soil combined.

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table K-8.11
Calculation of Cancer Risks - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 4
Receptor Population: Other Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aroclor-1260	0.687	mg/kg	0.687	mg/kg	M	4.8E-09	1/mg/kg/day	2.0E+00	1/mg/kg/day	2.4E-07
	Benzo(a)Pyrene	2.3	mg/kg	2.3	mg/kg	M	1.6E-08	1/mg/kg/day	7.3E+00	1/mg/kg/day	2.9E-06
	Arsenic	34	mg/kg	34	mg/kg	M	2.4E-07	1/mg/kg/day	1.5E+00	1/mg/kg/day	9.0E-06
	Chromium	97	mg/kg	97	mg/kg	M	6.8E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Iron	32512	mg/kg	32512	mg/kg	M	2.3E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	1.2E-05
Dermal	Aroclor-1260	0.687	mg/kg	0.687	mg/kg	M	5.12E-07	1/mg/kg/day	2.2E+00	1/mg/kg/day	1.1E-06
	Benzo(a)Pyrene	2.3	mg/kg	2.3	mg/kg	M	2.86E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	34	mg/kg	34	mg/kg	M	1.36E-05	1/mg/kg/day	1.6E+00	1/mg/kg/day	2.2E-05
	Chromium	97	mg/kg	97	mg/kg	M	1.20E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Iron	32512	mg/kg	32512	mg/kg	M	4.04E-03	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	2.3E-05
										Total Risk Across All Exposure Routes/Pathways	3.5E-05

Surface and surface soil combined.

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table K-8.12
Calculation of Cancer Risks - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Air
Exposure Point: Emissions from Soil at Site 4
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value (1)	Route EPC Units	EPC Selected for Hazard Calculation (2)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Aroclor-1260	0.687	mg/kg	0.0000000005	mg/m3	R	7.3E-13	1/mg/kg/day	2.0E+00	1/mg/kg/day	1.5E-12
	Benzo(a)Pyrene	2.300	mg/kg	0.000000002	mg/m3	R	2.4E-12	1/mg/kg/day	3.1E+00	1/mg/kg/day	7.6E-12
	Arsenic	34	mg/kg	0.00000003	mg/m3	R	3.6E-11	1/mg/kg/day	1.5E+01	1/mg/kg/day	5.5E-10
	Chromium	97	mg/kg	0.00000007	mg/m3	R	1.0E-10	1/mg/kg/day	4.1E+01	1/mg/kg/day	4.2E-09
	Iron	32512	mg/kg	0.00002	mg/m3	R	3.4E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	4.8E-09
										Total Risk Across All Exposure Routes/Pathways	4.8E-09

*Surface and surface soil combined.

(1) Route-specific EPC value is equal to the medium-specific EPC value multiplied by 1/PEF (PEF = 1.32E+09 mg3/kg).

(2) Route-Specific (R) EPC selected for hazard calculation.

Table K-8.13
Calculation of Cancer Risks - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage Features
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	Dibenz(a,h)anthracene	3	ug/l	3	ug/l	M	1.4E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Indeno(1,2,3-cd)pyrene	2	ug/l	2	ug/l	M	1.2E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Aluminum	50000	ug/l	50000	ug/l	M	9.2E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	26.6	ug/l	26.6	ug/l	M	4.9E-08	1/mg/kg/day	1.6E+00	1/mg/kg/day	7.7E-08
	Iron	93100	ug/l	93100	ug/l	M	1.7E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
	Manganese	2310	ug/l	2310	ug/l	M	4.2E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	7.7E-08
										Total Risk Across All Exposure Routes/Pathways	7.7E-08

(1) Medium-Specific (M) EPC selected for risk calculation.

Table K-8.13a RME Supplement
Calculation of Daevent, Adult Resident
Surface Water - Drainage Features
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC)	Lag Time (t)	B (dimensionless)	Duration of Event (ET)	t*	Eq	DAevent
bis(2-Ethylhexyl)phthalate	3.00E+00	µg/l	3.3E-02	2.10E+00	1.3E+01	0.25	1.0E+02	2	2.0E-07
Chloroform	2.0E+00	µg/l	8.9E-03	4.7E-01	9.3E-03	0.25	1.1E+00	2	1.7E-08
Arsenic	5.0E+04	µg/l	1.0E-03	N/A	N/A	0.25	N/A	1	1.3E-05
Barium	2.7E+01	µg/l	1.0E-03	N/A	N/A	0.25	N/A	1	6.7E-09
Iron	9.3E+04	µg/l	1.0E-03	N/A	N/A	0.25	N/A	1	2.3E-05
Manganese	2.3E+03	µg/l	1.0E-03	N/A	N/A	0.25	N/A	1	5.8E-07

Inorganics: DAevent (mg/cm2-event) =
PC x EPC x ET x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
ET<t*: DAevent (mg/cm2-event) =
2 x PC x EPC x (sqrt((6 x t x ET)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:
Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

Table K-8.13b RME Supplement
Calculation of Daevent, Child Resident
Surface Water - Drainage
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC)	Lag Time (t)	B (dimensionless)	Duration of Event (ET)	t*	Eq	DAevent
bis(2-Ethylhexyl)phthalate	3.00E+00	µg/l	3.3E-02	2.10E+00	1.3E+01	0.33	1.0E+02	2	2.3E-07
Chloroform	2.0E+00	µg/l	8.9E-03	4.7E-01	9.3E-03	0.33	1.1E+00	2	1.9E-08
Arsenic	5.0E+04	µg/l	1.0E-03	N/A	N/A	0.33	N/A	1	1.7E-05
Barium	2.7E+01	µg/l	1.0E-03	N/A	N/A	0.33	N/A	1	8.8E-09
Iron	9.3E+04	µg/l	1.0E-03	N/A	N/A	0.33	N/A	1	3.1E-05
Manganese	2.3E+03	µg/l	1.0E-03	N/A	N/A	0.33	N/A	1	7.6E-07

Inorganics: DAevent (mg/cm2-event) =
PC x EPC x ET x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
ET<t*: DAevent (mg/cm2-event) =
2 x PC x EPC x (sqrt((6 x t x ET)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:
Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

Table K-8.14
Calculation of Cancer Risks - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage Features
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Benzo(a)Pyrene	0.888	mg/kg	0.888	mg/kg	M	2.1E-07	1/mg/kg/day	7.3E+00	1/mg/kg/day	1.5E-06
	Arsenic	27.7	mg/kg	27.7	mg/kg	M	6.4E-06	1/mg/kg/day	1.5E+00	1/mg/kg/day	9.7E-06
	Iron	53013	mg/kg	53013	mg/kg	M	1.2E-02	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	1.1E-05
Dermal	Benzo(a)Pyrene	0.888	mg/kg	0.888	mg/kg	M	1.1E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	27.7	mg/kg	27.7	mg/kg	M	1.8E-05	1/mg/kg/day	1.6E+00	1/mg/kg/day	2.8E-05
	Iron	53013	mg/kg	53013	mg/kg	M	1.1E-02	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	2.8E-05
										Total Risk Across All Exposure Routes/Pathways	4.0E-05

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table K-8.15
Calculation of Cancer Risks - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Shallow Groundwater
Exposure Point: Water Table
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	Bis(2-Ethylhexyl)Phthalate	13.0	ug/l	13.0	ug/l	M	6.8E-07	1/mg/kg/day	2.5E-02	1/mg/kg/day	1.7E-08
	Aluminum	28000	ug/l	28000	ug/l	M	4.9E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Antimony	1.9	ug/l	1.9	ug/l	M	3.3E-10	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	11	ug/l	11	ug/l	M	2.0E-09	1/mg/kg/day	1.6E+00	1/mg/kg/day	3.1E-09
	Barium	647	ug/l	647	ug/l	M	1.1E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Cadmium	4.2	ug/l	4.2	ug/l	M	7.3E-10	1/mg/kg/day	NA	1/mg/kg/day	NA
	Chromium	37	ug/l	37	ug/l	M	6.5E-09	1/mg/kg/day	NA	1/mg/kg/day	NA
	Cobalt	89	ug/l	89	ug/l	M	1.6E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
	Iron	90900	ug/l	90900	ug/l	M	1.6E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Manganese	3590	ug/l	3590	ug/l	M	6.3E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Nickel	52	ug/l	52	ug/l	M	9.1E-09	1/mg/kg/day	NA	1/mg/kg/day	NA
	Silver	140	ug/l	140	ug/l	M	2.5E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
	Thallium	1.7	ug/l	1.7	ug/l	M	3.1E-10	1/mg/kg/day	NA	1/mg/kg/day	NA
	Vanadium	54	ug/l	54	ug/l	M	9.5E-09	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	2.0E-08
										Total Risk Across All Exposure Routes/Pathways	2.0E-08

(1) Medium-Specific (M) EPIC selected for risk calculation.

Table K-8.15 RME Supplement A
Calculation of Daevent, Adult Construction Worker
Shallow Groundwater
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC)	Lag Time (t)	B (dimensionless)	Duration of Event (ET)	t*	Eq	DAevent
Bis(2-Ethylhexyl)Phthalate	1.3E+01	µg/l	3.3E-02	2.1E+01	1.3E+01	2	1.0E+02	2	7.7E-06
Aluminum	2.8E+04	µg/l	1.0E-03	N/A	N/A	2	N/A	1	5.6E-05
Antimony	1.9E+00	µg/l	1.0E-03	N/A	N/A	2	N/A	1	3.8E-09
Arsenic	1.1E+01	µg/l	1.0E-03	N/A	N/A	2	N/A	1	2.2E-08
Barium	6.5E+02	µg/l	1.0E-03	N/A	N/A	2	N/A	1	1.3E-06
Cadmium	4.2E+00	µg/l	1.0E-03	N/A	N/A	2	N/A	1	8.3E-09
Chromium	3.7E+01	µg/l	1.0E-03	N/A	N/A	2	N/A	1	7.4E-08
Cobalt	8.9E+01	µg/l	1.0E-03	N/A	N/A	2	N/A	1	1.8E-07
Iron	9.1E+04	µg/l	1.0E-03	N/A	N/A	2	N/A	1	1.8E-04
Manganese	3.6E+03	µg/l	1.0E-03	N/A	N/A	2	N/A	1	7.2E-06
Nickel	5.2E+01	µg/l	1.0E-03	N/A	N/A	2	N/A	1	1.0E-07
Silver	1.4E+02	µg/l	1.0E-03	N/A	N/A	2	N/A	1	2.8E-07
Thallium	1.7E+00	µg/l	1.0E-03	N/A	N/A	2	N/A	1	3.5E-09
Vanadium	5.4E+01	µg/l	1.0E-03	N/A	N/A	2	N/A	1	1.1E-07

Inorganics: DAevent (mg/cm2-event) =
PC x EPC x ET x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
ET<t*: DAevent (mg/cm2-event) =
2 x PC x EPC x (sqrt((6 x t x ET)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:
Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

Table K-8.16
Calculation of Cancer Risks - CT
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Deep Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	bis(2-Ethylhexyl)phthalate	3	ug/l	3	ug/l	M	1.7E-05	1/mg/kg/day	1.4E-02	1/mg/kg/day	2.4E-07
	Chloroform	1.9	ug/l	1.9	ug/l	M	1.0E-05	1/mg/kg/day	6.1E-03	1/mg/kg/day	6.3E-08
	Arsenic	3.6	ug/l	3.6	ug/l	M	1.9E-05	1/mg/kg/day	1.5E+00	1/mg/kg/day	2.8E-05
	Barium	224	ug/l	224	ug/l	M	1.2E-03	1/mg/kg/day	NA	1/mg/kg/day	NA
	Iron	31624	ug/l	31624	ug/l	M	1.7E-01	1/mg/kg/day	NA	1/mg/kg/day	NA
	Manganese	6052	ug/l	6052	ug/l	M	3.2E-02	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	2.9E-05
Dermal	bis(2-Ethylhexyl)phthalate	3	ug/l	3	ug/l	M	1.1E-05	1/mg/kg/day	2.5E-02	1/mg/kg/day	2.7E-07
	Chloroform	1.9	ug/l	1.9	ug/l	M	8.2E-07	1/mg/kg/day	6.1E-03	1/mg/kg/day	5.0E-09
	Arsenic	3.6	ug/l	3.6	ug/l	M	4.9E-08	1/mg/kg/day	1.6E+00	1/mg/kg/day	7.7E-08
	Barium	224	ug/l	224	ug/l	M	3.1E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Iron	31624	ug/l	31624	ug/l	M	4.3E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
	Manganese	6052	ug/l	6052	ug/l	M	8.3E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	3.5E-07
										Total Risk Across All Exposure Routes/Pathways	2.9E-05

(1) Medium-Specific (M) EPC selected for risk calculation.

Table K-8.16a CT Supplement
Calculation of Daevent, Adult Resident
Deep Groundwater - Tap Water
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC)	Lag Time (t)	B (dimensionless)	Duration of Event (ET)	t*	Eq	DAevent
bis(2-Ethylhexyl)phthalate	3.20E+00	µg/l	3.3E-02	2.10E+00	1.3E+01	0.25	1.0E+02	2	2.1E-07
Chloroform	1.9E+00	µg/l	8.9E-03	4.7E-01	9.3E-03	0.25	1.1E+00	2	1.6E-08
Arsenic	3.6E+00	µg/l	1.0E-03	N/A	N/A	0.25	N/A	1	8.9E-10
Barium	2.2E+02	µg/l	1.0E-03	N/A	N/A	0.25	N/A	1	5.6E-08
Iron	3.2E+04	µg/l	1.0E-03	N/A	N/A	0.25	N/A	1	7.9E-06
Manganese	6.1E+03	µg/l	1.0E-03	N/A	N/A	0.25	N/A	1	1.5E-06

Inorganics: DAevent (mg/cm2-event) =
PC x EPC x ET x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
ET<t*: DAevent (mg/cm2-event) =
2 x PC x EPC x (sqrt((6 x t x ET)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:
Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

Table K-8.16b CT Supplement
Calculation of Daevent, Child Resident
Deep Groundwater - Tap Water
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC)	Lag Time (t)	B (dimensionless)	Duration of Event (ET)	t*	Eq	DAevent
bis(2-Ethylhexyl)phthalate	3.20E+00	µg/l	3.3E-02	2.10E+00	1.3E+01	0.33	1.0E+02	2	2.4E-07
Chloroform	1.9E+00	µg/l	8.9E-03	4.7E-01	9.3E-03	0.33	1.1E+00	2	1.9E-08
Arsenic	3.6E+00	µg/l	1.0E-03	N/A	N/A	0.33	N/A	1	1.2E-09
Barium	2.2E+02	µg/l	1.0E-03	N/A	N/A	0.33	N/A	1	7.4E-08
Iron	3.2E+04	µg/l	1.0E-03	N/A	N/A	0.33	N/A	1	1.0E-05
Manganese	6.1E+03	µg/l	1.0E-03	N/A	N/A	0.33	N/A	1	2.0E-06

Inorganics: DAevent (mg/cm2-event) =
PC x EPC x ET x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
ET<t*: DAevent (mg/cm2-event) =
2 x PC x EPC x (sqrt((6 x t x ET)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:
Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

Table K-8.17
Calculation of Cancer Risks - CT
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 4
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aroclor-1260	0.276	mg/kg	0.276	mg/kg	M	1.2E-07	1/mg/kg/day	2.0E+00	1/mg/kg/day	2.3E-07
	Dieldrin	0.007	mg/kg	0.007	mg/kg	M	3.0E-09	1/mg/kg/day	1.6E+01	1/mg/kg/day	4.8E-08
	Benzo(a)Anthracene	0.351	mg/kg	0.351	mg/kg	M	1.5E-07	1/mg/kg/day	7.3E-01	1/mg/kg/day	1.1E-07
	Benzo(a)Pyrene	1.271	mg/kg	1.271	mg/kg	M	5.4E-07	1/mg/kg/day	7.3E+00	1/mg/kg/day	3.9E-06
	Benzo(b)Fluoranthene	0.652	mg/kg	0.652	mg/kg	M	2.8E-07	1/mg/kg/day	7.3E-01	1/mg/kg/day	2.0E-07
	Dibenz(a,h)Anthracene	0.320	mg/kg	0.320	mg/kg	M	1.4E-07	1/mg/kg/day	7.3E+00	1/mg/kg/day	9.9E-07
	Indeno(1,2,3-cd)Pyrene	0.330	mg/kg	0.330	mg/kg	M	1.4E-07	1/mg/kg/day	7.3E-01	1/mg/kg/day	1.0E-07
	Aluminum	9686	mg/kg	9686	mg/kg	M	4.1E-03	1/mg/kg/day	NA	1/mg/kg/day	NA
	Antimony	4.3	mg/kg	4.3	mg/kg	M	1.8E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	19	mg/kg	19	mg/kg	M	8.2E-06	1/mg/kg/day	1.5E+00	1/mg/kg/day	1.2E-05
	Barium	79	mg/kg	79	mg/kg	M	3.4E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Cadmium	0.7	mg/kg	0.7	mg/kg	M	3.0E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Chromium	54	mg/kg	54	mg/kg	M	2.3E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Copper	81	mg/kg	81	mg/kg	M	3.5E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Iron	24014	mg/kg	24014	mg/kg	M	1.0E-02	1/mg/kg/day	NA	1/mg/kg/day	NA
	Manganese	186	mg/kg	186	mg/kg	M	7.9E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Nickel	47.2	mg/kg	47.2	mg/kg	M	2.0E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Thallium	0.8	mg/kg	0.8	mg/kg	M	3.3E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Vanadium	55	mg/kg	55	mg/kg	M	2.3E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Zinc	200	mg/kg	200	mg/kg	M	8.5E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	1.8E-05

Table K-8.17
Calculation of Cancer Risks - CT
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 4
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	Aroclor-1260	0.276	mg/kg	0.276	mg/kg	M	9.5E-09	1/mg/kg/day	2.2E+00	1/mg/kg/day	2.1E-08
	Dieldrin	0.007	mg/kg	0.007	mg/kg	M	4.0E-10	1/mg/kg/day	3.2E+01	1/mg/kg/day	1.3E-08
	Benzo(a)Anthracene	0.351	mg/kg	0.351	mg/kg	M	2.0E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
	Benzo(a)Pyrene	1.271	mg/kg	1.271	mg/kg	M	7.3E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
	Benzo(b)Fluoranthene	0.652	mg/kg	0.652	mg/kg	M	3.7E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
	Dibenz(a,h)Anthracene	0.320	mg/kg	0.320	mg/kg	M	1.8E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
	Indeno(1,2,3-cd)Pyrene	0.330	mg/kg	0.330	mg/kg	M	1.9E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
	Aluminum	9686	mg/kg	9686	mg/kg	M	5.5E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Antimony	4.3	mg/kg	4.3	mg/kg	M	2.4E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	19	mg/kg	19	mg/kg	M	3.5E-07	1/mg/kg/day	1.6E+00	1/mg/kg/day	5.6E-07
	Barium	79	mg/kg	79	mg/kg	M	4.5E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Cadmium	0.7	mg/kg	0.7	mg/kg	M	4.1E-09	1/mg/kg/day	NA	1/mg/kg/day	NA
	Chromium	54	mg/kg	54	mg/kg	M	3.1E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Copper	81	mg/kg	81	mg/kg	M	4.7E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Iron	24014	mg/kg	24014	mg/kg	M	1.4E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
	Manganese	186	mg/kg	186	mg/kg	M	1.1E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Nickel	47.2	mg/kg	47.2	mg/kg	M	2.7E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Thallium	0.8	mg/kg	0.8	mg/kg	M	4.5E-09	1/mg/kg/day	NA	1/mg/kg/day	NA
	Vanadium	55	mg/kg	55	mg/kg	M	3.1E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Zinc	200	mg/kg	200	mg/kg	M	1.1E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	5.9E-07
										Total Risk Across All Exposure Routes/Pathways	1.9E-05

*Surface and surface soil combined.

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table K-8.18
Calculation of Cancer Risks - CT
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 4
Receptor Population: Other Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aroclor-1260	0.276	mg/kg	0.276	mg/kg	M	8.4E-10	1/mg/kg/day	2.0E+00	1/mg/kg/day	1.7E-09
	Benzo(a)Pyrene	1.3	mg/kg	1.3	mg/kg	M	3.9E-09	1/mg/kg/day	7.3E+00	1/mg/kg/day	2.8E-08
	Arsenic	19	mg/kg	19	mg/kg	M	5.9E-08	1/mg/kg/day	1.5E+00	1/mg/kg/day	8.9E-08
	Chromium	54	mg/kg	54	mg/kg	M	1.6E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Iron	24014	mg/kg	24014	mg/kg	M	7.4E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	1.2E-07
Dermal	Aroclor-1260	0.276	mg/kg	0.276	mg/kg	M	7.21E-09	1/mg/kg/day	2.2E+00	1/mg/kg/day	1.6E-08
	Benzo(a)Pyrene	1.3	mg/kg	1.3	mg/kg	M	5.53E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	19	mg/kg	19	mg/kg	M	2.69E-07	1/mg/kg/day	1.6E+00	1/mg/kg/day	4.2E-07
	Chromium	54	mg/kg	54	mg/kg	M	2.34E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Iron	24014	mg/kg	24014	mg/kg	M	1.05E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	4.4E-07
										Total Risk Across All Exposure Routes/Pathways	5.6E-07

Surface and surface soil combined.

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table K-8.19
Calculation of Cancer Risks - CT
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage Features
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Benzo(a)Pyrene	0.321	mg/kg	0.321	mg/kg	M	1.5E-08	1/mg/kg/day	7.3E+00	1/mg/kg/day	1.1E-07
	Arsenic	14.9	mg/kg	14.9	mg/kg	M	7.0E-07	1/mg/kg/day	1.5E+00	1/mg/kg/day	1.1E-06
	Iron	30388	mg/kg	30388	mg/kg	M	1.4E-03	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	1.2E-06
Dermal	Benzo(a)Pyrene	0.321	mg/kg	0.321	mg/kg	M	4.6E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	14.9	mg/kg	14.9	mg/kg	M	1.1E-06	1/mg/kg/day	1.6E+00	1/mg/kg/day	1.8E-06
	Iron	30388	mg/kg	30388	mg/kg	M	7.2E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	1.8E-06
										Total Risk Across All Exposure Routes/Pathways	3.0E-06

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table K-9.1
Summary of Receptor Risks and Hazards for COPCs - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Receptor Population: Trespasser
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	At Site 4	Aroclor-1260	1.7E-07	NA	1.1E-07	2.8E-07	Aroclor-1260	NA	NA	NA	0.1	NA
			Benzo(a)Pyrene	1.5E-06	NA	NA	1.5E-06	Benzo(a)Pyrene	NA	NA	NA	0.00	NA
			Arsenic	2.2E-06	NA	7.0E-07	2.9E-06	Arsenic	Skin	0.00	NA	0.000	0.00
			Chromium	NA	NA	NA	NA	Chromium	NOAEL	0.083	NA	0.00	0.08
			Iron	NA	NA	NA	NA	Iron	Gastrointestinal	0.01	NA	0.00	0.01
			(Total)	3.8E-06	NA	8.1E-07	4.6E-06	(Total)		0.10	NA	0.1	0.1
			Total Risk Across Surface Soil at Site 4				4.6E-06	Total Hazard Index Across Surface Soil at Site 4					0.1
	Air	Emissions from Surface Soil at Site 4	Aroclor-1260	NA	2.1E-12	NA	2.1E-12	Aroclor-1260	NA	NA	0.00	NA	NA
			Benzo(a)Pyrene	NA	7.5E-12	NA	7.5E-12	Benzo(a)Pyrene	NA	NA	0.00	NA	NA
			Arsenic	NA	2.6E-10	NA	2.6E-10	Arsenic	NA	NA	0.00	NA	NA
			Chromium	NA	5.6E-09	NA	5.6E-09	Chromium	Lung	NA	0.00000	NA	0.00000
			Iron	NA	NA	NA	NA	Iron	NA	NA	0.00	NA	NA
			(Total)	NA	5.9E-09	NA	5.9E-09	(Total)		NA	0.00000	NA	0.00000
			Total Risk Across Emissions from Surface Soil				5.9E-09	Total Hazard Index Across Emissions from Surface Soil					0.00000
			Total Risk Across Surface Soil				4.7E-06	Total Hazard Index Across Surface Soil					0.10
Surface Water	Surface Water	Drainage Features	Dibenz(a,h)anthracene	NA	NA	NA	NA	Dibenz(a,h)anthracene	NA	NA	NA	0.02	NA
			Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	Indeno(1,2,3-cd)pyrene	NA	NA	NA	0.02	NA
			Aluminum	NA	NA	NA	NA	Aluminum	CNS	NA	NA	0.000	0.000
			Arsenic	NA	NA	1.8E-07	1.8E-07	Arsenic	Skin	NA	NA	0.0000	0.0000
			Iron	NA	NA	NA	NA	Iron	Gastrointestinal	NA	NA	0.00	0.00
			Manganese	NA	NA	NA	NA	Manganese	CNS	NA	NA	0.000	0.000
			(Total)	NA	NA	1.8E-07	1.8E-07	(Total)		NA	NA	0.00	0.00
			Total Risk Across Surface Water				1.8E-07	Total Hazard Index Across Surface Water					0.00
			Total Risk Across All Media and All Exposure Routes				4.8E-06	Total Hazard Index Across All Media and All Exposure Routes					0.10

Total Skin HI =	3.6E-03
Total NOAEL HI =	8.3E-02
Total Gastrointestinal HI =	1.1E-02
Total Lung HI =	0.0E+00
Total CNS HI =	0.0E+00

Table K-9.2
Summary of Receptor Risks and Hazards for COPCs - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	At Site 4	Aroclor-1260	4.3E-08	NA	1.3E-08	5.6E-08	Aroclor-1260	NA	NA	NA	0.1	NA
			Benzo(a)Pyrene	3.7E-07	NA	NA	3.7E-07	Benzo(a)Pyrene	NA	NA	NA	0.00	NA
			Arsenic	5.5E-07	NA	8.1E-08	6.3E-07	Arsenic	Skin	0.00	NA	0.000	0.00
			Chromium	NA	NA	NA	NA	Chromium	NOAEL	0.007	NA	0.00	0.01
			Iron	NA	NA	NA	NA	Iron	Gastrointestinal	0.01	NA	0.00	0.01
			(Total)	9.6E-07	NA	9.4E-08	1.1E-06	(Total)		0.02	NA	0.06	0.02
			Total Risk Across Surface Soil at Site 4				1.1E-06	Total Hazard Index Across Surface Soil at Site 4					0.02
	Air	Emissions from Surface Soil at Site 4	Aroclor-1260	NA	4.6E-13	NA	4.6E-13	Aroclor-1260	NA	NA	0.00	NA	NA
			Benzo(a)Pyrene	NA	1.6E-12	NA	1.6E-12	Benzo(a)Pyrene	NA	NA	0.00	NA	NA
			Arsenic	NA	5.7E-11	NA	5.7E-11	Arsenic	NA	NA	0.00	NA	NA
			Chromium	NA	1.2E-09	NA	1.2E-09	Chromium	Lung	NA	0.000000	NA	0.000000
			Iron	NA	NA	NA	NA	Iron	NA	NA	0.00	NA	NA
			(Total)	NA	1.3E-09	NA	1.3E-09	(Total)		NA	0.00000	NA	0.00000
			Total Risk Across Emissions from Surface Soil				1.1E-06	Total Hazard Index Across Emissions from Surface Soil					0.00001
			Total Risk Across Surface Soil				1.1E-06	Total Hazard Index Across Surface Soil					0.02
Surface Water	Surface Water	Drainage Features	Dibenz(a,h)anthracene	NA	NA	NA	NA	Dibenz(a,h)anthracene	NA	NA	NA	0.02	NA
			Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	Indeno(1,2,3-cd)pyrene	NA	NA	NA	0.02	NA
			Aluminum	NA	NA	NA	NA	Aluminum	CNS	NA	NA	0.0000	0.0000
			Arsenic	NA	NA	9.2E-09	9.2E-09	Arsenic	Skin	NA	NA	0.0000	0.0000
			Iron	NA	NA	NA	NA	Iron	Gastrointestinal	NA	NA	0.00	0.000
			Manganese	NA	NA	NA	NA	Manganese	CNS	NA	NA	0.000	0.000
				NA	NA	9.2E-09	9.2E-09			NA	NA	0.00	0.00
			Total Risk Across Surface Water				9.2E-09	Total Hazard Index Across Surface Water					0.00
			Total Risk Across All Media and All Exposure Routes				1.1E-06	Total Hazard Index Across All Media and All Exposure Routes					0.02

Total Skin HI =	2.1E-03
Total NOAEL HI =	7.2E-03
Total Gastrointestinal HI =	6.2E-03
Total Lung HI =	0.0E+00
Total CNS HI =	0.0E+00

Table K-9.3
Summary of Receptor Risks and Hazards for COPCs - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water						bis(2-Ethylhexyl)phthalate	Liver	25.345	NA	0.216	25.561
								Chloroform	Liver	0.01	NA	25.5612	25.57
								Arsenic	Skin	0.0	NA	0.000	0.0
								Barium	Heart	0.0	NA	0.0000	0.0
								Iron	Gastrointestinal	0	NA	0.00	0
								Manganese	CNS	0	NA	0.0	0
			(Total)					(Total)		25	NA	25.8	51
			Total Risk Across Tap water				0.0E+00	Total Hazard Index Across Tap water					51
	Air	Deep Groundwater - Water Vapors at Showerhead	Chloroform	NA	1.3E-05	NA	1.3E-05	Chloroform	Nasal	NA	0.0	NA	0.0
			(Total)	NA	1.3E-05	NA	1.3E-05	(Total)		NA	0	NA	0.0
			Total Risk Across Vapors at Showerhead				1.3E-05	Total Hazard Index Across Vapors at Showerhead					0.0
			Total Risk Across All Media and All Exposure Routes				1.3E-05	Total Hazard Index Across All Media and All Exposure Routes					51

Total Liver HI =	51.131
Total Skin HI =	0.0
Total Heart HI =	0.0
Total Gastronintestinal HI =	0
Total CNS HI =	0
Total Nasal HI =	0.0

Table K-9.4
Summary of Receptor Risks and Hazards for COPCs - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water						bis(2-Ethylhexyl)phthalate	Liver	59.14	NA	0.476	59.615
								Chloroform	Liver	0.02	NA	59.615	59.63
								Arsenic	Skin	0.0	NA	0.000	0.0
								Barium	Heart	0.0	NA	0.0000	0.0
								Iron	Gastrointestinal	0	NA	0.00	0
								Manganese	CNS	0	NA	0.0	0
			(Total)					(Total)		59	NA	60.1	119
						Total Risk Across Tap water	0.0E+00					Total Hazard Index Across Tap water	119
						Total Risk Across All Media and All Exposure Routes	0E+00					Total Hazard Index Across All Media and All Exposure Routes	119

Total Liver HI =	119.245
Total Skin HI =	0.0
Total Heart HI =	0.0
Total Gastronintestinal HI =	0
Total CNS HI =	0

Table K-9.5
Summary of Receptor Risks and Hazards for COPCs - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Receptor Population: Resident
Receptor Age: Adult/Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water	bis(2-Ethylhexyl)phthalate	1.0E-06	NA	1.2E-06	2.2E-06						
			Chloroform	8.2E-07	1.3E-05	6.5E-08	1.4E-05						
			Arsenic	4.3E-04	NA	1.1E-06	4.3E-04						
			Barium	NA	NA	NA	NA						
			Iron	NA	NA	NA	NA						
			Manganese	NA	NA	NA	NA						
			(Total)	4.3E-04	1.3E-05	2.4E-06	4.4E-04	(Total)					
							Total Risk Across Tap water	4.4E-04					Total Hazard Index Across Tap water	0
							Total Risk Across All Media and All Exposure Routes	4.4E-04					Total Hazard Index Across All Media and All Exposure Routes	0

Table K-9.6
Summary of Receptor Risks and Hazards for COPCs - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water						bis(2-Ethylhexyl)phthalate	Liver	25.345	NA	0.216	25.561
								Chloroform	Liver	0.01	NA	25.5612	25.57
								Arsenic	Skin	0.0	NA	0.000	0.0
								Barium	Heart	0.0	NA	0.0000	0.0
								Iron	Gastrointestinal	0	NA	0.00	0
								Manganese	CNS	0	NA	0.0	0
			(Total)					(Total)		25	NA	25.8	51
			Total Risk Across Tap water				0.0E+00	Total Hazard Index Across Tap water					51
	Air	Deep Groundwater - Water Vapors at Showerhead	Chloroform	NA	1.3E-05	NA	1.3E-05	Chloroform	Nasal	NA	0.0	NA	0.0
			(Total)	NA	1.3E-05	NA	1.3E-05	(Total)		NA	0	NA	0.0
			Total Risk Across Vapors at Showerhead				1.3E-05	Total Hazard Index Across Vapors at Showerhead					0.0
Soil*	Soil*	At Site 4						Aroclor-1260	NA	NA	NA	NA	NA
								Dieldrin	Liver	0.0165	NA	0.006	0.0222
								Benzo(a)Anthracene	NA	0.03	NA	0.0	NA
								Benzo(a)Pyrene	NA	0.18	NA	0.1	NA
								Benzo(b)Fluoranthene	NA	0.00	NA	0.0	NA
								Dibenz(a,h)Anthracene	NA	0.00	NA	0.0	NA
								Indeno(1,2,3-cd)Pyrene	NA	0.04	NA	0.4	NA
								Aluminum	CNS	0.01	NA	0.00	0.01
								Antimony	Longevity, Blood	0.15	NA	0.07	0.22
								Arsenic	Skin	0.02	NA	0.2	0.18
								Barium	Heart	0.006	NA	0.0541	0.0598
								Cadmium	Kidney	0.021	NA	0.002	0.02
								Chromium	NOAEL	0.02	NA	0.1	0.09
								Copper	Gastrointestinal	0.00	NA	0.001	0.00
								Iron	Gastrointestinal	0.48	NA	0.9	1.35
								Manganese	CNS	NA	NA	1.3	1.35
								Nickel	Body weight	0.00	NA	0.0	0.00
								Thallium	Liver	NA	NA	0.000	0.00
								Vanadium	NOAEL	NA	NA	0.00	0.0
								Zinc	Blood	NA	NA	0.000	0.000
			(Total)				0.0E+00	(Total)		0.96	NA	3.1	3.3
			Total Risk Across Soil* at Site 4				0.0E+00	Total Hazard Index Across Soil* at Site 4					3.3

Table K-9.6
Summary of Receptor Risks and Hazards for COPCs - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Drainage features						Dibenz(a,h)anthracene	NA	NA	NA	0.044	NA
								Indeno(1,2,3-cd)pyrene	NA	NA	NA	0.0440	NA
								Aluminum	CNS	NA	NA	0.000	0.000
								Arsenic	Skin	NA	NA	0.0000	0.000
								Iron	Gastrointestinal	NA	NA	0.00	0.00
								Manganese	CNS	NA	NA	0.000	0.000
			(Total)					(Total)		NA	NA	0.00	0.00
			Total Risk Across Surface Water				0.0E+00	Total Hazard Index Across Surface Water					0.00
Sediment	Sediment	Drainage features						Benzo(a)Pyrene	NA	0.017	NA	0.000	NA
								Arsenic	Skin	0.02	NA	0.0000	0.02
								Iron	Gastrointestinal	0.07	NA	0.000	0.07
			(Total)					(Total)		0.09	NA	0.000	0.09
			Total Risk Across Sediment				0.0E+00	Total Hazard Index Across Sediment					0.09
			Total Risk Across All Media and All Exposure Routes				1.3E-05	Total Hazard Index Across All Media and All Exposure Routes					54.6

* Includes both surface and subsurface soil.

Total Liver HI =	51.15
Total CNS HI =	1.4
Total Longevity HI =	0.22
Total Blood HI =	0.22
Total Skin HI =	0.2
Total Heart HI =	0.064
Total Kidney HI =	0.02
Total NOAEL HI =	0.1
Total Gastrointestinal HI =	1.4
Total Body Weight HI =	0.0
Total Nasal HI =	0.0

Table K-9.7
Summary of Receptor Risks and Hazards for COPCs - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water						bis(2-Ethylhexyl)phthalate	Liver	59.14	NA	0.476	59.615
								Chloroform	Liver	0.02	NA	59.6147	59.63
								Arsenic	Skin	0.0	NA	0.000	0.0
								Barium	Heart	0.0	NA	0.0000	0.0
								Iron	Gastrointestinal	0	NA	0.00	0
								Manganese	CNS	0	NA	0.0	0
			(Total)					(Total)		59	NA	60.1	119
			Total Risk Across Tap water				0.0E+00	Total Hazard Index Across Tap water					119
Soil*	Soil*	At Site 4						Aroclor-1260	NA	NA	NA	NA	NA
								Dieldrin	Liver	0.1536	NA	0.011	0.1649
								Benzo(a)Anthracene	NA	0.27	NA	0.1	NA
								Benzo(a)Pyrene	NA	1.46	NA	0.1	NA
								Benzo(b)Fluoranthene	NA	0.03	NA	0.0	NA
								Dibenz(a,h)Anthracene	NA	0.02	NA	0.0	NA
								Indeno(1,2,3-cd)Pyrene	NA	0.06	NA	0.1	NA
								Aluminum	CNS	0.10	NA	0.00	0.11
								Antimony	Longevity, Blood	1.39	NA	0.14	1.52
								Arsenic	Skin	0.22	NA	0.3	0.53
								Barium	Heart	0.053	NA	0.1052	0.1583
								Cadmium	Kidney	0.194	NA	0.004	0.20
								Chromium	NOAEL	0.14	NA	0.1	0.28
								Copper	Gastrointestinal	0.03	NA	0.002	0.03
								Iron	Gastrointestinal	4.12	NA	1.0	5.12
								Manganese	CNS	NA	NA	5.1	5.12
								Nickel	Body weight	0.00	NA	0.0	0.00
								Thallium	Liver	NA	NA	0.000	0.00
								Vanadium	NOAEL	NA	NA	0.00	0.0
								Zinc	Blood	NA	NA	0.000	0.000
			(Total)				0.0E+00	(Total)		8	NA	7	13
			Total Risk Across Soil* at Site 4				0.0E+00	Total Hazard Index Across Soil* at Site 4					13
Surface Water	Surface Water	Drainage features						Dibenz(a,h)anthracene	NA	NA	NA	0.148	NA
								Indeno(1,2,3-cd)pyrene	NA	NA	NA	0.1477	NA
								Aluminum	CNS	NA	NA	0.00	0.00
								Arsenic	Skin	NA	NA	0.000	0.000
								Iron	Gastrointestinal	NA	NA	0.0	0.0
								Manganese	CNS	NA	NA	0.00	0.00
			(Total)					(Total)		NA	NA	0.0	0.0
			Total Risk Across Surface Water				0.0E+00	Total Hazard Index Across Surface Water					0.00

Table K-9.7
Summary of Receptor Risks and Hazards for COPCs - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sediment	Sediment	Drainage features						Benzo(a)Pyrene	NA	2.024	NA	0.000	NA
								Arsenic	Skin	2.7	NA	0.0	2.7
								Iron	Gastrointestinal	3.2	NA	0.0	3
			(Total)					(Total)		6.0	NA	0.0	6.0
						Total Risk Across Sediment	0.0E+00					Total Hazard Index Across Sediment	6.0
						Total Risk Across All Media and All Exposure Routes	0.0E+00					Total Hazard Index Across All Media and All Exposure Routes	139

* Includes both surface and subsurface soil.

Total Liver HI =	119.41
Total CNS HI =	5.4
Total Longevity HI =	1.52
Total Blood HI =	1.52
Total Skin HI =	3.3
Total Heart HI =	0.169
Total Kidney HI =	0.20
Total NOAEL HI =	0.3
Total Gastrointestinal HI =	8.4
Total Body Weight HI =	0.0

Table K-9.8
Summary of Receptor Risks and Hazards for COPCs - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water	bis(2-Ethylhexyl)phthalate	1.0E-06	NA	1.2E-06	2.2E-06						
			Chloroform	8.2E-07	NA	6.5E-08	8.9E-07						
			Arsenic	4.3E-04	NA	1.1E-06	4.3E-04						
			Barium	NA	NA	NA	NA						
			Iron	NA	NA	NA	NA						
			Manganese	NA	NA	NA	NA						
			(Total)	4.3E-04	NA	2.4E-06	4.3E-04	(Total)					
			Total Risk Across Tap water				4.3E-04	Total Hazard Index Across Tap water					0
Soil*	Soil*	At Site 4	Aroclor-1260	2.2E-06	NA	6.1E-07	2.8E-06						
			Dieldrin	3.0E-07	NA	2.5E-07	5.5E-07						
			Benzo(a)Anthracene	2.4E-06	NA	NA	2.4E-06						
			Benzo(a)Pyrene	2.6E-05	NA	NA	2.6E-05						
			Benzo(b)Fluoranthene	2.9E-06	NA	NA	2.9E-06						
			Dibenz(a,h)Anthracene	3.7E-06	NA	NA	3.7E-06						
			Indeno(1,2,3-cd)Pyrene	1.3E-06	NA	NA	1.3E-06						
			Aluminum	NA	NA	NA	NA						
			Antimony	NA	NA	NA	NA						
			Arsenic	8.0E-05	NA	1.1E-05	9.2E-05						
			Barium	NA	NA	NA	NA						
			Cadmium	NA	NA	NA	NA						
			Chromium	NA	NA	NA	NA						
			Copper	NA	NA	NA	NA						
			Iron	NA	NA	NA	NA						
			Manganese	NA	NA	NA	NA						
			Nickel	NA	NA	NA	NA						
			Thallium	NA	NA	NA	NA						
			Vanadium	NA	NA	NA	NA						
			Zinc	NA	NA	NA	NA						
			(Total)	1.2E-04	NA	1.2E-05	1.3E-04	(Total)					0
			Total Risk Across Soil* at Site 4				1.3E-04	Total Hazard Index Across Soil* at Site 4					0
Surface Water	Surface Water	Drainage features	Dibenz(a,h)anthracene	NA	NA	NA	NA						
			Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA						
			Aluminum	NA	NA	NA	NA						
			Arsenic	NA	NA	7.7E-08	7.7E-08						
			Iron	NA	NA	NA	NA						
			Manganese	NA	NA	NA	NA						
			(Total)	NA	NA	7.7E-08	7.7E-08	(Total)					0
			Total Risk Across Surface Water				7.7E-08	Total Hazard Index Across Surface Water					0

Table K-9.8
Summary of Receptor Risks and Hazards for COPCs - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sediment	Sediment	Drainage features	Benzo(a)Pyrene	1.5E-06	NA	NA	1.5E-06						
			Arsenic	9.7E-06	NA	2.8E-05	3.8E-05						
			Iron	NA	NA	NA	NA						
			(Total)	1.1E-05	NA	2.8E-05	4.0E-05	(Total)					0
							Total Risk Across Sediment	4.0E-05					Total Hazard Index Across Sediment	0
							Total Risk Across All Media and All Exposure Routes	6.0E-04					Total Hazard Index Across All Media and All Exposure Routes	0

* Includes both surface and subsurface soil.

Table K-9.9
Summary of Receptor Risks and Hazards for COPCs - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil*	Soil*	At Site 4	Aroclor-1260	4.6E-08	NA	7.7E-09	5.4E-08	Aroclor-1260	NA	NA	NA	1.2	NA
			Benzo(a)Pyrene	5.6E-07	NA	NA	5.6E-07	Benzo(a)Pyrene	NA	NA	NA	0.000	NA
			Arsenic	1.7E-06	NA	1.5E-07	1.9E-06	Arsenic	Skin	0.0	NA	0.00	0.05
			Chromium	NA	NA	NA	NA	Chromium	NOAEL	0.06	NA	0.0	0.06
			Iron	NA	NA	NA	NA	Iron	Gastrointestinal	0.1	NA	0.00	0.1
			(Total)	2.3E-06	NA	1.5E-07	2.5E-06	(Total)		0	NA	1.2	0
			Total Risk Across Soil* at Site 4				2.5E-06	Total Hazard Index Across Soil* at Site 4					0
	Air	Emissions from Surface Soil at Site 4	Aroclor-1260	NA	1.5E-12	NA	1.5E-12	Aroclor-1260	NA	NA	0.00	NA	NA
			Benzo(a)Pyrene	NA	7.6E-12	NA	7.6E-12	Benzo(a)Pyrene	NA	NA	0.00	NA	NA
			Arsenic	NA	5.5E-10	NA	5.5E-10	Arsenic	NA	NA	0.00	NA	NA
			Chromium	NA	4.2E-09	NA	4.2E-09	Chromium	Lung	NA	0.00000	NA	0.00000
			Iron	NA	NA	NA	NA	Iron	NA	NA	0.00	NA	NA
			(Total)	NA	4.8E-09	NA	4.8E-09	(Total)		NA	0.00000	NA	0.00000
			Total Risk Across Emissions from Surface Soil				4.8E-09	Total Hazard Index Across Emissions from Surface Soil					0.00000
			Total Risk Across Surface Soil				2.5E-06	Total Hazard Index Across Surface Soil					0
Groundwater	Shallow Groundwater	Water Table	Bis(2-Ethylhexyl)Phthalate	NA	NA	1.7E-08	1.7E-08	Bis(2-Ethylhexyl)Phthalate	Liver	NA	NA	0.005	0.0045
			Aluminum	NA	NA	NA	NA	Aluminum	CNS	NA	NA	0.000	0.000
			Antimony	NA	NA	NA	NA	Antimony	Longevity, Blood	NA	NA	0.037	0.037
			Arsenic	NA	NA	3.1E-09	3.1E-09	Arsenic	Skin	NA	NA	0.013	0.013
			Barium	NA	NA	NA	NA	Barium	Heart	NA	NA	0.0006	0.0006
			Cadmium	NA	NA	NA	NA	Cadmium	Kidney	NA	NA	0.003	0.003
			Chromium	NA	NA	NA	NA	Chromium	NOAEL	NA	NA	0.001	0.001
			Cobalt	NA	NA	NA	NA	Cobalt	Sensitizer	NA	NA	0.0094	0.0094
			Iron	NA	NA	NA	NA	Iron	Gastrointestinal	NA	NA	0.09	0.09
			Manganese	NA	NA	NA	NA	Manganese	CNS	NA	NA	0.09	0.09
			Nickel	NA	NA	NA	NA	Nickel	Body Weight	NA	NA	0.000	0.000
			Silver	NA	NA	NA	NA	Silver	Skin	NA	NA	0.000	0.000
			Thallium	NA	NA	NA	NA	Thallium	Liver	NA	NA	0.000	0.0000
			Vanadium	NA	NA	NA	NA	Vanadium	NOAEL	NA	NA	0.00	0.00
			(Total)	NA	NA	2.0E-08	2.0E-08	(Total)		NA	NA	0.24	0.24
			Total Risk Across Shallow Groundwater				2.0E-08	Total Hazard Index Across Shallow Groundwater					0.24
			Total Risk Across All Media and All Exposure Routes				2.5E-06	Total Hazard Index Across All Media and All Exposure Routes					0.4

* Includes both surface and subsurface soil.

Total Skin HI =	0.1
Total NOAEL HI =	0.1
Total Gastrointestinal HI =	0.1
Total Lung HI =	0.00000
Total Liver HI =	0.005
Total CNS HI =	0.09
Total Longevity HI =	0.037
Total Blood HI =	0.037
Total Heart HI =	0.0006
Total Kidney HI =	0.003
Total Sensitizer HI =	0.009
Total Body Weight HI =	0.00

Table K-9.10
Summary of Receptor Risks and Hazards for COPCs - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil*	Soil*	At Site 4	Aroclor-1260	2.4E-07	NA	1.1E-06	1.4E-06	Aroclor-1260	NA	NA	NA	0.3	NA
			Benzo(a)Pyrene	2.9E-06	NA	NA	2.9E-06	Benzo(a)Pyrene	NA	NA	NA	0.0	NA
			Arsenic	9.0E-06	NA	2.2E-05	3.0E-05	Arsenic	Skin	0.01	NA	0.00	0.01
			Chromium	NA	NA	NA	NA	Chromium	NOAEL	0.11	NA	0.0	0.11
			Iron	NA	NA	NA	NA	Iron	Gastrointestinal	0.02	NA	0.00	0.02
				1.2E-05	NA	2.3E-05	3.5E-05	(Total)		0.1	NA	0.27	0.1
							Total Risk Across Soil* at Site 3	3.5E-05					Total Hazard Index Across Soil* at Site 3	0.1
							Total Risk Across All Media and All Exposure Routes	3.5E-05					Total Hazard Index Across All Media and All Exposure Routes	0.1

* Includes both surface and subsurface soil.

Total Skin HI =	0.01
Total NOAEL HI =	0.11
Total Gastrointestinal HI =	0.02

Table K-9.11
Summary of Receptor Risks and Hazards for COPCs - CT
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water						bis(2-Ethylhexyl)phthalate	Liver	5.429	NA	0.040	5.469
								Chloroform	Liver	0.002	NA	5.4691	5.472
								Arsenic	Skin	0.0	NA	0.0000	0.0
								Barium	Heart	0.00	NA	0.0000	0.00
								Iron	Gastrointestinal	0	NA	0.00	0
								Manganese	CNS	0	NA	0.00	0
			(Total)					(Total)		5	NA	5.51	11
							Total Risk Across Tap water						Total Hazard Index Across Tap water	11
							Total Risk Across All Media and All Exposure Routes						Total Hazard Index Across All Media and All Exposure Routes	11

Total Liver HI =	10.941
Total Skin HI =	0.0
Total Heart HI =	0.00
Total Gastronintestinal HI =	0
Total CNS HI =	0

Table K-9.12
Summary of Receptor Risks and Hazards for COPCs - CT
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water						bis(2-Ethylhexyl)phthalate	Liver	15.745	NA	0.115	15.86
								Chloroform	Liver	0.006	NA	15.8594	15.865
								Arsenic	Skin	0.00	NA	0.000	0.0
								Barium	Heart	0.001	NA	0.0000	0.00
								Iron	Gastrointestinal	0.0	NA	0.00	0
								Manganese	CNS	0	NA	0.0	0
			(Total)					(Total)		16	NA	16.0	32
						Total Risk Across Tap water	0.0E+00					Total Hazard Index Across Tap water	32
						Total Risk Across All Media and All Exposure Routes	0E+00					Total Hazard Index Across All Media and All Exposure Routes	32

Total Liver HI =	31.725
Total Skin HI =	0.0
Total Heart HI =	0.00
Total Gastronintestinal HI =	0
Total CNS HI =	0

Table K-9.13
Summary of Receptor Risks and Hazards for COPCs - CT
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Receptor Population: Resident
Receptor Age: Adult/Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water	bis(2-Ethylhexyl)phthalate	2.4E-07	NA	2.7E-07	5.1E-07						
			Chloroform	6.3E-08	NA	5.0E-09	6.8E-08						
			Arsenic	2.8E-05	NA	7.7E-08	2.8E-05						
			Barium	NA	NA	NA	NA						
			Iron	NA	NA	NA	NA						
			Manganese	NA	NA	NA	NA						
			(Total)	2.9E-05	NA	3.5E-07	2.9E-05	(Total)					0
			Total Risk Across Tap water				2.9E-05	Total Hazard Index Across Tap water					0
			Total Risk Across All Media and All Exposure Routes				2.9E-05	Total Hazard Index Across All Media and All Exposure Routes					0

Table K-9.14
Summary of Receptor Risks and Hazards for COPCs - CT
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water						bis(2-Ethylhexyl)phthalate	Liver	5.429	NA	0.040	5.469
								Chloroform	Liver	0.002	NA	5.4691	5.472
								Arsenic	Skin	0.0	NA	0.0000	0.0
								Barium	Heart	0.00	NA	0.0000	0.00
								Iron	Gastrointestinal	0	NA	0.00	0
								Manganese	CNS	0	NA	0.00	0
			(Total)					(Total)		5	NA	5.51	11
			Total Risk Across Tap water				0.0E+00					Total Hazard Index Across Tap water	11
			Total Risk Across All Media and All Exposure Routes				0.0E+00					Total Hazard Index Across All Media and All Exposure Routes	11

* Includes both surface and subsurface soil.

Total Liver HI =	10.941
Total CNS HI =	0
Total Skin HI =	0.0
Total Heart HI =	0.00
Total Gastrointestinal HI =	0

Table K-9.15
Summary of Receptor Risks and Hazards for COPCs - CT
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water						bis(2-Ethylhexyl)phthalate	Liver	15.745	NA	0.115	15.86
								Chloroform	Liver	0.01	NA	15.8594	15.865
								Arsenic	Skin	0.0	NA	0.000	0.0
								Barium	Heart	0.00	NA	0.0000	0.00
								Iron	Gastrointestinal	0	NA	0.00	0
								Manganese	CNS	0	NA	0.0	0
			(Total)					(Total)		16	NA	16.0	32
			Total Risk Across Tap water				0.0E+00	Total Hazard Index Across Tap water					32
Soil*	Soil*	At Site 4						Aroclor-1260	NA	NA	NA	NA	NA
								Dieldrin	Liver	0.1536	NA	0.011	0.165
								Benzo(a)Anthracene	NA	0.05	NA	0.0	NA
								Benzo(a)Pyrene	NA	0.27	NA	0.0	NA
								Benzo(b)Fluoranthene	NA	0.00	NA	0.0	NA
								Dibenz(a,h)Anthracene	NA	0.00	NA	0.0	NA
								Indeno(1,2,3-cd)Pyrene	NA	0.01	NA	0.0	NA
								Aluminum	CNS	0.01	NA	0.000	0.01
								Antimony	Longevity, Blood	0.34	NA	0.016	0.36
								Arsenic	Skin	0.06	NA	0.038	0.1
								Barium	Heart	0.010	NA	0.00958	0.020
								Cadmium	Kidney	0.048	NA	0.000	0.048
								Chromium	NOAEL	0.03	NA	0.02	0.05
								Copper	Gastrointestinal	0.00	NA	0.0001	0.00
								Iron	Gastrointestinal	0.88	NA	0.11	1.0
								Manganese	CNS	NA	NA	0.99	0.99
								Nickel	Body weight	0.000	NA	0.000	0.00
								Thallium	Liver	NA	NA	0.0000	0.00
								Vanadium	NOAEL	NA	NA	0.00	0.00
								Zinc	Blood	NA	NA	0.0000	0.000
			(Total)				0E+00	(Total)		1.9	NA	1.2	2.7
			Total Risk Across Soil* at Site 4				0E+00	Total Hazard Index Across Soil* at Site 4					2.7
Sediment	Sediment	Drainage features						Benzo(a)Pyrene	NA	0.139	NA	0.000	NA
								Arsenic	Skin	0.19	NA	0.0	0.19
								Iron	Gastrointestinal	0.26	NA	0.00	0.26
			(Total)					(Total)		0.44	NA	0.00	0.4
			Total Risk Across Sediment				0.0E+00	Total Hazard Index Across Sediment					0.4
			Total Risk Across All Media and All Exposure Routes				0E+00	Total Hazard Index Across All Media and All Exposure Routes					35

Table K-9.15
Summary of Receptor Risks and Hazards for COPCs - CT
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total

Total Liver HI =	31.89
Total CNS HI =	1.0
Total Longevity HI =	0.36
Total Blood HI =	0.36
Total Skin HI =	0.3
Total Heart HI =	0.021
Total Kidney HI =	0.048
Total NOAEL HI =	0.05
Total Gastrointestinal HI =	1.3
Total Body Weight HI =	0.00

* Includes both surface and subsurface soil.

Table K-9.16
Summary of Receptor Risks and Hazards for COPCs - CT
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water	bis(2-Ethylhexyl)phthalate	2.4E-07	NA	2.7E-07	5.1E-07						
			Chloroform	6.3E-08	NA	5.0E-09	6.8E-08						
			Arsenic	2.8E-05	NA	7.7E-08	2.8E-05						
			Barium	NA	NA	NA	NA						
			Iron	NA	NA	NA	NA						
			Manganese	NA	NA	NA	NA						
			(Total)	2.9E-05	NA	3.5E-07	2.9E-05	(Total)					0
			Total Risk Across Tap water				2.9E-05	Total Hazard Index Across Tap water					0
Soil*	Soil*	At Site 4	Aroclor-1260	2.3E-07	NA	2.1E-08	2.6E-07						
			Dieldrin	4.8E-08	NA	1.3E-08	6.1E-08						
			Benzo(a)Anthracene	1.1E-07	NA	NA	1.1E-07						
			Benzo(a)Pyrene	3.9E-06	NA	NA	3.9E-06						
			Benzo(b)Fluoranthene	2.0E-07	NA	NA	2.0E-07						
			Dibenz(a,h)Anthracene	9.9E-07	NA	NA	9.9E-07						
			Indeno(1,2,3-cd)Pyrene	1.0E-07	NA	NA	1.0E-07						
			Aluminum	NA	NA	NA	NA						
			Antimony	NA	NA	NA	NA						
			Arsenic	1.2E-05	NA	5.6E-07	1.3E-05						
			Barium	NA	NA	NA	NA						
			Cadmium	NA	NA	NA	NA						
			Chromium	NA	NA	NA	NA						
			Copper	NA	NA	NA	NA						
			Iron	NA	NA	NA	NA						
			Manganese	NA	NA	NA	NA						
			Nickel	NA	NA	NA	NA						
			Thallium	NA	NA	NA	NA						
			Vanadium	NA	NA	NA	NA						
			Zinc	NA	NA	NA	NA						
			(Total)	1.8E-05	NA	5.9E-07	1.9E-05	(Total)					0
			Total Risk Across Soil* at Site 4				1.9E-05	Total Hazard Index Across Soil* at Site 4					0
Sediment	Sediment	Drainage features	Benzo(a)Pyrene	1.1E-07	NA	NA	1.1E-07						
			Arsenic	1.1E-06	NA	1.8E-06	2.8E-06						
			Iron	NA	NA	NA	NA						
			(Total)	1.2E-06	NA	1.8E-06	3.0E-06	(Total)					0
			Total Risk Across Sediment				3.0E-06	Total Hazard Index Across Sediment					0
			Total Risk Across All Media and All Exposure Routes				5.1E-05	Total Hazard Index Across All Media and All Exposure Routes					0

* Includes both surface and subsurface soil.

Table K-10.1
Risk Assessment Summary - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water						Arsenic	Skin	0.0	NA	0.000	0.0
								Barium	Heart	0.0	NA	0.0000	0.0
								Iron	Gastrointestinal	0	NA	0.00	0
								Manganese	CNS	0	NA	0.0	0
			(Total)					(Total)		0	NA	0.0	0
			Total Risk Across Tap water				0.0E+00	Total Hazard Index Across Tap water					0
	Air	Deep Groundwater - Water Vapors at Showerhead	Chloroform	NA	1E-05	NA	1E-05	Chloroform	Nasal	NA	0.0	NA	0.0
			(Total)	NA	1E-05	NA	1E-05	(Total)		NA	0	NA	0.0
			Total Risk Across Vapors at Showerhead				1E-05	Total Hazard Index Across Vapors at Showerhead					0.0
			Total Risk Across All Media and All Exposure Routes				1E-05	Total Hazard Index Across All Media and All Exposure Routes					0

Total Skin HI =	0.0
Total Heart HI =	0.0
Total Gastronintestinal HI =	0
Total CNS HI =	0
Total Nasal HI =	0.0

Table K-10.2
Summary of Receptor Risks and Hazards for COPCs
Risk Assessment Summary - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water						Arsenic	Skin	0.0	NA	0.000	0.0
								Barium	Heart	0.0	NA	0.0000	0.0
								Iron	Gastrointestinal	0	NA	0.00	0
								Manganese	CNS	0	NA	0.0	0
			(Total)					(Total)		0	NA	0.0	0
			Total Risk Across Tap water				0.0E+00		Total Hazard Index Across Tap water				0
			Total Risk Across All Media and All Exposure Routes				0E+00		Total Hazard Index Across All Media and All Exposure Routes				0

Total Skin HI =	0.0
Total Heart HI =	0.0
Total Gastronintestinal HI =	0
Total CNS HI =	0

Table K-10.3
Risk Assessment Summary - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Receptor Population: Resident
Receptor Age: Adult/Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water	bis(2-Ethylhexyl)phthalate	1E-06	NA	1E-06	2E-06						
			Chloroform	8E-07	NA	7E-08	9E-07						
			Arsenic	4E-04	NA	1E-06	4E-04						
			(Total)	4E-04	NA	2E-06	4E-04	(Total)					
							Total Risk Across Tap water						Total Hazard Index Across Tap water
							4E-04						0
							Total Risk Across All Media and All Exposure Routes						Total Hazard Index Across All Media and All Exposure Routes
							4E-04						0

Table K-10.4
Risk Assessment Summary - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water						Arsenic	Skin	0.0	NA	0.000	0.0
								Barium	Heart	0.0	NA	0.0000	0.0
								Iron	Gastrointestinal	0	NA	0.00	0
								Manganese	CNS	0	NA	0.0	0
			(Total)					(Total)		0	NA	0.0	0
			Total Risk Across Tap water				0.0E+00			Total Hazard Index Across Tap water			0
	Air	Deep Groundwater - Water Vapors at Showerhead	Chloroform	NA	1E-05	NA	1E-05	Chloroform	Nasal	NA	0.0	NA	0.0
			(Total)	NA	1E-05	NA	1E-05	(Total)		NA	0	NA	0.0
			Total Risk Across Vapors at Showerhead				1E-05			Total Hazard Index Across Vapors at Showerhead			0.0
Soil*	Soil*	At Site 4						Arsenic	Skin	0.02	NA	0.2	0.18
								Chromium	NOAEL	0.02	NA	0.1	0.09
								Iron	Gastrointestinal	0.48	NA	0.9	1.35
								Manganese	CNS	NA	NA	1.3	1.35
								Vanadium	NOAEL	NA	NA	0.00	0.0
			(Total)				0E+00	(Total)		0.52	NA	2.4	3
			Total Risk Across All Media and All Exposure Routes				1E-05			Total Hazard Index Across All Media and All Exposure Routes			3

* Includes both surface and subsurface soil.

Total NOAEL HI =	0.09
Total Skin HI =	0.18
Total Gastrointestinal HI =	1.3
Total CNS HI =	1
Total Heart HI =	0.00
Total Nasal HI =	0.0

Table K-10.5
Risk Assessment Summary - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water						Arsenic	Skin	0.0	NA	0.000	0.0
								Barium	Heart	0.0	NA	0.0000	0.0
								Iron	Gastrointestinal	0	NA	0.00	0
								Manganese	CNS	0	NA	0.0	0
			(Total)					(Total)		0	NA	0.0	0
			Total Risk Across Tap water				0.0E+00	Total Hazard Index Across Tap water					0
Soil*	Soil*	At Site 4						Aluminum	CNS	0.10	NA	0.00	0.11
								Antimony	Longevity, Blood	1.39	NA	0.14	1.52
								Arsenic	Skin	0.22	NA	0.3	0.53
								Chromium	NOAEL	0.14	NA	0.1	0.28
								Iron	Gastrointestinal	4.12	NA	1.0	5.12
								Manganese	CNS	NA	NA	5.1	5.12
								Vanadium	NOAEL	NA	NA	0.00	0.0
			(Total)				0E+00	(Total)		6	NA	7	13
			Total Risk Across Soil* at Site 4				0E+00	Total Hazard Index Across Soil* at Site 4					13
Sediment	Sediment	Drainage features						Arsenic	Skin	2.7	NA	0.0	2.7
								Iron	Gastrointestinal	3.2	NA	0	3
			(Total)					(Total)		6.0	NA	0	6
			Total Risk Across Sediment				0.0E+00	Total Hazard Index Across Sediment					8
			Total Risk Across All Media and All Exposure Routes				0E+00	Total Hazard Index Across All Media and All Exposure Routes					19

* Includes both surface and subsurface soil.

Total CNS HI =	5
Total Heart HI =	0.0
Total Longevity HI =	1.52
Total Blood HI =	1.52
Total Skin HI =	3.3
Total NOAEL HI =	0.3
Total Gastrointestinal HI =	8

Table K-10.6
Risk Assessment Summary - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water	bis(2-Ethylhexyl)phthalate	1E-06	NA	1E-06	2E-06						
			Chloroform	8E-07	NA	7E-08	9E-07						
			Arsenic	4E-04	NA	1E-06	4E-04						
			(Total)	4E-04	NA	2E-06	4E-04	(Total)					
			Total Risk Across Tap water				4E-04	Total Hazard Index Across Tap water					0
Soil*	Soil*	At Site 4	Aroclor-1260	2E-06	NA	6E-07	3E-06						
			Benzo(a)Anthracene	2E-06	NA	NA	2E-06						
			Benzo(a)Pyrene	3E-05	NA	NA	3E-05						
			Benzo(b)Fluoranthene	3E-06	NA	NA	3E-06						
			Dibenz(a,h)Anthracene	4E-06	NA	NA	4E-06						
			Indeno(1,2,3-cd)Pyrene	1E-06	NA	NA	1E-06						
			Arsenic	8E-05	NA	1E-05	9E-05						
			Barium	NA	NA	NA	NA						
			(Total)	1E-04	NA	1E-05	1E-04	(Total)					0
			Total Risk Across Soil* at Site 4				1E-04	Total Hazard Index Across Soil* at Site 4					0
Surface Water	Surface Water	Drainage features	Arsenic	NA	NA	8E-08	8E-08						
			(Total)	NA	NA	8E-08	8E-08	(Total)					0
			Total Risk Across Surface Water				8E-08	Total Hazard Index Across Surface Water					0
Sediment	Sediment	Drainage features	Benzo(a)Pyrene	2E-06	NA	NA	2E-06						
			Arsenic	1E-05	NA	3E-05	4E-05						
			(Total)	1E-05	NA	3E-05	4E-05	(Total)					0
			Total Risk Across Sediment				4E-05	Total Hazard Index Across Sediment					0
			Total Risk Across All Media and All Exposure Routes				6E-04	Total Hazard Index Across All Media and All Exposure Routes					0

* Includes both surface and subsurface soil.

Table K-10.7
Risk Assessment Summary - RME
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil*	Soil*	At Site 4	Arsenic	2E-06	NA	1E-07	2E-06	Arsenic	Skin	0.0	NA	0.00	0.05
								Iron	Gastrointestinal	0.1	NA	0.00	0.1
				2E-06	NA	1E-07	2E-06	(Total)		0	NA	0.0	0
			Total Risk Across Surface Soil				2E-06		Total Hazard Index Across Surface Soil				0
			Total Risk Across All Media and All Exposure Routes				2E-06		Total Hazard Index Across All Media and All Exposure Routes				0.1

* Includes both surface and subsurface soil.

Total Skin HI =	0.0
Total Gastrointestinal HI =	0.1

Table K-10.8
Risk Assessment Summary - CT
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water						Iron	Gastrointestinal	0	NA	0.00	0
								Manganese	CNS	0	NA	0.0	0
			(Total)					(Total)		0	NA	0.0	0
			Total Risk Across Tap water				0.0E+00	Total Hazard Index Across Tap water					0
	Air	Deep Groundwater - Water Vapors at Showerhead	Chloroform	NA	0E+00	NA	0E+00	Chloroform	Nasal	NA	15.7	NA	15.7
			(Total)	NA	0E+00	NA	0E+00	(Total)		NA	15.7	NA	15.7
			Total Risk Across Vapors at Showerhead				0E+00	Total Hazard Index Across Vapors at Showerhead					15.7
			Total Risk Across All Media and All Exposure Routes				0E+00	Total Hazard Index Across All Media and All Exposure Routes					16

Total Gastronintestinal HI =	0
Total CNS HI =	0
Total Nasal HI =	15.7

Table K-10.9
Risk Assessment Summary - CT
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water						Arsenic	Skin	0.0	NA	0.000	0.0
								Iron	Gastrointestinal	0	NA	0.00	0
								Manganese	CNS	0	NA	0.0	0
			(Total)					(Total)		0	NA	0.0	0
			Total Risk Across Tap water				0.0E+00	Total Hazard Index Across Tap water					0
			Total Risk Across All Media and All Exposure Routes				0E+00	Total Hazard Index Across All Media and All Exposure Routes					0

Total Skin HI =	0.0
Total Gastronintestinal HI =	0
Total CNS HI =	0

Table K-10.10
Risk Assessment Summary - CT
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Receptor Population: Resident
Receptor Age: Adult/Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water	bis(2-Ethylhexyl)phthalate	2E-07	NA	3E-07	5E-07						
			Chloroform	6E-08	NA	5E-09	7E-08						
			Arsenic	3E-05	NA	8E-08	3E-05						
			(Total)	3E-05	NA	4E-07	3E-05	(Total)					0
							Total Risk Across Tap water	3E-05					Total Hazard Index Across Tap water	0
							Total Risk Across All Media and All Exposure Routes	3E-05					Total Hazard Index Across All Media and All Exposure Routes	0

Table K-10.11
Risk Assessment Summary - CT
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water						Iron	Gastrointestinal	0	NA	0.00	0
								Manganese	CNS	0	NA	0.0	0
			(Total)					(Total)		0	NA	0.0	0
			Total Risk Across Tap water				0.0E+00	Total Hazard Index Across Tap water					0
	Air	Deep Groundwater - Water Vapors at Showerhead	Chloroform	NA	0E+00	NA	0E+00	Chloroform	Nasal	NA	15.7	NA	15.7
			(Total)	NA	0E+00	NA	0E+00	(Total)		NA	15.7	NA	15.7
			Total Risk Across Vapors at Showerhead				0E+00	Total Hazard Index Across Vapors at Showerhead					15.7
			Total Risk Across All Media and All Exposure Routes				0E+00	Total Hazard Index Across All Media and All Exposure Routes					16

Total Gastronintestinal HI =	0
Total CNS HI =	0
Total Nasal HI =	15.7

Table K-10.12
Risk Assessment Summary - CT
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water						Arsenic	Skin	0.0	NA	0.000	0.0
								Iron	Gastrointestinal	0	NA	0.00	0
								Manganese	CNS	0	NA	0.0	0
			(Total)					(Total)		0	NA	0.0	0
			Total Risk Across Tap water				0.0E+00	Total Hazard Index Across Tap water					0
			Total Risk Across All Media and All Exposure Routes				0E+00	Total Hazard Index Across All Media and All Exposure Routes					0

Total Skin HI =	0.0
Total GastronIntestinal HI =	0
Total CNS HI =	0

Table K-10.13
Risk Assessment Summary - CT
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water	bis(2-Ethylhexyl)phthalate	2E-07	NA	3E-07	5E-07						
			Chloroform	6E-08	NA	5E-09	7E-08						
			Arsenic	3E-05	NA	8E-08	3E-05						
			(Total)	3E-05	NA	4E-07	3E-05	(Total)					0
							Total Risk Across Tap water	3E-05					Total Hazard Index Across Tap water	0
Soil*	Soil*	At Site 4	Arsenic	NA	NA	0E+00	0E+00						
			(Total)	0E+00	NA	0E+00	0E+00	(Total)					0
							Total Risk Across Soil* at Site 4	0E+00					Total Hazard Index Across Soil* at Site 4	0
							Total Risk Across All Media and All Exposure Routes	3E-05					Total Hazard Index Across All Media and All Exposure Routes	0

* Includes both surface and subsurface soil.

Table K-10.14
Risk Assessment Summary - CT
Site 4
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil*	Soil*	At Site 4	Benzo(a)Pyrene	1E-06	NA	2E-06	3E-06						
			Arsenic	NA	NA	3E-06	3E-06						
			(Total)	1E-06	NA	5E-06	6E-06	(Total)					0.0
							Total Risk Across Soil* at Site 4						Total Hazard Index Across Soil* at Site 4
							Total Risk Across All Media and All Exposure Routes						Total Hazard Index Across All Media and All Exposure Routes
							6E-06						0.0

* Includes both surface and subsurface soil.

Table L-1
Selection of Exposure Pathways
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current / Future	Surface Soil	Surface Soil	At Site 5	Trespasser	Adult	Dermal	On-Site	Quant	Trespassers may have exposed skin surfaces come into contact with soil
						Ingestion	On-Site	Quant	Trespassers may incidentally ingest soil
					Adolescent	Dermal	On-Site	Quant	Trespassers may have exposed skin surfaces come into contact with soil
						Ingestion	On-Site	Quant	Trespassers may incidentally ingest soil
		Air	Emissions from Surface Soil at Site 5	Trespasser	Adult	Inhalation	On-Site	Quant	Trespassers may inhale volatiles/particulates
					Adolescent	Inhalation	On-Site	Quant	Trespassers may inhale volatiles/particulates
	Groundwater	Deep Groundwater	Tap Water	Resident	Adult	Dermal	Off-Site	Quant	Local municipality currently has some uses for groundwater from deep aquifer
						Ingestion	Off-Site	Quant	Local municipality currently has some uses for groundwater from deep aquifer
					Child	Dermal	Off-Site	Quant	Local municipality currently has some uses for groundwater from deep aquifer
						Ingestion	Off-Site	Quant	Local municipality currently has some uses for groundwater from deep aquifer
					Adult/Child	Dermal	Off-Site	Quant	Local municipality currently has some uses for groundwater from deep aquifer
						Ingestion	Off-Site	Quant	Local municipality currently has some uses for groundwater from deep aquifer
		Air	Deep Groundwater - Water Vapors at Showerhead	Resident	Adult	Inhalation	Off-Site	Quant	Local municipality currently has some uses for groundwater from deep aquifer
	Surface Water [2]	Surface Water [2]	Drainage Features and Tributary to Blows Creek	Trespasser	Adult	Dermal	On-Site	Quant	Trespassers may have exposed skin surfaces come into contact with surface water
						Ingestion	On-Site	None	Ingestion of surface water not expected to be a significant exposure pathway during wading
					Adolescent	Dermal	On-Site	Quant	Trespassers may have exposed skin surfaces come into contact with surface water
						Ingestion	On-Site	None	Ingestion of surface water not expected to be a significant exposure pathway during wading
	Sediment [2]	Sediment [2]	Drainage Features and Tributary to Blows Creek	Trespasser	Adult	Dermal	On-Site	Quant	Trespassers may have exposed skin surfaces come into contact with sediment
						Ingestion	On-Site	Quant	Trespassers may incidentally ingest sediment that has adhered to their hands
					Adolescent	Dermal	On-Site	Quant	Trespassers may have exposed skin surfaces come into contact with sediment
						Ingestion	On-Site	Quant	Trespassers may incidentally ingest sediment that has adhered to their hands

Table L-1
Selection of Exposure Pathways
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Soil[1]	Soil[1]	At Site 5	Resident	Adult	Dermal	On-Site	Quant	Residents may have exposed skin surfaces come into contact with soil
						Ingestion	On-Site	Quant	Residents may incidentally ingest soil
					Child	Dermal	On-Site	Quant	Residents may have exposed skin surfaces come into contact with soil
						Ingestion	On-Site	Quant	Residents may incidentally ingest soil
					Adult/Child	Dermal	On-Site	Quant	Residents may have exposed skin surfaces come into contact with soil
						Ingestion	On-Site	Quant	Residents may incidentally ingest soil
				Construction Worker	Adult	Dermal	On-Site	Quant	Workers may have exposed skin surfaces come into contact with soil
						Ingestion	On-Site	Quant	Workers may incidentally ingest soil
				Other Worker	Adult	Dermal	On-Site	Quant	Workers may have exposed skin surfaces come into contact with soil
						Ingestion	On-Site	Quant	Workers may incidentally ingest soil
		Air	Emissions from Soil at Site 5	Construction Worker	Adult	Inhalation	On-Site	Quant	Workers may inhale volatiles/particulates
	Surface Water[2]	Surface Water[2]	Drainage Features and Tributary to Blows Creek	Resident	Adult	Dermal	On-Site	Quant	Residents may have exposed skin surfaces come into contact with surface water
						Ingestion	On-Site	None	Ingestion of surface water not expected to be a significant exposure pathway during wading
					Child	Dermal	On-Site	Quant	Residents may have exposed skin surfaces come into contact with surface water
						Ingestion	On-Site	None	Ingestion of surface water not expected to be a significant exposure pathway during wading
					Adult/Child	Dermal	On-Site	Quant	Residents may have exposed skin surfaces come into contact with surface water
						Ingestion	On-Site	None	Ingestion of surface water not expected to be a significant exposure pathway during wading
	Sediment[2]	Sediment[2]	Drainage Features and Tributary to Blows Creek	Resident	Adult	Dermal	On-Site	Quant	Residents may have exposed skin surfaces come into contact with sediment
						Ingestion	On-Site	Quant	Residents may incidentally ingest sediment that has adhered to their hands
					Child	Dermal	On-Site	Quant	Residents may have exposed skin surfaces come into contact with sediment
						Ingestion	On-Site	Quant	Residents may incidentally ingest sediment that has adhered to their hands
					Adult/Child	Dermal	On-Site	Quant	Residents may have exposed skin surfaces come into contact with sediment
						Ingestion	On-Site	Quant	Residents may incidentally ingest sediment that has adhered to their hands
	Groundwater	Shallow Groundwater	Water Table	Construction Worker	Adult	Dermal	On-Site	Quant	Workers may have exposed skin surfaces come into contact with groundwater

[1] Includes both surface soil and subsurface soil.

[2] Surface water and sediment exposure scenarios are for waders.

Table L-2.1
Occurrence, Distribution, and Selection of COPCs
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: At Site 5

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background [2] Value	Screening [3] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [4] Contaminant Deletion or Selection
540-59-0	1,2-Dichloroethene (total)	1.00E-03	J	1.00E-03	J	MG/KG	SJS05-SS08-000	1/27	0.01 - 0.022	0.001	ND	1,840 N	NA	NA	NO	BSL
78-93-3	2-Butanone	0.03		0.2		MG/KG	SJS05-SS06-000	2/26	0.01 - 0.022	0.2	ND	122,640 N	NA	NA	NO	BSL
67-64-1	Acetone	0.01	UJ	0.06		MG/KG	SJS05-SS14-000	9/26	0.01 - 0.022	0.06	ND	20,440 N	NA	NA	NO	BSL
75-09-2	Methylene chloride	0.07		0.2		MG/KG	SJS05-SS12-000	5/27	0.01 - 0.022	0.2	ND	763 C	NA	NA	NO	BSL
100-42-5	Styrene	0.03		0.03		MG/KG	SJS05-SS34-000	1/27	0.01 - 0.022	0.03	ND	40,880 N	NA	NA	NO	BSL
127-18-4	Tetrachloroethene	1.00E-03	J	0.004	J	MG/KG	SJS05-SS09-000	3/27	0.01 - 0.022	0.004	ND	110 C	NA	NA	NO	BSL
108-88-3	Toluene	0.002	J	0.005	J	MG/KG	SJS05-SS09-000	4/27	0.01 - 0.022	0.005	ND	40,880 N	NA	NA	NO	BSL
79-01-6	Trichloroethene	0.002	J	0.03		MG/KG	SJS05-SS32-000	6/27	0.01 - 0.022	0.03	ND	520 C	NA	NA	NO	BSL
1330-20-7	Xylene, total	0.003	J	0.003	J	MG/KG	SJS05-SS05-000	1/27	0.01 - 0.022	0.003	ND	408,800 N	NA	NA	NO	BSL
121-14-2	2,4-Dinitrotoluene	0.04	J	3	J	MG/KG	SJS05-SS03-000	7/27	0.33 - 2	3.2	ND	409 N	NA	NA	NO	BSL
606-20-2	2,6-Dinitrotoluene	0.04	J	0.04	J	MG/KG	SJS05-SS01-000	1/27	0.33 - 2	0.04	ND	204 N	NA	NA	NO	BSL
91-57-6	2-Methylnaphthalene	0.04	J	0.04	J	MG/KG	SJS05-SS01-000	1/27	0.33 - 2	0.04	ND	4,088 N	NA	NA	NO	BSL
83-32-9	Acenaphthene	0.04	J	0.04	J	MG/KG	SJS05-SS04-000	1/27	0.33 - 2	0.04	0.6	12,264 N	NA	NA	NO	BSL
208-96-8	Acenaphthylene	0.04	J	0.1	J	MG/KG	SJS05-SS35-000	4/27	0.33 - 2	0.1	0.2	4,088 N	NA	NA	NO	BSL
120-12-7	Anthracene	0.05	J	0.1	J	MG/KG	SJS05-SS35-000	5/27	0.33 - 2	0.1	0.5	61,320 N	NA	NA	NO	BSL
56-55-3	Benzo(a)anthracene	0.04	J	0.8	J	MG/KG	SJS05-SS35-000	21/27	0.33 - 2	0.84	2	7.84 C	NA	NA	NO	BSL
50-32-8	Benzo(a)pyrene	0.05	J	0.8	J	MG/KG	SJS05-SS35-000	18/27	0.33 - 2	0.76	2	0.784 C	NA	NA	NO	BSL
205-99-2	Benzo(b)fluoranthene	0.06	J	2	J	MG/KG	SJS05-SS35-000	22/27	0.33 - 2	2.1	3	7.84 C	NA	NA	NO	BSL
191-24-2	Benzo(g,h,i)perylene	0.05	J	0.7	J	MG/KG	SJS05-SS35-000	18/27	0.33 - 2	0.7	2	6,132 N	NA	NA	NO	BSL
207-08-9	Benzo(k)fluoranthene	0.05	J	0.7	J	MG/KG	SJS05-SS03-000	16/27	0.33 - 2	0.7	2	78.4 C	NA	NA	NO	BSL
86-74-8	Carbazole	0.04	J	0.06	J	MG/KG	SJS05-SS06-000	2/27	0.33 - 2	0.06	ND	286 C	NA	NA	NO	BSL
218-01-9	Chrysene	0.05	J	1	J	MG/KG	SJS05-SS35-000	22/27	0.33 - 2	1.3	3	784 C	NA	NA	NO	BSL
84-74-2	Di-n-butylphthalate	0.04	J	5		MG/KG	SJS05-SS03-000	11/27	0.33 - 2	4.7	ND	20,440 N	NA	NA	NO	BSL
53-70-3	Dibenz(a,h)anthracene	0.06	J	0.3	J	MG/KG	SJS05-SS35-000	3/27	0.33 - 2	0.3	0.7	0.784 C	NA	NA	NO	BSL
84-66-2	Diethylphthalate	0.2	J	0.2	J	MG/KG	SJS05-SS12-000	1/27	0.33 - 2	0.2	ND	163,520 N	NA	NA	NO	BSL
131-11-3	Dimethyl phthalate	0.06	J	0.06	J	MG/KG	SJS05-SS12-000	1/27	0.33 - 2	0.06	ND	2,044,000 N	NA	NA	NO	BSL
206-44-0	Fluoranthene	0.06	J	2	J	MG/KG	SJS05-SS03-000	22/27	0.33 - 2	2	3	8,176 N	NA	NA	NO	BSL
193-39-5	Indeno(1,2,3-cd)pyrene	0.04	J	0.7	J	MG/KG	SJS05-SS35-000	18/27	0.33 - 2	0.7	2	7.84 C	NA	NA	NO	BSL
91-20-3	Naphthalene	0.05	J	0.09	J	MG/KG	SJS05-SS35-000	2/27	0.33 - 2	0.09	0.5	4,088 N	NA	NA	NO	BSL
85-01-8	Phenanthrene	0.04	J	0.3	UJ	MG/KG	SJS05-SS11-000 SJS05-SS31-000	15/27	0.33 - 2	0.3	0.9	6,132 N	NA	NA	NO	BSL
129-00-0	Pyrene	0.05	J	1		MG/KG	SJS05-SS09-000	22/27	0.33 - 2	1.2	3	6,132 N	NA	NA	NO	BSL
117-81-7	bis(2-Ethylhexyl)phthalate	0.07	J	0.2	J	MG/KG	SJS05-SS12-000	2/27	0.28 - 2	0.2	ND	409 C	NA	NA	NO	BSL
86-30-6	n-Nitrosodiphenylamine	0.1	J	0.5	UJ	MG/KG	SJS05-SS03-000 SJS05-SS21-000	3/27	0.33 - 2	0.5	ND	1,168 C	NA	NA	NO	BSL
72-54-8	4,4'-DDD	0.001	J	0.3	J	MG/KG	SJS05-SS09-000	17/26	3.29E-03 - 0.037	0.3	0.005	23.8 C	NA	NA	NO	BSL
72-55-9	4,4'-DDE	5.30E-04	J	5	J	MG/KG	SJS05-SS35-000	24/27	3.29E-03 - 0.6	4.7	0.009	16.8 C	NA	NA	NO	BSL
50-29-3	4,4'-DDT	0.002	J	3	J	MG/KG	SJS05-SS32-000 SJS05-SS35-000	21/27	3.29E-03 - 0.037	3.1	0.02	16.8 C	NA	NA	NO	BSL

Table L-2.1
Occurrence, Distribution, and Selection of COPCs
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: At Site 5

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background [2] Value	Screening [3] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [4] Contaminant Deletion or Selection
11096-82-5	Aroclor-1260	0.03	J	0.04	UJ	MG/KG	SJS05-SS08-000 SJS05-SS33-000	2/27	0.033 - 0.37	0.04	ND	2.86 C	NA	NA	NO	BSL
60-57-1	Dieldrin	0.005	J	0.007		MG/KG	SJS05-SS08-000	2/27	3.29E-03 - 0.037	0.007	0.005	0.358 C	NA	NA	NO	BSL
319-84-6	alpha-BHC	0.004		0.004	UJ	MG/KG	SJS05-SS08-000 SJS05-SS23-000	1/27	0.0017 - 0.019	0.004	ND	0.908 C	NA	NA	NO	BSL
5103-71-9	alpha-Chlordane	0.001	J	0.002	J	MG/KG	SJS05-SS08-000	2/27	0.0017 - 0.019	0.002	0.003	16.4 C	NA	NA	NO	BSL
12789-03-6	gamma-Chlordane	0.003	J	0.003	J	MG/KG	SJS05-SS08-000	1/27	0.0017 - 0.019	0.003	0.003	16.4 C	NA	NA	NO	BSL
121-14-2	2,4-Dinitrotoluene	0.303		0.638		MG/KG	SJS05-SS14-000	2/18	0.238 - 0.25	0.6	ND	410 N	NA	NA	NO	BSL
35572-78-2	2-Amino-4,6-dinitrotoluene	0.4		0.4		MG/KG	SJS05-SS24-000	1/19	0.238 - 0.53	0.4	NA	12000 N	NA	NA	NO	BSL
14265-44-2	Phosphorus	2		77		MG/KG	SJS05-SS30-000	12/27	1.2 - 13.69	77	ND	NA	NA	NA	NO	NTX
7429-90-5	Aluminum	4,760		20,600		MG/KG	SJS05-SS35-000	27/27	6.88 - 16.7	20600	22788	204,400 N	NA	NA	NO	BSL
7440-36-0	Antimony	0.5	L	11	J	MG/KG	SJS05-SS19-000	14/24	0.31 - 1.20	11	1	81.8 N	NA	NA	NO	BSL
7440-38-2	Arsenic	2	K	152		MG/KG	SJS05-SS11-000	27/27	0.37 - 0.87	152	24	3.82 C	NA	NA	YES	ASL
7440-39-3	Barium	31	J	5,970		MG/KG	SJS05-SS11-000	27/27	3.99E-02 - 0.45	5970	98	14,308 N	NA	NA	NO	BSL
7440-41-7	Beryllium	0.2	J	1	J	MG/KG	SJS05-SS18-000 SJS05-SS24-000	27/27	1.99E-02 - 0.23	1.3	1	409 N	NA	NA	NO	BSL
7440-43-9	Cadmium	0.06	J	23		MG/KG	SJS05-SS19-000	24/27	5.995E-02 - 0.129	23	ND	102 N	NA	NA	NO	BSL
7440-70-2	Calcium	230	J	36,700		MG/KG	SJS05-SS10-000	27/27	10.8 - 25.39	36700	3251	NA	NA	NA	NO	BSL
7440-47-3	Chromium	5		867		MG/KG	SJS05-SS19-000	27/27	0.20 - 1.58	867	45	613 N	NA	NA	YES	ASL
7440-48-4	Cobalt	2	J	18		MG/KG	SJS05-SS01-000	27/27	9.0E-02 - 1.8	17.7	13	4,100 N	NA	NA	NO	BSL
7440-50-8	Copper	17		6,470		MG/KG	SJS05-SS01-000	27/27	0.20 - 1.35	6470	58	8,176 N	NA	NA	NO	BSL
57-12-5	Cyanide	0.2		1.5	J	MG/KG	SJS05-SS03-000	5/24	0.17 - 0.57	1.45	ND	4,088 N	NA	NA	NO	BSL
7439-89-6	Iron	9,850		120,000		MG/KG	SJS05-SS01-000	27/27	2.66 - 13.5	120000	45805	61,320 N	NA	NA	YES	ASL
7439-92-1	Lead	34		7,210	J	MG/KG	SJS05-SS01-000	27/27	0.16 - 0.43	7210	147	1,000	NA	NA	YES	ASL
7439-95-4	Magnesium	904	J	5,080		MG/KG	SJS05-SS18-000	27/27	4.5 - 40.8	5080	4507	NA	NA	NA	NO	BSL
7439-96-5	Manganese	40		852		MG/KG	SJS05-SS01-000	27/27	5.9E-02 - 0.45	852	198	4,088 N	NA	NA	NO	BSL
7439-97-6	Mercury	0.05		1.1		MG/KG	SJS05-SS33-000	26/26	9.9E-03 - 0.06	1.1	1	61.3 N	NA	NA	NO	BSL
7440-02-0	Nickel	3	J	92		MG/KG	SJS05-SS01-000	26/27	0.170 - 1.58	91.5	19	4,088 N	NA	NA	NO	BSL
7440-09-7	Potassium	625	J	4,430		MG/KG	SJS05-SS35-000	27/27	2.5 - 50.04	4430	4577	NA	NA	NA	NO	BSL
7782-49-2	Selenium	0.6	J	1.6	J	MG/KG	SJS05-SS23-000	8/27	0.47 - 1.100	1.6	2	1,022 N	NA	NA	NO	BSL
7440-22-4	Silver	0.3	J	4.6		MG/KG	SJS05-SS29-000P	5/27	0.16 - 0.389	4.6	0.7	1,022 N	NA	NA	NO	BSL
7440-23-5	Sodium	59	J	6,410		MG/KG	SJS05-SS18-000	20/27	9.07 - 64.8	6410	620	NA	NA	NA	NO	BSL
7440-28-0	Thallium	0.5	J	5.3		MG/KG	SJS05-SS01-000	8/27	0.31 - 1.399	5.3	ND	14.3 N	NA	NA	NO	BSL
7440-62-2	Vanadium	13		69		MG/KG	SJS05-SS35-000	27/27	0.1094 - 2.03	69	70	1,431 N	NA	NA	NO	BSL
7440-66-6	Zinc	48		8,490	L	MG/KG	SJS05-SS01-000	27/27	0.34 - 1.13	8490	137	61,320 N	NA	NA	NO	BSL

(1) Minimum/maximum detected concentration.
(2) Background data is UCL for dredge-fill background soil type from St. Juliens Creek Background Investigation.
(3) Tier II screening: With the exception of lead, all compounds are screened against the Risk-Based Concentration (RBC) Table, U.S. EPA Region III, October 9, 2002 for industrial soil (cancer benchmark value = 1e-06; HQ = 0.1). Lead is screened against

Definitions: NA = Not Applicable
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Re
J = Estimated Value

Table L-2.1
Occurrence, Distribution, and Selection of COPCs
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: At Site 5

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background [2] Value	Screening [3] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [4] Contaminant Deletion or Selection

the EPA screening value of 1000 mg/kg.

When no RBC available, surrogate RBC used as follows:

Acenaphthylene - used naphthalene

Benzo(g,h,i)Perylene, Phenanthrene - used pyrene

alpha-Chlordane, gamma-Chlordane - used Chlordane

Cadmium - used Cadmium - Food

Chromium - used Chromium VI

Mercury - used Mercuric Chloride

L = Estimated Value - Biased Low

K = Estimated Value - Biased High

(4) Rationale Codes

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

Deletion Reason: Essential Nutrient (NUT)
Below Screening Level (BSL)

Surface Soil Samples: SS01 to SS09 - Phase I; SS10 to SS12, SS14, SS16, SS18 to SS21, SS23, SS24, SS29 to SS35 - Phase II

Table L-2.2
Occurrence, Distribution, and Selection of COPCs
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from Surface Soil at Site 5

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background [2] Value	Screening [3] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [4] Contaminant Deletion or Selection
540-59-0	1,2-Dichloroethene (total)	1.00E-03	J	1.00E-03	J	MG/KG	SJS05-SS08-000	1/27	0.01 - 0.022	0.001	ND	1,840 N	NA	NA	NO	BSL
78-93-3	2-Butanone	0.028		0.21		MG/KG	SJS05-SS06-000	2/26	0.01 - 0.022	0.21	ND	122,640 N	NA	NA	NO	BSL
67-64-1	Acetone	0.011	UJ	0.062		MG/KG	SJS05-SS14-000	9/26	0.01 - 0.022	0.062	ND	20,440 N	NA	NA	NO	BSL
75-09-2	Methylene chloride	0.067		0.171		MG/KG	SJS05-SS12-000	5/27	0.01 - 0.022	0.171	ND	763 C	NA	NA	NO	BSL
100-42-5	Styrene	0.029		0.029		MG/KG	SJS05-SS34-000	1/27	0.01 - 0.022	0.029	ND	40,880 N	NA	NA	NO	BSL
127-18-4	Tetrachloroethene	1.00E-03	J	0.004	J	MG/KG	SJS05-SS09-000	3/27	0.01 - 0.022	0.004	ND	110 C	NA	NA	NO	BSL
108-88-3	Toluene	0.002	J	0.005	J	MG/KG	SJS05-SS09-000	4/27	0.01 - 0.022	0.005	ND	40,880 N	NA	NA	NO	BSL
79-01-6	Trichloroethene	0.002	J	0.026		MG/KG	SJS05-SS32-000	6/27	0.01 - 0.022	0.026	ND	520 C	NA	NA	NO	BSL
1330-20-7	Xylene, total	0.003	J	0.003	J	MG/KG	SJS05-SS05-000	1/27	0.01 - 0.022	0.003	ND	408,800 N	NA	NA	NO	BSL
121-14-2	2,4-Dinitrotoluene	0.043	J	3.2	J	MG/KG	SJS05-SS03-000	7/27	0.33 - 2	3.2	ND	409 N	NA	NA	NO	BSL
606-20-2	2,6-Dinitrotoluene	0.039	J	0.039	J	MG/KG	SJS05-SS01-000	1/27	0.33 - 2	0.039	ND	204 N	NA	NA	NO	BSL
91-57-6	2-Methylnaphthalene	0.042	J	0.042	J	MG/KG	SJS05-SS01-000	1/27	0.33 - 2	0.042	ND	4,088 N	NA	NA	NO	BSL
83-32-9	Acenaphthene	0.041	J	0.041	J	MG/KG	SJS05-SS04-000	1/27	0.33 - 2	0.041	0.592	12,264 N	NA	NA	NO	BSL
208-96-8	Acenaphthylene	0.035	J	0.11	J	MG/KG	SJS05-SS35-000	4/27	0.33 - 2	0.11	0.246	4,088 N	NA	NA	NO	BSL
120-12-7	Anthracene	0.049	J	0.14	J	MG/KG	SJS05-SS35-000	5/27	0.33 - 2	0.14	0.462	61,320 N	NA	NA	NO	BSL
56-55-3	Benzo(a)anthracene	0.037	J	0.84	J	MG/KG	SJS05-SS35-000	21/27	0.33 - 2	0.84	2.027	7.84 C	NA	NA	NO	BSL
50-32-8	Benzo(a)pyrene	0.047	J	0.76	J	MG/KG	SJS05-SS35-000	18/27	0.33 - 2	0.76	1.785	0.784 C	NA	NA	NO	BSL
205-99-2	Benzo(b)fluoranthene	0.061	J	2.1	J	MG/KG	SJS05-SS35-000	22/27	0.33 - 2	2.1	3.197	7.84 C	NA	NA	NO	BSL
191-24-2	Benzo(g,h,i)perylene	0.052	J	0.68	J	MG/KG	SJS05-SS35-000	18/27	0.33 - 2	0.68	1.655	6,132 N	NA	NA	NO	BSL
207-08-9	Benzo(k)fluoranthene	0.054	J	0.7	J	MG/KG	SJS05-SS03-000	16/27	0.33 - 2	0.7	2.038	78.4 C	NA	NA	NO	BSL
86-74-8	Carbazole	0.04	J	0.061	J	MG/KG	SJS05-SS06-000	2/27	0.33 - 2	0.061	ND	286 C	NA	NA	NO	BSL
218-01-9	Chrysene	0.045	J	1.3	J	MG/KG	SJS05-SS35-000	22/27	0.33 - 2	1.3	3.487	784 C	NA	NA	NO	BSL
84-74-2	Di-n-butylphthalate	0.038	J	4.7		MG/KG	SJS05-SS03-000	11/27	0.33 - 2	4.7	ND	20,440 N	NA	NA	NO	BSL
53-70-3	Dibenz(a,h)anthracene	0.061	J	0.26	J	MG/KG	SJS05-SS35-000	3/27	0.33 - 2	0.26	0.714	0.784 C	NA	NA	NO	BSL
84-66-2	Diethylphthalate	0.17	J	0.17	J	MG/KG	SJS05-SS12-000	1/27	0.33 - 2	0.17	ND	163,520 N	NA	NA	NO	BSL
131-11-3	Dimethyl phthalate	0.063	J	0.063	J	MG/KG	SJS05-SS12-000	1/27	0.33 - 2	0.063	ND	2,044,000 N	NA	NA	NO	BSL
206-44-0	Fluoranthene	0.057	J	2	J	MG/KG	SJS05-SS03-000	22/27	0.33 - 2	2	2.766	8,176 N	NA	NA	NO	BSL
193-39-5	Indeno(1,2,3-cd)pyrene	0.035	J	0.68	J	MG/KG	SJS05-SS35-000	18/27	0.33 - 2	0.68	1.829	7.84 C	NA	NA	NO	BSL
91-20-3	Naphthalene	0.05	J	0.09	J	MG/KG	SJS05-SS35-000	2/27	0.33 - 2	0.09	0.485	4,088 N	NA	NA	NO	BSL
85-01-8	Phenanthrene	0.038	J	0.34	UJ	MG/KG	SJS05-SS11-000 SJS05-SS31-000	15/27	0.33 - 2	0.34	0.913	6,132 N	NA	NA	NO	BSL
129-00-0	Pyrene	0.052	J	1.2		MG/KG	SJS05-SS09-000	22/27	0.33 - 2	1.2	2.59	6,132 N	NA	NA	NO	BSL
117-81-7	bis(2-Ethylhexyl)phthalate	0.066	J	0.18	J	MG/KG	SJS05-SS12-000	2/27	0.28 - 2	0.18	ND	409 C	NA	NA	NO	BSL
86-30-6	n-Nitrosodiphenylamine	0.12	J	0.53	UJ	MG/KG	SJS05-SS03-000 SJS05-SS21-000	3/27	0.33 - 2	0.53	ND	1,168 C	NA	NA	NO	BSL
72-54-8	4,4'-DDD	0.00110	J	0.31	J	MG/KG	SJS05-SS09-000	17/26	3.29E-03 - 0.037	0.31	0.0053	23.8 C	NA	NA	NO	BSL
72-55-9	4,4'-DDE	5.30E-04	J	4.7	J	MG/KG	SJS05-SS35-000	24/27	3.29E-03 - 0.6	4.7	0.009	16.8 C	NA	NA	NO	BSL
50-29-3	4,4'-DDT	0.00220	J	3.1	J	MG/KG	SJS05-SS32-000 SJS05-SS35-000	21/27	3.29E-03 - 0.037	3.1	0.021	16.8 C	NA	NA	NO	BSL

Table L-2.2
Occurrence, Distribution, and Selection of COPCs
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from Surface Soil at Site 5

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background [2] Value	Screening [3] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [4] Contaminant Deletion or Selection
11096-82-5	Aroclor-1260	0.03	J	0.039	UJ	MG/KG	SJS05-SS08-000 SJS05-SS33-000	2/27	0.033 - 0.37	0.039	ND	2.86 C	NA	NA	NO	BSL
60-57-1	Dieldrin	0.005	J	0.0068		MG/KG	SJS05-SS08-000	2/27	3.29E-03 - 0.037	0.0068	0.0053	0.358 C	NA	NA	NO	BSL
319-84-6	alpha-BHC	0.0035		0.0035	UJ	MG/KG	SJS05-SS08-000 SJS05-SS23-000	1/27	0.0017 - 0.019	0.0035	ND	0.908 C	NA	NA	NO	BSL
5103-71-9	alpha-Chlordane	0.00058	J	0.0024	J	MG/KG	SJS05-SS08-000	2/27	0.0017 - 0.019	0.0024	0.0028	16.4 C	NA	NA	NO	BSL
12789-03-6	gamma-Chlordane	0.0026	J	0.0026	J	MG/KG	SJS05-SS08-000	1/27	0.0017 - 0.019	0.0026	0.0028	16.4 C	NA	NA	NO	BSL
121-14-2	2,4-Dinitrotoluene	0.303		0.638		MG/KG	SJS05-SS14-000	2/18	0.238 - 0.25	0.6	ND	410 N	NA	NA	NO	BSL
35572-78-2	2-Amino-4,6-dinitrotoluene	0.417		0.417		MG/KG	SJS05-SS24-000	1/19	0.238 - 0.53	0.417	NA	12000 N	NA	NA	NO	BSL
14265-44-2	Phosphorus	2.2		76.5		MG/KG	SJS05-SS30-000	12/27	1.2 - 13.69	77	ND	NA	NA	NA	NO	NTX
7429-90-5	Aluminum	4,760		20,600		MG/KG	SJS05-SS35-000	27/27	6.88 - 16.7	20600	22786	204,400 N	NA	NA	NO	BSL
7440-36-0	Antimony	0.51	L	10.8	J	MG/KG	SJS05-SS19-000	14/24	0.31 - 1.20	10.8	1.47	81.8 N	NA	NA	NO	BSL
7440-38-2	Arsenic	2	K	152		MG/KG	SJS05-SS11-000	27/27	0.37 - 0.87	152	24	3.82 C	NA	NA	YES	ASL
7440-39-3	Barium	31.2	J	5,970		MG/KG	SJS05-SS11-000	27/27	3.99E-02 - 0.45	5970	98	14,308 N	NA	NA	NO	BSL
7440-41-7	Beryllium	0.190	J	1.30	J	MG/KG	SJS05-SS18-000 SJS05-SS24-000	27/27	1.99E-02 - 0.23	1.3	1	409 N	NA	NA	NO	BSL
7440-43-9	Cadmium	0.0600	J	22.7		MG/KG	SJS05-SS19-000	24/27	5.995E-02 - 0.129	22.7	ND	102 N	NA	NA	NO	BSL
7440-70-2	Calcium	230	J	36,700		MG/KG	SJS05-SS10-000	27/27	10.8 - 25.39	36700	3251	NA	NA	NA	NO	BSL
7440-47-3	Chromium	4.6		867		MG/KG	SJS05-SS19-000	27/27	0.20 - 1.58	867	45	613 N	NA	NA	YES	ASL
7440-48-4	Cobalt	1.5	J	17.7		MG/KG	SJS05-SS01-000	27/27	9.0E-02 - 1.8	17.7	13	4,100 N	NA	NA	NO	BSL
7440-50-8	Copper	17.1		6,470		MG/KG	SJS05-SS01-000	27/27	0.20 - 1.35	6470	58	8,176 N	NA	NA	NO	BSL
57-12-5	Cyanide	0.240		1.45	J	MG/KG	SJS05-SS03-000	5/24	0.17 - 0.57	1.45	ND	4,088 N	NA	NA	NO	BSL
7439-89-6	Iron	9,850		120,000		MG/KG	SJS05-SS01-000	27/27	2.66 - 13.5	120000	45805	61,320 N	NA	NA	YES	ASL
7439-92-1	Lead	33.5		7,210	J	MG/KG	SJS05-SS01-000	27/27	0.16 - 0.43	7210	147	1,000	NA	NA	YES	ASL
7439-95-4	Magnesium	904	J	5,080		MG/KG	SJS05-SS18-000	27/27	4.5 - 40.8	5080	4507	NA	NA	NA	NO	BSL
7439-96-5	Manganese	39.6		852		MG/KG	SJS05-SS01-000	27/27	5.9E-02 - 0.45	852	198	4,088 N	NA	NA	NO	BSL
7439-97-6	Mercury	0.0500		1.10		MG/KG	SJS05-SS33-000	26/26	9.9E-03 - 0.06	1.1	1.3	61.3 N	NA	NA	NO	BSL
7440-02-0	Nickel	2.6	J	91.5		MG/KG	SJS05-SS01-000	26/27	0.170 - 1.58	91.5	19	4,088 N	NA	NA	NO	BSL
7440-09-7	Potassium	625	J	4,430		MG/KG	SJS05-SS35-000	27/27	2.5 - 50.04	4430	4577	NA	NA	NA	NO	BSL
7782-49-2	Selenium	0.640	J	1.60	J	MG/KG	SJS05-SS23-000	8/27	0.47 - 1.100	1.6	2.2	1,022 N	NA	NA	NO	BSL
7440-22-4	Silver	0.31	J	4.60		MG/KG	SJS05-SS29-000P	5/27	0.16 - 0.389	4.6	0.67	1,022 N	NA	NA	NO	BSL
7440-23-5	Sodium	58.6	J	6,410		MG/KG	SJS05-SS18-000	20/27	9.07 - 64.8	6410	620	NA	NA	NA	NO	BSL
7440-28-0	Thallium	0.45	J	5.3		MG/KG	SJS05-SS01-000	8/27	0.31 - 1.399	5.3	ND	14.3 N	NA	NA	NO	BSL
7440-62-2	Vanadium	12.7		69.1		MG/KG	SJS05-SS35-000	27/27	0.1094 - 2.03	69.1	70	1,431 N	NA	NA	NO	BSL
7440-66-6	Zinc	47.6		8,490	L	MG/KG	SJS05-SS01-000	27/27	0.34 - 1.13	8490	137	61,320 N	NA	NA	NO	BSL

(1) Minimum/maximum detected concentration.
(2) Background data is UCL for dredge-fill background soil type from St. Juliens Creek Background Investigation.
(3) Tier II screening: With the exception of lead, all compounds are screened against the Risk-Based Concentration (RBC) Table, U.S. EPA Region III, October 9, 2002 for industrial soil (cancer benchmark value = 1e-06; HQ = 0.1). Lead is screened against

Definitions: NA = Not Applicable
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Re
J = Estimated Value

Table L-2.2
Occurrence, Distribution, and Selection of COPCs
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from Surface Soil at Site 5

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background [2] Value	Screening [3] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [4] Contaminant Deletion or Selection

the EPA screening value of 1000 mg/kg.

When no RBC available, surrogate RBC used as follows:

Acenaphthylene - used naphthalene

Benzo(g,h,i)Perylene, Phenanthrene - used pyrene

alpha-Chlordane, gamma-Chlordane - used Chlordane

Cadmium - used Cadmium - Food

Chromium - used Chromium VI

Mercury - used Mercuric Chloride

(4) Rationale Codes

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

Deletion Reason: Essential Nutrient (NUT)
Below Screening Level (BSL)

L = Estimated Value - Biased Low
K = Estimated Value - Biased High

Table L-2.3
Occurrence, Distribution, and Selection of COPCs
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Deep Groundwater
Exposure Point: Tap Water

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	(2) Background Value	(3) Screening Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(4) Rationale for Contaminant Deletion or Selection
	Organic																
121824	RDX	1.6	J	1.6	J	ug/l	GW1D	1 / 3	2.6 - 2.6	1.6	NA	0.61	C	NA	NA	yes	ASL
50293	4,4'-DDT	0.0057	J	0.0057	J	ug/l	GW1D	1 / 7	0.1 - 0.1	0.0057	NA	0.2	C	NA	NA	no	BSL
76448	Heptachlor	0.033	J	0.033	J	ug/l	GW4DP	1 / 7	0.05 - 0.05	0.033	NA	0.015	C	0.4	MCL	yes	ASL
117817	bis(2-Ethylhexyl)phthalate	2	J	2	J	ug/l	GW4DP	1 / 7	10 - 12	2	8.4	4.8	C	6	MCL	no	BSL
75150	Carbon Disulfide	0.2	J	6		ug/l	GW4D	2 / 7	1 - 1	6	ND	100	N	NA	NA	no	BSL
67663	Chloroform	2		5		ug/l	GW2D	2 / 7	1 - 1	5	ND	0.063	N	100	MCL	yes	ASL
	Inorganic																
14265442	Phosphorus	0.042		0.485		ug/l	GW1D	5 / 7	0.02 - 1.3	0.485	0.12	NA		NA	NA	no	NTX
7429905	Aluminum	42.3	J	2250		ug/l	GW2D	4 / 7	29 - 38.2	2250	167	3700	N	50 to 200	SMCL	no	BSL
7440360	Antimony	3.1	J	3.2	J	ug/l	GW2D	2 / 6	1 - 2.7	3.2	ND	1.5	N	6	MCL	yes	ASL
7440382	Arsenic	4.9	J	4.9	J	ug/l	GW2D	1 / 7	2 - 3.2	4.9	ND	0.045	C	50	MCL	yes	ASL
7440393	Barium	20.6	J	26.5	J	ug/l	GW2D	5 / 7	0.2 - 1	26.5	44	260	N	2000	MCL	no	BSL
7440417	Beryllium	1.5	K	1.5	K	ug/l	GW2D	1 / 7	0.1 - 1	1.5	ND	7.3	N	4	MCL	no	BSL
7440702	Calcium	51600	K	78500	K	ug/l	GW1D	7 / 7	46 - 57.9	78500	96106	NA	N	NA	NA	no	NUT
7440473	Chromium	1.3	J	10.1	J	ug/l	GW1D	2 / 7	1.1 - 4.6	10.1	ND	11	N	100	MCL	no	BSL
7439896	Iron	325	J	4420	J	ug/l	GW2D	6 / 7	5 - 30.8	4420	2035	1100	N	300	SMCL	yes	ASL
7439954	Magnesium	3750	J	11100	J	ug/l	GW4D	7 / 7	24.3 - 45	11100	14980	NA	N	NA	NA	no	NUT
7439965	Manganese	52.4	J	192	J	ug/l	GW2D	5 / 7	0.3 - 1	192	271	73	N	50	SMCL	yes	ASL
7440020	Nickel	1.5	J	1.5	J	ug/l	GW4DP	1 / 7	0.9 - 7	1.5	1.3	73	N	NA	NA	no	BSL
7440097	Potassium	7170	J	9070	J	ug/l	GW4D	7 / 7	13.5 - 97	9070	10649	NA		NA	NA	no	NUT
7440235	Sodium	39000	J	53000	J	ug/l	GW4D	7 / 7	28 - 148	53000	52872	NA		NA	NA	no	NUT
7440622	Vanadium	15.6	K	15.6	K	ug/l	GW2D	1 / 7	0.6 - 9	15.6	0.80	26	N	NA	NA	no	BSL
7440666	Zinc	2.1	K	4.4	K	ug/l	GW4D	3 / 7	1.9 - 3	4.4	5.7	1100	N	5000	SMCL	no	BSL

(1) Minimum/maximum detected concentration.

(2) Background data is UCL for Yorktown Aquifer from St. Julliens Creek Background Investigation.

(3) Tier I screening: With the exception of lead, all compounds are screened against the Risk-Based Concentration (RBC) Table, U.S. EPA Region III, October 9, 2002 for tap water (cancer benchmark value = 1e-06; HQ = 0.1). Lead is screened against the maximum contaminant level (MCL) value of 15 ug/l.
When no RBC available, surrogate RBC used as follows:
Chromium - used Chromium VI

(4) Rationale Codes
Selection Reason: Above Screening Level (ASL)
No Toxicity Information (NTX)
Deletion Reason: Essential Nutrient (NUT)
Below Screening Level (BSL)

Definitions: N/A = Not Applicable
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
MCL = Maximum Contaminant Level
SMCL = Secondary Maximum Contaminant Level
J = Estimated Value
K = Estimated Value - Biased High

Deep Groundwater Samples: GW1D, GW2D - Phase I, Rounds 1 and 2 and Phase II; GW4D - Phase II

Table L-2.4
Occurrence, Distribution, and Selection of COPCs
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Deep groundwater - Water Vapors at Showerhead

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	(2) Background Value	(3) Screening Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(4) Rationale for Contaminant Deletion or Selection
	Organic																
121824	RDX	1.6	J	1.6	J	ug/l	GW1D	1 / 3	2.6 - 2.6	1.6	NA	0.61	C	NA	NA	yes	ASL
76448	Heptachlor	0.033	J	0.033	J	ug/l	GW4DP	1 / 7	0.05 - 0.05	0.033	NA	0.015	C	0.4	MCL	yes	ASL
67663	Chloroform	2		5		ug/l	GW2D	2 / 7	1 - 1	5	ND	0.063	N	100	MCL	yes	ASL

(1) Minimum/maximum detected concentration.

(2) Background data is UCL for Yorktown Aquifer from St. Juliens Creek Background Investigation.

(3) Tier I screening: With the exception of lead, all compounds are screened against the Risk-Based Concentration (RBC) Table, U.S. EPA Region III, October 9, 2002 for tap water (cancer benchmark value = 1e-06; HQ = 0.1). Lead is screened against the maximum contaminant level (MCL) value of 15 ug/l.
When no RBC available, surrogate RBC used as follows:
Chromium - used Chromium VI

(4) Rationale Codes
Selection Reason: Above Screening Level (ASL)
No Toxicity Information (NTX)
Deletion Reason: Essential Nutrient (NUT)
Below Screening Level (BSL)

Deep Groundwater Samples: GW1D, GW2D - Phase I, Rounds 1 and 2 and Phase II; GW4D - Phase II

Definitions: N/A = Not Applicable
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
MCL = Maximum Contaminant Level
SMCL = Secondary Maximum Contaminant Level
J = Estimated Value
K = Estimated Value - Biased High

Table L-2.5
Occurrence, Distribution, and Selection of COPCs
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage Features and Tributary to Blows Creek

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	(2) Background Value	(3) Screening Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(4) Rationale for Contaminant Deletion or Selection
	Organics																
72548	4,4'-DDD	0.01	J	0.01	J	ug/l	SW06	1 / 7	0.1 - 0.11	0.01	NA	2.8	C	0.0084	VAWQS	no	BSL
72559	4,4'-DDE	0.012	J	0.012	J	ug/l	SW04	1 / 7	0.1 - 0.11	0.012	NA	2	C	0.0059	VAWQS	no	BSL
106445	4-Methylphenol	5	J	5	J	ug/l	SW06P	1 / 7	10 - 13	5	NA	180	N	NA	NA	no	BSL
117817	Bis(2-ethylhexyl)phthalate	4	J	4	J	ug/l	SW07P	1 / 7	10 - 13	4	NA	48	C	59	VAWQS	no	BSL
67641	Acetone	4	L	4	L	ug/l	SW04	1 / 2	5 - 5	4	NA	610	N	NA	NA	no	BSL
75150	Carbon Disulfide	1.2		11.5		ug/l	SW06	4 / 7	1 - 1	11.5	NA	1000	N	NA	NA	no	BSL
108883	Toluene	0.5	J	0.5	J	ug/l	SW04	1 / 7	1 - 1	0.5	NA	750	N	200000	VAWQS	no	BSL
1330207	Xylenes (Total)	0.3	J	0.3	J	ug/l	SW04	1 / 7	1 - 1	0.3	NA	12000	N	NA	NA	no	BSL
	Inorganics																
14265442	Phosphorus	22		1150		ug/l	SW05	4 / 6	19900 - 200000	1150	NA	NA		NA	NA	no	NTX
7429905	Aluminum	268		26100		ug/l	SW05	6 / 6	38.2 - 38.2	26100	NA	37000	N	NA	NA	no	BSL
7440382	Arsenic	2.7	J	12.6		ug/l	SW05	3 / 7	2 - 3.6	12.6	NA	0.45	C	NA	NA	yes	ASL
7440393	Barium	17.3	J	64.800003	J	ug/l	SW05	7 / 7	0.2 - 0.3	64.8	NA	2600	N	NA	NA	no	BSL
7440417	Beryllium	0.98	J	12.1		ug/l	SW05	5 / 7	0.1 - 0.2	12.1	NA	73	N	NA	NA	no	BSL
7440439	Cadmium	0.47	J	4.4000001	J	ug/l	SW05	5 / 7	0.3 - 0.3	4.4	NA	18	N	NA	NA	no	BSL
7440702	Calcium	52200		141000		ug/l	SW05	6 / 6	57.9 - 57.9	141000	NA	NA		NA	NA	no	NUT
7440473	Chromium	1	J	2.0999999	J	ug/l	SW05	5 / 7	0.6 - 1.1	2.1	NA	110	N	NA	NA	no	BSL
7440484	Cobalt	3.3	J	146		ug/l	SW05	7 / 7	0.5 - 0.8	146	NA	730	N	NA	NA	no	BSL
7440508	Copper	6.4	J	215		ug/l	SW05	7 / 7	0.8 - 1.1	215	NA	1500	N	NA	NA	no	BSL
57125	Cyanide	18	L	30.200001	L	ug/l	SW02\SW03	3 / 7	5 - 5	30.2	NA	730	N	215000	VAWQS	no	BSL
7439896	Iron	3740		46900		ug/l	SW05	6 / 6	30.7 - 30.8	46900	NA	11000	N	NA	NA	yes	ASL
7439921	Lead	2.4	J	4760		ug/l	SW05	5 / 7	1 - 1.4	4760	NA	15		NA	NA	yes	ASL
7439954	Magnesium	28900		112000		ug/l	SW07	6 / 6	24.3 - 24.3	112000	NA	NA		NA	NA	no	NUT
7439965	Manganese	400		7590		ug/l	SW05	6 / 6	0.3 - 0.3	7590	NA	730	N	NA	NA	yes	ASL
7440020	Nickel	4.3	J	245		ug/l	SW05	7 / 7	0.9 - 0.9	245	NA	730	N	4600	VAWQS	no	BSL
7440097	Potassium	10600		40600		ug/l	SW05	6 / 6	13.5 - 13.5	40600	NA	NA		NA	NA	no	NUT
7440235	Sodium	132000		310000	J	ug/l	SW06P	6 / 6	148 - 148	310000	NA	NA		NA	NA	no	NUT
7440622	Vanadium	3.2	J	12.6	J	ug/l	SW05	2 / 7	0.6 - 0.7	12.6	NA	260	N	NA	NA	no	BSL
7440666	Zinc	56.2	J	4690		ug/l	SW05	7 / 7	0.7 - 1.9	4690	NA	11000	N	NA	NA	no	BSL

(1) Minimum/maximum detected concentration.

(2) No background study has been completed for the St. Juliens Creek Annex surface water.

(3) Tier I screening: With the exception of lead, all compounds are screened against 10 times the Risk-Based Concentration (RBC) Table, U.S. EPA Region III, October 9, 2002 for tap water (10 times the cancer benchmark value = 1e-06; 10 times the HQ = 0.1). Lead is screened against the maximum contaminant level (MCL) value of 15 ug/l.

Definitions: NA = Not Applicable
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
VAWQS = Virginia Water Quality Standard
J = Estimated Value

Table L-2.5
Occurrence, Distribution, and Selection of COPCs
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage Features and Tributary to Blows Creek

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)

When no RBC available, surrogate RBC used as follows:
Cadmium - used Cadmium - Water
Chromium - used Chromium VI

L= Estimated Value - Biased Low

(4) Rationale Codes

Selection Reason:	Above Screening Level (ASL)
	No Toxicity Information (NTX)
Deletion Reason:	Essential Nutrient (NUT)
	Below Screening Level (BSL)

Surface Water Samples: SW01 through SW07 - Phase II.

Table L-2.6
Occurrence, Distribution, and Selection of COPCs
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage Features and Tributary to Blows Creek

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value (2)	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (4)
	Organics															
72548	4,4'-DDD	0.00076	L	0.16		mg/kg	SD01	5 / 7	0.0058 - 0.071	0.16	NA	240 C	NA	NA	no	BSL
72559	4,4'-DDE	0.0015	J	0.32		mg/kg	SD01	6 / 7	0.0058 - 0.051	0.32	NA	170 C	NA	NA	no	BSL
50293	4,4'-DDT	0.00074	J	0.24		mg/kg	SD01	6 / 7	0.0058 - 0.051	0.24	NA	170 C	NA	NA	no	BSL
60571	Dieldrin	0.021		0.021		mg/kg	SD03	1 / 7	0.0051 - 0.0073	0.02	NA	3.60 C	NA	NA	no	BSL
7421934	Endrin Aldehyde	0.0089	J	0.0089	J	mg/kg	SD02	1 / 7	0.0051 - 0.0073	0.009	NA	610 N	NA	NA	no	BSL
121142	2,4-Dinitrotoluene	0.065	J	0.47	J	mg/kg	SD01	2 / 6	0.51 - 3.6	0.47	NA	4100 N	NA	NA	no	BSL
83329	Acenaphthene	0.065	J	0.065	J	mg/kg	SD02	1 / 6	0.51 - 3.6	0.07	NA	120000 N	NA	NA	no	BSL
208968	Acenaphthylene	0.14	J	0.14	J	mg/kg	SD01	1 / 6	0.51 - 3.6	0.14	NA	41000 N	NA	NA	no	BSL
120127	Anthracene	0.093	J	0.1	L	mg/kg	SD07	3 / 7	0.51 - 3.6	0.1	NA	610000 N	NA	NA	no	BSL
56553	Benzo(a)Anthracene	0.069	J	0.6		mg/kg	SD01	4 / 7	0.51 - 3.6	1	NA	78 C	NA	NA	no	BSL
50328	Benzo(a)Pyrene	0.063	J	0.39	J	mg/kg	SD01	4 / 7	0.51 - 3.6	0.39	NA	8 C	NA	NA	no	BSL
205992	Benzo(b)Fluoranthene	0.11	J	0.94		mg/kg	SD01	5 / 7	0.51 - 3.6	1	NA	78 C	NA	NA	no	BSL
191242	Benzo(g,h,i)Perylene	0.17	J	0.39	J	mg/kg	SD01	3 / 7	0.51 - 3.6	0.39	NA	61000 N	NA	NA	no	BSL
207089	Benzo(k)fluoranthene	0.16	J	0.36	J	mg/kg	SD01	3 / 7	0.51 - 3.6	0.36	NA	780 C	NA	NA	no	BSL
117817	Bis(2-Ethylhexyl)Phthalate	0.069	J	0.069	J	mg/kg	SD04	1 / 6	0.63 - 0.63	0.07	NA	4100 C	NA	NA	no	BSL
218019	Chrysene	0.089	J	0.67		mg/kg	SD01	6 / 7	0.51 - 3.6	1	NA	7800 C	NA	NA	no	BSL
53703	Dibenz(a,h)Anthracene	0.16	J	0.16	J	mg/kg	SD01	1 / 6	0.51 - 3.6	0.16	NA	8 C	NA	NA	no	BSL
84662	Diethylphthalate	0.72	J	0.72	J	mg/kg	SD03	1 / 6	0.51 - 3.6	0.72	NA	1600000 N	NA	NA	no	BSL
206440	Fluoranthene	0.72	J	0.68	L	mg/kg	SD07	3 / 7	0.51 - 3.6	0.68	NA	82000 N	NA	NA	no	BSL
86737	Fluorene	0.063	J	0.063	J	mg/kg	SD02	1 / 6	0.51 - 3.6	0.063	NA	82000 N	NA	NA	no	BSL
193395	Indeno(1,2,3-cd)Pyrene	0.17	J	0.44	J	mg/kg	SD01	3 / 7	0.51 - 3.6	0.44	NA	78 C	NA	NA	no	BSL
86306	N-Nitrosodiphenylamine	0.078	J	0.61	J	mg/kg	SD02	2 / 6	0.51 - 3.6	0.61	NA	12000 C	NA	NA	no	BSL
91203	Naphthalene	0.08	J	0.11	J	mg/kg	SD01	2 / 6	0.51 - 3.6	0.11	NA	41000 N	NA	NA	no	BSL

Table L-2.6
Occurrence, Distribution, and Selection of COPCs
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage Features and Tributary to Blows Creek

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background (2) Value	Screening (3) Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (4) Contaminant Deletion or Selection
85018	Phenanthrene	0.17	L	0.52	J	mg/kg	SD02	3 / 7	0.51 - 3.6	0.52	NA	61000 N	NA	NA	no	BSL
129000	Pyrene	0.51	L	0.68		mg/kg	SD02	3 / 7	0.51 - 3.6	0.68	NA	61000 N	NA	NA	no	BSL
78933	2-Butanone	0.012	J	0.014	J	mg/kg	SD06	2 / 7	0.015 - 0.022	0.014	NA	1200000 N	NA	NA	no	BSL
67641	Acetone	0.009	J	0.073		mg/kg	SD06	3 / 7	0.015 - 0.024	0.073	NA	200000 N	NA	NA	no	BSL
75150	Carbon Disulfide	0.007	J	0.039		mg/kg	SD07	2 / 7	0.015 - 0.022	0.039	NA	200000 N	NA	NA	no	BSL
67663	Chloroform	0.003	J	0.003	J	mg/kg	SD02	1 / 7	0.015 - 0.022	0.003	NA	9400 N	NA	NA	no	BSL
75092	Methylene Chloride	0.003	J	0.003	J	mg/kg	SD05/SD06	2 / 7	0.015 - 0.022	0.003	NA	7600 C	NA	NA	no	BSL
	Inorganics															
14265442	Phosphorus	7.1		602		mg/kg	SD07	5 / 7	2 - 49.6	602	NA	NA	NA	NA	no	NTX
7429905	Aluminum	71.7		18900		mg/kg	SD01	7 / 7	0.04 - 18.1	18900	NA	2000000 N	NA	NA	no	BSL
7440360	Antimony	0.94	L	1.5	J	mg/kg	SD06	3 / 7	0 - 1.1	1.5	NA	820 N	NA	NA	no	BSL
7440382	Arsenic	0.05		23.2		mg/kg	SD01	6 / 7	0 - 1.6	23.2	NA	38 C	NA	NA	no	BSL
7440393	Barium	0.82		2460		mg/kg	SD01	7 / 7	0 - 0.82	2460	NA	140000 N	NA	NA	no	BSL
7440417	Beryllium	0.01		3.5		mg/kg	SD01	7 / 7	0 - 0.41	3.5	NA	4100 N	NA	NA	no	BSL
7440439	Cadmium	0.34	J	1.3	J	mg/kg	SD06	3 / 7	0 - 0.21	1.3	NA	2000 N	NA	NA	no	BSL
7440702	Calcium	3.1	J	3660		mg/kg	SD01	7 / 7	0.06 - 35.79	3660	NA	NA	NA	NA	no	NUT
7440473	Chromium	0.11		37		mg/kg	SD05	7 / 7	0 - 2.88	37	NA	6100 N	NA	NA	no	BSL
7440484	Cobalt	0.01	J	46.8		mg/kg	SD01	6 / 7	0 - 3.29	46.8	NA	41000 N	NA	NA	no	BSL
7440508	Copper	0.54		256		mg/kg	SD01	7 / 7	0 - 2.47	256	NA	82000 N	NA	NA	no	BSL
57125	Cyanide	0.54	L	1.1	J	mg/kg	SD02	2 / 6	0.31 - 1.1	1.1	NA	41000 N	NA	NA	no	BSL
7439896	Iron	117		161000		mg/kg	SD02	7 / 7	0.03 - 9.7	161000	NA	610000 N	NA	NA	no	BSL
7439921	Lead	1.1		377		mg/kg	SD01	7 / 7	0 - 0.57	377	NA	1000	NA	NA	no	BSL
7439954	Magnesium	8		4770		mg/kg	SD05	7 / 7	0.02 - 74.46	4770	NA	NA	NA	NA	no	NUT
7439965	Manganese	0.34		572	K	mg/kg	SD01	7 / 7	0 - 0.82	572	NA	41000 N	NA	NA	no	BSL
7439976	Mercury	0.08		0.44		mg/kg	SD01	7 / 7	0.02 - 0.1	0.44	NA	610 N	NA	NA	no	BSL

Table L-2.6
Occurrence, Distribution, and Selection of COPCs
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage Features and Tributary to Blows Creek

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background (2) Value	Screening (3) Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (4) Contaminant Deletion or Selection
7440020	Nickel	0.04		33.6		mg/kg	SD01	6 / 7	0 - 2.88	33.6	NA	41000 N	NA	NA	no	BSL
7440097	Potassium	7.3		3680		mg/kg	SD05	7 / 7	0.01 - 91.33	3680	NA	NA	NA	NA	no	NUT
7782492	Selenium	1.8	J	1.8	J	mg/kg	SD07	1 / 7	0 - 1.4	1.8	NA	10000 N	NA	NA	no	BSL
7440224	Silver	0.32	J	1.6	J	mg/kg	SD02	4 / 7	0 - 0.41	1.6	NA	10000 N	NA	NA	no	BSL
7440235	Sodium	2.7	J	6000	J	mg/kg	SD07	7 / 7	0.15 - 83	6000	NA	NA	NA	NA	no	NUT
7440280	Thallium	5.7		5.7		mg/kg	SD02	1 / 7	0 - 2.3	5.7	NA	140 N	NA	NA	no	BSL
7440622	Vanadium	0.22		63.8		mg/kg	SD01	7 / 7	0 - 3.7	63.8	NA	14000 N	NA	NA	no	BSL
7440666	Zinc	0.81		970		mg/kg	SD01	7 / 7	0 - 2.06	970	NA	610000 N	NA	NA	no	BSL

(1) Minimum/maximum detected concentration.

(2) No background study has been completed for the St. Juliens Creek Annex sediment.

(3) Tier II screening: With the exception of lead, all compounds are screened against 10 times the Risk-Based Concentration (RBC) Table, U.S. EPA Region III, October 9, 2002 for industrial soil (10 times the cancer benchmark value = 1e-06; 10 times the HQ = 0.1). Lead is screened against the EPA screening value of 1000 mg/kg.
When no RBC available, surrogate RBC used as follows:
Acenaphthylene - used naphthalene
Benzo(g,h,i)Perylene, Phenanthrene - used pyrene
alpha-Chlordane, gamma-Chlordane - used Chlordane
Endrin Aldehyde, Endrin Ketone - used Endrin
Cadmium - used Cadmium - Food
Chromium - used Chromium VI
Mercury - used Mercuric Chloride

(4) Rationale Codes
Selection Reason: Above Screening Level (ASL)
No Toxicity Information (NTX)
Deletion Reason: Essential Nutrient (NUT)
Below Screening Level (BSL)

Sediment Samples: SD01 through SD03 - Phase I; SD04 through SD07 - Phase II.

Definitions: NA = Not Applicable
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
J = Estimated Value
K = Estimated Value - Biased High
L = Estimated Value - Biased Low

Table L-2.7
Occurrence, Distribution, and Selection of COPCs
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 5

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background [2] Value	Screening [3] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [4] Contaminant Deletion or Selection
540-59-0	1,2-Dichloroethene (total)	1.00E-03	J	1.00E-03	J	MG/KG	SJS05-SS08-000	1/41	0.01 - 0.022	0.001	ND	70.4 N	NA	NA	NO	BSL
78-93-3	2-Butanone	0.021		0.21		MG/KG	SJS05-SS06-000	6/40	0.01 - 0.022	0.21	ND	4,693 N	NA	NA	NO	BSL
67-64-1	Acetone	0.011	J	0.17		MG/KG	SJS05-SB01-003	15/40	0.01 - 0.036	0.17	ND	782 N	NA	NA	NO	BSL
75-15-0	Carbon disulfide	0.008	J	0.017	J	MG/KG	SJS05-SB07-002 SJS05-SB07-002P	2/41	0.01 - 0.022	0.017	ND	782 N	NA	NA	NO	BSL
75-09-2	Methylene chloride	0.014	J	0.171		MG/KG	SJS05-SS12-000	7/41	0.01 - 0.022	0.171	ND	85.2 C	NA	NA	NO	BSL
100-42-5	Styrene	0.029		0.029		MG/KG	SJS05-SS34-000	1/41	0.01 - 0.022	0.029	ND	1,564 N	NA	NA	NO	BSL
127-18-4	Tetrachloroethene	1.00E-03		0.004		MG/KG	SJS05-SS09-000	5/41	0.01 - 0.022	0.004	ND	12.3 C	NA	NA	NO	BSL
108-88-3	Toluene	0.002	J	0.005	J	MG/KG	SJS05-SS09-000	4/41	0.01 - 0.022	0.005	ND	1,564 N	NA	NA	NO	BSL
79-01-6	Trichloroethene	0.002	J	0.026		MG/KG	SJS05-SS32-000	6/41	0.01 - 0.022	0.026	ND	46.9 N	NA	NA	NO	BSL
1330-20-7	Xylene, total	0.003	J	0.003	J	MG/KG	SJS05-SS05-000	1/41	0.01 - 0.022	0.003	ND	15,643 N	NA	NA	NO	BSL
121-14-2	2,4-Dinitrotoluene	0.043	J	3.2	J	MG/KG	SJS05-SS03-000	7/41	0.33 - 2	3.2	ND	15.6 N	NA	NA	NO	BSL
606-20-2	2,6-Dinitrotoluene	0.039	J	0.039	J	MG/KG	SJS05-SS01-000	1/41	0.33 - 2	0.039	ND	7.82 N	NA	NA	NO	BSL
91-57-6	2-Methylnaphthalene	0.042	J	0.042	J	MG/KG	SJS05-SS01-000	1/41	0.33 - 2	0.042	ND	156 N	NA	NA	NO	BSL
83-32-9	Acenaphthene	0.041	J	0.041	J	MG/KG	SJS05-SS04-000	1/41	0.33 - 2	0.041	0.592	469 N	NA	NA	NO	BSL
208-96-8	Acenaphthylene	0.035	J	0.11	J	MG/KG	SJS05-SS35-000	4/41	0.33 - 2	0.11	0.131	156 N	NA	NA	NO	BSL
120-12-7	Anthracene	0.049	J	0.17	J	MG/KG	SJS05-SB03-002	6/41	0.33 - 2	0.17	0.462	2,346 N	NA	NA	NO	BSL
56-55-3	Benzo(a)anthracene	0.037	J	0.84	J	MG/KG	SJS05-SS35-000	27/41	0.33 - 2	0.84	2.027	0.875 C	NA	NA	NO	BSL
50-32-8	Benzo(a)pyrene	0.047	J	0.76	J	MG/KG	SJS05-SS35-000	24/41	0.33 - 2	0.76	1.785	0.0875 C	NA	NA	YES	ASL
205-99-2	Benzo(b)fluoranthene	0.042	J	2.1	J	MG/KG	SJS05-SS35-000	31/41	0.33 - 2	2.1	2.335	0.875 C	NA	NA	YES	ASL
191-24-2	Benzo(g,h,i)perylene	0.052	J	0.68	J	MG/KG	SJS05-SS35-000	21/41	0.33 - 2	0.68	1.655	235 N	NA	NA	NO	BSL
207-08-9	Benzo(k)fluoranthene	0.054	J	0.7	J	MG/KG	SJS05-SS03-000	20/41	0.33 - 2	0.7	2.038	8.75 C	NA	NA	NO	BSL
86-74-8	Carbazole	0.04	J	0.061	J	MG/KG	SJS05-SS06-000	2/41	0.33 - 2	0.061	ND	31.9 C	NA	NA	NO	BSL
218-01-9	Chrysene	0.045	J	1.3	J	MG/KG	SJS05-SS35-000	31/41	0.33 - 2	1.3	3.487	87.5 C	NA	NA	NO	BSL
84-74-2	Di-n-butylphthalate	0.038	J	4.7		MG/KG	SJS05-SS03-000	13/41	0.33 - 2	4.7	ND	782 N	NA	NA	NO	BSL
53-70-3	Dibenz(a,h)anthracene	0.061	J	0.26	J	MG/KG	SJS05-SS35-000	3/41	0.33 - 2	0.26	0.708	0.0875 C	NA	NA	YES	ASL
84-66-2	Diethylphthalate	0.17	J	0.17	J	MG/KG	SJS05-SS12-000	1/41	0.33 - 2	0.17	ND	6,257 N	NA	NA	NO	BSL
131-11-3	Dimethyl phthalate	0.063	J	0.063	J	MG/KG	SJS05-SS12-000	1/41	0.33 - 2	0.063	ND	78,214 N	NA	NA	NO	BSL
206-44-0	Fluoranthene	0.042	J	2	J	MG/KG	SJS05-SS03-000	31/41	0.33 - 2	2	2.766	313 N	NA	NA	NO	BSL
193-39-5	Indeno(1,2,3-cd)pyrene	0.035	J	0.68	J	MG/KG	SJS05-SS35-000	21/41	0.33 - 2	0.68	1.769	0.875 C	NA	NA	NO	BSL
91-20-3	Naphthalene	0.05	J	0.09	J	MG/KG	SJS05-SS35-000	3/41	0.33 - 2	0.09	0.485	156 N	NA	NA	NO	BSL
85-01-8	Phenanthrene	0.038	J	0.34	UJ	MG/KG	SJS05-SS11-000 SJS05-SS31-000	17/41	0.33 - 2	0.33	0.913	235 N	NA	NA	NO	BSL
129-00-0	Pyrene	0.042	J	1.2		MG/KG	SJS05-SS09-000	30/41	0.33 - 2	1.2	2.59	235 N	NA	NA	NO	BSL
117-81-7	bis(2-Ethylhexyl)phthalate	0.066	J	0.34	J	MG/KG	SJS05-SB18-001	4/41	0.25 - 2	0.34	ND	45.6 C	NA	NA	NO	BSL
86-30-6	n-Nitrosodiphenylamine	0.12	J	0.53	UJ	MG/KG	SJS05-SS03-000 SJS05-SS21-000	3/41	0.33 - 2	0.53	ND	130 C	NA	NA	NO	BSL
72-54-8	4,4'-DDD	1.70E-04	J	0.31	J	MG/KG	SJS05-SS09-000	20/40	3.29E-03 - 0.037	0.31	NA	2.66 C	NA	NA	NO	BSL

Table L-2.7
Occurrence, Distribution, and Selection of COPCs
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 5

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background [2] Value	Screening [3] Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [4] Contaminant Deletion or Selection
72-55-9	4,4'-DDE	1.40E-04	J	4.7	J	MG/KG	SJS05-SS35-000	29/41	3.29E-03 - 0.6	4.7	NA	1.88	C	NA	NA	YES	ASL
50-29-3	4,4'-DDT	1.10E-04	J	3.1	J	MG/KG	SJS05-SS32-000 SJS05-SS35-000	26/41	3.29E-03 - 0.6	3.1	NA	1.88	C	NA	NA	YES	ASL
11096-82-5	Aroclor-1260	0.03	J	0.039	UJ	MG/KG	SJS05-SS08-000 SJS05-SS33-000	2/41	0.033 - 0.37	0.039	ND	0.319	C	NA	NA	NO	BSL
60-57-1	Dieldrin	0.005	J	0.0068		MG/KG	SJS05-SS08-000	2/41	3.29E-03 - 0.037	0.0068	0.0053	0.0399	C	NA	NA	NO	BSL
319-84-6	alpha-BHC	0.0035		0.0035	UJ	MG/KG	SJS05-SS08-000 SJS05-SS23-000	1/41	0.0017 - 0.019	0.0035	ND	0.101	C	NA	NA	NO	BSL
5103-71-9	alpha-Chlordane	0.00058	J	0.0024	J	MG/KG	SJS05-SS08-000	2/41	0.0017 - 0.019	0.0024	0.0028	1.82	C	NA	NA	NO	BSL
12789-03-6	gamma-Chlordane	0.0026	J	0.0026	J	MG/KG	SJS05-SS08-000	1/41	0.0017 - 0.019	0.0026	0.0028	1.82	C	NA	NA	NO	BSL
1746016	Total Dioxins (2,3,7,8-TCDD equivalent)	3.07E-07		1.67E-05		MG/KG	SJS05-SB22-001	10/10		1.7E-05	NA	4.3E-06	C	NA	NA	YES	ASL
121-14-2	2,4-Dinitrotoluene	0.303		0.638		MG/KG	SJS05-SS14-000	3/22	0.238 - 0.25	0.638	ND	15.6	N	NA	NA	NO	BSL
35572-78-2	2-Amino-4,6-dinitrotoluene	0.417		0.417		MG/KG	SJS05-SS24-000	1/24	0.238 - 0.58	0.417	NA	0.47	N	NA	NA	NO	BSL
14265-44-2	Phosphorus	2.2		366		MG/KG	SJS05-SB02-002	21/41	1.2 - 110	366	ND	NA		NA	NA	NO	NTX
7429-90-5	Aluminum	547		27,900	J	MG/KG	SJS05-SB02-002	41/41	6.88 - 16.7	27900	18839	7,821	N	NA	NA	YES	ASL
7440-36-0	Antimony	0.51	L	10.8	J	MG/KG	SJS05-SS19-000	19/36	0.31 - 1.2	10.8	1.47	3.13	N	NA	NA	YES	ASL
7440-38-2	Arsenic	1.3	L	152		MG/KG	SJS05-SS11-000	39/41	0.37 - 1.07	152	14	0.426	C	NA	NA	YES	ASL
7440-39-3	Barium	7.6	J	5,970		MG/KG	SJS05-SS11-000	38/41	3.99E-02 - 0.72	5970	50	548	N	NA	NA	YES	ASL
7440-41-7	Beryllium	0.190	J	1.5	J	MG/KG	SJS05-SB07-002	37/41	1.99E-02 - 0.36	1.5	0.81	15.6	N	NA	NA	NO	BSL
7440-43-9	Cadmium	0.0600	J	22.7		MG/KG	SJS05-SS19-000	27/41	5.99E-02 - 0.18	22.7	ND	3.91	N	NA	NA	YES	ASL
7440-70-2	Calcium	230	J	50,500		MG/KG	SJS05-SB11-002P	38/41	10.8 - 31.13	50500	3251	NA		NA	NA	NO	NUT
7440-47-3	Chromium	1.9	K	867		MG/KG	SJS05-SS19-000	41/41	0.20 - 2.5	867	39	23.5	N	NA	NA	YES	ASL
7440-48-4	Cobalt	1.5	J	36		MG/KG	SJS05-SB02-002	39/41	9.0E-02 - 2.86	36	13	160	N	NA	NA	NO	BSL
7440-50-8	Copper	2.6	J	6,470		MG/KG	SJS05-SS01-000	38/41	0.20 - 2.15	6470	40	313	N	NA	NA	YES	ASL
57-12-5	Cyanide	0.240		1.45	J	MG/KG	SJS05-SS03-000	6/38	0.17 - 0.91	1.45	ND	156	N	NA	NA	NO	BSL
7439-89-6	Iron	767		120,000		MG/KG	SJS05-SS01-000	41/41	2.66 - 13.5	120000	36585	2,346	N	NA	NA	YES	ASL
7439-92-1	Lead	1.1	K	7,210	J	MG/KG	SJS05-SS01-000	41/41	0.16 - 0.43	7210	86	400		NA	NA	YES	ASL
7439-95-4	Magnesium	148	J	5,910		MG/KG	SJS05-SB02-002	41/41	4.5 - 64.76	5910	3847	NA		NA	NA	NO	NUT
7439-96-5	Manganese	6.6		852		MG/KG	SJS05-SS01-000	41/41	5.99E-02 - 0.72	852	151	156	N	NA	NA	YES	ASL
7439-97-6	Mercury	0.0200	J	1.10		MG/KG	SJS05-SS33-000	34/40	9.99E-03 - 0.09	1.1	0.62	2.35	N	NA	NA	NO	BSL
7440-02-0	Nickel	2.6	J	91.5		MG/KG	SJS05-SS01-000	34/41	0.170- 2.5	91.5	15	156	N	NA	NA	NO	BSL
7440-09-7	Potassium	123	J	4,430		MG/KG	SJS05-SS35-000	41/41	2.5 - 79.43	4430	3465	NA		NA	NA	NO	NUT
7782-49-2	Selenium	0.630	J	1.60	J	MG/KG	SJS05-SS23-000	10/41	0.47 - 1.10	1.6	1.5	39.1	N	NA	NA	NO	BSL
7440-22-4	Silver	0.23	J	4.60		MG/KG	SJS05-SS29-000P	11/41	0.16 - 0.38	4.6	0.67	39.1	N	NA	NA	NO	BSL
7440-23-5	Sodium	58.6	J	6,410		MG/KG	SJS05-SS18-000	27/41	9.07 - 64.8	6410	203	NA		NA	NA	NO	NUT
7440-28-0	Thallium	0.45	J	5.3		MG/KG	SJS05-SS01-000	12/41	0.31 - 1.39	5.3	ND	0.548	N	NA	NA	YES	ASL
7440-62-2	Vanadium	5.9	J	75.2		MG/KG	SJS05-SB08-002	39/41	0.10 - 3.22	75.2	42	54.8	N	NA	NA	YES	ASL
7440-66-6	Zinc	13.5		8,490	L	MG/KG	SJS05-SS01-000	37/41	0.34 - 1.79	8490	87	2,346	N	NA	NA	YES	ASL

* Surface soil & subsurface soil combined

Table L-2.7
Occurrence, Distribution, and Selection of COPCs
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 5

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background [2] Value	Screening [3] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [4] Contaminant Deletion or Selection

(1) Minimum/maximum detected concentration.

(2) Background data is UCL for dredge-fill background soil type from St. Juliens Creek Background Investigation.

(3) Tier I screening: With the exception of lead, all compounds are screened against the Risk-Based Concentration (RBC) Table, U.S. EPA Region III, October 9, 2002 for residential soil (cancer benchmark value = 1e-06; HQ = 0.1). Lead is screened against the EPA screening value of 400 mg/kg.
When no RBC available, surrogate RBC used as follows:
Acenaphthylene - used naphthalene
Benzo(g,h,i)Perylene, Phenanthrene - used pyrene
alpha-Chlordane, gamma-Chlordane - used Chlordane
Cadmium - used Cadmium - Food
Chromium - used Chromium VI
Mercury - used Mercuric Chloride

(4) Rationale Codes

Selection Reason:	Above Screening Level (ASL)
	No Toxicity Information (NTX)
Deletion Reason:Deletion Reason:	Essential Nutrient (NUT)
	Below Screening Level (BSL)

(5) Total equivalent value of 2,3,7,8-trichlorodibenzodioxin.

Surface and Subsurface Soil Samples: SS01 to SS09, SB01 to SB11 - Phase I; SS10, SS12, SS14, SS16, SS18 to SS21, SS23, SS24, SS29 to SS35, SB16, SB18, SB20 - Phase II

Definitions: NA = Not Applicable
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
J = Estimated Value
L = Estimated Value - Biased Low
K = Estimated

Table L-2.8
Occurrence, Distribution, and Selection of COPCs
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 5

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
540-59-0	1,2-Dichloroethene (total)	1.00E-03	J	1.00E-03	J	MG/KG	SJS05-SS08-000	1/41	0.01 - 0.022	0.001	ND	1,840	N	NA	NA	NO	BSL
78-93-3	2-Butanone	0.021		0.21		MG/KG	SJS05-SS06-000	6/40	0.01 - 0.022	0.21	ND	122,640	N	NA	NA	NO	BSL
67-64-1	Acetone	0.011	J	0.17		MG/KG	SJS05-SB01-003	15/40	0.01 - 0.036	0.17	ND	20,440	N	NA	NA	NO	BSL
75-15-0	Carbon disulfide	0.008	J	0.017	J	MG/KG	SJS05-SB07-002 SJS05-SB07-002P	2/41	0.01 - 0.022	0.017	ND	20,440	N	NA	NA	NO	BSL
75-09-2	Methylene chloride	0.014	J	0.171		MG/KG	SJS05-SS12-000	7/41	0.01 - 0.022	0.171	ND	763	C	NA	NA	NO	BSL
100-42-5	Styrene	0.029		0.029		MG/KG	SJS05-SS34-000	1/41	0.01 - 0.022	0.029	ND	40,880	N	NA	NA	NO	BSL
127-18-4	Tetrachloroethene	1.00E-03		0.004		MG/KG	SJS05-SS09-000	5/41	0.01 - 0.022	0.004	ND	110	C	NA	NA	NO	BSL
108-88-3	Toluene	0.002	J	0.005	J	MG/KG	SJS05-SS09-000	4/41	0.01 - 0.022	0.005	ND	40,880	N	NA	NA	NO	BSL
79-01-6	Trichloroethene	0.002	J	0.026		MG/KG	SJS05-SS32-000	6/41	0.01 - 0.022	0.026	ND	520	C	NA	NA	NO	BSL
1330-20-7	Xylene, total	0.003	J	0.003	J	MG/KG	SJS05-SS05-000	1/41	0.01 - 0.022	0.003	ND	408,800	N	NA	NA	NO	BSL
121-14-2	2,4-Dinitrotoluene	0.043	J	3.2	J	MG/KG	SJS05-SS03-000	7/41	0.33 - 2	3.2	ND	409	N	NA	NA	NO	BSL
606-20-2	2,6-Dinitrotoluene	0.039	J	0.039	J	MG/KG	SJS05-SS01-000	1/41	0.33 - 2	0.039	ND	204	N	NA	NA	NO	BSL
91-57-6	2-Methylnaphthalene	0.042	J	0.042	J	MG/KG	SJS05-SS01-000	1/41	0.33 - 2	0.042	ND	4,088	N	NA	NA	NO	BSL
83-32-9	Acenaphthene	0.041	J	0.041	J	MG/KG	SJS05-SS04-000	1/41	0.33 - 2	0.041	0.592	12,264	N	NA	NA	NO	BSL
208-96-8	Acenaphthylene	0.035	J	0.11	J	MG/KG	SJS05-SS35-000	4/41	0.33 - 2	0.11	0.131	4,088	N	NA	NA	NO	BSL
120-12-7	Anthracene	0.049	J	0.17	J	MG/KG	SJS05-SB03-002	6/41	0.33 - 2	0.17	0.462	61,320	N	NA	NA	NO	BSL
56-55-3	Benzo(a)anthracene	0.037	J	0.84	J	MG/KG	SJS05-SS35-000	27/41	0.33 - 2	0.84	2.027	7.84	C	NA	NA	NO	BSL
50-32-8	Benzo(a)pyrene	0.047	J	0.76	J	MG/KG	SJS05-SS35-000	24/41	0.33 - 2	0.76	1.785	0.784	C	NA	NA	NO	BSL
205-99-2	Benzo(b)fluoranthene	0.042	J	2.1	J	MG/KG	SJS05-SS35-000	31/41	0.33 - 2	2.1	2.335	7.84	C	NA	NA	NO	BSL
191-24-2	Benzo(g,h,i)perylene	0.052	J	0.68	J	MG/KG	SJS05-SS35-000	21/41	0.33 - 2	0.68	1.655	6,132	N	NA	NA	NO	BSL
207-08-9	Benzo(k)fluoranthene	0.054	J	0.7	J	MG/KG	SJS05-SS03-000	20/41	0.33 - 2	0.7	2.038	78.4	C	NA	NA	NO	BSL
86-74-8	Carbazole	0.04	J	0.061	J	MG/KG	SJS05-SS06-000	2/41	0.33 - 2	0.061	ND	286	C	NA	NA	NO	BSL
218-01-9	Chrysene	0.045	J	1.3	J	MG/KG	SJS05-SS35-000	31/41	0.33 - 2	1.3	3.487	784	C	NA	NA	NO	BSL
84-74-2	Di-n-butylphthalate	0.038	J	4.7		MG/KG	SJS05-SS03-000	13/41	0.33 - 2	4.7	ND	20,440	N	NA	NA	NO	BSL
53-70-3	Dibenz(a,h)anthracene	0.061	J	0.26	J	MG/KG	SJS05-SS35-000	3/41	0.33 - 2	0.26	0.708	0.784	C	NA	NA	NO	BSL
84-66-2	Diethylphthalate	0.17	J	0.17	J	MG/KG	SJS05-SS12-000	1/41	0.33 - 2	0.17	ND	163,520	N	NA	NA	NO	BSL
131-11-3	Dimethyl phthalate	0.063	J	0.063	J	MG/KG	SJS05-SS12-000	1/41	0.33 - 2	0.063	ND	2,044,000	N	NA	NA	NO	BSL
206-44-0	Fluoranthene	0.042	J	2	J	MG/KG	SJS05-SS03-000	31/41	0.33 - 2	2	2.766	8,176	N	NA	NA	NO	BSL
193-39-5	Indeno(1,2,3-cd)pyrene	0.035	J	0.68	J	MG/KG	SJS05-SS35-000	21/41	0.33 - 2	0.68	1.769	7.84	C	NA	NA	NO	BSL
91-20-3	Naphthalene	0.05	J	0.09	J	MG/KG	SJS05-SS35-000	3/41	0.33 - 2	0.09	0.485	4,088	N	NA	NA	NO	BSL
85-01-8	Phenanthrene	0.038	J	0.34	UJ	MG/KG	SJS05-SS11-000 SJS05-SS31-000	17/41	0.33 - 2	0.33	0.913	6,132	N	NA	NA	NO	BSL
129-00-0	Pyrene	0.042	J	1.2		MG/KG	SJS05-SS09-000	30/41	0.33 - 2	1.2	2.59	6,132	N	NA	NA	NO	BSL
117-81-7	bis(2-Ethylhexyl)phthalate	0.066	J	0.34	J	MG/KG	SJS05-SB18-001	4/41	0.25 - 2	0.34	ND	409	C	NA	NA	NO	BSL
86-30-6	n-Nitrosodiphenylamine	0.12	J	0.53	UJ	MG/KG	SJS05-SS03-000 SJS05-SS21-000	3/41	0.33 - 2	0.53	ND	1,168	C	NA	NA	NO	BSL
72-54-8	4,4'-DDD	1.70E-04	J	0.31	J	MG/KG	SJS05-SS09-000	20/40	3.29E-03 - 0.037	0.31	NA	23.8	C	NA	NA	NO	BSL

Table L-2.8
Occurrence, Distribution, and Selection of COPCs
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 5

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Backgroun [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
72-55-9	4,4'-DDE	1.40E-04	J	4.7	J	MG/KG	SJS05-SS35-000	29/41	3.29E-03 - 0.6	4.7	NA	16.8 C	NA	NA	NO	BSL
50-29-3	4,4'-DDT	1.10E-04	J	3.1	J	MG/KG	SJS05-SS32-000 SJS05-SS35-000	26/41	3.29E-03 - 0.6	3.1	NA	16.8 C	NA	NA	NO	BSL
11096-82-5	Aroclor-1260	0.03	J	0.039	UJ	MG/KG	SJS05-SS08-000 SJS05-SS33-000	2/41	0.033 - 0.37	0.039	ND	2.86 C	NA	NA	NO	BSL
60-57-1	Dieldrin	0.005	J	0.0068		MG/KG	SJS05-SS08-000	2/41	3.29E-03 - 0.037	0.0068	0.0053	0.358 C	NA	NA	NO	BSL
319-84-6	alpha-BHC	0.0035		0.0035	UJ	MG/KG	SJS05-SS08-000 SJS05-SS23-000	1/41	0.0017 - 0.019	0.0035	ND	0.908 C	NA	NA	NO	BSL
5103-71-9	alpha-Chlordane	0.00058	J	0.0024	J	MG/KG	SJS05-SS08-000	2/41	0.0017 - 0.019	0.0024	0.0028	16.4 C	NA	NA	NO	BSL
12789-03-6	gamma-Chlordane	0.0026	J	0.0026	J	MG/KG	SJS05-SS08-000	1/41	0.0017 - 0.019	0.0026	0.0028	16.4 C	NA	NA	NO	BSL
1746016	Total Dioxins (2,3,7,8-TCDD equivalent)	3.07E-07		1.67E-05		MG/KG	SJS05-SB22-001	10/10		1.7E-05	NA	0.00004 C	NA	NA	NO	BSL
121-14-2	2,4-Dinitrotoluene	0.303		0.638		MG/KG	SJS05-SS14-000	3/22	0.238 - 0.25	0.638	ND	409 N	NA	NA	NO	BSL
35572-78-2	2-Amino-4,6-dinitrotoluene	0.417		0.417		MG/KG	SJS05-SS24-000	1/24	0.238 - 0.58	0.417	NA	12 N	NA	NA	NO	BSL
14265-44-2	Phosphorus	2.2		366		MG/KG	SJS05-SB02-002	21/41	1.2 - 110	366	ND	NA	NA	NA	NO	NTX
7429-90-5	Aluminum	547		27,900	J	MG/KG	SJS05-SB02-002	41/41	6.88 - 16.7	27900	18839	204,400 N	NA	NA	NO	BSL
7440-36-0	Antimony	0.51	L	10.8	J	MG/KG	SJS05-SS19-000	19/36	0.31 - 1.2	10.8	1.47	81.8 N	NA	NA	NO	BSL
7440-38-2	Arsenic	1.3	L	152		MG/KG	SJS05-SS11-000	39/41	0.37 - 1.07	152	14	3.82 C	NA	NA	YES	ASL
7440-39-3	Barium	7.6	J	5,970		MG/KG	SJS05-SS11-000	38/41	3.99E-02 - 0.72	5970	50	14,308 N	NA	NA	NO	BSL
7440-41-7	Beryllium	0.190	J	1.5	J	MG/KG	SJS05-SB07-002	37/41	1.99E-02 - 0.36	1.5	0.81	409 N	NA	NA	NO	BSL
7440-43-9	Cadmium	0.0600	J	22.7		MG/KG	SJS05-SS19-000	27/41	5.99E-02 - 0.18	22.7	ND	102 N	NA	NA	NO	BSL
7440-70-2	Calcium	230	J	50,500		MG/KG	SJS05-SB11-002P	38/41	10.8 - 31.13	50500	3251	NA	NA	NA	NO	NUT
7440-47-3	Chromium	1.9	K	867		MG/KG	SJS05-SS19-000	41/41	0.20 - 2.5	867	39	613 N	NA	NA	YES	ASL
7440-48-4	Cobalt	1.5	J	36		MG/KG	SJS05-SB02-002	39/41	9.0E-02 - 2.86	36	13	4,100 N	NA	NA	NO	BSL
7440-50-8	Copper	2.6	J	6,470		MG/KG	SJS05-SS01-000	38/41	0.20 - 2.15	6470	40	8,176 N	NA	NA	NO	BSL
57-12-5	Cyanide	0.240		1.45	J	MG/KG	SJS05-SS03-000	6/38	0.17 - 0.91	1.45	ND	4,088 N	NA	NA	NO	BSL
7439-89-6	Iron	767		120,000		MG/KG	SJS05-SS01-000	41/41	2.66 - 13.5	120000	36585	61,320 N	NA	NA	YES	ASL
7439-92-1	Lead	1.1	K	7,210	J	MG/KG	SJS05-SS01-000	41/41	0.16 - 0.43	7210	86	400	NA	NA	YES	ASL
7439-95-4	Magnesium	148	J	5,910		MG/KG	SJS05-SB02-002	41/41	4.5 - 64.76	5910	3847	NA	NA	NA	NO	NUT
7439-96-5	Manganese	6.6		852		MG/KG	SJS05-SS01-000	41/41	5.99E-02 - 0.72	852	151	4,088 N	NA	NA	NO	BSL
7439-97-6	Mercury	0.0200	J	1.10		MG/KG	SJS05-SS33-000	34/40	9.99E-03 - 0.09	1.1	0.62	61.3 N	NA	NA	NO	BSL
7440-02-0	Nickel	2.6	J	91.5		MG/KG	SJS05-SS01-000	34/41	0.170- 2.5	91.5	15	4,088 N	NA	NA	NO	BSL
7440-09-7	Potassium	123	J	4,430		MG/KG	SJS05-SS35-000	41/41	2.5 - 79.43	4430	3465	NA	NA	NA	NO	NUT
7782-49-2	Selenium	0.630	J	1.60	J	MG/KG	SJS05-SS23-000	10/41	0.47 - 1.10	1.6	1.5	1,022 N	NA	NA	NO	BSL
7440-22-4	Silver	0.23	J	4.60		MG/KG	SJS05-SS29-000P	11/41	0.16 - 0.38	4.6	0.67	1,022 N	NA	NA	NO	BSL
7440-23-5	Sodium	58.6	J	6,410		MG/KG	SJS05-SS18-000	27/41	9.07 - 64.8	6410	203	NA	NA	NA	NO	NUT
7440-28-0	Thallium	0.45	J	5.3		MG/KG	SJS05-SS01-000	12/41	0.31 - 1.39	5.3	ND	14.3 N	NA	NA	NO	BSL
7440-62-2	Vanadium	5.9	J	75.2		MG/KG	SJS05-SB08-002	39/41	0.10 - 3.22	75.2	42	1,431 N	NA	NA	NO	BSL
7440-66-6	Zinc	13.5		8,490	L	MG/KG	SJS05-SS01-000	37/41	0.34 - 1.79	8490	87	61,320 N	NA	NA	NO	BSL

* Surface soil & subsurface soil combined

Table L-2.8
Occurrence, Distribution, and Selection of COPCs
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 5

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection

(1) Minimum/maximum detected concentration.

(2) Background data is UCL for dredge-fill background soil type from St. Juliens Creek Background Investigation.

(3) Tier II screening: With the exception of lead, all compounds are screened against the Risk-Based Concentration (RBC) Table, U.S. EPA Region III, October 9, 2002 for industrial soil (cancer benchmark value = 1e-06; HQ = 0.1). Lead is screened against the EPA screening value of 1,000 mg/kg.
When no RBC available, surrogate RBC used as follows:
Acenaphthylene - used naphthalene
Benzo(g,h,i)Perylene, Phenanthrene - used pyrene
alpha-Chlordane, gamma-Chlordane - used Chlordane
Cadmium - used Cadmium - Food
Chromium - used Chromium VI
Mercury - used Mercuric Chloride

(4) Rationale Codes
Selection Reason: Above Screening Level (ASL)
No Toxicity Information (NTX)
Deletion Reason:Deletion Reason: Essential Nutrient (NUT)
Below Screening Level (BSL)

(5) Toxic Equivalence Value of 2,3,7,8-Tetrachlorodibenzodioxin.

Surface and Subsurface Soil Samples: SS01 to SS09, SB01 to SB11 - Phase I; SS10 to SS12, SS14, SS16, SS18 to SS21, SS23, SS24, SS29 to SS35, SB16 to SB18, SB20 - Phase II

Definitions: NA = Not Applicable
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Re
J = Estimated Value
L = Estimated Value - Biased Low
K = Estimated Value - Biased High

Table L-2.9
Occurrence, Distribution, and Selection of COPCs
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: Emissions from Soil at Site 5

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
540-59-0	1,2-Dichloroethene (total)	1.00E-03	J	1.00E-03	J	MG/KG	SJS05-SS08-000	1/41	0.01 - 0.022	0.001	ND	1,840 N	NA	NA	NO	BSL
78-93-3	2-Butanone	0.021		0.21		MG/KG	SJS05-SS06-000	6/40	0.01 - 0.022	0.21	ND	122,640 N	NA	NA	NO	BSL
67-64-1	Acetone	0.011	J	0.17		MG/KG	SJS05-SB01-003	15/40	0.01 - 0.036	0.17	ND	20,440 N	NA	NA	NO	BSL
75-15-0	Carbon disulfide	0.008	J	0.017	J	MG/KG	SJS05-SB07-002 SJS05-SB07-002P	2/41	0.01 - 0.022	0.017	ND	20,440 N	NA	NA	NO	BSL
75-09-2	Methylene chloride	0.014	J	0.171		MG/KG	SJS05-SS12-000	7/41	0.01 - 0.022	0.171	ND	763 C	NA	NA	NO	BSL
100-42-5	Styrene	0.029		0.029		MG/KG	SJS05-SS34-000	1/41	0.01 - 0.022	0.029	ND	40,880 N	NA	NA	NO	BSL
127-18-4	Tetrachloroethene	1.00E-03		0.004		MG/KG	SJS05-SS09-000	5/41	0.01 - 0.022	0.004	ND	110 C	NA	NA	NO	BSL
108-88-3	Toluene	0.002	J	0.005	J	MG/KG	SJS05-SS09-000	4/41	0.01 - 0.022	0.005	ND	40,880 N	NA	NA	NO	BSL
79-01-6	Trichloroethene	0.002	J	0.026		MG/KG	SJS05-SS32-000	6/41	0.01 - 0.022	0.026	ND	520 C	NA	NA	NO	BSL
1330-20-7	Xylene, total	0.003	J	0.003	J	MG/KG	SJS05-SS05-000	1/41	0.01 - 0.022	0.003	ND	408,800 N	NA	NA	NO	BSL
121-14-2	2,4-Dinitrotoluene	0.043	J	3.2	J	MG/KG	SJS05-SS03-000	7/41	0.33 - 2	3.2	ND	409 N	NA	NA	NO	BSL
606-20-2	2,6-Dinitrotoluene	0.039	J	0.039	J	MG/KG	SJS05-SS01-000	1/41	0.33 - 2	0.039	ND	204 N	NA	NA	NO	BSL
91-57-6	2-Methylnaphthalene	0.042	J	0.042	J	MG/KG	SJS05-SS01-000	1/41	0.33 - 2	0.042	ND	4,088 N	NA	NA	NO	BSL
83-32-9	Acenaphthene	0.041	J	0.041	J	MG/KG	SJS05-SS04-000	1/41	0.33 - 2	0.041	0.592	12,264 N	NA	NA	NO	BSL
208-96-8	Acenaphthylene	0.035	J	0.11	J	MG/KG	SJS05-SS35-000	4/41	0.33 - 2	0.11	0.131	4,088 N	NA	NA	NO	BSL
120-12-7	Anthracene	0.049	J	0.17	J	MG/KG	SJS05-SB03-002	6/41	0.33 - 2	0.17	0.462	61,320 N	NA	NA	NO	BSL
56-55-3	Benzo(a)anthracene	0.037	J	0.84	J	MG/KG	SJS05-SS35-000	27/41	0.33 - 2	0.84	2.027	7.84 C	NA	NA	NO	BSL
50-32-8	Benzo(a)pyrene	0.047	J	0.76	J	MG/KG	SJS05-SS35-000	24/41	0.33 - 2	0.76	1.785	0.784 C	NA	NA	NO	BSL
205-99-2	Benzo(b)fluoranthene	0.042	J	2.1	J	MG/KG	SJS05-SS35-000	31/41	0.33 - 2	2.1	2.335	7.84 C	NA	NA	NO	BSL
191-24-2	Benzo(g,h,i)perylene	0.052	J	0.68	J	MG/KG	SJS05-SS35-000	21/41	0.33 - 2	0.68	1.655	6,132 N	NA	NA	NO	BSL
207-08-9	Benzo(k)fluoranthene	0.054	J	0.7	J	MG/KG	SJS05-SS03-000	20/41	0.33 - 2	0.7	2.038	78.4 C	NA	NA	NO	BSL
86-74-8	Carbazole	0.04	J	0.061	J	MG/KG	SJS05-SS06-000	2/41	0.33 - 2	0.061	ND	286 C	NA	NA	NO	BSL
218-01-9	Chrysene	0.045	J	1.3	J	MG/KG	SJS05-SS35-000	31/41	0.33 - 2	1.3	3.487	784 C	NA	NA	NO	BSL
84-74-2	Di-n-butylphthalate	0.038	J	4.7		MG/KG	SJS05-SS03-000	13/41	0.33 - 2	4.7	ND	20,440 N	NA	NA	NO	BSL
53-70-3	Dibenz(a,h)anthracene	0.061	J	0.26	J	MG/KG	SJS05-SS35-000	3/41	0.33 - 2	0.26	0.708	0.784 C	NA	NA	NO	BSL
84-66-2	Diethylphthalate	0.17	J	0.17	J	MG/KG	SJS05-SS12-000	1/41	0.33 - 2	0.17	ND	163,520 N	NA	NA	NO	BSL
131-11-3	Dimethyl phthalate	0.063	J	0.063	J	MG/KG	SJS05-SS12-000	1/41	0.33 - 2	0.063	ND	2,044,000 N	NA	NA	NO	BSL
206-44-0	Fluoranthene	0.042	J	2	J	MG/KG	SJS05-SS03-000	31/41	0.33 - 2	2	2.766	8,176 N	NA	NA	NO	BSL
193-39-5	Indeno(1,2,3-cd)pyrene	0.035	J	0.68	J	MG/KG	SJS05-SS35-000	21/41	0.33 - 2	0.68	1.769	7.84 C	NA	NA	NO	BSL
91-20-3	Naphthalene	0.05	J	0.09	J	MG/KG	SJS05-SS35-000	3/41	0.33 - 2	0.09	0.485	4,088 N	NA	NA	NO	BSL
85-01-8	Phenanthrene	0.038	J	0.34	UJ	MG/KG	SJS05-SS11-000 SJS05-SS31-000	17/41	0.33 - 2	0.33	0.913	6,132 N	NA	NA	NO	BSL
129-00-0	Pyrene	0.042	J	1.2		MG/KG	SJS05-SS09-000	30/41	0.33 - 2	1.2	2.59	6,132 N	NA	NA	NO	BSL
117-81-7	bis(2-Ethylhexyl)phthalate	0.066	J	0.34	J	MG/KG	SJS05-SB18-001	4/41	0.25 - 2	0.34	ND	409 C	NA	NA	NO	BSL
86-30-6	n-Nitrosodiphenylamine	0.12	J	0.53	UJ	MG/KG	SJS05-SS03-000 SJS05-SS21-000	3/41	0.33 - 2	0.53	ND	1,168 C	NA	NA	NO	BSL
72-54-8	4,4'-DDD	1.70E-04	J	0.31	J	MG/KG	SJS05-SS09-000	20/40	3.29E-03 - 0.037	0.31	NA	23.8 C	NA	NA	NO	BSL

Table L-2.9
Occurrence, Distribution, and Selection of COPCs
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: Emissions from Soil at Site 5

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
72-55-9	4,4'-DDE	1.40E-04	J	4.7	J	MG/KG	SJS05-SS35-000	29/41	3.29E-03 - 0.6	4.7	NA	16.8 C	NA	NA	NO	BSL
50-29-3	4,4'-DDT	1.10E-04	J	3.1	J	MG/KG	SJS05-SS32-000 SJS05-SS35-000	26/41	3.29E-03 - 0.6	3.1	NA	16.8 C	NA	NA	NO	BSL
11096-82-5	Aroclor-1260	0.03	J	0.039	UJ	MG/KG	SJS05-SS08-000 SJS05-SS33-000	2/41	0.033 - 0.37	0.039	ND	2.66 C	NA	NA	NO	BSL
60-57-1	Dieldrin	0.005	J	0.0068		MG/KG	SJS05-SS08-000	2/41	3.29E-03 - 0.037	0.0068	0.0053	0.358 C	NA	NA	NO	BSL
319-84-6	alpha-BHC	0.0035		0.0035	UJ	MG/KG	SJS05-SS08-000 SJS05-SS23-000	1/41	0.0017 - 0.019	0.0035	ND	0.908 C	NA	NA	NO	BSL
5103-71-9	alpha-Chlordane	0.00058	J	0.0024	J	MG/KG	SJS05-SS08-000	2/41	0.0017 - 0.019	0.0024	0.0028	16.4 C	NA	NA	NO	BSL
12789-03-6	gamma-Chlordane	0.0026	J	0.0026	J	MG/KG	SJS05-SS08-000	1/41	0.0017 - 0.019	0.0026	0.0028	16.4 C	NA	NA	NO	BSL
1746016	Total Dioxins (2,3,7,8-TCDD equivalent)	3.07E-07		1.67E-05		MG/KG	SJS05-SB22-001	10/10		1.7E-05	NA	0.00004 C	NA	NA	NO	BSL
121-14-2	2,4-Dinitrotoluene	0.303		0.638		MG/KG	SJS05-SS14-000	3/22	0.238 - 0.25	0.638	ND	409 N	NA	NA	NO	BSL
35572-78-2	2-Amino-4,6-dinitrotoluene	0.417		0.417		MG/KG	SJS05-SS24-000	1/24	0.238 - 0.58	0.417	NA	12 N	NA	NA	NO	BSL
14265-44-2	Phosphorus	2.2		366		MG/KG	SJS05-SB02-002	21/41	1.2 - 110	366	ND	NA	NA	NA	NO	NTX
7429-90-5	Aluminum	547		27,900	J	MG/KG	SJS05-SB02-002	41/41	6.88 - 16.7	27900	18839	204,400 N	NA	NA	NO	BSL
7440-36-0	Antimony	0.51	L	10.8	J	MG/KG	SJS05-SS19-000	19/36	0.31 - 1.2	10.8	1.47	81.8 N	NA	NA	NO	BSL
7440-38-2	Arsenic	1.3	L	152		MG/KG	SJS05-SS11-000	39/41	0.37 - 1.07	152	14	3.82 C	NA	NA	YES	ASL
7440-39-3	Barium	7.6	J	5,970		MG/KG	SJS05-SS11-000	38/41	3.99E-02 - 0.72	5970	50	14,308 N	NA	NA	NO	BSL
7440-41-7	Beryllium	0.190	J	1.5	J	MG/KG	SJS05-SB07-002	37/41	1.99E-02 - 0.36	1.5	0.81	409 N	NA	NA	NO	BSL
7440-43-9	Cadmium	0.0600	J	22.7		MG/KG	SJS05-SS19-000	27/41	5.99E-02 - 0.18	22.7	ND	102 N	NA	NA	NO	BSL
7440-70-2	Calcium	230	J	50,500		MG/KG	SJS05-SB11-002P	38/41	10.8 - 31.13	50500	3251	NA	NA	NA	NO	NUT
7440-47-3	Chromium	1.9	K	867		MG/KG	SJS05-SS19-000	41/41	0.20 - 2.5	867	39	613 N	NA	NA	YES	ASL
7440-48-4	Cobalt	1.5	J	36		MG/KG	SJS05-SB02-002	39/41	9.0E-02 - 2.86	36	13	4,100 N	NA	NA	NO	BSL
7440-50-8	Copper	2.6	J	6,470		MG/KG	SJS05-SS01-000	38/41	0.20 - 2.15	6470	40	8,176 N	NA	NA	NO	BSL
57-12-5	Cyanide	0.240		1.45	J	MG/KG	SJS05-SS03-000	6/38	0.17 - 0.91	1.45	ND	4,088 N	NA	NA	NO	BSL
7439-89-6	Iron	767		120,000		MG/KG	SJS05-SS01-000	41/41	2.66 - 13.5	120000	36585	61,320 N	NA	NA	YES	ASL
7439-92-1	Lead	1.1	K	7,210	J	MG/KG	SJS05-SS01-000	41/41	0.16 - 0.43	7210	86	400	NA	NA	YES	ASL
7439-95-4	Magnesium	148	J	5,910		MG/KG	SJS05-SB02-002	41/41	4.5 - 64.76	5910	3847	NA	NA	NA	NO	NUT
7439-96-5	Manganese	6.6		852		MG/KG	SJS05-SS01-000	41/41	5.99E-02 - 0.72	852	151	4,088 N	NA	NA	NO	BSL
7439-97-6	Mercury	0.0200	J	1.10		MG/KG	SJS05-SS33-000	34/40	9.99E-03 - 0.09	1.1	0.62	61.3 N	NA	NA	NO	BSL
7440-02-0	Nickel	2.6	J	91.5		MG/KG	SJS05-SS01-000	34/41	0.170- 2.5	91.5	15	4,088 N	NA	NA	NO	BSL
7440-09-7	Potassium	123	J	4,430		MG/KG	SJS05-SS35-000	41/41	2.5 - 79.43	4430	3465	NA	NA	NA	NO	NUT
7782-49-2	Selenium	0.630	J	1.60	J	MG/KG	SJS05-SS23-000	10/41	0.47 - 1.10	1.6	1.5	1,022 N	NA	NA	NO	BSL
7440-22-4	Silver	0.23	J	4.60		MG/KG	SJS05-SS29-000P	11/41	0.16 - 0.38	4.6	0.67	1,022 N	NA	NA	NO	BSL
7440-23-5	Sodium	58.6	J	6,410		MG/KG	SJS05-SS18-000	27/41	9.07 - 64.8	6410	203	NA	NA	NA	NO	NUT
7440-28-0	Thallium	0.45	J	5.3		MG/KG	SJS05-SS01-000	12/41	0.31 - 1.39	5.3	ND	14.3 N	NA	NA	NO	BSL
7440-62-2	Vanadium	5.9	J	75.2		MG/KG	SJS05-SB08-002	39/41	0.10 - 3.22	75.2	42	1,431 N	NA	NA	NO	BSL
7440-66-6	Zinc	13.5		8,490	L	MG/KG	SJS05-SS01-000	37/41	0.34 - 1.79	8490	87	61,320 N	NA	NA	NO	BSL

* Surface soil & subsurface soil combined

Table L-2.9
Occurrence, Distribution, and Selection of COPCs
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: Emissions from Soil at Site 5

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection

(1) Minimum/maximum detected concentration.

(2) Background data is UCL for dredge-fill background soil type from St. Juliens Creek Background Investigation.

(3) Tier II screening: With the exception of lead, all compounds are screened against the Risk-Based Concentration (RBC) Table, U.S. EPA Region III, October 9, 2002 for industrial soil (cancer benchmark value = 1e-06; HQ = 0.1). Lead is screened against the EPA screening value of 1,000 mg/kg.
When no RBC available, surrogate RBC used as follows:
Acenaphthylene - used naphthalene
Benzo(g,h,i)Perylene, Phenanthrene - used pyrene
alpha-Chlordane, gamma-Chlordane - used Chlordane
Cadmium - used Cadmium - Food
Chromium - used Chromium VI
Mercury - used Mercuric Chloride

(4) Rationale Codes
Selection Reason: Above Screening Level (ASL)
No Toxicity Information (NTX)
Deletion Reason:Deletion Reason: Essential Nutrient (NUT)
Below Screening Level (BSL)

(5) Toxic Equivalence Value of 2,3,7,8-Tetrachlorodibenzodioxin.

Surface and Subsurface Soil Samples: SS01 to SS09, SB01 to SB11 - Phase I; SS10 to SS12, SS14, SS16, SS18 to SS21, SS23, SS24, SS29 to SS35, SB16 to SB18, SB20 - Phase II

Definitions: NA = Not Applicable
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Re
J = Estimated Value
L = Estimated Value - Biased Low
K = Estimated Value - Biased High

Table L-2.10
Occurrence, Distribution, and Selection of COPCs
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage Features and Tributary to Blows Creek

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	(2) Background Value	(3) Screening Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(4) Rationale for Contaminant Deletion or Selection
	Organics																
72548	4,4'-DDD	0.01	J	0.01	J	ug/l	SW06	1 / 7	0.1 - 0.11	0.01	NA	2.8	C	0.0084	VAWQS	no	BSL
72559	4,4'-DDE	0.012	J	0.012	J	ug/l	SW04	1 / 7	0.1 - 0.11	0.012	NA	2	C	0.0059	VAWQS	no	BSL
106445	4-Methylphenol	5	J	5	J	ug/l	SW06P	1 / 7	10 - 13	5	NA	180	N	NA	NA	no	BSL
117817	Bis(2-ethylhexyl)phthalate	4	J	4	J	ug/l	SW07P	1 / 7	10 - 13	4	NA	48	C	59	VAWQS	no	BSL
67641	Acetone	4	L	4	L	ug/l	SW04	1 / 2	5 - 5	4	NA	610	N	NA	NA	no	BSL
75150	Carbon Disulfide	1.2		11.5		ug/l	SW06	4 / 7	1 - 1	11.5	NA	1000	N	NA	NA	no	BSL
108883	Toluene	0.5	J	0.5	J	ug/l	SW04	1 / 7	1 - 1	0.5	NA	750	N	200000	VAWQS	no	BSL
1330207	Xylenes (Total)	0.3	J	0.3	J	ug/l	SW04	1 / 7	1 - 1	0.3	NA	12000	N	NA	NA	no	BSL
	Inorganics																
14265442	Phosphorus	22		1150		ug/l	SW05	4 / 6	19900 - 200000	1150	NA	NA		NA	NA	no	NTX
7429905	Aluminum	268		26100		ug/l	SW05	6 / 6	38.2 - 38.2	26100	NA	37000	N	NA	NA	no	BSL
7440382	Arsenic	2.7	J	12.6		ug/l	SW05	3 / 7	2 - 3.6	12.6	NA	0.45	C	NA	NA	yes	ASL
7440393	Barium	17.3	J	64.8	J	ug/l	SW05	7 / 7	0.2 - 0.3	64.8	NA	2600	N	NA	NA	no	BSL
7440417	Beryllium	0.98	J	12.1		ug/l	SW05	5 / 7	0.1 - 0.2	12.1	NA	73	N	NA	NA	no	BSL
7440439	Cadmium	0.47	J	4.4	J	ug/l	SW05	5 / 7	0.3 - 0.3	4.4	NA	18	N	NA	NA	no	BSL
7440702	Calcium	52200		141000		ug/l	SW05	6 / 6	57.9 - 57.9	141000	NA	NA		NA	NA	no	NUT
7440473	Chromium	1	J	2.1	J	ug/l	SW05	5 / 7	0.6 - 1.1	2.1	NA	110	N	NA	NA	no	BSL
7440484	Cobalt	3.3	J	146		ug/l	SW05	7 / 7	0.5 - 0.8	146	NA	730	N	NA	NA	no	BSL
7440508	Copper	6.4	J	215		ug/l	SW05	7 / 7	0.8 - 1.1	215	NA	1500	N	NA	NA	no	BSL
57125	Cyanide	18	L	30.2	L	ug/l	SW02\SW03	3 / 7	5 - 5	30.2	NA	730	N	215000	VAWQS	no	BSL
7439896	Iron	3740		46900		ug/l	SW05	6 / 6	30.7 - 30.8	46900	NA	11000	N	NA	NA	yes	ASL
7439921	Lead	2.4	J	4760		ug/l	SW05	5 / 7	1 - 1.4	4760	NA	15		NA	NA	yes	ASL
7439954	Magnesium	28900		112000		ug/l	SW07	6 / 8	24.3 - 24.3	112000	NA	NA		NA	NA	no	NUT
7439965	Manganese	400		7590		ug/l	SW05	6 / 6	0.3 - 0.3	7590	NA	730	N	NA	NA	yes	ASL
7440020	Nickel	4.3	J	245		ug/l	SW05	7 / 7	0.9 - 0.9	245	NA	730	N	4600	VAWQS	no	BSL
7440097	Potassium	10600		40600		ug/l	SW05	6 / 6	13.5 - 13.5	40600	NA	NA		NA	NA	no	NUT
7440235	Sodium	132000		310000	J	ug/l	SW06P	6 / 6	148 - 148	310000	NA	NA		NA	NA	no	NUT
7440622	Vanadium	3.2	J	12.6	J	ug/l	SW05	2 / 7	0.6 - 0.7	12.6	NA	260	N	NA	NA	no	BSL
7440666	Zinc	56.2	J	4690		ug/l	SW05	7 / 7	0.7 - 1.9	4690	NA	11000	N	NA	NA	no	BSL

(1) Minimum/maximum detected concentration.

(2) No background study has been completed for the St. Juliens Creek Annex surface water.

(3) Tier I screening: With the exception of lead, all compounds are screened against 10 times the Risk-Based Concentration (RBC) Table, U.S. EPA Region III, October 9, 2002 for tap water (10 times the cancer benchmark value = 1e-06; 10 times the HQ = 0.1). Lead is screened against the maximum contaminant level (MCL) value of 15 ug/l.

Definitions: NA = Not Applicable
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
VAWQS = Virginia Water Quality Standard
J = Estimated Value

Table L-2.10
Occurrence, Distribution, and Selection of COPCs
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage Features and Tributary to Blows Creek

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	(2) Background Value	(3) Screening Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(4) Rationale for Contaminant Deletion or Selection

When no RBC available, surrogate RBC used as follows:
Cadmium - used Cadmium - Water
Chromium - used Chromium VI

L= Estimated Value - Biased Low

(4) Rationale Codes

Selection Reason:	Above Screening Level (ASL)
	No Toxicity Information (NTX)
Deletion Reason:	Essential Nutrient (NUT)
	Below Screening Level (BSL)

Surface Water Samples: SW01 through SW07 - Phase II.

Table L-2.11
Occurrence, Distribution, and Selection of COPCs
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage Features and Tributary to Blows Creek

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background [2] Value	Screening [3] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [4] Contaminant Deletion or Selection
	Organics															
72548	4,4'-DDD	0.00076	L	0.16		mg/kg	SD01	5 / 7	0.0058 - 0.071	0.16	NA	27 C	NA	NA	no	BSL
72559	4,4'-DDE	0.0015	J	0.32		mg/kg	SD01	6 / 7	0.0058 - 0.051	0.32	NA	19 C	NA	NA	no	BSL
50293	4,4'-DDT	0.00074	J	0.24		mg/kg	SD01	6 / 7	0.0058 - 0.051	0.24	NA	19 C	NA	NA	no	BSL
60571	Dieldrin	0.021		0.021		mg/kg	SD03	1 / 7	0.0051 - 0.0073	0.02	NA	0.4 C	NA	NA	no	BSL
7421934	Endrin Aldehyde	0.0089	J	0.0089	J	mg/kg	SD02	1 / 7	0.0051 - 0.0073	0.01	NA	23 N	NA	NA	no	BSL
121142	2,4-Dinitrotoluene	0.065	J	0.47	J	mg/kg	SD01	2 / 6	0.51 - 3.6	0.47	NA	160 N	NA	NA	no	BSL
83329	Acenaphthene	0.065	J	0.065	J	mg/kg	SD02	1 / 6	0.51 - 3.6	0.07	NA	4700 N	NA	NA	no	BSL
208968	Acenaphthylene	0.14	J	0.14	J	mg/kg	SD01	1 / 6	0.51 - 3.6	0.14	NA	1600 N	NA	NA	no	BSL
120127	Anthracene	0.093	J	0.1	L	mg/kg	SD07	3 / 7	0.51 - 3.6	0.10	NA	23000 N	NA	NA	no	BSL
56553	Benzo(a)Anthracene	0.069	J	0.6		mg/kg	SD01	4 / 7	0.51 - 3.6	1	NA	8.7 C	NA	NA	no	BSL
50328	Benzo(a)Pyrene	0.063	J	0.39	J	mg/kg	SD01	4 / 7	0.51 - 3.6	0.39	NA	0.87 C	NA	NA	no	BSL
205992	Benzo(b)Fluoranthene	0.11	J	0.94		mg/kg	SD01	5 / 7	0.51 - 3.6	1	NA	8.7 C	NA	NA	no	BSL
191242	Benzo(g,h,I)Perylene	0.17	J	0.39	J	mg/kg	SD01	3 / 7	0.51 - 3.6	0.39	NA	2300 N	NA	NA	no	BSL
207089	Benzo(k)fluoranthene	0.16	J	0.36	J	mg/kg	SD01	3 / 7	0.51 - 3.6	0.36	NA	87 C	NA	NA	no	BSL
117817	Bis(2-Ethylhexyl)Phthalate	0.069	J	0.069	J	mg/kg	SD04	1 / 6	0.63 - 0.63	0.07	NA	460 C	NA	NA	no	BSL
218019	Chrysene	0.089	J	0.67		mg/kg	SD01	6 / 7	0.51 - 3.6	1	NA	870 C	NA	NA	no	BSL
53703	Dibenz(a,h)Anthracene	0.16	J	0.16	J	mg/kg	SD01	1 / 6	0.51 - 3.6	0.16	NA	0.87 C	NA	NA	no	BSL
84662	Diethylphthalate	0.72	J	0.72	J	mg/kg	SD03	1 / 6	0.51 - 3.6	0.72	NA	63000 N	NA	NA	no	BSL
206440	Fluoranthene	0.72	J	0.68	L	mg/kg	SD07	3 / 7	0.51 - 3.6	0.68	NA	3100 N	NA	NA	no	BSL
86737	Fluorene	0.063	J	0.063	J	mg/kg	SD02	1 / 6	0.51 - 3.6	0.063	NA	3100 N	NA	NA	no	BSL
193395	Indeno(1,2,3-cd)Pyrene	0.17	J	0.44	J	mg/kg	SD01	3 / 7	0.51 - 3.6	0.44	NA	8.7 C	NA	NA	no	BSL
86306	N-Nitrosodiphenylamine	0.078	J	0.61	J	mg/kg	SD02	2 / 6	0.51 - 3.6	0.61	NA	1300 C	NA	NA	no	BSL
91203	Naphthalene	0.08	J	0.11	J	mg/kg	SD01	2 / 6	0.51 - 3.6	0.11	NA	1600 N	NA	NA	no	BSL
85018	Phenanthrene	0.17	L	0.52	J	mg/kg	SD02	3 / 7	0.51 - 3.6	0.52	NA	2300 N	NA	NA	no	BSL
129000	Pyrene	0.51	L	0.68		mg/kg	SD02	3 / 7	0.51 - 3.6	0.68	NA	2300 N	NA	NA	no	BSL
78933	2-Butanone	0.012	J	0.014	J	mg/kg	SD06	2 / 7	0.015 - 0.022	0.014	NA	47000 N	NA	NA	no	BSL
67641	Acetone	0.009	J	0.073		mg/kg	SD06	3 / 7	0.015 - 0.024	0.073	NA	7800 N	NA	NA	no	BSL
75150	Carbon Disulfide	0.007	J	0.039		mg/kg	SD07	2 / 7	0.015 - 0.022	0.039	NA	7800 N	NA	NA	no	BSL
67663	Chloroform	0.003	J	0.003	J	mg/kg	SD02	1 / 7	0.015 - 0.022	0.003	NA	780 N	NA	NA	no	BSL
75092	Methylene Chloride	0.003	J	0.003	J	mg/kg	SD05/SD06	2 / 7	0.015 - 0.022	0.003	NA	850 C	NA	NA	no	BSL
	Inorganics															
14265442	Phosphorus	7.1		602		mg/kg	SD07	5 / 7	2 - 49.6	602	NA	NA	NA	NA	no	NTX
7429905	Aluminum	71.7		18900		mg/kg	SD01	7 / 7	0.04 - 18.1	18900	NA	78000 N	NA	NA	no	BSL
7440360	Antimony[5]	0.94	L	1.5	J	mg/kg	SD06	3 / 7	0.85 - 1.1	1.5	NA	31 N	NA	NA	no	BSL
7440382	Arsenic	0.05		23.2		mg/kg	SD01	6 / 7	0.56 - 1.23	23.2	NA	4.3 C	NA	NA	yes	ASL
7440393	Barium	0.82		2460		mg/kg	SD01	7 / 7	0.006 - 0.82	2460	NA	5500 N	NA	NA	no	BSL
7440417	Beryllium	0.01		3.5		mg/kg	SD01	7 / 7	0.003 - 0.41	3.5	NA	160 N	NA	NA	no	BSL

Table L-2.11
Occurrence, Distribution, and Selection of COPCs
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage Features and Tributary to Blows Creek

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background (2) Value	Screening (3) Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (4) Contaminant Deletion or Selection
7440439	Cadmium(5)	0.34	J	1.3	J	mg/kg	SD06	3 / 7	0.14 - 0.21	1.3	NA	78 N	NA	NA	no	BSL
7440702	Calcium	3.1	J	3660		mg/kg	SD01	7 / 7	0.06 - 35.79	3660	NA	NA	NA	NA	no	NUT
7440473	Chromium	0.11		37		mg/kg	SD05	7 / 7	0.31 - 2.88	37	NA	230 N	NA	NA	no	BSL
7440484	Cobalt	0.01	J	46.8		mg/kg	SD01	6 / 7	0.14 - 3.29	46.8	NA	1600 N	NA	NA	no	BSL
7440508	Copper	0.54		256		mg/kg	SD01	7 / 7	0.31 - 2.47	256	NA	3100 N	NA	NA	no	BSL
57125	Cyanide	0.54	L	1.1	J	mg/kg	SD02	2 / 7	0.31 - 1.1	1.1	NA	1600 N	NA	NA	no	BSL
7439896	Iron	117		161000		mg/kg	SD02	7 / 7	0.03 - 9.7	161000	NA	23000 N	NA	NA	yes	ASL
7439921	Lead	1.1		377		mg/kg	SD01	7 / 7	0.28 - 0.41	377	NA	400	NA	NA	no	BSL
7439954	Magnesium	8		4770		mg/kg	SD05	7 / 7	0.02 - 74.46	4770	NA	NA	NA	NA	no	NUT
7439965	Manganese	0.34		572	K	mg/kg	SD01	7 / 7	0.08 - 0.82	572	NA	1600 N	NA	NA	no	BSL
7439976	Mercury	0.08		0.44		mg/kg	SD01	7 / 7	0.02 - 0.1	0.44	NA	23 N	NA	NA	no	BSL
7440020	Nickel	0.04		33.6		mg/kg	SD01	6 / 7	0.25 - 2.88	33.6	NA	1600 N	NA	NA	no	BSL
7440097	Potassium	7.3		3680		mg/kg	SD05	7 / 7	0.01 - 91.33	3680	NA	NA	NA	NA	no	NUT
7782492	Selenium(5)	1.8	J	1.8	J	mg/kg	SD07	1 / 7	0.59 - 1.4	1.8	NA	390 N	NA	NA	no	BSL
7440224	Silver(5)	0.32	J	1.6	J	mg/kg	SD02	4 / 7	0.2 - 0.41	1.6	NA	390 N	NA	NA	no	BSL
7440235	Sodium	2.7	J	6000	J	mg/kg	SD07	7 / 7	0.15 - 83	6000	NA	NA	NA	NA	no	NUT
7440280	Thallium(5)	5.7		5.7		mg/kg	SD02	1 / 7	0.63 - 2.3	5.7	NA	5.5 N	NA	NA	yes	ASL
7440622	Vanadium	0.22		63.8		mg/kg	SD01	7 / 7	0.17 - 3.7	63.8	NA	550 N	NA	NA	no	BSL
7440666	Zinc	0.81		970		mg/kg	SD01	7 / 7	0.53 - 2.06	970	NA	23000 N	NA	NA	no	BSL

(1) Minimum/maximum detected concentration.

(2) No background study has been completed for the St. Juliens Creek Annex sediment.

(3) Tier I screening: With the exception of lead, all compounds are screened against 10 times the Risk-Based Concentration (RBC) Table, U.S. EPA Region III, October 9, 2002 for residential soil (10 times the cancer benchmark value = 1e-06; 10 times the HQ = 0.1).
Lead is screened against the EPA screening value of 400 mg/kg.
When no RBC available, surrogate RBC used as follows:
Acenaphthylene - used naphthalene
Benzo(g,h,i)Perylene, Phenanthrene - used pyrene
Endrin Aldehyde, Endrin Ketone - used Endrin
Cadmium - used Cadmium - Food
Chromium - used Chromium VI
Mercury - used Mercuric Chloride

(4) Rationale Codes
Selection Reason: Above Screening Level (ASL)
No Toxicity Information (NTX)
Deletion Reason: Essential Nutrient (NUT)
Below Screening Level (BSL)

(5) Lab reported incomplete sample results from sample SJS05-SD04, therefore range of detection limits adjusted to reflect results of all other samples.

Sediment Samples: SD01 through SD03 - Phase I; SD04 through SD07 - Phase II.

Definitions: NA = Not Applicable
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
J = Estimated Value
K = Estimated Value - Biased High
L = Estimated Value - Biased Low

Table L-2.12
Occurrence, Distribution, and Selection of COPCs
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Shallow Groundwater
Exposure Point: Water Table

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	(2) Background Value	(3) Screening Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(4) Rationale for Contaminant Deletion or Selection
	Organic															
72548	4,4'-DDD	0.011	J	0.012	J	ug/l	GW5S	2 / 11	0.1 - 0.1	0.012	NA	0.28 C	NA	NA	no	BSL
50293	4,4'-DDT	0.0052	J	0.0052	J	ug/l	GW5S	1 / 11	0.1 - 0.12	0.0052	NA	0.2 C	NA	NA	no	BSL
106445	4-Methylphenol	9	J	9	J	ug/l	GW4S	1 / 11	10 - 12	9	ND	18 N	NA	NA	no	BSL
117817	Bis(2-Ethylhexyl)Phthalate	1	J	2	J	ug/l	GW3S	2 / 11	10 - 12	2	ND	4.8 C	6	MCL	no	BSL
84742	Di-n-Butylphthalate	3	J	4	J	ug/l	GW4S	2 / 11	10 - 12	4	ND	370 N	NA	NA	no	BSL
108952	Phenol	3	J	3	J	ug/l	GW4S	1 / 11	10 - 12	3	ND	1100 N	NA	NA	no	BSL
78933	2-Butanone	40.7	L	40.7	L	ug/l	GW4S	1 / 1	5 - 5	40.7	ND	190 N	NA	NA	no	BSL
67641	Acetone	11	L	40.4	L	ug/l	GW4S	2 / 5	5 - 5	40.4	26	61 N	NA	NA	no	BSL
75150	Carbon Disulfide	0.3	J	0.8	J	ug/l	GW2S	2 / 11	1 - 1	0.8	ND	100 N	NA	NA	no	BSL
108883	Toluene	0.2	J	0.2	J	ug/l	GW1S	1 / 11	1 - 1	0.2	ND	75 N	1000	MCL	no	BSL
	Inorganic															
14265442	Phosphorus	0.104		0.309		ug/l	GW2S	8 / 11	0.02 - 0.05	0.309	ND	NA	NA	NA	no	NTX
7429905	Aluminum	89.7	J	87400		ug/l	GW2S	10 / 11	29 - 38.2	87400	331	3700 N	50 - 200	SMCL	yes	ASL
7440360	Antimony	6	J	6	J	ug/l	GW3S	1 / 11	1 - 2.7	6	ND	1.5 N	6	MCL	yes	ASL
7440382	Arsenic	3.6	J	27.3		ug/l	GW3S	8 / 11	2 - 3	27.3	1.8	0.045 C	50	MCL	yes	ASL
7440393	Barium	18.4	J	359		ug/l	GW1S	10 / 11	0.2 - 1	359	74	260 N	2000	MCL	yes	ASL
7440417	Beryllium	1.2	J	18.3		ug/l	GW2S	6 / 11	0.1 - 1	18.3	0.23	7.3 N	4	MCL	yes	ASL
7440439	Cadmium	0.69	J	11		ug/l	GW3S	5 / 11	0.3 - 0.5	11	ND	1.8 N	5	MCL	yes	ASL
7440702	Calcium	37300		257000		ug/l	GW4S	11 / 11	46 - 57.9	257000	123732	NA	NA	NA	no	NUT
7440473	Chromium	2	J	58.7		ug/l	GW3S	5 / 11	1.1 - 7	58.7	ND	11 N	100	MCL	yes	ASL
7440484	Cobalt	3.2	J	257		ug/l	GW2S	7 / 11	0.5 - 8	257	14	73 N	NA	NA	yes	ASL
7440508	Copper	4	J	124		ug/l	GW2S	5 / 11	1.1 - 6	124	ND	150 N	1300	MCL	no	BSL
7439896	Iron	13500		83700		ug/l	GW3S	11 / 11	5 - 30.8	83700	16704	1100 N	300	SMCL	yes	ASL
7439921	Lead	1.1	J	26.1		ug/l	GW3S	8 / 11	1 - 1	26.1	1.8	15	15	MCL	yes	ASL
7439954	Magnesium	35600		278000		ug/l	GW1S	11 / 11	24.3 - 45	278000	19702	NA	NA	NA	no	NUT
7439965	Manganese	992		4320		ug/l	GW2S	11 / 11	0.3 - 1	4,320	825	73 N	50	SMCL	yes	ASL
7440020	Nickel	4.7	J	360		ug/l	GW2S	7 / 11	0.9 - 7	360	14	73 N	NA	NA	yes	ASL
7440097	Potassium	9460	J	96300		ug/l	GW1S	11 / 11	13.5 - 97	96300	5003	NA	NA	NA	no	NUT
7440224	Silver	1.5	J	2.8	J	ug/l	GW2S	2 / 11	0.9 - 3	2.8	ND	18 N	100	SMCL	no	BSL
7440235	Sodium	21,800		1,480,000		ug/l	GW1S	10 / 11	28 - 148	1480000	59614	NA	NA	NA	no	NUT

Table L-2.12
Occurrence, Distribution, and Selection of COPCs
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Shallow Groundwater
Exposure Point: Water Table

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	(2) Background Value	(3) Screening Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(4) Rationale for Contaminant Deletion or Selection
7440280	Thallium	2.1	J	2.1	J	ug/l	GW3S	1 / 11	1.5 - 10	2.1	NA	0.26 N	2	MCL	yes	ASL
7440622	Vanadium	0.63	J	82.8		ug/l	GW3S	4 / 11	0.6 - 9	82.8	0.99	26 N	NA	NA	yes	ASL
7440666	Zinc	8.8	J	2020		ug/l	GW2S	8 / 11	1.9 - 3	2020	85.6	1100 N	5000	SMCL	yes	ASL

(1) Minimum/maximum detected concentration.

(2) Background data is UCL for Columbia Aquifer from St. Juliens Creek Background Investigation.

(3) Tier I screening: With the exception of lead, all compounds are screened against the Risk-Based Concentration (RBC) Table, U.S. EPA Region III, October 9, 2002 for tap water (cancer benchmark value = 1e-06; HQ = 0.1). Lead is screened against the maximum contaminant level (MCL) value of 15 ug/l.
When no RBC available, surrogate RBC used as follows:
Cadmium - used Cadmium - Water
Chromium - used Chromium VI

(4) Rationale Codes
Selection Reason: Above Screening Level (ASL)
No Toxicity Information (NTX)
Deletion Reason: Essential Nutrient (NUT)
Below Screening Level (BSL)

Shallow Groundwater Samples: GW1S, GW2S GW3S - Phase I, Rounds 1,2 and Phase II; GW4S and GW5S - Phase II

Definitions:
NA = Not Applicable
COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
J = Estimated Value
L = Estimated Value - Biased Low
MCL = Maximum Contaminant Level
SMCL = Secondary Maximum Contaminant Level

Table L-3.1
Medium-Specific Exposure Point Concentration Summary
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: At Site 5

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Arsenic	MG/KG	24.6	37.4	152		MG/KG	37.4	95% UCL-T	(2)	14.3	Mean-T	(2)
Chromium	MG/KG	55.8	109	867		MG/KG	109	95% UCL-N	(4)	55.8	Mean-N	(4)
Iron	MG/KG	24,528	31,527	120,000		MG/KG	31,527	95% UCL-N	(4)	24,528	Mean-N	(4)
Lead	MG/KG	784	1,660	7,210	J	MG/KG	1,660	95% UCL-T	(2)	239	Mean-T	(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-tran: J = Estimated Value
Mean of Normal Data (Mean-N).

(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(2) Shapiro-Wilk W Test indicates data are lognormally distributed.

(3) Shapiro-Wilk W Test indicates data are normally distributed.

(4) Shapiro-Wilk W Test inconclusive. Higher of UCL for normally and lognormally distributed data used for the RME EPC. Higher of mean value for normally and lognormally distributed data used for CT EPC.

Note: The arithmetic mean is calculated using one-half the sample quantitation limit for non-detects and is normally distributed. When calculated in this way, it is possible for the mean to exceed the maximum detected value. In such cases, the maximum detected value is used as the EPC value. The 95% UCL of Data is based on the conclusive distribution (lognormal or normal) or the maximum UCL value when inconclusive.

Table L-3.2
Medium-Specific Exposure Point Concentration Summary
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from Surface Soil at Site 5

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Arsenic	MG/KG	24.6	37.4	152		MG/KG	37.4	95% UCL-T	(2)	14.3	Mean-T	(2)
Chromium	MG/KG	55.8	109	867		MG/KG	109	95% UCL-N	(4)	55.8	Mean-N	(4)
Iron	MG/KG	24,528	31,527	120,000		MG/KG	31,527	95% UCL-N	(4)	24,528	Mean-N	(4)
Lead	MG/KG	784	1,660	7,210	J	MG/KG	1,660	95% UCL-T	(2)	239	Mean-T	(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-tran: J = Estimated Value
Mean of Normal Data (Mean-N).

(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(2) Shapiro-Wilk W Test indicates data are lognormally distributed.

(3) Shapiro-Wilk W Test indicates data are normally distributed.

(4) Shapiro-Wilk W Test inconclusive. Higher of UCL for normally and lognormally distributed data used for the RME EPC. Higher of mean value for normally and lognormally distributed data used for CT EPC.

Note: The arithmetic mean is calculated using one-half the sample quantitation limit for non-detects and is normally distributed. When calculated in this way, it is possible for the mean to exceed the maximum detected value. In such cases, the maximum detected value is used as the EPC value. The 95% UCL of Data is based on the conclusive distribution (lognormal or normal) or the maximum UCL value when inconclusive.

Table L-3.3
Medium-Specific Exposure Point Concentration Summary
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Deep Groundwater
Exposure Point: Tap Water

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Chloroform	UG/L	1.36	5.47	5.00		UG/L	5.47	95% UCL-T	W-Test (2)	0.84	Mean-T	W-Test (2)
Heptachlor	UG/L	0.027	0.03	0.033	J	UG/L	0.03	95% UCL-T	W-Test (4)	0.03	Mean-N	W-Test (4)
RDX	UG/L	1.40	1.79	1.60	J	UG/L	1.79	95% UCL-T	W-Test (4)	1.4	Mean-N	W-Test (4)
Antimony	UG/L	1.78	4.01	3.20	J	UG/L	3.20	Max	W-Test (2,1)	1.54	Mean-T	W-Test (2)
Arsenic	UG/L	2.12	3.62	4.90	J	UG/L	3.62	95% UCL-T	W-Test (2)	1.86	Mean-T	W-Test (2)
Iron	UG/L	1,267	30,197	4,420	J	UG/L	4,420	Max	W-Test (2,1)	652	Mean-T	W-Test (2)
Manganese	UG/L	101	1,613	192	J	UG/L	192	Max	W-Test (4,1)	101	Mean-N	W-Test (4,1)

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).

J = Estimated Value
K = Estimated Value -Biased High

(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(2) Shapiro-Wilk W Test indicates data are lognormally distributed.

(3) Shapiro-Wilk W Test indicates data are normally distributed.

(4) Shapiro-Wilk W Test inconclusive. Higher of UCL for normally and lognormally distributed data used for the RME EPC. Higher of mean value for normally and lognormally distributed data used for CT EPC.

Note: The arithmetic mean is calculated using one-half the sample quantitation limit for non-detects and is normally distributed. When calculated in this way, it is possible for the mean to exceed the maximum detected value. In such cases, the maximum det

Table L-3.4
Medium-Specific Exposure Point Concentration Summary
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Deep Groundwater - Water Vapors at Showerhead

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value
Chloroform	UG/L	1.36	5.47	5.00		UG/L	5.47	95% UCL-T	W-Test (2)	0.84
Heptachlor	UG/L	0.027	0.03	0.033	J	UG/L	0.03	95% UCL-T	W-Test (4)	0.03
RDX	UG/L	1.40	1.79	1.60	J	UG/L	1.79	95% UCL-T	W-Test (4)	1.4

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).

J = Estimated \
K = Estimated \

(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(2) Shapiro-Wilk W Test indicates data are lognormally distributed.

(3) Shapiro-Wilk W Test indicates data are normally distributed.

(4) Shapiro-Wilk W Test inconclusive. Higher of UCL for normally and lognormally distributed data used for the RME EPC. Higher of mean value for normally and lognormally distributed data used for CT EP(

Note: The arithmetic mean is calculated using one-half the sample quantitation limit for non-detects and is normally distributed. When calculated in this way, it is possible for the mean to exceed the maximum value. In such cases, the maximum det

Table L-3.4
Medium-Specific Exposure Point Concentration Summary
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Central Tendency	
Medium EPC Statistic	Medium EPC Rationale
Mean-T	W-Test (2)
Mean-N	W-Test (4)
Mean-N	W-Test (4)

Value
Value -Biased High

'C.

detected

Table L-3.5
Medium-Specific Exposure Point Concentration Summary
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage Features and Tributary to Blows Creek

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Ten	
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic
Arsenic	UG/L	3.40	15.46	12.6		UG/L	12.6	Max	W-Test (4,1)	3.40	Mean-N
Iron	UG/L	17,512	235,705	46,900		UG/L	46,900	Max	W-Test (4,1)	17,512	Mean-N
Lead	UG/L	684	465,309,394	4,760		UG/L	4,760	Max	W-Test (2,1)	7.61	Mean-T
Manganese	UG/L	2,693	17,882	7,590		UG/L	7,590	Max	W-Test (2,1)	1901	Mean-T

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).

J = Estimatec

(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(2) Shapiro-Wilk W Test indicates data are lognormally distributed.

(3) Shapiro-Wilk W Test indicates data are normally distributed.

(4) Shapiro-Wilk W Test inconclusive. Higher of UCL for normally and lognormally distributed data used for the RME EPC. Higher of mean value for normally and lognormally distributed data used for CT EPC.

Note: The arithmetic mean is calculated using one-half the sample quantitation limit for non-detects and is normally distributed. When calculated in this way, it is possible for the mean to exceed the maximum detected value. In such cases, the maximum det

Table L-3.5
Medium-Specific Exposure Point Concentration Summary
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

idency	Medium EPC Rationale
	W-Test (4) W-Test (4) W-Test (2) W-Test (2)

d Value

Table L-3.6
Medium-Specific Exposure Point Concentration Summary
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 5

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
4,4'-DDE	MG/KG	0.258	2.33	4.70	J	MG/KG	2.33	95% UCL - T	(4)	0.258	Mean - N	(4)
4,4'-DDT	MG/KG	0.230	0.863	3.10	J	MG/KG	0.863	95% UCL - T	(4)	0.230	Mean - N	(4)
Benzo(a)pyrene	MG/KG	0.220	0.277	0.760	J	MG/KG	0.277	95% UCL - T	(2)	0.182	Mean-T	(2)
Benzo(b)fluoranthene	MG/KG	0.389	0.536	2.10	J	MG/KG	0.536	95% UCL - T	(2)	0.258	Mean-T	(2)
Dibenz(a,h)anthracene	MG/KG	0.247	0.283	0.260	J	MG/KG	0.260	Max	(4,1)	0.247	Mean - N	(4)
Total Dioxins (2,3,7,8-TCDD equivalent)	MG/KG	0.0000058	0.00003644	0.0000167		MG/KG	0.0000167	Max	(4,1)	0.0000058	Mean - N	(4)
Aluminum	MG/KG	10,435	12,026	27,900	J	MG/KG	12,026	95% UCL - N	(3)	10,435	Mean - N	(3)
Antimony	MG/KG	2.01	3.04	10.8	J	MG/KG	3.04	95% UCL - N	(4)	2.01	Mean - N	(4)
Arsenic	MG/KG	18.8	35.0	152		MG/KG	35.0	95% UCL - T	(4)	18.8	Mean - N	(4)
Barium	MG/KG	435	1,327	5,970		MG/KG	1,327	95% UCL - T	(2)	103	Mean - T	(2)
Cadmium	MG/KG	1.17	2.13	22.7		MG/KG	2.13	95% UCL - N	(4)	1.17	Mean - N	(4)
Chromium	MG/KG	44.3	79.1	867		MG/KG	79.1	95% UCL - N	(4)	44.3	Mean - N	(4)
Copper	MG/KG	224	488	6,470		MG/KG	488	95% UCL - N	(4)	224	Mean - N	(4)
Iron	MG/KG	23,543	38,159	120,000		MG/KG	38,159	95% UCL - T	(4)	23,543	Mean - N	(4)
Lead	MG/KG	543	1,699	7,210	J	MG/KG	1,699	95% UCL - T	(2)	118	Mean-T	(2)
Manganese	MG/KG	180	298	852		MG/KG	298	95% UCL - T	(4)	180	Mean - N	(4)
Thallium	MG/KG	0.87	1.15	5.30		MG/KG	1.15	95% UCL - N	(4)	0.87	Mean - N	(4)
Vanadium	MG/KG	31.9	36.5	75.2		MG/KG	36.5	95% UCL - N	(3)	31.9	Mean - N	(3)
Zinc	MG/KG	476	1,064	8,490	L	MG/KG	1,064	95% UCL - T	(4)	476	Mean - N	(4)

Table L-3.6
Medium-Specific Exposure Point Concentration Summary
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 5

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale

*Subsurface and surface soil combined.

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).

J = Estimated Value
L = Estimated Value - Biased Low

(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(2) Shapiro-Wilk W Test indicates data are lognormally distributed.

(3) Shapiro-Wilk W Test indicates data are normally distributed.

(4) Shapiro-Wilk W Test inconclusive. Higher of UCL for normally and lognormally distributed data used for the RME EPC. Higher of mean value for normally and lognormally distributed data used for CT El

Table L-3.7
Medium-Specific Exposure Point Concentration Summary
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 5

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Arsenic	MG/KG	18.8	35.0	152		MG/KG	35.0	95% UCL - T	(4)	18.8	Mean - N	(4)
Chromium	MG/KG	44.3	79.1	867		MG/KG	79.1	95% UCL - N	(4)	44.3	Mean - N	(4)
Iron	MG/KG	23,543	38,159	120,000		MG/KG	38,159	95% UCL - T	(4)	23,543	Mean - N	(4)
Lead	MG/KG	543	1,699	7,210	J	MG/KG	1,699	95% UCL - T	(2)	118	Mean-T	(2)

*Subsurface and surface soil combined.

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).

J = Estimated Value
L = Estimated Value - Biased Low

(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(2) Shapiro-Wilk W Test indicates data are lognormally distributed.

(3) Shapiro-Wilk W Test indicates data are normally distributed.

(4) Shapiro-Wilk W Test inconclusive. Higher of UCL for normally and lognormally distributed data used for the RME EPC. Higher of mean value for normally and lognormally distributed data used for CT EPC.

Note: The arithmetic mean is calculated using one-half the sample quantitation limit for non-detects and is normally distributed. When calculated in this way, it is possible for the mean to exceed the maximum detected value. In such cases, the maximum detected value is used as the EPC value. The 95% UCL of Data is based on the conclusive distribution (lognormal or normal) or the maximum UCL value when inconclusive.

Table L-3.8
Medium-Specific Exposure Point Concentration Summary
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium:Soil*
Exposure Medium: Air
Exposure Point: Emissions from Soil at Site 5

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Arsenic	MG/KG	18.8	35.0	152		MG/KG	35.0	95% UCL - T	(4)	18.8	Mean - N	(4)
Chromium	MG/KG	44.3	79.1	867		MG/KG	79.1	95% UCL - N	(4)	44.3	Mean - N	(4)
Iron	MG/KG	23,543	38,159	120,000		MG/KG	38,159	95% UCL - T	(4)	23,543	Mean - N	(4)
Lead	MG/KG	543	1,699	7,210	J	MG/KG	1,699	95% UCL - T	(2)	118	Mean-T	(2)

*Subsurface and surface soil combined.

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).

J = Estimated Value

L = Estimated Value - Biased Low

(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(2) Shapiro-Wilk W Test indicates data are lognormally distributed.

(3) Shapiro-Wilk W Test indicates data are normally distributed.

(4) Shapiro-Wilk W Test inconclusive. Higher of UCL for normally and lognormally distributed data used for the RME EPC. Higher of mean value for normally and lognormally distributed data used for CT EPC.

Note: The arithmetic mean is calculated using one-half the sample quantitation limit for non-detects and is normally distributed. When calculated in this way, it is possible for the mean to exceed the maximum detected value. In such cases, the maximum detected value is used as the EPC value. The 95% UCL of Data is based on the conclusive distribution (lognormal or normal) or the maximum UCL value when inconclusive.

Table L-3.9
Medium-Specific Exposure Point Concentration Summary
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe:Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage Features and Tributary to Blows Creek

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Arsenic	UG/L	3.40	15.46	12.6		UG/L	12.6	Max	W-Test (4,1)	3.40	Mean-N	W-Test (4)
Iron	UG/L	17,512	235,705	46,900		UG/L	46,900	Max	W-Test (4,1)	17,512	Mean-N	W-Test (4)
Lead	UG/L	684	465,309,394	4,760		UG/L	4,760	Max	W-Test (2,1)	7.61	Mean-T	W-Test (2)
Manganese	UG/L	2,693	17,882	7,590		UG/L	7,590	Max	W-Test (2,1)	1901	Mean-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).

J = Estimated Value

(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(2) Shapiro-Wilk W Test indicates data are lognormally distributed.

(3) Shapiro-Wilk W Test indicates data are normally distributed.

(4) Shapiro-Wilk W Test inconclusive. Higher of UCL for normally and lognormally distributed data used for the RME EPC. Higher of mean value for normally and lognormally distributed data used for CT EPC.

Note: The arithmetic mean is calculated using one-half the sample quantitation limit for non-detects and is normally distributed. When calculated in this way, it is possible for the mean to exceed the maximum detected value. In such cases, the maximum detected value is used as the EPC value. The 95% UCL of Data is based on the conclusive distribution (lognormal or normal) or the maximum UCL value when inconclusive.

Table L-3.10
Medium-Specific Exposure Point Concentration Summary
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage Features and Tributary to Blows Creek

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Arsenic	mg/kg	10.5	17.8	23.2	-	mg/kg	17.8	95% UCL-N	W - Test (3)	10.5	Mean-N	W - Test (3)
Iron	mg/kg	51320	98611	161000	-	mg/kg	98611	95% UCL-N	W - Test (3)	51320	Mean-N	W - Test (3)
Thallium	mg/kg	1.22	5.7	5.7	-	mg/kg	5.7	95% UCL-T	W - Test (2)	0.8	Mean-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). J = Estimated Value

(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(2) Shapiro-Wilk W Test indicates data are lognormally distributed.

(3) Shapiro-Wilk W Test indicates data are normally distributed.

(4) Shapiro-Wilk W Test inconclusive. Higher of UCL for normally and lognormally distributed data used for the RME EPC. Higher of mean value for normally and lognormally distributed data used for CT EPC.

Note: The arithmetic mean is calculated using one-half the sample quantitation limit for non-detects and is normally distributed. When calculated in this way, it is possible for the mean to exceed the maximum detected value. In such cases, the maximum det

Table L-3.11
Medium-Specific Exposure Point Concentration Summary
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Shallow Groundwater
Exposure Point: Water Table

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Aluminum	UG/L	15,910	14,575,947	87,400	J	UG/L	87,400	Max	W - Test (2,1)	2,368	Mean - T	W - Test (2)
Antimony	UG/L	1.57	2.38	6.00	J	UG/L	2.38	95% UCL-N	W - Test (4)	1.57	Mean - N	W - Test (4)
Arsenic	UG/L	6.93	16.3	27.3	J	UG/L	16.3	95% UCL-T	W - Test (2)	4.66	Mean - T	W - Test (2)
Barium	UG/L	112	566	359	J	UG/L	359	Max	W - Test (2,1)	59.0	Mean - T	W - Test (2)
Beryllium	UG/L	4.50	723	18.3	J	UG/L	18.3	Max	W - Test (2,1)	0.96	Mean - T	W - Test (2)
Cadmium	UG/L	2.60	30.9	11.0	J	UG/L	11.0	Max	W - Test (4,1)	2.60	Mean - N	W - Test (4)
Chromium	UG/L	9.72	42.1	58.7	J	UG/L	42.1	95% UCL-T	W - Test (2)	4.22	Mean - T	W - Test (2)
Cobalt	UG/L	56.0	5,277	257	J	UG/L	257	Max	W - Test (2,1)	13.1	Mean - T	W - Test (2)
Iron	UG/L	45,227	76,564	83,700	J	UG/L	76,564	95% UCL-T	W - Test (4)	45,227	Mean - N	W - Test (4)
Lead	UG/L	8.15	89.8	26.1	J	UG/L	26.1	Max	W - Test (2,1)	3.1	Mean - T	W - Test (2)
Manganese	UG/L	2,703	3,282	4,320	J	UG/L	3,282	95% UCL - N	W - Test (3)	2703	Mean - N	W - Test (3)
Nickel	UG/L	85.4	10,484	360	J	UG/L	360	Max	W - Test (2,1)	18.2	Mean - T	W - Test (2)
Thallium	UG/L	1.60	2.34	2.10	J	UG/L	2.10	Max	W - Test (2,1)	1.36	Mean - T	W - Test (2)
Vanadium	UG/L	10.7	252	82.8	J	UG/L	82.8	Max	W - Test (2,1)	2.04	Mean - T	W - Test (2)
Zinc	UG/L	512	68,639	2,020	J	UG/L	2020	Max	W - Test (2,1)	89.4	Mean - 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).

J = Estimated Value

(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(2) Shapiro-Wilk W Test indicates data are lognormally distributed.

(3) Shapiro-Wilk W Test indicates data are normally distributed.

(4) Shapiro-Wilk W Test inconclusive. Higher of UCL for normally and lognormally distributed data used for the RME EPC. Higher of mean value for normally and lognormally distributed data used for CT EPC

Note: The arithmetic mean is calculated using one-half the sample quantitation limit for non-detects and is normally distributed. When calculated in this way, it is possible for the mean to exceed the maximum detected value. In such cases, the maximum det

Table L-4.1
Values Used for Daily Intake Calculations
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: At Site 5
Receptor Population: Trespasser
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	See Table 3.1	--	See Table 3.1	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR-S	Ingestion Rate of Soil	mg/day	100	EPA, 1991	50	EPA, 1997	CS x IR x EF x ED x CF1 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	
	ED	Exposure Duration	years	30	EPA, 1991	15 [1]	Professional judgment	
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	10,950	EPA, 1989	5,475	EPA, 1989	
Dermal	CS	Chemical Concentration in Soil	mg/kg	See Table 3.1	--	See Table 3.1	--	CDI (mg/kg-day)=
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	CS x CF1 x SA x AF x AB x EF x ED x 1/BW x 1/AT
	SA	Skin Surface Area Available for Contact	cm^2	5,000	EPA, 1997	1,000	EPA, 1997	
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.19	EPA, 1997	0.19	EPA, 1997	
	AB	Absorption Factor	unitless	Chemical Specific	EPA, 1995	Chemical Specific	EPA, 1995	
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	
	ED	Exposure Duration	years	30	EPA, 1991	15 [1]	Professional judgment	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	10,950	EPA, 1989	5,475	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,

EPA, 1995: Assessing Dermal Exposure from Soil, Technical Guidance Manual, Region III, EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The RME skin surface area is obtained from Table 6-14, central tendency surface area for outdoor soil contact (assumes 25% of total surface area).

The CT surface area assumes exposure to hands and feet and is obtained by averaging both male and female hands and feet mean values found on Table 6-4.

CT soil ingestion rate found on Table 4-23. Soil to Skin Adherence Factor calculated from Table 6-12 by averaging hand values for gardeners no. 1 an 2. (No trespasser activity on Table 6-12).

TBD = To Be Determined

NA = Not Available

Note:

1. For RME values, assumes trespassing one hour per day, one day per week for 52 weeks per year. For CT values, assumes one-half of RME values.

Table L-4.2
Values Used for Daily Intake Calculations
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: At Site 5
Receptor Population: Trespasser
Receptor Age: Adolescent

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	See Table 3.1	--	See Table 3.1	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR-S	Ingestion Rate of Soil	mg/day	100	EPA, 1991	50	EPA, 1997	CS x IR x EF x ED x CF1 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	52 [1]	Professional judgement	26 [1]	Professional judgement	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	
	BW	Body Weight	kg	56	EPA, 1997	56	EPA, 1997	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	2,190	EPA, 1989	2,190	EPA, 1989	
Dermal	CS	Chemical Concentration in Soil	mg/kg	See Table 3.1	--	See Table 3.1	--	CDI (mg/kg-day)=
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	CS x CF1 x SA x AF x AB x EF x ED x 1/BW x 1/AT
	SA	Skin Surface Area Available for Contact	cm^2	4,000	EPA, 1997	2,000	EPA, 1997	
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.11	EPA, 1997	0.11	EPA, 1997	
	AB	Absorption Factor	unitless	Chemical Specific	EPA, 1995	Chemical Specific	EPA, 1995	
	EF	Exposure Frequency	days/year	52 [1]	Professional judgement	26 [1]	Professional judgement	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	
	BW	Body Weight	kg	56	EPA, 1997	56	EPA, 1997	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	2,190	EPA, 1989	2,190	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,

EPA, 1993: Superfund Standard Default Exposure Factors for Central Tendency and Reasonable Maximum Exposures.

EPA, 1995: Assessing Dermal Exposure from Soil, Technical Guidance manual, Region III, EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The skin surface area presented in this table includes hands, forearms, lower legs, and feet (assumes 25% of total surface area) and is obtained by averaging the 50 percentile total body surface area of male and female children ages 12 through 17 and dividing by 4.

The CT skin surface area is for hands and feet and is calculated by averaging the mean percentage of total surface body area for hands and feet (approximately 13%) for children ages 12 through 17 found on Table 6-8, then multiplying by total surface body area (16,000 cm^2).

Mean body weight for adolescent derived by averaging the mean (12 to 17 years) boy and girl values (see Table 7-3).

Soil to Skin Adherence Factor obtained from Table 6-12 for the Soccer No. 1 activity (most conservative) for hands.

TBD = To Be Determined

NA = Not Available

Note:

1. For RME values, assumes trespassing one hour per day, one day per week for 52 weeks per year. For CT values, assumes one-half of RME values.

Table L-4.3
Values Used for Daily Intake Calculations
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from Surface Soil at Site 5
Receptor Population: Trespasser
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Inhalation	CS	Chemical Concentration in Soil	mg/kg	See Table 3.2	--	See Table 3.2	--	Chronic Daily Intake (CDI) (mg/kg-day) =
	CA	Chemical Concentration in Air	mg/m^3	Calculated	--	Calculated	--	CA x IR x ET x EF x ED x 1/BW x 1/AT
	IR	Inhalation Rate	m^3/hour	1.6	EPA, 1997	1	EPA, 1997	
	PEF	Particulate Emissions Factor	m^3/kg	1.32E+09	--	1.32E+09	--	CA (mg/m^3) = CS (1/PEF + 1/VF)
	VF	Volatilization Factor for Volatile Constituents	m^3/kg	Calculated [2]	--	Calculated [2]	--	
	ET	Exposure Time	hr/day	1 [1]	Professional judgment	0.5 [1]	Professional judgment	
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	
	ED	Exposure Duration	years	30	EPA, 1991	15 [1]	Professional judgment	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	10,950	EPA, 1989	5,475	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

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

Inhalation rates are based on adult values assuming moderate activity for the RME and light activity for the CT (Table 5-23 of EPA, 1997).

TBD = To Be Determined

Notes:

1. For RME values, assumes trespassing one hour per day, one day per week for 52 weeks per year. For CT values, assumes one-half of RME values.
2. See RAGS Part D Standard Tables 7 and 8 for calculation.

Table L-4.4
Values Used for Daily Intake Calculations
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from Surface Soil at Site 5
Receptor Population: Trespasser
Receptor Age: Adolescent

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Inhalation	CS	Chemical Concentration in Soil	mg/kg	See Table 3.2	--	See Table 3.2	--	Chronic Daily Intake (CDI) (mg/kg-day) =
	CA	Chemical Concentration in Air	mg/m^3	Calculated	--	Calculated	--	CA x IR x ET x EF x ED x 1/BW x 1/AT
	IR	Inhalation Rate	m^3/hour	1.4	EPA, 1997	1	EPA, 1997	
	PEF	Particulate Emissions Factor	m^3/kg	1.32E+09	--	1.32E+09	--	CA (mg/m^3) = CS (1/PEF + 1/VF)
	VF	Volatilization Factor for Volatile Constituents	m^3/kg	Calculated [2]	--	Calculated [2]	--	
	ET	Exposure Time	hr/day	1 [1]	Professional judgment	0.5 [1]	Professional judgment	
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	
	BW	Body Weight	kg	56	EPA, 1991	56	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989	2,190	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

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

Inhalation rates are based on averaging the adult and child values assuming moderate activity for the RME and light activity for the CT (Table 5-23 of EPA, 1997).

Mean body weight for adolescent derived by averaging the mean (12 to 17 years) boy and girl values (see Table 7-3).

TBD = To Be Determined

Notes:

1. For RME values, assumes trespassing one hour per day, one day per week for 52 weeks per year. For CT values, assumes one-half of RME values.
2. See RAGS Part D Standard Tables 7 and 8 for calculation.

Table L-4.5
Values Used for Daily Intake Calculations
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Deep Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CW	Chemical Concentration in Water	mg/l	See Table 3.3	--	See Table 3.3	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR-W	Ingestion Rate of Water	l/day	2	EPA, 1991	1.4	EPA, 1989	CW x IR-W x EF x ED x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	8,760	EPA, 1989	3,285	EPA, 1989	
Dermal	CW	Chemical Concentration in Water	mg/l	See Table 3.3	--	See Table 3.3	--	CDI (mg/kg-day)=
	DAevent	Dermally Absorbed Dose per Event	mg/cm^2-day	Calculated	EPA, 1992	Calculated	EPA, 1992	DAevent x SA x EF x ED x 1/BW x 1/AT
	PC	Permeability Constant	cm/hr	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	t	Lag Time	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	Inorganics: DAevent (mg/cm2-day) =
	t*	Time to Reach Steady-state	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	PC x CW x ET x CF1
	B	Ratio of Permeability of Stratum Corneum to Epidermis	dimensionless	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	ET	Exposure Time	hours	0.25	EPA, 1997	0.17 [1]	Professional judgment	Organics :
	CF1	Conversion Factor 1	l/cm^3	0.001	- -	0.001	- -	ET<t*: DAevent (mg/cm2-day) =
	SA	Skin Surface Area	cm^2	20,000	EPA, 1997	17,000	EPA, 1997	2 x PC x CW x (sqrt((6 x t x ET)/3.1415)) x CF1
	EF	Exposure Frequency	events/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	ET>t*: DAevent (mg/cm2-day) =
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x CF1
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	8,760	EPA, 1989	3,285	EPA, 1989	

Sources:
EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.
EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,
EPA, 1992: Dermal Exposure Assessment: Principles and Applications. EPA/600/8-91/011B. The CT skin surface area is the lower range value.
EPA, 1993: Superfund Standard Default Exposure Factors for Central Tendency and Reasonable Maximum Exposures.
EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The RME skin surface area is obtained from Table 6-14.
TBD = To Be Determined

Table L-4.6
Values Used for Daily Intake Calculations
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Deep Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CW	Chemical Concentration in Water	mg/l	See Table 3.3	--	See Table 3.3	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR-W	Ingestion Rate of Water	l/day	1	EPA, 1989b	0.87	EPA, 1997	CW x IR-W x EF x ED x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1993	
	BW	Body Weight	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989a	25,550	EPA, 1989a	
	AT-N	Averaging Time - Non-Cancer	days	2,190	EPA, 1989a	2,190	EPA, 1989a	
Dermal	CW	Chemical Concentration in Water	mg/l	See Table 3.3	--	See Table 3.3	--	CDI (mg/kg-day)=
	DAevent	Dermally Absorbed Dose per Event	mg/cm^2-day	Calculated	EPA, 1992	Calculated	EPA, 1992	DAevent x SA x EF x ED x 1/BW x 1/AT
	PC	Permeability Constant	cm/hr	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	t	Lag Time	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	Inorganics: DAevent (mg/cm2-day) =
	t*	Time to Reach Steady-state	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	PC x CW x ET x CF1
	B	Ratio of Permeability of Stratum Corneum to Epidermis	dimensionless	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	ET	Exposure Time	hours	0.33	EPA, 1997	0.25 [1]	Professional judgment	Organics :
	CF1	Conversion Factor 1	l/cm^3	0.001	--	0.001	--	ET<t*: DAevent (mg/cm2-day) =
	SA	Skin Surface Area	cm^2	7,200	EPA, 1997	7,200	EPA, 1997	2 x PC x CW x (sqrt((6 x t x ET)/3.1415)) x CF1
	EF	Exposure Frequency	events/year	350	EPA, 1991	234	EPA, 1991	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	ET>t*: DAevent (mg/cm2-day) =
	BW	Body Weight	kg	15	EPA, 1991	15	EPA, 1991	PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x CF1
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989a	25,550	EPA, 1989a	
	AT-N	Averaging Time - Non-Cancer	days	2,190	EPA, 1989a	2,190	EPA, 1989a	

Sources:
EPA, 1989a: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.
EPA, 1989b: Exposure Factors Handbook, July 1989, EPA/600/8-89/043.
EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,
EPA, 1992: Dermal Exposure Assessment: Principles and Applications. EPA/600/8-91/011B.
EPA, 1993: Superfund Standard Default Exposure Factors for Central Tendency and Reasonable Maximum Exposure
EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. CT ingestion rate value is obtained from Table 3-30 for 3-5 year child mean value. The skin surface area presented in this table was derived by averaging the mean child (2 to 7 years) values from Tables 6-6 and 6-7.
TBD = To Be Determined

Table L-4.7
Values Used for Daily Intake Calculations
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Deep Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CW	Chemical Concentration in Water	mg/l	See Table 3.3	--	See Table 3.3	--	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-W-A	Ingestion Rate of Water, Adult	liters/day	2	EPA, 1991	1.4	EPA, 1989	CW x IR-W-Adj x EF x 1/AT
	IR-W-C	Ingestion Rate of Water, Child	liters/day	1	EPA, 1989b	0.87	EPA, 1997	
	IR-W-Adj	Ingestion Rate of Water, Age-adjusted	liter-year/kg-day	1.09	calculated	0.58	calculated	IR-W-Adj (liter-year/kg-day) =
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	(ED-C x IR-W-C / BW-C) + (ED-A x IR-W-A / BW-A)
	ED-A	Exposure Duration, Adult	years	24	EPA, 1991	9	EPA, 1993	
	ED-C	Exposure Duration, Child	years	6	EPA, 1991	6	EPA, 1991	
	BW-A	Body Weight , Adult	kg	70	EPA, 1991	70	EPA, 1991	
	BW-C	Body Weight, Child	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
Dermal Absorption	CW	Chemical Concentration in Water	mg/l	See Table 3.3	--	See Table 3.3	--	CDI (mg/kg-day) = DA-Adj x EF x 1/AT
	DAevent-A	Dermally Absorbed Dose per Event, Adult	mg/cm^2-event	Calculated	EPA, 1992	Calculated	EPA, 1992	
	DAevent-C	Dermally Absorbed Dose per Event, Child	mg/cm^2-event	Calculated	EPA, 1992	Calculated	EPA, 1992	DA-Adj = (Daevent-A x SA-A x ED-A x 1/BW-A)
	DA-Adj	Dermally Absorbed Dose, Age-adjusted	mg-year/event-kg	Calculated		Calculated		+ (Daevent-C x SA-C x ED-C x 1/BW-C)
	PC	Permeability Constant	cm/hr	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	t	Lag Time	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	Inorganics:
	t*	Time to Reach Steady-state	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	DAevent-A (mg/cm2-event) = PC x CW x ET-A x CF1
	B	Ratio of Permeability of Stratum Corneum to Epidermis	dimensionless	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	DAevent-C (mg/cm2-event) = PC x CW x ET-C x CF1
	ET-A	Exposure Time, Adult	hr/day	0.25	EPA, 1997	0.17 [1]	Professional judgment	
	ET-C	Exposure Time, Child	hr/day	0.33	EPA, 1997	0.25 [1]	Professional judgment	Organics, ET<t*:
	CF1	Conversion Factor 1	l/cm^3	0.001	- -	0.001	- -	DAevent-A (mg/cm2-event) =
	SA-A	Skin Surface Area, Adult	cm^2	20,000	EPA, 1997	17,000	EPA, 1997	2 x PC x CW x (sqrt((6 x t x ET-A)/3.1415)) x CF1
	SA-C	Skin Surface Area, Child	cm^2	7,200	EPA, 1997	7,200	EPA, 1997	DAevent-C (mg/cm2-event) =
	EF	Exposure Frequency	events/year	350	EPA, 1991	234	EPA, 1993	2 x PC x CW x (sqrt((6 x t x ET-C)/3.1415)) x CF1
	ED-A	Exposure Duration, Adult	years	24	EPA, 1991	9	EPA, 1993	
	ED-C	Exposure Duration, Child	years	6	EPA, 1991	6	EPA, 1991	Organics, ET>t*:
	BW-A	Body Weight , Adult	kg	70	EPA, 1991	70	EPA, 1991	Daevent-A (mg/cm2-event) =
	BW-C	Body Weight, Child	kg	15	EPA, 1991	15	EPA, 1991	PC x CW x (ET-A/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x CF1
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	Daevent-C (mg/cm2-event) =
								PC x CW x (ET-C/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x CF1

Sources:
EPA, 1989a: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.
EPA, 1989b: Exposure Factors Handbook, July 1989, EPA/600/8-89/043.
EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.
EPA, 1992; Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.
EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.
EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa.

Notes:
1. CT value for adult assumes showering for 10 minutes .CT value for child assumes an exposure time of 15 minutes while bathing.

Table L-4.8
Values Used for Daily Intake Calculations
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Deep Groundwater - Water Vapor at Showerhead
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Inhalation	InhExp	Inhalation Exposure per Shower	mg/kg-shower	Calculated	--	Calculated	--	Foster & Chrostowski Shower Inhalation Model will be used to calculate InhExp
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	Chronic Daily Intake (CDI) (mg/kg-day) =
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	InhExp x EF x ED x 1/AT
	AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA. 1989	3,285	EPA. 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

Table L-4.9
Values Used for Daily Intake Calculations
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage Features and Tributary to Blows Creek
Receptor Population: Trespasser
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Dermal	CW	Chemical Concentration in Water	mg/l	See Table 3.5	--	See Table 3.5	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	DAevent	Dermally Absorbed Dose per Event	mg/cm^2-day	Calculated	EPA, 1992	Calculated	EPA, 1992	DAevent x SA x EF x ED x 1/BW x 1/AT
	PC	Permeability Constant	cm/hr	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	t	Lag Time	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	Inorganics: DAevent (mg/cm2-day) =
	t*	Time to Reach Steady-state	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	PC x CW x ET x CF1
	B	Ratio of Permeability of Stratum Corneum to Epidermis	dimensionless	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	ET	Exposure Time	hours	1 [1]	Professional judgment	0.5 [1]	Professional judgment	Organics :
	CF1	Conversion Factor 1	l/cm^3	0.001	--	0.001	--	ET<t*: DAevent (mg/cm2-day) =
	SA	Skin Surface Area	cm^2	5,000	EPA, 1997	1,000	EPA, 1997	2 x PC x CW x (sqrt((6 x t x ET)/3.1415)) x CF1
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	
	ED	Exposure Duration	years	30	EPA, 1991	15 [1]	Professional judgment	ET>t*: DAevent (mg/cm2-day) =
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x CF1
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	10,950	EPA, 1989	5,475	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,

EPA, 1992: Dermal Exposure Assessment: Principles and Applications. EPA/600/8-91/011B.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The RME skin surface area assumes 25% of total surface area of 20,000.

The CT surface area assumes exposure to hands and feet and is obtained by averaging both male and female hands and feet mean values found on Table 6-4.

TBD = To Be Determined

Table L-4.10
Values Used for Daily Intake Calculations
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage Features and Tributary to Blows Creek
Receptor Population: Trespasser
Receptor Age: Adolescent

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Dermal	CW	Chemical Concentration in Water	mg/l	See Table 3.5	--	See Table 3.5	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	DAevent	Dermally Absorbed Dose per Event	mg/cm^2-day	Calculated	EPA, 1992	Calculated	EPA, 1992	DAevent x SA x EF x ED x 1/BW x 1/AT
	PC	Permeability Constant	cm/hr	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	t	Lag Time	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	Inorganics: DAevent (mg/cm2-day) =
	t*	Time to Reach Steady-state	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	PC x CW x ET x CF1
	B	Ratio of Permeability of Stratum Corneum to Epidermis	dimensionless	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	ET	Exposure Time	hours	1 [1]	Professional judgment	0.5 [1]	Professional judgment	Organics :
	CF1	Conversion Factor 1	l/cm^3	0.001	--	0.001	--	ET<t*: DAevent (mg/cm2-day) =
	SA	Skin Surface Area	cm^2	4,000	EPA, 1997	2,000	EPA, 1997	2 x PC x CW x (sqrt((6 x t x ET)/3.1415)) x CF1
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	ET>t*: DAevent (mg/cm2-day) =
	BW	Body Weight	kg	56	EPA, 1997	56	EPA, 1997	PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x CF1
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	2,190	EPA, 1989	2,190	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,

EPA, 1992: Dermal Exposure Assessment: Principles and Applications. EPA/600/8-91/011B.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The RME skin surface area assumes 25% of total surface area of 20,000.

The CT surface area assumes exposure to hands and feet and is obtained by averaging both male and female hands and feet mean values found on Table 6-4.

TBD = To Be Determined

Notes:

1. For RME values, assumes trespassing one hour per day, one day per week for 52 weeks per year. For CT values, assumes one-half of RME values.

Table L-4.11
Values Used for Daily Intake Calculations
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage Features and Tributary to Blows Creek
Receptor Population: Trespasser
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Sediment	mg/kg	See Table 3.6	--	See Table 3.6	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR-S	Ingestion Rate of Sediment	mg/day	100	EPA, 1991	50	EPA, 1997	CS x IR x EF x ED x CF1 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	
	ED	Exposure Duration	years	30	EPA, 1991	15 [1]	Professional judgment	
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	10,950	EPA, 1989	5,475	EPA, 1989	
Dermal	CS	Chemical Concentration in Sediment	mg/kg	See Table 3.6	--	See Table 3.6	--	CDI (mg/kg-day)=
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	CS x CF1 x SA x AF x AB x EF x ED x 1/BW x 1/AT
	SA	Skin Surface Area Available for Contact	cm^2	5,000	EPA, 1997	1,000	EPA, 1997	
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.19	EPA, 1997	0.19	EPA, 1997	
	AB	Absorption Factor	unitless	Chemical Specific	EPA, 1995	Chemical Specific	EPA, 1995	
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	
	ED	Exposure Duration	years	30	EPA, 1991	15 [1]	Professional judgment	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	10,950	EPA, 1989	5,475	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1995: Assessing Dermal Exposure from Soil, Technical Guidance Manual, Region III, EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The RME skin surface area assumes 25% of total surface area of 20,000.

The CT surface area assumes exposure to hands and feet and is obtained by averaging both male and female hands and feet mean values found on Table 6-4.

CT soil ingestion rate found on Table 4-23. Soil to Skin Adherence Factor calculated from Table 6-12 by averaging hand values for gardeners no. 1 an 2. (No trespasser activity on Table 6-12).

TBD = To Be Determined

NA = Not Available

Note:

1. For RME values, assumes trespassing one hour per day, one day per week for 52 weeks per year. For CT values, assumes one-half of RME values.

Table L-4.12
Values Used for Daily Intake Calculations
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage Features and Tributary to Blows Creek
Receptor Population: Trespasser
Receptor Age: Adolescent

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Sediment	mg/kg	See Table 3.6	--	See Table 3.6	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR-S	Ingestion Rate of Sediment	mg/day	100	EPA, 1991	50	EPA, 1997	CS x IR x EF x ED x CF1 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	52 [1]	Professional judgement	26 [1]	Professional judgement	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	
	BW	Body Weight	kg	56	EPA, 1997	56	EPA, 1997	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	2,190	EPA, 1989	2,190	EPA, 1989	
Dermal	CS	Chemical Concentration in Sediment	mg/kg	See Table 3.6	--	See Table 3.6	--	CDI (mg/kg-day)=
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	CS x CF1 x SA x AF x AB x EF x ED x 1/BW x 1/AT
	SA	Skin Surface Area Available for Contact	cm^2	4,000	EPA, 1997	2,000	EPA, 1997	
	AF	Soil to Skin Adherence Factor	mg/cm^2	6.7	EPA, 1997	6.7	EPA, 1997	
	AB	Absorption Factor	unitless	Chemical Specific	EPA, 1995	Chemical Specific	EPA, 1995	
	EF	Exposure Frequency	days/year	52 [1]	Professional Judgement	26 [1]	Professional Judgement	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	
	BW	Body Weight	kg	56	EPA, 1997	56	EPA, 1997	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	2,190	EPA, 1989	2,190	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991; Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,

EPA, 1993: Superfund Standard Default Exposure Factors for Central Tendency and Reasonable Maximum Exposures.

EPA, 1992: Dermal Exposure Assessment: Principles and Applications. EPA/600/8-91/011B.

EPA, 1995: Assessing Dermal Exposure from Soil, Technical Guidance manual, Region III, EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The skin surface area presented in this table includes hands, forearms, lower legs, and feet (assumes 25% of total surface area) and is obtained by averaging the 50 percentile total body surface area of male and female children ages 12 through 17 and dividing by 4.

The CT skin surface area is for hands and feet and is calculated by averaging the mean percentage of total surface body area for hands and feet (approximately 13%) for children ages 12 through 17 found on Table 6-8, then multiplying by total surface body area (16,000 cm^2).

Mean body weight for adolescent derived by averaging the mean (12 to 17 years) boy and girl values (see Table 7-3).

Soil to Skin Adherence Factor from Table 6-12 for Kids in Mud No. 2 using feet value which is conservative considering the surface water will wash some of the sediment off.

TBD = To Be Determined

NA = Not Available

Notes:

1. For RME values, assume trespassing one hour per day, one day per week for 52 weeks per year. For CT values, assume one-half of RME values.

Table L-4.13
Values Used for Daily Intake Calculations
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 5
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	See Table 3.7	--	See Table 3.7	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR-S	Ingestion Rate of Soil	mg/day	100	EPA, 1991	50	EPA, 1997	CS x IR x EF x ED x CF1 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	8,760	EPA, 1989	3,285	EPA, 1989	
Dermal	CS	Chemical Concentration in Soil	mg/kg	See Table 3.7	--	See Table 3.7	--	CDI (mg/kg-day)=
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	CS x CF1 x SA x AF x AB x EF x ED x 1/BW x 1/AT
	SA	Skin Surface Area Available for Contact	cm^2	5,000	EPA, 1997	1,000	EPA, 1997	
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.19	EPA, 1997	0.19	EPA, 1997	
	AB	Absorption Factor	unitless	Chemical Specific	EPA, 1995	Chemical Specific	EPA, 1995	
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1997	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	8,760	EPA, 1989	3,285	EPA, 1989	

*Surface and subsurface soil combined.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,

EPA, 1993: Superfund Standard Default Exposure Factors for Central Tendency and Reasonable Maximum Exposures.

EPA, 1995: Assessing Dermal Exposure from Soil, Technical Guidance manual, Region III, EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The RME skin surface area is obtained from Table 6-14, central tendency surface area for outdoor soil contact (assumes 25% of total surface area).

The CT surface area assumes exposure to hands and feet and is obtained by averaging both male and female hands and feet mean values found on Table 6-4.

CT soil ingestion rate found on Table 4-23. Soil to Skin Adherence Factor calculated from Table 6-12 by averaging hand values for gardeners no. 1 and 2.

TBD = To Be Determined

NA = Not Available

Table L-4.14
Values Used for Daily Intake Calculations
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 5
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	See Table 3.7	--	See Table 3.7	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR-S	Ingestion Rate of Soil	mg/day	200	EPA, 1991	100	EPA, 1997	CS x IR x EF x ED x CF1 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	
	BW	Body Weight	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	2,190	EPA, 1989	2,190	EPA, 1989	
Dermal	CS	Chemical Concentration in Soil	mg/kg	See Table 3.7	--	See Table 3.7	--	CDI (mg/kg-day)=
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	CS x CF1 x SA x AF x AB x EF x ED x 1/BW x 1/AT
	SA	Skin Surface Area Available for Contact	cm^2	3,600	EPA, 1997	864	EPA, 1997	
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.11	EPA, 1997	0.11	EPA, 1997	
	AB	Absorption Factor	unitless	Chemical Specific	EPA, 1995	Chemical Specific	EPA, 1995	
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	
	BW	Body Weight	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	2,190	EPA, 1989	2,190	EPA, 1989	

*Surface and subsurface soil combined.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,

EPA, 1993: Superfund Standard Default Exposure Factors for Central Tendency and Reasonable Maximum Exposures.

EPA, 1995: Assessing Dermal Exposure from Soil, Technical Guidance Manual, Region III, EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The RME skin surface area is for hands, arms, legs, and feet (assumes 50% of total surface area) and is obtained by averaging the 50% values of male and female chil from age 2 through 7 years found on Table 6-6 and 6-7 and dividing by 2. The CT skin surface area is for hands and feet and is calculated by averaging the mean percentage of total surface body area for hands and feet (approximately 12%) children ages 1 through 7 found on Table 6-8, then multiplying by the total surface body area (7,200 cm^2).

CT soil ingestion rate found on Table 4-23. Soil to Skin Adherence Factor obtained from Table 6-12 for the Soccer No. 1 activity (most conservative) for hands.

TBD = To Be Determined

NA = Not Available

Table L-4.15
Values Used for Daily Intake Calculations
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 5
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	See Table 3.7	--	See Table 3.7	see Table 3	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S-A	Ingestion Rate of Soil, Adult	mg/day	100	EPA, 1991	50	EPA, 1997	CS x IR-S-Adj x EF x CF3 x 1/AT
	IR-S-C	Ingestion Rate of Soil, Child	mg/day	200	EPA, 1991	100	EPA, 1997	
	IR-S-Adj	Ingestion Rate of Soil, Age-adjusted	mg-year/kg-day	114.29	Calculated	46.43	Calculated	IR-S-Adj (mg-year/kg-day) =
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	(ED-C x IR-S-C / BW-C) + (ED-A x IR-S-A / BW-A)
	ED-A	Exposure Duration, Adult	years	24	EPA, 1991	9	EPA, 1993	
	ED-C	Exposure Duration, Child	years	6	EPA, 1991	6	EPA, 1991	
	CF3	Conversion Factor 3	kg/mg	0.000001	--	0.000001	--	
	BW-A	Body Weight , Adult	kg	70	EPA, 1991	70	EPA, 1991	
	BW-C	Body Weight, Child	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg	See Table 3.7	--	See Table 3.7	see Table 3	CDI (mg/kg-day) =
	SA-A	Skin Surface Area Available for Contact, Adult	cm^2	5,000	EPA, 1997	1,000	EPA, 1997	CS x DA-Adj x DABS x CF3 x EF x 1/AT
	SA-C	Skin Surface Area Available for Contact, Child	cm^2	3,600	EPA, 1997	864	EPA, 1997	
	SSAF-A	Soil to Skin Adherence Factor	mg/cm^2-day	0.19	EPA, 1997	0.19	EPA, 1997	DA-Adj (mg-year/kg-day) =
	SSAF-C	Soil to Skin Adherence Factor	mg/cm^2-day	0.11	EPA, 1997	0.11	EPA, 1997	[(ED-C x SA-C x SSAF-C / BW-C) +
	DA-Adj	Dermal Absorption, Age-adjusted	mg-year/kg-day	484	calculated	62.4	calculated	(ED-A x SA-A x SSAF-A / BW-A)]
	AB	Absorption Factor	unitless	Chemical Specific	EPA, 1995	Chemical Specific	EPA, 1995	
	CF3	Conversion Factor 3	kg/mg	0.000001	--	0.000001	--	
	EF	Exposure Frequency	days/year	350	EPA, 1991	234	EPA, 1993	
	ED-A	Exposure Duration, Adult	years	24	EPA, 1991	9	EPA, 1993	
	ED-C	Exposure Duration, Child	years	6	EPA, 1991	6	EPA, 1991	
	BW-A	Body Weight , Adult	kg	70	EPA, 1991	70	EPA, 1991	
	BW-C	Body Weight, Child	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	

*Surface and subsurface soil combined.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa.

Table L-4.16
Values Used for Daily Intake Calculations
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 5
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	See Table 3.8	--	See Table 3.8	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR-S	Ingestion Rate of Soil	mg/day	480	EPA, 1993	240 [1]	Professional judgment	CS x IR x EF x ED x CF1 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	250	EPA, 1991	219	EPA, 1993	
	ED	Exposure Duration	years	0.5	VADEQ, 1997	0.25 [1]	Professional judgment	
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	183	EPA, 1989	91	EPA, 1989	
Dermal	CS	Chemical Concentration in Soil	mg/kg	See Table 3.8	--	See Table 3.8	--	CDI (mg/kg-day)=
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	CS x CF1 x SA x AF x AB x EF x ED x 1/BW x 1/AT
	SA	Skin Surface Area Available for Contact	cm^2	5,000	EPA, 1997	1,000	EPA, 1997	
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.24	EPA, 1997	0.24	EPA, 1997	
	AB	Absorption Factor	unitless	Chemical Specific	EPA, 1995	Chemical Specific	EPA, 1995	
	EF	Exposure Frequency	days/year	250	EPA, 1991	219	EPA, 1993	
	ED	Exposure Duration	years	0.5	VADEQ, 1997	0.25 [1]	Professional judgment	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	183	EPA, 1989	91	EPA, 1989	

*Surface and subsurface soil combined.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1993: Superfund Standard Default Exposure Factors for Central Tendency and Reasonable Maximum Exposures.

EPA, 1995: Assessing Dermal Exposure from Soil, Technical Guidance manual, Region III, EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The RME skin surface area assumes 25% of total surface area of 20,000.

The CT surface area assumes exposure to hands and feet and is obtained by averaging both male and female hands and feet mean values found on Table 6-4.

The RME and CT Soil to Skin Adherence Factor is calculated from Table 6-12 for construction worker's hands.

VADEQ, 1997: Value provided by Pat McMurray, Virginia Department of Environmental Quality, during St. Juliens Creek risk assessment assumptions conference call on November 20, 1997.

TBD = To Be Determined

NA = Not Available

Note:

1. CT value assumes one-half the RME value.

Table L-4.17
Values Used for Daily Intake Calculations
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil *
Exposure Medium: Soil*
Exposure Point: At Site 5
Receptor Population: Other Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	See Table 3.8	--	See Table 3.8	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR-S	Ingestion Rate of Soil	mg/day	50	VADEQ, 1997	25 [1]	Professional judgment	CS x IR x EF x ED x CF1 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	250	EPA, 1991	219	EPA, 1993	
	ED	Exposure Duration	years	25	EPA, 1991	5	EPA, 1993	
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	9,125	EPA, 1989	1,825	EPA, 1989	
Dermal	CS	Chemical Concentration in Soil	mg/kg	See Table 3.8	--	See Table 3.8	--	CDI (mg/kg-day)=
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	CS x CF1 x SA x AF x AB x EF x ED x 1/BW x 1/AT
	SA	Skin Surface Area Available for Contact	cm^2	5,000	EPA, 1997	1,000	EPA, 1997	
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.071	EPA, 1997	0.071	EPA, 1997	
	AB	Absorption Factor	unitless	chemical-specific	EPA, 1995	chemical-specific	EPA, 1995	
	EF	Exposure Frequency	days/year	250	EPA, 1991	219	EPA, 1993	
	ED	Exposure Duration	years	25	EPA, 1991	5	EPA, 1993	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	9,125	EPA, 1989	1,825	EPA, 1989	

*Surface and subsurface soil combined.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,

EPA, 1993: Superfund Standard default Exposure Factors for Central Tendency and Reasonable Maximum Exposures.

EPA, 1995: Assessing Dermal Exposure from Soil, Technical Guidance manual, Region III, EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The RME skin surface area assumes 25% of total surface area of 20,000.

The CT surface area assumes exposure to hands and feet and is obtained by averaging both male and female hands and feet mean values found on Table 6-4.

The RME and CT Soil to Skin Adherence Factor is calculated from Table 6-12 using the average of the five groundskeepers' values for hands.

VADEQ, 1997: Value provided by Pat McMurray, Virginia Department of Environmental Quality, during St. Juliens Creek risk assessment assumptions conference call on November 20, 1997.

TBD = To Be Determined

NA = Not Available

Note:

1. CT value assumes one-half the RME value.

Table L-4.18
Values Used for Daily Intake Calculations
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Air
Exposure Point: Emissions from Soil at Site 5
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Inhalation	CS	Chemical Concentration in Soil	mg/kg	See Table 3.9	--	See Table 3.9	--	Chronic Daily Intake (CDI) (mg/kg-day) =
	CA	Chemical Concentration in Air	mg/m^3	Calculated	--	Calculated	--	CA x IR x ET x EF x ED x 1/BW x 1/AT
	IR	Inhalation Rate	m^3/hour	2.5	EPA, 1997	1.5	EPA, 1997	
	PEF	Particulate Emissions Factor	m^3/kg	1.32E+09	--	1.32E+09	--	CA (mg/m^3) = CS (1/PEF + 1/VF)
	VF	Volatilization Factor for Volatile Constituents	m^3/kg	Calculated [3]	--	Calculated [3]	--	
	ET	Exposure Time	hr/day	8 [1]	Professional judgment	4 [1]	Professional judgment	
	EF	Exposure Frequency	days/year	250	EPA,1991	219	EPA, 1993	
	ED	Exposure Duration	years	0.5	VADEQ, 1997	0.25 [2]	Professional judgment	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	183	EPA, 1989	91	EPA, 1989	

Surface and subsurface soil combined.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1993: Superfund Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

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

Inhalation rates are based on values for the outdoor worker assuming heavy activity for the RME and moderate activity for the CT (Table 5-23 of EPA, 1997).

VADEQ, 1997: Value provided by Pat McMurray, Virginia Department of Environmental Quality, during St. Juliens Creek risk assessment assumptions conference call on November 20, 1997.

TBD = To Be Determined

Notes:

1. Professional Judgement based on activities that would occur 8 hrs per day for the RME and 1/2 of a day for the CT.
2. For CT value, assumes one-half of the RME value.
3. See Appendix F for VF calculations.

Table L-4.19
Values Used for Daily Intake Calculations
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage Features and Tributary to Blows Creek
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Dermal	CW	Chemical Concentration in Water	mg/l	See Table 3.10	--	See Table 3.10	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	DAevent	Dermally Absorbed Dose per Event	mg/cm^2-day	Calculated	EPA, 1992	Calculated	EPA, 1992	DAevent x SA x EF x ED x 1/BW x 1/AT
	PC	Permeability Constant	cm/hr	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	t	Lag Time	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	Inorganics: DAevent (mg/cm2-day) =
	t*	Time to Reach Steady-state	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	PC x CW x ET x CF1
	B	Ratio of Permeability of Stratum Corneum to Epidermis	dimensionless	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	ET	Exposure Time	hours/day	2 [1]	Professional judgment	1 [1]	Professional judgment	Organics :
	CF1	Conversion Factor 1	l/cm^3	0.001	- -	0.001	- -	ET<t*: DAevent (mg/cm2-day) =
	SA	Skin Surface Area	cm^2	5,000	EPA, 1997	1,000	EPA, 1997	2 x PC x CW x (sqrt((6 x t x ET)/3.1415)) x CF1
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	ET>t*: DAevent (mg/cm2-day) =
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x CF1
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	8,760	EPA, 1989	3,285	EPA, 1993	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,

EPA, 1992: Dermal Exposure Assessment: Principles and Applications. EPA/600/8-91/011B.

EPA, 1993: Superfund Standard Default Exposure Factors for Central Tendency and Reasonable Maximum Exposures.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The RME skin surface area assumes 25% of total surface area of 20,000.

The CT surface area assumes exposure to hands and feet and is obtained by averaging both male and female hands and feet mean values found on Table 6-4.

TBD = To Be Determined

Table L-4.20
Values Used for Daily Intake Calculations
Site 5/6
St. Julens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage Features and Tributary to Blows Creek
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Dermal	CW	Chemical Concentration in Water	mg/l	See Table 3.10	--	See Table 3.10	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	DAevent	Dermally Absorbed Dose per Event	mg/cm^2-day	Calculated	EPA, 1992	Calculated	EPA, 1992	DAevent x SA x EF x ED x 1/BW x 1/AT
	PC	Permeability Constant	cm/hr	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	t	Lag Time	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	Inorganics: DAevent (mg/cm2-day) =
	t*	Time to Reach Steady-state	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	PC x CW x ET x CF1
	B	Ratio of Permeability of Stratum Corneum to Epidermis	dimensionless	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	ET	Exposure Time	hours/day	2 [1]	Professional judgment	1 [1]	Professional judgment	Organics :
	CF1	Conversion Factor 1	l/cm^3	0.001	- -	0.001	- -	ET<t*: DAevent (mg/cm2-day) =
	SA	Skin Surface Area	cm^2	3,600	EPA, 1997	864	EPA, 1997	2 x PC x CW x (sqrt((6 x t x ET)/3.1415)) x CF1
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	ET>t*: DAevent (mg/cm2-day) =
	BW	Body Weight	kg	15	EPA, 1991	15	EPA, 1991	PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x CF1
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	2,190	EPA, 1989	2,190	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,

EPA, 1992: Dermal Exposure Assessment: Principles and Applications. EPA/600/8-91/011B.

EPA, 1993: Superfund Standard Default Exposure Factors for Central Tendency and Reasonable Maximum Exposures.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The RME skin surface area is for hands, arms, legs, and feet (assumes 50% of total surface area) and is obtained by averaging the 50% values of male and female children from age 2 through 7 years found on Table 6-6 and 6-7 and dividing by 2. The CT skin surface area is for hands and feet and is calculated by aveaging the mean percentage of total surafce body area for hands and feet (approximately 12%) for children ages 1 through 7 found on Table 6-8, then multiplying by the total surface body area (7,200 cm^2).

TBD = To Be Determined

Table L-4.21
Values Used for Daily Intake Calculations
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage Features and Tributary to Blows Creek
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Dermal Absorption	CW	Chemical Concentration in Water	mg/l	See Table 3.10	--	See Table 3.10	--	CDI (mg/kg-day) = DA-Adj x EF x 1/AT
	DAevent-A	Dermally Absorbed Dose per Event, Adult	mg/cm^2-event	Calculated	EPA, 1992	Calculated	EPA, 1992	
	DAevent-C	Dermally Absorbed Dose per Event, Child	mg/cm^2-event	Calculated	EPA, 1992	Calculated	EPA, 1992	DA-Adj = (Daevent-A x SA-A x ED-A x 1/BW-A) + (Daevent-C x SA-C x ED-C x 1/BW-C)
	DA-Adj	Dermally Absorbed Dose, Age-adjusted	mg-year/event-kg	Calculated		Calculated		
	PC	Permeability Constant	cm/hr	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	t	Lag Time	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	Inorganics:
	t*	Time to Reach Steady-state	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	DAevent-A (mg/cm2-event) = PC x CW x ET-A x CF1
	B	Ratio of Permeability of Stratum Corneum to Epidermis	dimensionless	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	DAevent-C (mg/cm2-event) = PC x CW x ET-C x CF1
	ET-A	Exposure Time, Adult	hours/day	2 [1]	Professional judgment	1 [1]	Professional judgment	
	ET-C	Exposure Time, Child	hours/day	2 [1]	Professional judgment	1 [1]	Professional judgment	Organics, ET<t*:
	CF1	Conversion Factor 1	l/cm^3	0.001	--	0.001	--	DAevent-A (mg/cm2-event) =
	SA-A	Skin Surface Area, Adult	cm^2	5,000	EPA, 1997	1,000	EPA, 1997	2 x PC x CW x (sqrt((6 x t x ET-A)/3.1415)) x CF1
	SA-C	Skin Surface Area, Child	cm^2	3,600	EPA, 1997	864	EPA, 1997	DAevent-C (mg/cm2-event) =
	EF	Exposure Frequency	events/year	52 [1]	Professional judgment	26 [1]	Professional judgment	2 x PC x CW x (sqrt((6 x t x ET-C)/3.1415)) x CF1
	ED-A	Exposure Duration, Adult	years	24	EPA, 1991	9	EPA, 1993	
	ED-C	Exposure Duration, Child	years	6	EPA, 1991	6	EPA, 1991	Organics, ET>t*:
	BW-A	Body Weight , Adult	kg	70	EPA, 1991	70	EPA, 1991	Daevent-A (mg/cm2-event) =
	BW-C	Body Weight, Child	kg	15	EPA, 1991	15	EPA, 1991	PC x CW x (ET-A/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x CF1
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	Daevent-C (mg/cm2-event) = PC x CW x (ET-C/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x CF1

Sources:
EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.
EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.
EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.
EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.
EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa.

Notes:
1. For RME value, assumes residents recreate two hours per day, one day per week for 52 weeks per year. For CT value, assumes one-half of RME values.

Table L-4.22
Values Used for Daily Intake Calculations
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage Features and Tributary to Blows Creek
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Sediment	mg/kg	See Table 3.11	--	See Table 3.11	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR-S	Ingestion Rate of Sediment	mg/day	100	EPA, 1991	50	EPA, 1997	CS x IR x EF x ED x CF1 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	8,760	EPA, 1989	3,285	EPA, 1989	
Dermal	CS	Chemical Concentration in Sediment	mg/kg	See Table 3.11	--	See Table 3.11	--	CDI (mg/kg-day)=
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	CS x CF1 x SA x AF x AB x EF x ED x 1/BW x 1/AT
	SA	Skin Surface Area Available for Contact	cm^2	5,000	EPA, 1997	1,000	EPA, 1997	
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.19	EPA, 1997	0.19	EPA, 1997	
	AB	Absorption Factor	unitless	chemical-specific	EPA, 1995	chemical-specific	EPA, 1995	
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	
	ED	Exposure Duration	years	24	EPA, 1991	9	EPA, 1993	
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	8,760	EPA, 1989	3,285	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,

EPA, 1993: Superfund Standard Default Exposure Factors for Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil, Technical Guidance manual, Region III, EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The RME skin surface area assumes 25% of total surface area of 20,000.

The CT surface area assumes exposure to hands and feet and is obtained by averaging both male and female hands and feet mean values found on Table 6-4.

CT soil ingestion rate found on Table 4-23. Soil to Skin Adherence Factor calculated from Table 6-12 by averaging hand values for gardeners no.1 and 2.

TBD = To Be Determined

NA = Not Available

Notes:

1. For RME value, assumes residents recreate two hours per day, one day per week for 52 weeks per year. For CT value, assumes one-half of RME values.

Table L-4.23
Values Used for Daily Intake Calculations
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage Features and Tributary to Blows Creek
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Sediment	mg/kg	See Table 3.11	--	See Table 3.11	--	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR-S	Ingestion Rate of Sediment	mg/day	200	EPA, 1991	100	EPA, 1997	CS x IR x EF x ED x CF1 x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	
	BW	Body Weight	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	2,190	EPA, 1989	2,190	EPA, 1989	
Dermal	CS	Chemical Concentration in Sediment	mg/kg	See Table 3.11	--	See Table 3.11	--	CDI (mg/kg-day)=
	CF1	Conversion Factor	kg/mg	1.00E-06	NA	1.00E-06	NA	CS x CF1 x SA x AF x AB x EF x ED x 1/BW x 1/AT
	SA	Skin Surface Area Available for Contact	cm^2	3,600	EPA, 1997	864	EPA, 1997	
	AF	Soil to Skin Adherence Factor	mg/cm^2	6.7	EPA, 1997	6.7	EPA, 1997	
	AB	Absorption Factor	unitless	chemical-specific	EPA, 1995	chemical-specific	EPA, 1995	
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [3]	Professional judgment	
	ED	Exposure Duration	years	6	EPA, 1991	6	EPA, 1991	
	BW	Body Weight	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	2,190	EPA, 1989	2,190	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,

EPA, 1993: Superfund Standard Default Exposure Factors for Central Tendency and Reasonable Maximum Exposures.

EPA, 1995: Assessing Dermal Exposure from Soil, Technical Guidance manual, Region III, EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The RME skin surface area is for hands, arms, legs, and feet (assumes 50% of total surface area) and is obtained by averaging the 50% values of male and female children from age 2 through 7 years found on Table 6-6 and 6-7 and dividing by 2. The CT skin surface area is for hands and feet and is calculated by averaging the mean percentage of total surface body area for hands and feet (approximately 12%) for children ages 1 through 7 found on Table 6-8, then multiplying by the total surface body area (7,200 cm^2).

Soil to Skin Adherence Factor from Table 6-12 for Kids in Mud No. 2 using feet value which is conservative considering the surface water will wash some of the sediment off.

CT soil ingestion rate found on Table 4-23.

TBD = To Be Determined

NA = Not Available

Notes:

1. For RME value, assumes residents recreate two hours per day, one day per week for 52 weeks per year. For CT value, assumes one-half of RME values.

Table L-4.24
Values Used for Daily Intake Calculations
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage Features and Tributary to Blows Creek
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	See Table 3.11	--	See Table 3.11	see Table 3	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S-A	Ingestion Rate of Soil, Adult	mg/day	100	EPA, 1991	50	EPA, 1997	CS x IR-S-Adj x EF x CF3 x 1/AT
	IR-S-C	Ingestion Rate of Soil, Child	mg/day	200	EPA, 1991	100	EPA, 1997	
	IR-S-Adj	Ingestion Rate of Soil, Age-adjusted	mg-year/kg-day	114.29	Calculated	46.43	Calculated	IR-S-Adj (mg-year/kg-day) =
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	(ED-C x IR-S-C / BW-C) + (ED-A x IR-S-A / BW-A)
	ED-A	Exposure Duration, Adult	years	24	EPA, 1991	9	EPA, 1993	
	ED-C	Exposure Duration, Child	years	6	EPA, 1991	6	EPA, 1991	
	CF3	Conversion Factor 3	kg/mg	0.000001	--	0.000001	--	
	BW-A	Body Weight , Adult	kg	70	EPA, 1991	70	EPA, 1991	
	BW-C	Body Weight, Child	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg	See Table 3.7	--	See Table 3.7	see Table 3	CDI (mg/kg-day) =
	SA-A	Skin Surface Area Available for Contact, Adult	cm^2	5,000	EPA, 1997	1,000	EPA, 1997	CS x DA-Adj x DABS x CF3 x EF x 1/AT
	SA-C	Skin Surface Area Available for Contact, Child	cm^2	3,600	EPA, 1997	864	EPA, 1997	
	SSAF-A	Soil to Skin Adherence Factor	mg/cm^2-day	0.19	EPA, 1997	0.19	EPA, 1997	DA-Adj (mg-year/kg-day) =
	SSAF-C	Soil to Skin Adherence Factor	mg/cm^2-day	6.7	EPA, 1997	6.7	EPA, 1997	[(ED-C x SA-C x SSAF-C / BW-C) +
	DA-Adj	Dermal Absorption, Age-adjusted	mg-year/kg-day	9,974	calculated	2,340	calculated	(ED-A x SA-A x SSAF-A / BW-A)]
	AB	Absorption Factor	unitless	Chemical Specific	EPA, 1995	Chemical Specific	EPA, 1995	
	CF3	Conversion Factor 3	kg/mg	0.000001	--	0.000001	--	
	EF	Exposure Frequency	days/year	52 [1]	Professional judgment	26 [1]	Professional judgment	
	ED-A	Exposure Duration, Adult	years	24	EPA, 1991	9	EPA, 1993	
	ED-C	Exposure Duration, Child	years	6	EPA, 1991	6	EPA, 1991	
	BW-A	Body Weight , Adult	kg	70	EPA, 1991	70	EPA, 1991	
	BW-C	Body Weight, Child	kg	15	EPA, 1991	15	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	25,550	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 1992: Dermal Exposure Assessment: Principals and Applications. ORD. EPA/600/8-91/011B.

EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

EPA, 1995: Assessing Dermal Exposure from Soil. EPA Region III. EPA/903-K-95-003.

EPA, 1997: Exposure Factors Handbook, Vol. 1, EPA/600/P-95/002Fa.

Notes:

1. For RME value, assumes residents recreate two hours per day, one day per week for 52 weeks per year. For CT value, assumes one-half of RME values.

Table L-4.25
Values Used for Daily Intake Calculations
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Shallow Groundwater
Exposure Point: Water Table
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Dermal	CW	Chemical Concentration in Water	mg/l	See Table 3.12	--	See Table 3.12	--	CDI (mg/kg-day)=
	DAevent	Dermally Absorbed Dose per Event	mg/cm^2-day	Calculated	EPA, 1992	Calculated	EPA, 1992	DAevent x SA x EF x ED x 1/BW x 1/AT
	PC	Permeability Constant	cm/hr	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	t	Lag Time	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	Inorganics: DAevent (mg/cm2-day) =
	t*	Time to Reach Steady-state	hours	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	PC x CW x ET x CF1
	B	Ratio of Permeability of Stratum Corneum to Epidermis	dimensionless	Chemical Specific	EPA, 1992	Chemical Specific	EPA, 1992	
	ET	Exposure Time	hours	2 [1]	Professional judgment	1 [1]	Professional judgment	Organics :
	CF1	Conversion Factor 1	l/cm^3	0.001	- -	0.001	- -	ET<t*: DAevent (mg/cm2-day) =
	SA	Skin Surface Area	cm^2	5,000	EPA, 1997	1,000	EPA, 1997	2 x PC x CW x (sqrt((6 x t x ET)/3.1415)) x CF1
	EF	Exposure Frequency	events/year	63 [1]	Professional judgment	31 [1]	Professional judgment	
	ED	Exposure Duration	years	0.5	VADEQ, 1997	0.25 [1]	Professional judgment	ET>t*: DAevent (mg/cm2-day) =
	BW	Body Weight	kg	70	EPA, 1991	70	EPA, 1991	PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x CF1
	AT-C	Averaging Time - Cancer	days	25,550	EPA, 1989	25,550	EPA, 1989	
	AT-N	Averaging Time - Non-Cancer	days	183	EPA, 1989	91	EPA, 1989	

Sources:
EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.
EPA, 1991: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03,
EPA, 1992: Dermal Exposure Assessment: Principles and Applications. EPA/600/8-91/011B.
EPA, 1997: Exposure Factors Handbook, Vol. 1. EPA/600/P-95/002Fa. The RME skin surface area assumes 25% of total surface area of 20,000.
The CT surface area assumes exposure to hands and feet and is obtained by averaging both male and female hands and feet mean values found on Table 6-4.
VADEQ, 1997: Value provided by Pat McMurray, Virginia Department of Environmental Quality, during St. Juliens Creek risk assessment assumptions conference call on November 20, 1997.
TBD = To Be Determined

Note:
1. For RME values, assumes workers spend two hours per day exposed to shallow groundwater during excavation and construction activities (i.e. basement or footer construction), one-quarter of the RME exposure frequency

Table L-5.1
Non-Cancer Toxicity Data -- Oral/Dermal
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD Value	Oral RfD Units	Oral to Dermal Adjustment Factor (1)	Adjusted Dermal RfD (2)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ (MM/DD/YY)
4,4'DDE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4-DDT	Chronic	5.0E-04	mg/kg/day	0.9	4.5E-04	mg/kg/day	Liver	100	IRIS	05/04/01
4,4-DDT	Subchronic	5.0E-04	mg/kg/day	0.9	4.5E-04	mg/kg/day	Liver	100	HEAST	07/01/97
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	Chronic	1.0E-02	mg/kg/day	1	1.0E-02	mg/kg/day	Liver	1000	IRIS	05/04/01
Chloroform	Subchronic	1.0E-02	mg/kg/day	1	1.0E-02	mg/kg/day	Liver	1000	HEAST	07/01/97
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor	Chronic	5.0E-04	mg/kg/day	0.5	2.5E-04	mg/kg/day	Liver	300	IRIS	05/04/01
Heptachlor	Subchronic	5.0E-04	mg/kg/day	0.5	2.5E-04	mg/kg/day	Liver	300	HEAST	07/01/97
RDX	Chronic	3.0E-03	mg/kg/day	0.5	1.5E-03	mg/kg/day	Prostate	100	IRIS	05/04/01
Dioxin (as 2,3,7,8-TCDD)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aluminum	Chronic	1.0E+00	mg/kg/day	0.27	2.7E-01	mg/kg/day	Central Nervous System	100	NCEA	08/26/96
Antimony	Chronic	4.0E-04	mg/kg/day	0.10	4.0E-05	mg/kg/day	Longevity, Blood	1000	IRIS	05/04/01
Antimony	Subchronic	4.0E-04	mg/kg/day	0.10	4.0E-05	mg/kg/day	Longevity, Blood	1000	HEAST	07/01/97
Arsenic	Chronic	3.0E-04	mg/kg/day	0.95	2.9E-04	mg/kg/day	Skin	3	IRIS	05/04/01
Arsenic	Subchronic	3.0E-04	mg/kg/day	0.95	2.9E-04	mg/kg/day	Skin	3	HEAST	07/01/97
Barium	Chronic	7.0E-02	mg/kg/day	1	7.0E-02	mg/kg/day	Heart	3	IRIS	05/04/01
Barium	Subchronic	7.0E-02	mg/kg/day	1	7.0E-02	mg/kg/day	Heart	3	HEAST	07/01/97
Cadmium (food)	Chronic	1.0E-03	mg/kg/day	0.025	2.5E-05	mg/kg/day	Kidney	10	IRIS	05/04/01
Cadmium (nonfood)	Chronic	5.0E-04	mg/kg/day	0.05	2.5E-05	mg/kg/day	Kidney	10	IRIS	05/04/01
Chromium (VI)	Chronic	3.0E-03	mg/kg/day	0.01	3.0E-05	mg/kg/day	NOAEL	300	IRIS	05/04/0
Chromium (VI)	Subchronic	2.0E-02	mg/kg/day	0.01	2.0E-04	mg/kg/day	NOAEL	100	HEAST	07/01/97
Cobalt	Chronic	6.0E-02	mg/kg/day	0.30	1.8E-02	mg/kg/day	Sensitizer	NA	NCEA	11/18/91
Copper	Chronic	3.7E-02	mg/kg/day	0.60	2.2E-02	mg/kg/day	Gastrointestinal	NA	HEAST	07/01/97
Copper	Subchronic	3.7E-02	mg/kg/day	0.60	2.2E-02	mg/kg/day	Gastrointestinal	NA	HEAST	07/01/97
Iron	Chronic	3.0E-01	mg/kg/day	0.20	6.0E-02	mg/kg/day	Gastrointestinal	1	NCEA	07/23/96
Manganese (nonfood)	Chronic	2.0E-02	mg/kg/day	0.35	7.0E-03	mg/kg/day	Central Nervous System	1	IRIS	05/04/01
Manganese(food)	Chronic	1.4E-01	mg/kg/day	0.05	2.0E-04	mg/kg/day	Central Nervous System	1	IRIS	05/04/01
Nickel	Chronic	2.0E-02	mg/kg/day	0.10	2.0E-04	mg/kg/day	Body weight	300	IRIS	05/04/01
Nickel	Subchronic	2.0E-02	mg/kg/day	0.10	2.0E-04	mg/kg/day	Body weight	300	HEAST	07/01/97
Phosphorous	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	Chronic	7.0E-05	mg/kg/day	1	7.0E-05	mg/kg/day	Liver	NA	RBC	10/09/02
Vanadium	Chronic	7.0E-03	mg/kg/day	0.02	1.4E-04	mg/kg/day	NOAEL	100	HEAST	07/01/97
Vanadium	Subchronic	7.0E-03	mg/kg/day	0.02	1.4E-04	mg/kg/day	NOAEL	100	HEAST	07/01/97
Zinc	Chronic	3.0E-01	mg/kg/day	0.25	7.5E-02	mg/kg/day	Blood	3	IRIS	05/04/01
Zinc	Subchronic	3.0E-01	mg/kg/day	0.25	7.5E-02	mg/kg/day	Blood	3	HEAST	07/01/97

NOAEL = No-Observed-Adverse-Effect Level

NA = Not Available

IRIS = Integrated Risk Information System

HEAST = Health Effects Assessment Summary Tables, July 1997

RBC = Region III Risk-Based Concentration Table, October 9, 2002

NCEA = National Center for Environmental Assessment

(1) Oral to Dermal Adjustment Factor from oral ABS values for oral to dermal extrapolation per RAGS Appendix A, USEPA Update, April 8, 1999

Table L-5.2
Non-Cancer Toxicity Data -- Inhalation
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Chronic/ Subchronic	Value Inhalation RfC	Units	Adjusted Inhalation RfD (1)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfC:RfD: Target Organ	Dates (MM/DD/YY)
1,4-Dichlorobenzene	Chronic	8.0E-01	mg/m^3	2.3E-01	mg/kg/day	Liver	100	IRIS	05/04/01
2-am-4,6-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'DDD	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'DDE	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4-DDT	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	Subchronic	3.0E-03	mg/m3	8.6E-04	mg/kg/day	Nasal	100	NCEA	12/01/97
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor	NA	NA	NA	4.5E+00	mg/kg/day	NA	NA	RBC	10/09/02
Indeno(1,2,3-c,d)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	Chronic	3.0E-03	mg/m^3	8.6E-04	mg/kg/day	Respiratory	3000	IRIS	05/04/01
Trichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl Chloride	Chronic	1.0E-01	mg/m3	2.9E-02	mg/kg/day	Liver	30	IRIS	05/04/01
Aluminum	Chronic	5.0E-03	mg/m3	1.4E-03	mg/kg/day	CNS	300	NCEA	06/20/97
Beryllium	Chronic	2.0E-05	mg/m^3	5.7E-06	mg/kg/day	Lung	10	IRIS	05/04/01
Cadmium (food)	Chronic	2.0E-04	mg/m^3	5.7E-05	mg/kg/day	Kidney	10	RBC	10/09/02
Cadmium (nonfood)	Chronic	2.0E-04	mg/m^3	5.7E-05	mg/kg/day	Kidney	10	RBC	10/09/02
Chromium (VI)	Chronic	1.0E-04	mg/m^3	2.9E-05	mg/kg/day	Lung	300	IRIS	05/04/01
Chromium (VI)	Subchronic	1.0E-03	mg/m^3	2.9E-04	mg/kg/day	Lung	30	IRIS	05/04/01
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese (food)	Chronic	5.0E-05	mg/m^3	1.4E-05	mg/kg/day	CNS	1000	IRIS	05/04/01
Manganese (nonfood)	Chronic	5.0E-05	mg/m^3	1.4E-05	mg/kg/day	CNS	1000	IRIS	05/04/01
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phosphorous	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA

CNS = Central Nervous System

IRIS = Integrated Risk Information System

HEAST = Health Effects Assessment Summary Tables, July 1997

RBC = Region III Risk-Based Concentration Table, October 9, 2002

NCEA = National Center for Environmental Assessment

(1) Adjusted Inhalation RfD (mg/kg/day) = Inhalation RfC (mg/m^3) x 20 (m^3/day) / 70 (kg)

Table L-6.1
Cancer Toxicity Data -- Oral/Dermal
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Oral Cancer Slope Factor	Oral to Dermal Adjustment Factor (1)	Adjusted Dermal Cancer Slope Factor (2)	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date (MM/DD/YY)
4,4'DDE	3.4E-01	0.9	3.8E-01	1/mg/kg/day	B2	IRIS	05/04/01
4,4-DDT	3.4E-01	0.9	3.8E-01	1/mg/kg/day	B2	IRIS	05/04/01
Benzo(a)anthracene	7.3E-01	NA	NA	1/mg/kg/day	B2	RBC	10/05/00
Benzo(a)pyrene	7.3E+00	NA	NA	1/mg/kg/day	B2	IRIS	05/04/01
Benzo(b)fluoranthene	7.3E-01	NA	NA	1/mg/kg/day	B2	RBC	10/05/00
Bis(2-ethylhexyl)phthalate	1.4E-02	0.55	2.5E-02	1/mg/kg/day	B2	IRIS	05/04/01
Chloroform	6.1E-03	1	6.1E-03	1/mg/kg/day	B2	IRIS	05/04/01
Dibenz(a,h)anthracene	7.3E+00	NA	NA	1/mg/kg/day	B2	RBC	10/05/00
Heptachlor	4.5E+00	0.5	9.0E+00	1/mg/kg/day	B2	IRIS	05/04/01
RDX	1.1E-01	0.5	2.2E-01	1/mg/kg/day	C	IRIS	05/04/01
Dioxin (as 2,3,7,8-TCDD)	1.5E+05	0.5	3.0E+05	1/mg/kg/day	B2	HEAST	07/01/97
Aluminum	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA
Arsenic	1.5E+00	0.95	1.6E+00	1/mg/kg/day	A	IRIS	05/04/01
Barium	NA	NA	NA	NA	NA	NA	NA
Cadmium (food)	NA	NA	NA	NA	NA	NA	NA
Cadmium (nonfood)	NA	NA	NA	NA	NA	NA	NA
Chromium VI	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA
Manganese (food)	NA	NA	NA	NA	NA	NA	NA
Manganese (nonfood)	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA
Phosphorous	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA

NA = Not Available

IRIS = Integrated Risk Information System

HEAST = Health Effects Assessment Summary Tables, July 1997

RBC = Region III Risk-Based Concentration Table, April 13, 2000

NCEA = National Center for Environmental Assessment

(1) Oral to Dermal Adjustment Factor from oral ABS values for oral to dermal extrapolation per RAGS Appendix A, USEPA Update, April 8, 1999

(2) Adjusted Dermal Cancer Slope Factor (1/mg/kg/day) = Oral Cancer Slope Factor (1/mg/kg/day) / Oral to Dermal Adjustment Factor

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

Weight of Evidence:

Known/Likely

Cannot be Determined

Not Likely

Table L-6.2
Cancer Toxicity Data -- Inhalation
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Unit Risk	Units	Adjustment	Inhalation Cancer Slope Factor	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date (MM/DD/YY)
4,4'DDE	NA	NA	NA	NA	NA	NA	NA	NA
4,4-DDT	9.7E-05	1/ug/m^3	(1)	3.4E-01	1/mg/kg/day	B2	IRIS	05/04/01
Benzo(a)anthracene	8.9E-05	1/ug/m3	(1)	3.1E-01	1/mg/kg/day	B2	NCEA (3)	01/01/94
Benzo(a)pyrene	8.9E-04	1/ug/m^3	(1)	3.1E+00	1/mg/kg/day	B2	NCEA	07/08/93
Benzo(b)fluoranthene	8.9E-05	1/ug/m3	(1)	3.1E-01	1/mg/kg/day	B2	NCEA (3)	01/01/94
Chloroform	2.3E-05	1/ug/m^3	(1)	8.1E-02	1/mg/kg/day	B2	IRIS	05/04/01
Dibenz(a,h)anthracene	8.9E-04	1/ug/m^3	(1)	3.1E+00	1/mg/kg/day	B2	NCEA (3)	01/01/94
Heptachlor	1.3E-03	1/ug/m^3	(1)	4.5E+00	1/mg/kg/day	B2	IRIS	05/04/01
RDX	NA	NA	NA	NA	NA	NA	NA	NA
Dioxin (as 2,3,7,8-TCDD)	3.3E-05	1/pg/m^3	(2)	1.5E+05	1/mg/kg/day	B2	HEAST	07/01/97
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	4.3E-03	1/ug/m^3	(1)	1.5E+01	1/mg/kg/day	A	IRIS	05/04/01
Barium	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium (food)	1.8E-03	1/ug/m^3	(1)	6.3E+00	1/mg/kg/day	B1	IRIS	05/04/01
Cadmiun (nonfood)	1.8E-03	1/ug/m^3	(1)	6.3E+00	1/mg/kg/day	B1	IRIS	05/04/01
Chromium VI	1.2E-02	1/ug/m^3	(1)	4.1E+01	1/mg/kg/day	A	IRIS	05/04/01
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA
Manganese (food)	NA	NA	NA	NA	NA	NA	NA	NA
Manganese (nonfood)	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA	NA
Phosphorous	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA

NA - Not Available

IRIS = Integrated Risk Information System

HEAST = Health Effects Assessment Summary Tables

RBC = Region III Risk-Based Concentration Table, April 13, 2000

NCEA = National Center for Environmental Assessment

(1) Inhalation Cancer Slope Factor (1/mg/kg/day) = Unit Risk (1/ug/m^3) x 70 kg / 20 m^3/day x 1000 ug/mg

(2) Inhalation Cancer Slope Factor (1/mg/kg/day) = Unit Risk (1/pg/m^3) x 70 kg / 20 m^3/day x 1,000,000,000 ug/mg

(3) Toxicity equivalent factors from NCEA Risk Assessment Issue Paper: Status of Inhalation Cancer Unit Risk for Benzo(a)pyrene, 1994.

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

Weight of Evidence:

Known/Likely

Cannot be Determined

Not Likely

Table L-7.1
Calculation of Non-Cancer Hazards - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: At Site 5
Receptor Population: Trespasser
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Arsenic	37	mg/kg	37	mg/kg	M	7.6E-06	mg/kg/day	3.0E-04	mg/kg/day	NA	NA	0.03
	Chromium	109	mg/kg	109	mg/kg	M	2.2E-05	mg/kg/day	3.0E-03	mg/kg/day	NA	NA	0.007
	Iron	31527	mg/kg	31527	mg/kg	M	6.4E-03	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	0.02
												Total	0.05
Dermal	Arsenic	37	mg/kg	37	mg/kg	M	2.3E-06	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.008
	Chromium	109	mg/kg	109	mg/kg	M	2.1E-06	mg/kg/day	3.0E-05	mg/kg/day	NA	NA	0.07
	Iron	31527	mg/kg	31527	mg/kg	M	6.1E-04	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.01
												Total	0.1
												Total Hazard Index Across All Exposure Routes/Pathways	0.1

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table L-7.2
Calculation of Non-Cancer Hazards - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: At Site 5
Receptor Population: Trespasser
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Arsenic	37	mg/kg	37	mg/kg	M	9.5E-06	mg/kg/day	3.0E-04	mg/kg/day	NA	NA	0.03
	Chromium	109	mg/kg	109	mg/kg	M	2.8E-05	mg/kg/day	2.0E-02	mg/kg/day	NA	NA	0.001
	Iron	31527	mg/kg	31527	mg/kg	M	8.0E-03	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	0.03
												Total	0.06
Dermal	Arsenic	37	mg/kg	37	mg/kg	M	1.3E-06	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.005
	Chromium	109	mg/kg	109	mg/kg	M	1.2E-06	mg/kg/day	2.0E-04	mg/kg/day	NA	NA	0.006
	Iron	31527	mg/kg	31527	mg/kg	M	3.5E-04	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.006
												Total	0.02
												Total Hazard Index Across All Exposure Routes/Pathways	0.08

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table L-7.3
Calculation of Non-Cancer Hazards - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from Surface Soil at Site 5
Receptor Population: Trespasser
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value (1)	Route EPC Units	EPC Selected for Hazard Calculation (2)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Arsenic	37	mg/kg	0.00000003	mg/m^3	R	9.2E-11	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Chromium	109	mg/kg	0.00000008	mg/m^3	R	2.7E-10	mg/kg/day	2.9E-05	mg/kg/day	1.0E-04	mg/m3	0.00001
	Iron	31527	mg/kg	0.00002	mg/m^3	R	7.8E-08	mg/kg/day	NA	mg/kg/day	NA	NA	NA
												Total	0.00001
												Total Hazard Index Across All Exposure Routes/Pathways	0.00001

(1) Route-specific EPC value is equal to the medium EPC value multilplied by 1/PEF (PEF = 1.32E+09mg3/kg).
(2) Route-Specific (R) EPC selected for hazard calculation.

Table L-7.4
Calculation of Non-Cancer Hazards - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from Surface Soil at Site 5
Receptor Population: Trespasser
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value (1)	Route EPC Units	EPC Selected for Hazard Calculation (2)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Arsenic	37	mg/kg	0.00000003	mg/m^3	R	1.0E-10	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Chromium	109	mg/kg	0.00000008	mg/m^3	R	2.9E-10	mg/kg/day	2.9E-04	mg/kg/day	1.0E-03	mg/m3	0.000001
	Iron	31527	mg/kg	0.00002	mg/m^3	R	8.5E-08	mg/kg/day	NA	mg/kg/day	NA	NA	NA
												Total	0.000001
												Total Hazard Index Across All Exposure Routes/Pathways	0.000001

(1) Route-specific EPC value is equal to the medium EPC value multiplied by 1/PEF (PEF = 1.32E+09mg3/kg).
(2) Route-Specific (R) EPC selected for hazard calculation.

Table L-7.5
Calculation of Non-Cancer Hazards - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Deep Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	RDX	1.79	ug/l	1.79	ug/l	M	4.9E-05	mg/kg/day	3.0E-03	mg/kg/day	NA	NA	0.02
	Heptachlor	0.03	ug/l	0.03	ug/l	M	8.2E-07	mg/kg/day	5.0E-04	mg/kg/day	NA	NA	0.002
	Chloroform	5.47	ug/l	5.47	ug/l	M	1.5E-04	mg/kg/day	1.0E-02	mg/kg/day	NA	NA	0.01
	Antimony	3.20	ug/l	3.20	ug/l	M	8.8E-05	mg/kg/day	4.0E-04	mg/kg/day	NA	NA	0.2
	Arsenic	3.62	ug/l	3.62	ug/l	M	9.9E-05	mg/kg/day	3.0E-04	mg/kg/day	NA	NA	0.3
	Iron	4420	ug/l	4420	ug/l	M	1.2E-01	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	0.4
	Manganese	192	ug/l	192	ug/l	M	5.3E-03	mg/kg/day	2.0E-02	mg/kg/day	NA	NA	0.3
												Total	1
Dermal	RDX	1.79	ug/l	1.79	ug/l	M	3.3E-07	mg/kg/day	1.5E-03	mg/kg/day	NA	NA	0.0002
	Heptachlor	0.03	ug/l	0.03	ug/l	M	5.2E-07	mg/kg/day	2.5E-04	mg/kg/day	NA	NA	0.002
	Chloroform	5.47	ug/l	5.47	ug/l	M	1.3E-05	mg/kg/day	1.0E-02	mg/kg/day	NA	NA	0.001
	Antimony	3.20	ug/l	3.20	ug/l	M	2.2E-07	mg/kg/day	4.0E-05	mg/kg/day	NA	NA	0.005
	Arsenic	3.62	ug/l	3.62	ug/l	M	2.5E-07	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.0009
	Iron	4420	ug/l	4420	ug/l	M	3.0E-04	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.005
	Manganese	192	ug/l	192	ug/l	M	1.3E-05	mg/kg/day	7.0E-03	mg/kg/day	NA	NA	0.002
												Total	0.02
												Total Hazard Index Across All Exposure Routes/Pathways	1

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table L-7.5a RME Supplement
Calculation of Daevent, Adult Resident
Deep Groundwater - Tap Water
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC)	Lag Time (t)	B (dimensionless)	Duration of Event (ET)	t*	Eq	DAevent
RDX[1]	1.8E+00	µg/l	3.48E-04	1.98E+00	7.41E-04	0.25	4.8E+00	2	1.2E-09
Heptachlor	3.0E-02	µg/l	1.1E-02	1.70E+01	1.90E+00	0.25	9.40E+01	2	1.9E-09
Chloroform	5.5E+00	µg/l	8.9E-03	4.70E-01	9.3E-03	0.25	1.1E+00	2	4.6E-08
Antimony	3.2E+00	µg/l	1.0E-03	N/A	N/A	0.25	N/A	1	8.0E-10
Arsenic	3.6E+00	µg/l	1.0E-03	N/A	N/A	0.25	N/A	1	9.1E-10
Iron	4.4E+03	µg/l	1.0E-03	N/A	N/A	0.25	N/A	1	1.1E-06
Manganese	1.9E+02	µg/l	1.0E-03	N/A	N/A	0.25	N/A	1	4.8E-08

Inorganics: DAevent (mg/cm2-event) =
PC x EPC x ET x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
ET<t*: DAevent (mg/cm2-event) =
2 x PC x EPC x (sqrt((6 x t x ET)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:
1. Permeability constant and lag time calculated on Table 7.5b.RME Supplement.
Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

Table L-7.5b RME Supplement
Calculation of Daevent, Adult Resident
Deep Groundwater
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical	MW	log Kow	Kow	log Kp[1]	Kp (cm/hr)	B[1]	log Dsc/lsc[1]	lsc (cm)	log Dsc[1]	Dsc (cm^2/hr)	Tau[1] (hr)	c[1]	b[1]	T*[1] (hr)
RDX	222.26	0.87	7.41E+00	-3.46E+00	3.48E-04	7.41E-04	-4.08E+00	1.00E-03	-7.08E+00	8.40E-08	1.98E+00	3.34E-01	3.03E-01	4.76E+00

1. Equations from *Dermal Exposure Assessment: Principles and Applications*. EPA/600/8-91/011B. January 1992.

Table L-7.6
Calculation of Non-Cancer Hazards - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Deep Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	RDX	1.79	ug/l	1.79	ug/l	M	1.1E-04	mg/kg/day	3.0E-03	mg/kg/day	NA	NA	0.04
	Heptachlor	0.03	ug/l	0.03	ug/l	M	1.9E-06	mg/kg/day	5.0E-04	mg/kg/day	NA	NA	0.004
	Chloroform	5.47	ug/l	5.47	ug/l	M	3.5E-04	mg/kg/day	1.0E-02	mg/kg/day	NA	NA	0.03
	Antimony	3.20	ug/l	3.20	ug/l	M	2.0E-04	mg/kg/day	4.0E-04	mg/kg/day	NA	NA	0.5
	Arsenic	3.62	ug/l	3.62	ug/l	M	2.3E-04	mg/kg/day	3.0E-04	mg/kg/day	NA	NA	0.8
	Iron	4420	ug/l	4420	ug/l	M	2.8E-01	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	0.9
	Manganese	192	ug/l	192	ug/l	M	1.2E-02	mg/kg/day	2.0E-02	mg/kg/day	NA	NA	0.6
												Total	3
Dermal	RDX	1.79	ug/l	1.79	ug/l	M	6.4E-07	mg/kg/day	1.5E-03	mg/kg/day	NA	NA	0.00043
	Heptachlor	0.03	ug/l	0.03	ug/l	M	9.9E-07	mg/kg/day	2.5E-04	mg/kg/day	NA	NA	0.0040
	Chloroform	5.47	ug/l	5.47	ug/l	M	2.4E-05	mg/kg/day	1.0E-02	mg/kg/day	NA	NA	0.0024
	Antimony	3.20	ug/l	3.20	ug/l	M	4.9E-07	mg/kg/day	4.0E-05	mg/kg/day	NA	NA	0.01
	Arsenic	3.62	ug/l	3.62	ug/l	M	5.5E-07	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.002
	Iron	4420	ug/l	4420	ug/l	M	6.7E-04	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.01
	Manganese	192	ug/l	192	ug/l	M	2.9E-05	mg/kg/day	7.0E-03	mg/kg/day	NA	NA	0.004
												Total	0.04
												Total Hazard Index Across All Exposure Routes/Pathways	3

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table L-7.6 RME Supplement
Calculation of Daevent, Adult Resident
Deep Groundwater - Tap Water
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC)	Lag Time (t)	B (dimensionless)	Duration of Event (ET)	t*	Eq	DAevent
RDX[1]	1.8E+00	µg/l	3.48E-04	1.98E+00	7.41E-04	0.33	4.8E+00	2	1.4E-09
Heptachlor	3.0E-02	µg/l	1.1E-02	1.70E+01	1.90E+00	0.33	9.40E+01	2	2.2E-09
Chloroform	5.5E+00	µg/l	8.9E-03	4.70E-01	9.3E-03	0.33	1.1E+00	2	5.3E-08
Antimony	3.2E+00	µg/l	1.0E-03	N/A	N/A	0.33	N/A	1	1.1E-09
Arsenic	3.6E+00	µg/l	1.0E-03	N/A	N/A	0.33	N/A	1	1.2E-09
Iron	4.4E+03	µg/l	1.0E-03	N/A	N/A	0.33	N/A	1	1.5E-06
Manganese	1.9E+02	µg/l	1.0E-03	N/A	N/A	0.33	N/A	1	6.3E-08

Inorganics: DAevent (mg/cm2-event) =
PC x EPC x ET x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
ET<t*: DAevent (mg/cm2-event) =
2 x PC x EPC x (sqrt((6 x t x ET)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:
1. Permeability constant and lag time calculated on Table 7.5b.RME Supplement.
Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

Table L-7.7
Calculation of Non-Cancer Hazards - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Deep Groundwater - Water Vapors at Shower Head
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Chloroform	5.5	ug/l	3.0E-04	mg/kg-shower	R	2.9E-04	mg/kg/day	8.6E-05	mg/kg/day	3.0E-04	mg/m3	3
												Total	3
												Total Hazard Index Across All Exposure Routes/Pathways	3

(1) Route-Specific (R) EPC selected for hazard calculation.
Route EPC calculated using Foster and Chrostowski Shower Model (Table 7.7 RME Supplement)

Table L-7.7 RME Supplement
Inhalation Exposure Concentrations from Foster and Chrostowski Shower Model
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical	Exposure Point Concentration Cwo (µg/l)	Molecular weight (HH) (g/mole)	Henry's Law Constant (H) (atm-m^3/mole)	Kg (VOC) (cm/hr)	Kl(VOC) (cm/hr)	KL (cm/hr)	Kal (cm/hr)	Cwd (µg/l)	S (µg/m^3-min)	Calculated Inhalation Exposure (Einh) (mg/kg/shower)
Chloroform	5.5E+00	1.2E+02	4.4E-03	1.16E+03	1.21E+01	1.15E+01	1.55E+01	2.21E+00	1.47E+01	3.00E-04

Variables	Units	Exposure Assumptions	Source
Kg(VOC) = gas-film mass transfer coefficient	cm/hr	Solved by Eq 1	NA
Kl(VOC) = liquid-film mass transfer coefficient	cm/hr	Solved by Eq 2	NA
KL = overall mass transfer coefficient	cm/hr	Solved by Eq 3	NA
Kal = adjusted overall mass transfer coeff.	cm/hr	Solved by Eq 4	NA
Tl = Calibration temp. of water	K (20C +273)	293	F&C
Ts = Shower water temperature	k (45C)	318	F&C
Us = water viscosity at Ts	centipoise	0.596	F&C
Ul = water viscosity at Tl	cp	1.002	F&C
Cwd = conc. leaving droplets after time sdt	ug/l	Solved by Eq 5	NA
sdt = shower droplet drop time	sec	2	F&C
d = shower droplet diameter	mm	1	F&C
FR = shower water flow rate	l/min	20	F&C
SV = shower room air volume	m^3	3	F&C
S = indoor VOC generation rate	ug/m^3-min	Solved by Eq 6	NA
VR = ventilation rate	l/min	13.8	JSEPA, 1991
BW = body weight	kg	70	JSEPA, 1991
Ds = duration of shower	min	12	JSEPA, 1989
Dt = total duration in shower room	min	15	
R = air exchange rate	min^{-1}	0.0083	F&C
Ca = indoor air concentration of VOCs	ug/m^3	Solved by Eq 7	NA
Einh = inhalation exposure per shower	mg/kg/shower	Solved by Eq 8	NA

Equation 1:	Kg(VOC) =	$3000 * (18 / HH)^{0.5}$
Equation 2:	Kl(VOC) =	$20 * (44 / HH)^{0.5}$
Equation 3:	KL =	$((1 / Kl(VOC)) + (0.024 / (Kg (VOC) * H)))^{-1}$
Equation 4:	Kal =	$(KL * (((Tl * Us) / (Ts * Ul))^{-0.5}))$
Equation 5:	Cwd =	(Cwo * (1-EXP((-1 * Kal * sdt)/(60 * d))))
Equation 6:	S =	(Cwd * FR / SV)
Equation 7:	see time series example on Table I-GW-5	
Equation 8:	**Einh =**	**If t>Ds** (((VR * S) / (BW * R * 1000000)) * ((Ds + (EXP(-R * Dt) / R)-(EXP(R * (Ds - Dt))) / R)))

Henry's Law Constant from USEPA's *Superfund Public Health Evaluation Manual.* USEPA/540/1-86/060, October 1986.

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual. Interim Final. OSWER Directive 9285.6-03.

USEPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

F&C. Foster, S. A. and P. C. Chrostowski. 1987. Inhalation Exposures to Volatile Organic Contaminants in the Shower. ICF-Clement Associates, Inc. Washington, D.C.

Table L-7.8
Calculation of Non-Cancer Hazards - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage Features and Tributary to Blows Creek
Receptor Population: Trespasser
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	Arsenic	12.6	ug/l	12.6	ug/l	M	1.3E-07	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.0004
	Iron	46900	ug/l	46900	ug/l	M	4.8E-04	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.008
	Manganese	7590	ug/l	7590	ug/l	M	7.7E-05	mg/kg/day	7.0E-03	mg/kg/day	NA	NA	0.01
												Total	0.02
												Total Hazard Index Across All Exposure Routes/Pathways	0.02

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table L-7.8 RME Supplement
Calculation of Daevent, Adult and Adolescent Trespasser
Drainage Features and Tributary to Blows Creek
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC)	Lag Time (t)	B (dimensionless)	Duration of Event (ET)	t*	Eq	DAevent
Arsenic	1.3E+01	µg/l	1.0E-03	N/A	N/A	1	N/A	1	1.3E-08
Iron	4.7E+04	µg/l	1.0E-03	N/A	N/A	1	N/A	1	4.7E-05
Manganese	7.6E+03	µg/l	1.0E-03	N/A	N/A	1	N/A	1	7.6E-06

Inorganics: DAevent (mg/cm2-event) =
PC x EPC x ET x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
ET<t*: DAevent (mg/cm2-event) =
2 x PC x EPC x (sqrt((6 x t x ET)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:
Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

Table L-7.9
Calculation of Non-Cancer Hazards - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage Features and Tributary to Blows Creek
Receptor Population: Trespasser
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	Arsenic	12.6	ug/l	12.6	ug/l	M	1.3E-07	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.0004
	Iron	46900	ug/l	46900	ug/l	M	4.8E-04	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.008
	Manganese	7590	ug/l	7590	ug/l	M	7.7E-05	mg/kg/day	7.0E-03	mg/kg/day	NA	NA	0.01
												Total	0.02
												Total Hazard Index Across All Exposure Routes/Pathways	0.02

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table L-7.10
Calculation of Non-Cancer Hazards - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 5
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	4,4'-DDT	0.86	mg/kg	0.86	mg/kg	M	1.2E-06	mg/kg/day	5.0E-04	mg/kg/day	NA	NA	0.002
	4,4'-DDE	2.3	mg/kg	2.3	mg/kg	M	3.2E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(a)Pyrene	0.28	mg/kg	0.28	mg/kg	M	3.8E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(b)Fluoranthene	0.54	mg/kg	0.54	mg/kg	M	7.3E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Dibenz(a,h)Anthracene	0.26	mg/kg	0.26	mg/kg	M	3.6E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Total Dioxins	0.000017	mg/kg	0.000017	mg/kg	M	2.3E-11	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Aluminum	12,026	mg/kg	12,026	mg/kg	M	1.6E-02	mg/kg/day	1.0E+00	mg/kg/day	NA	NA	0.02
	Antimony	3.04	mg/kg	3.04	mg/kg	M	4.2E-06	mg/kg/day	4.0E-04	mg/kg/day	NA	NA	0.01
	Arsenic	35.0	mg/kg	35.0	mg/kg	M	4.8E-05	mg/kg/day	3.0E-04	mg/kg/day	NA	NA	0.2
	Barium	1,327	mg/kg	1,327	mg/kg	M	1.8E-03	mg/kg/day	7.0E-02	mg/kg/day	NA	NA	0.03
	Cadmium	2.13	mg/kg	2.13	mg/kg	M	2.9E-06	mg/kg/day	1.0E-03	mg/kg/day	NA	NA	0.003
	Chromium	79.1	mg/kg	79.1	mg/kg	M	1.1E-04	mg/kg/day	3.0E-03	mg/kg/day	NA	NA	0.04
	Copper	488	mg/kg	488	mg/kg	M	6.7E-04	mg/kg/day	3.7E-02	mg/kg/day	NA	NA	0.02
	Iron	38,159	mg/kg	38,159	mg/kg	M	5.2E-02	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	0.2
	Manganese	298	mg/kg	298	mg/kg	M	4.1E-04	mg/kg/day	2.0E-02	mg/kg/day	NA	NA	0.02
	Thallium	1.15	mg/kg	1.15	mg/kg	M	1.6E-06	mg/kg/day	7.0E-05	mg/kg/day	NA	NA	0.02
	Vanadium	36.5	mg/kg	36.5	mg/kg	M	5.0E-05	mg/kg/day	7.0E-03	mg/kg/day	NA	NA	0.01
	Zinc	1,064	mg/kg	1,064	mg/kg	M	1.5E-03	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	0.005
												Total	0.5
Dermal	4,4'-DDT	0.86	mg/kg	0.86	mg/kg	M	1.1E-06	mg/kg/day	4.5E-04	mg/kg/day	NA	NA	0.002
	4,4'-DDE	2.3	mg/kg	2.3	mg/kg	M	3.0E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(a)Pyrene	0.28	mg/kg	0.28	mg/kg	M	3.6E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(b)Fluoranthene	0.54	mg/kg	0.54	mg/kg	M	7.0E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Dibenz(a,h)Anthracene	0.26	mg/kg	0.26	mg/kg	M	3.4E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Total Dioxins	0.000017	mg/kg	0.000017	mg/kg	M	6.5E-12	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Aluminum	12,026	mg/kg	12,026	mg/kg	M	1.6E-03	mg/kg/day	2.7E-01	mg/kg/day	NA	NA	0.006
	Antimony	3.04	mg/kg	3.04	mg/kg	M	4.0E-07	mg/kg/day	4.0E-05	mg/kg/day	NA	NA	0.01
	Arsenic	35.0	mg/kg	35.0	mg/kg	M	1.5E-05	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.05
	Barium	1,327	mg/kg	1,327	mg/kg	M	1.7E-04	mg/kg/day	7.0E-02	mg/kg/day	NA	NA	0.002
	Cadmium	2.13	mg/kg	2.13	mg/kg	M	2.8E-07	mg/kg/day	2.5E-05	mg/kg/day	NA	NA	0.01
	Chromium	79.1	mg/kg	79.1	mg/kg	M	1.0E-05	mg/kg/day	3.0E-05	mg/kg/day	NA	NA	0.3
	Copper	488	mg/kg	488	mg/kg	M	6.4E-05	mg/kg/day	2.2E-02	mg/kg/day	NA	NA	0.003
	Iron	38,159	mg/kg	38,159	mg/kg	M	5.0E-03	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.08
	Manganese	298	mg/kg	298	mg/kg	M	3.9E-05	mg/kg/day	7.0E-03	mg/kg/day	NA	NA	0.006
	Thallium	1.15	mg/kg	1.15	mg/kg	M	1.5E-07	mg/kg/day	7.0E-05	mg/kg/day	NA	NA	0.002
	Vanadium	36.5	mg/kg	36.5	mg/kg	M	4.7E-06	mg/kg/day	1.4E-04	mg/kg/day	NA	NA	0.03
	Zinc	1,064	mg/kg	1,064	mg/kg	M	1.4E-04	mg/kg/day	7.5E-02	mg/kg/day	NA	NA	0.002
												Total	0.6
												Total Hazard Index Across All Exposure Routes/Pathways	1

*Surface and subsurface soil combined.

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table L-7.11
Calculation of Non-Cancer Hazards - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 5
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	4,4'-DDT	0.86	mg/kg	0.86	mg/kg	M	1.1E-05	mg/kg/day	5.0E-04	mg/kg/day	NA	NA	0.02
	4,4'-DDE	2.3	mg/kg	2.3	mg/kg	M	3.0E-05	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(a)Pyrene	0.28	mg/kg	0.28	mg/kg	M	3.5E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(b)Fluoranthene	0.54	mg/kg	0.54	mg/kg	M	6.8E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Dibenz(a,h)Anthracene	0.26	mg/kg	0.26	mg/kg	M	3.3E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Total Dioxins	0.000017	mg/kg	0.000017	mg/kg	M	2.1E-10	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Aluminum	12,026	mg/kg	12,026	mg/kg	M	1.5E-01	mg/kg/day	1.0E+00	mg/kg/day	NA	NA	0.2
	Antimony	3.04	mg/kg	3.04	mg/kg	M	3.9E-05	mg/kg/day	4.0E-04	mg/kg/day	NA	NA	0.1
	Arsenic	35.0	mg/kg	35.0	mg/kg	M	4.5E-04	mg/kg/day	3.0E-04	mg/kg/day	NA	NA	1.5
	Barium	1,327	mg/kg	1,327	mg/kg	M	1.7E-02	mg/kg/day	7.0E-02	mg/kg/day	NA	NA	0.2
	Cadmium	2.13	mg/kg	2.13	mg/kg	M	2.7E-05	mg/kg/day	1.0E-03	mg/kg/day	NA	NA	0.03
	Chromium	79.1	mg/kg	79.1	mg/kg	M	1.0E-03	mg/kg/day	2.0E-02	mg/kg/day	NA	NA	0.05
	Copper	488	mg/kg	488	mg/kg	M	6.2E-03	mg/kg/day	3.7E-02	mg/kg/day	NA	NA	0.2
	Iron	38,159	mg/kg	38,159	mg/kg	M	4.9E-01	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	2
	Manganese	298	mg/kg	298	mg/kg	M	3.8E-03	mg/kg/day	2.0E-02	mg/kg/day	NA	NA	0.2
	Thallium	1.15	mg/kg	1.15	mg/kg	M	1.5E-05	mg/kg/day	7.0E-05	mg/kg/day	NA	NA	0.2
	Vanadium	36.5	mg/kg	36.5	mg/kg	M	4.7E-04	mg/kg/day	7.0E-03	mg/kg/day	NA	NA	0.1
	Zinc	1,064	mg/kg	1,064	mg/kg	M	1.4E-02	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	0.05
												Total	4.4
Dermal	4,4'-DDT	0.86	mg/kg	0.86	mg/kg	M	2.2E-06	mg/kg/day	4.5E-04	mg/kg/day	NA	NA	0.005
	4,4'-DDE	2.3	mg/kg	2.3	mg/kg	M	5.9E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(a)Pyrene	0.28	mg/kg	0.28	mg/kg	M	7.0E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(b)Fluoranthene	0.54	mg/kg	0.54	mg/kg	M	1.4E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Dibenz(a,h)Anthracene	0.26	mg/kg	0.26	mg/kg	M	6.6E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Total Dioxins	0.000017	mg/kg	0.000017	mg/kg	M	1.3E-11	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Aluminum	12,026	mg/kg	12,026	mg/kg	M	3.0E-03	mg/kg/day	2.7E-01	mg/kg/day	NA	NA	0.01
	Antimony	3.04	mg/kg	3.04	mg/kg	M	7.7E-07	mg/kg/day	4.0E-05	mg/kg/day	NA	NA	0.02
	Arsenic	35.0	mg/kg	35.0	mg/kg	M	2.8E-05	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.10
	Barium	1,327	mg/kg	1,327	mg/kg	M	3.4E-04	mg/kg/day	7.0E-02	mg/kg/day	NA	NA	0.005
	Cadmium	2.13	mg/kg	2.13	mg/kg	M	5.4E-07	mg/kg/day	2.5E-05	mg/kg/day	NA	NA	0.02
	Chromium	79.1	mg/kg	79.1	mg/kg	M	2.0E-05	mg/kg/day	2.0E-04	mg/kg/day	NA	NA	0.1
	Copper	488	mg/kg	488	mg/kg	M	1.2E-04	mg/kg/day	2.2E-02	mg/kg/day	NA	NA	0.006
	Iron	38,159	mg/kg	38,159	mg/kg	M	9.7E-03	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.2
	Manganese	298	mg/kg	298	mg/kg	M	7.5E-05	mg/kg/day	7.0E-03	mg/kg/day	NA	NA	0.01
	Thallium	1.15	mg/kg	1.15	mg/kg	M	2.9E-07	mg/kg/day	7.0E-05	mg/kg/day	NA	NA	0.004
	Vanadium	36.5	mg/kg	36.5	mg/kg	M	9.2E-06	mg/kg/day	1.4E-04	mg/kg/day	NA	NA	0.1
	Zinc	1,064	mg/kg	1,064	mg/kg	M	2.7E-04	mg/kg/day	7.5E-02	mg/kg/day	NA	NA	0.004
												Total	0.5
												Total Hazard Index Across All Exposure Routes/Pathways	5

*Surface and subsurface soil combined.

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table L-7.12
Calculation of Non-Cancer Hazards - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 5
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Arsenic	35.0	mg/kg	35.0	mg/kg	M	1.6E-04	mg/kg/day	3.0E-04	mg/kg/day	NA	NA	0.5
	Chromium	79.1	mg/kg	79.1	mg/kg	M	3.7E-04	mg/kg/day	2.0E-02	mg/kg/day	NA	NA	0.02
	Iron	38159	mg/kg	38159	mg/kg	M	1.8E-01	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	0.6
												Total	1.2
Dermal	Arsenic	35.0	mg/kg	35.0	mg/kg	M	1.3E-05	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.05
	Chromium	79.1	mg/kg	79.1	mg/kg	M	9.3E-06	mg/kg/day	2.0E-04	mg/kg/day	NA	NA	0.05
	Iron	38159	mg/kg	38159	mg/kg	M	4.5E-03	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.07
												Total	0.2
												Total Hazard Index Across All Exposure Routes/Pathways	1

*Surface and subsurface soil combined.

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table L-7.13
Calculation of Non-Cancer Hazards - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 5
Receptor Population: Other Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Arsenic	35.0	mg/kg	35.0	mg/kg	M	1.7E-05	mg/kg/day	3.0E-04	mg/kg/day	NA	NA	0.06
	Chromium	79.1	mg/kg	79.1	mg/kg	M	3.9E-05	mg/kg/day	3.0E-03	mg/kg/day	NA	NA	0.01
	Iron	38159	mg/kg	38159	mg/kg	M	1.9E-02	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	0.06
												Total	0.1
Dermal	Arsenic	35.0	mg/kg	35.0	mg/kg	M	3.9E-06	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.01
	Chromium	79.1	mg/kg	79.1	mg/kg	M	2.7E-06	mg/kg/day	3.0E-05	mg/kg/day	NA	NA	0.1
	Iron	38159	mg/kg	38159	mg/kg	M	1.3E-03	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.02
												Total	0.1
												Total Hazard Index Across All Exposure Routes/Pathways	0.3

*Surface and subsurface soil combined.

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table L-7.14
Calculation of Non-Cancer Hazards - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Air
Exposure Point: Emissions from Soil at Site 5
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value (1)	Route EPC Units	EPC Selected for Hazard Calculation (2)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Arsenic	35.0	mg/kg	0.00000003	mg/m^3	R	5.2E-09	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Chromium	79.1	mg/kg	0.00000006	mg/m^3	R	1.2E-08	mg/kg/day	2.9E-04	mg/kg/day	1.0E-03	mg/m3	0.00004
	Iron	38159	mg/kg	0.00003	mg/m^3	R	5.6E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
												Total	0.00004
												Total Hazard Index Across All Exposure Routes/Pathways	0.00004

*Surface and subsurface soil combined.

(1) Route-specific EPC value is equal to the medium EPC value multilplied by 1/PEF (PEF = 1.32E+09mg3/kg).

(2) Route-Specific (R) EPC selected for hazard calculation.

Table L-7.15
Calculation of Non-Cancer Hazards - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage Features and Tributary to Blows Creek
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	Arsenic	12.6	ug/l	12.6	ug/l	M	2.6E-07	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.0009
	Iron	46900	ug/l	46900	ug/l	M	9.5E-04	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.02
	Manganese	7590	ug/l	7590	ug/l	M	1.5E-04	mg/kg/day	7.0E-03	mg/kg/day	NA	NA	0.02
												Total	0.04
												Total Hazard Index Across All Exposure Routes/Pathways	0.04

(1) Medium-Specific (M) EPC selected for hazard calculation.
Dermally absorbed dose per exposure event calculated in Table 7.15 RME Supplement

Table L-7.15 RME Supplement
Calculation of Daevent, Adult and Child Resident
Drainage Features and Tributary to Blows Creek
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC)	Lag Time (t)	B (dimensionless)	Duration of Event (ET)	t*	Eq	DAevent
Arsenic	1.3E+01	µg/l	1.0E-03	N/A	N/A	2	N/A	1	2.5E-08
Iron	4.7E+04	µg/l	1.0E-03	N/A	N/A	2	N/A	1	9.4E-05
Manganese	7.6E+03	µg/l	1.0E-03	N/A	N/A	2	N/A	1	1.5E-05

Inorganics: DAevent (mg/cm2-event) =
PC x EPC x ET x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
ET<t*: DAevent (mg/cm2-event) =
2 x PC x EPC x (sqrt((6 x t x ET)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:
Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

Table L-7.16
Calculation of Non-Cancer Hazards - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage Features and Tributary to Blows Creek
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	Arsenic	12.6	ug/l	12.6	ug/l	M	8.6E-07	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.003
	Iron	46900	ug/l	46900	ug/l	M	3.2E-03	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.05
	Manganese	7590	ug/l	7590	ug/l	M	5.2E-04	mg/kg/day	7.0E-03	mg/kg/day	NA	NA	0.07
												Total	0.1
												Total Hazard Index Across All Exposure Routes/Pathways	0.1

(1) Medium-Specific (M) EPC selected for hazard calculation.
Dermally absorbed dose per exposure event calculated in Table 7.15 RME Supplement

Table L-7.17
Calculation of Non-Cancer Hazards - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage Features and Tributary to Blows Creek
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Arsenic	17.8	mg/kg	17.8	mg/kg	M	3.6E-06	mg/kg/day	3.0E-04	mg/kg/day	NA	NA	0.01
	Iron	98611	mg/kg	98611	mg/kg	M	2.0E-02	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	0.1
	Thallium	5.7	mg/kg	5.7	mg/kg	M	1.2E-06	mg/kg/day	7.0E-05	mg/kg/day	NA	NA	0.02
												Total	0.1
Dermal	Arsenic	17.8	mg/kg	17.8	mg/kg	M	1.1E-06	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.004
	Iron	98611	mg/kg	98611	mg/kg	M	1.9E-03	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.03
	Thallium	5.7	mg/kg	5.7	mg/kg	M	1.1E-07	mg/kg/day	7.0E-05	mg/kg/day	NA	NA	0.002
												Total	0.04
												Total Hazard Index Across All Exposure Routes/Pathways	0.1

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table L-7.18
Calculation of Non-Cancer Hazards - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage Features and Tributary to Blows Creek
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Arsenic	17.8	mg/kg	17.8	mg/kg	M	3.4E-05	mg/kg/day	3.0E-04	mg/kg/day	NA	NA	0.1
	Iron	98611	mg/kg	98611	mg/kg	M	1.9E-01	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	0.6
	Thallium	5.7	mg/kg	5.7	mg/kg	M	1.1E-05	mg/kg/day	7.0E-05	mg/kg/day	NA	NA	0.2
												Total	1
Dermal	Arsenic	17.8	mg/kg	17.8	mg/kg	M	1.3E-04	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.5
	Iron	98611	mg/kg	98611	mg/kg	M	2.3E-01	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	4
	Thallium	5.7	mg/kg	5.7	mg/kg	M	1.3E-05	mg/kg/day	7.0E-05	mg/kg/day	NA	NA	0.2
												Total	4
												Total Hazard Index Across All Exposure Routes/Pathways	5

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table L-7.19
Calculation of Non-Cancer Hazards - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Shallow Groundwater
Exposure Point: Water Table
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	Aluminum	87400	ug/l	87400	ug/l	M	2.1E-03	mg/kg/day	2.7E-01	mg/kg/day	NA	NA	0.008
	Antimony	2.38	ug/l	2.4	ug/l	M	5.9E-08	mg/kg/day	4.0E-05	mg/kg/day	NA	NA	0.001
	Arsenic	16.3	ug/l	16.3	ug/l	M	4.0E-07	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.001
	Barium	359	ug/l	359	ug/l	M	8.8E-06	mg/kg/day	7.0E-02	mg/kg/day	NA	NA	0.0001
	Beryllium	18.3	ug/l	18.3	ug/l	M	4.5E-07	mg/kg/day	5.0E-05	mg/kg/day	NA	NA	0.009
	Cadmium	11	ug/l	11	ug/l	M	2.7E-07	mg/kg/day	2.5E-05	mg/kg/day	NA	NA	0.01
	Chromium	42	ug/l	42	ug/l	M	1.0E-06	mg/kg/day	2.0E-04	mg/kg/day	NA	NA	0.005
	Cobalt	257	ug/l	257	ug/l	M	6.3E-06	mg/kg/day	1.8E-02	mg/kg/day	NA	NA	0.0004
	Iron	76564	ug/l	76564	ug/l	M	1.9E-03	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.03
	Manganese	3282	ug/l	3282	ug/l	M	8.1E-05	mg/kg/day	7.0E-03	mg/kg/day	NA	NA	0.01
	Nickel	360	ug/l	360	ug/l	M	8.9E-06	mg/kg/day	2.0E-04	mg/kg/day	NA	NA	0.04
	Thallium	2.1	ug/l	2.1	ug/l	M	5.2E-08	mg/kg/day	7.0E-05	mg/kg/day	NA	NA	0.0007
	Vanadium	83	ug/l	83	ug/l	M	2.0E-06	mg/kg/day	1.4E-04	mg/kg/day	NA	NA	0.01
	Zinc	2020	ug/l	2020	ug/l	M	5.0E-05	mg/kg/day	7.5E-02	mg/kg/day	NA	NA	0.0007
												Total	0.1
												Total Hazard Index Across All Exposure Routes/Pathways	0.1

(1) Medium-Specific (M) EPC selected for hazard calculation.
Dermally absorbed dose per exposure event calculated in Table 7.19 RME Supplement A

Table L-7.19 RME Supplement A
Calculation of Daevent, Adult Construction Worker
Shallow Groundwater
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC)	Lag Time (t)	B (dimensionless)	Duration of Event (ET)	t*	Eq	DAevent
Aluminum	8.7E+04	µg/l	1.0E-03	N/A	N/A	2	N/A	1	1.7E-04
Antimony	2.4E+00	µg/l	1.0E-03	N/A	N/A	2	N/A	1	4.8E-09
Arsenic	1.6E+01	µg/l	1.0E-03	N/A	N/A	2	N/A	1	3.3E-08
Barium	3.6E+02	µg/l	1.0E-03	N/A	N/A	2	N/A	1	7.2E-07
Beryllium	1.8E+01	µg/l	1.0E-03	N/A	N/A	2	N/A	1	3.7E-08
Cadmium	1.1E+01	µg/l	1.0E-03	N/A	N/A	2	N/A	1	2.2E-08
Chromium	4.2E+01	µg/l	1.0E-03	N/A	N/A	2	N/A	1	8.4E-08
Cobalt	2.6E+02	µg/l	1.0E-03	N/A	N/A	2	N/A	1	5.1E-07
Iron	7.7E+04	µg/l	1.0E-03	N/A	N/A	2	N/A	1	1.5E-04
Manganese	3.3E+03	µg/l	1.0E-03	N/A	N/A	2	N/A	1	6.6E-06
Nickel	3.6E+02	µg/l	1.0E-03	N/A	N/A	2	N/A	1	7.2E-07
Thallium	2.1E+00	µg/l	1.0E-03	N/A	N/A	2	N/A	1	4.2E-09
Vanadium	8.3E+01	µg/l	1.0E-03	N/A	N/A	2	N/A	1	1.7E-07
Zinc	2.0E+03	µg/l	1.0E-03	N/A	N/A	2	N/A	1	4.0E-06

Inorganics: DAevent (mg/cm2-event) =
PC x EPC x ET x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
ET<t*: DAevent (mg/cm2-event) =
2 x PC x EPC x (sqrt((6 x t x ET)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:
Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

Table L-7.20
Calculation of Non-Cancer Hazards - CT
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Deep Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	RDX	1.4	ug/l	1.4	ug/l	M	5.2E-05	mg/kg/day	3.0E-03	mg/kg/day	NA	NA	0.02
	Heptachlor	0.03	ug/l	0.03	ug/l	M	1.1E-06	mg/kg/day	5.0E-04	mg/kg/day	NA	NA	0.002
	Chloroform	0.84	ug/l	0.84	ug/l	M	3.1E-05	mg/kg/day	1.0E-02	mg/kg/day	NA	NA	0.003
	Antimony	1.54	ug/l	1.54	ug/l	M	5.7E-05	mg/kg/day	4.0E-04	mg/kg/day	NA	NA	0.1
	Arsenic	1.86	ug/l	1.86	ug/l	M	6.9E-05	mg/kg/day	3.0E-04	mg/kg/day	NA	NA	0.2
	Iron	652	ug/l	652	ug/l	M	2.4E-02	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	0.08
	Manganese	101	ug/l	101	ug/l	M	3.8E-03	mg/kg/day	2.0E-02	mg/kg/day	NA	NA	0.2
												Total	0.7
Dermal	RDX	1.4	ug/l	1.4	ug/l	M	2.9E-07	mg/kg/day	1.5E-03	mg/kg/day	NA	NA	0.0002
	Heptachlor	0.03	ug/l	0.03	ug/l	M	5.8E-07	mg/kg/day	2.5E-04	mg/kg/day	NA	NA	0.00231
	Chloroform	0.84	ug/l	0.84	ug/l	M	2.2E-06	mg/kg/day	1.0E-02	mg/kg/day	NA	NA	0.00022
	Antimony	1.54	ug/l	1.54	ug/l	M	1.2E-07	mg/kg/day	4.0E-05	mg/kg/day	NA	NA	0.003
	Arsenic	1.86	ug/l	1.86	ug/l	M	1.4E-07	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.0005
	Iron	652	ug/l	652	ug/l	M	5.0E-05	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.001
	Manganese	101	ug/l	101	ug/l	M	7.8E-06	mg/kg/day	7.0E-03	mg/kg/day	NA	NA	0.001
												Total	0.01
												Total Hazard Index Across All Exposure Routes/Pathways	0.7

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table L-7.20 CT Supplement
Calculation of Daevent, Child Resident
Deep Groundwater -Tap Water
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC)	Lag Time (t)	B (dimensionless)	Duration of Event (ET)	t*	Eq	DAevent
RDX[1]	1.4E+00	µg/l	3.48E-04	1.98E+00	7.41E-04	0.25	4.8E+00	2	9.5E-10
Heptachlor	3.0E-02	µg/l	1.1E-02	1.70E+01	1.90E+00	0.25	9.40E+01	2	1.9E-09
Chloroform	8.4E-01	µg/l	8.9E-03	4.70E-01	9.3E-03	0.25	1.1E+00	2	7.1E-09
Antimony	1.5E+00	µg/l	1.0E-03	N/A	N/A	0.25	N/A	1	3.9E-10
Arsenic	1.9E+00	µg/l	1.0E-03	N/A	N/A	0.25	N/A	1	4.7E-10
Iron	6.5E+02	µg/l	1.0E-03	N/A	N/A	0.25	N/A	1	1.6E-07
Manganese	1.0E+02	µg/l	1.0E-03	N/A	N/A	0.25	N/A	1	2.5E-08

Inorganics: DAevent (mg/cm2-event) =
PC x EPC x ET x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
ET<t*: DAevent (mg/cm2-event) =
2 x PC x EPC x (sqrt((6 x t x ET)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:
1. Permeability constant and lag time calculated on Table 7.17b.RME Supplement.
Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

Table L-7.21
Calculation of Non-Cancer Hazards - CT
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Deep Groundwater - Water Vapors at Shower Head
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Chloroform	0.84	ug/l	3.0E-04	mg/kg-shower	R	1.9E-04	mg/kg/day	8.6E-05	mg/kg/day	3.0E-04	mg/m3	2.2
												Total	2.2
												Total Hazard Index Across All Exposure Routes/Pathways	2.2

(1) Route-Specific (R) EPC selected for hazard calculation.
Route EPC calculated using Foster and Chrostowski Shower Model (Table 7.7 RME Supplement)

Table L-7.22
Calculation of Non-Cancer Hazards - CT
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 5
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	4,4'-DDT	0.23	mg/kg	0.23	mg/kg	M	9.8E-07	mg/kg/day	5.0E-04	mg/kg/day	NA	NA	0.002
	4,4'-DDE	0.26	mg/kg	0.26	mg/kg	M	1.1E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(a)Pyrene	0.18	mg/kg	0.18	mg/kg	M	7.8E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(b)Fluoranthene	0.26	mg/kg	0.26	mg/kg	M	1.1E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Dibenz(a,h)Anthracene	0.25	mg/kg	0.25	mg/kg	M	1.1E-06	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Total Dioxins	0.0000058	mg/kg	0.0000058	mg/kg	M	2.5E-11	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Aluminum	10435	mg/kg	10435	mg/kg	M	4.5E-02	mg/kg/day	1.0E+00	mg/kg/day	NA	NA	0.04
	Antimony	2.0	mg/kg	2.0	mg/kg	M	8.6E-06	mg/kg/day	4.0E-04	mg/kg/day	NA	NA	0.02
	Arsenic	18.8	mg/kg	18.8	mg/kg	M	8.0E-05	mg/kg/day	3.0E-04	mg/kg/day	NA	NA	0.3
	Barium	103	mg/kg	103	mg/kg	M	4.4E-04	mg/kg/day	7.0E-02	mg/kg/day	NA	NA	0.01
	Cadmium	1.2	mg/kg	1.2	mg/kg	M	5.0E-06	mg/kg/day	1.0E-03	mg/kg/day	NA	NA	0.005
	Chromium	44.3	mg/kg	44.3	mg/kg	M	1.9E-04	mg/kg/day	2.0E-02	mg/kg/day	NA	NA	0.01
	Copper	224	mg/kg	224	mg/kg	M	9.6E-04	mg/kg/day	3.7E-02	mg/kg/day	NA	NA	0.03
	Iron	23543	mg/kg	23543	mg/kg	M	1.0E-01	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	0.3
	Manganese	180	mg/kg	180	mg/kg	M	7.7E-04	mg/kg/day	2.0E-02	mg/kg/day	NA	NA	0.04
	Thallium	1	mg/kg	1	mg/kg	M	3.7E-06	mg/kg/day	7.0E-05	mg/kg/day	NA	NA	0.05
	Vanadium	31.9	mg/kg	31.9	mg/kg	M	1.4E-04	mg/kg/day	7.0E-03	mg/kg/day	NA	NA	0.020
	Zinc	476	mg/kg	476	mg/kg	M	2.0E-03	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	0.007
												Total	0.8
Dermal	4,4'-DDT	0.23	mg/kg	0.23	mg/kg	M	9.3E-08	mg/kg/day	4.5E-04	mg/kg/day	NA	NA	0.0002
	4,4'-DDE	0.26	mg/kg	0.26	mg/kg	M	1.0E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(a)Pyrene	0.18	mg/kg	0.18	mg/kg	M	7.4E-08	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Benzo(b)Fluoranthene	0.26	mg/kg	0.26	mg/kg	M	1.0E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Dibenz(a,h)Anthracene	0.25	mg/kg	0.25	mg/kg	M	1.0E-07	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Total Dioxins	0.0000058	mg/kg	0.0000058	mg/kg	M	7.1E-13	mg/kg/day	NA	mg/kg/day	NA	NA	NA
	Aluminum	10435	mg/kg	10435	mg/kg	M	4.2E-04	mg/kg/day	2.7E-01	mg/kg/day	NA	NA	0.002
	Antimony	2.0	mg/kg	2.0	mg/kg	M	8.2E-08	mg/kg/day	4.0E-05	mg/kg/day	NA	NA	0.002
	Arsenic	18.8	mg/kg	18.8	mg/kg	M	2.4E-06	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.009
	Barium	103	mg/kg	103	mg/kg	M	4.2E-06	mg/kg/day	7.0E-02	mg/kg/day	NA	NA	0.0001
	Cadmium	1.2	mg/kg	1.2	mg/kg	M	4.8E-08	mg/kg/day	2.5E-05	mg/kg/day	NA	NA	0.002
	Chromium	44.3	mg/kg	44.3	mg/kg	M	1.8E-06	mg/kg/day	2.0E-04	mg/kg/day	NA	NA	0.01
	Copper	224	mg/kg	224	mg/kg	M	9.1E-06	mg/kg/day	2.2E-02	mg/kg/day	NA	NA	0.0004
	Iron	23543	mg/kg	23543	mg/kg	M	9.6E-04	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.02
	Manganese	180	mg/kg	180	mg/kg	M	7.3E-06	mg/kg/day	7.0E-03	mg/kg/day	NA	NA	0.001
	Thallium	1	mg/kg	1	mg/kg	M	3.5E-08	mg/kg/day	7.0E-05	mg/kg/day	NA	NA	0.0005
	Vanadium	31.9	mg/kg	31.9	mg/kg	M	1.3E-06	mg/kg/day	1.4E-04	mg/kg/day	NA	NA	0.009
	Zinc	476	mg/kg	476	mg/kg	M	1.9E-05	mg/kg/day	7.5E-02	mg/kg/day	NA	NA	0.0003
												Total	0.05
												Total Hazard Index Across All Exposure Routes/Pathways	0.9

*Surface and subsurface soil combined.

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table L-7.23
Calculation of Non-Cancer Hazards - CT
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage Features and Tributary to Blows Creek
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Arsenic	10.5	mg/kg	10.5	mg/kg	M	5.0E-06	mg/kg/day	3.0E-04	mg/kg/day	NA	NA	0.02
	Iron	51320	mg/kg	51320	mg/kg	M	2.4E-02	mg/kg/day	3.0E-01	mg/kg/day	NA	NA	0.08
	Thallium	0.8	mg/kg	0.8	mg/kg	M	3.7E-07	mg/kg/day	7.0E-05	mg/kg/day	NA	NA	0.005
													0.1
Dermal	Arsenic	10.5	mg/kg	10.5	mg/kg	M	9.2E-06	mg/kg/day	2.9E-04	mg/kg/day	NA	NA	0.03
	Iron	51320	mg/kg	51320	mg/kg	M	1.4E-02	mg/kg/day	6.0E-02	mg/kg/day	NA	NA	0.2
	Thallium	0.8	mg/kg	0.8	mg/kg	M	2.2E-07	mg/kg/day	7.0E-05	mg/kg/day	NA	NA	0.003
												Total	0.3
												Total Hazard Index Across All Exposure Routes/Pathways	0.4

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table L-8.1
Calculation of Cancer Risks - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: At Site 5
Receptor Population: Trespasser
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Arsenic	37	mg/kg	37	mg/kg	M	3E-06	1/mg/kg/day	2E+00	1/mg/kg/day	5E-06
	Chromium	109	mg/kg	109	mg/kg	M	1E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Iron	31527	mg/kg	31527	mg/kg	M	3E-03	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	5E-06
Dermal	Arsenic	37	mg/kg	37	mg/kg	M	1E-06	1/mg/kg/day	2E+00	1/mg/kg/day	2E-06
	Chromium	109	mg/kg	109	mg/kg	M	9E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Iron	31527	mg/kg	31527	mg/kg	M	3E-03	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	2E-06
										Total Risk Across All Exposure Routes/Pathways	6E-06

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table L-8.2
Calculation of Cancer Risks - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: At Site 5
Receptor Population: Trespasser
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Arsenic	37	mg/kg	37	mg/kg	M	8.2E-07	1/mg/kg/day	1.5E+00	1/mg/kg/day	1E-06
	Chromium	109	mg/kg	109	mg/kg	M	2E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Iron	31527	mg/kg	31527	mg/kg	M	7E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	1E-06
Dermal	Arsenic	37	mg/kg	37	mg/kg	M	1E-07	1/mg/kg/day	2E+00	1/mg/kg/day	2E-07
	Chromium	109	mg/kg	109	mg/kg	M	1E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Iron	31527	mg/kg	31527	mg/kg	M	3E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	2E-07
										Total Risk Across All Exposure Routes/Pathways	1E-06

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table L-8.3
Calculation of Cancer Risks - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from Surface Soil at Site 5
Receptor Population: Trespasser
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value (1)	Route EPC Units	EPC Selected for Hazard Calculation (2)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Arsenic	37	mg/kg	0.00000003	mg/m^3	R	4E-11	1/mg/kg/day	2E+01	1/mg/kg/day	6E-10
	Chromium	109	mg/kg	0.00000008	mg/m^3	R	1E-10	1/mg/kg/day	4E+01	1/mg/kg/day	5E-09
	Iron	31527	mg/kg	0.00002	mg/m^3	R	3E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	5E-09
										Total Risk Across All Exposure Routes/Pathways	5E-09

(1) Route-specific EPC value is equal to the medium EPC value multilplied by 1/PEF (PEF = 1.32E+09mg3/kg).
(2) Route-Specific (R) EPC selected for hazard calculation.

Table L-8.4
Calculation of Cancer Risks - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Emissions from Surface Soil at Site 5
Receptor Population: Trespasser
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value(1)	Route EPC Units	EPC Selected for Hazard Calculation (2)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Arsenic	37	mg/kg	0.00000003	mg/m^3	R	9E-12	1/mg/kg/day	2E+01	1/mg/kg/day	1E-10
	Chromium	109	mg/kg	0.00000008	mg/m^3	R	3E-11	1/mg/kg/day	4E+01	1/mg/kg/day	1E-09
	Iron	31527	mg/kg	0.00002	mg/m^3	R	7E-09	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	1E-09
										Total Risk Across All Exposure Routes/Pathways	1E-09

(1) Route-specific EPC value is equal to the medium EPC value multilplied by 1/PEF (PEF = 1.32E+09mg3/kg).
(2) Route-Specific (R) EPC selected for hazard calculation.

Table L-8.5
Calculation of Cancer Risks - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Deep Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	RDX	1.79	ug/l	1.79	ug/l	M	3E-05	1/mg/kg/day	1E-01	1/mg/kg/day	3E-06
	Heptachlor	0.03	ug/l	0.03	ug/l	M	4E-07	1/mg/kg/day	5E+00	1/mg/kg/day	2E-06
	Chloroform	5.47	ug/l	5.47	ug/l	M	8E-05	1/mg/kg/day	6E-03	1/mg/kg/day	5E-07
	Antimony	3.20	ug/l	3.2	ug/l	M	5E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	3.62	ug/l	3.62	ug/l	M	5E-05	1/mg/kg/day	2E+00	1/mg/kg/day	8E-05
	Iron	4420	ug/l	4420	ug/l	M	7E-02	1/mg/kg/day	NA	1/mg/kg/day	NA
	Manganese	192	ug/l	192	ug/l	M	3E-03	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	9E-05
Dermal	RDX	1.79	ug/l	1.79	ug/l	M	2E-07	1/mg/kg/day	2E-01	1/mg/kg/day	4E-08
	Heptachlor	0.03	ug/l	0.03	ug/l	M	3E-07	1/mg/kg/day	9E+00	1/mg/kg/day	2E-06
	Chloroform	5.47	ug/l	5.47	ug/l	M	6E-06	1/mg/kg/day	6E-03	1/mg/kg/day	4E-08
	Antimony	3.20	ug/l	3.2	ug/l	M	1E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	3.62	ug/l	3.62	ug/l	M	1E-07	1/mg/kg/day	2E+00	1/mg/kg/day	2E-07
	Iron	4420	ug/l	4420	ug/l	M	2E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
	Manganese	192	ug/l	192	ug/l	M	7E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	3E-06
										Total Risk Across All Exposure Routes/Pathways	9E-05

(1) Medium-Specific (M) EPC selected for risk calculation.

Table L-8.5a RME Supplement
Calculation of Daevent, Adult Resident
Deep Groundwater - Tap Water
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC)	Lag Time (t)	B (dimensionless)	Duration of Event Adult (ETa)	Duration of Event Child (ETc)	t*	Eq	DAevent Adult	DAevent Child
RDX[1]	1.8E+00	µg/l	3.48E-04	1.98E+00	0.00E+00	0.25	0.33	0.0E+00	3	1.2E-09	1.4E-09
Heptachlor	3.0E-02	µg/l	1.1E-02	1.70E+01	1.90E+00	0.25	0.33	9.40E+01	2	1.9E-09	2.2E-09
Chloroform	5.5E+00	µg/l	8.9E-03	4.70E-01	9.3E-03	0.25	0.33	1.1E+00	2	4.6E-08	5.3E-08
Antimony	3.2E+00	µg/l	1.0E-03	N/A	N/A	0.25	0.33	N/A	1	8.0E-10	1.1E-09
Arsenic	3.6E+00	µg/l	1.0E-03	N/A	N/A	0.25	0.33	N/A	1	9.1E-10	1.2E-09
Iron	4.4E+03	µg/l	1.0E-03	N/A	N/A	0.25	0.33	N/A	1	1.1E-06	1.5E-06
Manganese	1.9E+02	µg/l	1.0E-03	N/A	N/A	0.25	0.33	N/A	1	4.8E-08	6.3E-08

Inorganics: DAevent (mg/cm2-event) =
PC x EPC x ET x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
ET<t*: DAevent (mg/cm2-event) =
2 x PC x EPC x (sqrt((6 x t x ET)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:
1. Permeability constant and lag time calculated on Table 8.5b.RME Supplement.
Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

Table L-8.5b RME Supplement
Calculation of Daevent
Deep Groundwater
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical	MW	log Kow	Kow	log Kp[1]	Kp (cm/hr)	B[1]	log Dsc/lsc[1]	lsc (cm)	log Dsc[1]	Dsc (cm^2/hr)	Tau[1] (hr)	c[1]	b[1]	T*[1] (hr)
RDX	222.26	0.87	7.41E+00	-3.46E+00	3.48E-04	7.41E-04	-4.08E+00	1.00E-03	-7.08E+00	8.40E-08	1.98E+00	3.34E-01	3.03E-01	4.76E+00

1. Equations from *Dermal Exposure Assessment: Principles and Applications*. EPA/600/8-91/011B. January 1992.

Table L-8.6
Calculation of Cancer Risks - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Deep Groundwater - Water Vapors at Shower Head
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Chloroform	5.5	ug/l	3.0E-04	mg/kg-shower	R	1E-04	1/mg/kg/day	8E-02	1/mg/kg/day	8E-06
										Total	8E-06
										Total Risk Across All Exposure Routes/Pathways	8E-06

(1) Route-Specific (R) EPC selected for risk calculation.
Route EPC calculated using Foster and Chrostowski Shower Model (Table 8.6 RME Supplement)

Table L-8.6 RME Supplement
Inhalation Exposure Concentrations from Foster and Chrostowski Shower Model
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical	Exposure Point Concentration Cwo (µg/l)	Molecular weight (HH) (g/mole)	Henry's Law Constant (H) (atm-m^3/mole)	Kg (VOC) (cm/hr)	Kl(VOC) (cm/hr)	KL (cm/hr)	Kal (cm/hr)	Cwd (µg/l)	S (µg/m^3-min)	Calculated Inhalation Exposure (Einh) (mg/kg/shower)
Chloroform	5.5E+00	1.2E+02	4.4E-03	1.16E+03	1.21E+01	1.15E+01	1.55E+01	2.21E+00	1.47E+01	3.00E-04

Variables	Units	Exposure Assumptions	Source
Kg(VOC) = gas-film mass transfer coefficient	cm/hr	Solved by Eq 1	NA
Kl(VOC) = liquid-film mass transfer coefficient	cm/hr	Solved by Eq 2	NA
KL = overall mass transfer coefficient	cm/hr	Solved by Eq 3	NA
Kal = adjusted overall mass transfer coeff.	cm/hr	Solved by Eq 4	NA
Tl = Calibration temp. of water	K (20C +273)	293	F&C
Ts = Shower water temperature	k (45C)	318	F&C
Us = water viscosity at Ts	centipoise	0.596	F&C
Ul = water viscosity at Tl	cp	1.002	F&C
Cwd = conc. leaving droplets after time sdt	ug/l	Solved by Eq 5	NA
sdt = shower droplet drop time	sec	2	F&C
d = shower droplet diameter	mm	1	F&C
FR = shower water flow rate	l/min	20	F&C
SV = shower room air volume	m^3	3	F&C
S = indoor VOC generation rate	ug/m^3-min	Solved by Eq 6	NA
VR = ventilation rate	l/min	13.8	JSEPA, 1991
BW = body weight	kg	70	JSEPA, 1991
Ds = duration of shower	min	12	JSEPA, 1989
Dt = total duration in shower room	min	15	
R = air exchange rate	min^{-1}	0.0083	F&C
Ca = indoor air concentration of VOCs	ug/m^3	Solved by Eq 7	NA
Einh = inhalation exposure per shower	mg/kg/shower	Solved by Eq 8	NA

Equation 1:	Kg(VOC) =	$3000 * (18 / HH)^{0.5}$	
Equation 2:	Kl(VOC) =	$20 * (44 / HH)^{0.5}$	
Equation 3:	KL =	$((1 / Kl(VOC)) + (0.024 / (Kg(VOC) * H)))^{-1}$	
Equation 4:	Kal =	$(KL * (((Tl * Us) / (Ts * Ul))^{-0.5}))$	
Equation 5:	Cwd =	(Cwo * (1-EXP((-1 * Kal * sdt)/(60 * d))))	
Equation 6:	S =	(Cwd * FR / SV)	
Equation 7:	see time series example on Table I-GW-5		
Equation 8:	**Einh =**	**If t>Ds**	(((VR * S) / (BW * R * 1000000)) * ((Ds + (EXP(-R * Dt) / R)-(EXP(R * (Ds - Dt))) / R)))

Henry's Law Constant from USEPA's *Superfund Public Health Evaluation Manual.* USEPA/540/1-86/060, October 1986.

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual. Interim Final. OSWER Directive 9285.6-03.

USEPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

F&C. Foster, S. A. and P. C. Chrostowski. 1987. Inhalation Exposures to Volatile Organic Contaminants in the Shower. ICF-Clement Associates, Inc. Washington, D.C.

Table L-8.7
Calculation of Cancer Risks - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage Features and Tributary to Blows Creek
Receptor Population: Trespasser
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	Arsenic	12.6	ug/l	12.6	ug/l	M	5E-08	1/mg/kg/day	2E+00	1/mg/kg/day	9E-08
	Iron	46900	ug/l	46900	ug/l	M	2E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
	Manganese	7590	ug/l	7590	ug/l	M	3E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	9E-08
										Total Risk Across All Exposure Routes/Pathways	9E-08

(1) Medium-Specific (M) EPC selected for risk calculation.
Dermally absorbed dose per exposure event calculated in Table 8.7 RME Supplement

Table L-8.7 RME Supplement
Calculation of Daevent, Adult and Adolescent Trespasser
Surface Water
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC)	Lag Time (t)	B (dimensionless)	Duration of Event (ET)	t*	Eq	DAevent
Arsenic	1.3E+01	µg/l	1.0E-03	N/A	N/A	1	N/A	1	1.3E-08
Iron	4.7E+04	µg/l	1.0E-03	N/A	N/A	1	N/A	1	4.7E-05
Manganese	7.6E+03	µg/l	1.0E-03	N/A	N/A	1	N/A	1	7.6E-06

Inorganics: DAevent (mg/cm2-event) =
PC x EPC x ET x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
ET<t*: DAevent (mg/cm2-event) =
2 x PC x EPC x (sqrt((6 x t x ET)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:
Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

Table L-8.8
Calculation of Cancer Risks - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage Features and Tributary to Blows Creek
Receptor Population: Trespasser
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	Arsenic	12.6	ug/l	12.6	ug/l	M	1E-08	1/mg/kg/day	2E+00	1/mg/kg/day	2E-08
	Iron	46900	ug/l	46900	ug/l	M	4E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Manganese	7590	ug/l	7590	ug/l	M	7E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	2E-08
										Total Risk Across All Exposure Routes/Pathways	2E-08

(1) Medium-Specific (M) EPC selected for risk calculation.

Table L-8.9
Calculation of Cancer Risks - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 5
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	4,4'-DDT	0.86	mg/kg	0.86	mg/kg	M	1E-06	1/mg/kg/day	3E-01	1/mg/kg/day	5E-07
	4,4'-DDE	2.3	mg/kg	2.3	mg/kg	M	4E-06	1/mg/kg/day	3E-01	1/mg/kg/day	1E-06
	Benzo(a)Pyrene	0.277	mg/kg	0.277	mg/kg	M	4E-07	1/mg/kg/day	7E+00	1/mg/kg/day	3E-06
	Benzo(b)Fluoranthene	0.536	mg/kg	0.536	mg/kg	M	8E-07	1/mg/kg/day	7E-01	1/mg/kg/day	6E-07
	Dibenz(a,h)Anthracene	0.26	mg/kg	0.26	mg/kg	M	4E-07	1/mg/kg/day	7E+00	1/mg/kg/day	3E-06
	Total Dioxins	0.000017	mg/kg	0.000017	mg/kg	M	3E-11	1/mg/kg/day	2E+05	1/mg/kg/day	4E-06
	Aluminum	12026	mg/kg	12026	mg/kg	M	2E-02	1/mg/kg/day	NA	1/mg/kg/day	NA
	Antimony	3.0	mg/kg	3.0	mg/kg	M	5E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	35.0	mg/kg	35.0	mg/kg	M	5E-05	1/mg/kg/day	2E+00	1/mg/kg/day	8E-05
	Barium	1327	mg/kg	1327	mg/kg	M	2E-03	1/mg/kg/day	NA	1/mg/kg/day	NA
	Cadmium	2.13	mg/kg	2.13	mg/kg	M	3E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Chromium	79.1	mg/kg	79.1	mg/kg	M	1E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
	Copper	488	mg/kg	488	mg/kg	M	8E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
	Iron	38159	mg/kg	38159	mg/kg	M	6E-02	1/mg/kg/day	NA	1/mg/kg/day	NA
	Manganese	298	mg/kg	298	mg/kg	M	5E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
	Thallium	1.15	mg/kg	1.15	mg/kg	M	2E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Vanadium	36.5	mg/kg	36.5	mg/kg	M	6E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Zinc	1064	mg/kg	1064	mg/kg	M	2E-03	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	9E-05

Table L-8.9
Calculation of Cancer Risks - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 5
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	4,4'-DDT	0.86	mg/kg	0.86	mg/kg	M	6E-07	1/mg/kg/day	4E-01	1/mg/kg/day	2E-07
	4,4'-DDE	2.33	mg/kg	2.3	mg/kg	M	2E-06	1/mg/kg/day	4E-01	1/mg/kg/day	6E-07
	Benzo(a)Pyrene	0.28	mg/kg	0.277	mg/kg	M	2E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Benzo(b)Fluoranthene	0.54	mg/kg	0.536	mg/kg	M	4E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Dibenz(a,h)Anthracene	0.26	mg/kg	0.26	mg/kg	M	2E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Total Dioxins	0.000017	mg/kg	0.000017	mg/kg	M	3E-12	1/mg/kg/day	3E+05	1/mg/kg/day	1E-06
	Aluminum	12026.10	mg/kg	12026	mg/kg	M	8E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
	Antimony	3.04	mg/kg	3.0	mg/kg	M	2E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	35.00	mg/kg	35.0	mg/kg	M	7E-06	1/mg/kg/day	2E+00	1/mg/kg/day	1E-05
	Barium	1326.57	mg/kg	1327	mg/kg	M	9E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Cadmium	2.13	mg/kg	2.13	mg/kg	M	1E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Chromium	79.15	mg/kg	79.1	mg/kg	M	5E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Copper	488.11	mg/kg	488	mg/kg	M	3E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Iron	38158.58	mg/kg	38159	mg/kg	M	3E-03	1/mg/kg/day	NA	1/mg/kg/day	NA
	Manganese	297.69	mg/kg	298	mg/kg	M	2E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Thallium	1.15	mg/kg	1.15	mg/kg	M	8E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
	Vanadium	36.48	mg/kg	36.5	mg/kg	M	2E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Zinc	1064.39	mg/kg	1064	mg/kg	M	7E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	1E-05
										Total Risk Across All Exposure Routes/Pathways	1E-04

*Surface and subsurface soil combined.

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table L-8.10
Calculation of Cancer Risks - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 5
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Arsenic	35.0	mg/kg	35.0	mg/kg	M	1E-06	1/mg/kg/day	2E+00	1/mg/kg/day	2E-06
	Chromium	79.1	mg/kg	79.1	mg/kg	M	3E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Iron	38159	mg/kg	38159	mg/kg	M	1E-03	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	2E-06
Dermal	Arsenic	35.0	mg/kg	35.0	mg/kg	M	9E-08	1/mg/kg/day	2E+00	1/mg/kg/day	1E-07
	Chromium	79.1	mg/kg	79.1	mg/kg	M	7E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
	Iron	38159	mg/kg	38159	mg/kg	M	3E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	1E-07
										Total Risk Across All Exposure Routes/Pathways	2E-06

*Surface and subsurface soil combined.

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table L-8.11
Calculation of Cancer Risks - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 5
Receptor Population: Other Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Arsenic	35.0	mg/kg	35.0	mg/kg	M	6E-06	1/mg/kg/day	2E+00	1/mg/kg/day	9E-06
	Chromium	79.1	mg/kg	79.1	mg/kg	M	1E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Iron	38159	mg/kg	38159	mg/kg	M	7E-03	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	9E-06
Dermal	Arsenic	35.0	mg/kg	35.0	mg/kg	M	1E-06	1/mg/kg/day	2E+00	1/mg/kg/day	2E-06
	Chromium	79.1	mg/kg	79.1	mg/kg	M	1E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Iron	38159	mg/kg	38159	mg/kg	M	5E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	2E-06
										Total Risk Across All Exposure Routes/Pathways	1E-05

*Surface and subsurface soil combined.

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table L-8.12
Calculation of Cancer Risks - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Air
Exposure Point: Emissions from Soil at Site 5
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value (1)	Route EPC Units	EPC Selected for Hazard Calculation (2)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Arsenic	35.0	mg/kg	0.00000003	mg/m3	R	4E-11	1/mg/kg/day	2E+01	1/mg/kg/day	6E-10
	Chromium	79.1	mg/kg	0.00000006	mg/m3	R	8E-11	1/mg/kg/day	4E+01	1/mg/kg/day	3E-09
	Iron	38159	mg/kg	0.00003	mg/m3	R	4E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	4E-09
										Total Risk Across All Exposure Routes/Pathways	4E-09

*Subsurface and Surface Soil Combined.
(1) Route-specific EPC value is equal to the medium EPC value multilplied by 1/PEF (PEF = 1.32E+09mg3/kg).
(2) Route-Specific (R) EPC selected for hazard calculation.

Table L-8.13
Calculation of Cancer Risks - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Drainage Features and Tributary to Blows Creek
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	Arsenic	12.6	ug/l	12.6	ug/l	M	2E-07	1/mg/kg/day	2E+00	1/mg/kg/day	3E-07
	Iron	46900	ug/l	46900	ug/l	M	6E-01	1/mg/kg/day	NA	1/mg/kg/day	NA
	Manganese	7590	ug/l	7590	ug/l	M	1E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	3E-07
										Total Risk Across All Exposure Routes/Pathways	3E-07

(1) Medium-Specific (M) EPC selected for risk calculation.
Dermally absorbed dose per exposure event calculated in Table 8.13 RME Supplement

Table L-8.13 RME Supplement
Calculation of Daevent, Adult and Child Resident
Surface Water
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC)	Lag Time (t)	B	Duration of Event Adult (ETa)	Duration of Event Child (ETc)	t*	Eq	DAevent Adult	DAevent Child
Arsenic	1.3E+01	µg/l	1.0E-03	N/A	N/A	2	2	N/A	1	2.5E-08	2.5E-08
Iron	4.7E+04	µg/l	1.0E+00	N/A	N/A	2	2	N/A	2	9.4E-02	9.4E-02
Manganese	7.6E+03	µg/l	1.0E-03	N/A	N/A	2	2	N/A	1	1.5E-05	1.5E-05

Inorganics: DAevent (mg/cm2-event) =
PC x EPC x ET x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
ET<t*: DAevent (mg/cm2-event) =
2 x PC x EPC x (sqrt((6 x t x ET)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:
Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

Table L-8.14
Calculation of Cancer Risks - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage Features and Tributary to Blows Creek
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Arsenic	17.8	mg/kg	17.8	mg/kg	M	4E-06	1/mg/kg/day	2E+00	1/mg/kg/day	6E-06
	Iron	98611	mg/kg	98611	mg/kg	M	2E-02	1/mg/kg/day	NA	1/mg/kg/day	NA
	Thallium	5.7	mg/kg	5.7	mg/kg	M	1E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	6E-06
Dermal	Arsenic	17.8	mg/kg	17.8	mg/kg	M	1E-05	1/mg/kg/day	2E+00	1/mg/kg/day	2E-05
	Iron	98611	mg/kg	98611	mg/kg	M	2E-02	1/mg/kg/day	NA	1/mg/kg/day	NA
	Thallium	5.7	mg/kg	5.7	mg/kg	M	1E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	2E-05
										Total Risk Across All Exposure Routes/Pathways	2E-05

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table L-8.15
Calculation of Cancer Risks - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Shallow Groundwater
Exposure Point: Water Table
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	Aluminum	87400	ug/l	87400	ug/l	M	1.5E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Antimony	2.38	ug/l	2.38	ug/l	M	4E-10	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	16.3	ug/l	16.3	ug/l	M	3E-09	1/mg/kg/day	2E+00	1/mg/kg/day	5E-09
	Barium	359	ug/l	359	ug/l	M	6E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
	Beryllium	18.3	ug/l	18.3	ug/l	M	3E-09	1/mg/kg/day	NA	1/mg/kg/day	NA
	Cadmium	11	ug/l	11	ug/l	M	2E-09	1/mg/kg/day	NA	1/mg/kg/day	NA
	Chromium	42.1	ug/l	42.1	ug/l	M	7E-09	1/mg/kg/day	NA	1/mg/kg/day	NA
	Cobalt	257	ug/l	257	ug/l	M	5E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
	Iron	76564	ug/l	76564	ug/l	M	1E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Manganese	3282	ug/l	3282	ug/l	M	6E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Nickel	360	ug/l	360	ug/l	M	6E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
	Thallium	2.1	ug/l	2.1	ug/l	M	4E-10	1/mg/kg/day	NA	1/mg/kg/day	NA
	Vanadium	82.8	ug/l	82.8	ug/l	M	1E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
	Zinc	2020	ug/l	2020	ug/l	M	4E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	5E-09
										Total Risk Across All Exposure Routes/Pathways	5E-09

(1) Medium-Specific (M) EPC selected for risk calculation.
Dermally absorbed dose per exposure event calculated in Table 8.15 RME Supplement A

Table L-8.15 RME Supplement A
Calculation of Daevent, Adult Construction Worker
Shallow Groundwater
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC)	Lag Time (t)	B (dimensionless)	Duration of Event (ET)	t*	Eq	DAevent
Aluminum	8.7E+04	µg/l	1.0E-03	N/A	N/A	2	N/A	1	1.7E-04
Antimony	2.4E+00	µg/l	1.0E-03	N/A	N/A	2	N/A	1	4.8E-09
Arsenic	1.6E+01	µg/l	1.0E-03	N/A	N/A	2	N/A	1	3.3E-08
Barium	3.6E+02	µg/l	1.0E-03	N/A	N/A	2	N/A	1	7.2E-07
Beryllium	1.8E+01	µg/l	1.0E-03	N/A	N/A	2	N/A	1	3.7E-08
Cadmium	1.1E+01	µg/l	1.0E-03	N/A	N/A	2	N/A	1	2.2E-08
Chromium	4.2E+01	µg/l	1.0E-03	N/A	N/A	2	N/A	1	8.4E-08
Cobalt	2.6E+02	µg/l	1.0E-03	N/A	N/A	2	N/A	1	5.1E-07
Iron	7.7E+04	µg/l	1.0E-03	N/A	N/A	2	N/A	1	1.5E-04
Manganese	3.3E+03	µg/l	1.0E-03	N/A	N/A	2	N/A	1	6.6E-06
Nickel	3.6E+02	µg/l	1.0E-03	N/A	N/A	2	N/A	1	7.2E-07
Thallium	2.1E+00	µg/l	1.0E-03	N/A	N/A	2	N/A	1	4.2E-09
Vanadium	8.3E+01	µg/l	1.0E-03	N/A	N/A	2	N/A	1	1.7E-07
Zinc	2.0E+03	µg/l	1.0E-03	N/A	N/A	2	N/A	1	4.0E-06

Inorganics: DAevent (mg/cm2-event) =
PC x EPC x ET x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
ET<t*: DAevent (mg/cm2-event) =
2 x PC x EPC x (sqrt((6 x t x ET)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:
Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

Table L-8.16
Calculation of Cancer Risks - CT
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Deep Groundwater
Exposure Point: Tap Water
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	RDX	1.4	ug/l	1.4	ug/l	M	7E-06	1/mg/kg/day	1E-01	1/mg/kg/day	8E-07
	Heptachlor	0.03	ug/l	0.03	ug/l	M	1E-07	1/mg/kg/day	5E+00	1/mg/kg/day	6E-07
	Chloroform	0.84	ug/l	0.84	ug/l	M	4E-06	1/mg/kg/day	6E-03	1/mg/kg/day	3E-08
	Antimony	1.54	ug/l	1.54	ug/l	M	8E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	1.86	ug/l	1.86	ug/l	M	1E-05	1/mg/kg/day	2E+00	1/mg/kg/day	1E-05
	Iron	652	ug/l	652	ug/l	M	3E-03	1/mg/kg/day	NA	1/mg/kg/day	NA
	Manganese	101	ug/l	101	ug/l	M	5E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	2E-05
Dermal	RDX	1.4	ug/l	1.4	ug/l	M	6E-08	1/mg/kg/day	2E-01	1/mg/kg/day	1E-08
	Heptachlor	0.03	ug/l	0.03	ug/l	M	9E-08	1/mg/kg/day	9E+00	1/mg/kg/day	9E-07
	Chloroform	0.84	ug/l	0.84	ug/l	M	2E-06	1/mg/kg/day	6E-03	1/mg/kg/day	1E-08
	Antimony	1.54	ug/l	1.54	ug/l	M	4E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	1.86	ug/l	1.86	ug/l	M	5E-08	1/mg/kg/day	2E+00	1/mg/kg/day	8E-08
	Iron	652	ug/l	652	ug/l	M	6E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Manganese	101	ug/l	101	ug/l	M	3E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	1E-06
										Total Risk Across All Exposure Routes/Pathways	2E-05

(1) Medium-Specific (M) EPC selected for risk calculation.
Dermally absorbed dose per exposure event calculated in Table 8.16 CT Supplement

Table L-8.16a RME Supplement
Calculation of Daevent, Adult Resident
Deep Groundwater - Tap Water
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Permeability Constant (PC)	Lag Time (t)	B (dimensionless)	Duration of Event Adult (ETa)	Duration of Event Child (ETc)	t*	Eq	DAevent Adult	DAevent Child
RDX[1]	1.8E+00	µg/l	3.48E-04	1.98E+00	7.41E-04	0.25	0.33	4.8E+00	2	1.2E-09	1.4E-09
Heptachlor	3.0E-02	µg/l	1.1E-02	1.70E+01	1.90E+00	0.25	0.33	9.40E+01	2	1.9E-09	2.2E-09
Chloroform	5.5E+00	µg/l	8.9E-03	4.70E-01	9.3E-03	0.25	0.33	1.1E+00	2	4.6E-08	5.3E-08
Antimony	3.2E+00	µg/l	1.0E-03	N/A	N/A	0.25	0.33	N/A	1	8.0E-10	1.1E-09
Arsenic	3.6E+00	µg/l	1.0E-03	N/A	N/A	0.25	0.33	N/A	1	9.1E-10	1.2E-09
Iron	4.4E+03	µg/l	1.0E-03	N/A	N/A	0.25	0.33	N/A	1	1.1E-06	1.5E-06
Manganese	1.9E+02	µg/l	1.0E-03	N/A	N/A	0.25	0.33	N/A	1	4.8E-08	6.3E-08

Inorganics: DAevent (mg/cm2-event) =
PC x EPC x ET x 0.001 mg/ug x 0.001 l/cm^3 (eq 1)

Organics: DAevent (mg/cm2-event) =
ET<t*: DAevent (mg/cm2-event) =
2 x PC x EPC x (sqrt((6 x t x ET)/3.1415)) x 0.001 mg/ug x 0.001 l/cm^3 (eq 2)

ET>t*: DAevent (mg/cm2-event) =
PC x CW x (ET/(1+B) + 2 x t x ((1 + 3xB)/(1+B)) x 0.001 mg/ug x 0.001 l/cm3 (eq 3)

Notes:
1. Permeability constant and lag time calculated on Table 8.5b.RME Supplement.
Permeability constants from EPA 1992, Dermal Exposure Assessment: Principals and Applications. ORD, EPA/600/8-91/001B. Default value of 0.001 cm/hour used for inorganics without published values.
N/A - not available or not applicable.

Table L-8.17
Calculation of Cancer Risks - CT
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 5
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	4,4'-DDT	0.23	mg/kg	0.23	mg/kg	M	1.E-07	1/mg/kg/day	3.E-01	1/mg/kg/day	3.E-08
	4,4'-DDE	0.26	mg/kg	0.26	mg/kg	M	1.E-07	1/mg/kg/day	3.E-01	1/mg/kg/day	4.E-08
	Benzo(a)Pyrene	0.182	mg/kg	0.182	mg/kg	M	8.E-08	1/mg/kg/day	7.E+00	1/mg/kg/day	6.E-07
	Benzo(b)Fluoranthene	0.258	mg/kg	0.258	mg/kg	M	1.E-07	1/mg/kg/day	7.E-01	1/mg/kg/day	8.E-08
	Dibenz(a,h)Anthracene	0.25	mg/kg	0.25	mg/kg	M	1.E-07	1/mg/kg/day	7.E+00	1/mg/kg/day	8.E-07
	Total Dioxins	0.0000058	mg/kg	0.0000058	mg/kg	M	2.E-12	1/mg/kg/day	2.E+05	1/mg/kg/day	4.E-07
	Aluminum	10435	mg/kg	10435	mg/kg	M	4.E-03	1/mg/kg/day	NA	1/mg/kg/day	NA
	Antimony	2.0	mg/kg	2.0	mg/kg	M	9.E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	18.8	mg/kg	18.8	mg/kg	M	8.E-06	1/mg/kg/day	2.E+00	1/mg/kg/day	1.E-05
	Barium	103	mg/kg	103	mg/kg	M	4.E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Cadmium	1.2	mg/kg	1.2	mg/kg	M	5.E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Chromium	44.3	mg/kg	44.3	mg/kg	M	2.E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Copper	224	mg/kg	224	mg/kg	M	1.E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
	Iron	23543	mg/kg	23543	mg/kg	M	1.E-02	1/mg/kg/day	NA	1/mg/kg/day	NA
	Manganese	180	mg/kg	180	mg/kg	M	8.E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Thallium	0.87	mg/kg	0.87	mg/kg	M	4.E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Vanadium	32	mg/kg	32	mg/kg	M	1.E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Zinc	476	mg/kg	476	mg/kg	M	2.E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	1.E-05

Table L-8.17
Calculation of Cancer Risks - CT
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Soil*
Exposure Medium: Soil*
Exposure Point: At Site 5
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	4,4'-DDT	0.23	mg/kg	0.23	mg/kg	M	1.E-08	1/mg/kg/day	4.E-01	1/mg/kg/day	5.E-09
	4,4'-DDE	0.26	mg/kg	0.26	mg/kg	M	1.E-08	1/mg/kg/day	4.E-01	1/mg/kg/day	6.E-09
	Benzo(a)Pyrene	0.182	mg/kg	0.182	mg/kg	M	1.E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
	Benzo(b)Fluoranthene	0.258	mg/kg	0.258	mg/kg	M	1.E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
	Dibenz(a,h)Anthracene	0.25	mg/kg	0.25	mg/kg	M	1.E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
	Total Dioxins	0.0000058	mg/kg	0.0000058	mg/kg	M	1.E-13	1/mg/kg/day	3.E+05	1/mg/kg/day	3.E-08
	Aluminum	10435	mg/kg	10435	mg/kg	M	6.E-05	1/mg/kg/day	NA	1/mg/kg/day	NA
	Antimony	2.0	mg/kg	2.0	mg/kg	M	1.E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
	Arsenic	18.8	mg/kg	18.8	mg/kg	M	3.E-07	1/mg/kg/day	2.E+00	1/mg/kg/day	5.E-07
	Barium	103	mg/kg	103	mg/kg	M	6.E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Cadmium	1.2	mg/kg	1.2	mg/kg	M	7.E-09	1/mg/kg/day	NA	1/mg/kg/day	NA
	Chromium	44.3	mg/kg	44.3	mg/kg	M	3.E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Copper	224	mg/kg	224	mg/kg	M	1.E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Iron	23543	mg/kg	23543	mg/kg	M	1.E-04	1/mg/kg/day	NA	1/mg/kg/day	NA
	Manganese	180	mg/kg	180	mg/kg	M	1.E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
	Thallium	0.87	mg/kg	0.87	mg/kg	M	5.E-09	1/mg/kg/day	NA	1/mg/kg/day	NA
	Vanadium	32	mg/kg	32	mg/kg	M	2.E-07	1/mg/kg/day	NA	1/mg/kg/day	NA
	Zinc	476	mg/kg	476	mg/kg	M	3.E-06	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	6.E-07
										Total Risk Across All Exposure Routes/Pathways	1.E-05

*Surface and subsurface soil combined.

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table L-8.18
Calculation of Cancer Risks - CT
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Drainage Features and Tributary to Blows Creek
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Arsenic	10.5	mg/kg	10.5	mg/kg	M	5E-07	1/mg/kg/day	2E+00	1/mg/kg/day	7E-07
	Iron	51320	mg/kg	51320	mg/kg	M	2E-03	1/mg/kg/day	NA	1/mg/kg/day	NA
	Thallium	0.8	mg/kg	0.8	mg/kg	M	4E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	7E-07
Dermal	Arsenic	10.5	mg/kg	10.5	mg/kg	M	8E-07	1/mg/kg/day	2E+00	1/mg/kg/day	1E-06
	Iron	51320	mg/kg	51320	mg/kg	M	1E-03	1/mg/kg/day	NA	1/mg/kg/day	NA
	Thallium	0.8	mg/kg	0.8	mg/kg	M	2E-08	1/mg/kg/day	NA	1/mg/kg/day	NA
										Total	1E-06
										Total Risk Across All Exposure Routes/Pathways	2E-06

(1) Medium-Specific (M) EPC selected for hazard calculation.

Table L-9.1
Summary of Receptor Risks and Hazards for COPCs - RME
Site 5/6
St. Julians Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Receptor Population: Trespasser
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	At Site 5	Arsenic	NA	NA	0E+00	0E+00	Arsenic	NA	0.01	NA	0.000	0.01
			Chromium	2E-06	NA	0E+00	NA	Chromium	Skin	0.089	NA	0.00	0.09
			Iron	6E-06	NA	0E+00	NA	Iron	Gastrointestinal	0.14	NA	0.00	0.14
			(Total)	8E-06	NA	0E+00	0E+00	(Total)		0.24	NA	0.0	0.2
			Total Risk Across Surface Soil at Site 5				0E+00	Total Hazard Index Across Surface Soil at Site 5					0.2
	Air	Emissions from Surface Soil at Site 5	Arsenic	NA	0E+00	NA	0E+00	Arsenic	NA	NA	0.00	NA	NA
			Chromium	NA	0E+00	NA	0E+00	Chromium	Lung	NA	0.00000	NA	0.00000
			Iron	NA	0E+00	NA	NA	Iron	NA	NA	0.00	NA	0.000000
			(Total)	NA	0E+00	NA	0E+00	(Total)		NA	0.00000	NA	0.00000
			Total Risk Across Emissions from Surface Soil				0E+00	Total Hazard Index Across Emissions from Surface Soil					0.00000
			Total Risk Across Surface Soil				0E+00	Total Hazard Index Across Surface Soil					0.2
Surface Water	Surface Water	Drainage Features and Tributary to Blows Creek	Arsenic	NA	NA	0E+00	0E+00	Arsenic	Skin	NA	NA	0.0000	0.0000
			Iron	NA	NA	0E+00	NA	Iron	Gastrointestinal	NA	NA	0.000	0.000
			Manganese	NA	NA	0E+00	NA	Manganese	CNS	NA	NA	0.00	0.00
			(Total)	NA	NA	0E+00	0E+00	(Total)		NA	NA	0.00	0.00
			Total Risk Across Surface Water				0E+00	Total Hazard Index Across Surface Water					0.00
			Total Risk Across All Media and All Exposure Routes				0E+00	Total Hazard Index Across All Media and All Exposure Routes					0.2

Total CNS HI =	0.00
Total Gastrointestinal HI =	0.14
Total Lung HI =	0.00000
Total Skin HI =	0.09

Table L-9.2
Summary of Receptor Risks and Hazards for COPCs - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	At Site 5	Arsenic	NA	NA	0E+00	0E+00	Arsenic	NA	0.01	NA	0.000	0.01
			Chromium	2E-07	NA	0E+00	NA	Chromium	Skin	0.017	NA	0.000	0.017
			Iron	1E-06	NA	0E+00	NA	Iron	Gastrointestinal	0.08	NA	0.000	0.08
			(Total)	2E-06	NA	0E+00	0E+00	(Total)		0.10	NA	0.00	0.10
			Total Risk Across Surface Soil at Site 5				0E+00	Total Hazard Index Across Surface Soil at Site 5					0.10
	Air	Emissions from Surface Soil at Site 5	Arsenic	NA	0E+00	NA	0E+00	Arsenic	NA	NA	0.00	NA	NA
			Chromium	NA	0E+00	NA	0E+00	Chromium	Lung	NA	0.000000	NA	0.000000
			Iron	NA	0E+00	NA	NA	Iron	NA	NA	0.000000	NA	0.000000
			(Total)	NA	0E+00	NA	0E+00	(Total)		NA	0.000000	NA	0.000000
			Total Risk Across Emissions from Surface Soil				0E+00	Total Hazard Index Across Emissions from Surface Soil					0.10
			Total Risk Across Surface Soil				0E+00	Total Hazard Index Across Surface Soil					0.10
Surface Water	Surface Water	Drainage Features and Tributary to Blows Creek	Arsenic	NA	NA	0E+00	0E+00	Arsenic	Skin	NA	NA	0.0000	0.0000
			Iron	NA	NA	0E+00	NA	Iron	Gastrointestinal	NA	NA	0.000	0.000
			Manganese	NA	NA	0E+00	NA	Manganese	CNS	NA	NA	0.00	0.00
			(Total)	NA	NA	0E+00	0E+00	(Total)		NA	NA	0.00	0.00
			Total Risk Across Surface Water				0E+00	Total Hazard Index Across Surface Water					0.00
			Total Risk Across All Media and All Exposure Routes				0E+00	Total Hazard Index Across All Media and All Exposure Routes					0.10

Total CNS HI =	0.00
Total Gastrointestinal HI =	0.08
Total Lung HI =	0.000000
Total Skin HI =	0.017

Table L-9.3
Summary of Receptor Risks and Hazards for COPCs - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water						RDX	Prostate	0.26	NA	0.0019	0.26
								Heptachlor	Liver	1.249	NA	0.017	1.266
								Chloroform	Liver	0.00	NA	1.266	1.27
								Antimony	Longevity, Blood	0.0	NA	0.000	0.0
								Arsenic	Skin	0.0	NA	0.0000	0.0
								Iron	Gastrointestinal	0.0	NA	0.000	0.0
								Manganese	CNS	0.0	NA	0.000	0.0
			(Total)					(Total)		2	NA	1.28	2.8
			Total Risk Across Tap water				0E+00	Total Hazard Index Across Tap water					2.8
	Air	Deep Groundwater - Water Vapors at Showerhead	Chloroform	NA	8E-06	NA	8E-06	Chloroform	Nasal	NA	0	NA	0.0
			(Total)	NA	8E-06	NA	8E-06	(Total)		NA	0	NA	0.0
			Total Risk Across Vapors at Showerhead				8E-06	Total Hazard Index Across Vapors at Showerhead					0.0
			Total Risk Across All Media and All Exposure Routes				8E-06	Total Hazard Index Across All Media and All Exposure Routes					2.8

Total Blood HI =	0.0
Total CNS HI =	0.0
Total Gastrointestinal HI =	0.0
Total Liver HI =	2.53
Total Longevity HI =	0.0
Total Nasal HI =	0
Total Prostate HI =	0.26
Total Skin HI =	0.0

Table L-9.4
Summary of Receptor Risks and Hazards for COPCs - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water					
			(Total)				
			Total Risk Across Tap water				0E+00
			Total Risk Across All Media and All Exposure Routes				0E+00

Chemical	Non-Carcinogenic Hazard Quotient				
	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
RDX	Prostate	0.61	NA	0.0042	0.62
Heptachlor	Liver	2.915	NA	0.036	2.952
Chloroform	Liver	0.00	NA	2.952	2.95
Antimony	Longevity, Blood	0.0	NA	0.00	0.0
Arsenic	Skin	0.0	NA	0.000	0.0
Iron	Gastrointestinal	0.0	NA	0.00	0
Manganese	CNS	0.0	NA	0.000	0.0
(Total)		4	NA	2.99	7
Total Hazard Index Across Tap water					7
Total Hazard Index Across All Media and All Exposure Routes					7

Total Blood HI =	0.0
Total CNS HI =	0.0
Total Gastrointestinal HI =	0
Total Liver HI =	5.90
Total Longevity HI =	0.0
Total Prostate HI =	0.62
Total Skin HI =	0.0

Table L-9.5
Summary of Receptor Risks and Hazards for COPCs - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current
Receptor Population: Resident
Receptor Age: Adult/Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water	RDX	NA	NA	NA	0E+00						
			Heptachlor	9E-05	NA	3E-06	9E-05						
			Chloroform	4E-08	NA	9E-05	9E-05						
			Antimony	2E-06	NA	0E+00	NA						
			Arsenic	4E-08	NA	0E+00	4E-08						
			Iron	NA	NA	0E+00	NA						
			Manganese	2E-07	NA	0E+00	NA						
			(Total)	9E-05	NA	9E-05	2E-04	(Total)					
			Total Risk Across Tap water				2E-04	Total Hazard Index Across Tap water					0.0
	Air	Deep Groundwater - Water Vapors at Showerhead	Chloroform	NA	8E-06	NA	8E-06						
			(Total)	NA	8E-06	NA	8E-06	(Total)					
			Total Risk Across Vapors at Showerhead				8E-06	Total Hazard Index Across Vapors at Showerhead					0.0
			Total Risk Across All Media and All Exposure Routes				2E-04	Total Hazard Index Across All Media and All Exposure Routes					0.0

Table L-9.6
Summary of Receptor Risks and Hazards for COPCs - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water						RDX	Prostate	0.26	NA	0.0019	0.26
								Heptachlor	Liver	1.249	NA	0.017	1.266
								Chloroform	Liver	0.00	NA	1.266	1.27
								Antimony	Longevity, Blood	0.0	NA	0.000	0.0
								Arsenic	Skin	0.0	NA	0.0000	0.0
								Iron	Gastrointestinal	0.0	NA	0.000	0.0
								Manganese	CNS	0.0	NA	0.000	0.0
			(Total)					(Total)		2	NA	1.28	2.8
			Total Risk Across Tap water				0E+00	Total Hazard Index Across Tap water					2.8
	Air	Deep Groundwater - Water Vapors at Showerhead	Chloroform	NA	8E-06	NA	8E-06	Chloroform	Nasal	NA	0	NA	0
			(Total)	NA	8E-06	NA	8E-06	(Total)		NA	0	NA	0
			Total Risk Across Vapors at Showerhead				8E-06	Total Hazard Index Across Vapors at Showerhead					0
			Total Risk Across Groundwater				8E-06	Total Hazard Index Across Groundwater					2.8
Soil*	Soil*	At Site 5						4,4'-DDT	Liver	0.016	NA	0.006	0.02
								4,4'-DDE	NA	0.0104	NA	0.0099	NA
								Benzo(a)Pyrene	NA	0.1598	NA	0.0511	NA
								Benzo(b)Fluoranthene	NA	0.0260	NA	0.0025	NA
								Dibenz(a,h)Anthracene	NA	0.0029	NA	0.0111	NA
								Total Dioxins	NA	0.0361	NA	0.3433	NA
								Aluminum	CNS	0.02	NA	0.003	0.02
								Antimony	Longevity, Blood	0.17	NA	0.08	0.26
								Arsenic	Skin	0.02	NA	0.01	0.0
								Barium	Heart	0.02	NA	0.002	0.02
								Cadmium	Kidney	0.007	NA	0.03	0.04
								Chromium	NOAEL	0.00	NA	0.0	0.0
								Copper	Gastrointestinal	0.50	NA	0.555	1.06
								Iron	Gastrointestinal	0.00	NA	1.06	1.1
								Manganese	CNS	NA	NA	0.000	0.00
								Thallium	Liver	NA	NA	0.000	0.00
								Vanadium	NOAEL	NA	NA	0.00	0.00
								Zinc	Blood	NA	NA	0.000	0.00
			(Total)				0E+00	(Total)		1.0	NA	2.2	2.5
			Total Risk Across Soil* at Site 5				0E+00	Total Hazard Index Across Soil* at Site 5					2.5

Table L-9.6
Summary of Receptor Risks and Hazards for COPCs - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Drainage Features and Tributary to Blows Creek						Arsenic	Skin	NA	NA	0.0000	0.0000
								Iron	Gastrointestinal	NA	NA	0.00	0.00
								Manganese	CNS	NA	NA	0.00	0.00
			(Total)					(Total)		NA	NA	0.00	0.00
			Total Risk Across Surface Water				0E+00	Total Hazard Index Across Surface Water					0.00
Sediment	Sediment	Drainage Features and Tributary to Blows Creek						Arsenic	Skin	0.00	NA	0.000	0.00
								Iron	Gastrointestinal	0.0	NA	0.00	0.04
								Thallium	Liver	0.13	NA	0.000	0.13
			(Total)					(Total)		0.2	NA	0.00	0.2
			Total Risk Across Sediment				0E+00	Total Hazard Index Across Sediment					0.2
			Total Risk Across All Media and All Exposure Routes				8E-06	Total Hazard Index Across All Media and All Exposure Routes					5.5

* Includes both surface and subsurface soil.

Total Blood HI =	0.3
Total CNS HI =	0.0
Total Gastrointestinal HI =	2.2
Total Heart HI =	0.02
Total Kidney HI =	0.04
Total Liver HI =	2.69
Total Longevity HI =	0.3
Total Nasal HI =	0
Total NOAEL HI =	0.0
Total Prostate HI =	0.26
Total Skin HI =	0.0

Table L-9.7
Summary of Receptor Risks and Hazards for COPCs - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water						RDX	Prostate	0.61	NA	0.0042	0.62
								Heptachlor	Liver	2.915	NA	0.036	2.952
								Chloroform	Liver	0.00	NA	2.952	2.95
								Antimony	Longevity, Blood	0.0	NA	0.000	0.0
								Arsenic	Skin	0.0	NA	0.0000	0.0
								Iron	Gastrointestinal	0.0	NA	0.000	0.0
								Manganese	CNS	0.0	NA	0.000	0.0
			(Total)					(Total)		4	NA	2.99	7
			Total Risk Across Tap water				0E+00	Total Hazard Index Across Tap water					7
Soil*	Soil*	At Site 5						4,4'-DDT	Liver	0.15	NA	0.011	0.17
								4,4'-DDE	NA	0.097	NA	0.019	NA
								Benzo(a)Pyrene	NA	1.492	NA	0.099	NA
								Benzo(b)Fluoranthene	NA	0.242	NA	0.005	NA
								Dibenz(a,h)Anthracene	NA	0.027	NA	0.022	NA
								Total Dioxins	NA	0.051	NA	0.100	NA
								Aluminum	CNS	0.2	NA	0.01	0.2
								Antimony	Longevity, Blood	1.63	NA	0.16	1.8
								Arsenic	Skin	0.2	NA	0.01	0.2
								Barium	Heart	0.2	NA	0.004	0.2
								Cadmium	Kidney	0.07	NA	0.07	0.13
								Chromium	NOAEL	0.05	NA	0.0	0.0
								Copper	Gastrointestinal	4.4	NA	0.512	4.9
								Iron	Gastrointestinal	0.0	NA	4.9	4.9
								Manganese	CNS	NA	NA	0.00	0.0
								Thallium	Liver	NA	NA	0.000	0.0
								Vanadium	NOAEL	NA	NA	0.0	0.0
								Zinc	Blood	NA	NA	0.000	0.00
			(Total)				0E+00	(Total)		9	NA	5.9	12.5
			Total Risk Across Soil* at Site 5				0E+00	Total Hazard Index Across Soil* at Site 5					12.5
Surface Water	Surface Water	Drainage Features and Tributary to Blows Creek						Arsenic	Skin	NA	NA	0.000	0.000
								Iron	Gastrointestinal	NA	NA	0.00	0.00
								Manganese	CNS	NA	NA	0.00	0.00
			(Total)					(Total)		NA	NA	0.0	0.0
			Total Risk Across Surface Water				0E+00	Total Hazard Index Across Surface Water					0.0

Table L-9.7
Summary of Receptor Risks and Hazards for COPCs - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sediment	Sediment	Drainage Features and Tributary to Blows Creek						Arsenic	Skin	0.2	NA	0.0	0.2
								Iron	Gastrointestinal	4.4	NA	0.0	4.4
								Thallium	Liver	5.3	NA	0.0	5.3
			(Total)					(Total)		10	NA	0	9.9
			Total Risk Across Sediment				0E+00	Total Hazard Index Across Sediment					9.9
			Total Risk Across All Media and All Exposure Routes				0E+00	Total Hazard Index Across All Media and All Exposure Routes					29.0

* Includes both surface and subsurface soil.

Total Blood HI =	1.8
Total CNS HI =	0
Total Gastrointestinal HI =	14
Total Heart HI =	0.2
Total Kidney HI =	0.13
Total Liver HI =	11.4
Total Longevity HI =	1.8
Total NOAEL HI =	0.0
Total Prostate HI =	0.62
Total Skin HI =	0

Table L-9.7
Summary of Receptor Risks and Hazards for COPCs - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water						RDX	Prostate	0.61	NA	0.0042	0.62
								Heptachlor	Liver	2.915	NA	0.036	2.952
								Chloroform	Liver	0.00	NA	2.952	2.95
								Antimony	Longevity, Blood	0.0	NA	0.000	0.0
								Arsenic	Skin	0.0	NA	0.0000	0.0
								Iron	Gastrointestinal	0.0	NA	0.000	0.0
								Manganese	CNS	0.0	NA	0.000	0.0
			(Total)					(Total)		4	NA	2.99	7
			Total Risk Across Tap water				0E+00	Total Hazard Index Across Tap water					7
Soil*	Soil*	At Site 5						4,4'-DDT	Liver	0.15	NA	0.011	0.17
								4,4'-DDE	NA	0.097	NA	0.019	NA
								Benzo(a)Pyrene	NA	1.492	NA	0.099	NA
								Benzo(b)Fluoranthene	NA	0.242	NA	0.005	NA
								Dibenz(a,h)Anthracene	NA	0.027	NA	0.022	NA
								Total Dioxins	NA	0.051	NA	0.100	NA
								Aluminum	CNS	0.2	NA	0.01	0.2
								Antimony	Longevity, Blood	1.63	NA	0.16	1.8
								Arsenic	Skin	0.2	NA	0.01	0.2
								Barium	Heart	0.2	NA	0.004	0.2
								Cadmium	Kidney	0.07	NA	0.07	0.13
								Chromium	NOAEL	0.05	NA	0.0	0.0
								Copper	Gastrointestinal	4.4	NA	0.512	4.9
								Iron	Gastrointestinal	0.0	NA	4.9	4.9
								Manganese	CNS	NA	NA	0.00	0.0
								Thallium	Liver	NA	NA	0.000	0.0
								Vanadium	NOAEL	NA	NA	0.0	0.0
								Zinc	Blood	NA	NA	0.000	0.00
			(Total)				0E+00	(Total)		9	NA	5.9	12.5
			Total Risk Across Soil* at Site 5				0E+00	Total Hazard Index Across Soil* at Site 5					12.5
Surface Water	Surface Water	Drainage Features and Tributary to Blows Creek						Arsenic	Skin	NA	NA	0.000	0.000
								Iron	Gastrointestinal	NA	NA	0.00	0.00
								Manganese	CNS	NA	NA	0.00	0.00
			(Total)					(Total)		NA	NA	0.0	0.0
			Total Risk Across Surface Water				0E+00	Total Hazard Index Across Surface Water					0.0

Table L-9.7
Summary of Receptor Risks and Hazards for COPCs - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sediment	Sediment	Drainage Features and Tributary to Blows Creek						Arsenic	Skin	0.2	NA	0.0	0.2
								Iron	Gastrointestinal	4.4	NA	0.0	4.4
								Thallium	Liver	5.3	NA	0.0	5.3
			(Total)					(Total)		10	NA	0	9.9
						Total Risk Across Sediment	0E+00					Total Hazard Index Across Sediment	9.9
						Total Risk Across All Media and All Exposure Routes	0E+00					Total Hazard Index Across All Media and All Exposure Routes	29.0

* Includes both surface and subsurface soil.

Total Blood HI =	1.8
Total CNS HI =	0
Total Gastrointestinal HI =	14
Total Heart HI =	0.2
Total Kidney HI =	0.13
Total Liver HI =	11.4
Total Longevity HI =	1.8
Total NOAEL HI =	0.0
Total Prostate HI =	0.62
Total Skin HI =	0

Table L-9.8
Summary of Receptor Risks and Hazards for COPCs - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water	RDX	NA	NA	NA	0E+00						
			Heptachlor	9E-05	NA	3E-06	9E-05						
			Chloroform	4E-08	NA	9E-05	9E-05						
			Antimony	2E-06	NA	0E+00	NA						
			Arsenic	4E-08	NA	0E+00	4E-08						
			Iron	NA	NA	0E+00	NA						
			Manganese	2E-07	NA	0E+00	NA						
			(Total)	9E-05	NA	9E-05	2E-04	(Total)					
			Total Risk Across Tap water				2E-04	Total Hazard Index Across Tap water					0
	Air	Deep Groundwater - Water Vapors at Showerhead	Chloroform	NA	8E-06	NA	8E-06						
			(Total)	NA	8E-06	NA	8E-06	(Total)					
			Total Risk Across Vapors at Showerhead				8E-06	Total Hazard Index Across Vapors at Showerhead					0
			Total Risk Across Groundwater				2E-04	Total Hazard Index Across Groundwater					0
Soil*	Soil*	At Site 5	4,4'-DDT	NA	NA	NA	0E+00						
			4,4'-DDE	NA	NA	NA	0E+00						
			Benzo(a)Pyrene	8E-05	NA	1E-05	9E-05						
			Benzo(b)Fluoranthene	NA	NA	NA	0E+00						
			Dibenz(a,h)Anthracene	NA	NA	NA	0E+00						
			Total Dioxins	NA	NA	NA	0E+00						
			Aluminum	NA	NA	NA	NA						
			Antimony	NA	NA	NA	NA						
			Arsenic	NA	NA	NA	0E+00						
			Barium	NA	NA	NA	NA						
			Cadmium	NA	NA	NA	NA						
			Chromium	NA	NA	NA	NA						
			Copper	9E-05	NA	1E-05	NA						
			Iron	2E-07	NA	1E-04	NA						
			Manganese	6E-07	NA	0E+00	NA						
			Thallium	NA	NA	0E+00	NA						
			Vanadium	NA	NA	0E+00	NA						
			Zinc	NA	NA	0E+00	NA						
			(Total)	2E-04	NA	1E-04	9E-05	(Total)					0
			Total Risk Across Soil* at Site 5				9E-05	Total Hazard Index Across Soil* at Site 3					0

Table L-9.8
Summary of Receptor Risks and Hazards for COPCs - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Drainage Features and Tributary to Blows Creek	Arsenic	NA	NA	3E-07	3E-07						
			Iron	NA	NA	NA	NA						
			Manganese	NA	NA	NA	NA						
			(Total)	NA	NA	3E-07	3E-07	(Total)					0
			Total Risk Across Surface Water				3E-07	Total Hazard Index Across Surface Water					0
Sediment	Sediment	Drainage Features and Tributary to Blows Creek	Arsenic	NA	NA	0E+00	0E+00						
			Iron	2E-05	NA	0E+00	NA						
			Thallium	2E-05	NA	0E+00	NA						
			(Total)	4E-05	NA	0E+00	0E+00	(Total)					0
			Total Risk Across Sediment				0E+00	Total Hazard Index Across Sediment					0
			Total Risk Across All Media and All Exposure Routes				3E-04	Total Hazard Index Across All Media and All Exposure Routes					0

* Includes both surface and subsurface soil.

Table L-9.9
Summary of Receptor Risks and Hazards for COPCs - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil*	Soil*	At Site 5	Arsenic	NA	NA	0E+00	0E+00	Arsenic	Skin	0.1	NA	0.00	0.1
			Chromium	1E-07	NA	0E+00	NA	Chromium	NOAEL	0.17	NA	0.00	0.17
			Iron	2E-06	NA	0E+00	NA	Iron	Gastrointestinal	1.3	NA	0.0	1.3
			(Total)	2E-06	NA	0E+00	0E+00	(Total)		2	NA	0.0	2
			Total Risk Across Soil* at Site 5				0E+00	Total Hazard Index Across Soil* at Site 5					2
	Air	Emissions from Soil at Site 5	Arsenic	NA	0E+00	NA	0E+00	Arsenic	NA	NA	0.00	NA	NA
			Chromium	NA	0E+00	NA	0E+00	Chromium	Lung	NA	0.00000	NA	0.00000
			Iron	NA	0E+00	NA	NA	Iron	NA	NA	0.00	NA	NA
			(Total)	NA	0E+00	NA	0E+00	(Total)		NA	0.00000	NA	0.00000
			Total Risk Across Emissions from Soil at Site 5				0E+00	Total Hazard Index Across Emissions from Soil at Site 5					0.00000
			Total Risk Across Soil				0E+00	Total Hazard Index Across Soil					2
Groundwater	Shallow Groundwater	Water Table	Aluminum	NA	NA	NA	NA	Aluminum	CNS	NA	NA	0.005	0.005
			Antimony	NA	NA	NA	NA	Antimony	Longevity, Blood	NA	NA	0.000	0.000
			Arsenic	NA	NA	NA	0E+00	Arsenic	Skin	NA	NA	0.031	0.031
			Barium	NA	NA	NA	NA	Barium	Heart	NA	NA	0.0115	0.0115
			Beryllium	NA	NA	NA	NA	Beryllium	Intestines	NA	NA	0.044	0.044
			Cadmium	NA	NA	NA	NA	Cadmium	Kidney	NA	NA	0.00	0.00
			Chromium	NA	NA	NA	NA	Chromium	NOAEL	NA	NA	0.015	0.015
			Cobalt	NA	NA	NA	NA	Cobalt	Sensitizer	NA	NA	0.0007	0.0007
			Iron	NA	NA	5E-09	NA	Iron	Gastrointestinal	NA	NA	0.14	0.14
			Manganese	NA	NA	5E-09	NA	Manganese	CNS	NA	NA	0.14	0.14
			Nickel	NA	NA	0E+00	NA	Nickel	Body weight	NA	NA	0.00	0.00
			Thallium	NA	NA	0E+00	NA	Thallium	Liver	NA	NA	0.0000	0.0000
			Vanadium	NA	NA	0E+00	NA	Vanadium	NOAEL	NA	NA	0.00	0.00
			Zinc	NA	NA	0E+00	NA	Zinc	Blood	NA	NA	0.000	0.000
			(Total)	NA	NA	9E-09	0E+00	(Total)		NA	NA	0.4	0.4
			Total Risk Across Shallow Groundwater				0E+00	Total Hazard Index Across Shallow Groundwater					0.4
			Total Risk Across All Media and All Exposure Routes				0E+00	Total Hazard Index Across All Media and All Exposure Routes					2.0

* Includes both surface and subsurface soil.

Total Blood HI =	0.000
Total Body Weight HI =	0.00
Total CNS HI =	0.14
Total Gastrointestinal HI =	1.5
Total Heart HI =	0.0115
Total Intestines HI =	0.044
Total Kidney HI =	0.00
Total Liver HI =	0.0000
Total Longevity HI =	0.000
Total Lung HI =	0.00000
Total NOAEL HI =	0.18
Total Sensitizer HI =	0.0007
Total Skin HI =	0.1

Table L-9.10
Summary of Receptor Risks and Hazards for COPCs - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil*	Soil*	At Site 5	Arsenic	NA	NA	0E+00	0E+00	Arsenic	Skin	0.02	NA	0.00	0.02
			Chromium	2E-06	NA	0E+00	NA	Chromium	NOAEL	0.13	NA	0.00	0.1
			Iron	1E-05	NA	0E+00	NA	Iron	Gastrointestinal	0.26	NA	0.00	0.26
				1E-05	NA	0E+00	0E+00	(Total)		0.4	NA	0.0	0.4
							Total Risk Across Soil* at Site 5	0E+00					Total Hazard Index Across Soil* at Site 5	0.4
							Total Risk Across All Media and All Exposure Routes	0E+00					Total Hazard Index Across All Media and All Exposure Routes	0.4

* Includes both surface and subsurface soil.

Total Gastrointenstinal HI =	0.26
Total NOAEL HI =	0.1
Total Skin HI =	0.02

Table L-9.11
Summary of Receptor Risks and Hazards for COPCs - CT
Site 5/6
St. Jullens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water						RDX	Prostate	0.19	NA	0.0011	0.19
								Heptachlor	Liver	0.665	NA	0.008	0.673
								Chloroform	Liver	0.000	NA	0.6731	0.673
								Antimony	Longevity, Blood	0.0	NA	0.000	0.0
								Arsenic	Skin	0.0	NA	0.0000	0.0
								Iron	Gastrointestinal	0.0	NA	0.000	0.0
								Manganese	CNS	0.0	NA	0.000	0.0
			(Total)					(Total)		0.9	NA	0.68	1.5
			Total Risk Across Tap water				0E+00	Total Hazard Index Across Tap water					1.5
Soil*	Soil*	At Site 5						4,4'-DDT	Liver	0.045	NA	0.0016	0.046
								4,4'-DDE	NA	0.02	NA	0.0	NA
								Benzo(a)Pyrene	NA	0.27	NA	0.0	NA
								Benzo(b)Fluoranthene	NA	0.01	NA	0.0	NA
								Dibenz(a,h)Anthracene	NA	0.01	NA	0.0	NA
								Total Dioxins	NA	0.01	NA	0.0	NA
								Aluminum	CNS	0.03	NA	0.000	0.03
								Antimony	Longevity, Blood	0.34	NA	0.016	0.35
								Arsenic	Skin	0.0	NA	0.001	0.0
								Barium	Heart	0.05	NA	0.0005	0.05
								Cadmium	Kidney	0.020	NA	0.009	0.03
								Chromium	NOAEL	0.01	NA	0.000	0.01
								Copper	Gastrointestinal	0.84	NA	0.0508	0.89
								Iron	Gastrointestinal	0.0	NA	0.89	0.9
								Manganese	CNS	NA	NA	0.000	0.00
								Thallium	Liver	NA	NA	0.0000	0.00
								Vanadium	NOAEL	NA	NA	0.00	0.00
								Zinc	Blood	NA	NA	0.0000	0.00
			(Total)				0E+00	(Total)		1.7	NA	0.99	2.3
			Total Risk Across Soil* at Site 3				0E+00	Total Hazard Index Across Soil* at Site 3					2.3
Sediment	Sediment	Drainage Features and Tributary to Blows Creek						Arsenic	Skin	0.00	NA	0.00	0.00
								Iron	Gastrointestinal	0.27	NA	0.0	0.3
								Thallium	Liver	0.37	NA	0.000	0.37
			(Total)					(Total)		0.6	NA	0.0	0.6
			Total Risk Across Sediment				0E+00	Total Hazard Index Across Sediment					0.6
			Total Risk Across All Media and All Exposure Routes				0E+00	Total Hazard Index Across All Media and All Exposure Routes					5

Total Prostate HI =	0.19
Total Liver HI =	1.77
Total Longevity HI =	0.4

Table L-9.11
Summary of Receptor Risks and Hazards for COPCs - CT
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
												Total Blood HI =	0.4
												Total Skin HI =	0.0
												Total Gastrointestinal HI =	2.0
												Total CNS HI =	0.0
												Total Heart HI =	0.05
												Total Kidney HI =	0.03
												Total NOAEL HI =	0.01

* Includes both surface and subsurface soil.

Table L-9.12
Summary of Receptor Risks and Hazards for COPCs - CT
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air	Deep Groundwater - Water Vapors at Showerhead						Chloroform	Nasal	NA	0	NA	0
								(Total)		NA	0	NA	0
												Total Hazard Index Across Vapors at Showerhead	0
												Total Hazard Index Across All Media and All Exposure Routes	0

Total Nasal HI = 0

Table L-9.13
Summary of Receptor Risks and Hazards for COPCs - CT
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current/Future
Receptor Population: Resident
Receptor Age: Adult/Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water	RDX	NA	NA	NA	0E+00						
			Heptachlor	2E-05	NA	1E-06	2E-05						
			Chloroform	1E-08	NA	2E-05	2E-05						
			Antimony	9E-07	NA	0E+00	NA						
			Arsenic	1E-08	NA	0E+00	1E-08						
			Iron	NA	NA	0E+00	NA						
			Manganese	8E-08	NA	0E+00	NA						
			(Total)	2E-05	NA	2E-05	3E-05	(Total)					
			Total Risk Across Tap water				3E-05	Total Hazard Index Across Tap water					0
			Total Risk Across Groundwater				3E-05	Total Hazard Index Across Groundwater					0
Soil*	Soil*	At Site 5	4,4'-DDT	NA	NA	NA	0E+00						
			4,4'-DDE	NA	NA	NA	0E+00						
			Benzo(a)Pyrene	1E-05	NA	5E-07	1E-05						
			Benzo(b)Fluoranthene	NA	NA	NA	0E+00						
			Dibenz(a,h)Anthracene	NA	NA	NA	0E+00						
			Total Dioxins	NA	NA	NA	0E+00						
			Aluminum	NA	NA	NA	NA						
			Antimony	NA	NA	NA	NA						
			Arsenic	NA	NA	NA	0E+00						
			Barium	NA	NA	NA	NA						
			Cadmium	NA	NA	NA	NA						
			Chromium	NA	NA	NA	NA						
			Copper	1E-05	NA	6E-07	NA						
			Iron	5E-09	NA	1E-05	NA						
			Manganese	6E-09	NA	0E+00	NA						
			Thallium	NA	NA	0E+00	NA						
			Vanadium	NA	NA	0E+00	NA						
			Zinc	NA	NA	0E+00	NA						
			(Total)	3E-05	NA	2E-05	1E-05	(Total)					0
			Total Risk Across Soil* at Site 5				1E-05	Total Hazard Index Across Soil* at Site 5					0
Sediment	Sediment	Drainage Features and Tributary to Blows Creek	Arsenic	NA	NA	0E+00	0E+00						
			Iron	1E-06	NA	0E+00	NA						
			Thallium	2E-06	NA	0E+00	NA						
			(Total)	3E-06	NA	0E+00	0E+00	(Total)					0
			Total Risk Across Sediment				0E+00	Total Hazard Index Across Sediment					0
			Total Risk Across All Media and All Exposure Routes				8E-05	Total Hazard Index Across All Media and All Exposure Routes					#REF!

* Includes both surface and subsurface soil.

Table 10.1
Risk Assessment Summary - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water					
			(Total)				
			Total Risk Across Tap water				0E+00
	Air	Deep Groundwater - Water Vapors at Showerhead					
			(Total)				0E+00
			Total Risk Across Vapors at Showerhead				0E+00
			Total Risk Across All Media and All Exposure Routes				0E+00

Chemical	Non-Carcinogenic Hazard Quotient				
	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Antimony	Longevity, Blood	0.0	NA	0.000	0.0
Arsenic	Skin	0.0	NA	0.0000	0.0
Iron	Gastrointestinal	0.0	NA	0.000	0.0
Manganese	CNS	0.0	NA	0.000	0.0
(Total)		0	NA	0.00	0
Total Hazard Index Across Tap water					0
Chloroform	Nasal	NA	0	NA	0
(Total)		NA	0	NA	0
Total Hazard Index Across Vapors at Showerhead					0
Total Hazard Index Across All Media and All Exposure Routes					0

Total Longevity HI =	0.0
Total Blood HI =	0.0
Total Skin HI =	0.0
Total Gastrointestinal HI =	0.0
Total CNS HI =	0.0
Total Nasal HI =	0

Table 10.2
Risk Assessment Summary - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water					
			(Total)				
			Total Risk Across Tap water				0E+00
			Total Risk Across All Media and All Exposure Routes				0E+00

Chemical	Non-Carcinogenic Hazard Quotient				
	Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Antimony	Longevity, Blood	0.0	NA	0.00	0.0
Arsenic	Skin	0.0	NA	0.000	0.0
Iron	Gastrointestinal	0.0	NA	0.00	0
Manganese	CNS	0.0	NA	0.000	0.0
(Total)		0	NA	0.00	0
Total Hazard Index Across Tap water					0
Total Hazard Index Across All Media and All Exposure Routes					0

Total Longevity HI =	0.0
Total Blood HI =	0.0
Total Skin HI =	0.0
Total Gastrointestinal HI =	0
Total CNS HI =	0.0

Table 10.3
Risk Assessment Summary - RME
Site 5/6
St. Jullens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current
Receptor Population: Resident
Receptor Age: Adult/Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water	RDX	NA	NA	NA	0E+00						
			Heptachlor	9E-05	NA	3E-06	9E-05						
			Arsenic	4E-08	NA	0E+00	4E-08						
			(Total)	9E-05	NA	3E-06	9E-05	(Total)					
			Total Risk Across Tap water				9E-05	Total Hazard Index Across Tap water					0
	Air	Deep Groundwater - Water Vapors at Showerhead	Chloroform	NA	8E-06	NA	8E-06						
			(Total)	NA	8E-06	NA	8E-06	(Total)					
			Total Risk Across Vapors at Showerhead				8E-06	Total Hazard Index Across Vapors at Showerhead					0
			Total Risk Across All Media and All Exposure Routes				1E-04	Total Hazard Index Across All Media and All Exposure Routes					0

Table 10.4
Risk Assessment Summary - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water						Antimony	Longevity, Blood	0.0	NA	0.000	0.0
								Arsenic	Skin	0.0	NA	0.0000	0.0
								Iron	Gastrointestinal	0.0	NA	0.000	0.0
								Manganese	CNS	0.0	NA	0.000	0.0
			(Total)					(Total)		0	NA	0.00	0
			Total Risk Across Tap water				0E+00	Total Hazard Index Across Tap water					0
	Air	Deep Groundwater - Water Vapors at Showerhead	Chloroform	NA	8E-06	NA	8E-06	Chloroform	Nasal	NA	0	NA	0
			(Total)	NA	8E-06	NA	8E-06	(Total)		NA	0	NA	0
			Total Risk Across Vapors at Showerhead				8E-06	Total Hazard Index Across Vapors at Showerhead					0
			Total Risk Across Groundwater				8E-06	Total Hazard Index Across Groundwater					0
			Total Risk Across All Media and All Exposure Routes				8E-06	Total Hazard Index Across All Media and All Exposure Routes					0

Total Longevity HI =	0.0
Total Blood HI =	0.0
Total Skin HI =	0.0
Total Gastrointestinal HI =	0.0
Total CNS HI =	0.0
Total Nasal HI =	0

* Includes both surface and subsurface soil.

Table 10.5
Risk Assessment Summary - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water						Antimony	Longevity, Blood	0.0	NA	0.00	0.0
								Arsenic	Skin	0.0	NA	0.000	0.0
								Iron	Gastrointestinal	0.0	NA	0.00	0
								Manganese	CNS	0.0	NA	0.000	0.0
			(Total)					(Total)		0	NA	0.00	0
			Total Risk Across Tap water				0E+00	Total Hazard Index Across Tap water					0
Soil*	Soil*	At Site 5						Arsenic	Skin	0	NA	0.01	0
								Iron	Gastrointestinal	0	NA	4.9	5
			(Total)				0E+00	(Total)		0	NA	4.9	5
			Total Risk Across Soil* at Site 3				0E+00	Total Hazard Index Across Soil* at Site 3					5
Sediment	Sediment	Drainage Features and Tributary to Blows Creek						Arsenic	Skin	0.2	NA	0.0	0.2
								Iron	Gastrointestinal	4.4	NA	0	4
			(Total)					(Total)		4.6	NA	0	5
			Total Risk Across Sediment				0.0E+00	Total Hazard Index Across Sediment					5
			Total Risk Across All Media and All Exposure Routes				0E+00	Total Hazard Index Across All Media and All Exposure Routes					10

* Includes both surface and subsurface soil.

Total Longevity HI =	0.0
Total Blood HI =	0.0
Total Skin HI =	0.0
Total Gastrointestinal HI =	9
Total CNS HI =	0.0

Table 10.6
Risk Assessment Summary - RME
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water	Arsenic	4E-08	NA	0E+00	4E-08						
			(Total)	4E-08	NA	0E+00	4E-08	(Total)					
			Total Risk Across Tap water				4E-08	Total Hazard Index Across Tap water					0
Soil*	Soil*	At Site 5	Arsenic	NA	NA	NA	0E+00						
			(Total)	NA	NA	0E+00	0E+00	(Total)					0
			Total Risk Across Soil* at Site 3				0E+00	Total Hazard Index Across Soil* at Site 3					0
Sediment	Sediment	Drainage Features and Tributary to Blows Creek	Arsenic	NA	NA	0E+00	0E+00						
			(Total)	0E+00	NA	0E+00	0E+00	(Total)					0
			Total Risk Across Sediment				0E+00	Total Hazard Index Across Sediment					0
			Total Risk Across All Media and All Exposure Routes				4E-08	Total Hazard Index Across All Media and All Exposure Routes					0

* Includes both surface and subsurface soil.

Table 10.7
Risk Assessment Summary - CT
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air	Deep Groundwater - Water Vapors at Showerhead						Chloroform	Nasal	NA	0	NA	0
								(Total)		NA	0	NA	0
			Total Risk Across Vapors at Showerhead				0E+00	Total Hazard Index Across Vapors at Showerhead					0
			Total Risk Across All Media and All Exposure Routes				0E+00	Total Hazard Index Across All Media and All Exposure Routes					0

Total Nasal HI = 0

Table 10.8
Risk Assessment Summary - CT
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

Scenario Timeframe: Current
Receptor Population: Resident
Receptor Age: Adult/Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water	Arsenic	1.4E-08	NA	0.0E+00	1.4E-08						
			(Total)	1.4E-08	NA	0.0E+00	1.4E-08	(Total)					0.0
							Total Risk Across Tap water	1.4E-08					Total Hazard Index Across Tap water	0.0
							Total Risk Across All Media and All Exposure Routes	1.4E-08					Total Hazard Index Across All Media and All Exposure Routes	0

Table 10.9
Risk Assessment Summary - CT
Site 5/6
St. Juliens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air	Deep Groundwater - Water Vapors at Showerhead						Chloroform	Nasal	NA	0	NA	0
			(Total)					(Total)		NA	0	NA	0
			Total Risk Across Vapors at Showerhead				0E+00	Total Hazard Index Across Vapors at Showerhead					0
			Total Risk Across Groundwater				0E+00	Total Hazard Index Across Groundwater					0
			Total Risk Across All Media and All Exposure Routes				0E+00	Total Hazard Index Across All Media and All Exposure Routes					0

Total Nasal HI = 0

Table 10.10
Risk Assessment Summary - CT
Site 5/6
St. Julens Creek Annex
Chesapeake, Virginia

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

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Deep Groundwater	Tap Water	Arsenic	1E-08	NA	0E+00	1E-08						
			(Total)	1E-08	NA	0E+00	1E-08	(Total)					
			Total Risk Across Tap water				1E-08	Total Hazard Index Across Tap water					0
Soil*	Soil*	At Site 5	Arsenic	0E+00	NA	0E+00	0E+00						
			(Total)	0E+00	NA	0E+00	0E+00	(Total)					0
			Total Risk Across Soil* at Site 3				0E+00	Total Hazard Index Across Soil* at Site 3					0
			Total Risk Across All Media and All Exposure Routes				1E-08	Total Hazard Index Across All Media and All Exposure Routes					0

* Includes both surface and subsurface soil.

Terrestrial and Aquatic Wildlife Associated With Sites 3, 4, and 5/6 and Blows Creek and Species of Special Concern Search Results

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
P.O. Box 99
6669 Short Lane
Gloucester, Virginia 23061

December 17, 1997

Ms. Nancy Zygmont
CDM Federal Programs Corporation
107-F Corporate Boulevard
South Plainfield, New Jersey 07080

Greetings:

The U.S. Fish and Wildlife Service has received your request to review the attached project for potential impacts to federally listed or proposed endangered and threatened species and designated critical habitat in Virginia pursuant to the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.). Attached are lists of species with federal status and species of concern know to occur in the county(s) where your project is located. These lists were prepared by our office and are based on information obtained from previous surveys for rare and endangered species. Species of concern are those that have been identified as potentially imperiled or vulnerable throughout their range or a portion of their range. While these species are not legally protected under the Endangered Species Act, the Service provides this information for consideration in your environmental review process and to encourage efforts to avoid adverse impacts to these species. Protection of these species now may preclude them from becoming candidates for federal listing in the future.

Due to the limited staff in this office, we have had increasing difficulty in reviewing projects in a timely manner. Therefore, we request that you send the attached project to the following state agencies for review:

Plant Protection
Virginia Department of Agriculture & Consumer Services
P.O. Box 1163
Richmond, VA 23209
(804) 786-3515

Virginia Department of Game and Inland Fisheries
Environmental Services Section
P.O. Box 11104
Richmond, VA 23230
(804) 367-1000

Virginia Department of Conservation and Recreation
Division of Natural Heritage
1500 East Main Street, Suite 312
Richmond, VA 23219
(804) 786-7951

It is recommended that all of the agencies named above review the project because each maintains a different database and has differing expertise and/or regulatory responsibility. If any of these agencies determines that your project may impact a federally listed or proposed species or critical habitat, please contact this office. If you have any questions or need further assistance, please contact Cindy Schulz of this office at (804) 693-6694, extension 127.

Sincerely,

Karen L. Mayne

Karen L. Mayne
Supervisor
Virginia Field Office

Enclosures

CDM Federal Programs Corporation

A Subsidiary of Camp Dresser & McKee Inc.

107-F Corporate Boulevard
South Plainfield, New Jersey 07080
Tel: 908 757-9500 Fax: 908 757-9806

DEC 1997
RECEIVED
GLOUCESTER

December 10, 1997

Ms. Cindy Schulz
Virginia Field Office
U.S. Fish & Wildlife Service
Post Office Box 99
Gloucester, VA 23061

PROJECT: Contract No.:N62470-95-D-6007
Work Assignment No.s CTO-0027/CTO-0028

SUBJECT: Information request - informal consultation

Dear Ms. Schulz:

As a subcontractor of work for the Department of the Navy, CDM Federal Programs Corporation (CDM Federal) is conducting an ecological investigation as part of a Remedial Investigation at the St. Juliens Creek Annex sites, located at the confluence of St. Juliens Creek with the southern branch of the Elizabeth River, Chesapeake, Virginia (see enclosed U.S.G.S. topographic map, Norfolk South quadrangle). This request for information concerns the presence of threatened/endangered species in the vicinity of the indicated sites.

The location of the site study area is highlighted on the enclosed map. The information requested is a description of any Federal and/or State-listed threatened and/or endangered species at or within three miles of the study area.

If you have any questions, please contact me at (908) 757-9500. Thank you in advance for your prompt assistance in providing the requested information. Any related information would also be greatly appreciated.

Sincerely,

CDM FEDERAL PROGRAMS CORPORATION

Nancy Zygmont

Nancy Zygmont

Att: Site map

cc: D. Schroeder, CDM Federal WAM, FFX

NZ/27-8rsqa.wp/njjz

KEY

LE - listed endangered.

LT - listed threatened.

PE - proposed endangered.

PT - proposed threatened.

EX - believed to be extirpated in Virginia.

E(S/A) - endangered due to similarity of appearance to a federally listed species.

C - CANDIDATE. The service has enough information to list the species as threatened or endangered, but this action is precluded by other listing activities.

SPECIES OF CONCERN - those species that have been identified as potentially imperiled or vulnerable throughout their range or a portion of their range.

GLOBAL RANK - the species rarity throughout its total range.

G1 - extremely rare and critically imperiled with 5 or fewer occurrences or very few remaining individuals; or because of some factor(s) making it especially vulnerable to extinction.

G2 - very rare and imperiled with 6 to 20 occurrences or few remaining individuals; or because of some factor(s) making it vulnerable to extinction.

G3 - either very rare and local throughout its range or found locally (abundantly at some of its locations) in a restricted range; or vulnerable to extinction because of other factors. Usually fewer than 100 occurrences are documented.

G_T_ - signifies the rank of a subspecies or variety. For example, a G5T1 would apply to a subspecies of a species that is demonstrably secure globally (G5) but the subspecies warrants a rank of T1, critically imperiled.

CITY OF CHESAPEAKE, VIRGINIA
Federally Listed, Proposed, and Candidate Species

SCIENTIFIC NAME	COMMON NAME	STATUS
MAMMALS		
Sorex longirostris fisheri	Dismal Swamp southeastern shrew	LT

Last Updated: February 13, 1997
Prepared by U.S. Fish and Wildlife Service, Virginia Field Office

CITY OF CHESAPEAKE, VIRGINIA
Species of Concern

SCIENTIFIC NAME	COMMON NAME	GLOBAL RANK
INVERTEBRATES		
Euphyes dukesi	Scarce swamp skipper	G3
Pseudopolydesmus paludicolous	A millipede	G1
Stygobromus araeus	Tidewater interstitial amphipod	G2
NON-VASCULAR PLANTS		
Sphagnum macrophyllum var macrophyllum	Large-leaf peatmoss	G3T3
VASCULAR PLANTS		
Trillium pusillum var. virginianum	Virginia least trillium	G3T2

Last Updated: February 20, 1997
Prepared by U.S. Fish and Wildlife Service, Virginia Field Office

COMMONWEALTH of VIRGINIA

George Allen
Governor
Becky Norton Dunlop
Secretary of Natural Resources

Department of Game and Inland Fisheries

William L. Woodfin, Jr.
Director

November 26, 1997

Ms. Nancy Zygmont
CDM Federal Programs Corporation
107-F Corporate Boulevard
South Plainfield, NJ 07080

REF: ESS LOG# 10763

Dear Ms Zygmont:

This letter is in response to your November 6, 1997 letter regarding listed species within 3 miles of the ST. Juliens Creek Annex. Information about fish and wildlife species was generated from our agency's computerized Fish and Wildlife Information System, which describes animals that are known or may occur in a particular geographic area. Field surveys may be necessary to determine the presence or absence of some of these species on or near the proposed area. Also, additional sensitive animal species may be present, but their presence has not been documented in our information system.

There are no documented occurrences of threatened or endangered species at the immediate project site. Attached is a listing of species that may occur within the 3 mile radius specified in your letter. Each of the species have specific habitat requirements and could be found in the project area if habitat conditions are appropriate.

Endangered plants and insects are under the jurisdiction of the Virginia Department of Agriculture and Consumer Services, Bureau of Plant Protection. Questions concerning sensitive plant and insect species which may be found at the project site should be directed to John Tate at (804) 786-3515.

There is a processing charge of $26.00 for our response. Please remit a check, made payable to **TREASURER OF VIRGINIA**, within 30 days to MaryBeth Murr at the address listed on the first page. Include a copy of this letter with your payment to ensure that your account is properly credited.

This letter summarizes the likelihood of the occurrence of endangered or threatened animal species at the project site. If you have additional questions in this regard, please contact me. Please note

that this response does not address any other environmental concerns. These issues are analyzed by our Environmental Services Section, in conjunction with interagency review of applications for state and federal permits. If you have any questions in this regard, please contact Ray Fernald at (804) 367-8999.

The Wildlife Information Online Service (Service) is now available for access via modem and includes many query and reporting features such as those used to generate the information in this letter. The Service has numerous features that enhance the user's session, including current and comprehensive information about all of Virginia's fish and wildlife resources. Queries and reports can be completed for trout streams, anadromous fish, colonial birds, waterfowl, and species listed as threatened, endangered, candidate, or of special concern, as well as all wildlife. General locations of listed plant species are also provided through an arrangement with the Virginia Department of Agriculture and Consumer Services. System documentation and online help are also available. For more information, or to schedule a demonstration of the Service, please contact Kathy Quindlen, Online Service Coordinator, at (804) 367-9717.

Thank you for your interest in the wildlife resources of Virginia.

Sincerely,

Lisa P. Sausville
FWIS Wildlife Analyst

cc: R.T. Fernald

(Point search BROADMOOR, PPL; 36,46,28 76,19,16 (917678 4079871) Distance 3 miles) <AND> (Designated species by status rank by common name)
Selection of 42 on 26 NOV 1997

Code..	ST	Common Name.....	Scientific Name.....
)30074	FE	Turtle, Kemp's Ridley sea	Lepidochelys kempii
)40096	FE	Falcon, peregrine	Falco peregrinus
)30071	FT	Turtle, loggerhead sea	Caretta caretta caretta
)40093	FT	Eagle, bald	Haliaeetus leucocephalus leucoc
)40120	FT	Plover, piping	Charadrius melodus melodus
)50008	FT	Shrew, Dismal Swamp southeaste	Sorex longirostris fisheri
)30013	SE	Rattlesnake, canebrake	Crotalus horridus atricaudatus
)40129	ST	Sandpiper, upland	Bartramia longicauda
)40293	ST	Shrike, loggerhead	Lanius ludovicianus ludovicianu
)10032	SS	Sturgeon, Atlantic	Acipenser oxyrhynchus
)20005	SS	Frog, carpenter	Rana virgatipes
)20063	SS	Toad, oak	Bufo quercicus
)30067	FS	Terrapin, northern diamondback	Malaclemys terrapin terrapin
)40264	SS	Creeper, brown	Certhia americana
)40364	SS	Dickcissel	Spiza americana
)40032	SS	Egret, great	Ardea alba egretta
)40366	SS	Finch, purple	Carpodacus purpureus
)40094	SS	Harrier, northern	Circus cyaneus
)40029	SS	Heron, little blue	Egretta caerulea caerulea
)40034	SS	Heron, tricolored	Egretta tricolor
)40040	SS	Ibis, glossy	Plegadis falcinellus
)40285	SS	Kinglet, golden-crowned	Regulus satrapa
)40112	SS	Moorhen, common	Gallinula chloropus cachinnans
)40036	SS	Night-heron, yellow-crowned	Nyctanassa violacea violacea
)40262	SS	Nuthatch, red-breasted	Sitta canadensis
)40204	SS	Owl, barn	Tyto alba pratincola
)40020	SS	Pelican, brown	Pelecanus occidentalis caroline
)40110	FS	Rail, black	Laterallus jamaicensis
)40292	FS	Shrike, migrant loggerhead	Lanius ludovicianus migrans
)40189	SS	Tern, Caspian	Sterna caspia
)40180	SS	Tern, Forster's	Sterna forsteri
)40186	SS	Tern, least	Sterna antillarum
)40278	SS	Thrush, hermit	Catharus guttatus
)40320	FS	Warbler, cerulean	Dendroica cerulea
)40314	SS	Warbler, magnolia	Dendroica magnolia
)40304	SS	Warbler, Swainson's	Limnothlypis swainsonii
)40270	SS	Wren, sedge	Cistothorus platensis
)40266	SS	Wren, winter	Troglodytes troglodytes
)50034	FS	Bat, eastern big-eared	Plecotus rafinesquii macrotis
)50110	SS	Mole, small star-nosed	Condylura cristata parva
)50045	SS	Otter, river	Lontra canadensis lataxina
)50107	SS	Rabbit, marsh	Sylvilagus palustris palustris

J. Carlton Courter, III
Commissioner

COMMONWEALTH *of* VIRGINIA

Department of Agriculture and Consumer Services
Division of Consumer Protection
Office of Plant & Pest Services
PO Box 1163, Richmond, Virginia 23218
Phone: 804/786-3515 • Fax: 804/371-7793 • Hearing Impaired: 800/828-1120
http://www.state.va.us/~vdacs/vdacs.htm

November 10, 1997

Ms. Nancy Zygmont
CDM Federal Programs Corporation
107-F Corporate Boulevard
South Plainfield, New Jersey 07080

RE: Contract No. N62470-95-6007

Dear Ms Zygmont:

This letter is in response to your request for information on listed threatened or endangered plant or insect species in the vicinity of the confluence of St. Juliens Creek with the southern Branch of the Elizabeth River in Chesapeake, VA. To date, Virginia Department of Agriculture and Consumer Services records indicate that no threatened or endangered plant or insect species have been documented in the area outlined on the map that you provided. The absence of data does not necessarily mean that no listed species occur in the area, but that our files do not currently contain information to document their presence.

The Virginia Department of Agriculture and Consumer Services has jurisdiction over listed plant and insect species only. The Virginia Department of Game and Inland Fisheries has jurisdiction over all other listed threatened or endangered species. Additional information on unique geologic formations, rare or critical habitat, rare and candidate species can be obtained from the Virginia Department of Conservation and Recreation, Division of Natural Heritage.

Thank you for your interest in the endangered or threatened plant and insect species in Virginia. If you have any questions or need any additional information, please contact me.

Sincerely,

John R. Tate
Endangered Species Coordinator

George Allen
Governor

Becky Norton Dunlop
Secretary of Natural
Resources

Kathleen W. Lawrence
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

Main Street Station, 1500 East Main Street Suite 312
TDD (804) 786-2121 Richmond, Virginia 23219 (804) 786-7951 FAX (804) 371-2674
http://www.state.va.us/~ dcr/vaher.html

November 10, 1997

Nancy Zigmont
CDM Federal Programs Corporation
107-F Corporate Boulevard
South Plainfield, New Jersey 07080

Re: Contract No. N62470-95-D-6007
Work Assignment No.s CTO-0027/CTO-0028

Dear Ms. Zygmont:

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biological and Conservation Data System (BCD) for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

According to the information currently in our files, natural heritage resources have not been documented within a two mile radius of the project site. However, the absence of data may indicate that the project area has not been surveyed, rather than confirm that the area lacks natural heritage resources.

Outside of the two mile radius, several natural heritage resources have been documented on the Norfolk South quad. These natural heritage resources include the Great Egret (*Ardea alba*, G5/S2B, S4N/NF/SC), the Peregrine Falcon (*Falco peregrinus*, G4/S1/LE/LE), the Tidewater interstitial amphipod (*Stygobromus araeus*, G2/S2/SOC/SC), and the bay-gail holly (*Ilex coriacea*, G5/S2/NF/NS). I have also included a list of natural heritage resources for the cities of Norfolk, Portsmouth, and Chesapeake for your information.

DCR's Biological and Conservation Data System is constantly growing and revised. Please contact DCR for an update on this natural heritage information if a significant amount of time passes before it is utilized.

A fee of $65.00 has been assessed for the service of providing this information. Please find

enclosed an invoice for that amount. Please return one copy of the invoice along with your remittance made payable to the Treasurer of Virginia, Department of Conservation and Recreation, Post Office Box 721, Richmond, VA 23206-0721, ATTN: Financial Services. Payment is due within thirty days of the invoice date.

Thank you for the opportunity to comment on this project.

Sincerely,

Lesa S. Berlinghoff
Project Review Coordinator

DEPARTMENT OF CONSERVATION & RECREATION
DIVISION OF NATURAL HERITAGE

NATURAL HERITAGE RESOURCES OF
CHESAPEAKE, NORFOLK & PORTSMOUTH CITIES

SCIENTIFIC NAME	COMMON NAME	GLOBAL RANK	STATE RANK	FEDERAL STATUS	STATE STATUS	*LAST SEEN IN CC SINCE 1980?
*CHESAPEAKE						
BIRDS						
ARDEA ALBA	GREAT EGRET	G5	S2B,S4		SC	Y
IXOBRYCHUS EXILIS	LEAST BITTERN	G5	S2			Y
COMMUNITIES						
EUTROPHIC SEMIPERMANENTLY FLOODED FOREST						Y
MID-HEIGHT HERBACEOUS WETLAND						Y
OLIGOTROPHIC SATURATED FOREST						N
OLIGOTROPHIC SATURATED WOODLAND						Y
OLIGOTROPHIC SEMIPERMANENTLY FLOODED WOODLAND						Y
SUBMESOTROPHIC FOREST						Y
INVERTEBRATES						
ATLIDES HALESUS	GREAT PURPLE HAIRSTREAK	G5	S2S3			Y
ENALLAGMA PALLIDUM	PALE BLUET	G4	S1			Y
EUPHYES DUKESI	SCARCE SWAMP SKIPPER	G3	S2			Y
MAMMALS						
CORYNORHINUS RAFINESQUII	EASTERN BIG-EARED BAT	G3G4	S1	SOC	LE	Y
SOREX LONGIROSTRIS FISHERI	DISMAL SWAMP SOUTHEASTERN SHREW	G5T2	S2	LT	LT	Y
NON-VASCULAR PLANTS						
SPHAGNUM TRINITENSE	TRINIDAD PEATMOSS	G4	S2S3			N
REPTILES						
CROTALUS HORRIDUS ATRICAUDATUS	CANEBRAKE RATTLESNAKE	G5TUQ	S1		LE	N
VASCULAR PLANTS						
CAREX DECOMPOSITA	EPIPHYTIC SEDGE	G4	S2			Y
CLADIUM JAMAICENSE	SAWGRASS	G5T5	S1			Y
COREOPSIS FALCATA	POOL COREOPSIS	G4G5	S1			N
CUSCUTA INDECORA	PRETTY DODDER	G5	S2?			Y
DICHANTHELIUM CONSANGUINEUM	BLOOD WITCHGRASS	G5	S1?			Y
ERIOCAULON DECANGULARE	TEN-ANGLE PIPEWORT	G5	S2			N
ILEX CORIACEA	BAY-GALL HOLLY	G5	S2			Y
LOBELIA ELONGATA	ELONGATED LOBELIA	G4G5	S1			Y
LUDWIGIA ALATA	WINGED SEEDBOX	G3G4	S1			Y
LUDWIGIA RAVENII	RAVEN'S SEEDBOX	G2?	S1			Y
PANICUM HEMITOMON	MAIDENCANE	G5?	S2			Y
PASPALUM DISSECTUM	WALTER PASPALUM	G4?	S1			Y
PYCNANTHEMUM SETOSUM	AWNED MOUNTAIN-MINT	G3?	S1			N
RHYNCHOSPORA SCIRPOIDES	LONG-BEAKED BALDRUSH	G4	S1			N
SOLIDAGO LATISSIMIFOLIA	ELLIOTT GOLDENROD	G5	S2			Y
STACHYS ASPERA	ROUGH HEDGE-NETTLE	G4	S2			Y
TILLANDSIA USNEOIDES	SPANISH MOSS	G5	S2			Y
TRILLIUM PUSILLUM VAR VIRGINIANUM	VIRGINIA LEAST TRILLIUM	G3T2	S2	SOC		Y
UTRICULARIA PURPUREA	PURPLE BLADDERWORT	G5	S2			Y
XYRIS FIMBRIATA	FRINGED YELLOW-EYED-GRASS	G5	S1			Y
XYRIS IRIDIFOLIA	IRISLEAF YELLOW-EYED-GRASS	G4G5T4T5	S1			Y

36 Records Processed

DEPARTMENT OF CONSERVATION & RECREATION
DIVISION OF NATURAL HERITAGE

NATURAL HERITAGE RESOURCES OF
CHESAPEAKE, NORFOLK & PORTSMOUTH CITIES

SCIENTIFIC NAME	COMMON NAME	GLOBAL RANK	STATE RANK	FEDERAL STATUS	STATE STATUS	*LAST SEEN IN CC SINCE 1980?
**CITY OF NORFOLK						
* BIRDS						
FALCO PEREGRINUS	PEREGRINE FALCON	G4	S1	LE	LE	Y
NYCTANASSA VIOLACEA	YELLOW-CROWNED NIGHT-HERON	G5	S2		SC	Y
RYNCHOPS NIGER	BLACK SKIMMER	G5	S2			Y
STERNA ANTILLARUM	LEAST TERN	G4	S2		SC	Y
* VASCULAR PLANTS						
SOLIDAGO TORTIFOLIA	A GOLDENROD	G4G5	S1			N
TILLANDSIA USNEOIDES	SPANISH MOSS	G5	S2			N
6 Records Processed						
**CITY OF PORTSMOUTH						
* BIRDS						
ARDEA ALBA	GREAT EGRET	G5	S2B,S4		SC	Y
CHARADRIUS MELODUS	PIPING PLOVER	G3	S2	LT	LT	Y
HIMANTOPUS MEXICANUS	BLACK-NECKED STILT	G5	S1			Y
STERNA ANTILLARUM	LEAST TERN	G4	S2		SC	Y
[illegible]ords Processed						

*Indicates at least one occurrence in the county seen since 1980

Definition of Abbreviations Used on Natural Heritage Resource Lists
of the
Virginia Department of Conservation and Recreation

Natural Heritage Ranks

The following ranks are used by the Virginia Department of Conservation and Recreation to set protection priorities for natural heritage resources. Natural Heritage Resources, or "NHR's," are rare plant and animal species, rare and exemplary natural communities, and significant geologic features. The primary criterion for ranking NHR's is the number of populations or occurrences, i.e. the number of known distinct localities. Also of great importance is the number of individuals in existence at each locality or, if a highly mobile organism (e.g., sea turtles, many birds, and butterflies), the total number of individuals. Other considerations may include the quality of the occurrences, the number of protected occurrences, and threats. However, the emphasis remains on the number of populations or occurrences such that ranks will be an index of known biological rarity.

S1 Extremely rare; usually 5 or fewer populations or occurrences in the state; or may be a few remaining individuals; often especially vulnerable to extirpation.

S2 Very rare; usually between 5 and 20 populations or occurrences; or with many individuals in fewer occurrences; often susceptible to becoming extirpated.

S3 Rare to uncommon; usually between 20 and 100 populations or occurrences; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances.

S4 Common; usually >100 populations or occurrences, but may be fewer with many large populations; may be restricted to only a portion of the state; usually not susceptible to immediate threats.

S5 Very common; demonstrably secure under present conditions.

SA Accidental in the state.

S#B Breeding status of an organism within the state.

SH Historically known from the state, but not verified for an extended period, usually > 15 years; this rank is used primarily when inventory has been attempted recently.

S#N Non-breeding status within the state. Usually applied to winter resident species.

SU Status uncertain, often because of low search effort or cryptic nature of the element.

SX Apparently extirpated from the state.

SZ Long distance migrant whose occurrences during migration are too irregular, transitory and/or dispersed to be reliably identified, mapped and protected.

Global ranks are similar, but refer to a species' rarity throughout its total range. Global ranks are denoted with a "G" followed by a character. Note that GA and GN are not used and GX means apparently extinct. A "Q" in a rank indicates that a taxonomic question concerning that species exists. Ranks for subspecies are denoted with a "T". The global and state ranks combined (e.g. G2/S1) give an instant grasp of a species' known rarity.

These ranks should not be interpreted as legal designations.

Federal Legal Status

The Division of Natural Heritage uses the standard abbreviations for Federal endangerment developed by the U.S. Fish and Wildlife Service, Division of Endangered Species and Habitat Conservation.

LE - Listed Endangered
LT - Listed Threatened
PE - Proposed Endangered
PT - Proposed Threatened
C - Candidate (formerly C1-Candidate, category 1)
SOC - Species of concern (formerly C2-Candidate, category 2)
NF - no federal legal status

State Legal Status

The Division of Natural Heritage uses similar abbreviations for State endangerment.

LE - Listed Endangered
LT - Listed Threatened
C - Candidate
PE - Proposed Endangered
PT - Proposed Threatened
NS - no state legal status

For information on the laws pertaining to threatened or endangered species, contact:

U.S. Fish and Wildlife Service for all FEDERALLY listed species
Department of Agriculture and Consumer Services Plant Protection Bureau for STATE listed plants and insects
Department of Game and Inland Fisheries for all other STATE listed animals

5/96

Definitions of Abbreviations Used on Natural Heritage Resource Lists

State Rank

The following ranks are used by the Virginia Department of Conservation and Recreation to set protection priorities for natural heritage resources. Natural Heritage Resources, or "NHR's," are rare plant and animal species, rare and exemplary natural communities, and significant geologic features. The criterion for ranking NHR's is the number of populations or occurrences, i.e. the number of known distinct localities; the number of individuals in existence at each locality or, if a highly mobile organism (e.g., sea turtles, many birds, and butterflies), the total number of individuals; the quality of the occurrences, the number of protected occurrences; and threats.

- **S1** - Extremely rare; usually 5 or fewer populations or occurrences in the state; or may be a few remaining individuals; often especially vulnerable to extirpation.
- **S2** - Very rare; usually between 5 and 20 populations or occurrences; or with many individuals in fewer occurrences; often susceptible to becoming extirpated.
- **S3** - Rare to uncommon; usually between 20 and 100 populations or occurrences; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances.
- **S4** - Common; usually >100 populations or occurrences, but may be fewer with many large populations; may be restricted to only a portion of the state; usually not susceptible to immediate threats.
- **S5** - Very common; demonstrably secure under present conditions.
- **SA** - Accidental in the state.
- **S#B** - Breeding status of an organism within the state.
- **SH** - Historically known from the state, but not verified for an extended period, usually > 15 years; this rank is used primarily when inventory has been attempted recently.
- **S#N** - Non-breeding status within the state. Usually applied to winter resident species.
- **SU** - Status uncertain, often because of low search effort or cryptic nature of the element.
- **SX** - Apparently extirpated from the state.
- **SZ** - Long distance migrant whose occurrences during migration are too irregular, transitory and/or dispersed to be reliably identified, mapped and protected.

Global ranks are similar, but refer to a species' rarity throughout its total range. Global ranks are denoted with a "G" followed by a character. Note that GA and GN are not used and GX means apparently extinct. A "Q" in a rank indicates that a taxonomic question concerning that species exists. Ranks for subspecies are denoted with a "T". The global and state ranks combined (e.g. G2/S1) give an instant grasp of a species' known rarity.

These ranks should not be interpreted as legal designations.

FEDERAL STATUS

The Division of Natural Heritage uses the standard abbreviations for Federal endangerment developed by the U.S. Fish and Wildlife Service, Division of Endangered Species and Habitat Conservation.

LE - Listed Endangered	**LT** - Listed Threatened	**PE** - Proposed Endangered	**PT** - Proposed Threatened
C - Candidate (formerly C1 - Candidate category 1)	**E(S/A)** - treat as endangered because of similarity of appearance	**T(S/A)** - treat as threatened because of similarity of appearance	

STATE STATUS

The Division of Natural Heritage uses similar abbreviations for State endangerment.

LE - Listed Endangered	**PE** - Proposed Endangered	**SC** - Special Concern - animals that merit special concern according to VDGIF (not a regulatory category)
LT - Listed Threatened	**PT** - Proposed Threatened	**C** - Candidate

For information on the laws pertaining to threatened or endangered species, please contact:

U.S. Fish and Wildlife Service for all **FEDERALLY** listed species;
Department of Agriculture and Consumer Services, Plant Protection Bureau for **STATE listed plants and insects**
Department of Game and Inland Fisheries for all other **STATE listed animals**

Use the "back" button on your browser to return to a specific list or click below to:

Return to the county index

Return to the rare plants and animals lists

Return to the Virginia Natural Heritage Program *home page*

2.1.2.3 Rare, Threatened, and Endangered Species

An inventory of rare, threatened, and endangered vertebrate and plant species was conducted on NAS Oceana in 1989 by the Virginia Department of Conservation and Recreation, Division of Natural Heritage (DNH), and was published in a Natural Heritage Technical Report (DNH 1990). These results were updated and verified by checking the DNH, VA Department of Game and Inland Fisheries, and USFWS web sites for rare and endangered species (http://www.dcr.state.va.us/dnh/rare.htm, http://www.dgif.state.va.us/wildlife/index.cfm, and http://endangered.fws.gov/). The updated information, in conjunction with the earlier DNH report (DNH 1990) suggests that ~~According to this report, and correspondence with DNH,~~ no rare, threatened, or endangered wildlife species are known to occur at NAS Oceana, with the possible exception of occasional transient species (CH2M HILL 1993). These species are discussed below. Several rare plant species have been found on the station (see below).

Wildlife. The following three listed species reside or migrate through southeastern Virginia and could be found at the station:

- Peregrine falcon (*Falco peregrinus*). Listed as endangered in the commonwealth of Virginia, the peregrine falcon can be found in coastal areas during migration, particularly in September and October. In addition, hacking stations (release areas) have been established for the peregrine falcon on the Eastern Shore and in Back Bay National Wildlife Refuge (RGH 1984).

- Bald eagle (*Haliaeetus leucocephalus*). This species is listed as endangered in the commonwealth of Virginia and threatened in portions of the lower 48 United States. The bald eagle was proposed for removal from the federal list in July 1999. Virginia provides prime habitat for the bald eagle. In 1978, 37 active nests were located in the state (RGH 1984). There are currently no known bald eagles nesting in the immediate area of NAS Oceana. Some birds, however, do winter along area beaches or pass through the region during migration.

- Swainson's warbler (*Limnothlypis swainsonii*). This species is known to inhabit areas with abundant giant cane. This habitat was once common in Virginia Beach and is found on NAS Oceana. The findings of the DNH technical report (DNH 1990) are that only marginally suitable habitat was found at the station for this species.

Natural Heritage Resources of the City of Chesapeake, Virginia

For an explanation of the rank and status codes click *here*

last updated: FEBRUARY 2000

SCIENTIFIC NAME	COMMON NAME	GLOBAL RANK	ST RA
** AMPHIBIANS			
BUFO QUERCICUS	OAK TOAD	G5	S1
SIREN LACERTINA	GREATER SIREN	G5	S2
** BIRDS			
ARDEA ALBA	GREAT EGRET	G5	S2
IXOBRYCHUS EXILIS	LEAST BITTERN	G5	S2
** COMMUNITIES			
	BALDCYPRESS-TUPELO SWAMP		
	HIGH POCOSIN		
	POND PINE FOREST/WOODLAND		
	PEATLAND ATLANTIC WHITE CEDAR FOREST		
	TIDAL BALDCYPRESS WOODLAND/SAVANNA		
	TIDAL OLIGOHALINE MARSH		
	MESIC MIXED HARDWOOD FOREST		
** INVERTEBRATES			
ATLIDES HALESUS	GREAT PURPLE HAIRSTREAK	G5	S2
CALEPHELIS VIRGINIENSIS	LITTLE METALMARK	G4	S2
ENALLAGMA PALLIDUM	PALE BLUET	G4	S1

EUPHYES DUKESI	SCARCE SWAMP SKIPPER	G3	S2
PSEUDOPOLYDESMUS PALUDICOLOUS	A MILLIPEDE	G1	S1
STYGOBROMUS ARAEUS	TIDEWATER INTERSTITIAL AMPHIPOD	G2G3	S2

** MAMMALS

CORYNORHINUS RAFINESQUII	EASTERN BIG-EARED BAT	G3G4	S1
MYOTIS AUSTRORIPARIUS	SOUTHEASTERN MYOTIS	G3G4	S1
SOREX LONGIROSTRIS FISHERI	DISMAL SWAMP SOUTHEASTERN SHREW	G5T2T3	S2

** NON-VASCULAR PLANTS

SPHAGNUM FLAVICOMANS		G3?	S?
SPHAGNUM MACROPHYLLUM VAR MACROPHYLLUM	LARGE-LEAF PEATMOSS	G3T3	S2
SPHAGNUM TRINITENSE	TRINIDAD PEATMOSS	G4	S2

** REPTILES

CROTALUS HORRIDUS ATRICAUDATUS	CANEBRAKE RATTLESNAKE	G4TUQ	S1

** VASCULAR PLANTS

ASTER PUNICEUS VAR ELLIOTTII	ELLIOTT'S ASTER	G5T3T4	S1
CAREX DECOMPOSITA	EPIPHYTIC SEDGE	G3	S2
CLADIUM JAMAICENSE	SAWGRASS	G5T5	S1
COREOPSIS FALCATA	POOL COREOPSIS	G4G5	S1
CUSCUTA INDECORA	PRETTY DODDER	G5	S2
DICHANTHELIUM CONSANGUINEUM	BLOOD WITCHGRASS	G5	S1
ERIGERON VERNUS	WHITE-TOP FLEABANE	G5	S2
ERIOCAULON DECANGULARE	TEN-ANGLE PIPEWORT	G5	S2
ILEX CORIACEA	BAY-GAIL HOLLY	G5	S2
KALMIA CAROLINA	CAROLINA SHEEP-LAUREL	G4	S2
LACHNANTHES CAROLIANA	CAROLINA REDROOT	G4	SH
LOBELIA ELONGATA	ELONGATED LOBELIA	G4G5	S1
LUDWIGIA ALATA	WINGED SEEDBOX	G4	S1

LUDWIGIA RAVENII	RAVEN'S SEEDBOX	G2?	S1
MITREOLA PETIOLATA	LAX HORNPOD	G5	S1
PANICUM HEMITOMON	MAIDENCANE	G5?	S2
PASPALUM DISSECTUM	WALTER PASPALUM	G4?	S2
PHYSOSTEGIA LEPTOPHYLLA	SLENDER-LEAVED DRAGON-HEAD	G4?	S2
PYCNANTHEMUM SETOSUM	AWNED MOUNTAIN-MINT	G3?	S1
RHYNCHOSPORA SCIRPOIDES	LONG-BEAKED BALDRUSH	G4	S1
SAGITTARIA ENGELMANNIANA	ENGELMANN ARROWHEAD	G5?	SH
SOLIDAGO LATISSIMIFOLIA	ELLIOTT GOLDENROD	G5	S2
SOLIDAGO TORTIFOLIA	A GOLDENROD	G4G5	S1
STACHYS ASPERA	ROUGH HEDGE-NETTLE	G4?	S2
TILLANDSIA USNEOIDES	SPANISH MOSS	G5	S2
TRILLIUM PUSILLUM VAR VIRGINIANUM	VIRGINIA LEAST TRILLIUM	G3T2	S2
UTRICULARIA PURPUREA	PURPLE BLADDERWORT	G5	S2
XYRIS FIMBRIATA	FRINGED YELLOW-EYED-GRASS	G5	S1
XYRIS IRIDIFOLIA	IRISLEAF YELLOW-EYED-GRASS	G4G5T4T5	S1

53 Records Processed

Return to the county list
Return to the Virginia Natural Heritage Program *home page*

The Virginia Fish and Wildlife Information Service

Point Search Site Location Map

Nearest Cultural Names
Species List

Area description within 3 miles of location point 36,47,01 76,19,39

Report compiled 13 April 2001

^23 Geographic Names within 3000 meters

Distance (meters)	Location	Name
413	36,47,14 76,19,43	Brentwood (ppl)
793	36,46,45 76,20,04	Treakle School (school)
851	36,46,51 76,20,11	Geneva Park (ppl)
1102	36,46,31 76,20,03	Loxley Gardens (ppl)
1168	36,46,28 76,19,16	Broadmoor (ppl)
1483	36,47,45 76,19,15	Cradock (ppl)
1584	36,46,46 76,18,38	Saint Julian Creek (stream)
1672	36,47,55 76,19,44	Williams Court (ppl)
1701	36,47,52 76,19,13	Hurst School (school)
1904	36,47,55 76,20,16	Loxley Place (ppl)
1912	36,46,47 76,18,24	Money Point (cape)
1970	36,46,15 76,18,44	Gilmerton (ppl)
2039	36,47,26 76,18,23	Blows Creek (stream)
2056	36,48,07 76,19,28	Cradock High School (school)
2193	36,45,51 76,19,24	Gilmerton Deep Creek Canal (canal)

2250	36,46,38 76,18,13	Upper Reach (channel)
2423	36,46,40 76,18,05	Elizabeth River Terminals (locale)
2424	36,47,35 76,21,07	Victory Park (ppl)
2520	36,48,16 76,18,59	Cradock School (school)
2749	36,48,30 76,19,41	Lincoln Memorial Cemetery (cemetery)
2751	36,48,28 76,19,15	Town and Country Shopping Center (locale)
2953	36,46,40 76,17,43	Milldam Creek (stream)
2987	36,48,37 76,19,24	Gosport (ppl)

^

^528 Species

Code	Status	Confirmed	Common Name	Scientific Name
030074	FE	No	Turtle, Kemp's Ridley sea	*Lepidochelys kempii*
040228	FE	Yes	Woodpecker, red-cockaded	*Picoides borealis borealis*
040093	FTSE	Yes	Eagle, bald	*Haliaeetus leucocephalus leucocephalus*
030071	FT	No	Turtle, loggerhead sea	*Caretta caretta caretta*
040120	FT	Yes	Plover, piping	*Charadrius melodus melodus*
050034	FSSE	No	Bat, eastern big-eared	*Plecotus (Corynorhinus) rafinesquii macrotis*
040292	FSST	No	Shrike, migrant loggerhead	*Lanius ludovicianus migrans*
030067	FS	No	Terrapin, northern diamond-backed	*Malaclemys terrapin terrapin*
040110	FS	Yes	Rail, black	*Laterallus jamaicensis*
040320	FS	No	Warbler, cerulean	*Dendroica cerulea*
030013	SE	No	Rattlesnake, canebrake	*Crotalus horridus atricaudatus*
040096	SE	No	Falcon, peregrine	*Falco peregrinus*
040129	ST	No	Sandpiper, upland	*Bartramia longicauda*
040293	ST	Yes	Shrike, loggerhead	*Lanius ludovicianus ludovicianus*
050008	ST	No	Shrew, Dismal Swamp southeastern	*Sorex longirostris fisheri*
010032	SS	No	Sturgeon, Atlantic	*Acipenser oxyrhynchus*

020005	SS	No	Frog, carpenter	*Rana virgatipes*
020063	SS	No	Toad, oak	*Bufo quercicus*
040264	SS	Yes	Creeper, brown	*Certhia americana*
040364	SS	No	Dickcissel	*Spiza americana*
040032	SS	Yes	Egret, great	*Ardea alba egretta*
040366	SS	Yes	Finch, purple	*Carpodacus purpureus*
040094	SS	Yes	Harrier, northern	*Circus cyaneus*
040029	SS	No	Heron, little blue	*Egretta caerulea caerulea*
040034	SS	No	Heron, tricolored	*Egretta tricolor*
040040	SS	No	Ibis, glossy	*Plegadis falcinellus*
040285	SS	Yes	Kinglet, golden-crowned	*Regulus satrapa*
040112	SS	No	Moorhen, common	*Gallinula chloropus cachinnans*
040036	SS	Yes	Night-heron, yellow-crowned	*Nyctanassa violacea violacea*
040262	SS	Yes	Nuthatch, red-breasted	*Sitta canadensis*
040204	SS	No	Owl, barn	*Tyto alba pratincola*
040020	SS	No	Pelican, brown	*Pelecanus occidentalis carolinensis*
040381	SS	Yes	Sparrow, saltmarsh sharp-tailed	*Ammodramus caudacutus diversus*
040189	SS	No	Tern, Caspian	*Sterna caspia*
040180	SS	Yes	Tern, Forster's	*Sterna forsteri*
040186	SS	No	Tern, least	*Sterna antillarum*
040278	SS	Yes	Thrush, hermit	*Catharus guttatus*
040304	SS	No	Warbler, Swainson's	*Limnothlypis swainsonii*
040270	SS	Yes	Wren, sedge	*Cistothorus platensis*
040266	SS	Yes	Wren, winter	*Troglodytes troglodytes*
050110	SS	No	Mole, small star-nosed	*Condylura cristata parva*
050045	SS	No	Otter, river	*Lontra canadensis lataxina*
050107	SS	No	Rabbit, marsh	*Sylvilagus palustris palustris*

010038	Yes	Alewife	*Alosa pseudoharengus*
010188	No	Bass, largemouth	*Micropterus salmoides*
010183	Yes	Bluegill	*Lepomis macrochirus*
010034	No	Bowfin	*Amia calva*
010123	Yes	Bullhead, brown	*Ameiurus nebulosus*
010122	Yes	Bullhead, yellow	*Ameiurus natalis*
010062	Yes	Carp, common	*Cyprinus carpio*
010125	Yes	Catfish, channel	*Ictalurus punctatus*
010120	Yes	Catfish, white	*Ameiurus catus*
010106	No	Chubsucker, creek	*Erimyzon oblongus*
010107	No	Chubsucker, lake	*Erimyzon sucetta*
010190	Yes	Crappie, black	*Pomoxis nigromaculatus*
010366	No	Dace, rosyside	*Clinostomus funduloides*
010194	Yes	Darter, swamp	*Etheostoma fusiforme*
010131	Yes	Eel, American	*Anguilla rostrata*
010176	Yes	Flier	*Centrarchus macropterus*
010033	No	Gar, longnose	*Lepisosteus osseus*
010045	Yes	Herring, blueback	*Alosa aestivalis*
010143	Yes	Killifish, banded	*Fundulus diaphanus*
010002	No	Lamprey, sea	*Petromyzon marinus*
010128	No	Madtom, tadpole	*Noturus gyrinus*
010408	No	Minnow, eastern silvery	*Hybognathus regius*
010148	Yes	Mosquitofish, eastern	*Gambusia holbrooki*
010054	No	Mudminnow, eastern	*Umbra pygmaea*
010144	Yes	Mummichog	*Fundulus heteroclitus*
010163	Yes	Perch, pirate	*Aphredoderus sayanus sayanus*

010166	Yes	Perch, white	*Morone americana*
010206	Yes	Perch, yellow	*Perca flavescens*
010056	Yes	Pickerel, chain	*Esox niger*
010055	Yes	Pickerel, redfin	*Esox americanus americanus*
010182	Yes	Pumpkinseed	*Lepomis gibbosus*
010040	Yes	Shad, American	*Alosa sapidissima*
010041	Yes	Shad, gizzard	*Dorosoma cepedianum*
010042	Yes	Shad, threadfin	*Dorosoma petenense*
010068	Yes	Shiner, golden	*Notemigonus crysoleucas*
010179	Yes	Sunfish, banded	*Enneacanthus obesus*
010178	Yes	Sunfish, bluespotted	*Enneacanthus gloriosus*
010173	Yes	Sunfish, mud	*Acantharchus pomotis*
010149	No	Swampfish	*Chologaster cornuta*
010177	No	Warmouth	*Lepomis gulosus*
020001	No	Amphiuma, two-toed	*Amphiuma means*
020004	No	Bullfrog	*Rana catesbeiana*
020003	Yes	Frog, Brimley's chorus	*Pseudacris brimleyi*
020015	No	Frog, coastal plain cricket	*Acris gryllus gryllus*
020010	No	Frog, little grass	*Pseudacris ocularis*
020008	No	Frog, southern green	*Rana clamitans melanota*
020016	Yes	Frog, southern leopard	*Rana sphenocephala*
020065	No	Newt, red-spotted	*Notophthalmus viridescens viridescens*
020071	Yes	Peeper, northern spring	*Pseudacris crucifer crucifer*
020084	Yes	Salamander, Atlantic Coast Slimy	*Plethodon chlorobryonis*
020069	No	Salamander, eastern mud	*Pseudotriton montanus montanus*
020029	No	Salamander, four-toed	*Hemidactylium scutatum*
020034	Yes	Salamander, many-lined	*Stereochilus marginatus*
020035	No	Salamander, marbled	*Ambystoma opacum*
020038	No	Salamander, northern dusky	*Desmognathus fuscus*
020043	Yes	Salamander, northern red-backed	*Plethodon cinereus*

020048	No	Salamander, southern dusky	*Desmognathus auriculatus*
020050	No	Salamander, southern two-lined	*Eurycea cirrigera*
020051	No	Salamander, three-lined	*Eurycea guttolineata*
020058	No	Siren, greater	*Siren lacertina*
020061	No	Spadefoot, eastern	*Scaphiopus holbrooki*
020062	No	Toad, Fowler's	*Bufo fowleri*
020060	No	Toad, eastern narrow-mouthed	*Gastrophryne carolinensis*
020064	No	Toad, southern	*Bufo terrestris*
020006	Yes	Treefrog, Cope's gray	*Hyla chrysoscelis*
020009	Yes	Treefrog, green	*Hyla cinerea*
020014	No	Treefrog, pine woods	*Hyla femoralis*
020017	Yes	Treefrog, squirrel	*Hyla squirrela*
030055	No	Cooter, Coastal Plain	*Pseudemys concinna floridana*
030057	No	Cooter, northern red-bellied	*Pseudemys rubriventris rubriventris*
030016	No	Copperhead, northern	*Agkistrodon contortrix mokasen*
030015	No	Cottonmouth, eastern	*Agkistrodon piscivorus piscivorus*
030026	Yes	Kingsnake, eastern	*Lampropeltis getula getula*
030009	No	Lizard, eastern slender glass	*Ophisaurus attenuatus longicaudus*
030002	No	Lizard, northern fence	*Sceloporus undulatus hyacinthinus*
030018	No	Racer, northern black	*Coluber constrictor constrictor*
030008	No	Racerunner, six-lined	*Cnemidophorus sexlineatus sexlineatus*
030006	No	Skink, broadhead	*Eumeces laticeps*
030004	No	Skink, five-lined	*Eumeces fasciatus*
030007	No	Skink, little brown	*Scincella lateralis*
030005	No	Skink, southeastern five-lined	*Eumeces inexpectatus*
030058	No	Slider, yellowbellied	*Trachemys scripta scripta*

030023	Yes	Snake, black rat	*Elaphe obsoleta obsoleta*
030037	No	Snake, brown water	*Nerodia taxispilota*
030044	No	Snake, eastern garter	*Thamnophis sirtalis sirtalis*
030024	No	Snake, eastern hognose	*Heterodon platirhinos*
030029	No	Snake, eastern milk	*Lampropeltis triangulum triangulum*
030025	No	Snake, eastern mud	*Farancia abacura abacura*
030045	No	Snake, eastern ribbon	*Thamnophis sauritus sauritus*
030049	No	Snake, eastern smooth earth	*Virginia valeriae valeriae*
030019	No	Snake, eastern worm	*Carphophis amoenus amoenus*
030041	No	Snake, northern brown	*Storeria dekayi dekayi*
030042	No	Snake, northern red-bellied	*Storeria occipitomaculata occipitomaculata*
030020	No	Snake, northern ringneck	*Diadophis punctatus edwardsii*
030017	No	Snake, northern scarlet	*Cemophora coccinea copei*
030034	No	Snake, northern water	*Nerodia sipedon sipedon*
030046	No	Snake, rainbow	*Farancia erytrogramma erytrogramma*
030036	No	Snake, red-bellied water	*Nerodia erythrogaster erythrogaster*
030047	No	Snake, rough earth	*Virginia striatula*
030038	No	Snake, rough green	*Opheodrys aestivus aestivus*
030021	No	Snake, southern ringneck	*Diadophis punctatus punctatus*
030068	Yes	Turtle, eastern box	*Terrapene carolina carolina*
030051	No	Turtle, eastern mud	*Kinosternon subrubrum subrubrum*
030052	No	Turtle, eastern musk (= stinkpot)	*Sternotherus odoratus*
030060	No	Turtle, eastern painted	*Chrysemys picta picta*
030050	Yes	Turtle, eastern snapping	*Chelydra serpentina serpentina*
030063	No	Turtle, spotted	*Clemmys guttata*
030076	No	Turtle, striped mud	*Kinosternon baurii*

040116	No	Avocet, American	*Recurvirostra americana*
040038	Yes	Bittern, American	*Botaurus lentiginosus*
040037	Yes	Bittern, least	*Ixobrychus exilis exilis*
040350	Yes	Blackbird, Brewer's	*Euphagus cyanocephalus*
040346	Yes	Blackbird, red-winged	*Agelaius phoeniceus*
040349	Yes	Blackbird, rusty	*Euphagus carolinus*
040282	Yes	Bluebird, eastern	*Sialia sialis*
040343	No	Bobolink	*Dolichonyx oryzivorus*
040100	Yes	Bobwhite, northern	*Colinus virginianus*
040068	Yes	Bufflehead	*Bucephala albeola*
040361	Yes	Bunting, indigo	*Passerina cyanea*
040401	Yes	Bunting, snow	*Plectrophenax nivalis nivalis*
040064	Yes	Canvasback	*Aythya valisineria*
040357	Yes	Cardinal, northern	*Cardinalis cardinalis*
040272	Yes	Catbird, gray	*Dumetella carolinensis*
040337	Yes	Chat, yellow-breasted	*Icteria virens virens*
040258	Yes	Chickadee, Carolina	*Poecile carolinensis*
040214	No	Chuck-will's-widow	*Caprimulgus carolinensis*
040113	Yes	Coot, American	*Fulica americana*
040024	Yes	Cormorant, double-crested	*Phalacrocorax auritus*
040023	Yes	Cormorant, great	*Phalacrocorax carbo*
040353	Yes	Cowbird, brown-headed	*Molothrus ater*
040373	No	Crossbill, white-winged	*Loxia leucoptera*
040255	Yes	Crow, American	*Corvus brachyrhynchos*
040256	Yes	Crow, fish	*Corvus ossifragus*
040203	No	Cuckoo, black-billed	*Coccyzus erythropthalmus*

040202	Yes	Cuckoo, yellow-billed	*Coccyzus americanus*
040198	Yes	Dove, mourning	*Zenaida macroura carolinensis*
040197	Yes	Dove, rock	*Columba livia*
040143	No	Dowitcher, long-billed	*Limnodromus scolopaceus*
040142	No	Dowitcher, short-billed	*Limnodromus griseus*
040052	Yes	Duck, American black	*Anas rubripes*
040063	Yes	Duck, ring-necked	*Aythya collaris*
040076	Yes	Duck, ruddy	*Oxyura jamaicensis*
040061	Yes	Duck, wood	*Aix sponsa*
040154	Yes	Dunlin	*Calidris alpina hudsonia*
040030	No	Egret, cattle	*Bubulcus ibis*
040033	Yes	Egret, snowy	*Egretta thula*
040367	No	Finch, house	*Carpodacus mexicanus*
040221	Yes	Flicker, northern	*Colaptes auratus*
040239	Yes	Flycatcher, Acadian	*Empidonax virescens*
040234	Yes	Flycatcher, great crested	*Myiarchus crinitus*
040053	Yes	Gadwall	*Anas strepera*
040022	Yes	Gannet, northern	*Morus bassanus*
040284	Yes	Gnatcatcher, blue-gray	*Polioptila caerulea*
040126	No	Godwit, marbled	*Limosa fedoa*
040067	Yes	Goldeneye, common	*Bucephala clangula americana*
040371	Yes	Goldfinch, American	*Carduelis tristis*
040045	Yes	Goose, Canada	*Branta canadensis*
040049	No	Goose, lesser snow	*Chen caerulescens caerulescens*
040410	No	Goose, snow	*Chen caerulescens atlanticus*
040351	Yes	Grackle, boat-tailed	*Quiscalus major*

040352	Yes	Grackle, common	*Quiscalus quiscula*
040006	Yes	Grebe, eared	*Podiceps nigricollis*
040005	Yes	Grebe, horned	*Podiceps auritus*
040008	Yes	Grebe, pied-billed	*Podilymbus podiceps*
040004	Yes	Grebe, red-necked	*Podiceps grisegena*
040360	Yes	Grosbeak, blue	*Guiraca caerulea caerulea*
040365	Yes	Grosbeak, evening	*Coccothraustes vespertinus*
040175	Yes	Gull, Bonaparte's	*Larus philadelphia*
040165	Yes	Gull, great black-backed	*Larus marinus*
040167	Yes	Gull, herring	*Larus argentatus*
040173	Yes	Gull, laughing	*Larus atricilla*
040176	Yes	Gull, little	*Larus minutus*
040170	Yes	Gull, ring-billed	*Larus delawarensis*
040086	Yes	Hawk, Cooper's	*Accipiter cooperii*
040088	Yes	Hawk, red-shouldered	*Buteo lineatus lineatus*
040087	Yes	Hawk, red-tailed	*Buteo jamaicensis*
040090	No	Hawk, rough-legged	*Buteo lagopus johannis*
040085	Yes	Hawk, sharp-shinned	*Accipiter striatus velox*
040027	Yes	Heron, great blue	*Ardea herodias herodias*
040028	Yes	Heron, green	*Butorides virescens*
040218	Yes	Hummingbird, ruby-throated	*Archilochus colubris*
040041	No	Ibis, white	*Eudocimus albus*
040160	No	Jaeger, parasitic	*Stercorarius parasiticus*
040159	No	Jaeger, pomarine	*Stercorarius pomarinus*
040252	Yes	Jay, blue	*Cyanocitta cristata*
040387	Yes	Junco, dark-eyed	*Junco hyemalis*

040098	Yes	Kestrel, American	*Falco sparverius sparverius*
040119	Yes	Killdeer	*Charadrius vociferus*
040229	Yes	Kingbird, eastern	*Tyrannus tyrannus*
040231	Yes	Kingbird, western	*Tyrannus verticalis*
040220	Yes	Kingfisher, belted	*Ceryle alcyon*
040286	Yes	Kinglet, ruby-crowned	*Regulus calendula*
040177	No	Kittiwake, black-legged	*Rissa tridactyla*
040144	No	Knot, red	*Calidris canutus rufus*
040245	Yes	Lark, horned	*Eremophila alpestris*
040399	Yes	Longspur, Lapland	*Calcarius lapponicus*
040001	Yes	Loon, common	*Gavia immer*
040003	Yes	Loon, red-throated	*Gavia stellata*
040051	Yes	Mallard	*Anas platyrhynchos*
040251	Yes	Martin, purple	*Progne subis*
040344	Yes	Meadowlark, eastern	*Sturnella magna*
040078	Yes	Merganser, common	*Mergus merganser americanus*
040077	Yes	Merganser, hooded	*Lophodytes cucullatus*
040079	Yes	Merganser, red-breasted	*Mergus serrator serrator*
040097	Yes	Merlin	*Falco columbarius*
040271	Yes	Mockingbird, northern	*Mimus polyglottos*
040035	No	Night-heron, black-crowned	*Nycticorax nycticorax hoactii*
040216	No	Nighthawk, common	*Chordeiles minor*
040263	Yes	Nuthatch, brown-headed	*Sitta pusilla*
040261	Yes	Nuthatch, white-breasted	*Sitta carolinensis*
040069	Yes	Oldsquaw	*Clangula hyemalis*
040348	Yes	Oriole, Baltimore	*Icterus galbula*

040347	Yes	Oriole, orchard	*Icterus spurius*
040095	No	Osprey	*Pandion haliaetus carolinensis*
040330	Yes	Ovenbird	*Seiurus aurocapillus*
040209	Yes	Owl, barred	*Strix varia*
040206	Yes	Owl, great horned	*Bubo virginianus*
040211	No	Owl, short-eared	*Asio flammeus*
040312	No	Parula, northern	*Parula americana*
040243	Yes	Pewee, eastern wood	*Contopus virens*
040136	No	Phalarope, Wilson's	*Phalaropus tricolor*
040236	Yes	Phoebe, eastern	*Sayornis phoebe*
040054	Yes	Pintail, northern	*Anas acuta acuta*
040287	Yes	Pipit, American	*Anthus rubescens*
040123	Yes	Plover, black-bellied	*Pluvialis squatarola*
040117	Yes	Plover, semipalmated	*Charadrius semipalmatus*
040107	Yes	Rail, Virginia	*Rallus limicola*
040106	Yes	Rail, clapper	*Rallus longirostris crepitans*
040105	Yes	Rail, king	*Rallus elegans*
040062	Yes	Redhead	*Aythya americana*
040369	Yes	Redpoll, common	*Carduelis flammea*
040341	No	Redstart, American	*Setophaga ruticilla*
040275	Yes	Robin, American	*Turdus migratorius*
040145	Yes	Sanderling	*Calidris alba*
040149	Yes	Sandpiper, least	*Calidris minutilla*
040153	Yes	Sandpiper, purple	*Calidris maritima*
040146	Yes	Sandpiper, semipalmated	*Calidris pusilla*
040134	No	Sandpiper, spotted	*Actitis macularia*

040147	Yes	Sandpiper, western	*Calidris mauri*
040225	Yes	Sapsucker, yellow-bellied	*Sphyrapicus varius*
040065	Yes	Scaup, greater	*Aythya marila*
040066	Yes	Scaup, lesser	*Aythya affinis*
040075	Yes	Scoter, black	*Melanitta nigra americana*
040074	Yes	Scoter, surf	*Melanitta perspicillata*
040073	Yes	Scoter, white-winged	*Melanitta fusca deglandi*
040205	Yes	Screech-owl, eastern	*Otus asio*
040060	Yes	Shoveler, northern	*Anas clypeata*
040370	Yes	Siskin, pine	*Carduelis pinus*
040192	Yes	Skimmer, black	*Rynchops niger*
040141	Yes	Snipe, common	*Gallinago gallinago*
040108	Yes	Sora	*Porzana carolina*
040388	Yes	Sparrow, American tree	*Spizella arborea*
040396	Yes	Sparrow, Lincoln's	*Melospiza lincolnii*
040389	Yes	Sparrow, chipping	*Spizella passerina*
040391	Yes	Sparrow, field	*Spizella pusilla*
040395	Yes	Sparrow, fox	*Passerella iliaca*
040378	No	Sparrow, grasshopper	*Ammodramus savannarum pratensis*
040342	Yes	Sparrow, house	*Passer domesticus*
040377	Yes	Sparrow, savannah	*Passerculus sandwichensis*
040382	No	Sparrow, seaside	*Ammodramus maritimus*
040398	Yes	Sparrow, song	*Melospiza melodia*
040397	Yes	Sparrow, swamp	*Melospiza georgiana*
040383	No	Sparrow, vesper	*Pooecetes gramineus*
040393	No	Sparrow, white-crowned	*Zonotrichia leucophrys*

040394	Yes	Sparrow, white-throated	*Zonotrichia albicollis*
040294	Yes	Starling, European	*Sturnus vulgaris*
040148	No	Stint, Temminck's	*Calidris temminckii*
040249	Yes	Swallow, barn	*Hirundo rustica*
040248	Yes	Swallow, northern rough-winged	*Stelgidopteryx serripennis*
040246	No	Swallow, tree	*Tachycineta bicolor*
040044	No	Swan, tundra	*Cygnus columbianus columbianus*
040217	Yes	Swift, chimney	*Chaetura pelagica*
040355	No	Tanager, scarlet	*Piranga olivacea*
040356	No	Tanager, summer	*Piranga rubra*
040057	Yes	Teal, blue-winged	*Anas discors orphna*
040056	Yes	Teal, green-winged	*Anas crecca carolinensis*
040181	Yes	Tern, common	*Sterna hirundo*
040187	Yes	Tern, royal	*Sterna maxima maximus*
040273	Yes	Thrasher, brown	*Toxostoma rufum*
040279	Yes	Thrush, Swainson's	*Catharus ustulatus*
040280	Yes	Thrush, gray-cheeked	*Catharus minimus*
040277	Yes	Thrush, wood	*Hylocichla mustelina*
040260	Yes	Titmouse, tufted	*Baeolophus bicolor*
040375	Yes	Towhee, eastern	*Pipilo erythrophthalmus*
040374	No	Towhee, green-tailed	*Pipilo chlorurus*
040102	No	Turkey, wild	*Meleagris gallopavo silvestris*
040135	Yes	Turnstone, ruddy	*Arenaria interpres morinella*
040281	No	Veery	*Catharus fuscescens*
040298	Yes	Vireo, blue-headed	*Vireo solitarius*
040299	Yes	Vireo, red-eyed	*Vireo olivaceus*

040295	Yes	Vireo, white-eyed	*Vireo griseus*
040297	No	Vireo, yellow-throated	*Vireo flavifrons*
040081	Yes	Vulture, black	*Coragyps atratus*
040080	Yes	Vulture, turkey	*Cathartes aura*
040333	No	Warbler, Kentucky	*Oporornis formosus*
040302	Yes	Warbler, black-and-white	*Mniotilta varia*
040319	No	Warbler, black-throated green	*Dendroica virens waynei*
040325	No	Warbler, blackpoll	*Dendroica striata*
040307	No	Warbler, blue-winged	*Vermivora pinus*
040323	No	Warbler, chestnut-sided	*Dendroica pensylvanica*
040338	Yes	Warbler, hooded	*Wilsonia citrina*
040329	Yes	Warbler, palm	*Dendroica palmarum*
040326	Yes	Warbler, pine	*Dendroica pinus*
040328	Yes	Warbler, prairie	*Dendroica discolor*
040303	Yes	Warbler, prothonotary	*Protonotaria citrea*
040305	No	Warbler, worm-eating	*Helmitheros vermivorus*
040317	No	Warbler, yellow-rumped	*Dendroica coronata cornata*
040322	No	Warbler, yellow-throated	*Dendroica dominica*
040313	No	Warbler, yellow	*Dendroica petechia*
040332	No	Waterthrush, Louisiana	*Seiurus motacilla*
040331	No	Waterthrush, northern	*Seiurus noveboracensis*
040290	Yes	Waxwing, cedar	*Bombycilla cedrorum*
040215	No	Whip-poor-will	*Caprimulgus vociferus*
040059	Yes	Wigeon, American	*Anas americana*
040058	No	Wigeon, Eurasian	*Anas penelope*
040133	No	Willet	*Catoptrophorus semipalmatus semipalmatus*

040140	Yes	Woodcock, American	*Scolopax minor*
040227	Yes	Woodpecker, downy	*Picoides pubescens medianus*
040226	Yes	Woodpecker, hairy	*Picoides villosus*
040222	Yes	Woodpecker, pileated	*Dryocopus pileatus*
040223	Yes	Woodpecker, red-bellied	*Melanerpes carolinus*
040224	Yes	Woodpecker, red-headed	*Melanerpes erythrocephalus*
040268	Yes	Wren, Carolina	*Thryothorus ludovicianus*
040265	Yes	Wren, house	*Troglodytes aedon*
040269	Yes	Wren, marsh	*Cistothorus palustris*
040131	No	Yellowlegs, lesser	*Tringa flavipes*
040336	Yes	Yellowthroat, common	*Geothlypis trichas brachidactylus*
050028	No	Bat, big brown	*Eptesicus fuscus fuscus*
050029	No	Bat, eastern red	*Lasiurus borealis borealis*
050033	No	Bat, evening	*Nycticeius humeralis humeralis*
050030	No	Bat, hoary	*Lasiurus cinereus cinereus*
050031	No	Bat, seminole	*Lasiurus seminolus*
050025	No	Bat, silver-haired	*Lasionycteris noctivagans*
050037	No	Bear, black	*Ursus americanus americanus*
050069	No	Beaver	*Castor canadensis*
050052	No	Bobcat, Florida	*Lynx rufus floridanus*
050055	No	Chipmunk, Fisher's eastern	*Tamias striatus fisheri*
050103	No	Cottontail, eastern	*Sylvilagus floridanus mallurus*
050108	No	Deer, white-tailed	*Odocoileus virginianus*
050050	No	Fox, eastern gray	*Urocyon cinereoargenteus cinereoargenteus*
050086	No	Lemming, southern bog	*Synaptomys cooperi helaletes*
050042	No	Mink, common	*Mustela vison mink*

050017	No	Mole, eastern	*Scalopus aquaticus aquaticus*
050076	No	Mouse, common golden	*Ochrotomys nuttalli nuttalli*
050074	No	Mouse, common white-footed	*Peromyscus leucopus leucopus*
050075	No	Mouse, cotton	*Peromyscus gossypinus gossypinus*
050070	Yes	Mouse, eastern harvest	*Reithrodontomys humulis humulis*
050098	No	Mouse, house	*Mus musculus musculus*
050099	No	Mouse, meadow jumping	*Zapus hudsonius americanus*
050093	No	Muskrat, large-toothed	*Ondatra zibethicus macrodon*
050022	No	Myotis, northern long-eared	*Myotis septentrionalis septentrionalis*
050131	No	Myotis, southeastern	*Myotis austroriparius*
050053	No	Nutria	*Myocastor coypus*
050001	No	Opossum, Virginia	*Didelphis virginiana virginiana*
050027	No	Pipistrelle, eastern	*Pipistrellus subflavus subflavus*
050038	No	Raccoon	*Procyon lotor lotor*
050095	No	Rat, Norway	*Rattus norvegicus norvegicus*
050094	No	Rat, black	*Rattus rattus rattus*
050079	No	Rat, hispid cotton	*Sigmodon hispidus virginianus*
050078	No	Rat, marsh rice	*Oryzomys palustris palustris*
050014	Yes	Shrew, Dismal Swamp short-tailed	*Blarina brevicauda telmalestes*
050015	No	Shrew, least	*Cryptotis parva parva*
050010	No	Shrew, pygmy	*Sorex hoyi winnemana*
050007	No	Shrew, southeastern	*Sorex longirostris longirostris*
050011	No	Shrew, southern short-tailed	*Blarina carolinensis carolinensis*
050047	No	Skunk, striped	*Mephitis mephitis nigra*
050057	No	Squirrel, gray	*Sciurus carolinensis carolinensis*
050065	No	Squirrel, southern flying	*Glaucomys volans volans*

050083	No	Vole, dark meadow	*Microtus pennsylvanicus nigrans*
050091	No	Vole, pine	*Microtus pinetorum scalapsoides*
050041	No	Weasel, long-tailed	*Mustela frenata noveboracensis*
060025	No	Mussel, eastern elliptio	*Elliptio complanata*
070095	No	Crayfish, no common name	*Cambarus diogenes diogenes*
070102	No	Crayfish	*Cambarus bartonii bartonii*
070088	No	Crayfish	*Cambarus robustus*
070099	No	Crayfish	*Fallicambarus uhleri*
070097	No	Crayfish	*Orconectes immunis*
100043	No	Armyworm	*Pseudaletia unipuncta*
100041	No	Borer, European corn	*Ostrinia nubilatis*
100181	No	Butterfly, Aaron's skipper	*Poanes aaroni*
100262	No	Butterfly, American lady	*Vanessa virginiensis*
100245	No	Butterfly, American snout	*Libytheana carinenta*
100196	No	Butterfly, Brazilian skipper	*Calpodes ethlius*
100189	No	Butterfly, Carolina road-skipper	*Amblyscirtes carolina*
100278	No	Butterfly, Carolina satyr	*Hermeuptychia sosybius*
100177	No	Butterfly, Delaware skipper	*Anatrytone logan*
100184	No	Butterfly, Dion skipper	*Euphyes dion*
100002	No	Butterfly, Duke's skipper	*Euphyes dukesi*
100185	No	Butterfly, Dun skipper	*Euphyes vestris*
100195	No	Butterfly, Eufala skipper	*Lerodea eufala*
100145	No	Butterfly, Hayhurst's scallopwing	*Staphylus hayhurstii*
100224	No	Butterfly, Henry's elfin	*Callophrys henrici*
100237	No	Butterfly, Hessel's hairstreak	*Callophrys hesseli*
100178	No	Butterfly, Hobomok skipper	*Poanes hobomok*

100149	No	Butterfly, Horace's duskywing	*Erynnis horatius*
100148	No	Butterfly, Juvenal's duskywing	*Erynnis juvenalis*
100004	No	Butterfly, King's hairstreak	*Satyrium kingi*
100197	No	Butterfly, Ocola skipper	*Panoquina ocola*
100203	No	Butterfly, Palamedes swallowtail	*Papilio palamedes*
100183	No	Butterfly, Palatka skipper	*Euphyes pilatka*
100182	No	Butterfly, Yehl skipper	*Poanes yehl*
100180	No	Butterfly, Zabulon skipper	*Poanes zabulon*
100151	No	Butterfly, Zarucco duskywing	*Erynnis zarucco*
100232	No	Butterfly, banded hairstreak	*Satyrium calanus*
100092	No	Butterfly, black swallowtail	*Papilio polyxenes asterius*
100179	No	Butterfly, broad-winged skipper	*Poanes viator*
100137	No	Butterfly, brown elfin	*Callophrys augustinus*
100205	No	Butterfly, cabbage white	*Pieris rapae*
100206	No	Butterfly, checkered white	*Pontia protodice*
100159	No	Butterfly, clouded skipper	*Lerema accius*
100094	No	Butterfly, clouded sulphur	*Colias philodice*
100213	No	Butterfly, cloudless sulphur	*Phoebis sennae eubule*
100265	No	Butterfly, common buckeye	*Junonia coenia*
100156	No	Butterfly, common checkered-skipper	*Pyrgus communis*
100157	No	Butterfly, common sootywing	*Pholisora catullus*
100277	No	Butterfly, common wood-nymph	*Cercyonis pegala*
100144	No	Butterfly, confused cloudywing	*Thorybes confusis*
100271	No	Butterfly, creole pearly-eye	*Enodia creola*
100168	No	Butterfly, crossline skipper	*Polites origenes*
100188	No	Butterfly, dusted skipper	*Atrytonopsis hianna*

100258	No	Butterfly, eastern comma	*Polygonia comma*
100238	No	Butterfly, eastern tailed-blue	*Everes comyntas*
100093	No	Butterfly, eastern tiger swallowtail	*Papilio glaucus*
100209	No	Butterfly, falcate orangetip	*Anthocharis midea*
100162	No	Butterfly, fiery skipper	*Hylephila phyleus*
100276	No	Butterfly, gemmed satyr	*Cyllopsis gemma*
100201	No	Butterfly, giant swallowtail	*Papilio cresphontes*
100228	No	Butterfly, gray hairstreak	*Strymon melinus*
100222	No	Butterfly, great purple hairstreak	*Atlides halesus*
100249	No	Butterfly, great spangled fritillary	*Speyeria cybele*
100246	No	Butterfly, gulf fritillary	*Agraulis vanillae nigrior*
100141	No	Butterfly, hoary edge	*Achalarus lyciades*
100191	No	Butterfly, lace-winged road-skipper	*Amblyscirtes aesculapius*
100160	No	Butterfly, least skipper	*Ancyloxypha numitor*
100175	No	Butterfly, little glassywing	*Pompeius verna*
100244	No	Butterfly, little metalmark	*Calephelis virginiensis*
100279	No	Butterfly, little wood-satyr	*Megisto cymela*
100217	No	Butterfly, little yellow	*Eurema lisa*
100140	No	Butterfly, long-tailed skipper	*Urbanus proteus*
100079	No	Butterfly, monarch	*Danaus plexippus*
100150	No	Butterfly, mottled duskywing	*Erynnis martialis*
100090	No	Butterfly, mourning cloak	*Nymphalis antiopa*
100173	No	Butterfly, northern broken dash	*Wallengrenia egeremet*
100143	No	Butterfly, northern cloudywing	*Thorybes pylades*
100236	No	Butterfly, olive juniper hairstreak	*Callophrys gryneus gryneus*
100211	No	Butterfly, orange sulphur	*Colias eurytheme*

100263	No	Butterfly, painted lady	*Vanessa cardui*
100257	No	Butterfly, pearl crescent	*Phyciodes tharos*
100200	No	Butterfly, pipevine swallowtail	*Battus philenor*
100259	No	Butterfly, question mark	*Polygonia interrogationis*
100264	No	Butterfly, red admiral	*Vanessa atalanta*
100235	No	Butterfly, red-banded hairstreak	*Calycopis cecrops*
100268	No	Butterfly, red-spotted purple	*Limenitis arthemis astyanax*
100190	No	Butterfly, reversed road-skipper	*Amblyscirtes reversa*
100174	No	Butterfly, sachem	*Atalopedes campestris*
100198	No	Butterfly, salt marsh skipper	*Panoquina panoquin*
100082	No	Butterfly, silver-spotted skipper	*Epargyreus clarus*
100146	No	Butterfly, sleepy duskywing	*Erynnis brizo*
100216	No	Butterfly, sleepy orange	*Eurema nicippe*
100172	No	Butterfly, southern broken dash	*Wallengrenia otho*
100142	No	Butterfly, southern cloudywing	*Thorybes bathyllus*
100226	No	Butterfly, southern hairstreak	*Satyrium favonius*
100273	No	Butterfly, southern pearly-eye	*Enodia portlandia*
100202	No	Butterfly, spicebush swallowtail	*Papilio troilus*
100239	No	Butterfly, spring azure	*Celastrina ladon*
100234	No	Butterfly, striped hairstreak	*Satyrium liparops*
100158	No	Butterfly, swarthy skipper	*Nastra lherminier*
100247	No	Butterfly, variegated fritillary	*Euptoieta claudia*
100266	No	Butterfly, viceroy	*Limenitis archippus*
100227	No	Butterfly, white M hairstreak	*Parrhasius m-album*
100199	No	Butterfly, yucca giant-skipper	*Megathymus yuccae*
100204	No	Butterfly, zebra swallowtail	*Eurytides marcellus*

100026	No	Deerfly	*Chrysops vittatus vittatus*
100042	No	Earworm, corn	*Heliathis zea*
100035	No	Gnat	*Culicoides debipalpis*
100016	No	Gnat	*Culicoides stellifer*
100040	No	Moth, codling	*Cydia pomonella*
100047	No	Moth, gypsy	*Lymantria dispar*
100289	No	Moth, pinkstriped oakworm	*Anisota virginiensis*
100291	No	Moth, sweetbay silk	*Callosamia securifera*
110230	No	Tick, American dog	*Dermacentor variabilis*
110232	No	Tick, brown dog	*Rhipicephalus sanguineus*
110228	No	Tick, lone star	*Amblyomma americanum*
110231	No	Tick, rabbit	*Haemaphysalis leporispalustris*
110229	No	Tick, winter	*Dermacentor albipictus*

^to beginning.

Options Menu ***Species Information*** ***Species Lists*** ***Geographic Search*** ***Last Location Map***

Disclaimer **Copyright © 1998, 1999, 2000 Virginia Department of Game and Inland Fisheries**

VDGIF Home

Visitor Reply 500888 compiled 13 April 2001 for VISITOR
Time to service request 00:00:15 --- Service idle before request 00:00:37 --- Ready for request 93%
VaFWIS version 6 April 2001

The Virginia Fish and Wildlife Information Service

Species list

- **within (550) Chesapeake City**

564 Species

To review a species booklet activate a Species Code link.

Code	Status	Common Name	Scientific Name
040228	FE	Woodpecker, red-cockaded	*Picoides borealis borealis*
040093	FTSE	Eagle, bald	*Haliaeetus leucocephalus leucocephalus*
030071	FT	Turtle, loggerhead sea	*Caretta caretta caretta*
040120	FT	Plover, piping	*Charadrius melodus melodus*
050034	FSSE	Bat, eastern big-eared	*Plecotus (Corynorhinus) rafinesquii macrotis*
040292	FSST	Shrike, migrant loggerhead	*Lanius ludovicianus migrans*
040379	FSST	Sparrow, Henslow's	*Ammodramus henslowii susurrans*
030067	FS	Terrapin, northern diamond-backed	*Malaclemys terrapin terrapin*
040110	FS	Rail, black	*Laterallus jamaicensis*
040320	FS	Warbler, cerulean	*Dendroica cerulea*
030013	SE	Rattlesnake, canebrake	*Crotalus horridus atricaudatus*
040096	SE	Falcon, peregrine	*Falco peregrinus*
040129	ST	Sandpiper, upland	*Bartramia longicauda*
040293	ST	Shrike, loggerhead	*Lanius ludovicianus ludovicianus*

050008	ST	Shrew, Dismal Swamp southeastern	*Sorex longirostris fisheri*
010032	SS	Sturgeon, Atlantic	*Acipenser oxyrhynchus*
020005	SS	Frog, carpenter	*Rana virgatipes*
020063	SS	Toad, oak	*Bufo quercicus*
040264	SS	Creeper, brown	*Certhia americana*
040372	SS	Crossbill, red	*Loxia curvirostra*
040364	SS	Dickcissel	*Spiza americana*
040032	SS	Egret, great	*Ardea alba egretta*
040366	SS	Finch, purple	*Carpodacus purpureus*
040094	SS	Harrier, northern	*Circus cyaneus*
040029	SS	Heron, little blue	*Egretta caerulea caerulea*
040034	SS	Heron, tricolored	*Egretta tricolor*
040040	SS	Ibis, glossy	*Plegadis falcinellus*
040285	SS	Kinglet, golden-crowned	*Regulus satrapa*
040112	SS	Moorhen, common	*Gallinula chloropus cachinnans*
040036	SS	Night-heron, yellow-crowned	*Nyctanassa violacea violacea*
040262	SS	Nuthatch, red-breasted	*Sitta canadensis*
040204	SS	Owl, barn	*Tyto alba pratincola*
040210	SS	Owl, long-eared	*Asio otus*
040213	SS	Owl, northern saw-whet	*Aegolius acadicus*
040020	SS	Pelican, brown	*Pelecanus occidentalis carolinensis*
040381	SS	Sparrow, saltmarsh sharp-tailed	*Ammodramus caudacutus diversus*
040189	SS	Tern, Caspian	*Sterna caspia*
040180	SS	Tern, Forster's	*Sterna forsteri*
040186	SS	Tern, least	*Sterna antillarum*
040278	SS	Thrush, hermit	*Catharus guttatus*
040304	SS	Warbler, Swainson's	*Limnothlypis swainsonii*
040270	SS	Wren, sedge	*Cistothorus platensis*
040266	SS	Wren, winter	*Troglodytes troglodytes*

050110	SS	Mole, small star-nosed	*Condylura cristata parva*
050045	SS	Otter, river	*Lontra canadensis lataxina*
050107	SS	Rabbit, marsh	*Sylvilagus palustris palustris*
010038		Alewife	*Alosa pseudoharengus*
010188		Bass, largemouth	*Micropterus salmoides*
010183		Bluegill	*Lepomis macrochirus*
010034		Bowfin	*Amia calva*
010123		Bullhead, brown	*Ameiurus nebulosus*
010122		Bullhead, yellow	*Ameiurus natalis*
010062		Carp, common	*Cyprinus carpio*
010125		Catfish, channel	*Ictalurus punctatus*
010120		Catfish, white	*Ameiurus catus*
010106		Chubsucker, creek	*Erimyzon oblongus*
010107		Chubsucker, lake	*Erimyzon sucetta*
010190		Crappie, black	*Pomoxis nigromaculatus*
010250		Croaker, Atlantic	*Micropogonias undulatus*
010398		Darter, sawcheek	*Etheostoma serrifer*
010194		Darter, swamp	*Etheostoma fusiforme*
010131		Eel, American	*Anguilla rostrata*
010176		Flier	*Centrarchus macropterus*
010033		Gar, longnose	*Lepisosteus osseus*
010045		Herring, blueback	*Alosa aestivalis*
010143		Killifish, banded	*Fundulus diaphanus*
010128		Madtom, tadpole	*Noturus gyrinus*
010148		Mosquitofish, eastern	*Gambusia holbrooki*
010054		Mudminnow, eastern	*Umbra pygmaea*

010299	Mullet, striped	*Mugil cephalus*
010144	Mummichog	*Fundulus heteroclitus*
010163	Perch, pirate	*Aphredoderus sayanus sayanus*
010166	Perch, white	*Morone americana*
010206	Perch, yellow	*Perca flavescens*
010056	Pickerel, chain	*Esox niger*
010055	Pickerel, redfin	*Esox americanus americanus*
010182	Pumpkinseed	*Lepomis gibbosus*
010040	Shad, American	*Alosa sapidissima*
010041	Shad, gizzard	*Dorosoma cepedianum*
010042	Shad, threadfin	*Dorosoma petenense*
010068	Shiner, golden	*Notemigonus crysoleucas*
010303	Silverside, Atlantic	*Menidia menidia*
010179	Sunfish, banded	*Enneacanthus obesus*
010178	Sunfish, bluespotted	*Enneacanthus gloriosus*
010173	Sunfish, mud	*Acantharchus pomotis*
010180	Sunfish, redbreast	*Lepomis auritus*
010185	Sunfish, redear	*Lepomis microlophus*
010149	Swampfish	*Chologaster cornuta*
010177	Warmouth	*Lepomis gulosus*
020001	Amphiuma, two-toed	*Amphiuma means*
020004	Bullfrog	*Rana catesbeiana*
020003	Frog, Brimley's chorus	*Pseudacris brimleyi*
020015	Frog, coastal plain cricket	*Acris gryllus gryllus*
020010	Frog, little grass	*Pseudacris ocularis*
020008	Frog, southern green	*Rana clamitans melanota*
020016	Frog, southern leopard	*Rana sphenocephala*
020065	Newt, red-spotted	*Notophthalmus viridescens viridescens*
020071	Peeper, northern spring	*Pseudacris crucifer crucifer*
020084	Salamander, Atlantic Coast Slimy	*Plethodon chlorobryonis*

020069	Salamander, eastern mud	*Pseudotriton montanus montanus*
020029	Salamander, four-toed	*Hemidactylium scutatum*
020034	Salamander, many-lined	*Stereochilus marginatus*
020035	Salamander, marbled	*Ambystoma opacum*
020038	Salamander, northern dusky	*Desmognathus fuscus*
020043	Salamander, northern red-backed	*Plethodon cinereus*
020047	Salamander, northern slimy	*Plethodon glutinosus*
020048	Salamander, southern dusky	*Desmognathus auriculatus*
020050	Salamander, southern two-lined	*Eurycea cirrigera*
020051	Salamander, three-lined	*Eurycea guttolineata*
020058	Siren, greater	*Siren lacertina*
020062	Toad, Fowler's	*Bufo fowleri*
020060	Toad, eastern narrow-mouthed	*Gastrophryne carolinensis*
020064	Toad, southern	*Bufo terrestris*
020006	Treefrog, Cope's gray	*Hyla chrysoscelis*
020009	Treefrog, green	*Hyla cinerea*
020014	Treefrog, pine woods	*Hyla femoralis*
020017	Treefrog, squirrel	*Hyla squirrela*
030055	Cooter, Coastal Plain	*Pseudemys concinna floridana*
030057	Cooter, northern red-bellied	*Pseudemys rubriventris rubriventris*
030016	Copperhead, northern	*Agkistrodon contortrix mokasen*
030015	Cottonmouth, eastern	*Agkistrodon piscivorus piscivorus*
030030	Kingsnake, black	*Lampropeltis getula nigra*
030026	Kingsnake, eastern	*Lampropeltis getula getula*
030009	Lizard, eastern slender glass	*Ophisaurus attenuatus longicaudus*
030002	Lizard, northern fence	*Sceloporus undulatus hyacinthinus*

030018	Racer, northern black	*Coluber constrictor constrictor*
030008	Racerunner, six-lined	*Cnemidophorus sexlineatus sexlineatus*
030006	Skink, broadhead	*Eumeces laticeps*
030004	Skink, five-lined	*Eumeces fasciatus*
030007	Skink, little brown	*Scincella lateralis*
030005	Skink, southeastern five-lined	*Eumeces inexpectatus*
030058	Slider, yellowbellied	*Trachemys scripta scripta*
030023	Snake, black rat	*Elaphe obsoleta obsoleta*
030037	Snake, brown water	*Nerodia taxispilota*
030044	Snake, eastern garter	*Thamnophis sirtalis sirtalis*
030024	Snake, eastern hognose	*Heterodon platirhinos*
030029	Snake, eastern milk	*Lampropeltis triangulum triangulum*
030025	Snake, eastern mud	*Farancia abacura abacura*
030045	Snake, eastern ribbon	*Thamnophis sauritus sauritus*
030049	Snake, eastern smooth earth	*Virginia valeriae valeriae*
030019	Snake, eastern worm	*Carphophis amoenus amoenus*
030041	Snake, northern brown	*Storeria dekayi dekayi*
030042	Snake, northern red-bellied	*Storeria occipitomaculata occipitomaculata*
030020	Snake, northern ringneck	*Diadophis punctatus edwardsii*
030017	Snake, northern scarlet	*Cemophora coccinea copei*
030034	Snake, northern water	*Nerodia sipedon sipedon*
030046	Snake, rainbow	*Farancia erytrogramma erytrogramma*
030036	Snake, red-bellied water	*Nerodia erythrogaster erythrogaster*
030047	Snake, rough earth	*Virginia striatula*
030038	Snake, rough green	*Opheodrys aestivus aestivus*
030021	Snake, southern ringneck	*Diadophis punctatus punctatus*

030068	Turtle, eastern box	*Terrapene carolina carolina*
030051	Turtle, eastern mud	*Kinosternon subrubrum subrubrum*
030052	Turtle, eastern musk (= stinkpot)	*Sternotherus odoratus*
030060	Turtle, eastern painted	*Chrysemys picta picta*
030050	Turtle, eastern snapping	*Chelydra serpentina serpentina*
030063	Turtle, spotted	*Clemmys guttata*
040025	Anhinga	*Anhinga anhinga*
040116	Avocet, American	*Recurvirostra americana*
040038	Bittern, American	*Botaurus lentiginosus*
040037	Bittern, least	*Ixobrychus exilis exilis*
040350	Blackbird, Brewer's	*Euphagus cyanocephalus*
040346	Blackbird, red-winged	*Agelaius phoeniceus*
040349	Blackbird, rusty	*Euphagus carolinus*
040345	Blackbird, yellow-headed	*Xanthocephalus xanthocephalus*
040282	Bluebird, eastern	*Sialia sialis*
040343	Bobolink	*Dolichonyx oryzivorus*
040100	Bobwhite, northern	*Colinus virginianus*
040046	Brant	*Branta bernicla brota*
040068	Bufflehead	*Bucephala albeola*
040361	Bunting, indigo	*Passerina cyanea*
040363	Bunting, painted	*Passerina ciris ciris*
040401	Bunting, snow	*Plectrophenax nivalis nivalis*
040064	Canvasback	*Aythya valisineria*
040357	Cardinal, northern	*Cardinalis cardinalis*
040272	Catbird, gray	*Dumetella carolinensis*
040337	Chat, yellow-breasted	*Icteria virens virens*

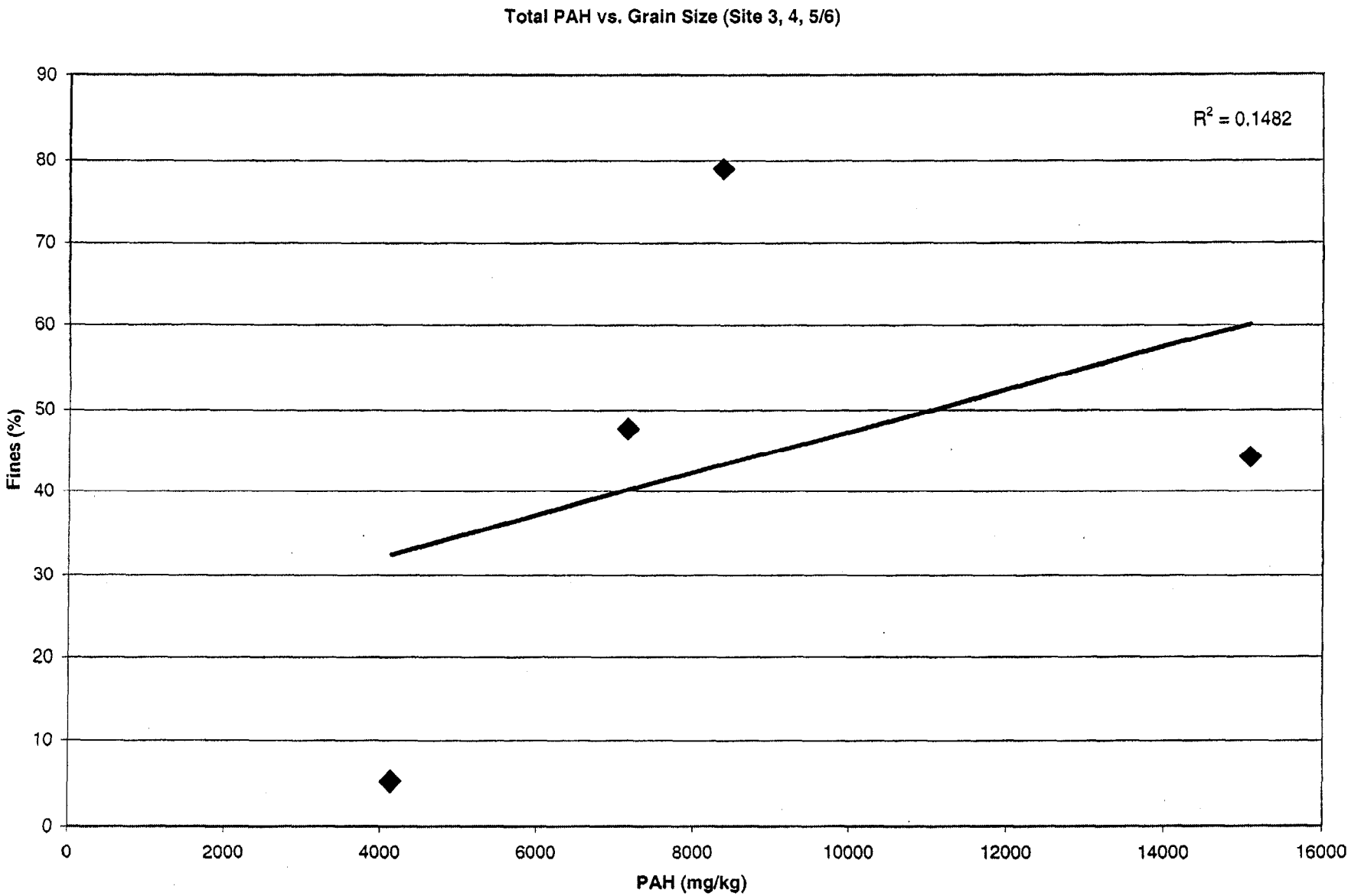
040258	Chickadee, Carolina	*Poecile carolinensis*
040214	Chuck-will's-widow	*Caprimulgus carolinensis*
040113	Coot, American	*Fulica americana*
040024	Cormorant, double-crested	*Phalacrocorax auritus*
040023	Cormorant, great	*Phalacrocorax carbo*
040353	Cowbird, brown-headed	*Molothrus ater*
040373	Crossbill, white-winged	*Loxia leucoptera*
040255	Crow, American	*Corvus brachyrhynchos*
040256	Crow, fish	*Corvus ossifragus*
040203	Cuckoo, black-billed	*Coccyzus erythropthalmus*
040202	Cuckoo, yellow-billed	*Coccyzus americanus*
040198	Dove, mourning	*Zenaida macroura carolinensis*
040197	Dove, rock	*Columba livia*
040195	Dovekie	*Alle alle*
040143	Dowitcher, long-billed	*Limnodromus scolopaceus*
040142	Dowitcher, short-billed	*Limnodromus griseus*
040052	Duck, American black	*Anas rubripes*
040070	Duck, Harlequin	*Histrionicus histrionicus*
040063	Duck, ring-necked	*Aythya collaris*
040076	Duck, ruddy	*Oxyura jamaicensis*
040061	Duck, wood	*Aix sponsa*
040154	Dunlin	*Calidris alpina hudsonia*
040092	Eagle, golden	*Aquila chrysaetos*
040030	Egret, cattle	*Bubulcus ibis*
040033	Egret, snowy	*Egretta thula*
040071	Eider, common	*Somateria mollissima*

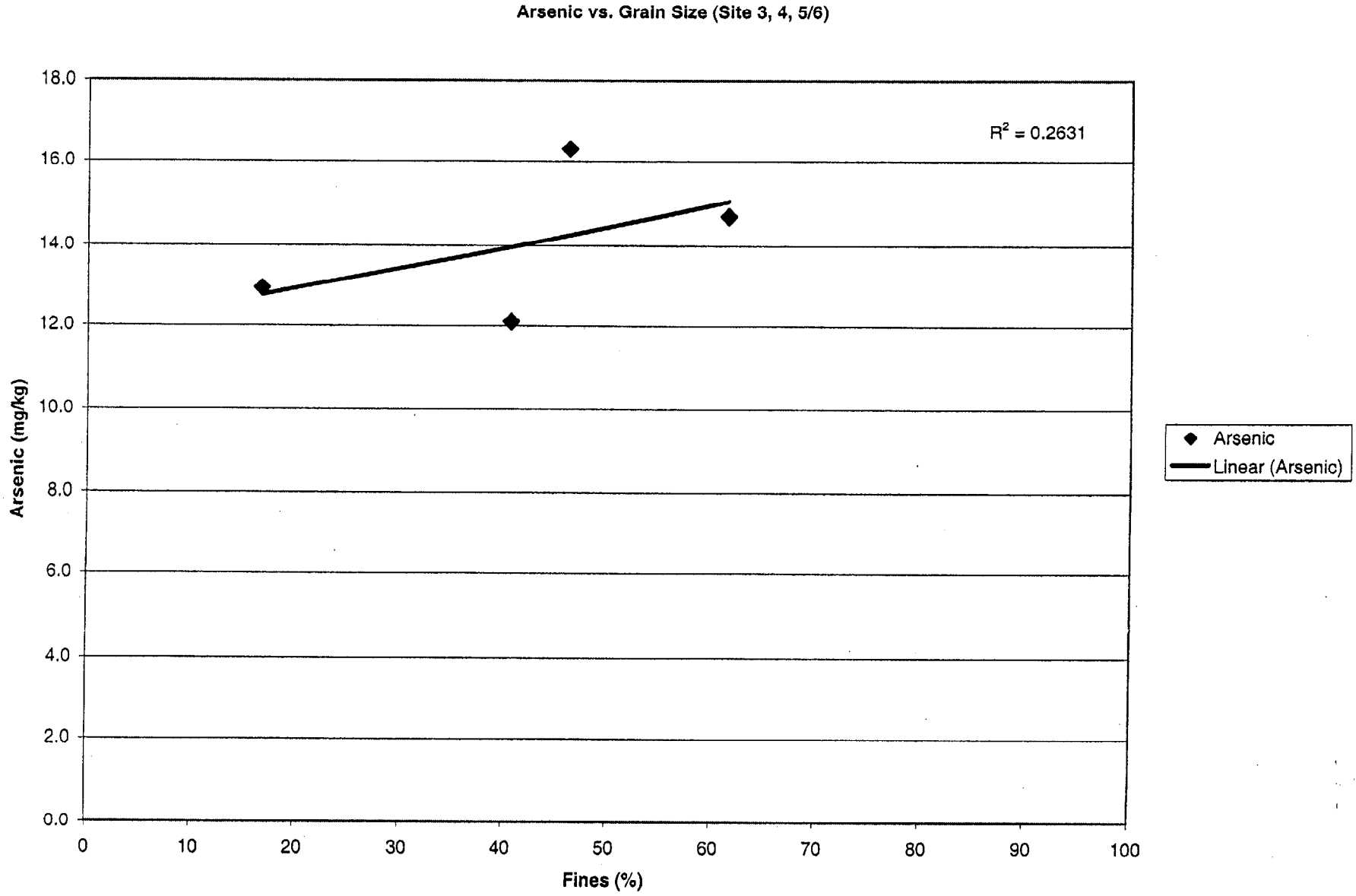
040072	Eider, king	*Somateria spectabilis*
040367	Finch, house	*Carpodacus mexicanus*
040042	Flamingo, greater	*Phoenicopterus ruber*
040221	Flicker, northern	*Colaptes auratus*
040239	Flycatcher, Acadian	*Empidonax virescens*
040234	Flycatcher, great crested	*Myiarchus crinitus*
040053	Gadwall	*Anas strepera*
040022	Gannet, northern	*Morus bassanus*
040284	Gnatcatcher, blue-gray	*Polioptila caerulea*
040126	Godwit, marbled	*Limosa fedoa*
040067	Goldeneye, common	*Bucephala clangula americana*
040371	Goldfinch, American	*Carduelis tristis*
040045	Goose, Canada	*Branta canadensis*
040416	Goose, Ross'	*Chen rossii*
040049	Goose, lesser snow	*Chen caerulescens caerulescens*
040410	Goose, snow	*Chen caerulescens atlanticus*
040351	Grackle, boat-tailed	*Quiscalus major*
040352	Grackle, common	*Quiscalus quiscula*
040006	Grebe, eared	*Podiceps nigricollis*
040005	Grebe, horned	*Podiceps auritus*
040008	Grebe, pied-billed	*Podilymbus podiceps*
040004	Grebe, red-necked	*Podiceps grisegena*
040007	Grebe, western	*Aechmophorus occidentalis*
040360	Grosbeak, blue	*Guiraca caerulea caerulea*
040365	Grosbeak, evening	*Coccothraustes vespertinus*
040175	Gull, Bonaparte's	*Larus philadelphia*

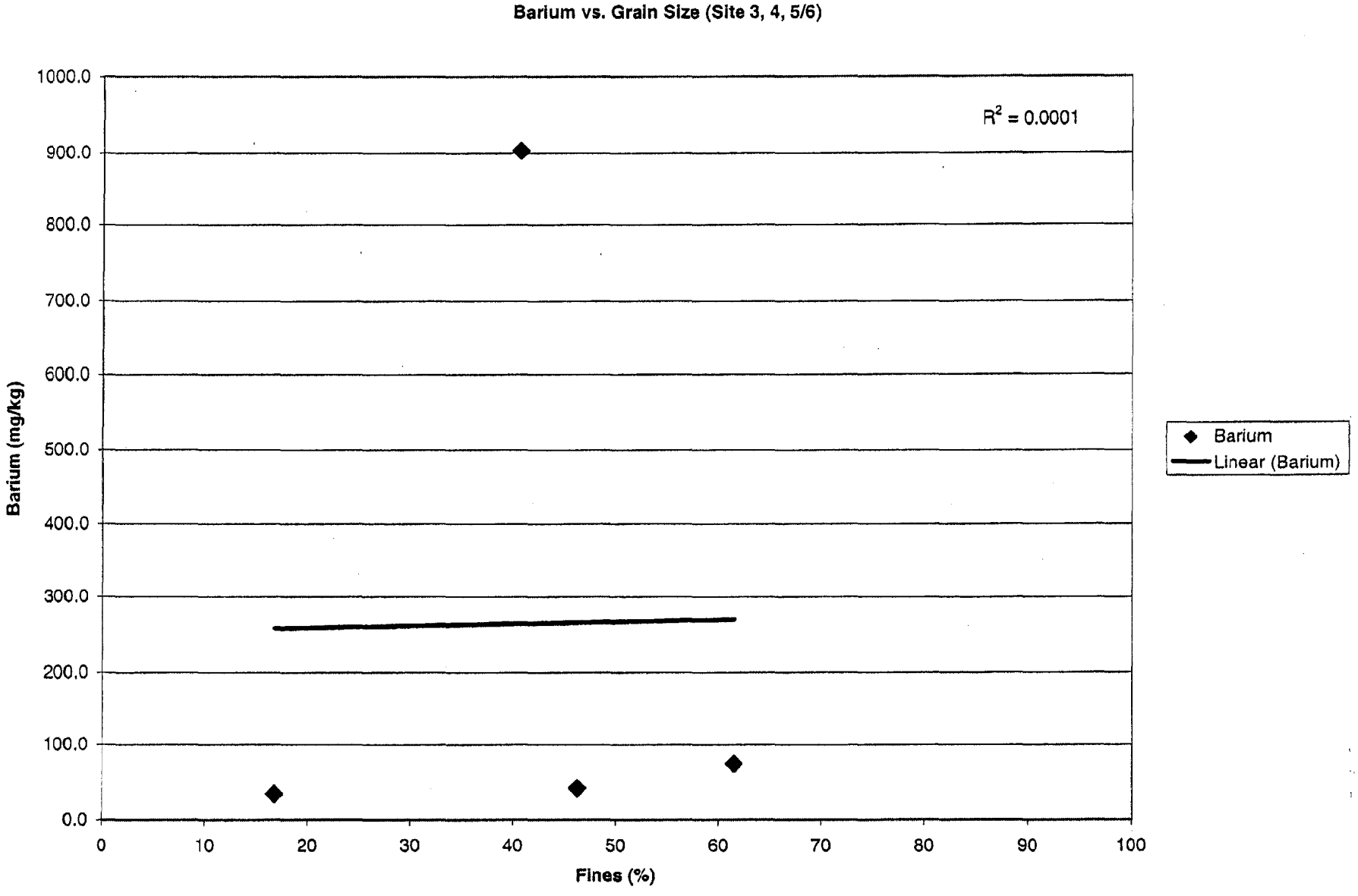
Plots of Sediment Chemical Concentration Against Grain Size and Total Organic Carbon

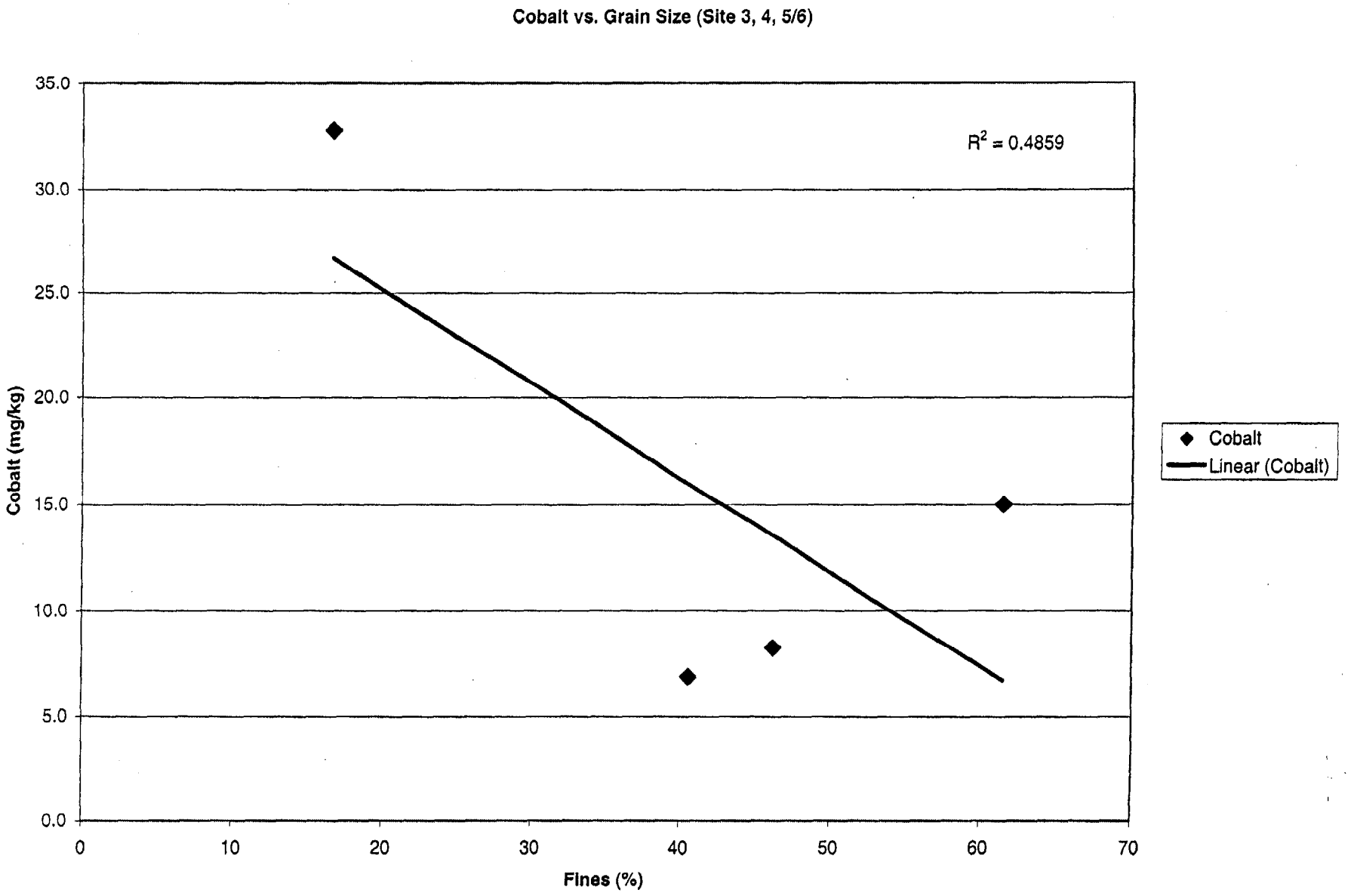
Plots of Sediment Chemical Concentration Against Grain Size and Total Organic Carbon

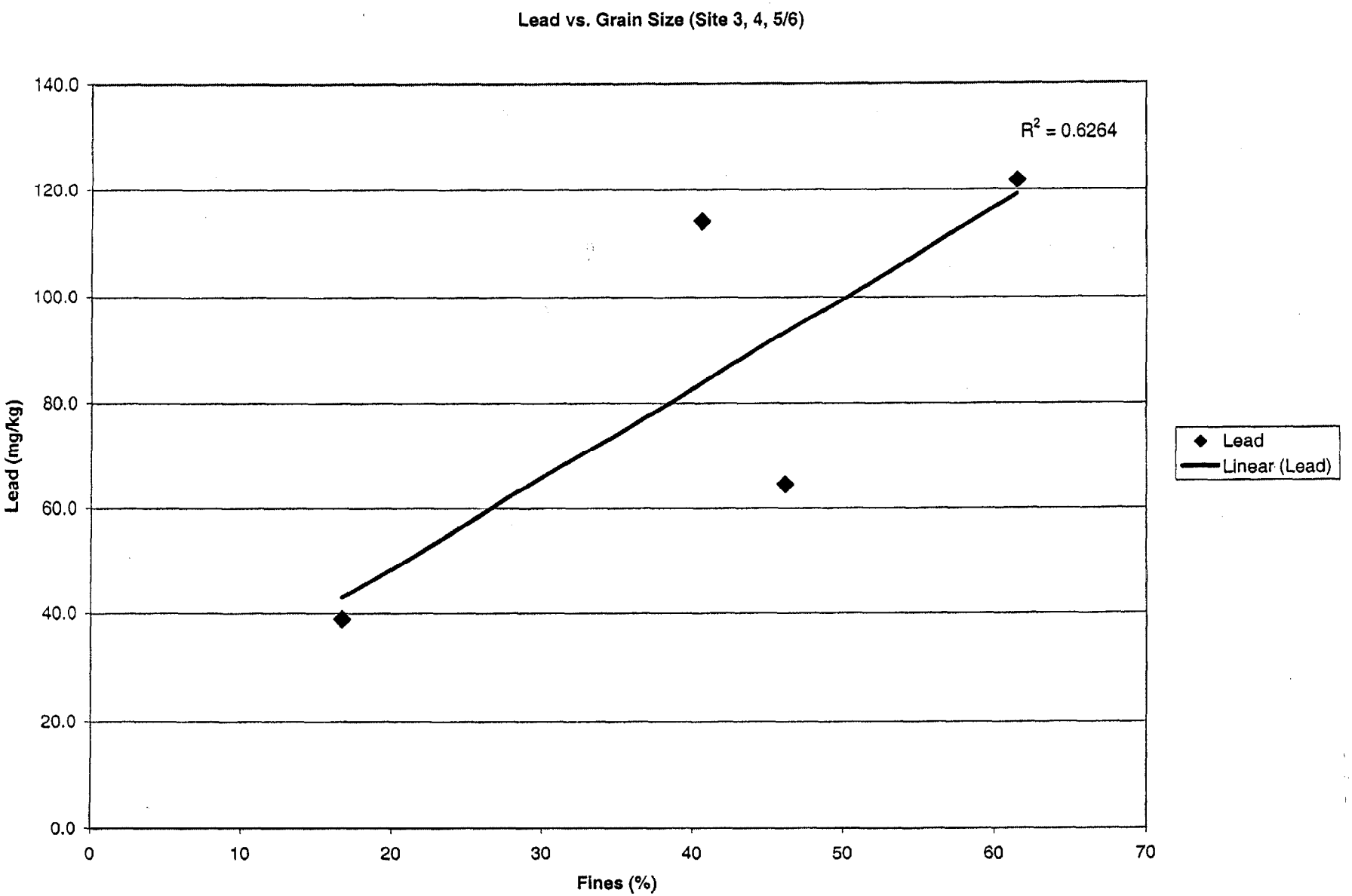
The following figures plot the relationship between chemical concentration in sediment and sediment grain size (for semivolatile organic and inorganic COPCs) and total organic carbon (TOC)(for semivolatile organic COPCs). Sediment grain size in these plots represents the percent fines composition, which consists of the sum of percent silt and clay in each sample. Chemicals detected in upland drainage sediments at Sites 3, 4, and 5/6 were grouped for analysis. Data were grouped because only a limited number of sample locations were analyzed for grain size (SJS04-SD05-001, SJS04-SD06-001, SJS04-SD07-001, SJS04-SD08-001) and TOC(SJS03-SD07-001, SJS03-SD04-001, SJS03-SD08-001, SJS03-SD06-001, SJS04-SD05-001, SJS04-SD06-001, SJS04-SD07-001, SJS04-SD08-001, SJS05-SD04-001). Samples were only plotted for locations where chemicals were detected. Accordingly, only a limited number of samples are plotted in the following graphs. In some situations, chemicals were not plotted and/or regressions could not be developed based on the small sample size/limited number of chemical detections.

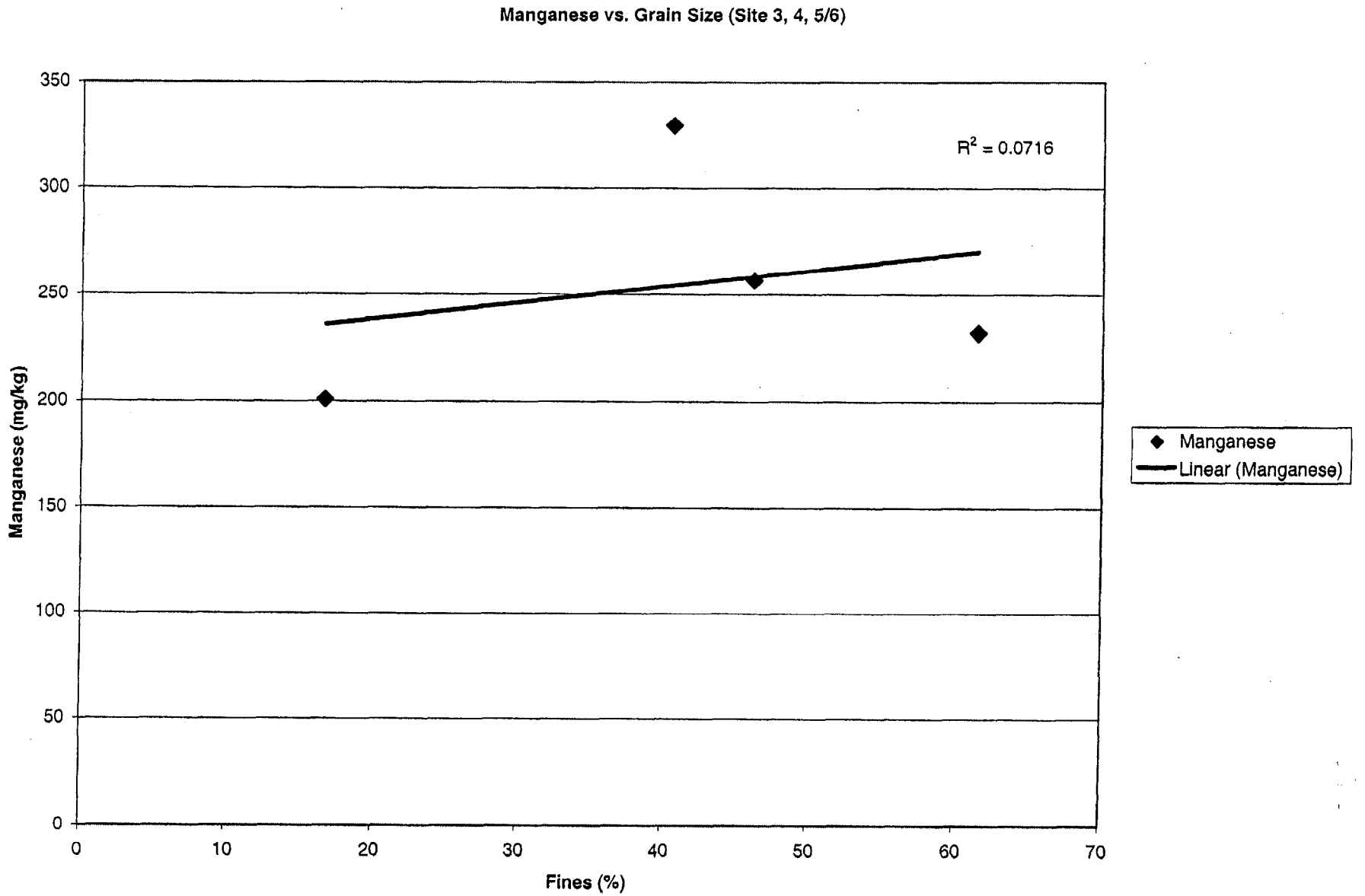

Total PAH vs. Grain Size (Site 3, 4, 5/6)
R^2 = 0.1482
Fines (%)
PAH (mg/kg)
0
10
20
30
40
50
60
70
80
90
0
2000
4000
6000
8000
10000
12000
14000
16000

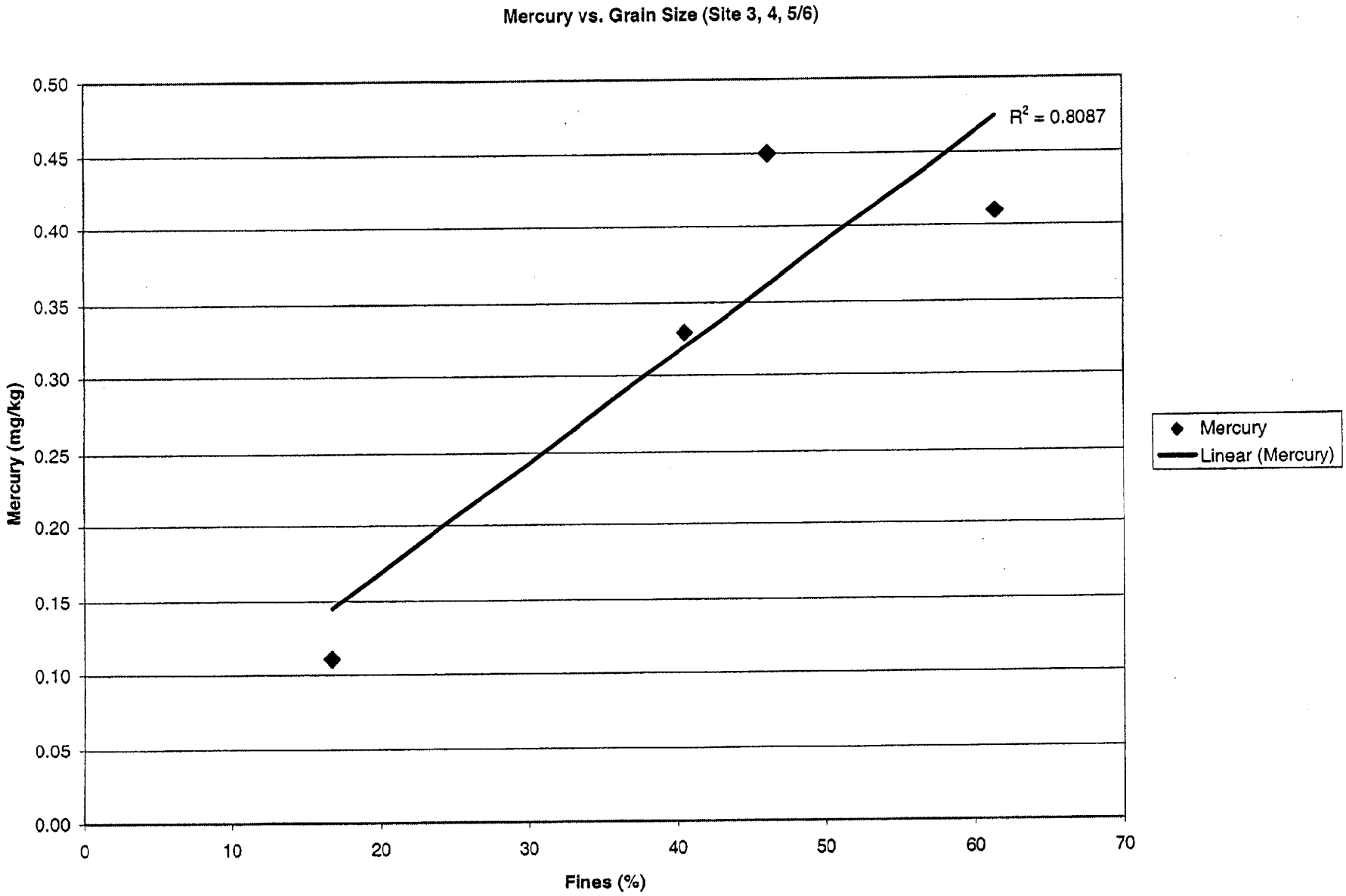

Arsenic vs. Grain Size (Site 3, 4, 5/6)
R^2 = 0.2631
Arsenic (mg/kg)
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
0
10
20
30
40
50
60
70
80
90
100
Fines (%)
Arsenic
Linear (Arsenic)

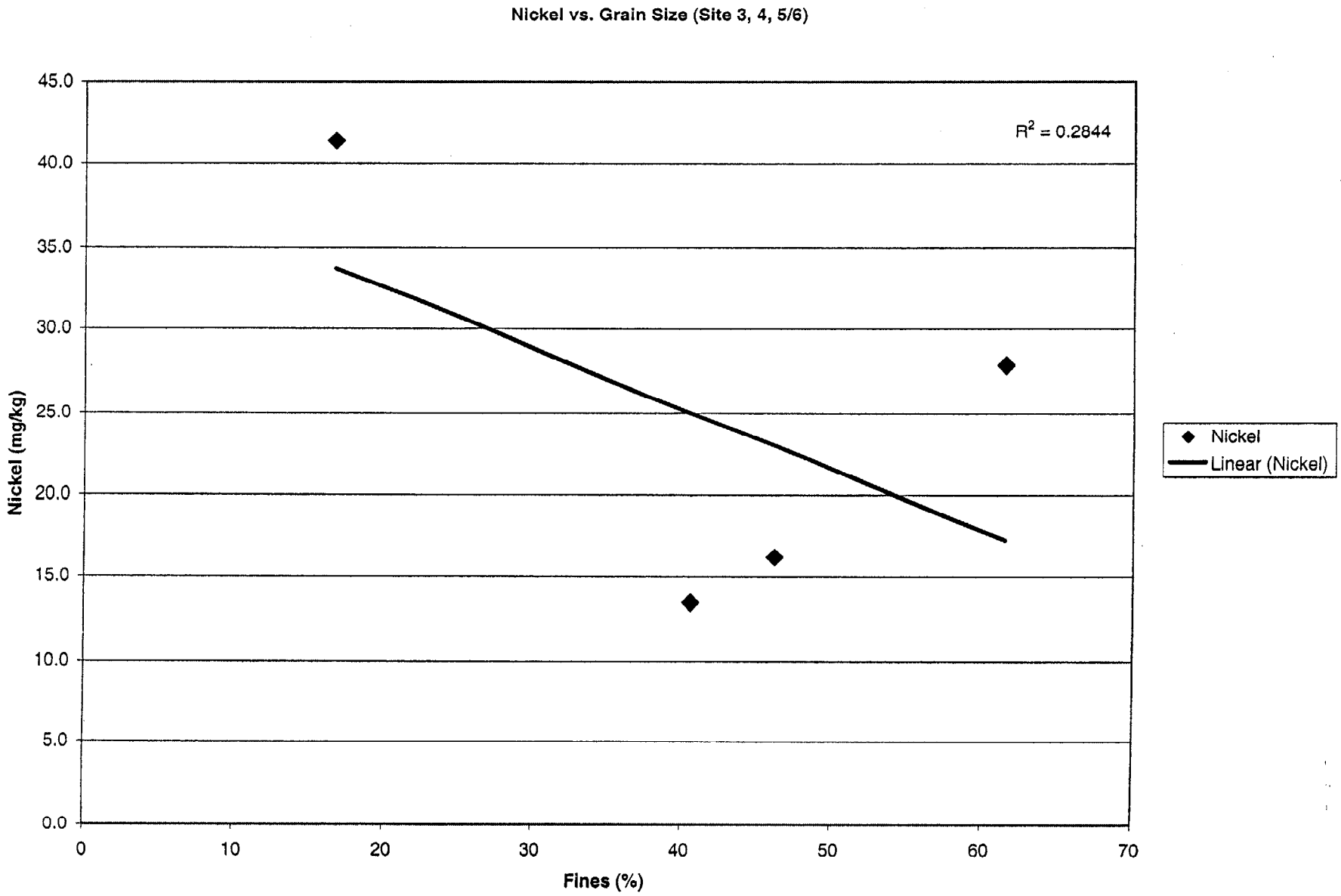

Barium vs. Grain Size (Site 3, 4, 5/6)
R^2 = 0.0001
Barium (mg/kg)
1000.0
900.0
800.0
700.0
600.0
500.0
400.0
300.0
200.0
100.0
0.0
0
10
20
30
40
50
60
70
80
90
100
Fines (%)
Barium
Linear (Barium)

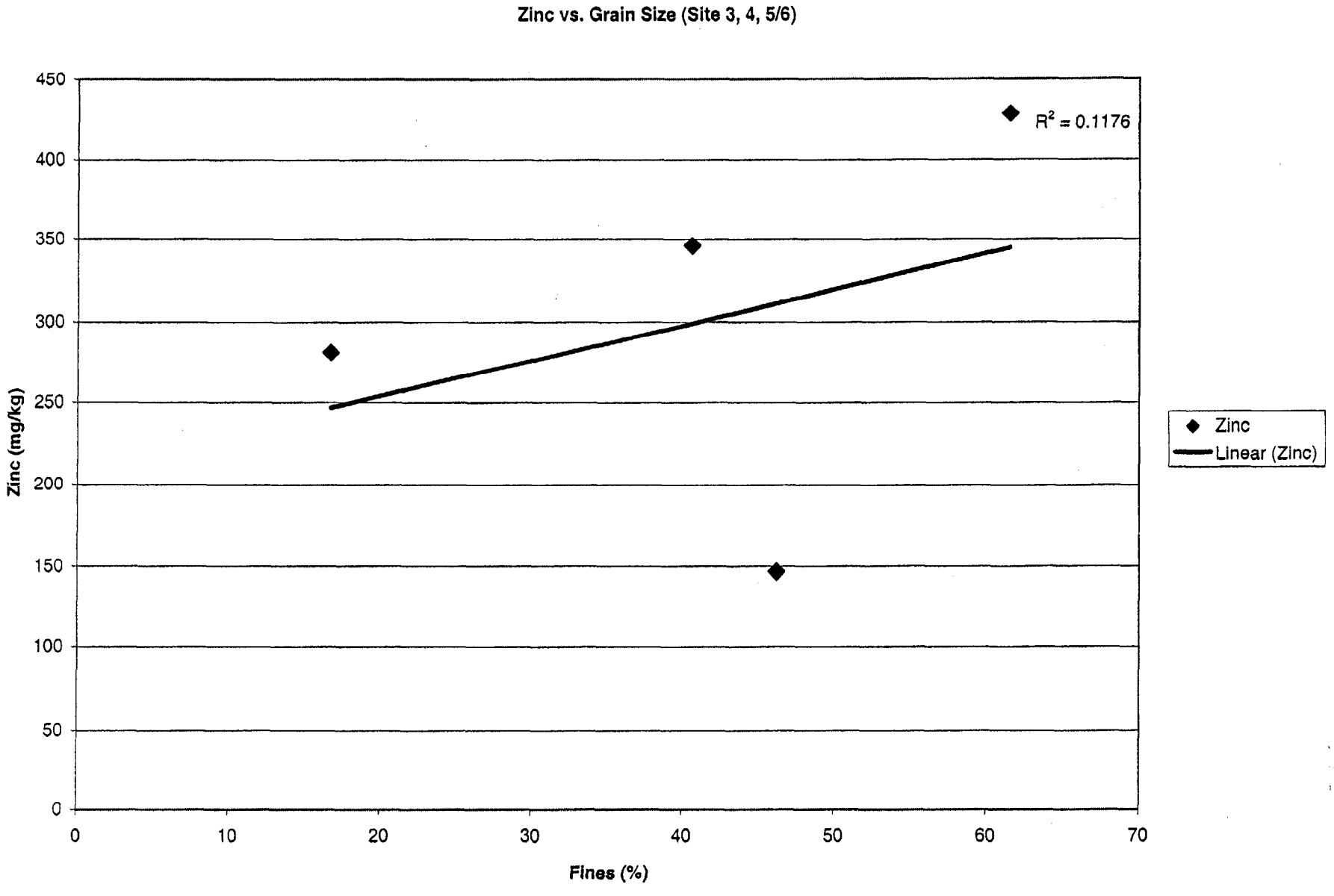

Cobalt vs. Grain Size (Site 3, 4, 5/6)
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Cobalt (mg/kg)
R^2 = 0.4859
0
10
20
30
40
50
60
70
Fines (%)
Cobalt
Linear (Cobalt)

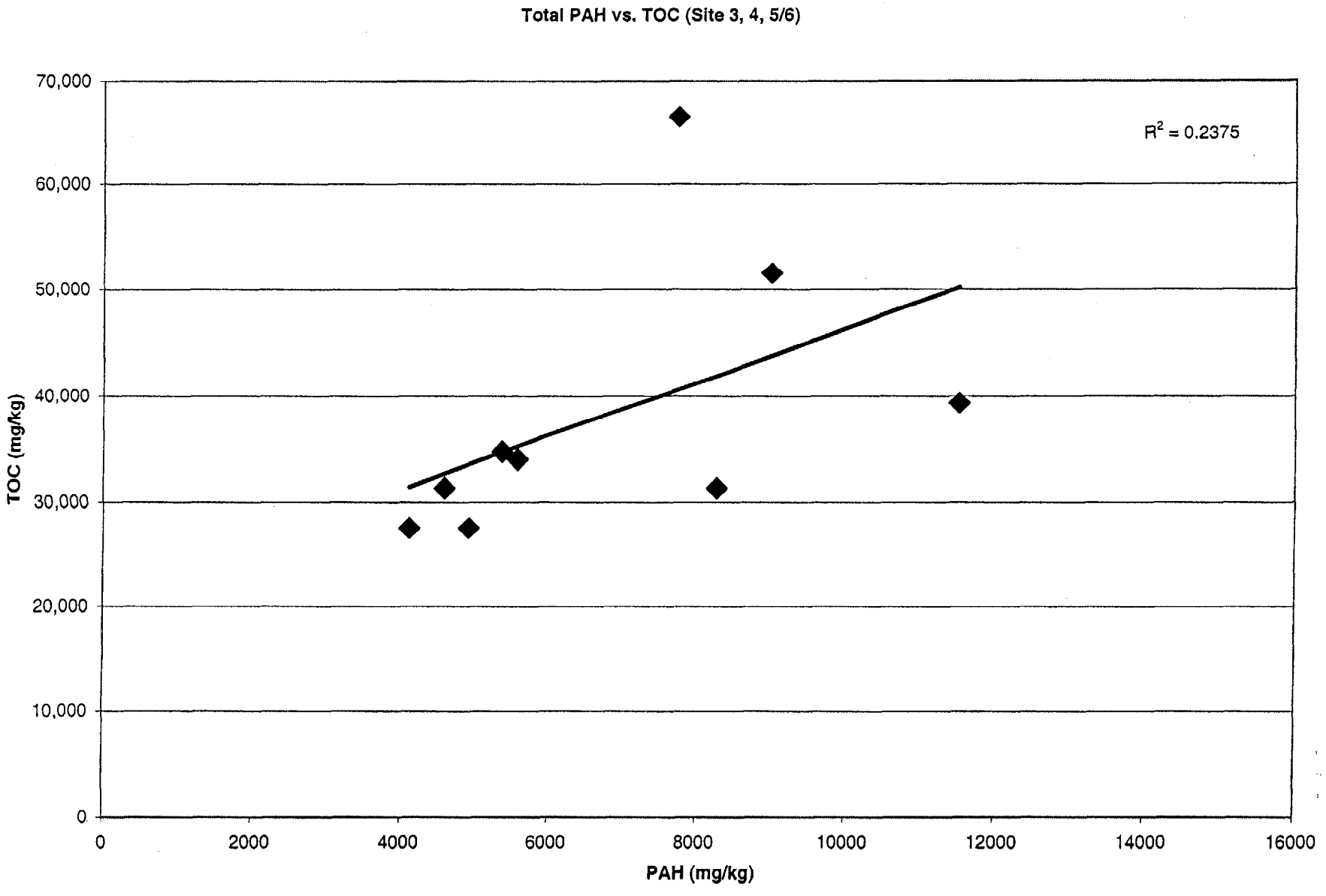

Lead vs. Grain Size (Site 3, 4, 5/6)
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
Lead (mg/kg)
0
10
20
30
40
50
60
70
Fines (%)
R2 = 0.6264
Lead
Linear (Lead)

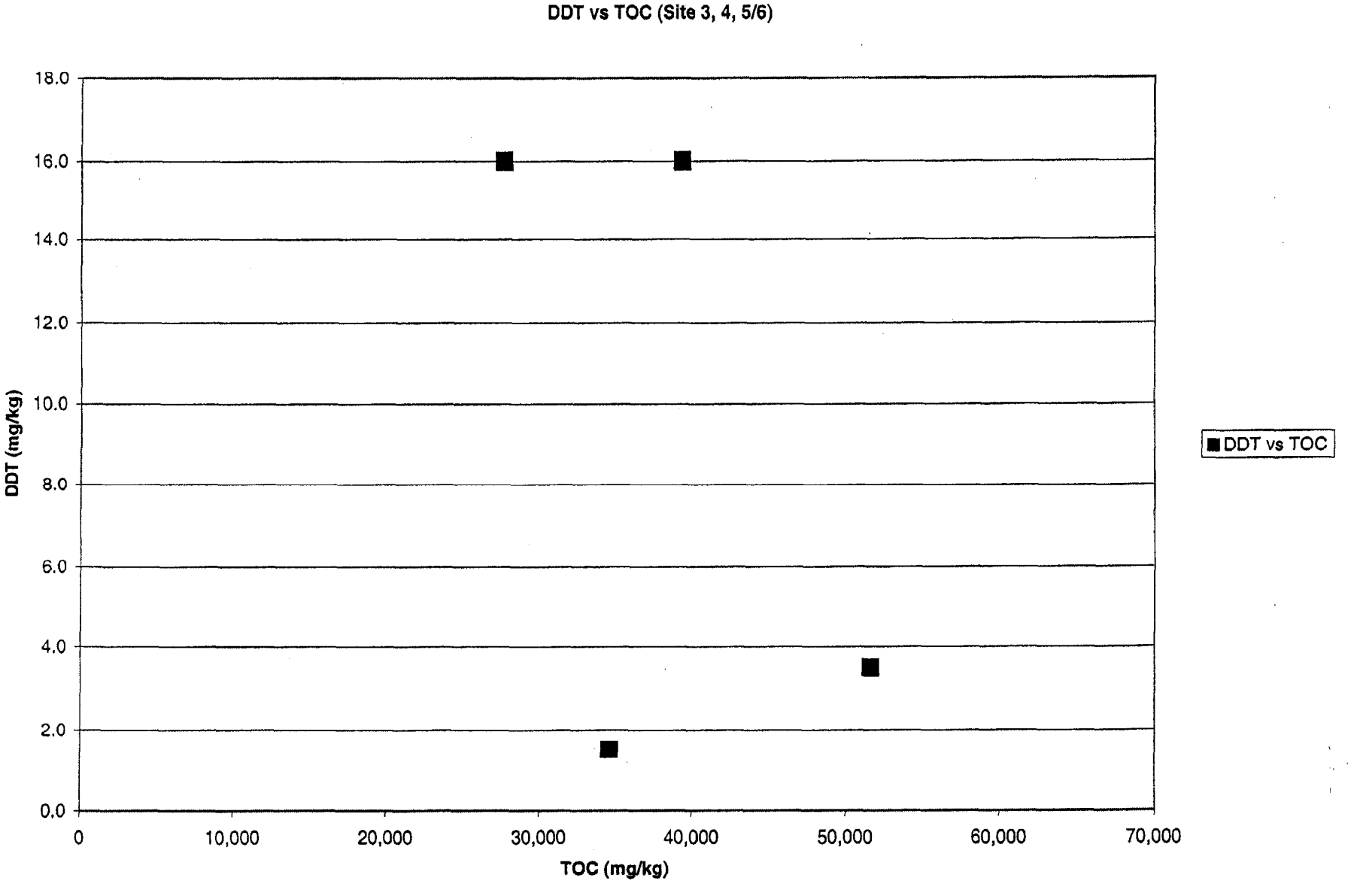

Manganese vs. Grain Size (Site 3, 4, 5/6)
350
300
250
200
150
100
50
0
Manganese (mg/kg)
0
10
20
30
40
50
60
70
Fines (%)
R2 = 0.0716
Manganese
Linear (Manganese)

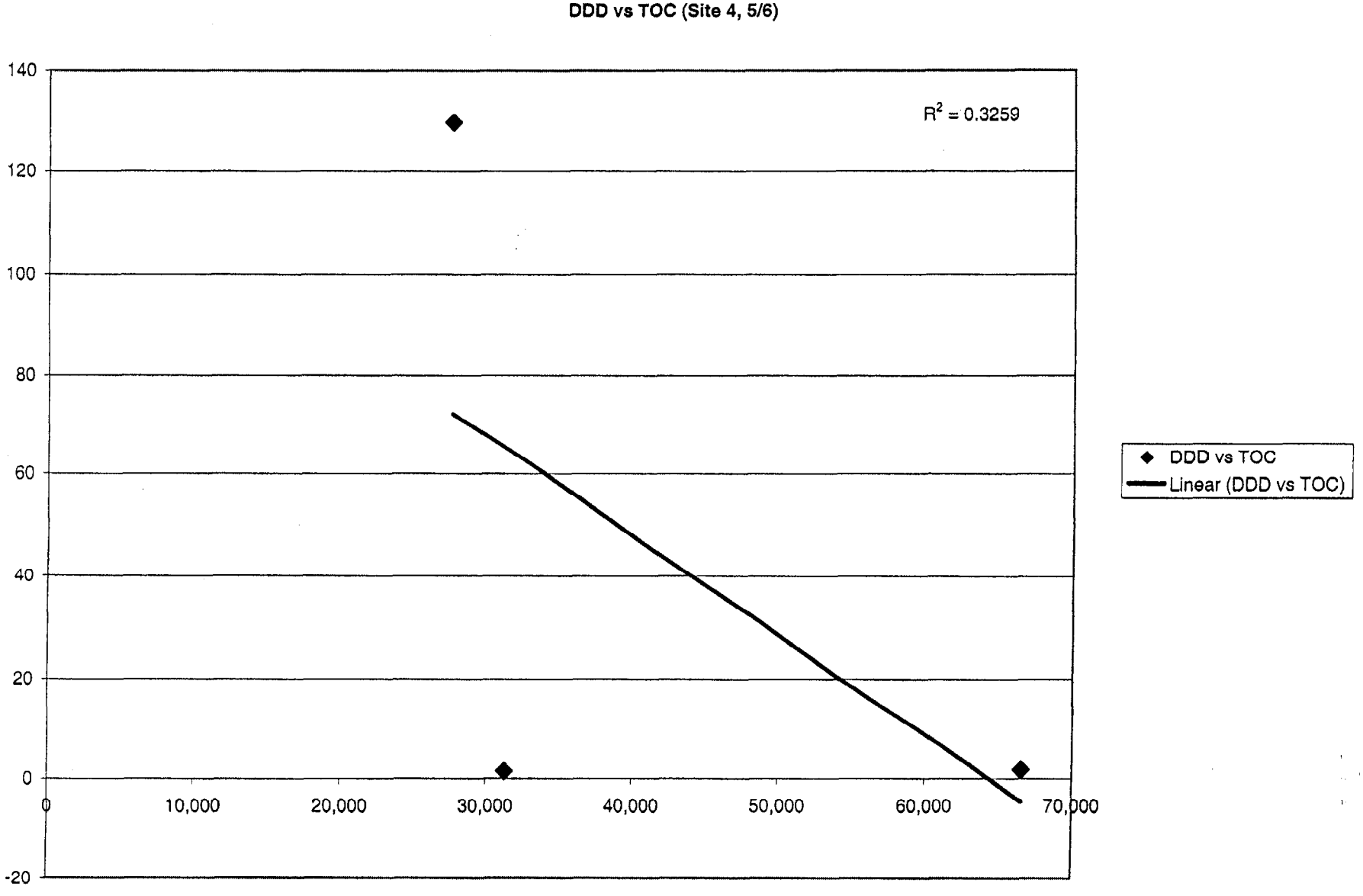

Mercury vs. Grain Size (Site 3, 4, 5/6)
Mercury (mg/kg)
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
0
10
20
30
40
50
60
70
Fines (%)
R^2 = 0.8087
Mercury
Linear (Mercury)

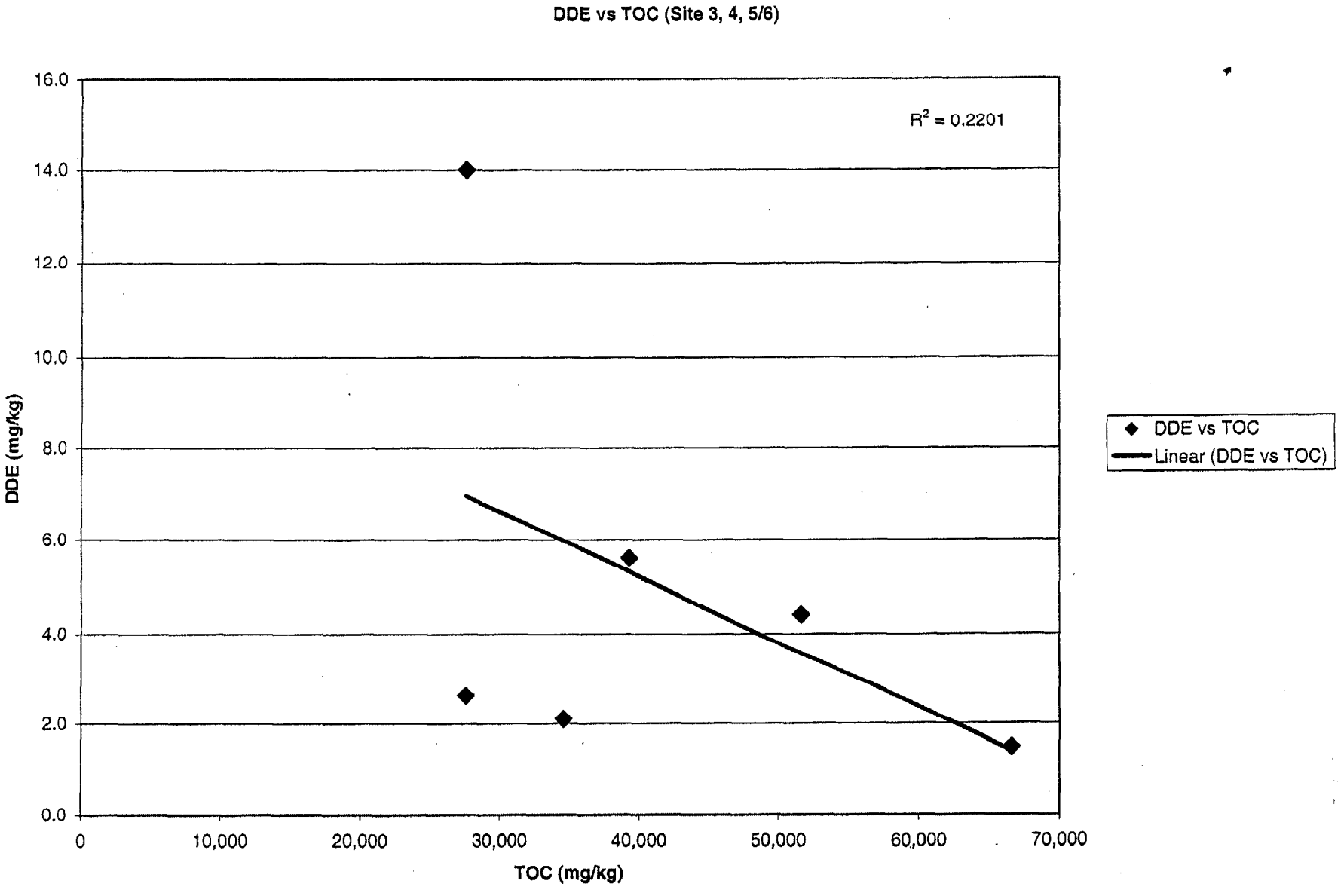

Nickel vs. Grain Size (Site 3, 4, 5/6)
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Nickel (mg/kg)
0
10
20
30
40
50
60
70
Fines (%)
R2 = 0.2844
Nickel
Linear (Nickel)


Zinc vs. Grain Size (Site 3, 4, 5/6)
450
400
350
300
250
200
150
100
50
0
Zinc (mg/kg)
0
10
20
30
40
50
60
70
Fines (%)
R² = 0.1176
Zinc
Linear (Zinc)


Total PAH vs. TOC (Site 3, 4, 5/6)
R^2 = 0.2375
TOC (mg/kg)
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
0
2000
4000
6000
8000
10000
12000
14000
16000
PAH (mg/kg)


DDT vs TOC (Site 3, 4, 5/6)
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
DDT (mg/kg)
0
10,000
20,000
30,000
40,000
50,000
60,000
70,000
TOC (mg/kg)
DDT vs TOC


DDD vs TOC (Site 4, 5/6)
140
120
100
80
60
40
20
0
-20
0
10,000
20,000
30,000
40,000
50,000
60,000
70,000
R² = 0.3259
DDD vs TOC
Linear (DDD vs TOC)


DDE vs TOC (Site 3, 4, 5/6)
R^2 = 0.2201
DDE (mg/kg)
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
0
10,000
20,000
30,000
40,000
50,000
60,000
70,000
TOC (mg/kg)
DDE vs TOC
Linear (DDE vs TOC)