Port of Bellingham
Harris Avenue Shipyard

Remedial Investigation/ Feasibility Study

Volume II (Appendices)

FINAL

June 2019

FLOYD | SNIDER
strategy ▪ science ▪ engineering
Two Union Square • 601 Union Street • Suite 600
Seattle, Washington 98101 • tel: 206.292.2078

Harris Avenue Shipyard

Remedial Investigation/ Feasibility Study

Appendix A
Site Photographs

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Appendix B
Lummi Nation – Puget Sound Area Usual and Accustomed Fishing Area and Ceded Lands Map

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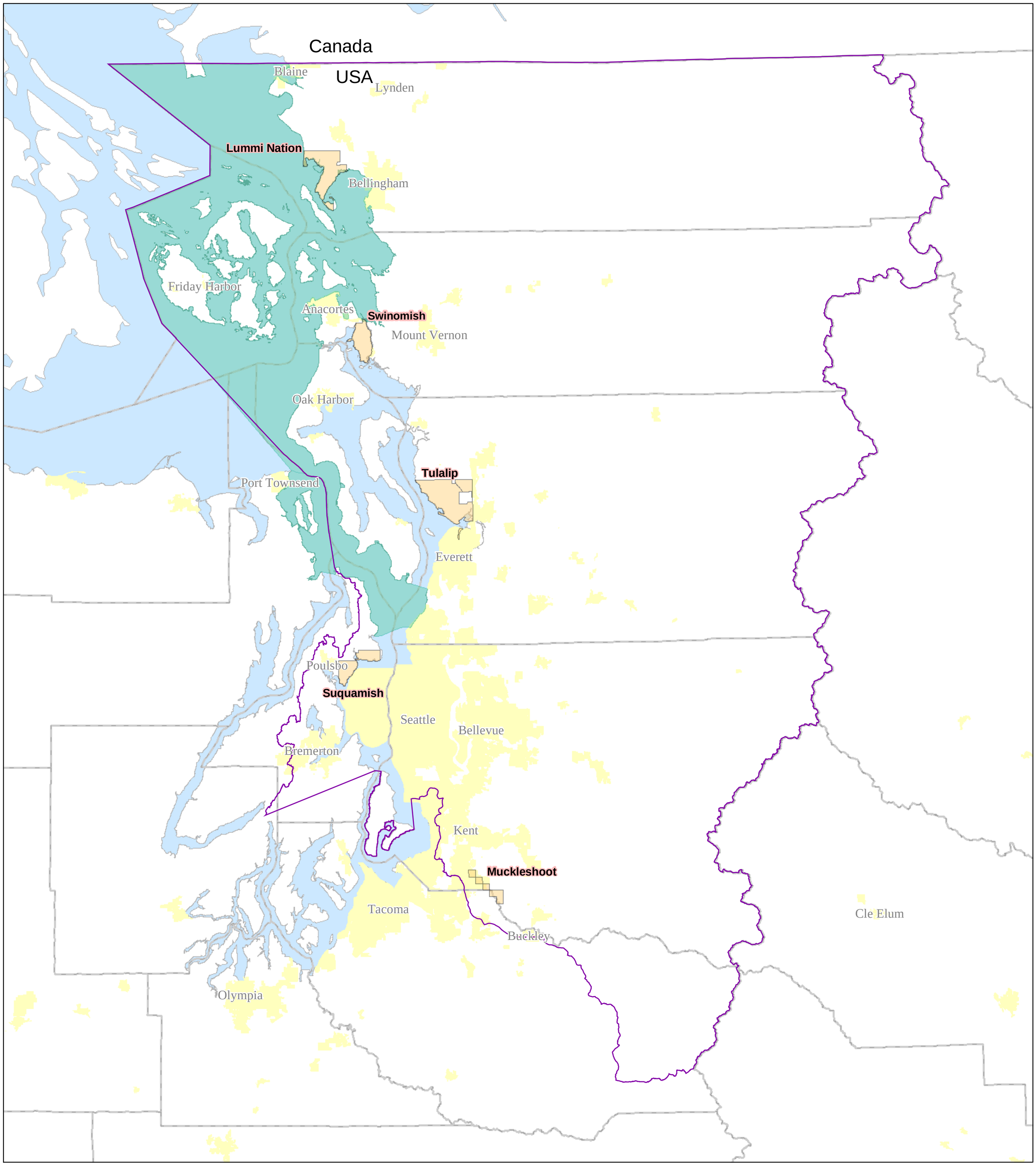


N

Data Source:
Ecology "Tribal" Coverage
WDFW DFW_Medi Coverage

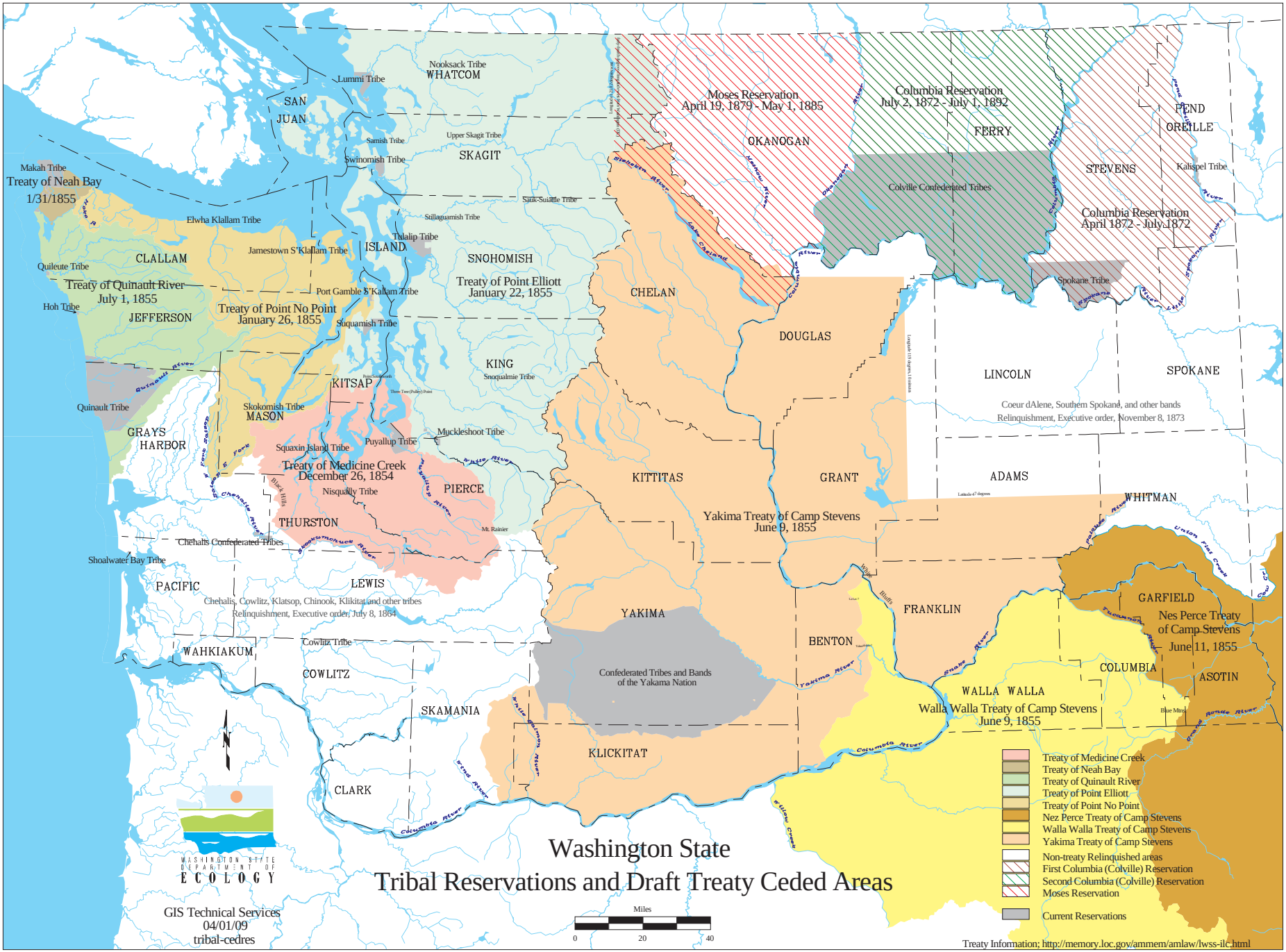
Map Projection:
UTM Zone 10 NAD 27

Lummi Nation - Puget Sound Area
Usual & Accustomed Area Fishing Area
&
Ceded Lands
Treaty of Point Elliot

Legend

- Point Elliott Treaty Reservations
- Point Elliot Treaty Ceded Lands (WDFW)
- Ocean
- County Boundaries
- Cities and Towns
- Lummi Primary Fishing U & A

0 20 40
Miles


Nooksack Tribe
WHATCOM
Lummi Tribe
SAN
JUAN
Samish Tribe
Upper Skagit Tribe
SKAGIT
Swinomish Tribe
Makah Tribe
Treaty of Neah Bay
1/31/1855
Elwha Klallam Tribe
Sauk-Suiattle Tribe
Stillaguamish Tribe
Tulalip Tribe
ISLAND
SNOHOMISH
Jamestown S'Klallam Tribe
CLALLAM
Quileute Tribe
Treaty of Quinault River
July 1, 1855
Hoh Tribe
Port Gamble S'Klallam Tribe
Treaty of Point Elliott
January 22, 1855
Treaty of Point No Point
January 26, 1855
JEFFERSON
Suquamish Tribe
KING
Snoqualmie Tribe
KITSAP
Quinault Tribe
Skokomish Tribe
MASON
GRAYS
HARBOR
Muckleshoot Tribe
Squaxin Island Tribe
Puyallup Tribe
Treaty of Medicine Creek
December 26, 1854
Nisqually Tribe
PIERCE
THURSTON
Mt. Rainier
Chehalis Confederated Tribes
Shoalwater Bay Tribe
PACIFIC
LEWIS
Chehalis, Cowlitz, Klatsop, Chinook, Klikitat and other tribes
Relinquishment, Executive order, July 8, 1864
Cowlitz Tribe
WAHKIAKUM
COWLITZ
SKAMANIA
CLARK
KLICKITAT
Moses Reservation
April 19, 1879 - May 1, 1885
Columbia Reservation
July 2, 1872 - July 1, 1892
OKANOGAN
FERRY
PEND
OREILLE
STEVENS
Kalispel Tribe
Colville Confederated Tribes
Columbia Reservation
April 1872 - July 1872
Spokane Tribe
CHELAN
DOUGLAS
LINCOLN
SPOKANE
Coeur dAlene, Southern Spokane, and other bands
Relinquishment, Executive order, November 8, 1873
KITTITAS
GRANT
ADAMS
WHITMAN
Yakima Treaty of Camp Stevens
June 9, 1855
YAKIMA
BENTON
FRANKLIN
GARFIELD
Nes Perce Treaty
of Camp Stevens
June 11, 1855
COLUMBIA
ASOTIN
Confederated Tribes and Bands
of the Yakama Nation
WALLA WALLA
Walla Walla Treaty of Camp Stevens
June 9, 1855
Treaty of Medicine Creek
Treaty of Neah Bay
Treaty of Quinault River
Treaty of Point Elliott
Treaty of Point No Point
Nez Perce Treaty of Camp Stevens
Walla Walla Treaty of Camp Stevens
Yakima Treaty of Camp Stevens
Non-treaty Relinquished areas
First Columbia (Colville) Reservation
Second Columbia (Colville) Reservation
Moses Reservation
Current Reservations
Miles
0
20
40
WASHINGTON STATE DEPARTMENT OF ECOLOGY
GIS Technical Services
04/01/09
tribal-cedres
Washington State
Tribal Reservations and Draft Treaty Ceded Areas
Treaty Information; http://memory.loc.gov/ammem/amlaw/lwss-ilc.html

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Appendix C
Current and Historical Data

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Table of Contents

Table C.1
List of Events

Event Name	Start Date	End Date	Media Sampled			
			Soil	Groundwater	Sediment	Porewater
Soil/Grit Samples (Ecology)	8/1/1993	8/1/1993	6			
Phase 2 Parcel 5 Surface Sediment Sampling (RETEC)	3/1/1998	3/1/1998			4	
Phase 2 Main Shipyard Grab Sampling (RETEC)	3/1/1998	3/1/1998			19	8
Phase 2 Main Shipyard Vibracore Sampling (RETEC)	3/1/1998	3/1/1998			10	
Phase 2 Groundwater Sampling (RETEC)	5/14/1998	5/14/1998		12		
Phase 2 Vadose Soils Sampling (RETEC)	9/1/1998	9/1/1998	10			
Phase 2 Saturated Zone Soils Sampling (RETEC)	9/1/1998	9/1/1998	8			
Sediments at Olavine (RETEC)	8/22/2000	11/9/2000			30	
Shipyard RI/FS Supplemental Investigation (RETEC)	7/24/2003	7/24/2003			8	
Shipyard RI/FS Supplemental Sediment Investigation (RETEC)	11/6/2003	11/6/2003			4	
Shipyards PSDDA Investigation (RETEC)	2/24/2004	2/27/2004			7	4
Shipyard Sediments RI/FS Intertidal Data (RETEC)	8/17/2005	8/19/2005	10	1	4	
RI/FS Round 1 Sampling (Floyd|Snider)	3/14/2011	3/23/2011	58	19	6	
RI/FS Round 2 Sampling (Floyd|Snider)	7/28/2011	7/29/2011		9	4	
RI/FS Data Gaps Investigation Sampling (Floyd|Snider)	1/29/2013	2/15/2013	29	38	15	
Interim Action Sampling (Floyd|Snider)	2/29/2015	2/13/2015	96[1]	15	129[2]	
Interim Action 2nd Quarter Groundwater (Floyd|Snider)	5/28/2015	5/28/2015		16		
Interim Action 3rd Quarter Groundwater (Floyd|Snider)	8/27/2015	8/27/2015		18		
Interim Action 4th Quarter Groundwater (Floyd|Snider)	12/3/2015	12/3/2015		18		

Notes:

Blank cells are intentional.

1 Total samples taken, 12 samples were archived and have no chemistry results.

2 Total samples taken, 37 samples were archived and have no chemistry results.

Abbreviations:

Ecology Washington State Department of Ecology
PSDDA Puget Sound Dredged Disposal Analysis
RETEC The RETEC Group
RI/FS Remedial Investigation/Feasibility Study

Table C.2
List of Locations and Media

Location Name	Easting (ft. NAD 83/98)	Northing (ft. NAD 83/98)	Sediment	Groundwater	Pore Water	Soil	Event Location Installed
Soil 1-A/1-B	1234583.377	632224.1376				X	Soil/Grit Samples (Ecology)
Soil 2-A/2-B	1234528.305	632202.9962				X	Soil/Grit Samples (Ecology)
Soil 3-A/3-B	1234428.807	632135.8677				X	Soil/Grit Samples (Ecology)
HG-19	1234101.024	632182.0579	X				Phase 2 Parcel 5 Surface Sediment Sampling (RETEC)
HG-20	1234054.28	631841.496	X				Phase 2 Parcel 5 Surface Sediment Sampling (RETEC)
HG-21	1234042.928	631545.0067	X				Phase 2 Parcel 5 Surface Sediment Sampling (RETEC)
HG-22	1233996.852	632258.1834	X				Phase 2 Parcel 5 Surface Sediment Sampling (RETEC)
HG-1	1234671.589	632754.6257	X		X		Phase 2 Main Shipyard Grab Sampling (RETEC)
HG-2	1234724.432	632469.7673	X		X		Phase 2 Main Shipyard Grab Sampling (RETEC)
HG-3	1234543.877	632580.1841	X				Phase 2 Main Shipyard Grab Sampling (RETEC)
HG-4	1234568.877	632486.434	X				Phase 2 Main Shipyard Grab Sampling (RETEC)
HG-5	1234556.806	632948.9399	X		X		Phase 2 Main Shipyard Grab Sampling (RETEC)
HG-6	1234506.377	632783.6565	X		X		Phase 2 Main Shipyard Grab Sampling (RETEC)
HG-7	1234484.881	632715.8305	X				Phase 2 Main Shipyard Grab Sampling (RETEC)
HG-8	1234463.947	632574.4978	X		X		Phase 2 Main Shipyard Grab Sampling (RETEC)
HG-9	1234359.49	632962.228	X				Phase 2 Main Shipyard Grab Sampling (RETEC)
HG-10	1234321.686	632764.0945	X		X		Phase 2 Main Shipyard Grab Sampling (RETEC)
HG-11	1234311.932	632607.2674	X				Phase 2 Main Shipyard Grab Sampling (RETEC)
HG-12	1234341.793	632426.0174	X				Phase 2 Main Shipyard Grab Sampling (RETEC)
HG-13	1234230.668	632606.6791	X				Phase 2 Main Shipyard Grab Sampling (RETEC)
HG-14	1234190.111	632417.6247	X				Phase 2 Main Shipyard Grab Sampling (RETEC)
HG-15	1234244.086	632296.7427	X				Phase 2 Main Shipyard Grab Sampling (RETEC)
HG-16	1234112.717	632991.9458	X		X		Phase 2 Main Shipyard Grab Sampling (RETEC)
HG-17	1234115.404	632787.8231	X				Phase 2 Main Shipyard Grab Sampling (RETEC)
HG-18	1234137.541	632432.8055	X		X		Phase 2 Main Shipyard Grab Sampling (RETEC)
HG-23	1233991.099	632601.712	X				Phase 2 Main Shipyard Grab Sampling (RETEC)
HV-3	1234414.829	632373.0352	X				Phase 2 Main Shipyard Vibracore Sampling (RETEC)
HV-4	1234549.04	632479.6348	X				Phase 2 Main Shipyard Vibracore Sampling (RETEC)
HV-6	1234523.596	632764.7887	X				Phase 2 Main Shipyard Vibracore Sampling (RETEC)
HV-8	1234461.959	632578.2451	X				Phase 2 Main Shipyard Vibracore Sampling (RETEC)
TP-3	1234539.954	631986.4287				X	Phase 2 Vadose Soils Sampling (RETEC)
TP-4	1234485.413	631976.5121				X	Phase 2 Vadose Soils Sampling (RETEC)
TP-6	1234261.53	631774.8084				X	Phase 2 Vadose Soils Sampling (RETEC)
TP-8	1234318.23	632044.4083				X	Phase 2 Vadose Soils Sampling (RETEC)
TP-9	1234403.607	632134.7818				X	Phase 2 Vadose Soils Sampling (RETEC)
TP-10	1234473.56	632176.058				X	Phase 2 Vadose Soils Sampling (RETEC)
TP-13	1234550.247	632231.238				X	Phase 2 Vadose Soils Sampling (RETEC)
TP-15	1234600.447	632170.9818				X	Phase 2 Vadose Soils Sampling (RETEC)
B-1	1234571.276	632065.1021				X	Phase 2 Saturated Zone Soils Sampling (RETEC)
MW-02	1234435.015	632261.3373		X		X	Phase 2 Saturated Zone Soils Sampling (RETEC)

Table C.2
List of Locations and Media

Location Name	Easting (ft. NAD 83/98)	Northing (ft. NAD 83/98)	Sediment	Groundwater	Pore Water	Soil	Event Location Installed
MW-03	1234279.465	631822.2037		X		X	Phase 2 Saturated Zone Soils Sampling (RETEC)
HG-30	1234688.309	632570.338	X				Sediments at Olavine (RETEC)
HG-31	1234682.952	632461.7798	X				Sediments at Olavine (RETEC)
HG-32	1234636.529	632547.8407	X				Sediments at Olavine (RETEC)
HG-33	1234578.679	632397.859	X				Sediments at Olavine (RETEC)
HG-34	1234471.035	632895.8219	X				Sediments at Olavine (RETEC)
HG-35	1234349.724	632872.3843	X				Sediments at Olavine (RETEC)
HG-36	1234374.811	632696.2124	X				Sediments at Olavine (RETEC)
HG-37	1234372.109	632509.7627	X				Sediments at Olavine (RETEC)
HG-38	1234320.471	632771.9068	X				Sediments at Olavine (RETEC)
HG-39	1234312.03	632519.199	X				Sediments at Olavine (RETEC)
HG-40	1234375.115	632323.9901	X				Sediments at Olavine (RETEC)
HG-41	1234307.081	632329.5242	X				Sediments at Olavine (RETEC)
HG-42	1234586.443	632737.3583	X				Sediments at Olavine (RETEC)
HG-44	1234665.78	632801.8274	X				Sediments at Olavine (RETEC)
HV-30	1234701.879	632573.9089	X				Sediments at Olavine (RETEC)
HV-31	1234685.452	632403.5726	X				Sediments at Olavine (RETEC)
HV-38	1234312.485	632769.4764	X				Sediments at Olavine (RETEC)
HV-39	1234310.143	632514.4808	X				Sediments at Olavine (RETEC)
HV-41	1234311.855	632325.5094	X				Sediments at Olavine (RETEC)
HV-50	1234514.401	632597.4777	X				Sediments at Olavine (RETEC)
HV-51	1234441.131	632701.5943	X				Sediments at Olavine (RETEC)
HV-52	1234490.374	632492.2863	X				Sediments at Olavine (RETEC)
HV-53	1234521.901	632379.2898	X				Sediments at Olavine (RETEC)
HV-54	1234417	6323410875	X				Sediments at Olavine (RETEC)
HB-1	1234760.183	632888.9689	X				Shipyard RI/FS Supplemental Investigation (RETEC)
HB-2	1234475.375	632897.5578	X				Shipyard RI/FS Supplemental Investigation (RETEC)
HB-3	1234233.815	632898.3462	X				Shipyard RI/FS Supplemental Investigation (RETEC)
HB-4	1234231.798	632630.2545	X				Shipyard RI/FS Supplemental Investigation (RETEC)
HC-10	1234485.575	632756.4554	X		X		Shipyards PSDDA Investigation (RETEC)
HC-12	1234680.81	632616.0469	X		X		Shipyards PSDDA Investigation (RETEC)
HC-14	1234475.171	632554.0136	X				Shipyards PSDDA Investigation (RETEC)
HC-16	1234327.936	632736.6638	X				Shipyards PSDDA Investigation (RETEC)
HC-23	1234239.655	632738.2419	X		X		Shipyards PSDDA Investigation (RETEC)
HC-8	1234745.659	632750.5109	X		X		Shipyards PSDDA Investigation (RETEC)
S-1	1234529.382	632323.5563	X				Shipyard Sediments RI/FS Intertidal Data (RETEC)
S-2	1234529.059	632285.1302	X				Shipyard Sediments RI/FS Intertidal Data (RETEC)
S-3	1234528.736	632256.3911				X	Shipyard Sediments RI/FS Intertidal Data (RETEC)
S-4	1234503.549	632286.0987				X	Shipyard Sediments RI/FS Intertidal Data (RETEC)
S-5	1234560.058	632260.2661				X	Shipyard Sediments RI/FS Intertidal Data (RETEC)

Table C.2
List of Locations and Media

Location Name	Easting (ft. NAD 83/98)	Northing (ft. NAD 83/98)	Sediment	Groundwater	Pore Water	Soil	Event Location Installed
FS-01	1234614.389	632230.6291				X	RI/FS Round 1 Sampling (Floyd|Snider)
FS-02	1234380.754	632247.7356				X	RI/FS Round 1 Sampling (Floyd|Snider)
FS-03	1234372.522	632185.9046				X	RI/FS Round 1 Sampling (Floyd|Snider)
FS-04	1234312.287	632108.1268				X	RI/FS Round 1 Sampling (Floyd|Snider)
FS-05	1234357.398	632001.263				X	RI/FS Round 1 Sampling (Floyd|Snider)
FS-06	1234403.531	632071.8226				X	RI/FS Round 1 Sampling (Floyd|Snider)
FS-07	1234379.696	632106.7195		X		X	RI/FS Round 1 Sampling (Floyd|Snider)
FS-08	1234458.012	632093.441				X	RI/FS Round 1 Sampling (Floyd|Snider)
FS-09	1234433.643	632128.4439		X		X	RI/FS Round 1 Sampling (Floyd|Snider)
FS-09A	1234440.486	632122.124				X	RI/FS Round 1 Sampling (Floyd|Snider)
FS-09A(2)	1234437.609	632115.08				X	RI/FS Round 1 Sampling (Floyd|Snider)
FS-09B	1234450.665	632126.531				X	RI/FS Round 1 Sampling (Floyd|Snider)
FS-09C	1234438.949	632142.54				X	RI/FS Round 1 Sampling (Floyd|Snider)
FS-09D	1234428.016	632129.229				X	RI/FS Round 1 Sampling (Floyd|Snider)
FS-10	1234505.894	632197.0211				X	RI/FS Round 1 Sampling (Floyd|Snider)
FS-11	1234543.677	632249.0953				X	RI/FS Round 1 Sampling (Floyd|Snider)
FS-12	1234627.991	632183.8875				X	RI/FS Round 1 Sampling (Floyd|Snider)
FS-13	1234622.889	632101.2958				X	RI/FS Round 1 Sampling (Floyd|Snider)
FS-14	1234589.113	632116.4161				X	RI/FS Round 1 Sampling (Floyd|Snider)
FS-15	1234569.184	632141.0371		X		X	RI/FS Round 1 Sampling (Floyd|Snider)
FS-16	1234518.459	632022.7982				X	RI/FS Round 1 Sampling (Floyd|Snider)
FS-17	1234536.888	631940.2406		X		X	RI/FS Round 1 Sampling (Floyd|Snider)
FS-18	1234463.054	631918.758				X	RI/FS Round 1 Sampling (Floyd|Snider)
HA-01	1234691.352	632312.618	X				RI/FS Round 1 Sampling (Floyd|Snider)
HA-02	1234658.609	632310.864	X				RI/FS Round 1 Sampling (Floyd|Snider)
HA-03	1234498.79	632299.028	X				RI/FS Round 1 Sampling (Floyd|Snider)
HA-04	1234400.989	632280.526	X				RI/FS Round 1 Sampling (Floyd|Snider)
HA-05	1234320.246	632241.6123	X				RI/FS Round 1 Sampling (Floyd|Snider)
HA-06	1234275.554	632136.9596	X				RI/FS Round 1 Sampling (Floyd|Snider)
HA-07	1234230.862	632035.6829	X				RI/FS Round 1 Sampling (Floyd|Snider)
HA-08	1234196.725	631950.5981	X				RI/FS Round 1 Sampling (Floyd|Snider)
MW-01	1234576.045	632217.5726		X		X	RI/FS Round 1 Sampling (Floyd|Snider)
MW-02A	1234456.324	632258.0725		X		X	RI/FS Round 1 Sampling (Floyd|Snider)
MW-04	1234505.554	632080.6207		X		X	RI/FS Round 1 Sampling (Floyd|Snider)
MW-05	1234655.094	631748.7663		X		X	RI/FS Round 1 Sampling (Floyd|Snider)
MW-06	1234636.986	632248.3162		X		X	RI/FS Round 1 Sampling (Floyd|Snider)
MW-07	1234337.768	632127.7118		X		X	RI/FS Round 1 Sampling (Floyd|Snider)
MW-08	1234273.294	631999.9527		X		X	RI/FS Round 1 Sampling (Floyd|Snider)
MW-09	1234582.276	632259.6744		X		X	RI/FS Round 1 Sampling (Floyd|Snider)
SG-01	1234210.071	632101.4046	X				RI/FS Round 2 Sampling (Floyd|Snider)

Table C.2
List of Locations and Media

Location Name	Easting (ft. NAD 83/98)	Northing (ft. NAD 83/98)	Sediment	Groundwater	Pore Water	Soil	Event Location Installed
SG-03	1234309.79	632293.7903	X				RI/FS Round 2 Sampling (Floyd|Snider)
SG-04	1234530.761	632418.7763	X				RI/FS Round 2 Sampling (Floyd|Snider)
FS-19	1234608.375	632240.0625		X		X	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)
FS-20	1234578.625	632221				X	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)
FS-21	1234586.625	632177.6875		X		X	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)
FS-22	1234674.25	632210.5625		X		X	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)
FS-23	1234612.5	632136.9375				X	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)
HA-09	1234694	632311.875	X				RI/FS Data Gaps Investigation Sampling (Floyd|Snider)
HA-10	1234227.75	632038.5	X				RI/FS Data Gaps Investigation Sampling (Floyd|Snider)
HA-11	1234194.5	631950.8125	X				RI/FS Data Gaps Investigation Sampling (Floyd|Snider)
MW-10	1234715.125	632274.5		X		X	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)
SFS-01	1234275.25	631999.9376				X	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)
SFS-02	1234457.218	632184.003				X	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)
SG-05	1234684.5	632370.3125	X				RI/FS Data Gaps Investigation Sampling (Floyd|Snider)
SG-06	1234519.375	632422.5625	X				RI/FS Data Gaps Investigation Sampling (Floyd|Snider)
SG-07	1234459.5	632574.9375	X				RI/FS Data Gaps Investigation Sampling (Floyd|Snider)
SG-08	1234734.25	632607.4375	X				RI/FS Data Gaps Investigation Sampling (Floyd|Snider)
SG-09	1234736.5	632701.375	X				RI/FS Data Gaps Investigation Sampling (Floyd|Snider)
SG-10	1234817.25	632644.1875	X				RI/FS Data Gaps Investigation Sampling (Floyd|Snider)
SG-11	1234819.25	632738	X				RI/FS Data Gaps Investigation Sampling (Floyd|Snider)
SG-12	1234105	632986.4375	X				RI/FS Data Gaps Investigation Sampling (Floyd|Snider)
SG-13	1234059.25	631865.1875	X				RI/FS Data Gaps Investigation Sampling (Floyd|Snider)
FS-24	1234564.727	632113.8037				X	Interim Action Sampling (Floyd|Snider)
FS-25	1234566.792	632132.5479				X	Interim Action Sampling (Floyd|Snider)
FS-26	1234584.961	632256.8446				X	Interim Action Sampling (Floyd|Snider)
FS-27	1234593.972	632119.8249				X	Interim Action Sampling (Floyd|Snider)
FS-28	1234594.83	632148.1543				X	Interim Action Sampling (Floyd|Snider)
FS-29	1234601.638	632250.461				X	Interim Action Sampling (Floyd|Snider)
FS-30	1234616.545	632119.6763				X	Interim Action Sampling (Floyd|Snider)
FS-31	1234617.754	632153.3673				X	Interim Action Sampling (Floyd|Snider)
FS-32	1234618.569	632183.4372				X	Interim Action Sampling (Floyd|Snider)
FS-33	1234618.713	632213.1189				X	Interim Action Sampling (Floyd|Snider)
FS-34	1234619.257	632233.5521				X	Interim Action Sampling (Floyd|Snider)
FS-35	1234619.93	632258.9036				X	Interim Action Sampling (Floyd|Snider)
FS-36	1234640.329	632192.43				X	Interim Action Sampling (Floyd|Snider)
FS-37	1234641.118	632212.4807				X	Interim Action Sampling (Floyd|Snider)
FS-38	1234638.02	632256.9035				X	Interim Action Sampling (Floyd|Snider)
FS-39	1234590.477	632170.0114				X	Interim Action Sampling (Floyd|Snider)
FS-40	1234596.233	632179.6579				X	Interim Action Sampling (Floyd|Snider)
FS-41	1234605.333	632170.2427				X	Interim Action Sampling (Floyd|Snider)

Table C.2
List of Locations and Media

Location Name	Easting (ft. NAD 83/98)	Northing (ft. NAD 83/98)	Sediment	Groundwater	Pore Water	Soil	Event Location Installed
FS-42	1234606.116	632179.9338				X	Interim Action Sampling (Floyd|Snider)
HA-12	1234692.337	632308.1438	X				Interim Action Sampling (Floyd|Snider)
HA-13	1234663.46	632309.0484	X				Interim Action Sampling (Floyd|Snider)
HA-14	1234543	632295.3	X				Interim Action Sampling (Floyd|Snider)
MW-11	1234512.922	632256.1657		X		X	Interim Action Sampling (Floyd|Snider)
MW-12	1234368.968	632221.7187		X		X	Interim Action Sampling (Floyd|Snider)
SC-01	1234709.785	632436.378	X				Interim Action Sampling (Floyd|Snider)
SC-02	1234663.697	632438.865	X				Interim Action Sampling (Floyd|Snider)
SC-03	1234718.103	632511.089	X				Interim Action Sampling (Floyd|Snider)
SC-04	1234549.308	632615.959	X				Interim Action Sampling (Floyd|Snider)
SC-05	1234600.969	632709.936	X				Interim Action Sampling (Floyd|Snider)
SC-06	1234553.27	632708.953	X				Interim Action Sampling (Floyd|Snider)
SC-07	1234699.805	632754.979	X				Interim Action Sampling (Floyd|Snider)
SC-08	1234731.038	632774.977	X				Interim Action Sampling (Floyd|Snider)
SC-09	1234666.424	632803.456	X				Interim Action Sampling (Floyd|Snider)
SC-11	1234851.285	632677.79	X				Interim Action Sampling (Floyd|Snider)
SC-12	1234853.22	632601.92	X				Interim Action Sampling (Floyd|Snider)
SC-13	1234685.054	632391.741	X				Interim Action Sampling (Floyd|Snider)
SC-14	1234543.592	632432.532	X				Interim Action Sampling (Floyd|Snider)
SC-15	1234661.237	632509.372	X				Interim Action Sampling (Floyd|Snider)
SC-16	1234599.629	632511.068	X				Interim Action Sampling (Floyd|Snider)
SC-17	1234541.813	632508.827	X				Interim Action Sampling (Floyd|Snider)
SC-18	1234728.917	632606.076	X				Interim Action Sampling (Floyd|Snider)
SC-19	1234665.566	632607.265	X				Interim Action Sampling (Floyd|Snider)
SC-20	1234601.627	632620.19	X				Interim Action Sampling (Floyd|Snider)
SC-21	1234702.909	632653.652	X				Interim Action Sampling (Floyd|Snider)
SC-22	1234731.391	632703.27	X				Interim Action Sampling (Floyd|Snider)
SC-23	1234673.859	632703.67	X				Interim Action Sampling (Floyd|Snider)
SC-24	1234905	632679.1	X				Interim Action Sampling (Floyd|Snider)
SC-25	1234900.7	632604.2	X				Interim Action Sampling (Floyd|Snider)
SC-26	1234777.1	632623.1	X				Interim Action Sampling (Floyd|Snider)

Notes:

Blank cells are intentional.

1 Coordinates are in State Plane North NAD 83 (feet).

Abbreviations:

Ecology Washington State Department of Ecology
ft Feet
PSDDA Puget Sound Dredged Disposal Analysis
NAD 83 North American Datum of 1983
RETEC The RETEC Group
RI/FS Remedial Investigation/Feasibility Study

Table C.3
Analytical Schedule by Event and Media

Event	Soil/Grit Samples (Ecology)	Phase 2 Main Shipyard Grab Sampling (RETEC)		Phase 2 Main Shipyard Vibracore Sampling (RETEC)	Phase 2 Parcel 5 Surface Sediment Sampling (RETEC)	Phase 2 Groundwater Sampling (RETEC)	Phase 2 Saturated Zone Soils Sampling (RETEC)	Phase 2 Vadose Soils Sampling (RETEC)	Sediments at Olavine (RETEC)	Shipyard RIFS Supplemental Investigation (RETEC)	Shipyard RI/FS Supplemental Sediment Investigation (RETEC)	Shipyards PSDDA Investigation (RETEC)		Shipyard Sediments RI/FS Intertidal Data (RETEC)		
Date	August 1993	March 1998		March 1998	March 1998	May 1998	1998	1998	August 2000	July 2003	November 2003	February 2004		August 2005		
Media	Soil	Sediment	Pore Water	Sediment	Sediment	Groundwater	Soil	Soil	Sediment	Sediment	Sediment	Sediment	Pore Water	Sediment	Soil	Groundwater
Analytical Method																
Total Petroleum Hydrocarbons (TPHs)																
EPH Aromatics GC/MS								X								
EPH GC/FID								X								
MTCA EPH																
MTCA VPH																
WA DOE VPH								X								
NWEPH																
NWTPH-Dx							X	X						X	X	X
NWTPH-Dx SG																
NWTPH-Gx							X	X						X	X	X
NWTPH-HCID																
NWTVPH																
Metals																
USEPA 200.8																
USEPA 6010									X							
USEPA 6010B										X		X		X	X	X
USEPA 6010C																
USEPA 6020																
USEPA 7060A																X
USEPA 7421																X
USEPA 7470																
USEPA 7470A																X
USEPA 7471									X							
USEPA 7471A										X		X		X	X	
Polychlorinated Biphenyls (PCBs)																
USEPA 8082														X	X	X
USEPA 8082A																
PSDDA SW8082A																
Dioxins/Furans																
USEPA 1613B																

Table C.3
Analytical Schedule by Event and Media

Event	RI/FS Round 1 Sampling (Floyd|Snider)			RI/FS Round 2 Sampling (Floyd|Snider)		RI/FS Data Gaps Investigation Sampling (Floyd|Snider)			Interim Action Sampling (Floyd|Snider)			Interim Action 2nd Quarter Groundwater Sampling (Floyd|Snider)	Interim Action 3rd Quarter Groundwater Sampling (Floyd|Snider)	Interim Action 2nd Quarter Groundwater Sampling (Floyd|Snider)
Date	March 2011			July 2011		January 2013			February 2015			May 2015	August 2015	December 2015
Media	Sediment	Soil	Groundwater	Sediment	Groundwater	Sediment	Soil	Groundwater	Sediment	Soil	Groundwater	Groundwater	Groundwater	Groundwater
Analytical Method														
Total Petroleum Hydrocarbons (TPHs)														
EPH Aromatics GC/MS														
EPH GC/FID														
MTCA EPH							X	X						
MTCA VPH							X	X						
WA DOE VPH											X			
NWEPH										X	X			
NWTPH-Dx				X	X		X	X	X	X				
NWTPH-Dx SG	X	X	X											
NWTPH-Gx	X	X	X		X		X	X		X				
NWTPH-HCID										X				
NWTVPH										X				
Metals														
USEPA 200.8						X		X			X	X	X	X
USEPA 6010														
USEPA 6010B														
USEPA 6010C						X			X	X				
USEPA 6020	X	X	X	X	X		X							
USEPA 7060A														
USEPA 7421														
USEPA 7470			X		X									
USEPA 7470A														
USEPA 7471	X	X		X			X							
USEPA 7471A						X			X	X				
Polychlorinated Biphenyls (PCBs)														
USEPA 8082	X	X	X	X	X									
USEPA 8082A						X			X					
PSDDA SW8082A						X								
Dioxins/Furans														
USEPA 1613B						X	X							

Table C.3
Analytical Schedule by Event and Media

Event	Soil/Grit Samples (Ecology)	Phase 2 Main Shipyard Grab Sampling (RETEC)		Phase 2 Main Shipyard Vibracore Sampling (RETEC)	Phase 2 Parcel 5 Surface Sediment Sampling (RETEC)	Phase 2 Groundwater Sampling (RETEC)	Phase 2 Saturated Zone Soils Sampling (RETEC)	Phase 2 Vadose Soils Sampling (RETEC)	Sediments at Olavine (RETEC)	Shipyard RIFS Supplemental Investigation (RETEC)	Shipyard RI/FS Supplemental Sediment Investigation (RETEC)	Shipyards PSDDA Investigation (RETEC)		Shipyard Sediments RI/FS Intertidal Data (RETEC)		
Date	August 1993	March 1998		March 1998	March 1998	May 1998	1998	1998	August 2000	July 2003	November 2003	February 2004		August 2005		
Media	Soil	Sediment	Pore Water	Sediment	Sediment	Groundwater	Soil	Soil	Sediment	Sediment	Sediment	Sediment	Pore Water	Sediment	Soil	Groundwater
Semivolatile Organic Compounds (SVOCs)																
USEPA 8270								X		X		X	X	X	X	
USEPA 8270D														X	X	X
USEPA 8270D-SIM																
PSDDA SW8270									X							
Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX)																
USEPA 8021																
Volatile Organic Compounds (VOCs)																
USEPA 8260							X	X				X		X	X	
USEPA 8260B										X						
Pesticides																
USEPA 8081										X		X				
PSDDA SW8081									X							
PSDDA SW8081B																
Conventionals																
ASTM D2216																
ASTM D2974																
ASTM D7263																
ASTM D854																
USEPA 160.3										X		X		X	X	
USEPA 160.4M										X		X				
USEPA 350.1										X		X				
USEPA 9060M																
USEPA 9100																
KRONE										X						
PLUMB									X							
PLUMB81PS										X		X		X	X	
PSEP																
PSEP-N										X	X	X				
SM 2540B																
SM 2540G																

Table C.3
Analytical Schedule by Event and Media

Event	RI/FS Round 1 Sampling (Floyd|Snider)			RI/FS Round 2 Sampling (Floyd|Snider)		RI/FS Data Gaps Investigation Sampling (Floyd|Snider)			Interim Action Sampling (Floyd|Snider)			Interim Action 2nd Quarter Groundwater Sampling (Floyd|Snider)	Interim Action 3rd Quarter Groundwater Sampling (Floyd|Snider)	Interim Action 2nd Quarter Groundwater Sampling (Floyd|Snider)
Date	March 2011			July 2011		January 2013			February 2015			May 2015	August 2015	December 2015
Media	Sediment	Soil	Groundwater	Sediment	Groundwater	Sediment	Soil	Groundwater	Sediment	Soil	Groundwater	Groundwater	Groundwater	Groundwater
Semivolatile Organic Compounds (SVOCs)														
USEPA 8270	X	X	X	X	X		X	X						
USEPA 8270D						X								
USEPA 8270D-SIM						X	X	X	X	X	X	X	X	X
PSDDA SW8270														
Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX)														
USEPA 8021							X	X						
Volatile Organic Compounds (VOCs)														
USEPA 8260														
USEPA 8260B		X	X		X			X						
Pesticides														
USEPA 8081														
PSDDA SW8081														
PSDDA SW8081B					X	X								
Conventionals														
ASTM D2216							X							
ASTM D2974							X							
ASTM D7263							X							
ASTM D854							X							
USEPA 160.3	X			X										
USEPA 160.4M														
USEPA 350.1														
USEPA 9060M					X	X			X					
USEPA 9100							X							
KRONE	X	X		X										
PLUMB	X			X					X					
PLUMB81PS														
PSEP					X	X			X					
PSEP-N														
SM 2540B					X	X								
SM 2540G									X					

Note:

Blank cells are intentional.

Abbreviations:

Ecology Washington State Department of Ecology.
PSDDA Puget Sound Dredged Disposal Analysis.
RETEC The RETEC Group.
RI/FS Remedial Investigation/Feasibility Study.

Table C.4
Sediment Analytes Measured For but Not Detected with Screening Levels and Detection Limits

Analyte	CAS No.	Unit	Screening Level (Most Stringent from Screening Levels from Various Scenarios)	Current Events (2011-2015)				Historical Events (1998-2010)		
				Number of Results	Lowest Reporting Limit	Lowest Method Detection Limit	Exceed Screening Level?	Number of Results	Lowest Reporting Limit	Exceed Screening Level?
Polychlorinated Biphenyls (PCBs)										
Aroclor 1016	12674-11-2	mg/kg	60	102	0.0029	0.00093	no	70	0.017	no
Aroclor 1221	11104-28-2	mg/kg	--	102	0.0029	0.0011		70	0.035	
Aroclor 1232	11141-16-5	mg/kg	--	102	0.0029	0.0011		70	0.017	
Aroclor 1262	37324-23-5	mg/kg	--	5	0.0037	0.0012				
Aroclor 1268	11100-14-4	mg/kg	--	13	0.0037	0.0012				
Pesticides										
Aldrin	309-00-2	mg/kg	--					11	0.00097	
alpha-Chlordane	5103-71-9	mg/kg	--					11	0.00097	
Dieldrin	60-57-1	mg/kg	--					11	0.0019	
gamma-BHC	58-89-9	mg/kg	--					11	0.00097	
Heptachlor	76-44-8	mg/kg	--					11	0.00097	
p,p'-DDD	72-54-8	mg/kg	--	9	0.00093	0.00013		11	0.0019	
p,p'-DDE	72-55-9	mg/kg	--	9	0.00093	0.00012		11	0.0019	
Semivolatile Organic Compounds (SVOCs)										
1,2,4-Trichlorobenzene	120-82-1	mg/kg	0.059	17	0.0047	0.0017	no	41	0.004	no
2,3,4,6-Tetrachlorophenol	58-90-2	mg/kg	96,000	8	0.25	0.0072	no			
2,4,5-Trichlorophenol	95-95-4	mg/kg	320,000	8	0.1	0.011	no	4	0.4	no
2,4,6-Trichlorophenol	88-06-2	mg/kg	380	8	0.1	0.0072	no	4	0.4	no
2,4-Dichlorophenol	120-83-2	mg/kg	9,600	8	0.1	0.0082	no	4	0.4	no
2,4-Dinitrophenol	51-28-5	mg/kg	6,400	8	0.5	0.017	no	4	0.81	no
2,6-Dichlorophenol	87-65-0	mg/kg	--	8	0.1	0.0097				
2-Chloronaphthalene	91-58-7	mg/kg	260,000	8	0.1	0.0038	no	4	0.081	no
2-Chlorophenol	95-57-8	mg/kg	16,000	8	0.1	0.01	no	4	0.081	no
2-Nitrophenol	88-75-5	mg/kg	--	8	0.25	0.0085		4	0.4	
4,6-Dinitro-o-cresol	534-52-1	mg/kg	--	8	0.1	0.015		4	0.81	
4-Chloro-3-methylphenol	59-50-7	mg/kg	--	8	0.1	0.0099		4	0.4	
4-Nitrophenol	100-02-7	mg/kg	--	8	0.5	0.033		4	0.4	
Aniline	62-53-3	mg/kg	740	8	0.1	0.0041	no			
Azobenzene	103-33-3	mg/kg	38	8	0.1	0.0092	no			
bis(2-chloroethoxy)methane	111-91-1	mg/kg	--	8	0.1	0.01		4	0.081	
Diethylphthalate	84-66-2	mg/kg	0.2	17	0.047	0.0072	no			
Di-n-butyl phthalate	84-74-2	mg/kg	1.4	17	0.019	0.0056	no			
Di-n-octyl phthalate	117-84-0	mg/kg	6.2	17	0.019	0.0055	no			
Hexachlorobutadiene	87-68-3	mg/kg	0.06	17	0.00093	0.00013	no	48	0.00097	no
Hexachlorocyclopentadiene	77-47-4	mg/kg	19,000	8	0.5	0.027	no	4	0.4	no

Table C.4
Sediment Analytes Measured For but Not Detected with Screening Levels and Detection Limits

Analyte	CAS No.	Unit	Screening Level (Most Stringent from Screening Levels from Various Scenarios)	Current Events (2011-2015)				Historical Events (1998-2010)		
				Number of Results	Lowest Reporting Limit	Lowest Method Detection Limit	Exceed Screening Level?	Number of Results	Lowest Reporting Limit	Exceed Screening Level?
SVOCs (continued)										
Isophorone	78-59-1	mg/kg	4,400	8	0.1	0.012	no	4	0.081	no
m,p-Cresol (2:1 ratio)	15831-10-4	mg/kg	--	8	0.1	0.012				
Monobutyltin Trichloride	1118-46-3	mg/kg	--					11	0.00005	
N-Nitrosodiethanolamine	1116-54-7	mg/kg	--					7	0.019	
N-Nitrosodimethylamine	62-75-9	mg/kg	0.082	8	0.1	0.0056	no			
N-Nitroso-di-n-propylamine	621-64-7	mg/kg	0.6	8	0.1	0.0088	no	4	0.4	no
Volatile Organic Compounds (VOCs)										
1,1,1,2-Tetrachloroethane	630-20-6	mg/kg	--					4	0.0011	
1,1,1-Trichloroethane	71-55-6	mg/kg	--					4	0.0011	
1,1,2,2-Tetrachloroethane	79-34-5	mg/kg	--					4	0.0011	
1,1,2-Trichloroethane	79-00-5	mg/kg	--					4	0.0011	
1,1,2-Trichlorotrifluoroethane	76-13-1	mg/kg	--					4	0.0023	
1,1-Dichloroethane	75-34-3	mg/kg	--					4	0.0011	
1,1-Dichloroethene	75-35-4	mg/kg	--					4	0.0011	
1,1-Dichloropropene	563-58-6	mg/kg	--					4	0.0011	
1,2,3-Trichlorobenzene	87-61-6	mg/kg	--					4	0.0056	
1,2,3-Trichloropropane	96-18-4	mg/kg	--					4	0.0023	
1,2,4-Trimethylbenzene	95-63-6	mg/kg	--					4	0.0011	
1,2-Dibromo-3-chloropropane	96-12-8	mg/kg	--					4	0.0056	
1,2-Dibromoethane	106-93-4	mg/kg	--					4	0.0011	
1,2-Dichloroethane	107-06-2	mg/kg	--					4	0.0011	
1,2-Dichloropropane	78-87-5	mg/kg	--					4	0.0011	
1,3,5-Trimethylbenzene	108-67-8	mg/kg	--					4	0.0011	
1,3-Dichloropropane	142-28-9	mg/kg	--					4	0.0011	
1,3-Dichlorobenzene	541-73-1	mg/kg	--	17	0.0047	0.0012		41	0.0008	
1,4-Dichlorobenzene	106-46-7	mg/kg	0.11					41	0.0008	no
2,2-Dichloropropane	594-20-7	mg/kg	--					4	0.0011	
2,4-Dinitrotoluene	121-14-2	mg/kg	6,400	8	0.25	0.0092	no	4	0.4	no
2,6-Dinitrotoluene	606-20-2	mg/kg	960	8	0.25	0.013	no	4	0.4	no
2-Chloroethyl vinyl ether	110-75-8	mg/kg	--					4	0.0056	
2-Chlorotoluene	95-49-8	mg/kg	--					4	0.0011	
2-Hexanone	591-78-6	mg/kg	--					4	0.0056	
2-Nitroaniline	88-74-4	mg/kg	32,000	8	0.25	0.0055	no	4	0.4	no
3,3'-Dichlorobenzidine	91-94-1	mg/kg	9.3	8	0.5	0.11	no	4	0.4	no
3-Nitroaniline	99-09-2	mg/kg	--	8	0.25	0.01		4	0.4	

Table C.4
Sediment Analytes Measured For but Not Detected with Screening Levels and Detection Limits

Analyte	CAS No.	Unit	Screening Level (Most Stringent from Screening Levels from Various Scenarios)	Current Events (2011-2015)				Historical Events (1998-2010)		
				Number of Results	Lowest Reporting Limit	Lowest Method Detection Limit	Exceed Screening Level?	Number of Results	Lowest Reporting Limit	Exceed Screening Level?
VOCs (continued)										
4-Bromophenyl phenyl ether	101-55-3	mg/kg	--	8	0.1	0.0088		4	0.081	
4-Chloroaniline	106-47-8	mg/kg	21	8	0.1	0.004	no	4	0.4	no
4-Chlorophenyl phenyl ether	7005-72-3	mg/kg	--	8	0.1	0.0082		4	0.081	
4-Chlorotoluene	106-43-4	mg/kg	--					4	0.0011	
4-Nitroaniline	100-01-6	mg/kg	--	8	0.25	0.012		4	0.4	
Acrolein	107-02-8	mg/kg	--					4	0.056	
Acrylonitrile	107-13-1	mg/kg	--					4	0.0056	
Benzene	71-43-2	mg/kg	--					4	0.0011	
bis(2-Chloroethyl) ether	111-44-4	mg/kg	3.8	8	0.1	0.0054	no	4	0.081	no
bis(2-chloroisopropyl)ether	39638-32-9	mg/kg	--	8	0.1	0.0066		4	0.081	
Bromobenzene	108-86-1	mg/kg	--					4	0.0011	
Bromochloromethane	74-97-5	mg/kg	--					4	0.0011	
Bromodichloromethane	75-27-4	mg/kg	--					4	0.0011	
Bromoethane	74-96-4	mg/kg	--					4	0.0023	
Bromoform	75-25-2	mg/kg	--					4	0.0011	
Bromomethane	74-83-9	mg/kg	--					4	0.0011	
Carbon tetrachloride	56-23-5	mg/kg	--					4	0.0011	
Chlorobenzene	108-90-7	mg/kg	--					4	0.0011	
Chloroethane	75-00-3	mg/kg	--					4	0.0011	
Chloroform	67-66-3	mg/kg	--					4	0.0011	
Chloromethane	74-87-3	mg/kg	--					4	0.0011	
cis-1,2-Dichloroethene	156-59-2	mg/kg	--					4	0.0011	
cis-1,3-Dichloropropene	10061-01-5	mg/kg	--					4	0.0011	
Cymene	99-87-6	mg/kg	--					4	0.0011	
Dibromochloromethane	124-48-1	mg/kg	--					4	0.0011	
Dibromomethane	74-95-3	mg/kg	--					4	0.0011	
Ethylbenzene	100-41-4	mg/kg	380,000					11	0.0008	no
Hexachlorobenzene	118-74-1	mg/kg	0.06	17	0.00093	0.000088	no	41	0.00097	no
Hexachloroethane	67-72-1	mg/kg	100	17	0.019	0.0028	no	23	0.019	no
Iodomethane	74-88-4	mg/kg	--					4	0.0011	
iso-Propylbenzene	98-82-8	mg/kg	--					4	0.0011	
Methyl iso butyl ketone	108-10-1	mg/kg	--					4	0.0056	
Methylene chloride	75-09-2	mg/kg	--					4	0.0023	
n-Butylbenzene	104-51-8	mg/kg	--					4	0.0011	
n-Propylbenzene	103-65-1	mg/kg	--					4	0.0011	

Table C.4
Sediment Analytes Measured For but Not Detected with Screening Levels and Detection Limits

Analyte	CAS No.	Unit	Screening Level (Most Stringent from Screening Levels from Various Scenarios)	Current Events (2011-2015)				Historical Events (1998-2010)		
				Number of Results	Lowest Reporting Limit	Lowest Method Detection Limit	Exceed Screening Level?	Number of Results	Lowest Reporting Limit	Exceed Screening Level?
VOCs (continued)										
Nitrobenzene	98-95-3	mg/kg	6400	8	0.1	0.0083	no	4	0.081	no
Pyridine	110-86-1	mg/kg	3,800	8	0.2	0.0076	no			
sec-Butylbenzene	135-98-8	mg/kg	--					4	0.0011	
Styrene	100-42-5	mg/kg	--					4	0.0011	
tert-Butylbenzene	98-06-6	mg/kg	--					4	0.0011	
Tetrachloroethene	127-18-4	mg/kg	2,400					11	0.0008	no
Toluene	108-88-3	mg/kg	--					4	0.0011	
trans-1,2-Dichloroethene	156-60-5	mg/kg	--					4	0.0011	
trans-1,3-Dichloropropene	10061-02-6	mg/kg	--					4	0.0011	
trans-1,4-Dichloro-2-butene	110-57-6	mg/kg	--					4	0.0056	
Trichloroethene	79-01-6	mg/kg	110					11	0.0008	no
Trichlorofluoromethane	75-69-4	mg/kg	--					4	0.0011	
Vinyl acetate	108-05-4	mg/kg	--					4	0.0056	
Vinyl chloride	75-01-4	mg/kg	--					4	0.0011	
Xylene (ortho)	95-47-6	mg/kg	760,000					11	0.0008	no

Notes:
Method Detection Limits are not available for historical data.

Abbreviations:
BHC Benzene hexachloride.
CAS Chemical Abstracts Service
COPC Contaminant of potentail concern
DDD Dichlorodiphenyldichloroethane
DDE Dichlordiphenyldichloroethylene
mg/kg Micrograms per liter

Table C.5

Groundwater Analytes Measured For but Not Detected with Screening Levels and Detection Limits

Analyte	CAS No.	Unit	Screening Level (Most Stringent from Screening Levels from Various Scenarios)	Current Events (2013-2015)				Historical Events (1998-2012)				Outcome
				Number of Results	Lowest Reporting Limit	Lowest Method Detection Limit	Exceed Screening Level?	Number of Results	Lowest Reporting Limit	Lowest Method Detection Limit	Exceed Screening Level?	
Metals, Dissolved												
Beryllium	7440-41-7	µg/L	32	11	0.2	0.00563	no	6	1		no	Eliminated
Mercury (inorganic)	7439-97-6	µg/L	0.15					25	0.1	0.036	no	The screening level is actually for mercury in the unfiltered (total) fraction; the total mercury analyses were performed using a different method and had acceptable detection limits and detected results. Total mercury is a COPC for groundwater; dissolved mercury is eliminated
Metals, Total												
Silver	7440-22-4	µg/L	1.9					7	3		yes	Eliminated in 2011 Work Plan because there was no indication of a release in historical data set -- not detected in soil or groundwater
Thallium	7440-28-0	µg/L	0.2					6	5		yes	
Polychlorinated Biphenyls (PCBs)												
Aroclor 1016	12674-11-2	µg/L	0.03					19	0.01	0.0033	no	Eliminated
Aroclor 1221	11104-28-2	µg/L	--					19	0.01	0.0033		Eliminated
Aroclor 1232	11141-16-5	µg/L	--					19	0.01	0.0033		Eliminated
Aroclor 1242	53469-21-9	µg/L	--					19	0.01	0.0033		Eliminated
Aroclor 1248	12672-29-6	µg/L	--					19	0.01	0.0033		Eliminated
Aroclor 1254	11097-69-1	µg/L	0.03					19	0.01	0.0033	no	Eliminated
Aroclor 1260	11096-82-5	µg/L	0.03					19	0.01	0.0033	no	Eliminated
Aroclor 1268	11100-14-4	µg/L	--					18	0.01	0.0033		Eliminated
Total PCBs	--	µg/L	0.025					19	0.01		no	
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)												
Benzo(b)fluoranthene	205-99-2	µg/L	0.01	10	0.01	0.01	no	19	1	0.38	yes	MDL from current events is acceptable; data gap resolved; analytes okay to eliminate as COPCs
Benzo(k)fluoranthene	207-08-9	µg/L	0.01	10	0.007	0.007	no	19	1	0.43	yes	
Semivolatile Organic Compounds (SVOCs)												
2,3,4,6-Tetrachlorophenol	58-90-2	µg/L	480	10	2	0.35	no	18	2	0.35	no	Eliminated
2,4,5-Trichlorophenol	95-95-4	µg/L	600	10	2	0.51	no	18	2	0.51	no	Eliminated
2,4,6-Trichlorophenol	88-06-2	µg/L	3	10	2	0.3	no	18	2	0.3	no	Eliminated
2,4-Dichlorophenol	120-83-2	µg/L	6	10	2	0.26	no	18	2	0.26	no	Eliminated
2,4-Dimethylphenol	105-67-9	µg/L	50	10	2	0.29	no	18	2	0.29	no	Eliminated
2,4-Dinitrophenol	51-28-5	µg/L	40	10	10	0.98	no	18	10	0.98	no	Eliminated
2,6-Dichlorophenol	87-65-0	µg/L	--	10	2	0.25		18	2	0.25		Eliminated
2-Chloronaphthalene	91-58-7	µg/L	100	10	2	0.3	no	18	2	0.3	no	Eliminated
2-Chlorophenol	95-57-8	µg/L	17	10	2	0.28	no	18	2	0.28	no	Eliminated
2-Methylphenol	95-48-7	µg/L	50	10	2	0.43	no	18	2	0.43	no	Eliminated
2-Nitrophenol	88-75-5	µg/L	--	10	2	0.38		18	2	0.38		Eliminated
4,6 Dinitro-o-cresol	534-52-1	µg/L	10	10	4	0.83	no	18	2	0.83	no	Eliminated
4-Chloro-3-methylphenol	59-50-7	µg/L	36	10	2	0.4	no	18	2	0.4	no	Eliminated
4-Nitrophenol	100-02-7	µg/L	--	10	5	1.5		18	2	1.5		Eliminated
Acrylonitrile	107-13-1	µg/L	5	10	10	0.019	RL only	18	1	0.019	no	Eliminated

Table C.5

Groundwater Analytes Measured For but Not Detected with Screening Levels and Detection Limits

Analyte	CAS No.	Unit	Screening Level (Most Stringent from Screening Levels from Various Scenarios)	Current Events (2013-2015)				Historical Events (1998-2012)				Outcome
				Number of Results	Lowest Reporting Limit	Lowest Method Detection Limit	Exceed Screening Level?	Number of Results	Lowest Reporting Limit	Lowest Method Detection Limit	Exceed Screening Level?	
SVOCs (continued)												
Aniline	62-53-3	µg/L	7.7	10	4	0.86	no	18	2	0.86	no	Eliminated
Azobenzene	103-33-3	µg/L	1	10	2	0.54	RL only	18	2	0.54	RL only	Eliminated
Benzoic acid	65-85-0	µg/L	64,000	10	10	0.81	no	18	10	0.81	no	Eliminated
Benzyl alcohol	100-51-6	µg/L	800	10	2	0.34	no	18	2	0.34	no	Eliminated
bis(2-chloroethoxy)methane	111-91-1	µg/L	--	10	2	0.35		18	2	0.35		Eliminated
Butyl benzyl phthalate	85-68-7	µg/L	1	10	1	0.22	no	18	2	0.22	RL only	Eliminated
Diethyl phthalate	84-66-2	µg/L	80	10	2	0.27	no	18	2	0.27	no	Eliminated
Dimethyl phthalate	131-11-3	µg/L	200	10	2	0.23	no	18	2	0.23	no	Eliminated
Di-n-octyl phthalate	117-84-0	µg/L	1	10	1	0.29	no	18	2	0.29	RL only	Eliminated
Hexachlorobutadiene	87-68-3	µg/L	3	10	2	0.023	no	18	1	0.023	no	Eliminated
Hexachlorocyclopentadiene	77-47-4	µg/L	5	10	4	0.98	no	18	2	0.98	no	Eliminated
Isophorone	78-59-1	µg/L	200	10	2	0.39	no	18	2	0.39	no	Eliminated
N-Nitrosodimethylamine	62-75-9	µg/L	0.34	10	2	0.5	yes	18	2	0.5	yes	Eliminated
N-Nitroso-di-n-propylamine	621-64-7	µg/L	1	10	0.7	0.7	no	18	2	0.7	RL only	Eliminated
N-Nitrosodiphenylamine	86-30-6	µg/L	1	10	2	0.31	RL only	18	2	0.31	RL only	Eliminated
Pentachlorophenol	87-86-5	µg/L	10	10	5	1.2	no	18	5	1.2	no	Eliminated
Phenol	108-95-2	µg/L	1,600	10	2	0.35	no	18	2	0.35	no	Eliminated
Volatile Organic Compounds (VOCs) Associated with TPH												
Benzene	71-43-2	µg/L	1.6	13	2	0.0094	RL only	24	1	0.0094	no	Eliminated
Toluene	108-88-3	µg/L	52	13	2	0.0051	no	24	1	0.0051	no	Eliminated
Other VOCs												
1,1,1,2-Tetrachloroethane	630-20-6	µg/L	1.7	10	2	0.029	RL only	18	1	0.029	no	Eliminated
1,1,1-Trichloroethane	71-55-6	µg/L	11,000	10	2	0.02	no	18	1	0.02	no	Eliminated
1,1,2,2-Tetrachloroethane	79-34-5	µg/L	0.5	10	2	0.0096	RL only	18	1	0.0096	RL only	Eliminated
1,1,2-Trichloroethane	79-00-5	µg/L	0.9	10	2	0.017	RL only	18	1	0.017	RL only	Eliminated
1,1-Dichloroethane	75-34-3	µg/L	7.7	10	2	0.0099	no	18	1	0.0099	no	Eliminated
1,1-Dichloroethene	75-35-4	µg/L	280	10	2	0.0046	no	18	1	0.0046	no	Eliminated
1,1-Dichloropropene	563-58-6	µg/L	--	10	2	0.022		18	1	0.022		Eliminated
1,2,3-Trichlorobenzene	87-61-6	µg/L	--	10	2	0.015		18	1	0.015		Eliminated
1,2,3-Trichloropropane	96-18-4	µg/L	0.5	10	2	0.0076	RL only	18	1	0.0076	RL only	Eliminated
1,2,3-Trimethylbenzene	526-73-8	µg/L	--	3	5	5						Eliminated
1,2,4-Trichlorobenzene	120-82-1	µg/L	1	10	1	0.016	no	18	1	0.016	no	Eliminated
1,2-Dibromo-3-chloropropane	96-12-8	µg/L	2	10	10	0.033	RL only	18	1	0.033	no	Eliminated
1,2-Dibromoethane (EDB)	106-93-4	µg/L	2	10	0.01	0.0079	no	18	0.01	0.0079	no	Eliminated
1,2-Dichlorobenzene	95-50-1	µg/L	8.7	10	2	0.0094	no	18	1	0.0094	no	Eliminated
1,2-Dichloroethane (EDC)	107-06-2	µg/L	42	10	2	0.0047	no	18	1	0.0047	no	Eliminated
1,2-Dichloropropane	78-87-5	µg/L	3.3	10	2	0.021	no	18	1	0.021	no	Eliminated
1,3-Dichlorobenzene	541-73-1	µg/L	1	10	2	0.014	RL only	18	1	0.014	no	Eliminated

Table C.5

Groundwater Analytes Measured For but Not Detected with Screening Levels and Detection Limits

Analyte	CAS No.	Unit	Screening Level (Most Stringent from Screening Levels from Various Scenarios)	Current Events (2013-2015)				Historical Events (1998-2012)				Outcome
				Number of Results	Lowest Reporting Limit	Lowest Method Detection Limit	Exceed Screening Level?	Number of Results	Lowest Reporting Limit	Lowest Method Detection Limit	Exceed Screening Level?	
Other VOCs (continued)												
1,3-Dichloropropane	142-28-9	µg/L	--	10	2	0.022		18	1	0.022		Eliminated
1,4-Dichlorobenzene	106-46-7	µg/L	10	10	2	0.015	no	18	1	0.015	no	Eliminated
2,2-Dichloropropane	594-20-7	µg/L	--	10	2	0.014		18	1	0.014		Eliminated
2,4-Dinitrotoluene	121-14-2	µg/L	1	10	2	0.26	RL only	18	2	0.26	RL only	Eliminated
2,6-Dinitrotoluene	606-20-2	µg/L	1	10	2	0.61	RL only	18	2	0.61	RL only	Eliminated
2-Chlorotoluene	95-49-8	µg/L	2	10	2	0.011	no	18	1	0.011	no	Eliminated
2-Hexanone	591-78-6	µg/L	--	10	10	0.31		18	2	0.31		Eliminated
2-Nitroaniline	88-74-4	µg/L	160	10	2	0.25	no	18	2	0.25	no	Eliminated
3,3'-Dichlorobenzidine	91-94-1	µg/L	5	10	5	1.5	no	18	2	1.5	no	Eliminated
3-Nitroaniline	99-09-2	µg/L	--	10	5	0.45		18	5	0.45		Eliminated
4-Bromophenyl phenyl ether	101-55-3	µg/L	--	10	2	0.26		18	2	0.26		Eliminated
4-Chloroaniline	106-47-8	µg/L	5	10	2	0.63	no	18	2	0.63	no	Eliminated
4-Chlorophenyl phenyl ether	7005-72-3	µg/L	--	10	2	0.25		18	2	0.25		Eliminated
4-Chlorotoluene	106-43-4	µg/L	--	10	2	0.013		18	1	0.013		Eliminated
4-Nitroaniline	100-01-6	µg/L	--	10	4	0.75		18	2	0.75		Eliminated
Bis(2-chloroethyl) ether	111-44-4	µg/L	1	10	1	0.31	no	18	2	0.31	RL only	Eliminated
bis(2-chloroisopropyl)ether	39638-32-9	µg/L	65,000	10	2	0.21	no	18	2	0.21	no	Eliminated
Bromobenzene	108-86-1	µg/L	--	10	2	0.014		18	1	0.014		Eliminated
Bromochloromethane	74-97-5	µg/L	--	10	2	0.038		18	1	0.038		Eliminated
Bromodichloromethane	75-27-4	µg/L	2.8	10	0.9	0.02	no	18	1	0.02	no	Eliminated
Bromoform	75-25-2	µg/L	12	10	2	0.018	no	18	1	0.018	no	Eliminated
Bromomethane	74-83-9	µg/L	28	10	2	0.048	no	18	1	0.048	no	Eliminated
Carbon disulfide	75-15-0	µg/L	800	10	2	0.018	no	18	1	0.018	no	Eliminated
Carbon tetrachloride	56-23-5	µg/L	0.5	10	1.6	0.0083	RL only	18	1	0.0083	RL only	Eliminated
Chloroethane	75-00-3	µg/L	40,000	10	2	0.039	no	18	1	0.039	no	Eliminated
Chloromethane	74-87-3	µg/L	330	10	2	0.077	no	18	1	0.077	no	Eliminated
cis-1,2-Dichloroethene	156-59-2	µg/L	16	10	2	0.023	no	18	1	0.023	no	Eliminated
cis-1,3-Dichloropropene	10061-01-5	µg/L	--	10	2	0.016		18	1	0.016		Eliminated
Dibromochloromethane	124-48-1	µg/L	2.2	10	2	0.025	no	18	1	0.025	no	Eliminated
Dibromomethane	74-95-3	µg/L	80	10	2	0.024	no	18	1	0.024	no	Eliminated
Dichlorodifluoromethane	75-71-8	µg/L	12	10	2	0.031	no	18	1	0.031	no	Eliminated
Hexachlorobenzene	118-74-1	µg/L	1	10	1	0.21	no	18	2	0.21	RL only	Eliminated
Hexachloroethane	67-72-1	µg/L	2	10	2	0.67	no	18	2	0.67	no	Eliminated
Methyl ethyl ketone	78-93-3	µg/L	4,800	10	10	0.47	no	18	2	0.47	no	Eliminated
Methyl iso butyl ketone	108-10-1	µg/L	640	10	10	0.11	no	18	2	0.11	no	Eliminated
Methyl-Tert-Butyl Ether	1634-04-4	µg/L	24	13	2	0.011	no	18	1	0.011	no	Eliminated
Nitrobenzene	98-95-3	µg/L	60	10	2	0.4	no	18	2	0.4	no	Eliminated
Pyridine	110-86-1	µg/L	8	10	4	1.1	no	18	2	1.1	no	Eliminated

Table C.5

Groundwater Analytes Measured For but Not Detected with Screening Levels and Detection Limits

Analyte	CAS No.	Unit	Screening Level (Most Stringent from Screening Levels from Various Scenarios)	Current Events (2013-2015)				Historical Events (1998-2012)				Outcome
				Number of Results	Lowest Reporting Limit	Lowest Method Detection Limit	Exceed Screening Level?	Number of Results	Lowest Reporting Limit	Lowest Method Detection Limit	Exceed Screening Level?	
Other VOCs (continued)												
Styrene	100-42-5	µg/L	1,600	10	2	0.0066	no	18	1	0.0066	no	Eliminated
tert-Butylbenzene	98-06-6	µg/L	2	10	2	0.017	no	18	1	0.017	no	Eliminated
Tetrachloroethene	127-18-4	µg/L	2.9	10	2	0.0078	no	18	1	0.0078	no	Eliminated
trans-1,2-Dichloroethene	156-60-5	µg/L	400	10	2	0.032	no	18	1	0.032	no	Eliminated
trans-1,3-Dichloropropene	10061-02-6	µg/L	--	10	2	0.019		18	1	0.019		Eliminated
Trichloroethene	79-01-6	µg/L	0.7	10	2	0.018	RL only	18	1	0.018	RL only	Eliminated
Trichlorofluoromethane	75-69-4	µg/L	260	10	2	0.015	no	18	1	0.015	no	Eliminated
Vinyl chloride	75-01-4	µg/L	0.5	10	0.2	0.01	no	18	0.2	0.01	no	Eliminated

Abbreviations:

CAS Chemical Abstracts Service
COPC Contaminant of potential concern
µg/L Micrograms per liter
RL Reporting limit

Table C.6

Soil Analytes Measured For but Not Detected with Screening Levels and Detection Limits

Analyte	CAS No.	Unit	Screening Level (Most Stringent from Screening Levels from Various Scenarios)	Current Events (2011-2015)				Historical Events (1993-2010)			Outcome
				Number of Results	Lowest Reporting Limit	Lowest Method Detection Limit	Exceed Screening Level?	Number of Results	Lowest Reporting Limit	Exceed Screening Level?	
Metals											
Thallium	7440-28-0	mg/kg	0.5	18	4.7	1.6	yes	23	0.5	no	Screening level is based on soil to protect groundwater, but not detected in groundwater; therefore data are acceptable; analyte eliminated
Polychlorinated Biphenyls (PCBs)											
Aroclor 1016	12674-11-2	mg/kg	0.033	16	0.0038	0.0038	no	10	0.036	yes	Eliminated
Aroclor 1016/1242	--	mg/kg	--					6	0.067		Eliminated
Aroclor 1221	11104-28-2	mg/kg	--	16	0.0038	0.0038		10	0.036		Eliminated
Aroclor 1232	11141-16-5	mg/kg	--	16	0.0038	0.0038		10	0.036		Eliminated
Semivolatile Organic Compounds (SVOCs)											
2,3,4,6-Tetrachlorophenol	58-90-2	mg/kg	0.27	75	0.1	0.0068	no				Eliminated
2,4,5-Trichlorophenol	95-95-4	mg/kg	1.1	75	0.1	0.0099	no	10	0.36	no	Eliminated
2,4,6-Trichlorophenol	88-06-2	mg/kg	0.1	75	0.1	0.0067	no	10	0.36	yes	Eliminated
2,4-Dichlorophenol	120-83-2	mg/kg	0.1	75	0.02	0.00022	no	10	0.36	yes	Eliminated
2,4-Dinitrophenol	51-28-5	mg/kg	0.2	75	0.1	0.016	no	10	0.72	yes	Eliminated
2,6-Dichlorophenol	87-65-0	mg/kg	--	75	0.1	0.0092					Eliminated
2-Chloronaphthalene	91-58-7	mg/kg	280,000	75	0.1	0.0036	no	10	0.072	no	Eliminated
2-Chlorophenol	95-57-8	mg/kg	0.02	75	0.033	0.0098	yes	10	0.072	yes	Screening level is based on soil to protect groundwater, but not detected in groundwater; therefore data are acceptable; analyte eliminated
2-Methylphenol	95-48-7	mg/kg	0.02	75	0.1	0.01	RL only	10	0.072	yes	Eliminated
2-Nitrophenol	88-75-5	mg/kg	--	75	0.1	0.008		10	0.36		Eliminated
4-Nitrophenol	100-02-7	mg/kg	--	75	0.1	0.018		10	0.36		Eliminated
Acrolein	107-02-8	mg/kg	1,800					6	0.051	no	Eliminated
Acrylonitrile	107-13-1	mg/kg	240	57	0.05	0.00025	no	6	0.0051	no	Eliminated
Aniline	62-53-3	mg/kg	23,000	75	0.1	0.0038	no				Eliminated
Azobenzene	103-33-3	mg/kg	1,200	75	0.1	0.0087	no				Eliminated
Benzyl Alcohol	100-51-6	mg/kg	350,000	75	0.1	0.0086	no	10	0.36	no	Eliminated
bis(2-chloroethoxy)methane	111-91-1	mg/kg	--	75	0.1	0.0098		10	0.072		Eliminated
Bis(2-chloro-1-methylethyl) ether	108-60-1	mg/kg	1,900					10	0.072		Eliminated
Diethylphthalate	84-66-2	mg/kg	0.029	75	0.1	0.0068	RL only	10	0.072	yes	Eliminated
Di-n-octyl phthalate	117-84-0	mg/kg	83	75	0.1	0.0072	no	10	0.072	no	Eliminated
Hexachlorobutadiene	87-68-3	mg/kg	0.16	75	0.01	0.00029	no	16	0.0051	no	Eliminated
Hexachlorocyclopentadiene	77-47-4	mg/kg	1	75	0.1	0.0082	no	10	0.36	no	Eliminated
m,p-Cresol (2:1 ratio)	15831-10-4	mg/kg	--	75	0.1	0.012					Eliminated
N-Nitrosodimethylamine	62-75-9	mg/kg	2.6	75	0.1	0.0053	no				Eliminated
N-Nitroso-di-n-propylamine	621-64-7	mg/kg	0.02	75	0.02	0.0003	no	10	0.36	yes	Eliminated
Phenol	108-95-2	mg/kg	0.51	75	0.1	0.0098	no	10	0.072	no	Eliminated
trans-1,4-Dichloro-2-butene	110-57-6	mg/kg	--					6	0.0051		Eliminated

Table C.6

Soil Analytes Measured For but Not Detected with Screening Levels and Detection Limits

Analyte	CAS No.	Unit	Screening Level (Most Stringent from Screening Levels from Various Scenarios)	Current Events (2011-2015)				Historical Events (1993-2010)			Outcome
				Number of Results	Lowest Reporting Limit	Lowest Method Detection Limit	Exceed Screening Level?	Number of Results	Lowest Reporting Limit	Exceed Screening Level?	
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH											
Benzene	71-43-2	mg/kg	0.005	73	0.005	0.0000079	no	7	0.001	no	Eliminated
Other VOCs											
1,1,1,2-Tetrachloroethane	630-20-6	mg/kg	5,000	57	0.01	0.0002	no	6	0.001	no	Eliminated
1,1,1-Trichloroethane	71-55-6	mg/kg	4.7	57	0.01	0.00022	no	6	0.001	no	Eliminated
1,1,2,2-Tetrachloroethane	79-34-5	mg/kg	0.005	57	0.01	0.00027	RL only	6	0.001	no	Eliminated
1,1,2-Trichloroethane	79-00-5	mg/kg	0.005	57	0.01	0.00026	RL only	6	0.001	no	Eliminated
1,1-Dichloroethane	75-34-3	mg/kg	0.005	57	0.01	0.00024	RL only	6	0.001	no	Eliminated
1,1-Dichloroethene	75-35-4	mg/kg	0.098	57	0.01	0.000011	no	6	0.001	no	Eliminated
1,1-Dichloropropene	563-58-6	mg/kg	--	57	0.01	0.00022		6	0.001		Eliminated
1,2,3-Trichlorobenzene	87-61-6	mg/kg	--	57	0.01	0.00026		6	0.0051		Eliminated
1,2,3-Trichloropropane	96-18-4	mg/kg	4.4	57	0.01	0.00029	no	6	0.002	no	Eliminated
1,2,4-Trichlorobenzene	120-82-1	mg/kg	4,500	75	0.01	0.00021	no	16	0.0051	no	Eliminated
1,2-Dibromo-3-chloropropane	96-12-8	mg/kg	160	57	0.05	0.00033	no	6	0.0051	no	Eliminated
1,2-Dibromoethane (EDB)	106-93-4	mg/kg	0.02	57	0.005	0.0000082	no	6	0.001	no	Eliminated
1,2-Dichloroethane (EDC)	107-06-2	mg/kg	0.014	57	0.01	0.0000062	no	6	0.001	no	Eliminated
1,2-Dichloropropane	78-87-5	mg/kg	0.005	57	0.01	0.00022	RL only	6	0.001	no	Eliminated
1,3-Dichlorobenzene	541-73-1	mg/kg	0.02	75	0.01	0.00028	no	16	0.001	no	Eliminated
1,3-Dichloropropane	142-28-9	mg/kg	--	57	0.01	0.00026		6	0.001		Eliminated
1,4-Dichlorobenzene	106-46-7	mg/kg	0.02	75	0.005	0.00019	no	16	0.001	no	Eliminated
2,2-Dichloropropane	594-20-7	mg/kg	--	57	0.01	0.00024		6	0.001		Eliminated
2,4-Dinitrotoluene	121-14-2	mg/kg	0.01	75	0.01	0.00032	no	10	0.36	yes	Eliminated
2,6-Dinitrotoluene	606-20-2	mg/kg	0.01	75	0.1	0.012	no	10	0.36	yes	Eliminated
2-Chloroethyl vinyl ether	110-75-8	mg/kg	--					6	0.0051		Eliminated
2-Chlorotoluene	95-49-8	mg/kg	70,000	57	0.01	0.00027	no	6	0.001	no	Eliminated
2-Hexanone	591-78-6	mg/kg	--	57	0.05	0.00017		6	0.0051		Eliminated
2-Nitroaniline	88-74-4	mg/kg	35,000	75	0.1	0.0052	no	10	0.36	no	Eliminated
3,3'-Dichlorobenzidine	91-94-1	mg/kg	0.1	75	0.1	0.00016	no	10	0.36	yes	Eliminated
3-Nitroaniline	99-09-2	mg/kg	--	75	0.25	0.0094		10	0.36		Eliminated
4-Bromophenyl phenyl ether	101-55-3	mg/kg	--	75	0.1	0.0083		10	0.072		Eliminated
4-Chloroaniline	106-47-8	mg/kg	0.1	75	0.1	0.0037	no	10	0.36	yes	Eliminated
4-Chlorophenyl phenyl ether	7005-72-3	mg/kg	--	75	0.1	0.0077		10	0.072		Eliminated
4-Chlorotoluene	106-43-4	mg/kg	--	57	0.01	0.00039		6	0.001		Eliminated
4-Nitroaniline	100-01-6	mg/kg	--	75	0.25	0.011		10	0.36		Eliminated
Bis(2-chloroethyl) Ether	111-44-4	mg/kg	0.1	75	0.1	0.0051	no	10	0.072	yes	Eliminated
bis(2-chloroisopropyl)ether	39638-32-9	mg/kg	19	75	0.1	0.0063	no				Eliminated
Bromobenzene	108-86-1	mg/kg	--	57	0.01	0.00027		6	0.001		Eliminated
Bromochloromethane	74-97-5	mg/kg	--	57	0.01	0.00042		6	0.001		Eliminated

Table C.6

Soil Analytes Measured For but Not Detected with Screening Levels and Detection Limits

Analyte	CAS No.	Unit	Screening Level (Most Stringent from Screening Levels from Various Scenarios)	Current Events (2011-2015)				Historical Events (1993-2010)			Outcome
				Number of Results	Lowest Reporting Limit	Lowest Method Detection Limit	Exceed Screening Level?	Number of Results	Lowest Reporting Limit	Exceed Screening Level?	
Other VOCs (continued)											
Bromodichloromethane	75-27-4	mg/kg	--	57	0.01	0.00025		6	0.001		Eliminated
Bromoethane	74-96-4	mg/kg	--					6	0.002		Eliminated
Bromoform	75-25-2	mg/kg	0.005	57	0.01	0.00028	RL only	6	0.001	no	Eliminated
Bromomethane	74-83-9	mg/kg	0.0083	57	0.01	0.0002	RL only	6	0.001	no	Eliminated
Carbon Tetrachloride	56-23-5	mg/kg	0.005	57	0.01	0.00025	RL only	6	0.001	no	Eliminated
Chlorobenzene	108-90-7	mg/kg	0.041	57	0.01	0.00026	no	6	0.001	no	Eliminated
Chloroethane	75-00-3	mg/kg	--	57	0.01	0.00024		6	0.001		Eliminated
Chloroform	67-66-3	mg/kg	0.005	57	0.01	0.00024	RL only	6	0.001	no	Eliminated
Chloromethane	74-87-3	mg/kg	0.097	57	0.01	0.00025	no	6	0.001	no	Eliminated
cis-1,2-Dichloroethene	156-59-2	mg/kg	--	57	0.01	0.00026		6	0.001		Eliminated
cis-1,3-Dichloropropene	10061-01-5	mg/kg	--	57	0.01	0.00025		6	0.001		Eliminated
Dibromochloromethane	124-48-1	mg/kg	0.005	57	0.01	0.00038	RL only	6	0.001	no	Eliminated
Dibromomethane	74-95-3	mg/kg	35,000	57	0.01	0.00028	no	6	0.001	no	Eliminated
Dichlorodifluoromethane	75-71-8	mg/kg	700,000	57	0.01	0.00039	no				Eliminated
Hexachlorobenzene	118-74-1	mg/kg	0.08	75	0.08	0.0082	no	10	0.072	yes	Eliminated
Hexachloroethane	67-72-1	mg/kg	0.02	75	0.02	0.00008	no	10	0.072	yes	Eliminated
Iodomethane	74-88-4	mg/kg	--					6	0.001		Eliminated
Methyl Iso Butyl Ketone	108-10-1	mg/kg	280,000	57	0.05	0.00024	no	6	0.0051	no	Eliminated
Methyl-tert-butyl ether	1634-04-4	mg/kg	0.05	61	0.01	0.00025	no				Eliminated
Nitrobenzene	98-95-3	mg/kg	0.024	75	0.1	0.0065	no	10	0.072	yes	Eliminated
Pyridine	110-86-1	mg/kg	3,500	75	0.2	0.0072	no				Eliminated
Styrene	100-42-5	mg/kg	1.9	57	0.01	0.0002	no	6	0.001	no	Eliminated
Tetrachloroethene	127-18-4	mg/kg	0.005	57	0.01	0.000016	RL only	6	0.001	no	Eliminated
trans-1,2-Dichloroethene	156-60-5	mg/kg	0.13	57	0.01	0.00024	no	6	0.001	no	Eliminated
trans-1,3-Dichloropropene	10061-02-6	mg/kg	--	57	0.01	0.00026		6	0.001		Eliminated
Trichloroethene	79-01-6	mg/kg	0.005	57	0.01	0.000017	RL only	6	0.001	no	Eliminated
Trichlorofluoromethane	75-69-4	mg/kg	1,100,000	57	0.01	0.00021	no	6	0.001	no	Eliminated
Vinyl Acetate	108-05-4	mg/kg	3,500,000					6	0.0051	no	Eliminated
Vinyl Chloride	75-01-4	mg/kg	0.005	57	0.01	0.00001	RL only	6	0.001	no	Eliminated

Notes:

Method Detection Limits are not available for historical data

Abbreviations:

CAS Chemical Abstracts Service
COPC Contaminants of potential concern
MDL Method detection limit
mg/kg Milligrams per kilogram
RL Reporting limit

Table C.7
Chemistry Data for Sediment Samples

		Event	Phase 2 Parcel 5 Surface Sediment Sampling (RETEC)				
		Location	HG-19	HG-20	HG-21	HG-22	
		Sample ID	**HG-19A**	**HG-20A**	**HG-21A**	**HG-22A**	
		Depth	0-10 cm	0-10 cm	0-10 cm	0-10 cm	
		Date	03/23/1998	03/23/1998	03/23/1998	03/24/1998	
Conventionals							
Total Organic Carbon	%		2.2	3.9	0.72	1.1	
Total Solids	%		37.7	21.1	73.9	62.7	
Metals							
Antimony	mg/kg		7 UJ	10 UJ	3 UJ		
Arsenic	mg/kg		14	10	3		
Cadmium	mg/kg		0.9	1.2	0.1 U		
Chromium	mg/kg		75.8	74	28.6		
Copper	mg/kg		136	99.4	15.2		
Lead	mg/kg		29	23	7		
Mercury	mg/kg		0.31 J	0.18 J	0.04 J		
Nickel	mg/kg		85	80	16.8		
Silver	mg/kg		0.5	0.8 U	0.2 U		
Zinc	mg/kg		150	128	28.3		
Polychlorinated Biphenyls (PCBs)							
Aroclor 1016	µg/kg		19 U	20 U	18 U	19 U	
Aroclor 1221	µg/kg		38 U	39 U	37 U	38 U	
Aroclor 1232	µg/kg		19 U	20 U	18 U	19 U	
Aroclor 1242	µg/kg		19 U	20 U	18 U	19 U	
Aroclor 1248	µg/kg		19 U	20 U	18 U	19 U	
Aroclor 1254	µg/kg		81	35 U	18 U	19	
Aroclor 1260	µg/kg		19 U	20 U	18 U	19 U	
Total PCBs	µg/kg		81	39 U	37 U	19	
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
Benz(a)anthracene	µg/kg		450	310	20		
Benzo(a)pyrene	µg/kg		420	260	20 U		
Benzo(b)fluoranthene	µg/kg		480	290	20 U		
Benzo(k)fluoranthene	µg/kg		440	250	20 U		
Chrysene	µg/kg		670	460	26		
Dibenzo(a,h)anthracene	µg/kg		97	52	20 U		
Indeno(1,2,3-cd)pyrene	µg/kg		220	130	20 U		
cPAHs (MTCA TEQ-HalfND)	µg/kg		600	370	16		
cPAHs (MTCA TEQ-ZeroND)	µg/kg		600	370	2.3		
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Total LPAHs	µg/kg		1200	860	20 U		
Naphthalene	µg/kg		210	100	20 U		
Acenaphthylene	µg/kg		57	34 U	20 U		
Acenaphthene	µg/kg		73	38	20 U		
Fluorene	µg/kg		90	80	20 U		
Phenanthrene	µg/kg		590	390	20 U		
Anthracene	µg/kg		200	250	20 U		
2-Methylnaphthalene	µg/kg		69	40	20 U		

Table C.7
Chemistry Data for Sediment Samples

		Event	Phase 2 Parcel 5 Surface Sediment Sampling (RETEC)				
		Location	HG-19	HG-20	HG-21	HG-22	
		Sample ID	**HG-19A**	**HG-20A**	**HG-21A**	**HG-22A**	
		Depth	0-10 cm	0-10 cm	0-10 cm	0-10 cm	
		Date	03/23/1998	03/23/1998	03/23/1998	03/24/1998	
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Total HPAHs	µg/kg		5200	3500	130		
Fluoranthene	µg/kg		1000	780	42		
Pyrene	µg/kg		1200	840	43		
Benzo(g,h,i)perylene	µg/kg		190	110	20 U		
Other SVOCs							
2,4-Dimethylphenol	µg/kg		20 U	34 U	20 U		
2-Methylphenol	µg/kg		20 U	34 U	20 U		
4-Methylphenol	µg/kg		450	340	20 U		
Benzoic Acid	µg/kg		200 U	340 U	20 U		
Benzyl Alcohol	µg/kg		20 U	34 U	20 U		
bis(2-Ethylhexyl) phthalate	µg/kg		460	180	20 U		
Butyl Benzyl Phthalate	µg/kg		20 U	34 U	20 U		
Dibenzofuran	µg/kg		110	62	20 U		
Diethylphthalate	µg/kg		20 U	34 U	20 U		
Dimethyl phthalate	µg/kg		36	34 U	20 U		
Di-n-butyl phthalate	µg/kg		20 U	38	20 U		
Di-n-octyl phthalate	µg/kg		20 U	34 U	20 U		
Hexachlorobutadiene	µg/kg		20 U	34 U	20 U		
Hexachloroethane	µg/kg		20 U	34 U	20 U		
N-Nitrosodiphenylamine	µg/kg		20 U	34 U	20 U		
Pentachlorophenol	µg/kg		99 U	170 U	99 U		
Phenol	µg/kg		71	48	23		

Table C.7
Chemistry Data for Sediment Samples

		Event	Phase 2 Main Shipyard Grab Sampling (RETEC)				
		Location	HG-1	HG-2	HG-3	HG-4	HG-5
		Sample ID	**HG-1A**	**HG-2A**	**HG-3A**	**HG-4A**	**HG-5A**
		Depth	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm
		Date	03/23/1998	03/24/1998	03/23/1998	03/24/1998	03/24/1998
Conventionals							
Total Organic Carbon	%		1.4	2.9	3.2	3.2	2.2
Total Solids	%		71.5	62	48.4	51.2	41.5
Metals							
Antimony	mg/kg			20 UJ			6 UJ
Arsenic	mg/kg			20 U			11
Cadmium	mg/kg			0.7 U			0.8
Chromium	mg/kg			42			77.7
Copper	mg/kg			207			68.8
Lead	mg/kg			512			25
Mercury	mg/kg			0.09 J			0.32 J
Nickel	mg/kg			40			91
Silver	mg/kg			1 U			0.5
Zinc	mg/kg			226			117
Polychlorinated Biphenyls (PCBs)							
Aroclor 1016	µg/kg			17 U	18 U	18 U	19 U
Aroclor 1221	µg/kg			35 U	37 U	36 U	38 U
Aroclor 1232	µg/kg			17 U	18 U	18 U	19 U
Aroclor 1242	µg/kg			17 U	18 U	18 U	19 U
Aroclor 1248	µg/kg			17 U	18 U	18 U	19 U
Aroclor 1254	µg/kg			28 U	680	1800	26 U
Aroclor 1260	µg/kg			44	120	18 U	19 U
Total PCBs	µg/kg			44	800	1800	38 U
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
Benz(a)anthracene	µg/kg			710			300
Benzo(a)pyrene	µg/kg			520			240
Benzo(b)fluoranthene	µg/kg			590			270
Benzo(k)fluoranthene	µg/kg			540			220
Chrysene	µg/kg			950			400
Dibenzo(a,h)anthracene	µg/kg			95			51
Indeno(1,2,3-cd)pyrene	µg/kg			250			120
cPAHs (MTCA TEQ-HalfND)	µg/kg			750			340
cPAHs (MTCA TEQ-ZeroND)	µg/kg			750			340
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Total LPAHs	µg/kg			730			890
Naphthalene	µg/kg			23			110
Acenaphthylene	µg/kg			36			24
Acenaphthene	µg/kg			37			41
Fluorene	µg/kg			43			64
Phenanthrene	µg/kg			370			510
Anthracene	µg/kg			220			140
2-Methylnaphthalene	µg/kg			19 U			35

Table C.7
Chemistry Data for Sediment Samples

		Event	Phase 2 Main Shipyard Grab Sampling (RETEC)				
		Location	HG-1	HG-2	HG-3	HG-4	HG-5
		Sample ID	**HG-1A**	**HG-2A**	**HG-3A**	**HG-4A**	**HG-5A**
		Depth	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm
		Date	03/23/1998	03/24/1998	03/23/1998	03/24/1998	03/24/1998
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Total HPAHs	µg/kg			7200			3500
Fluoranthene	µg/kg			1300			850
Pyrene	µg/kg			2000			910
Benzo(g,h,i)perylene	µg/kg			230			120
Other SVOCs							
2,4-Dimethylphenol	µg/kg			19 U			20 U
2-Methylphenol	µg/kg			19 U			20 U
4-Methylphenol	µg/kg			20			180
Benzoic Acid	µg/kg			190 U			200 U
Benzyl Alcohol	µg/kg			19 U			20 U
bis(2-Ethylhexyl) phthalate	µg/kg			140			150
Butyl Benzyl Phthalate	µg/kg			19 U			20 U
Dibenzofuran	µg/kg			26			52
Diethylphthalate	µg/kg			19 U			20 U
Dimethyl phthalate	µg/kg			19 U			20 U
Di-n-butyl phthalate	µg/kg			19 U			20 U
Di-n-octyl phthalate	µg/kg			19 U			20 U
Hexachlorobutadiene	µg/kg			19 U			20 U
Hexachloroethane	µg/kg			19 U			20 U
N-Nitrosodiphenylamine	µg/kg			19 U			20 U
Pentachlorophenol	µg/kg			94 U			98 U
Phenol	µg/kg			19 U			46

Table C.7
Chemistry Data for Sediment Samples

		Event	Phase 2 Main Shipyard Grab Sampling (RETEC)				
		Location	HG-6	HG-7	HG-8	HG-9	HG-10
		Sample ID	**HG-6A**	**HG-7A**	**HG-8A**	**HG-9A**	**HG-10A**
		Depth	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm
		Date	03/24/1998	03/24/1998	03/24/1998	03/24/1998	03/24/1998
Conventionals							
Total Organic Carbon	%		2.1	1.7	2.8	2.2	2.4
Total Solids	%		40.5	43.1	57.2	38.5	50.8
Metals							
Antimony	mg/kg						9 UJ
Arsenic	mg/kg						23
Cadmium	mg/kg						0.8
Chromium	mg/kg						46.4
Copper	mg/kg						397
Lead	mg/kg						29
Mercury	mg/kg						0.14 J
Nickel	mg/kg						47
Silver	mg/kg						0.6 U
Zinc	mg/kg						290
Polychlorinated Biphenyls (PCBs)							
Aroclor 1016	µg/kg			19 U	19 U	19 U	20 U
Aroclor 1221	µg/kg			37 U	38 U	38 U	39 U
Aroclor 1232	µg/kg			19 U	19 U	19 U	20 U
Aroclor 1242	µg/kg			19 U	19 U	19 U	20 U
Aroclor 1248	µg/kg			19 U	19 U	19 U	20 U
Aroclor 1254	µg/kg			110	650	56 U	20 U
Aroclor 1260	µg/kg			130 U	100	19 U	20 U
Total PCBs	µg/kg			110	750	56 U	39 U
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
Benz(a)anthracene	µg/kg						290
Benzo(a)pyrene	µg/kg						300
Benzo(b)fluoranthene	µg/kg						320
Benzo(k)fluoranthene	µg/kg						260
Chrysene	µg/kg						380
Dibenzo(a,h)anthracene	µg/kg						77
Indeno(1,2,3-cd)pyrene	µg/kg						180
cPAHs (MTCA TEQ-HalfND)	µg/kg						420
cPAHs (MTCA TEQ-ZeroND)	µg/kg						420
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Total LPAHs	µg/kg						860
Naphthalene	µg/kg						61
Acenaphthylene	µg/kg						20 U
Acenaphthene	µg/kg						160
Fluorene	µg/kg						110
Phenanthrene	µg/kg						430
Anthracene	µg/kg						100
2-Methylnaphthalene	µg/kg						66

Table C.7
Chemistry Data for Sediment Samples

		Event	Phase 2 Main Shipyard Grab Sampling (RETEC)				
		Location	HG-6	HG-7	HG-8	HG-9	HG-10
		Sample ID	**HG-6A**	**HG-7A**	**HG-8A**	**HG-9A**	**HG-10A**
		Depth	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm
		Date	03/24/1998	03/24/1998	03/24/1998	03/24/1998	03/24/1998
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Total HPAHs	µg/kg						3400
Fluoranthene	µg/kg						650
Pyrene	µg/kg						790
Benzo(g,h,i)perylene	µg/kg						170
Other SVOCs							
2,4-Dimethylphenol	µg/kg						20 U
2-Methylphenol	µg/kg						20 U
4-Methylphenol	µg/kg						160
Benzoic Acid	µg/kg						20 U
Benzyl Alcohol	µg/kg						27
bis(2-Ethylhexyl) phthalate	µg/kg						1400
Butyl Benzyl Phthalate	µg/kg						1500
Dibenzofuran	µg/kg						94
Diethylphthalate	µg/kg						20 U
Dimethyl phthalate	µg/kg						20 U
Di-n-butyl phthalate	µg/kg						28
Di-n-octyl phthalate	µg/kg						20 U
Hexachlorobutadiene	µg/kg						20 U
Hexachloroethane	µg/kg						20 U
N-Nitrosodiphenylamine	µg/kg						20 U
Pentachlorophenol	µg/kg						98 U
Phenol	µg/kg						21

Table C.7
Chemistry Data for Sediment Samples

	Event	Phase 2 Main Shipyard Grab Sampling (RETEC)				
	Location	HG-11	HG-12	HG-13	HG-14	HG-15
	Sample ID	**HG-11A**	**HG-12A**	**HG-13A**	**HG-14A**	**HG-15A**
	Depth	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm
	Date	03/24/1998	03/24/1998	03/24/1998	03/23/1998	03/24/1998
Conventionals						
Total Organic Carbon	%	1.8	2	2	2.4	1.8
Total Solids	%	40.4	41.2	36	35.2	47.6
Metals						
Antimony	mg/kg		6 UJ	7 UJ		
Arsenic	mg/kg		15	16		
Cadmium	mg/kg		3.6	1.2		
Chromium	mg/kg		70.7	81.2		
Copper	mg/kg		311	152		
Lead	mg/kg		26	28		
Mercury	mg/kg		0.2 J	0.41 J		
Nickel	mg/kg		80	94		
Silver	mg/kg		0.3 U	0.5		
Zinc	mg/kg		250	199		
Polychlorinated Biphenyls (PCBs)						
Aroclor 1016	µg/kg	19 U	19 U	19 U	19 U	19 U
Aroclor 1221	µg/kg	38 U	38 U	39 U	38 U	37 U
Aroclor 1232	µg/kg	19 U	19 U	19 U	19 U	19 U
Aroclor 1242	µg/kg	19 U	19 U	19 U	19 U	19 U
Aroclor 1248	µg/kg	19 U	19 U	19 U	19 U	19 U
Aroclor 1254	µg/kg	32	58	25 U	41	95
Aroclor 1260	µg/kg	19 U	46 U	19 U	19 U	19 U
Total PCBs	µg/kg	32	58	39 U	41	95

Table C.7
Chemistry Data for Sediment Samples

		Event	Phase 2 Main Shipyard Grab Sampling (RETEC)				
		Location	HG-16	HG-17	HG-18	HG-23	
		Sample ID	**HG-16A**	**HG-17A**	**HG-18A**	**HG-23A**	
		Depth	0-10 cm	0-10 cm	0-10 cm	0-10 cm	
		Date	03/24/1998	03/24/1998	03/23/1998	03/24/1998	
Conventionals							
Total Organic Carbon	%		2	2	2.1	2	
Total Solids	%		37.5	37.9	36.3	36.9	
Metals							
Antimony	mg/kg		7 UJ	6 UJ	7 UJ		
Arsenic	mg/kg		14	10	17		
Cadmium	mg/kg		0.8	0.9	1		
Chromium	mg/kg		89.5	83	83.6		
Copper	mg/kg		65.7	69.6	99.2		
Lead	mg/kg		18	16	22		
Mercury	mg/kg		0.28 J	0.25 J	0.28 J		
Nickel	mg/kg		105	99	99		
Silver	mg/kg		0.7	0.5	0.5		
Zinc	mg/kg		116	116	136		
Polychlorinated Biphenyls (PCBs)							
Aroclor 1016	µg/kg		20 U	20 U	19 U	19 U	
Aroclor 1221	µg/kg		40 U	39 U	39 U	39 U	
Aroclor 1232	µg/kg		20 U	20 U	19 U	19 U	
Aroclor 1242	µg/kg		20 U	20 U	19 U	19 U	
Aroclor 1248	µg/kg		20 U	20 U	19 U	19 U	
Aroclor 1254	µg/kg		49 U	28 U	48 U	30 U	
Aroclor 1260	µg/kg		20 U	20 U	19 U	19 U	
Total PCBs	µg/kg		49 U	39 U	48 U	39 U	
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
Benz(a)anthracene	µg/kg		39		270		
Benzo(a)pyrene	µg/kg		47		250		
Benzo(b)fluoranthene	µg/kg		40		260		
Benzo(k)fluoranthene	µg/kg		47		270		
Chrysene	µg/kg		67		400		
Dibenzo(a,h)anthracene	µg/kg		20 U		55		
Indeno(1,2,3-cd)pyrene	µg/kg		28		130		
cPAHs (MTCA TEQ-HalfND)	µg/kg		64		350		
cPAHs (MTCA TEQ-ZeroND)	µg/kg		63		350		
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Total LPAHs	µg/kg		130		1400		
Naphthalene	µg/kg		46		130		
Acenaphthylene	µg/kg		20 U		48		
Acenaphthene	µg/kg		20 U		47		
Fluorene	µg/kg		20 U		130		
Phenanthrene	µg/kg		59		580		
Anthracene	µg/kg		22		48		
2-Methylnaphthalene	µg/kg		20 U		62		

Table C.7
Chemistry Data for Sediment Samples

		Event	Phase 2 Main Shipyard Grab Sampling (RETEC)				
		Location	HG-16	HG-17	HG-18	HG-23	
		Sample ID	**HG-16A**	**HG-17A**	**HG-18A**	**HG-23A**	
		Depth	0-10 cm	0-10 cm	0-10 cm	0-10 cm	
		Date	03/24/1998	03/24/1998	03/23/1998	03/24/1998	
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Total HPAHs	µg/kg		500		3300		
Fluoranthene	µg/kg		100		720		
Pyrene	µg/kg		100		870		
Benzo(g,h,i)perylene	µg/kg		33		120		
Other SVOCs							
2,4-Dimethylphenol	µg/kg		20 U		19 U		
2-Methylphenol	µg/kg		20 U		19 U		
4-Methylphenol	µg/kg		210		560		
Benzoic Acid	µg/kg		200 U		190 U		
Benzyl Alcohol	µg/kg		20 U		19 U		
bis(2-Ethylhexyl) phthalate	µg/kg		44		170		
Butyl Benzyl Phthalate	µg/kg		20 U		19 U		
Dibenzofuran	µg/kg		20 U		110		
Diethylphthalate	µg/kg		20 U		19 U		
Dimethyl phthalate	µg/kg		76		23		
Di-n-butyl phthalate	µg/kg		20 U		19 U		
Di-n-octyl phthalate	µg/kg		20 U		19 U		
Hexachlorobutadiene	µg/kg		20 U		19 U		
Hexachloroethane	µg/kg		20 U		19 U		
N-Nitrosodiphenylamine	µg/kg		20 U		19 U		
Pentachlorophenol	µg/kg		98 U		97 U		
Phenol	µg/kg		20 U		43		

Table C.7
Chemistry Data for Sediment Samples

	Event	Phase 2 Main Shipyard Vibracore Sampling (RETEC)				
	Location	HV-3	HV-3	HV-3	HV-4	HV-4
	Sample ID	**HV-3A 0-10**	**HV-3A 2-4'**	**HV-3B 6-8'**	**HV-4A 0-10 Rep 1**	**HV-4A 2.5-4.4' Rep 1**
	Depth	0-10 cm	2-4 ft	6-8 ft	0-10 cm	2-4 ft
	Date	03/26/1998	03/26/1998	03/26/1998	03/26/1998	03/26/1998
Conventionals						
Total Organic Carbon	%	2.6	0.71	0.34	1.8	1.7 J
Total Solids	%	39.1	81.3	90.2	70.9	89.6
Metals						
Antimony	mg/kg	17 J	5 J	4 J	7 UJ	10 UJ
Arsenic	mg/kg	18	8	5	21	10 U
Cadmium	mg/kg	1.6	0.1	2.8	0.5	0.6 U
Chromium	mg/kg	79.3 J	34.3 J	31.4 J	35.5 J	50 J
Copper	mg/kg	286	38	17.5	199	19.4
Lead	mg/kg	49	1.3	3	74	6 U
Mercury	mg/kg	0.25 J	0.06 J	0.03 J	0.42 J	0.02 J
Nickel	mg/kg	96	31.5	33	30	34
Silver	mg/kg	0.4 U	0.2 U	0.2 U	0.4 U	0.9 U
Zinc	mg/kg	276	60.9	35.3	266	29
Polychlorinated Biphenyls (PCBs)						
Aroclor 1016	µg/kg	20 U	20 U	18 U	20 U	20 U
Aroclor 1221	µg/kg	39 U	39 U	37 U	40 U	39 U
Aroclor 1232	µg/kg	20 U	20 U	18 U	20 U	20 U
Aroclor 1242	µg/kg	20 U	20 U	18 U	26 U	20 U
Aroclor 1248	µg/kg	20 U	20 U	18 U	20 U	20 U
Aroclor 1254	µg/kg	250	15	18 U	600	20 U
Aroclor 1260	µg/kg	20 U	20 U	18 U	700	20 U
Total PCBs	µg/kg	250	15	37 U	1300	39 U

Table C.7
Chemistry Data for Sediment Samples

	Event	Phase 2 Main Shipyard Vibracore Sampling (RETEC)				
	Location	HV-6	HV-6	HV-6	HV-8	HV-8
	Sample ID	**HV-6A 0-10**	**HV-6A 2-4'**	**HV-6B 6-8'**	**HV-8A 0-10**	**HV-8A 2-4'**
	Depth	0-10 cm	2-4 ft	6-8 ft	0-10 cm	2-4 ft
	Date	03/26/1998	03/26/1998	03/26/1998	03/26/1998	03/26/1998
Conventionals						
Total Organic Carbon	%	1.9	0.38	0.23	1.3 J	1.4 J
Total Solids	%	51.7	80.5	85.4	80.6	86.5
Metals						
Antimony	mg/kg	13 J	4 J	4 J	4 J	6 UJ
Arsenic	mg/kg	21	7	5	10	7
Cadmium	mg/kg	0.7	0.2	0.1	0.3	0.2 U
Chromium	mg/kg	63.5 J	20.8 J	31.7 J	35.8 J	46 J
Copper	mg/kg	69.4	8.6	9.1	37	12.6
Lead	mg/kg	32	3	2	10	3
Mercury	mg/kg	0.51 J	0.02 J	0.01 J	0.03 J	0.01 UJ
Nickel	mg/kg	75.7	16.4	21.9	29.1	32
Silver	mg/kg	0.3 U	0.2 U	0.2 U	0.2 U	0.4 U
Zinc	mg/kg	134	22.4	23.1	37	34.4
Polychlorinated Biphenyls (PCBs)						
Aroclor 1016	µg/kg	19 U	17 U	20 U	18 U	19 U
Aroclor 1221	µg/kg	38 U	35 U	39 U	36 U	39 U
Aroclor 1232	µg/kg	19 U	17 U	20 U	18 U	19 U
Aroclor 1242	µg/kg	19 U	17 U	20 U	18 U	19 U
Aroclor 1248	µg/kg	19 U	17 U	20 U	18 U	19 U
Aroclor 1254	µg/kg	19 U	17 U	20 U	11 J	19 U
Aroclor 1260	µg/kg	73 U	17 U	20 U	18 U	19 U
Total PCBs	µg/kg	73 U	35 U	39 U	11 J	39 U

Table C.7
Chemistry Data for Sediment Samples

	Event	Sediments at Olavine (RETEC)				
	Location	HG-13	HG-30	HG-30	HG-31	HG-32
	Sample ID	**HG-13**	**HG-30**	**HG-100**	**HG-31**	**HG-32**
	Depth	0-12 cm	0-12 cm	0-12 cm	0-12 cm	0-12 cm
	Date	08/22/2000	08/22/2000	08/22/2000	08/22/2000	08/31/2000
Conventionals						
Ammonia (total as nitrogen)	mg/kg		17	20	2.7	18
Sulfide	mg/kg		1100	2500	250	640
Total Organic Carbon	%		3.6	5.8	2.5	1.1
Total Solids	%		58	57	84	52
Total Solids (preserved)	%		55	57	80	56
Metals						
Antimony	mg/kg		9 U	11	8	20 U
Arsenic	mg/kg		13	10	13	20 U
Cadmium	mg/kg		0.9	0.9	0.3	0.7 U
Chromium	mg/kg		32.4	36.2	30.6	10
Copper	mg/kg		149	428	107	115
Lead	mg/kg		143	151	65	27
Mercury	mg/kg	0.3	0.36	0.16	0.06 U	0.07 U
Nickel	mg/kg		33	45	38	9
Silver	mg/kg		0.5 U	0.5 U	0.4 U	1 U
Zinc	mg/kg		194	166	191	138
Polychlorinated Biphenyls (PCBs)						
Aroclor 1016	µg/kg		18 U	18 U	20 U	19 U
Aroclor 1221	µg/kg		36 U	37 U	39 U	37 U
Aroclor 1232	µg/kg		18 U	18 U	20 U	19 U
Aroclor 1242	µg/kg		18 U	18 U	20 U	19 U
Aroclor 1248	µg/kg		92 UJ	120 UJ	20 U	19 U
Aroclor 1254	µg/kg		270 UJ	280	27 UJ	38
Aroclor 1260	µg/kg		520	400	20 U	21 UJ
Total PCBs	µg/kg		520	680	39 U	38
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	µg/kg		2000	810	66	430
Benzo(a)pyrene	µg/kg		1800	880	66	280
Benzo(b)fluoranthene	µg/kg		1600	1000	68	370
Benzo(k)fluoranthene	µg/kg		1500	1000	96	410
Benzofluoranthenes (total)	µg/kg		3600	2000	164	780
Chrysene	µg/kg		2100	970	110	630
Dibenzo(a,h)anthracene	µg/kg		210	58	20 U	23
Indeno(1,2,3-cd)pyrene	µg/kg		740	290	27	120
cPAHs (MTCA TEQ-HalfND)	µg/kg		2400	1200	94	420
cPAHs (MTCA TEQ-ZeroND)	µg/kg		2400	1200	93	420
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAHs	µg/kg		3000	1600	93	651
Naphthalene	µg/kg		130	130	20 U	22
Acenaphthylene	µg/kg		310	130	20 U	49
Acenaphthene	µg/kg		120	78	20 U	38

Table C.7
Chemistry Data for Sediment Samples

		Event	Sediments at Olavine (RETEC)				
		Location	HG-13	HG-30	HG-30	HG-31	HG-32
		Sample ID	**HG-13**	**HG-30**	**HG-100**	**HG-31**	**HG-32**
		Depth	0-12 cm	0-12 cm	0-12 cm	0-12 cm	0-12 cm
		Date	08/22/2000	08/22/2000	08/22/2000	08/22/2000	08/31/2000
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Fluorene	µg/kg			210	120	20 U	42
Phenanthrene	µg/kg			1500	850	69	300
Anthracene	µg/kg			750	300	24	200
2-Methylnaphthalene	µg/kg			66	62	20 U	20 U
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Total HPAHs	µg/kg			23000	8800	785	3441
Fluoranthene	µg/kg			5900	1600	150	580
Pyrene	µg/kg			6400	1900	180	520
Benzo(g,h,i)perylene	µg/kg			630	270	22	78
Other SVOCs							
1,2,4-Trichlorobenzene	µg/kg			19 U	20 U	20 U	20 U
1,2-Dichlorobenzene	µg/kg			19 U	20 U	20 U	20 U
1,3-Dichlorobenzene	µg/kg			19 U	20 U	20 U	20 U
2,4-Dimethylphenol	µg/kg			31	22	20 U	20 U
2-Methylphenol	µg/kg			19 U	20 U	20 U	20 U
4-Methylphenol	µg/kg			120	100	20 U	21
Benzoic Acid	µg/kg			190 U	200 U	200 U	200 U
Benzyl Alcohol	µg/kg			19 U	20 U	20 U	310
bis(2-Ethylhexyl) phthalate	µg/kg			2400	330	50	260 JB
Butyl Benzyl Phthalate	µg/kg			19 U	20 U	20 U	36
Dibenzofuran	µg/kg			90	67	20 U	29
Diethylphthalate	µg/kg			19 U	20 U	20 U	20 U
Dimethyl phthalate	µg/kg			26	20 U	20 U	26
Di-n-butyl phthalate	µg/kg			19 U	34	20 U	20 U
Di-n-octyl phthalate	µg/kg			19 U	20 U	20 U	20 U
Hexachlorobenzene	µg/kg			19 U	20 U	20 U	20 U
Hexachlorobutadiene	µg/kg			19 U	20 U	20 U	20 U
N-Nitrosodiphenylamine	µg/kg			19 U	20 U	20 U	20 U
Pentachlorophenol	µg/kg			95 U	98 U	98 U	200
Phenol	µg/kg			19 U	20 U	20 U	110
Other VOCs							
1,4-Dichlorobenzene	µg/kg			19 U	20 U	20 U	20 U

Table C.7
Chemistry Data for Sediment Samples

	Event	Sediments at Olavine (RETEC)				
	Location	HG-33	HG-34	HG-35	HG-36	HG-37
	Sample ID	**HG-33**	**HG-34**	**HG-35**	**HG-36**	**HG-37**
	Depth	0-12 cm	0-12 cm	0-12 cm	0-12 cm	0-12 cm
	Date	08/31/2000	08/23/2000	08/22/2000	08/31/2000	08/31/2000
Conventionals						
Ammonia (total as nitrogen)	mg/kg	14	14	16	16	12
Sulfide	mg/kg	600	1900	1600	1700	1600
Total Organic Carbon	%	1.2	2.3	2.2	2	1.1
Total Solids	%	68	38	38	53	84
Total Solids (preserved)	%	69	41	40	46	52
Metals						
Antimony	mg/kg	20 U	10 U	10 U	20 U	10 U
Arsenic	mg/kg	30	10 U	10 U	20 U	10 U
Cadmium	mg/kg	1	0.7	0.9	1.9	0.5
Chromium	mg/kg	32	70	71	23	15.8
Copper	mg/kg	608	76.3	84.3	69.7	74
Lead	mg/kg	129	22	19	10	10
Mercury	mg/kg	0.14	0.4	0.24	0.11	0.1
Nickel	mg/kg	28	90	91	27	19
Silver	mg/kg	1 U	0.8 U	0.8 U	1 U	0.6 U
Zinc	mg/kg	536	141	126	127	90
Polychlorinated Biphenyls (PCBs)						
Aroclor 1016	µg/kg	20 U	20 U	20 U	19 U	19 U
Aroclor 1221	µg/kg	39 U	39 U	40 U	38 U	38 U
Aroclor 1232	µg/kg	20 U	20 U	20 U	19 U	19 U
Aroclor 1242	µg/kg	20 U	20 U	20 U	19 U	19 U
Aroclor 1248	µg/kg	20 U	29 UJ	34 UJ	19 U	19 U
Aroclor 1254	µg/kg	220	43	25	22	19
Aroclor 1260	µg/kg	65 UJ	29	20 U	19 U	19 U
Total PCBs	µg/kg	220	72	25	22	19
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	µg/kg	1200	190	120	630	220
Benzo(a)pyrene	µg/kg	900	160	88	340	260
Benzo(b)fluoranthene	µg/kg	1100	220	110	480	240
Benzo(k)fluoranthene	µg/kg	1000	210	130	450	300
Benzofluoranthenes (total)	µg/kg	2100	430	240	930	540
Chrysene	µg/kg	1700	240	180	1100	360
Dibenzo(a,h)anthracene	µg/kg	71	20 U	20 U	24	20
Indeno(1,2,3-cd)pyrene	µg/kg	410	65	34	110	94
cPAHs (MTCA TEQ-HalfND)	µg/kg	1300	230	130	520	350
cPAHs (MTCA TEQ-ZeroND)	µg/kg	1300	230	130	520	350
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAHs	µg/kg	1800	628	590 J	840	783
Naphthalene	µg/kg	56	130	98	60	59
Acenaphthylene	µg/kg	85	30	20 U	42	22
Acenaphthene	µg/kg	92	42	19 J	38	37

Table C.7
Chemistry Data for Sediment Samples

		Event	Sediments at Olavine (RETEC)				
		Location	HG-33	HG-34	HG-35	HG-36	HG-37
		Sample ID	**HG-33**	**HG-34**	**HG-35**	**HG-36**	**HG-37**
		Depth	0-12 cm	0-12 cm	0-12 cm	0-12 cm	0-12 cm
		Date	08/31/2000	08/23/2000	08/22/2000	08/31/2000	08/31/2000
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Fluorene	µg/kg		120	46	53	50	55
Phenanthrene	µg/kg		1000	280	220	350	470
Anthracene	µg/kg		420	100	200	300	140
2-Methylnaphthalene	µg/kg		36	39	29	29	36
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Total HPAHs	µg/kg		11000	2124	1232	4796	2674
Fluoranthene	µg/kg		2000	520	300	870	580
Pyrene	µg/kg		2400	460	240	720	540
Benzo(g,h,i)perylene	µg/kg		400	59	30	72	60
Other SVOCs							
1,2,4-Trichlorobenzene	µg/kg		20 U	20 U	20 U	19 U	19 U
1,2-Dichlorobenzene	µg/kg		20 U	20 U	20 U	19 U	19 U
1,3-Dichlorobenzene	µg/kg		20 U	20 U	20 U	19 U	19 U
2,4-Dimethylphenol	µg/kg		20 U	20 U	20 U	19 U	19 U
2-Methylphenol	µg/kg		20 U	20 U	20 U	19 U	19 U
4-Methylphenol	µg/kg		71	260	250	120	87
Benzoic Acid	µg/kg		200 U	200 U	200 U	190 U	190 U
Benzyl Alcohol	µg/kg		20 U	20 U	20 U	170	19 U
bis(2-Ethylhexyl) phthalate	µg/kg		610 JB	190	200	430 JB	450 JB
Butyl Benzyl Phthalate	µg/kg		49	20 U	20 U	19 U	19 U
Dibenzofuran	µg/kg		69	54	43	39	32
Diethylphthalate	µg/kg		20 U	20 U	20 U	19 U	19 U
Dimethyl phthalate	µg/kg		26	20 U	20 U	19 U	68
Di-n-butyl phthalate	µg/kg		27	20 U	20 U	19 U	19 U
Di-n-octyl phthalate	µg/kg		20 U	20 U	20 U	19 U	19 U
Hexachlorobenzene	µg/kg		20 U	20 U	20 U	19 U	19 U
Hexachlorobutadiene	µg/kg		20 U	20 U	20 U	19 U	19 U
N-Nitrosodiphenylamine	µg/kg		20 U	20 U	20 U	19 U	19 U
Pentachlorophenol	µg/kg		210	99 U	100 U	95 U	96 U
Phenol	µg/kg		20 U	20 U	20 U	19 U	27
Other VOCs							
1,4-Dichlorobenzene	µg/kg		20 U	20 U	20 U	19 U	19 U

Table C.7
Chemistry Data for Sediment Samples

	Event	Sediments at Olavine (RETEC)				
	Location	HG-38	HG-39	HG-39	HG-40	HG-41
	Sample ID	**HG-38**	**HG-39**	**HG-200**	**HG-40**	**HG-41**
	Depth	0-12 cm	0-12 cm	0-12 cm	0-12 cm	0-12 cm
	Date	08/22/2000	08/22/2000	08/22/2000	08/31/2000	08/22/2000
Conventionals						
Ammonia (total as nitrogen)	mg/kg	18	11	8.9	7.3	24
Sulfide	mg/kg	2100	910	950	42	2600
Total Organic Carbon	%	3	0.9	1.4	0.29	2.4
Total Solids	%	54	78	76	91	47
Total Solids (preserved)	%	55	78	76	87	48
Metals						
Antimony	mg/kg	10	7 U	7 U	10 U	10 U
Arsenic	mg/kg	30	7 U	7	20	10
Cadmium	mg/kg	0.9	0.5	0.4	0.5 U	0.5
Chromium	mg/kg	44	27.3	31.3	22	46
Copper	mg/kg	959	99.9	657	96.3	238
Lead	mg/kg	49	18	33	30	58
Mercury	mg/kg	0.16	0.13	0.06	0.05 U	0.3
Nickel	mg/kg	43	25	23	19	49
Silver	mg/kg	0.6 U	0.4 U	0.4 U	0.8 U	0.7 U
Zinc	mg/kg	901	184	372	233	267
Polychlorinated Biphenyls (PCBs)						
Aroclor 1016	µg/kg	20 U	18 U	18 U	19 U	20 U
Aroclor 1221	µg/kg	39 U	36 U	37 U	37 U	39 U
Aroclor 1232	µg/kg	20 U	18 U	18 U	19 U	20 U
Aroclor 1242	µg/kg	20 U	18 U	18 U	19 U	20 U
Aroclor 1248	µg/kg	20 U	18 U	18 U	19 U	32 UJ
Aroclor 1254	µg/kg	20 U	21	18 U	9.6 J	58
Aroclor 1260	µg/kg	20 U	18 U	18 U	19 U	40
Total PCBs	µg/kg	39 U	21	37 U	9.6 J	98
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	µg/kg	260	320	560	19 U	610
Benzo(a)pyrene	µg/kg	220	160	400	19 U	610
Benzo(b)fluoranthene	µg/kg	290	240	570	19 U	920
Benzo(k)fluoranthene	µg/kg	250	230	440	19 U	670
Benzofluoranthenes (total)	µg/kg	540	470	1010	19 U	1590
Chrysene	µg/kg	340	520	620	19 U	1000
Dibenzo(a,h)anthracene	µg/kg	19 J	19 U	29	19 U	54
Indeno(1,2,3-cd)pyrene	µg/kg	92	48	120	19 U	250
cPAHs (MTCA TEQ-HalfND)	µg/kg	310 J	250	580	14 U	870
cPAHs (MTCA TEQ-ZeroND)	µg/kg	310 J	250	580	19 U	870
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAHs	µg/kg	608	2825	1100 J	19 U	1311
Naphthalene	µg/kg	39	40	28	19 U	44
Acenaphthylene	µg/kg	22	25	15 J	19 U	76
Acenaphthene	µg/kg	58	70	51	19 U	59

Table C.7
Chemistry Data for Sediment Samples

	Event	Sediments at Olavine (RETEC)				
	Location	HG-38	HG-39	HG-39	HG-40	HG-41
	Sample ID	**HG-38**	**HG-39**	**HG-200**	**HG-40**	**HG-41**
	Depth	0-12 cm	0-12 cm	0-12 cm	0-12 cm	0-12 cm
	Date	08/22/2000	08/22/2000	08/22/2000	08/31/2000	08/22/2000
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Fluorene	µg/kg	49	420	72	19 U	72
Phenanthrene	µg/kg	340	1300	620	19 U	740
Anthracene	µg/kg	100	970	330	19 U	320
2-Methylnaphthalene	µg/kg	31	160	18	19 U	36
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Total HPAHs	µg/kg	2627 J	3537	4900	19 U	7124
Fluoranthene	µg/kg	550	980	1200	19 U	1300
Pyrene	µg/kg	530	1000	890	19 U	1500
Benzo(g,h,i)perylene	µg/kg	76	39	90	19 U	210
Other SVOCs						
1,2,4-Trichlorobenzene	µg/kg	20 U	19 U	15 U	19 U	20 U
1,2-Dichlorobenzene	µg/kg	20 U	19 U	15 U	19 U	20 U
1,3-Dichlorobenzene	µg/kg	20 U	19 U	15 U	19 U	20 U
2,4-Dimethylphenol	µg/kg	20 U	19 U	15 U	19 U	20 U
2-Methylphenol	µg/kg	20 U	19 U	15 U	19 U	20 U
4-Methylphenol	µg/kg	100	34	30	19 U	66
Benzoic Acid	µg/kg	200 U	190 U	150 U	190 U	200 U
Benzyl Alcohol	µg/kg	76	19 U	15 U	19 U	20 U
bis(2-Ethylhexyl) phthalate	µg/kg	540	71	72	89 JB	330
Butyl Benzyl Phthalate	µg/kg	230	19 U	15 U	19 U	33
Dibenzofuran	µg/kg	35	140	42	19 U	41
Diethylphthalate	µg/kg	20 U	19 U	15 U	19 U	20 U
Dimethyl phthalate	µg/kg	20 U	19 U	15 U	19 U	28
Di-n-butyl phthalate	µg/kg	21	19 U	15 U	19 U	20 U
Di-n-octyl phthalate	µg/kg	20 U	19 U	15 U	19 U	20 U
Hexachlorobenzene	µg/kg	20 U	19 U	15 U	19 U	20 U
Hexachlorobutadiene	µg/kg	20 U	19 U	15 U	19 U	20 U
N-Nitrosodiphenylamine	µg/kg	20 U	19 U	15 U	19 U	20 U
Pentachlorophenol	µg/kg	98 U	97 U	76 U	94 U	120
Phenol	µg/kg	20 U	19 U	15 U	19 U	20 U
Other VOCs						
1,4-Dichlorobenzene	µg/kg	20 U	19 U	15 U	19 U	20 U

Table C.7
Chemistry Data for Sediment Samples

		Event	Sediments at Olavine (RETEC)				
		Location	HG-42	HG-44	HV-30	HV-30	HV-31
		Sample ID	**HG-42**	**HG-44**	**HV-30-S2**	**HV-30-S3**	**HV-31-S2**
		Depth	0-12 cm	0-12 cm	67-155 cm	155-216 cm	55-110 cm
		Date	08/23/2000	11/09/2000	08/31/2000	08/31/2000	08/30/2000
Conventionals							
	Ammonia (total as nitrogen)	mg/kg	35				
	Sulfide	mg/kg	2700				
	Total Organic Carbon	%	2.4	1.5	0.14		
	Total Solids	%	62	62	86		
	Total Solids (preserved)	%	63				
Metals							
	Antimony	mg/kg	21	20 U			
	Arsenic	mg/kg	158	20 U			
	Cadmium	mg/kg	2.4	0.7 U			
	Chromium	mg/kg	42.7	28			
	Copper	mg/kg	669	372			
	Lead	mg/kg	168	15			
	Mercury	mg/kg	0.16	0.13	0.04 U	0.06 U	0.07
	Nickel	mg/kg	40	32			
	Silver	mg/kg	0.5 U	1 U			
	Zinc	mg/kg	1620	155			
Polychlorinated Biphenyls (PCBs)							
	Aroclor 1016	µg/kg	20 U	20 U	18 U		
	Aroclor 1221	µg/kg	39 U	40 U	36 U		
	Aroclor 1232	µg/kg	20 U	20 U	18 U		
	Aroclor 1242	µg/kg	20 U	20 U	18 U		
	Aroclor 1248	µg/kg	23 UJ	20 U	18 U		
	Aroclor 1254	µg/kg	51	210	18 U		
	Aroclor 1260	µg/kg	34	20 U	18 U		
	Total PCBs	µg/kg	85	210	36 U		
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
	Benz(a)anthracene	µg/kg	1100	120	18 U		
	Benzo(a)pyrene	µg/kg	790	100	18 U		
	Benzo(b)fluoranthene	µg/kg	1300	120	18 U		
	Benzo(k)fluoranthene	µg/kg	890	94	18 U		
	Benzofluoranthenes (total)	µg/kg	2190	214	18 U		
	Chrysene	µg/kg	1200	170	18 U		
	Dibenzo(a,h)anthracene	µg/kg	74	20 U	18 U		
	Indeno(1,2,3-cd)pyrene	µg/kg	340	62	18 U		
	cPAHs (MTCA TEQ-HalfND)	µg/kg	1200	140	14 U		
	cPAHs (MTCA TEQ-ZeroND)	µg/kg	1200	140	18 U		
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
	Total LPAHs	µg/kg	4200	298	18 U		
	Naphthalene	µg/kg	64	52	18 U		
	Acenaphthylene	µg/kg	38	20 U	18 U		
	Acenaphthene	µg/kg	220	20 U	18 U		

Table C.7
Chemistry Data for Sediment Samples

		Event	Sediments at Olavine (RETEC)				
		Location	HG-42	HG-44	HV-30	HV-30	HV-31
		Sample ID	**HG-42**	**HG-44**	**HV-30-S2**	**HV-30-S3**	**HV-31-S2**
		Depth	0-12 cm	0-12 cm	67-155 cm	155-216 cm	55-110 cm
		Date	08/23/2000	11/09/2000	08/31/2000	08/31/2000	08/30/2000
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Fluorene	µg/kg		270	22	18 U		
Phenanthrene	µg/kg		2800	170	18 U		
Anthracene	µg/kg		760	54	18 U		
2-Methylnaphthalene	µg/kg		39	31	18 U		
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Total HPAHs	µg/kg		11000	1457	18 U		
Fluoranthene	µg/kg		3000	340	18 U		
Pyrene	µg/kg		2500	390	18 U		
Benzo(g,h,i)perylene	µg/kg		300	61	18 U		
Other SVOCs							
1,2,4-Trichlorobenzene	µg/kg		20 U	20 U	18 U		
1,2-Dichlorobenzene	µg/kg		20 U	20 U	18 U		
1,3-Dichlorobenzene	µg/kg		20 U	20 U	18 U		
2,4-Dimethylphenol	µg/kg		20 U	20 U	18 U		
2-Methylphenol	µg/kg		20 U	20 U	18 U		
4-Methylphenol	µg/kg		62	73	18 U		
Benzoic Acid	µg/kg		200 U	200 U	180 U		
Benzyl Alcohol	µg/kg		50	110	18 U		
bis(2-Ethylhexyl) phthalate	µg/kg		150	250	18 U		
Butyl Benzyl Phthalate	µg/kg		20 U	20 U	18 U		
Dibenzofuran	µg/kg		140	20 U	18 U		
Diethylphthalate	µg/kg		20 U	20 U	18 U		
Dimethyl phthalate	µg/kg		20 U	20 U	18 U		
Di-n-butyl phthalate	µg/kg		20 U	45 JB	18 U		
Di-n-octyl phthalate	µg/kg		20 U	200	18 U		
Hexachlorobenzene	µg/kg		20 U	20 U	18 U		
Hexachlorobutadiene	µg/kg		20 U	20 U	18 U		
N-Nitrosodiphenylamine	µg/kg		20 U	20 U	18 U		
Pentachlorophenol	µg/kg		98 U	99 U	91 U		
Phenol	µg/kg		20 U	20 U	18 U		
Other VOCs							
1,4-Dichlorobenzene	µg/kg		20 U	20 U	18 U		

Table C.7
Chemistry Data for Sediment Samples

	Event	Sediments at Olavine (RETEC)				
	Location	HV-38	HV-39	HV-41	HV-50	HV-50
	Sample ID	**HV-38-S2**	**HV-39-S2**	**HV-41-S2**	**HV-50-S2**	**HV-50-S3**
	Depth	49-82 cm	73-131 cm	92-128 cm	107-162 cm	162-226 cm
	Date	08/31/2000	08/31/2000	08/31/2000	08/31/2000	08/31/2000
Conventionals						
Total Organic Carbon	%	1.3	0.16		0.19	0.085
Total Solids	%	79	87		85	83
Metals						
Antimony	mg/kg	3 U	3 U		5 U	
Arsenic	mg/kg	3 U	3 U		5 U	
Cadmium	mg/kg	0.1 U	0.1 U		0.2 U	
Chromium	mg/kg	10.6	23.3		31.6	
Copper	mg/kg	15.3	8.9		7.2	
Lead	mg/kg	2	1		3	
Mercury	mg/kg	0.06 U	0.05 U	0.05	0.04 U	
Nickel	mg/kg	9.7	17.9		25	
Silver	mg/kg	0.2 U	0.2 U		0.3 U	
Zinc	mg/kg	14.7	16.2		23.5	
Polychlorinated Biphenyls (PCBs)						
Aroclor 1016	µg/kg	18 U	20 U		18 U	
Aroclor 1221	µg/kg	36 U	39 U		37 U	
Aroclor 1232	µg/kg	18 U	20 U		18 U	
Aroclor 1242	µg/kg	18 U	20 U		18 U	
Aroclor 1248	µg/kg	18 U	20 U		18 U	
Aroclor 1254	µg/kg	18 U	20 U		18 U	
Aroclor 1260	µg/kg	18 U	20 U		18 U	
Total PCBs	µg/kg	36 U	39 U		37 U	
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	µg/kg	19 J	19 U		20 U	19 U
Benzo(a)pyrene	µg/kg	17 J	19 U		20 U	19 U
Benzo(b)fluoranthene	µg/kg	13 J	19 U		20 U	19 U
Benzo(k)fluoranthene	µg/kg	20	19 U		20 U	19 U
Benzofluoranthenes (total)	µg/kg	33 J	19 U		20 U	19 U
Chrysene	µg/kg	25	19 U		20 U	19 U
Dibenzo(a,h)anthracene	µg/kg	19 U	19 U		20 U	19 U
Indeno(1,2,3-cd)pyrene	µg/kg	19 U	19 U		20 U	19 U
cPAHs (MTCA TEQ-HalfND)	µg/kg	24 J	14 U		15 U	14 U
cPAHs (MTCA TEQ-ZeroND)	µg/kg	22 J	19 U		20 U	19 U
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAHs	µg/kg	49 J	20		20 U	19 U
Naphthalene	µg/kg	17 J	20		20 U	19 U
Acenaphthylene	µg/kg	19 U	19 U		20 U	19 U
Acenaphthene	µg/kg	19 U	19 U		20 U	19 U
Fluorene	µg/kg	19 U	19 U		20 U	19 U
Phenanthrene	µg/kg	32	19 U		20 U	19 U
Anthracene	µg/kg	19 U	19 U		20 U	19 U

Table C.7
Chemistry Data for Sediment Samples

	Event	Sediments at Olavine (RETEC)				
	Location	HV-38	HV-39	HV-41	HV-50	HV-50
	Sample ID	**HV-38-S2**	**HV-39-S2**	**HV-41-S2**	**HV-50-S2**	**HV-50-S3**
	Depth	49-82 cm	73-131 cm	92-128 cm	107-162 cm	162-226 cm
	Date	08/31/2000	08/31/2000	08/31/2000	08/31/2000	08/31/2000
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
2-Methylnaphthalene	µg/kg	19 U	19 U		20 U	19 U
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Total HPAHs	µg/kg	179 J	14 J		20 U	19 U
Fluoranthene	µg/kg	36	19 U		20 U	19 U
Pyrene	µg/kg	49	14 J		20 U	19 U
Benzo(g,h,i)perylene	µg/kg	19 U	19 U		20 U	19 U
Other SVOCs						
1,2,4-Trichlorobenzene	µg/kg	19 U	19 U		20 U	19 U
1,2-Dichlorobenzene	µg/kg	19 U	19 U		20 U	19 U
1,3-Dichlorobenzene	µg/kg	19 U	19 U		20 U	19 U
2,4-Dimethylphenol	µg/kg	19 U	19 U		20 U	19 U
2-Methylphenol	µg/kg	19 U	19 U		20 U	19 U
4-Methylphenol	µg/kg	19 U	19 U		20 U	19 U
Benzoic Acid	µg/kg	190 U	190 U		200 U	190 U
Benzyl Alcohol	µg/kg	19 U	19 U		20 U	19 U
bis(2-Ethylhexyl) phthalate	µg/kg	15 J	19 U		400 JB	19 U
Butyl Benzyl Phthalate	µg/kg	19 U	19 U		20 U	19 U
Dibenzofuran	µg/kg	19 U	19 U		20 U	19 U
Diethylphthalate	µg/kg	19 U	19 U		20 U	19 U
Dimethyl phthalate	µg/kg	19 U	19 U		20 U	19 U
Di-n-butyl phthalate	µg/kg	19 U	19 U		20 U	19 U
Di-n-octyl phthalate	µg/kg	19 U	19 U		20 U	19 U
Hexachlorobenzene	µg/kg	19 U	19 U		20 U	19 U
Hexachlorobutadiene	µg/kg	19 U	19 U		20 U	19 U
N-Nitrosodiphenylamine	µg/kg	19 U	19 U		20 U	19 U
Pentachlorophenol	µg/kg	97 U	97 U		100 U	93 U
Phenol	µg/kg	19 U	19 U		20 U	19 U
Other VOCs						
1,4-Dichlorobenzene	µg/kg	19 U	19 U		20 U	19 U

Table C.7
Chemistry Data for Sediment Samples

	Event	Sediments at Olavine (RETEC)				
	Location	HV-51	HV-52	HV-53	HV-54	HV-54
	Sample ID	**HV51S2A**	**HV52S2**	**HV53S2**	**HV-54-S2**	**HV-54-S3**
	Depth	37-110 cm	30-104 cm	88-119 cm	98-192 cm	192-195 cm
	Date	09/05/2000	09/05/2000	09/05/2000	09/01/2000	09/01/2000
Conventionals						
Total Organic Carbon	%	0.19	0.13	1.4	0.28	0.32
Total Solids	%	81	84	79	90	83
Metals						
Antimony	mg/kg	6 U	10 U	6 U	10 U	
Arsenic	mg/kg	6 U	10 U	6 U	10	
Cadmium	mg/kg	0.2 U	0.6 U	0.5	0.5 U	
Chromium	mg/kg	17.5	28	26.7	24	
Copper	mg/kg	6.8	8.2	24.8	15.1	
Lead	mg/kg	3	6 U	51	5 U	
Mercury	mg/kg	0.06 U	0.04 U	0.06	0.05 U	
Nickel	mg/kg	15	29	24	36	
Silver	mg/kg	0.4 U	0.9 U	0.3 U	0.8 U	
Zinc	mg/kg	20.1	23	55.2	28	
Polychlorinated Biphenyls (PCBs)						
Aroclor 1016	µg/kg	18 U	20 U	18 U	18 U	
Aroclor 1221	µg/kg	35 U	39 U	36 U	37 U	
Aroclor 1232	µg/kg	18 U	20 U	18 U	18 U	
Aroclor 1242	µg/kg	18 U	20 U	18 U	18 U	
Aroclor 1248	µg/kg	18 U	20 U	18 U	18 U	
Aroclor 1254	µg/kg	18 U	20 U	18 U	18 U	
Aroclor 1260	µg/kg	18 U	20 U	18 U	18 U	
Total PCBs	µg/kg	35 U	39 U	36 U	37 U	
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	µg/kg	19 U	20 U	300	60	18 U
Benzo(a)pyrene	µg/kg	19 U	20 U	220	42	18 U
Benzo(b)fluoranthene	µg/kg	19 U	20 U	160	41	18 U
Benzo(k)fluoranthene	µg/kg	19 U	20 U	260	63	18 U
Benzofluoranthenes (total)	µg/kg	19 U	20 U	420	104	18 U
Chrysene	µg/kg	19 U	20 U	290	94	18 U
Dibenzo(a,h)anthracene	µg/kg	19 U	20 U	40	18 U	18 U
Indeno(1,2,3-cd)pyrene	µg/kg	19 U	20 U	86	18 U	18 U
cPAHs (MTCA TEQ-HalfND)	µg/kg	14 U	15 U	310	61	14 U
cPAHs (MTCA TEQ-ZeroND)	µg/kg	19 U	20 U	310	59	18 U
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAHs	µg/kg	19 U	20 U	391	18 U	18 U
Naphthalene	µg/kg	19 U	20 U	55	18 U	18 U
Acenaphthylene	µg/kg	19 U	20 U	37	18 U	18 U
Acenaphthene	µg/kg	19 U	20 U	19 U	18 U	18 U
Fluorene	µg/kg	19 U	20 U	34	18 U	18 U
Phenanthrene	µg/kg	19 U	20 U	190	18 U	18 U
Anthracene	µg/kg	19 U	20 U	75	18 U	18 U

Table C.7
Chemistry Data for Sediment Samples

		Event	Sediments at Olavine (RETEC)				
		Location	HV-51	HV-52	HV-53	HV-54	HV-54
		Sample ID	**HV51S2A**	**HV52S2**	**HV53S2**	**HV-54-S2**	**HV-54-S3**
		Depth	37-110 cm	30-104 cm	88-119 cm	98-192 cm	192-195 cm
		Date	09/05/2000	09/05/2000	09/05/2000	09/01/2000	09/01/2000
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
2-Methylnaphthalene	µg/kg		19 U	20 U	19 U	18 U	18 U
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Total HPAHs	µg/kg		19 U	20 U	3649	690	18 U
Fluoranthene	µg/kg		19 U	20 U	1100	250	18 U
Pyrene	µg/kg		19 U	20 U	1100	140	18 U
Benzo(g,h,i)perylene	µg/kg		19 U	20 U	93	18 U	18 U
Other SVOCs							
1,2,4-Trichlorobenzene	µg/kg		19 U	20 U	19 U	18 U	18 U
1,2-Dichlorobenzene	µg/kg		19 U	20 U	19 U	18 U	18 U
1,3-Dichlorobenzene	µg/kg		19 U	20 U	19 U	18 U	18 U
2,4-Dimethylphenol	µg/kg		19 U	20 U	19 U	18 U	18 U
2-Methylphenol	µg/kg		19 U	20 U	19 U	18 U	18 U
4-Methylphenol	µg/kg		19 U	20 U	38	18 U	18 U
Benzoic Acid	µg/kg		190 U	200 U	190 U	180 U	180 U
Benzyl Alcohol	µg/kg		19 U	20 U	19 U	18 U	18 U
bis(2-Ethylhexyl) phthalate	µg/kg		19 U	21	19 U	400 JB	18 U
Butyl Benzyl Phthalate	µg/kg		19 U	20 U	19 U	18 U	18 U
Dibenzofuran	µg/kg		19 U	20 U	19 U	18 U	18 U
Diethylphthalate	µg/kg		19 U	20 U	19 U	18 U	18 U
Dimethyl phthalate	µg/kg		19 U	20 U	19 U	18 U	18 U
Di-n-butyl phthalate	µg/kg		19 U	20 U	19 U	18 U	18 U
Di-n-octyl phthalate	µg/kg		19 U	20 U	19 U	18 U	18 U
Hexachlorobenzene	µg/kg		19 U	20 U	19 U	18 U	18 U
Hexachlorobutadiene	µg/kg		19 U	20 U	19 U	18 U	18 U
N-Nitrosodiphenylamine	µg/kg		19 U	20 U	19 U	18 U	18 U
Pentachlorophenol	µg/kg		94 U	99 U	96 U	92 U	92 U
Phenol	µg/kg		19 U	20 U	19 U	18 U	18 U
Other VOCs							
1,4-Dichlorobenzene	µg/kg		19 U	20 U	19 U	18 U	18 U

Table C.7
Chemistry Data for Sediment Samples

		Event	Shipyard RI/FS Supplemental Investigation (RETEC)				
		Location	HB-1	HB-1	HB-2	HB-2	HB-3
		Sample ID	**HB-1**	**HB-1-WX**	**HB-2**	**HB-2-WX**	**HB-3**
		Depth	0-12 cm	0-12 cm	0-12 cm	0-12 cm	0-12 cm
		Date	07/24/2003	07/24/2003	07/24/2003	07/24/2003	07/24/2003
Conventionals							
	Ammonia	mg/kg	19		54		16
	Sulfide	mg/kg	1200		1900		1600
	Total Organic Carbon	%	2.6		2.6		2.3
	Total Solids	%	38.7		33		34.7
	Total Solids (preserved)	%	34.1		30.8		33.2
	Total Volatile Solids	%	6.6		8.4		7.5
Grain Size							
	Gravel	%	0.7		0.9		1.4
	Sand	%	31		19		19
	Silt	%	41.5		50.6		46
	Clay	%	27.3		30.1		34.2
Metals							
	Arsenic	mg/kg	10 U		10 U		10 U
	Cadmium	mg/kg	0.9		0.7		1.5
	Chromium	mg/kg	58		71		77
	Copper	mg/kg	69.7		106		114
	Lead	mg/kg	17		22		18
	Mercury	mg/kg	0.2		0.3		0.3
	Nickel	mg/kg	77		91		96
	Silver	mg/kg	0.8 U		0.9 U		0.8 U
	Zinc	mg/kg	104		145		129
Organometallics							
	Dibutyltin as Cl	µg/kg	6.1 J	0.05 UJ	8.8 J	0.05 UJ	5.9 UJ
	Monobutyltin Trichloride	µg/kg		0.05 UJ		0.05 UJ	
	Tributyltin	µg/kg	26 J	0.018 U	45	0.018 U	32
Polychlorinated Biphenyls (PCBs)							
	Aroclor 1016	µg/kg	19 U		19 U		19 U
	Aroclor 1221	µg/kg	39 U		76 U		39 U
	Aroclor 1232	µg/kg	23 U		21 U		25 U
	Aroclor 1242	µg/kg	20 U		19 U		19 U
	Aroclor 1248	µg/kg	20 U		19 U		19 U
	Aroclor 1254	µg/kg	20 U		19 U		19 U
	Aroclor 1260	µg/kg	20 U		19 U		19 U
	Total PCBs	µg/kg	39 U		76 U		39 U
Pesticide/Herbicides							
	p,p'-DDD	µg/kg	2 U		1.9 U		1.9 U
	p,p'-DDE	µg/kg	2 U		1.9 U		1.9 U
	p,p'-DDT	µg/kg	2 U		1.9 U		1.9 U
	gamma-BHC	µg/kg	0.98 U		0.97 U		0.97 U
	alpha-Chlordane	µg/kg	0.98 U		0.97 U		0.97 U
	Aldrin	µg/kg	0.98 U		0.97 U		0.97 U

Table C.7
Chemistry Data for Sediment Samples

		Event	Shipyard RI/FS Supplemental Investigation (RETEC)				
		Location	HB-1	HB-1	HB-2	HB-2	HB-3
		Sample ID	**HB-1**	**HB-1-WX**	**HB-2**	**HB-2-WX**	**HB-3**
		Depth	0-12 cm	0-12 cm	0-12 cm	0-12 cm	0-12 cm
		Date	07/24/2003	07/24/2003	07/24/2003	07/24/2003	07/24/2003
Pesticide/Herbicides							
Dieldrin	µg/kg		2 U		1.9 U		1.9 U
Heptachlor	µg/kg		0.98 U		0.97 U		0.97 U
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
Benz(a)anthracene	µg/kg		130		100		72
Benzo(a)pyrene	µg/kg		150		88		72
Benzo(b)fluoranthene	µg/kg		120		65		73
Benzo(k)fluoranthene	µg/kg		200		130		80
Benzofluoranthenes (total)	µg/kg		320		195		153
Chrysene	µg/kg		230		160		140
Dibenzo(a,h)anthracene	µg/kg		21		20 U		20 U
Indeno(1,2,3-cd)pyrene	µg/kg		97		44		48
cPAHs (MTCA TEQ-HalfND)	µg/kg		210		120		100
cPAHs (MTCA TEQ-ZeroND)	µg/kg		210		120		100
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Total LPAHs	µg/kg		403		154		158
Naphthalene	µg/kg		92		34		33
Acenaphthylene	µg/kg		31		20 U		20 U
Acenaphthene	µg/kg		20 U		20 U		20 U
Fluorene	µg/kg		32		20 U		20 U
Phenanthrene	µg/kg		170		78		93
Anthracene	µg/kg		78		42		32
2-Methylnaphthalene	µg/kg		27		20 U		20 U
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Total HPAHs	µg/kg		1632		952		869
Fluoranthene	µg/kg		300		180		200
Pyrene	µg/kg		310		150		150
Benzo(g,h,i)perylene	µg/kg		74		35		34
Other SVOCs							
1,2,4-Trichlorobenzene	µg/kg		20 U		20 U		20 U
1,2-Dichlorobenzene	µg/kg		20 U		20 U		20 U
1,3-Dichlorobenzene	µg/kg		20 U		20 U		20 U
2,4-Dimethylphenol	µg/kg		20 U		20 U		20 U
2-Methylphenol	µg/kg		20 U		20 U		20 U
4-Methylphenol	µg/kg		130		95		170
Benzoic Acid	µg/kg		200 U		200 U		200 U
Benzyl Alcohol	µg/kg		20 U		20 U		20 U
bis(2-Ethylhexyl) phthalate	µg/kg		130 JB		140 JB		49 JB
Butyl Benzyl Phthalate	µg/kg		20 U		20 U		20 U
Dibenzofuran	µg/kg		37		20 U		20 U
Diethylphthalate	µg/kg		20 U		65		20 U
Dimethyl phthalate	µg/kg		20 U		20 U		20 U

Table C.7
Chemistry Data for Sediment Samples

		Event	Shipyard RI/FS Supplemental Investigation (RETEC)				
		Location	HB-1	HB-1	HB-2	HB-2	HB-3
		Sample ID	**HB-1**	**HB-1-WX**	**HB-2**	**HB-2-WX**	**HB-3**
		Depth	0-12 cm	0-12 cm	0-12 cm	0-12 cm	0-12 cm
		Date	07/24/2003	07/24/2003	07/24/2003	07/24/2003	07/24/2003
Other SVOCs							
Di-n-butyl phthalate	µg/kg		20 U		20 U		20 U
Di-n-octyl phthalate	µg/kg		20 U		20 U		20 U
Hexachlorobenzene	µg/kg		0.98 U		0.97 U		1 U
Hexachlorobutadiene	µg/kg		0.98 U		0.97 U		0.97 U
Hexachloroethane	µg/kg		20 U		20 U		20 U
N-Nitrosodiphenylamine	µg/kg		20 U		20 U		20 U
Pentachlorophenol	µg/kg		130		98 U		99 U
Phenol	µg/kg		25		37		25
Other VOCs							
1,4-Dichlorobenzene	µg/kg		20 U		20 U		20 U

Table C.7
Chemistry Data for Sediment Samples

		Event	Shipyard RI/FS Supplemental Investigation (RETEC)				
		Location	HB-3	HB-4	HB-4		
		Sample ID	**HB-3-WX**	**HB-4**	**HB-4-WX**		
		Depth	0-12 cm	0-12 cm	0-12 cm		
		Date	07/24/2003	07/24/2003	07/24/2003		
Conventionals							
	Ammonia	mg/kg		50			
	Sulfide	mg/kg		3800			
	Total Organic Carbon	%		2.5			
	Total Solids	%		31.2			
	Total Solids (preserved)	%		26.4			
	Total Volatile Solids	%		9.1			
Grain Size							
	Gravel	%		0.2			
	Sand	%		15			
	Silt	%		50.1			
	Clay	%		34.4			
Metals							
	Arsenic	mg/kg		20 U			
	Cadmium	mg/kg		1.2			
	Chromium	mg/kg		71			
	Copper	mg/kg		90.1			
	Lead	mg/kg		23			
	Mercury	mg/kg		0.3			
	Nickel	mg/kg		93			
	Silver	mg/kg		1 U			
	Zinc	mg/kg		151			
Organometallics							
	Dibutyltin as Cl	µg/kg	0.05 UJ	6.2 J	0.05 UJ		
	Monobutyltin Trichloride	µg/kg	0.05 UJ		0.05 UJ		
	Tributyltin	µg/kg	0.018 U	32	0.018 U		
Polychlorinated Biphenyls (PCBs)							
	Aroclor 1016	µg/kg		19 U			
	Aroclor 1221	µg/kg		39 U			
	Aroclor 1232	µg/kg		23 U			
	Aroclor 1242	µg/kg		20 U			
	Aroclor 1248	µg/kg		20 U			
	Aroclor 1254	µg/kg		20 U			
	Aroclor 1260	µg/kg		20 U			
	Total PCBs	µg/kg		39 U			
Pesticide/Herbicides							
	p,p'-DDD	µg/kg		2 U			
	p,p'-DDE	µg/kg		2 U			
	p,p'-DDT	µg/kg		2 U			
	gamma-BHC	µg/kg		0.98 U			
	alpha-Chlordane	µg/kg		0.98 U			
	Aldrin	µg/kg		0.98 U			

Table C.7
Chemistry Data for Sediment Samples

		Event	Shipyard RI/FS Supplemental Investigation (RETEC)				
		Location	HB-3	HB-4	HB-4		
		Sample ID	**HB-3-WX**	**HB-4**	**HB-4-WX**		
		Depth	0-12 cm	0-12 cm	0-12 cm		
		Date	07/24/2003	07/24/2003	07/24/2003		
Pesticide/Herbicides							
Dieldrin	µg/kg			2 U			
Heptachlor	µg/kg			0.98 U			
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
Benz(a)anthracene	µg/kg			330			
Benzo(a)pyrene	µg/kg			200			
Benzo(b)fluoranthene	µg/kg			200			
Benzo(k)fluoranthene	µg/kg			210			
Benzofluoranthenes (total)	µg/kg			410			
Chrysene	µg/kg			390			
Dibenzo(a,h)anthracene	µg/kg			35			
Indeno(1,2,3-cd)pyrene	µg/kg			86			
cPAHs (MTCA TEQ-HalfND)	µg/kg			290			
cPAHs (MTCA TEQ-ZeroND)	µg/kg			290			
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Total LPAHs	µg/kg			420			
Naphthalene	µg/kg			20 U			
Acenaphthylene	µg/kg			20 U			
Acenaphthene	µg/kg			20 U			
Fluorene	µg/kg			20 U			
Phenanthrene	µg/kg			290			
Anthracene	µg/kg			130			
2-Methylnaphthalene	µg/kg			20 U			
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Total HPAHs	µg/kg			2713			
Fluoranthene	µg/kg			690			
Pyrene	µg/kg			510			
Benzo(g,h,i)perylene	µg/kg			62			
Other SVOCs							
1,2,4-Trichlorobenzene	µg/kg			20 U			
1,2-Dichlorobenzene	µg/kg			20 U			
1,3-Dichlorobenzene	µg/kg			20 U			
2,4-Dimethylphenol	µg/kg			20 U			
2-Methylphenol	µg/kg			20 U			
4-Methylphenol	µg/kg			120			
Benzoic Acid	µg/kg			200 U			
Benzyl Alcohol	µg/kg			20 U			
bis(2-Ethylhexyl) phthalate	µg/kg			24 JB			
Butyl Benzyl Phthalate	µg/kg			20 U			
Dibenzofuran	µg/kg			20 U			
Diethylphthalate	µg/kg			20 U			
Dimethyl phthalate	µg/kg			20 U			

Table C.7
Chemistry Data for Sediment Samples

		Event	Shipyard RI/FS Supplemental Investigation (RETEC)				
		Location	HB-3	HB-4	HB-4		
		Sample ID	**HB-3-WX**	**HB-4**	**HB-4-WX**		
		Depth	0-12 cm	0-12 cm	0-12 cm		
		Date	07/24/2003	07/24/2003	07/24/2003		
Other SVOCs							
Di-n-butyl phthalate	µg/kg			20 U			
Di-n-octyl phthalate	µg/kg			20 U			
Hexachlorobenzene	µg/kg			0.98 U			
Hexachlorobutadiene	µg/kg			1.1 U			
Hexachloroethane	µg/kg			20 U			
N-Nitrosodiphenylamine	µg/kg			20 U			
Pentachlorophenol	µg/kg			99 U			
Phenol	µg/kg			24			
Other VOCs							
1,4-Dichlorobenzene	µg/kg			20 U			

Table C.7
Chemistry Data for Sediment Samples

		Event	Shipyard RI/FS Supplemental Sediment Investigation (RETEC)				
		Location	HB-1	HB-2	HB-3	HB-4	
		Sample ID	**HB-1**	**HB-2**	**HB-3**	**HB-4**	
		Depth	0-12 cm	0-12 cm	0-12 cm	0-12 cm	
		Date	11/06/2003	11/06/2003	11/06/2003	11/06/2003	
Conventionals							
	Ammonia	mg/kg	19	54	19	50	
	Sulfide	mg/kg	2400	3100	1600	3800	
	Total Organic Carbon	%	2.6	2.6	2.3	2.5	
	Total Solids	%	30.5	32.6	37.3	31.2	
	Total Solids (preserved)	%	34.1	31.2	33.2	23	
	Total Volatile Solids	%	6.6	8.4	7.5	9.1	
Grain Size							
	Gravel	%	0.7	0.9	1.4	0.2	
	Sand	%	31	19	19	15	
	Silt	%	41.5	50.6	46	50.1	
	Clay	%	27.3	30.1	34.2	34.4	
Metals							
	Arsenic	mg/kg	10 U	10 U	10 U	20 U	
	Cadmium	mg/kg	0.9	0.7	1.5	1.2	
	Chromium	mg/kg	58	71	77	71	
	Copper	mg/kg	69.7	106	114	90.1	
	Lead	mg/kg	17	22	18	23	
	Mercury	mg/kg	0.2	0.3	0.3	0.3	
	Nickel	mg/kg	77	91	96	93	
	Silver	mg/kg	0.8 U	0.9 U	0.8 U	1 U	
	Zinc	mg/kg	104	145	129	151	
Organometallics							
	Dibutyltin as Cl	µg/kg	6.1 J	8.8 J	5.9 UJ	6.2 J	
	Tributyltin	µg/kg	26 J	45	32	32	
Polychlorinated Biphenyls (PCBs)							
	Aroclor 1016	µg/kg	19 U	19 U	19 U	19 U	
	Aroclor 1221	µg/kg	39 U	76 U	39 U	39 U	
	Aroclor 1232	µg/kg	23 U	21 U	25 U	23 U	
	Aroclor 1242	µg/kg	20 U	19 U	19 U	20 U	
	Aroclor 1248	µg/kg	20 U	19 U	19 U	20 U	
	Aroclor 1254	µg/kg	20 U	19 U	19 U	20 U	
	Aroclor 1260	µg/kg	20 U	19 U	19 U	20 U	
	Total PCBs	µg/kg	39 U	76 U	39 U	39 U	
Pesticide/Herbicides							
	p,p'-DDD	µg/kg	2 U	1.9 U	1.9 U	2 U	
	p,p'-DDE	µg/kg	2 U	1.9 U	1.9 U	2 U	
	p,p'-DDT	µg/kg	2 U	1.9 U	1.9 U	2 U	
	gamma-BHC	µg/kg	0.98 U	0.97 U	0.97 U	0.98 U	
	alpha-Chlordane	µg/kg	0.98 U	0.97 U	0.97 U	0.98 U	
	Aldrin	µg/kg	0.98 U	0.97 U	0.97 U	0.98 U	
	Dieldrin	µg/kg	2 U	1.9 U	1.9 U	2 U	

Table C.7
Chemistry Data for Sediment Samples

		Event	Shipyard RI/FS Supplemental Sediment Investigation (RETEC)				
		Location	HB-1	HB-2	HB-3	HB-4	
		Sample ID	**HB-1**	**HB-2**	**HB-3**	**HB-4**	
		Depth	0-12 cm	0-12 cm	0-12 cm	0-12 cm	
		Date	11/06/2003	11/06/2003	11/06/2003	11/06/2003	
Pesticide/Herbicides							
Heptachlor	µg/kg		0.98 U	0.97 U	0.97 U	0.98 U	
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
Benz(a)anthracene	µg/kg		130	100	72	330	
Benzo(a)pyrene	µg/kg		150	88	72	200	
Benzo(b)fluoranthene	µg/kg		120	65	73	200	
Benzo(k)fluoranthene	µg/kg		200	130	80	210	
Benzofluoranthenes (total)	µg/kg		320	195	153	410	
Chrysene	µg/kg		230	160	140	390	
Dibenzo(a,h)anthracene	µg/kg		21	20 U	20 U	35	
Indeno(1,2,3-cd)pyrene	µg/kg		97	44	48	86	
cPAHs (MTCA TEQ-HalfND)	µg/kg		210	120	100	290	
cPAHs (MTCA TEQ-ZeroND)	µg/kg		210	120	100	290	
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Total LPAHs	µg/kg		403	154	158	420	
Naphthalene	µg/kg		92	34	33	20 U	
Acenaphthylene	µg/kg		31	20 U	20 U	20 U	
Acenaphthene	µg/kg		20 U	20 U	20 U	20 U	
Fluorene	µg/kg		32	20 U	20 U	20 U	
Phenanthrene	µg/kg		170	78	93	290	
Anthracene	µg/kg		78	42	32	130	
2-Methylnaphthalene	µg/kg		27	20 U	20 U	20 U	
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Total HPAHs	µg/kg		1632	952	869	2713	
Fluoranthene	µg/kg		300	180	200	690	
Pyrene	µg/kg		310	150	150	510	
Benzo(g,h,i)perylene	µg/kg		74	35	34	62	
Other SVOCs							
1,2,4-Trichlorobenzene	µg/kg		20 U	20 U	20 U	20 U	
1,2-Dichlorobenzene	µg/kg		20 U	20 U	20 U	20 U	
1,3-Dichlorobenzene	µg/kg		20 U	20 U	20 U	20 U	
2,4-Dimethylphenol	µg/kg		20 U	20 U	20 U	20 U	
2-Methylphenol	µg/kg		20 U	20 U	20 U	20 U	
4-Methylphenol	µg/kg		130	95	170	120	
Benzoic Acid	µg/kg		200 U	200 U	200 U	200 U	
Benzyl Alcohol	µg/kg		20 U	20 U	20 U	20 U	
bis(2-Ethylhexyl) phthalate	µg/kg		130 JB	140 JB	49 JB	24 JB	
Butyl Benzyl Phthalate	µg/kg		20 U	20 U	20 U	20 U	
Dibenzofuran	µg/kg		37	20 U	20 U	20 U	
Diethylphthalate	µg/kg		20 U	65	20 U	20 U	
Dimethyl phthalate	µg/kg		20 U	20 U	20 U	20 U	
Di-n-butyl phthalate	µg/kg		20 U	20 U	20 U	20 U	

Table C.7
Chemistry Data for Sediment Samples

		Event	Shipyard RI/FS Supplemental Sediment Investigation (RETEC)				
		Location	HB-1	HB-2	HB-3	HB-4	
		Sample ID	**HB-1**	**HB-2**	**HB-3**	**HB-4**	
		Depth	0-12 cm	0-12 cm	0-12 cm	0-12 cm	
		Date	11/06/2003	11/06/2003	11/06/2003	11/06/2003	
Other SVOCs							
Di-n-octyl phthalate	µg/kg		20 U	20 U	20 U	20 U	
Hexachlorobenzene	µg/kg		0.98 U	0.97 U	1 U	0.98 U	
Hexachlorobutadiene	µg/kg		0.98 U	0.97 U	0.97 U	1.1 U	
Hexachloroethane	µg/kg		20 U	20 U	20 U	20 U	
N-Nitrosodiphenylamine	µg/kg		20 U	20 U	20 U	20 U	
Pentachlorophenol	µg/kg		130	98 U	99 U	99 U	
Phenol	µg/kg		25	37	25	24	
Other VOCs							
1,4-Dichlorobenzene	µg/kg		20 U	20 U	20 U	20 U	

Table C.7
Chemistry Data for Sediment Samples

		Event	Shipyards PSDDA Investigation (RETEC)				
		Location	HC-8	HC-10	HC-12	HC-12	HC-14
		Sample ID	**HC-1A-S1**	**HC-1B-S1**	**HC-2-S1**	**HC-2-S2**	**HC-3-S1**
		Depth	0-3 ft	0-3 ft	0-3 ft	3-4 ft	0-3 ft
		Date	02/26/2004	02/26/2004	02/26/2004	02/26/2004	02/27/2004
Conventionals							
	Ammonia	mg/kg	3.4	2.9	4.5	0.86	0.54
	Sulfide	mg/kg	120	140	11000	1.5	1.1 U
	Total Organic Carbon	%	1.2	1.6	1.4	0.081	0.25
	Total Solids	%	72.2	74.7	78.5	84.8	85
	Total Solids (preserved)	%	74.8	77.4	56.5	91.7	89.2
	Total Volatile Solids	%	3.3	1.9	2.1	13	1.4
Grain Size							
	Gravel	%	21.2	7.8	56.7		43.8
	Sand	%	62.3	70.5	31		50
Metals							
	Antimony	mg/kg	7 U	7 U	7 U	10 U	6 U
	Arsenic	mg/kg	10	10	67	10 U	14
	Cadmium	mg/kg	0.3	0.4	0.9	0.6 U	0.3
	Chromium	mg/kg	26.1	30.3	47.9	36	34.6
	Copper	mg/kg	19.9	43.9	195	10.4	79.1
	Lead	mg/kg	9	10	86	6 U	39
	Mercury	mg/kg	0.08	0.09	0.12	0.05 U	0.05 U
	Nickel	mg/kg	24	29	29	17	55
	Silver	mg/kg	0.4 U	0.4 U	0.4 U	0.9 U	0.4 U
	Zinc	mg/kg	38.5	55.2	622	18	189
Organometallics							
	Dibutyltin as Cl	µg/kg	5.6 U	19	5.6 U	5.7 U	16
	Monobutyltin Trichloride	µg/kg	5.6 U	5.9 U	5.6 U	5.7 U	6 U
	Tributyltin	µg/kg	0.005 U	0.028	0.0089	0.0051 U	0.055
Polychlorinated Biphenyls (PCBs)							
	Aroclor 1016	µg/kg	20 U	20 U	20 U	20 U	20 U
	Aroclor 1221	µg/kg	39 U	39 U	39 U	40 U	40 U
	Aroclor 1232	µg/kg	20 U	20 U	20 U	20 U	20 U
	Aroclor 1242	µg/kg	20 U	20 U	20 U	20 U	20 U
	Aroclor 1248	µg/kg	20 U	20 U	20 U	20 U	20 U
	Aroclor 1254	µg/kg	20 U	20 U	58	20 U	20 U
	Aroclor 1260	µg/kg	20 U	20 U	76 UJ	20 U	20 U
	Total PCBs	µg/kg	39 U	39 U	58	40 U	40 U
Pesticide/Herbicides							
	p,p'-DDD	µg/kg	2 U	2 U	3.3 UJ	2 U	2 U
	p,p'-DDE	µg/kg	2 U	2 U	2 U	2 U	2 U
	p,p'-DDT	µg/kg	2 U	2 U	5.5 UJ	2 U	2 U
	alpha-BHC	µg/kg	0.98 U	0.97 U	8.6 UJ	0.99 U	12
	gamma-BHC	µg/kg	0.98 U	0.97 U	0.98 U	0.99 U	0.99 U
	alpha-Chlordane	µg/kg	0.98 U	0.97 U	0.98 U	0.99 U	0.99 U
	Aldrin	µg/kg	0.98 U	0.97 U	0.98 U	0.99 U	0.99 U

Table C.7
Chemistry Data for Sediment Samples

		Event	Shipyards PSDDA Investigation (RETEC)				
		Location	HC-8	HC-10	HC-12	HC-12	HC-14
		Sample ID	**HC-1A-S1**	**HC-1B-S1**	**HC-2-S1**	**HC-2-S2**	**HC-3-S1**
		Depth	0-3 ft	0-3 ft	0-3 ft	3-4 ft	0-3 ft
		Date	02/26/2004	02/26/2004	02/26/2004	02/26/2004	02/27/2004
Pesticide/Herbicides							
Dieldrin	µg/kg		2 U	2 U	2 U	2 U	2 U
Heptachlor	µg/kg		0.98 U	0.97 U	0.98 U	0.99 U	0.99 U
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
Benz(a)anthracene	µg/kg		22	36	1300	20 U	69
Benzo(a)pyrene	µg/kg		30	40	850	20 U	83
Benzo(b)fluoranthene	µg/kg		34	43	1100	20 U	140
Benzo(k)fluoranthene	µg/kg		28	39	640	20 U	100
Benzofluoranthenes (total)	µg/kg		62	82	1740	20	240
Chrysene	µg/kg		35	57	1000	20 U	190
Dibenzo(a,h)anthracene	µg/kg		20 U	19 U	110	20 U	20 U
Indeno(1,2,3-cd)pyrene	µg/kg		20 U	23	260	20 U	35
cPAHs (MTCA TEQ-HalfND)	µg/kg		41	56	1200	15 U	120
cPAHs (MTCA TEQ-ZeroND)	µg/kg		39	55	1200	20 U	120
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Total LPAHs	µg/kg		24	37	8060	20	153
Naphthalene	µg/kg		20 U	19 U	41	20 U	20 U
Acenaphthylene	µg/kg		20 U	19 U	37	20 U	20 U
Acenaphthene	µg/kg		20 U	19 U	1400	20 U	20 U
Fluorene	µg/kg		20 U	19 U	1200	20 U	20 U
Phenanthrene	µg/kg		24	37	4690	20 U	120
Anthracene	µg/kg		20 U	19 U	780	20 U	33
2-Methylnaphthalene	µg/kg		20 U	19 U	19 U	20 U	20 U
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Total HPAHs	µg/kg		192	318	15200	20	1340
Fluoranthene	µg/kg		48	69	6300	20 U	540
Pyrene	µg/kg		57	71	5200	20 U	390
Benzo(g,h,i)perylene	µg/kg		20 U	22	230	20 U	29
Other SVOCs							
1,2,4-Trichlorobenzene	µg/kg		4.9 U	4.7 U	6.4 U	5.4 U	4 U
1,2-Dichlorobenzene	µg/kg		1 U	0.9 U	1.3 U	1.1 U	0.8 U
1,3-Dichlorobenzene	µg/kg		1 U	0.9 U	1.3 U	1.1 U	0.8 U
2,4-Dimethylphenol	µg/kg		20 U	19 U	19 U	20 U	20 U
2-Methylphenol	µg/kg		20 U	19 U	19 U	20 U	20 U
4-Methylphenol	µg/kg		20 U	19 U	19 U	20 U	20 U
Benzoic Acid	µg/kg		200 U	190 U	190 U	200 U	200 U
Benzyl Alcohol	µg/kg		20 U	19 U	19 U	20 U	20 U
bis(2-Ethylhexyl) phthalate	µg/kg		20 U	19 U	41	20 U	53
Butyl Benzyl Phthalate	µg/kg		20 U	19 U	19 U	20 U	20 U
Dibenzofuran	µg/kg		20 U	19 U	210	20 U	20 U
Diethylphthalate	µg/kg		20 U	19 U	19 U	20 U	20 U
Di-n-butyl phthalate	µg/kg		20 U	19 U	19 U	20 U	20 U

Table C.7
Chemistry Data for Sediment Samples

	Event	Shipyards PSDDA Investigation (RETEC)				
	Location	HC-8	HC-10	HC-12	HC-12	HC-14
	Sample ID	**HC-1A-S1**	**HC-1B-S1**	**HC-2-S1**	**HC-2-S2**	**HC-3-S1**
	Depth	0-3 ft	0-3 ft	0-3 ft	3-4 ft	0-3 ft
	Date	02/26/2004	02/26/2004	02/26/2004	02/26/2004	02/27/2004
Other SVOCs						
Hexachlorobenzene	µg/kg	0.98 U	0.97 U	0.98 U	0.99 U	0.99 U
Hexachlorobutadiene	µg/kg	0.98 U	0.97 U	0.98 U	0.99 U	0.99 U
Hexachloroethane	µg/kg	20 U	19 U	19 U	20 U	20 U
N-Nitrosodiethanolamine	µg/kg	20 U	19 U	19 U	20 U	20 U
Pentachlorophenol	µg/kg	99 U	96 U	97 U	99 U	98 U
Phenol	µg/kg	20 U	19 U	19 U	20 U	20 U
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH						
Ethylbenzene	µg/kg	1 U	0.9 U	1.3 U	1.1 U	0.8 U
Xylene (meta & para)	µg/kg	1 U	0.9 U	1.3 U	2	0.8 U
Xylene (ortho)	µg/kg	1 U	0.9 U	1.3 U	1.1 U	0.8 U
Other VOCs						
1,4-Dichlorobenzene	µg/kg	1 U	0.9 U	1.3 U	1.1 U	0.8 U
Trichloroethene	µg/kg	1 U	0.9 U	1.3 U	1.1 U	0.8 U
Tetrachloroethene	µg/kg	1 U	0.9 U	1.3 U	1.1 U	0.8 U

Table C.7
Chemistry Data for Sediment Samples

		Event	Shipyards PSDDA Investigation (RETEC)				
		Location	HC-16	HC-23			
		Sample ID	**HC-4-S1**	**HC-7B-S1**			
		Depth	0-3 ft	0-3 ft			
		Date	02/27/2004	02/27/2004			
Conventionals							
	Ammonia	mg/kg	4.5	4.1			
	Sulfide	mg/kg	9.9	93			
	Total Organic Carbon	%	0.57	1.8			
	Total Solids	%	72.9	68.6			
	Total Solids (preserved)	%	80.2	74.8			
	Total Volatile Solids	%	2.2	2.6			
Grain Size							
	Gravel	%	12.5	0.3			
	Sand	%	65.9	72			
Metals							
	Antimony	mg/kg	7 U	7 U			
	Arsenic	mg/kg	8	11			
	Cadmium	mg/kg	0.3	0.4			
	Chromium	mg/kg	35.1	32.5			
	Copper	mg/kg	33.1	25.6			
	Lead	mg/kg	12	11			
	Mercury	mg/kg	0.08	0.09			
	Nickel	mg/kg	32	35			
	Silver	mg/kg	0.4 U	0.4 U			
	Zinc	mg/kg	53.9	49.8			
Organometallics							
	Dibutyltin as Cl	µg/kg	5.8 U	5.7 U			
	Monobutyltin Trichloride	µg/kg	5.8 U	5.7 U			
	Tributyltin	µg/kg	0.011	0.012			
Polychlorinated Biphenyls (PCBs)							
	Aroclor 1016	µg/kg	20 U	19 U			
	Aroclor 1221	µg/kg	39 U	39 U			
	Aroclor 1232	µg/kg	20 U	19 U			
	Aroclor 1242	µg/kg	20 U	19 U			
	Aroclor 1248	µg/kg	20 U	19 U			
	Aroclor 1254	µg/kg	20 U	19 U			
	Aroclor 1260	µg/kg	26	19 U			
	Total PCBs	µg/kg	26	39 U			
Pesticide/Herbicides							
	p,p'-DDD	µg/kg	2 U	1.9 U			
	p,p'-DDE	µg/kg	2 U	1.9 U			
	p,p'-DDT	µg/kg	3.2 UJ	1.9 U			
	alpha-BHC	µg/kg	0.99 U	0.97 U			
	gamma-BHC	µg/kg	0.99 U	0.97 U			
	alpha-Chlordane	µg/kg	0.99 U	0.97 U			
	Aldrin	µg/kg	0.99 U	0.97 U			

Table C.7
Chemistry Data for Sediment Samples

		Event	Shipyards PSDDA Investigation (RETEC)				
		Location	HC-16	HC-23			
		Sample ID	**HC-4-S1**	**HC-7B-S1**			
		Depth	0-3 ft	0-3 ft			
		Date	02/27/2004	02/27/2004			
Pesticide/Herbicides							
	Dieldrin	µg/kg	2 U	1.9 U			
	Heptachlor	µg/kg	0.99 U	0.97 U			
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
	Benz(a)anthracene	µg/kg	42	34			
	Benzo(a)pyrene	µg/kg	38	40			
	Benzo(b)fluoranthene	µg/kg	38	38			
	Benzo(k)fluoranthene	µg/kg	39	43			
	Benzofluoranthenes (total)	µg/kg	77	81			
	Chrysene	µg/kg	54	44			
	Dibenzo(a,h)anthracene	µg/kg	20 U	19 U			
	Indeno(1,2,3-cd)pyrene	µg/kg	20 U	19 U			
	cPAHs (MTCA TEQ-HalfND)	µg/kg	52	54			
	cPAHs (MTCA TEQ-ZeroND)	µg/kg	50	52			
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
	Total LPAHs	µg/kg	40	72			
	Naphthalene	µg/kg	20 U	23			
	Acenaphthylene	µg/kg	20 U	19 U			
	Acenaphthene	µg/kg	20 U	19 U			
	Fluorene	µg/kg	20 U	19 U			
	Phenanthrene	µg/kg	40	49			
	Anthracene	µg/kg	20 U	19 U			
	2-Methylnaphthalene	µg/kg	20 U	19 U			
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
	Total HPAHs	µg/kg	307	290			
	Fluoranthene	µg/kg	94	87			
	Pyrene	µg/kg	79	82			
	Benzo(g,h,i)perylene	µg/kg	20 U	19 U			
Other SVOCs							
	1,2,4-Trichlorobenzene	µg/kg	4.4 U	4.8 U			
	1,2-Dichlorobenzene	µg/kg	0.9 U	1 U			
	1,3-Dichlorobenzene	µg/kg	0.9 U	1 U			
	2,4-Dimethylphenol	µg/kg	20 U	19 U			
	2-Methylphenol	µg/kg	20 U	19 U			
	4-Methylphenol	µg/kg	20 U	19 U			
	Benzoic Acid	µg/kg	200 U	190 U			
	Benzyl Alcohol	µg/kg	20 U	19 U			
	bis(2-Ethylhexyl) phthalate	µg/kg	33	19 U			
	Butyl Benzyl Phthalate	µg/kg	20 U	19 U			
	Dibenzofuran	µg/kg	20 U	19 U			
	Diethylphthalate	µg/kg	20 U	19 U			
	Di-n-butyl phthalate	µg/kg	20 U	19 U			

Table C.7
Chemistry Data for Sediment Samples

		Event	Shipyards PSDDA Investigation (RETEC)				
		Location	HC-16	HC-23			
		Sample ID	**HC-4-S1**	**HC-7B-S1**			
		Depth	0-3 ft	0-3 ft			
		Date	02/27/2004	02/27/2004			
Other SVOCs							
	Hexachlorobenzene	µg/kg	0.99 U	0.97 U			
	Hexachlorobutadiene	µg/kg	0.99 U				
	Hexachloroethane	µg/kg	20 U	19 U			
	N-Nitrosodiethanolamine	µg/kg	20 U	19 U			
	Pentachlorophenol	µg/kg	98 U	97 U			
	Phenol	µg/kg	20 U	19 U			
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH							
	Ethylbenzene	µg/kg	0.9 U	1 U			
	Xylene (meta & para)	µg/kg	0.9 U	1 U			
	Xylene (ortho)	µg/kg	0.9 U	1 U			
Other VOCs							
	1,4-Dichlorobenzene	µg/kg	0.9 U	1 U			
	Trichloroethene	µg/kg	0.9 U	1 U			
	Tetrachloroethene	µg/kg	0.9 U	1 U			

Table C.7
Chemistry Data for Sediment Samples

	Event	Shipyard Sediments RI/FS Intertidal Data (RETEC)				
	Location	S-1	S-1	S-2	S-2	
	Sample ID	**HAS-S1-0-2**	**HAS-S1-2-4**	**HAS-S2-0-2**	**HAS-S2-2-4**	
	Depth	0-2 ft	2-4 ft	0-2 ft	2-4 ft	
	Date	08/17/2005	08/17/2005	08/19/2005	08/19/2005	
Conventionals						
Total Organic Carbon	%	0.656	1.04	1.22	0.525	
Total Solids	%	76.8	78.6	71.5	72.1	
Metals						
Antimony	mg/kg	20 U	20 U	20 U	20 U	
Arsenic	mg/kg	30	30	110	60	
Cadmium	mg/kg	0.7 U	0.6 U	1.5	1.2	
Chromium	mg/kg	25	45	37	31	
Copper	mg/kg	289	212	2620	1630	
Lead	mg/kg	67	79	208	942	
Mercury	mg/kg	0.08	0.34	26	9	
Nickel	mg/kg	20	31	31	25	
Silver	mg/kg	1 U	0.9 U	1 U	0.9 U	
Zinc	mg/kg	402	280	1690	732	
Organometallics						
Tributyltin	µg/kg	3000 J	280 J	1100	690	
Polychlorinated Biphenyls (PCBs)						
Aroclor 1016	µg/kg	44 U	42 U	40 U	42 U	
Aroclor 1221	µg/kg	44 U	42 U	40 U	42 U	
Aroclor 1232	µg/kg	44 U	42 U	40 U	42 U	
Aroclor 1242	µg/kg	44 U	42 U	40 U	42 U	
Aroclor 1248	µg/kg	44 U	42 U	40 U	42 U	
Aroclor 1254	µg/kg	44 U	42 U	40 U	42 U	
Aroclor 1260	µg/kg	44 U	42 U	40 U	42 U	
Total PCBs	µg/kg	44 U	42 U	40 U	42 U	
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	µg/kg	110	84 U	130	100	
Benzo(a)pyrene	µg/kg	120	84 U	180	110	
Benzo(b)fluoranthene	µg/kg	120	84 U	230	140	
Benzo(k)fluoranthene	µg/kg	120	84 U	200	130	
Benzofluoranthenes (total)	µg/kg	240	84 U	430	270	
Chrysene	µg/kg	160	100	170	110	
Dibenzo(a,h)anthracene	µg/kg	88 U	84 U	81 U	84 U	
Indeno(1,2,3-cd)pyrene	µg/kg	88 U	84 U	100	84 U	
cPAHs (MTCA TEQ-HalfND)	µg/kg	170	64	250	160	
cPAHs (MTCA TEQ-ZeroND)	µg/kg	160	1	250	150	
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAHs	µg/kg	160	84 U	140	84 U	
Naphthalene	µg/kg	88 U	84 U	81 U	84 U	
Acenaphthylene	µg/kg	88 U	84 U	81 U	84 U	
Acenaphthene	µg/kg	88 U	84 U	81 U	84 U	
Fluorene	µg/kg	88 U	84 U	81 U	84 U	

Table C.7
Chemistry Data for Sediment Samples

		Event	Shipyard Sediments RI/FS Intertidal Data (RETEC)				
		Location	S-1	S-1	S-2	S-2	
		Sample ID	**HAS-S1-0-2**	**HAS-S1-2-4**	**HAS-S2-0-2**	**HAS-S2-2-4**	
		Depth	0-2 ft	2-4 ft	0-2 ft	2-4 ft	
		Date	08/17/2005	08/17/2005	08/19/2005	08/19/2005	
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Phenanthrene	µg/kg		160	84 U	140	84 U	
Anthracene	µg/kg		88 U	84 U	81 U	84 U	
2-Methylnaphthalene	µg/kg		88 U	84 U	81 U	84 U	
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Total HPAHs	µg/kg		1340	550	1997	1130	
Fluoranthene	µg/kg		340	190	470	280	
Pyrene	µg/kg		370	260	420	260	
Benzo(g,h,i)perylene	µg/kg		88 U	84 U	97	84 U	
Other SVOCs							
1,2,4-Trichlorobenzene	µg/kg		5.6 U	6.1 U	6.4 U	5.9 U	
1,2-Dichlorobenzene	µg/kg		1.1 U	1.2 U	1.3 U	1.2 U	
1,3-Dichlorobenzene	µg/kg		1.1 U	1.2 U	1.3 U	1.2 U	
2,4,5-Trichlorophenol	µg/kg		440 U	420 U	400 U	420 U	
2,4,6-Trichlorophenol	µg/kg		440 U	420 U	400 U	420 U	
2,4-Dichlorophenol	µg/kg		440 U	420 U	400 U	420 U	
2,4-Dimethylphenol	µg/kg		88 U	84 U	81 U	84 U	
2,4-Dinitrophenol	µg/kg		880 U	840 U	810 U	840 U	
2,4-Dinitrotoluene	µg/kg		440 U	420 U	400 U	420 U	
2,6-Dinitrotoluene	µg/kg		440 U	420 U	400 U	420 U	
2-Chloronaphthalene	µg/kg		88 U	84 U	81 U	84 U	
2-Chlorophenol	µg/kg		88 U	84 U	81 U	84 U	
2-Methylphenol	µg/kg		88 U	84 U	81 U	84 U	
2-Nitroaniline	µg/kg		440 U	420 U	400 U	420 U	
2-Nitrophenol	µg/kg		440 U	420 U	400 U	420 U	
3,3'-Dichlorobenzidine	µg/kg		440 U	420 U	400 U	420 U	
4,6-Dinitro-o-cresol	µg/kg		880 U	840 U	810 U	840 U	
4-Chloro-3-methylphenol	µg/kg		440 U	420 U	400 U	420 U	
4-Chloroaniline	µg/kg		440 U	420 U	400 U	420 U	
4-Methylphenol	µg/kg		88 U	84 U	81 U	84 U	
4-Nitrophenol	µg/kg		440 U	420 U	400 U	420 U	
Benzoic Acid	µg/kg		880 U	840 U	810 U	840 U	
Benzyl Alcohol	µg/kg		440 U	420 U	400 U	420 U	
bis(2-chloroethoxy)methane	µg/kg		88 U	84 U	81 U	84 U	
bis(2-Chloroethyl) ether	µg/kg		88 U	84 U	81 U	84 U	
bis(2-Ethylhexyl) phthalate	µg/kg		88 U	84 U	81 U	84 U	
bis-chloroisopropyl ether	µg/kg		88 U	84 U	81 U	84 U	
Butyl Benzyl Phthalate	µg/kg		88 U	84 U	81 U	84 U	
Carbazole	µg/kg		88 U	84 U	81 U	84 U	
Dibenzofuran	µg/kg		88 U	84 U	81 U	84 U	
Diethylphthalate	µg/kg		88 U	84 U	81 U	84 U	
Dimethyl phthalate	µg/kg		88 U	84 U	81 U	84 U	

Table C.7
Chemistry Data for Sediment Samples

		Event	Shipyard Sediments RI/FS Intertidal Data (RETEC)				
		Location	S-1	S-1	S-2	S-2	
		Sample ID	**HAS-S1-0-2**	**HAS-S1-2-4**	**HAS-S2-0-2**	**HAS-S2-2-4**	
		Depth	0-2 ft	2-4 ft	0-2 ft	2-4 ft	
		Date	08/17/2005	08/17/2005	08/19/2005	08/19/2005	
Other SVOCs							
Di-n-butyl phthalate	µg/kg		88 U	84 U	81 U	84 U	
Di-n-octyl phthalate	µg/kg		88 U	84 U	81 U	84 U	
Hexachlorobenzene	µg/kg		88 U	84 U	81 U	84 U	
Hexachlorobutadiene	µg/kg		5.6 U	6.1 U	6.4 U	5.9 U	
Hexachlorocyclopentadiene	µg/kg		440 U	420 U	400 U	420 U	
Hexachloroethane	µg/kg		88 U	84 U	81 U	84 U	
Isophorone	µg/kg		88 U	84 U	81 U	84 U	
Nitrobenzene	µg/kg		88 U	84 U	81 U	84 U	
N-Nitroso-di-n-propylamine	µg/kg		440 U	420 U	400 U	420 U	
N-Nitrosodiphenylamine	µg/kg		88 U	84 U	81 U	84 U	
Pentachlorophenol	µg/kg		440 U	420 U	400 U	420 U	
Phenol	µg/kg		88 U	84 U	81 U	84 U	
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH							
1,3,5-Trimethylbenzene	µg/kg		1.1 U	1.2 U	1.3 U	1.2 U	
Benzene	µg/kg		1.1 U	1.2 U	1.3 U	1.2 U	
Ethylbenzene	µg/kg		1.1 U	1.2 U	1.3 U	1.2 U	
iso-Propylbenzene	µg/kg		1.1 U	1.2 U	1.3 U	1.2 U	
n-Propylbenzene	µg/kg		1.1 U	1.2 U	1.3 U	1.2 U	
Toluene	µg/kg		1.1 U	1.2 U	1.3 U	1.2 U	
Xylene (meta & para)	µg/kg		1.1 U	1.2 U	1.3 U	1.2 U	
Xylene (ortho)	µg/kg		1.1 U	1.2 U	1.3 U	1.2 U	
Other VOCs							
1,1,1,2-Tetrachloroethane	µg/kg		1.1 U	1.2 U	1.3 U	1.2 U	
1,1,1-Trichloroethane	µg/kg		1.1 U	1.2 U	1.3 U	1.2 U	
1,1,2,2-Tetrachloroethane	µg/kg		1.1 U	1.2 U	1.3 U	1.2 U	
1,1,2-Trichloroethane	µg/kg		1.1 U	1.2 U	1.3 U	1.2 U	
1,1,2-Trichlorotrifluoroethane	µg/kg		2.3 U	2.4 U	2.5 U	2.4 U	
1,1-Dichloroethane	µg/kg		1.1 U	1.2 U	1.3 U	1.2 U	
1,1-Dichloroethene	µg/kg		1.1 U	1.2 U	1.3 U	1.2 U	
1,1-Dichloropropene	µg/kg		1.1 U	1.2 U	1.3 U	1.2 U	
1,2,3-Trichlorobenzene	µg/kg		5.6 U	6.1 U	6.4 U	5.9 U	
1,2,3-Trichloropropane	µg/kg		2.3 U	2.4 U	2.5 U	2.4 U	
1,2,4-Trimethylbenzene	µg/kg		1.1 U	1.2 U	1.3 U	1.2 U	
1,2-Dibromo-3-chloropropane	µg/kg		5.6 U	6.1 U	6.4 U	5.9 U	
1,2-Dibromoethane	µg/kg		1.1 U	1.2 U	1.3 U	1.2 U	
1,2-Dichloroethane	µg/kg		1.1 U	1.2 U	1.3 U	1.2 U	
1,2-Dichloropropane	µg/kg		1.1 U	1.2 U	1.3 U	1.2 U	
1,3-Dichloropropane	µg/kg		1.1 U	1.2 U	1.3 U	1.2 U	
1,4-Dichlorobenzene	µg/kg		1.1 U	1.2 U	1.3 U	1.2 U	
2,2-Dichloropropane	µg/kg		1.1 U	1.2 U	1.3 U	1.2 U	
2-Chloroethyl vinyl ether	µg/kg		5.6 U	6.1 U	6.4 U	5.9 U	

Table C.7
Chemistry Data for Sediment Samples

	Event	Shipyard Sediments RI/FS Intertidal Data (RETEC)				
	Location	S-1	S-1	S-2	S-2	
	Sample ID	**HAS-S1-0-2**	**HAS-S1-2-4**	**HAS-S2-0-2**	**HAS-S2-2-4**	
	Depth	0-2 ft	2-4 ft	0-2 ft	2-4 ft	
	Date	08/17/2005	08/17/2005	08/19/2005	08/19/2005	
Other VOCs						
2-Chlorotoluene	µg/kg	1.1 U	1.2 U	1.3 U	1.2 U	
2-Hexanone	µg/kg	5.6 U	6.1 U	6.4 U	5.9 U	
3-Nitroaniline	µg/kg	440 U	420 U	400 U	420 U	
4-Bromophenyl phenyl ether	µg/kg	88 U	84 U	81 U	84 U	
4-Chlorophenyl phenyl ether	µg/kg	88 U	84 U	81 U	84 U	
4-Chlorotoluene	µg/kg	1.1 U	1.2 U	1.3 U	1.2 U	
4-Nitroaniline	µg/kg	440 U	420 U	400 U	420 U	
Acetone	µg/kg	76 J	96 J	15	5.9 U	
Acrolein	µg/kg	56 U	61 U	64 U	59 U	
Acrylonitrile	µg/kg	5.6 U	6.1 U	6.4 U	5.9 U	
Bromobenzene	µg/kg	1.1 U	1.2 U	1.3 U	1.2 U	
Bromochloromethane	µg/kg	1.1 U	1.2 U	1.3 U	1.2 U	
Bromodichloromethane	µg/kg	1.1 U	1.2 U	1.3 U	1.2 U	
Bromoethane	µg/kg	2.3 U	2.4 U	2.5 U	2.4 U	
Bromoform	µg/kg	1.1 U	1.2 U	1.3 U	1.2 U	
Trichloroethene	µg/kg	1.1 U	1.2 U	1.3 U	1.2 U	
Trichlorofluoromethane	µg/kg	1.1 U	1.2 U	1.3 U	1.2 U	
Bromomethane	µg/kg	1.1 U	1.2 U	1.3 U	1.2 U	
Vinyl acetate	µg/kg	5.6 U	6.1 U	6.4 U	5.9 U	
Carbon disulfide	µg/kg	4.8 J	11 J	1.3 U	1.2 U	
Vinyl chloride	µg/kg	1.1 U	1.2 U	1.3 U	1.2 U	
Carbon tetrachloride	µg/kg	1.1 U	1.2 U	1.3 U	1.2 U	
Chlorobenzene	µg/kg	1.1 U	1.2 U	1.3 U	1.2 U	
Chloroethane	µg/kg	1.1 U	1.2 U	1.3 U	1.2 U	
Chloroform	µg/kg	1.1 U	1.2 U	1.3 U	1.2 U	
Chloromethane	µg/kg	1.1 U	1.2 U	1.3 U	1.2 U	
cis-1,2-Dichloroethene	µg/kg	1.1 U	1.2 U	1.3 U	1.2 U	
cis-1,3-Dichloropropene	µg/kg	1.1 U	1.2 U	1.3 U	1.2 U	
Cymene	µg/kg	1.1 U	1.2 U	1.3 U	1.2 U	
Dibromochloromethane	µg/kg	1.1 U	1.2 U	1.3 U	1.2 U	
Dibromomethane	µg/kg	1.1 U	1.2 U	1.3 U	1.2 U	
Iodomethane	µg/kg	1.1 U	1.2 U	1.3 U	1.2 U	
Methyl ethyl ketone	µg/kg	18 J	26 J	6.4 U	5.9 U	
Methyl iso butyl ketone	µg/kg	5.6 U	6.1 U	6.4 U	5.9 U	
Methylene chloride	µg/kg	2.3 U	2.4 U	2.5 U	3 U	
n-Butylbenzene	µg/kg	1.1 U	1.2 U	1.3 U	1.2 U	
sec-Butylbenzene	µg/kg	1.1 U	1.2 U	1.3 U	1.2 U	
Styrene	µg/kg	1.1 U	1.2 U	1.3 U	1.2 U	
tert-Butylbenzene	µg/kg	1.1 U	1.2 U	1.3 U	1.2 U	
Tetrachloroethene	µg/kg	1.1 U	1.2 U	1.3 U	1.2 U	
trans-1,2-Dichloroethene	µg/kg	1.1 U	1.2 U	1.3 U	1.2 U	

Table C.7
Chemistry Data for Sediment Samples

	Event	Shipyard Sediments RI/FS Intertidal Data (RETEC)				
	Location	S-1	S-1	S-2	S-2	
	Sample ID	**HAS-S1-0-2**	**HAS-S1-2-4**	**HAS-S2-0-2**	**HAS-S2-2-4**	
	Depth	0-2 ft	2-4 ft	0-2 ft	2-4 ft	
	Date	08/17/2005	08/17/2005	08/19/2005	08/19/2005	
Other VOCs						
trans-1,3-Dichloropropene	µg/kg	1.1 U	1.2 U	1.3 U	1.2 U	
trans-1,4-Dichloro-2-butene	µg/kg	5.6 U	6.1 U	6.4 U	5.9 U	
Total Petroleum Hydrocarbons (TPH)						
Gasoline-Range Hydrocarbons	mg/kg	16 U	16 U	180	230	
Diesel-Range Hydrocarbons	mg/kg	28 J	72 J	390	450	
Oil-Range Hydrocarbons	mg/kg	76 J	150 J	360	280	

Table C.7
Chemistry Data for Sediment Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	HA-02	HA-03	HA-04	HA-05	HA-06
	Sample ID	**HA2-031611**	**HA3-031611**	**HA4-031711**	**HA5-032211**	**HA6-032211**
	Depth	0-12 cm	0-12 cm	0-12 cm	0-12 cm	0-12 cm
	Date	03/16/2011	03/16/2011	03/17/2011	03/22/2011	03/22/2011
Conventionals						
Total Organic Carbon	%	1.75	0.416	1.66	2.41	1.9
Total Solids	%	92.3	81.8	79.7	93.6	92.2
Metals						
Arsenic	mg/kg	39	50	26	21	30
Cadmium	mg/kg	1 U	1 U	1 U	1 U	1 U
Calcium	mg/kg	210000	86000	56000	93000	32000
Chromium	mg/kg	17	31	25	20	29
Copper	mg/kg	400	450	270	130	76
Lead	mg/kg	73	91	55	54	54
Mercury	mg/kg	0.02	0.02 U	0.032	0.25	0.02 U
Nickel	mg/kg	16	21	22	18	25
Silver	mg/kg	0.72	0.39 U	0.4 U	0.34 U	0.34 U
Zinc	mg/kg	530	690	620	220	280
Organometallics						
Tributyltin	µg/kg	160	4.5	47	3.2 U	5.5
Polychlorinated Biphenyls (PCBs)						
Aroclor 1016	µg/kg	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U
Aroclor 1221	µg/kg	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U
Aroclor 1232	µg/kg	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U
Aroclor 1242	µg/kg	3.9 U	5.3	3.9 U	3.9 U	3.9 U
Aroclor 1248	µg/kg	3.9 U	3.9 U	12 UY	3.9 U	9.7 UY
Aroclor 1254	µg/kg	5.8	3.9 U	17	3.9 U	12 UY
Aroclor 1260	µg/kg	7.7	3.9 U	7.3	3.9 U	5.8 UY
Aroclor 1268	µg/kg	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U
Total PCBs	µg/kg	13.5	5.3	24.3	3.9 U	12 UY
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	µg/kg	150	100 U	250	100 U	100 U
Benzo(a)pyrene	µg/kg	150	100 U	210	100 U	100 U
Benzo(b)fluoranthene	µg/kg	160	100 U	370	100 U	100 U
Benzo(k)fluoranthene	µg/kg	120	100 U	280	100 U	100 U
Benzofluoranthenes (total)	µg/kg	280	100 U	650	100 U	100 U
Chrysene	µg/kg	200	160	570	100 U	100 U
Dibenzo(a,h)anthracene	µg/kg	100 U	100 U	100 U	100 U	100 U
Indeno(1,2,3-cd)pyrene	µg/kg	100 U	100 U	140	100 U	100 U
cPAHs (MTCA TEQ-HalfND)	µg/kg	210	77	320	76 U	76 U
cPAHs (MTCA TEQ-ZeroND)	µg/kg	200	1.6	320	100 U	100 U
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAHs	µg/kg	160	100 U	730	100 U	100 U
Naphthalene	µg/kg	100 U	100 U	100 U	100 U	100 U
Acenaphthylene	µg/kg	100 U	100 U	100 U	100 U	100 U
Acenaphthene	µg/kg	100 U	100 U	100 U	100 U	100 U

Table C.7
Chemistry Data for Sediment Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	HA-02	HA-03	HA-04	HA-05	HA-06
	Sample ID	**HA2-031611**	**HA3-031611**	**HA4-031711**	**HA5-032211**	**HA6-032211**
	Depth	0-12 cm	0-12 cm	0-12 cm	0-12 cm	0-12 cm
	Date	03/16/2011	03/16/2011	03/17/2011	03/22/2011	03/22/2011
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Fluorene	µg/kg	100 U	100 U	100 U	100 U	100 U
Phenanthrene	µg/kg	160	100 U	730	100 U	100 U
Anthracene	µg/kg	100 U	100 U	100 U	100 U	100 U
1-Methylnaphthalene	µg/kg	100 U	100 U	100 U	100 U	100 U
2-Methylnaphthalene	µg/kg	100 U	100 U	100 U	100 U	100 U
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Total HPAHs	µg/kg	1320	160	4370	100 U	100 U
Fluoranthene	µg/kg	280	100 U	1200	100 U	100 U
Pyrene	µg/kg	260	100 U	1200	100 U	100 U
Benzo(g,h,i)perylene	µg/kg	100 U	100 U	150	100 U	100 U
Other SVOCs						
1,2,4-Trichlorobenzene	µg/kg	100 U	100 U	100 U	100 U	100 U
1,2-Dichlorobenzene	µg/kg	100 U	100 U	100 U	100 U	100 U
1,3-Dichlorobenzene	µg/kg	100 U	100 U	100 U	100 U	100 U
2,3,4,6-Tetrachlorophenol	µg/kg	250 U	250 U	250 U	250 U	250 U
2,4,5-Trichlorophenol	µg/kg	100 U	100 U	100 U	100 U	100 U
2,4,6-Trichlorophenol	µg/kg	100 U	100 U	100 U	100 U	100 U
2,4-Dichlorophenol	µg/kg	100 U	100 U	100 U	100 U	100 U
2,4-Dimethylphenol	µg/kg	100 U	100 U	100 U	100 U	100 U
2,4-Dinitrophenol	µg/kg	500 U	500 U	500 U	500 U	500 U
2,4-Dinitrotoluene	µg/kg	250 U	250 U	250 U	250 U	250 U
2,6-Dichlorophenol	µg/kg	100 U	100 U	100 U	100 U	100 U
2,6-Dinitrotoluene	µg/kg	250 U	250 U	250 U	250 U	250 U
2-Chloronaphthalene	µg/kg	100 U	100 U	100 U	100 U	100 U
2-Chlorophenol	µg/kg	100 U	100 U	100 U	100 U	100 U
2-Methylphenol	µg/kg	100 U	100 U	100 U	100 U	100 U
2-Nitroaniline	µg/kg	250 U	250 U	250 U	250 U	250 U
2-Nitrophenol	µg/kg	250 U	250 U	250 U	250 U	250 U
3,3'-Dichlorobenzidine	µg/kg	500 U	500 U	670 U	500 U	500 U
4,6-Dinitro-o-cresol	µg/kg	100 U	100 U	100 U	100 U	100 U
4-Chloro-3-methylphenol	µg/kg	100 U	100 U	100 U	100 U	100 U
4-Chloroaniline	µg/kg	100 U	100 U	100 U	100 U	100 U
4-Nitrophenol	µg/kg	500 U	500 U	500 U	500 U	500 U
Aniline	µg/kg	100 U	100 U	100 U	100 U	100 U
Azobenzene	µg/kg	100 U	100 U	100 U	100 U	100 U
Benzoic Acid	µg/kg	1000 U	1000 U	1000 U	1000 U	1000 U
Benzyl Alcohol	µg/kg	100 U	100 U	100 U	100 U	100 U
bis(2-chloroethoxy)methane	µg/kg	100 U	100 U	100 U	100 U	100 U
bis(2-Chloroethyl) ether	µg/kg	100 U	100 U	100 U	100 U	100 U
bis(2-Ethylhexyl) phthalate	µg/kg	130 U	130 U	240	130 U	130 U
Butyl Benzyl Phthalate	µg/kg	100 U	100 U	100 U	100 U	100 U

Table C.7
Chemistry Data for Sediment Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	HA-02	HA-03	HA-04	HA-05	HA-06
	Sample ID	**HA2-031611**	**HA3-031611**	**HA4-031711**	**HA5-032211**	**HA6-032211**
	Depth	0-12 cm	0-12 cm	0-12 cm	0-12 cm	0-12 cm
	Date	03/16/2011	03/16/2011	03/17/2011	03/22/2011	03/22/2011
Other SVOCs						
Carbazole	µg/kg	100 U	100 U	140	100 U	100 U
Dibenzofuran	µg/kg	100 U	100 U	100 U	100 U	100 U
Diethylphthalate	µg/kg	100 U	100 U	100 U	100 U	100 U
Dimethyl phthalate	µg/kg	100 U	100 U	100 U	100 U	100 U
Di-n-butyl phthalate	µg/kg	130 U	130 U	130 U	130 U	130 U
Di-n-octyl phthalate	µg/kg	100 U	100 U	100 U	100 U	100 U
Hexachlorobenzene	µg/kg	100 U	100 U	100 U	100 U	100 U
Hexachlorobutadiene	µg/kg	100 U	100 U	100 U	100 U	100 U
Hexachlorocyclopentadiene	µg/kg	500 U	500 U	500 U	500 U	500 U
Hexachloroethane	µg/kg	100 U	100 U	100 U	100 U	100 U
Isophorone	µg/kg	100 U	100 U	100 U	100 U	100 U
m,p-Cresol (2:1 ratio)	µg/kg	100 U	100 U	100 U	100 U	100 U
Nitrobenzene	µg/kg	100 U	100 U	100 U	100 U	100 U
N-Nitrosodimethylamine	µg/kg	100 U	100 U	100 U	100 U	100 U
N-Nitroso-di-n-propylamine	µg/kg	100 U	100 U	100 U	100 U	100 U
N-Nitrosodiphenylamine	µg/kg	100 U	100 U	100 U	100 U	100 U
Pentachlorophenol	µg/kg	500 U	500 U	500 U	500 U	500 U
Phenol	µg/kg	100 U	100 U	100 U	100 U	100 U
Other VOCs						
1,4-Dichlorobenzene	µg/kg	100 U	100 U	100 U	100 U	100 U
3-Nitroaniline	µg/kg	250 U	250 U	250 U	250 U	250 U
4-Bromophenyl phenyl ether	µg/kg	100 U	100 U	100 U	100 U	100 U
4-Chlorophenyl phenyl ether	µg/kg	100 U	100 U	100 U	100 U	100 U
4-Nitroaniline	µg/kg	250 U	250 U	250 U	250 U	250 U
bis(2-chloroisopropyl)ether	µg/kg	100 U	100 U	100 U	100 U	100 U
Pyridine	µg/kg	200 U	200 U	200 U	200 U	200 U
Total Petroleum Hydrocarbons (TPH)						
Gasoline-Range Hydrocarbons	mg/kg	2 U	3 U			
Diesel-Range Hydrocarbons	mg/kg	25 UJ	25 UJ	25 UJ	25 U	25 U
Oil-Range Hydrocarbons	mg/kg	50 UJ	50 UJ	63 UJ	50 U	50 U

Table C.7
Chemistry Data for Sediment Samples

		Event	RI/FS Round 1 Sampling (Floyd|Snider)				
		Location	HA-07				
		Sample ID	**HA7-032211**				
		Depth	0-12 cm				
		Date	03/22/2011				
Conventionals							
Total Organic Carbon	%		2.22				
Total Solids	%		82.1				
Metals							
Arsenic	mg/kg		9.7				
Cadmium	mg/kg		1 U				
Calcium	mg/kg		40000				
Chromium	mg/kg		31				
Copper	mg/kg		100				
Lead	mg/kg		580				
Mercury	mg/kg		0.02 U				
Nickel	mg/kg		32				
Silver	mg/kg		0.38 U				
Zinc	mg/kg		190				
Organometallics							
Tributyltin	µg/kg		3.3 U				
Polychlorinated Biphenyls (PCBs)							
Aroclor 1016	µg/kg		3.8 U				
Aroclor 1221	µg/kg		3.8 U				
Aroclor 1232	µg/kg		3.8 U				
Aroclor 1242	µg/kg		3.8 U				
Aroclor 1248	µg/kg		3.8 U				
Aroclor 1254	µg/kg		3.8 U				
Aroclor 1260	µg/kg		3.8 U				
Aroclor 1268	µg/kg		3.8 U				
Total PCBs	µg/kg		3.8 U				
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
Benz(a)anthracene	µg/kg		100 U				
Benzo(a)pyrene	µg/kg		100 U				
Benzo(b)fluoranthene	µg/kg		100 U				
Benzo(k)fluoranthene	µg/kg		100 U				
Benzofluoranthenes (total)	µg/kg		100 U				
Chrysene	µg/kg		100 U				
Dibenzo(a,h)anthracene	µg/kg		100 U				
Indeno(1,2,3-cd)pyrene	µg/kg		100 U				
cPAHs (MTCA TEQ-HalfND)	µg/kg		76 U				
cPAHs (MTCA TEQ-ZeroND)	µg/kg		100 U				
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Total LPAHs	µg/kg		100 U				
Naphthalene	µg/kg		100 U				
Acenaphthylene	µg/kg		100 U				
Acenaphthene	µg/kg		100 U				

Table C.7
Chemistry Data for Sediment Samples

		Event	RI/FS Round 1 Sampling (Floyd|Snider)				
		Location	HA-07				
		Sample ID	**HA7-032211**				
		Depth	0-12 cm				
		Date	03/22/2011				
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Fluorene	µg/kg		100 U				
Phenanthrene	µg/kg		100 U				
Anthracene	µg/kg		100 U				
1-Methylnaphthalene	µg/kg		100 U				
2-Methylnaphthalene	µg/kg		100 U				
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Total HPAHs	µg/kg		100 U				
Fluoranthene	µg/kg		100 U				
Pyrene	µg/kg		100 U				
Benzo(g,h,i)perylene	µg/kg		100 U				
Other SVOCs							
1,2,4-Trichlorobenzene	µg/kg		100 U				
1,2-Dichlorobenzene	µg/kg		100 U				
1,3-Dichlorobenzene	µg/kg		100 U				
2,3,4,6-Tetrachlorophenol	µg/kg		250 U				
2,4,5-Trichlorophenol	µg/kg		100 U				
2,4,6-Trichlorophenol	µg/kg		100 U				
2,4-Dichlorophenol	µg/kg		100 U				
2,4-Dimethylphenol	µg/kg		100 U				
2,4-Dinitrophenol	µg/kg		500 U				
2,4-Dinitrotoluene	µg/kg		250 U				
2,6-Dichlorophenol	µg/kg		100 U				
2,6-Dinitrotoluene	µg/kg		250 U				
2-Chloronaphthalene	µg/kg		100 U				
2-Chlorophenol	µg/kg		100 U				
2-Methylphenol	µg/kg		100 U				
2-Nitroaniline	µg/kg		250 U				
2-Nitrophenol	µg/kg		250 U				
3,3'-Dichlorobenzidine	µg/kg		500 U				
4,6-Dinitro-o-cresol	µg/kg		100 U				
4-Chloro-3-methylphenol	µg/kg		100 U				
4-Chloroaniline	µg/kg		100 U				
4-Nitrophenol	µg/kg		500 U				
Aniline	µg/kg		100 U				
Azobenzene	µg/kg		100 U				
Benzoic Acid	µg/kg		1000 U				
Benzyl Alcohol	µg/kg		100 U				
bis(2-chloroethoxy)methane	µg/kg		100 U				
bis(2-Chloroethyl) ether	µg/kg		100 U				
bis(2-Ethylhexyl) phthalate	µg/kg		130 U				
Butyl Benzyl Phthalate	µg/kg		100 U				

Table C.7
Chemistry Data for Sediment Samples

		Event	RI/FS Round 1 Sampling (Floyd|Snider)				
		Location	HA-07				
		Sample ID	**HA7-032211**				
		Depth	0-12 cm				
		Date	03/22/2011				
Other SVOCs							
Carbazole	µg/kg		100 U				
Dibenzofuran	µg/kg		100 U				
Diethylphthalate	µg/kg		100 U				
Dimethyl phthalate	µg/kg		100 U				
Di-n-butyl phthalate	µg/kg		130 U				
Di-n-octyl phthalate	µg/kg		100 U				
Hexachlorobenzene	µg/kg		100 U				
Hexachlorobutadiene	µg/kg		100 U				
Hexachlorocyclopentadiene	µg/kg		500 U				
Hexachloroethane	µg/kg		100 U				
Isophorone	µg/kg		100 U				
m,p-Cresol (2:1 ratio)	µg/kg		100 U				
Nitrobenzene	µg/kg		100 U				
N-Nitrosodimethylamine	µg/kg		100 U				
N-Nitroso-di-n-propylamine	µg/kg		100 U				
N-Nitrosodiphenylamine	µg/kg		100 U				
Pentachlorophenol	µg/kg		500 U				
Phenol	µg/kg		100 U				
Other VOCs							
1,4-Dichlorobenzene	µg/kg		100 U				
3-Nitroaniline	µg/kg		250 U				
4-Bromophenyl phenyl ether	µg/kg		100 U				
4-Chlorophenyl phenyl ether	µg/kg		100 U				
4-Nitroaniline	µg/kg		250 U				
bis(2-chloroisopropyl)ether	µg/kg		100 U				
Pyridine	µg/kg		200 U				
Total Petroleum Hydrocarbons (TPH)							
Diesel-Range Hydrocarbons	mg/kg		25 U				
Oil-Range Hydrocarbons	mg/kg		50 U				

Table C.7
Chemistry Data for Sediment Samples

		Event	RI/FS Round 2 Sampling (Floyd|Snider)				
		Location	SG-01	SG-03	SG-03	SG-04	
		Sample ID	**SG1-072811**	**SG2a-072811**	**SG3-072811**	**SG4-072811**	
		Depth	0-12 cm	0-12 cm	0-12 cm	0-12 cm	
		Date	07/28/2011	07/28/2011	07/28/2011	07/28/2011	
Conventionals							
Total Organic Carbon	%		1.2			3.2	
Total Solids	%		66			58	
Metals							
Arsenic	mg/kg		3.8	20	21	17	
Cadmium	mg/kg		1 U	1 U	1 U	1 U	
Chromium	mg/kg		25	21	25	33	
Copper	mg/kg		44	160	150	220	
Lead	mg/kg		47	61	59	90	
Mercury	mg/kg		0.032	0.031	0.033	0.085	
Nickel	mg/kg		23	24	23	30	
Silver	mg/kg		0.44 U	0.39 U	0.39 U	0.54 U	
Zinc	mg/kg		64	280	290	400	
Organometallics							
Tributyltin	µg/kg		20			320	
Polychlorinated Biphenyls (PCBs)							
Aroclor 1016	µg/kg		3.8 U			3.8 U	
Aroclor 1221	µg/kg		3.8 U			3.8 U	
Aroclor 1232	µg/kg		3.8 U			3.8 U	
Aroclor 1242	µg/kg		3.8 U			3.8 U	
Aroclor 1248	µg/kg		3.8 U			49 U	
Aroclor 1254	µg/kg		7.8			40 U	
Aroclor 1260	µg/kg		3.8 U			100	
Aroclor 1268	µg/kg		3.8 U			3.8 U	
Total PCBs	µg/kg		7.8			100	
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
Benz(a)anthracene	µg/kg		100 U			800	
Benzo(a)pyrene	µg/kg		100 U			660	
Benzo(b)fluoranthene	µg/kg		100 U			810	
Benzo(k)fluoranthene	µg/kg		100 U			600	
Benzofluoranthenes (total)	µg/kg		100 U			1410	
Chrysene	µg/kg		130			1100	
Dibenzo(a,h)anthracene	µg/kg		100 U			100 U	
Indeno(1,2,3-cd)pyrene	µg/kg		100 U			170	
cPAHs (MTCA TEQ-HalfND)	µg/kg		76			910	
cPAHs (MTCA TEQ-ZeroND)	µg/kg		1.3			910	
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Total LPAHs	µg/kg		120			1900	
Naphthalene	µg/kg		100 U			100 U	
Acenaphthylene	µg/kg		100 U			100 U	
Acenaphthene	µg/kg		100 U			180	
Fluorene	µg/kg		100 U			210	

Table C.7
Chemistry Data for Sediment Samples

	Event	RI/FS Round 2 Sampling (Floyd|Snider)				
	Location	SG-01	SG-03	SG-03	SG-04	
	Sample ID	**SG1-072811**	**SG2a-072811**	**SG3-072811**	**SG4-072811**	
	Depth	0-12 cm	0-12 cm	0-12 cm	0-12 cm	
	Date	07/28/2011	07/28/2011	07/28/2011	07/28/2011	
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Phenanthrene	µg/kg	120			1100	
Anthracene	µg/kg	100 U			410	
1-Methylnaphthalene	µg/kg	100 U			480	
2-Methylnaphthalene	µg/kg	100 U			770	
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Total HPAHs	µg/kg	520			7600	
Fluoranthene	µg/kg	190			1600	
Pyrene	µg/kg	200			1700	
Benzo(g,h,i)perylene	µg/kg	100 U			160	
Other SVOCs						
1,2,4-Trichlorobenzene	µg/kg	100 U			100 U	
1,2-Dichlorobenzene	µg/kg	100 U			100 U	
1,3-Dichlorobenzene	µg/kg	100 U			100 U	
2,3,4,6-Tetrachlorophenol	µg/kg	250 U			250 U	
2,4,5-Trichlorophenol	µg/kg	100 U			100 U	
2,4,6-Trichlorophenol	µg/kg	100 U			100 U	
2,4-Dichlorophenol	µg/kg	100 U			100 U	
2,4-Dimethylphenol	µg/kg	100 U			100 U	
2,4-Dinitrophenol	µg/kg	500 U			500 U	
2,4-Dinitrotoluene	µg/kg	250 U			250 U	
2,6-Dichlorophenol	µg/kg	100 U			100 U	
2,6-Dinitrotoluene	µg/kg	250 U			250 U	
2-Chloronaphthalene	µg/kg	100 U			100 U	
2-Chlorophenol	µg/kg	100 U			100 U	
2-Methylphenol	µg/kg	100 U			100 U	
2-Nitroaniline	µg/kg	250 U			250 U	
2-Nitrophenol	µg/kg	250 U			250 U	
3,3'-Dichlorobenzidine	µg/kg	500 U			550 U	
4,6-Dinitro-o-cresol	µg/kg	100 U			100 U	
4-Chloro-3-methylphenol	µg/kg	100 U			100 U	
4-Chloroaniline	µg/kg	100 U			100 U	
4-Nitrophenol	µg/kg	500 U			500 U	
Aniline	µg/kg	100 U			100 U	
Azobenzene	µg/kg	100 U			100 U	
Benzoic Acid	µg/kg	1000 U			1000 U	
Benzyl Alcohol	µg/kg	100 U			100 U	
bis(2-chloroethoxy)methane	µg/kg	100 U			100 U	
bis(2-Chloroethyl) ether	µg/kg	100 U			100 U	
bis(2-Ethylhexyl) phthalate	µg/kg	130 U			720	
Butyl Benzyl Phthalate	µg/kg	100 U			100 U	
Carbazole	µg/kg	100 U			100 U	

Table C.7
Chemistry Data for Sediment Samples

		Event	RI/FS Round 2 Sampling (Floyd|Snider)				
		Location	SG-01	SG-03	SG-03	SG-04	
		Sample ID	**SG1-072811**	**SG2a-072811**	**SG3-072811**	**SG4-072811**	
		Depth	0-12 cm	0-12 cm	0-12 cm	0-12 cm	
		Date	07/28/2011	07/28/2011	07/28/2011	07/28/2011	
Other SVOCs							
	Dibenzofuran	µg/kg	100 U			100	
	Diethylphthalate	µg/kg	100 U			100 U	
	Dimethyl phthalate	µg/kg	100 U			100 U	
	Di-n-butyl phthalate	µg/kg	130 U			130 U	
	Di-n-octyl phthalate	µg/kg	100 U			100 U	
	Hexachlorobenzene	µg/kg	100 U			100 U	
	Hexachlorobutadiene	µg/kg	100 U			100 U	
	Hexachlorocyclopentadiene	µg/kg	500 U			500 U	
	Hexachloroethane	µg/kg	100 U			100 U	
	Isophorone	µg/kg	100 U			100 U	
	m,p-Cresol (2:1 ratio)	µg/kg	100 U			100 U	
	Nitrobenzene	µg/kg	100 U			100 U	
	N-Nitrosodimethylamine	µg/kg	100 U			100 U	
	N-Nitroso-di-n-propylamine	µg/kg	100 U			100 U	
	N-Nitrosodiphenylamine	µg/kg	100 U			100 U	
	Pentachlorophenol	µg/kg	500 U			500 U	
	Phenol	µg/kg	100 U			500	
Other VOCs							
	1,4-Dichlorobenzene	µg/kg	100 U			100 U	
	3-Nitroaniline	µg/kg	250 U			250 U	
	4-Bromophenyl phenyl ether	µg/kg	100 U			100 U	
	4-Chlorophenyl phenyl ether	µg/kg	100 U			100 U	
	4-Nitroaniline	µg/kg	250 U			250 U	
	bis(2-chloroisopropyl)ether	µg/kg	100 U			100 U	
	Pyridine	µg/kg	200 U			200 U	
Total Petroleum Hydrocarbons (TPH)							
	Diesel-Range Hydrocarbons	mg/kg	25 U			55	
	Oil-Range Hydrocarbons	mg/kg	50 U			140	

Table C.7
Chemistry Data for Sediment Samples

		Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
		Location	HA-09	HA-10	HA-11	SG-05	SG-05
		Sample ID	**HA-09-0-10-013013**	**HA-10-0-10-013013**	**HA-11-0-10-013013**	**SG-05-0-10-013113**	**SG-95-0-10-013113**
		Depth	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm
		Date	01/30/2013	01/30/2013	01/30/2013	01/31/2013	01/31/2013
Conventionals							
Total Organic Carbon	%		1.82			1.2	1.64
Total Solids	%		94.3	90.7	86.6	94.8	92.5
Grain Size							
Gravel	%		7.4	82.1	61	75.5	72
GS 1000 - 2000 µm	%		2.6	8.2	8	9.9	10.5
GS 500 - 1000 µm	%		11.5	4.7	16.9	6.5	7.9
GS 250 - 500 µm	%		61.1	1.9	8.7	5.4	6.2
GS 125 - 250 µm	%		17.1	0.8	1.9	2.3	2.6
GS 62.5 - 125 µm	%		0.1	0.3	0.7	0.3	0.3
GS 31.3 - 62.5 µm	%		0.3 U	2.1 U	2.8 U	0.1 U	0.6 U
GS 15.6 - 31.3 µm	%		0.3 U	2.1 U	2.8 U	0.1 U	0.6 U
GS 7.8 - 15.6 µm	%		0.3 U	2.1 U	2.8 U	0.1 U	0.6 U
GS 3.9 - 7.8 µm	%		0.3 U	2.1 U	2.8 U	0.1 U	0.6 U
GS 1.95 - 3.9 µm	%		0.3 U	2.1 U	2.8 U	0.1 U	0.6 U
GS 0.98 - 1.95 µm	%		0.3 U	2.1 U	2.8 U	0.1 U	0.6 U
GS <0.98 µm	%		0.3 U	2.1 U	2.8 U	0.1 U	0.6 U
Fines	%		0.3	2.1	2.8	0.1	0.6
Metals							
Arsenic	mg/kg		100	6	10 U	30	50
Cadmium	mg/kg		1.2	0.4	0.6 U	0.7	0.9
Chromium	mg/kg		27	21.9	19	27	57
Copper	mg/kg		682	53.4	24	280	292
Lead	mg/kg		125 J	44	8	42	58
Mercury	mg/kg		0.019	0.016	0.014	0.019	0.017
Silver	mg/kg		0.8 U	0.3 U	0.8 U	0.8 U	0.7 U
Zinc	mg/kg		1440	129	61	535	594
Polychlorinated Biphenyls (PCBs)							
Aroclor 1016	µg/kg		3.7 U			3.7 U	3.7 U
Aroclor 1221	µg/kg		3.7 U			3.7 U	3.7 U
Aroclor 1232	µg/kg		3.7 U			3.7 U	3.7 U
Aroclor 1242	µg/kg		3.7 U			3.7 U	3.7 U
Aroclor 1248	µg/kg		3.7 U			3.7 U	3.7 U
Aroclor 1254	µg/kg		2.6 J			2.6 J	9.5
Aroclor 1260	µg/kg		3.2 J			3 J	21
Aroclor 1262	µg/kg		3.7 U			3.7 U	3.7 U
Aroclor 1268	µg/kg		3.7 U			3.7 U	3.7 U
Total PCBs	µg/kg		5.8 J			5.6 J	31
Pesticide/Herbicides							
p,p'-DDD	µg/kg		0.93 U			0.94 U	0.94 U
p,p'-DDE	µg/kg		0.93 U			0.94 U	0.94 U
p,p'-DDT	µg/kg		0.93 U			0.94 U	0.94 U

Table C.7
Chemistry Data for Sediment Samples

		Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
		Location	HA-09	HA-10	HA-11	SG-05	SG-05
		Sample ID	**HA-09-0-10-013013**	**HA-10-0-10-013013**	**HA-11-0-10-013013**	**SG-05-0-10-013113**	**SG-95-0-10-013113**
		Depth	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm
		Date	01/30/2013	01/30/2013	01/30/2013	01/31/2013	01/31/2013
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
Benz(a)anthracene	µg/kg		11 J			60	440
Benzo(a)pyrene	µg/kg		11 J			54	480
Benzofluoranthenes (total)	µg/kg		31 J			110	830
Chrysene	µg/kg		15 J			82	520
Dibenzo(a,h)anthracene	µg/kg		4 J			7.8	58
Indeno(1,2,3-cd)pyrene	µg/kg		19 U			19 U	120
cPAHs (MTCA TEQ-HalfND)	µg/kg		17 J			73	630
cPAHs (MTCA TEQ-ZeroND)	µg/kg		16 J			74	630
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Total LPAHs	µg/kg		19 U			150	2200 J
Naphthalene	µg/kg		19 U			19 U	180
Acenaphthylene	µg/kg		19 U			19 U	15 J
Acenaphthene	µg/kg		19 U			19 U	160
Fluorene	µg/kg		19 U			19 U	240
Phenanthrene	µg/kg		19 U			120	1400
Anthracene	µg/kg		19 U			28	220
1-Methylnaphthalene	µg/kg		19 U			19 U	91
2-Methylnaphthalene	µg/kg		19 U			19 U	110
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Total HPAHs	µg/kg		100 J			620	5000
Fluoranthene	µg/kg		24			180	1400
Pyrene	µg/kg		20			130	1100
Benzo(g,h,i)perylene	µg/kg		9.4 J			19 U	65
Other SVOCs							
1,2,4-Trichlorobenzene	µg/kg		4.7 U			4.8 U	4.7 U
1,2-Dichlorobenzene	µg/kg		4.7 U			4.8 U	4.7 U
1,3-Dichlorobenzene	µg/kg		4.7 U			4.8 U	4.7 U
2,4-Dimethylphenol	µg/kg		19 U			19 U	19 U
2-Methylphenol	µg/kg		4.7 U			4.8 U	4.7 U
4-Methylphenol	µg/kg		38 U			38 U	38 U
Benzoic Acid	µg/kg		380 U			380 U	380 U
Benzyl Alcohol	µg/kg		19 U			19 U	19 U
bis(2-Ethylhexyl) phthalate	µg/kg		39			33 UB	30 UB
Butyl Benzyl Phthalate	µg/kg		4.7 U			9.4 J	4.7 U
Dibenzofuran	µg/kg		19 U			19 U	170
Diethylphthalate	µg/kg		47 U			48 U	47 U
Dimethyl phthalate	µg/kg		4.7 U			4.8 U	4.7 U
Di-n-butyl phthalate	µg/kg		19 U			19 U	19 U
Di-n-octyl phthalate	µg/kg		19 U			19 U	19 U
Hexachlorobenzene	µg/kg		0.93 U			0.94 U	0.94 U
Hexachlorobutadiene	µg/kg		0.93 U			0.94 U	0.94 U

Table C.7
Chemistry Data for Sediment Samples

		Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
		Location	HA-09	HA-10	HA-11	SG-05	SG-05
		Sample ID	**HA-09-0-10-013013**	**HA-10-0-10-013013**	**HA-11-0-10-013013**	**SG-05-0-10-013113**	**SG-95-0-10-013113**
		Depth	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm
		Date	01/30/2013	01/30/2013	01/30/2013	01/31/2013	01/31/2013
Other SVOCs							
Hexachloroethane	µg/kg		19 U			19 U	19 U
N-Nitrosodiphenylamine	µg/kg		19 U			19 U	2.5 J
Pentachlorophenol	µg/kg		47 U			48 U	47 U
Phenol	µg/kg		19 U			19 U	19 U
Other VOCs							
1,4-Dichlorobenzene	µg/kg		4.7 U			4.8 U	4.7 U

Table C.7
Chemistry Data for Sediment Samples

		Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
		Location	SG-06	SG-06	SG-07	SG-08	SG-08
		Sample ID	**SG-06-0-10-013113**	**SG-94-0-10-013113**	**SG-07-0-10-013113**	**SG-08-0-10-013113**	**SG-08-10-20-013113**
		Depth	0-10 cm	0-10 cm	0-10 cm	0-10 cm	10-20 cm
		Date	01/31/2013	01/31/2013	01/31/2013	01/31/2013	01/31/2013
Conventionals							
Total Organic Carbon	%		3.2		3.44	5.44	
Total Solids	%		57.8		76.5	52.5	
Grain Size							
Gravel	%		10.8		40.1	40	
GS 1000 - 2000 µm	%		5.2		16.8	10.9	
GS 500 - 1000 µm	%		5.9		11.4	5.3	
GS 250 - 500 µm	%		17.8		9.3	4.5	
GS 125 - 250 µm	%		31.9		9.9	4.4	
GS 62.5 - 125 µm	%		9.9		3.6	2.1	
GS 31.3 - 62.5 µm	%		4.9		1.3	5	
GS 15.6 - 31.3 µm	%		1.2		0.5	16.5	
GS 7.8 - 15.6 µm	%		2.7		1	3	
GS 3.9 - 7.8 µm	%		1.6		1.3	1.3	
GS 1.95 - 3.9 µm	%		1.9		1.4	1.1	
GS 0.98 - 1.95 µm	%		2.6		1.7	1.8	
GS <0.98 µm	%		3.7		1.7	4	
Fines	%		18.6		8.9	32.8	
Metals							
Arsenic	mg/kg					30 U	
Cadmium	mg/kg					1	
Chromium	mg/kg					38	
Copper	mg/kg					143	
Lead	mg/kg					30	
Mercury	mg/kg					0.31 J	0.15
Silver	mg/kg					2 U	
Zinc	mg/kg					153	
Polychlorinated Biphenyls (PCBs)							
Aroclor 1016	µg/kg					3.9 U	
Aroclor 1221	µg/kg					3.9 U	
Aroclor 1232	µg/kg					3.9 U	
Aroclor 1242	µg/kg					3.9 U	
Aroclor 1248	µg/kg					12 UY	
Aroclor 1254	µg/kg					16	
Aroclor 1260	µg/kg					24	
Aroclor 1262	µg/kg					3.9 U	
Aroclor 1268	µg/kg					3.9 U	
Total PCBs	µg/kg					40	
Pesticide/Herbicides							
p,p'-DDD	µg/kg		4.8 U		4.7 U	4.8 U	
p,p'-DDE	µg/kg		4.8 U		4.7 U	4.8 U	
p,p'-DDT	µg/kg		4.6 J		4.7 U	4.8 U	

Table C.7
Chemistry Data for Sediment Samples

		Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
		Location	SG-06	SG-06	SG-07	SG-08	SG-08
		Sample ID	**SG-06-0-10-013113**	**SG-94-0-10-013113**	**SG-07-0-10-013113**	**SG-08-0-10-013113**	**SG-08-10-20-013113**
		Depth	0-10 cm	0-10 cm	0-10 cm	0-10 cm	10-20 cm
		Date	01/31/2013	01/31/2013	01/31/2013	01/31/2013	01/31/2013
Dioxin/Furans							
2,3,7,8-TCDD (Dioxin)	pg/g		0.467 U	0.475 U	0.353 U		
1,2,3,7,8-PeCDD	pg/g		3.47	3.83	0.739 J		
1,2,3,4,7,8-HxCDD	pg/g		9.37	9.32	1.4 J		
1,2,3,6,7,8-HxCDD	pg/g		68.1	62.1	8.6		
1,2,3,7,8,9-HxCDD	pg/g		13.4	16.3	2.17		
1,2,3,4,6,7,8-HpCDD	pg/g		1250	1170	160		
Total OCDD	pg/g		10000 J	9450 J	1090		
2,3,7,8-TCDF	pg/g		2.4	2.41	1.89		
1,2,3,7,8-PeCDF	pg/g		3.91	3.69	0.893 J		
2,3,4,7,8-PeCDF	pg/g		4.59	4.55	0.995 J		
1,2,3,4,7,8-HxCDF	pg/g		16	14.3	1.93 J		
1,2,3,6,7,8-HxCDF	pg/g		6.78	6.48	1.12 J		
1,2,3,7,8,9-HxCDF	pg/g		8.45	7.5	0.902 J		
2,3,4,6,7,8-HxCDF	pg/g		7.05	6.6	0.69 J		
1,2,3,4,6,7,8-HpCDF	pg/g		155 J	139 J	24.1 J		
1,2,3,4,7,8,9-HpCDF	pg/g		10.1	9.48	1.67 J		
Total OCDF	pg/g		244	291	65.4		
Dioxin/Furans (MTCA TEQ-Hal	pg/g		35.6 J	34.2 J	5.32 J		
Dioxin/Furans (MTCA TEQ-Zer	pg/g		35.3 J	33.9 J	5.14 J		
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
Benz(a)anthracene	µg/kg		470		200	1700	
Benzo(a)pyrene	µg/kg		470		200	1600	
Benzofluoranthenes (total)	µg/kg		920		400	2600	
Chrysene	µg/kg		820		370	2300	
Dibenzo(a,h)anthracene	µg/kg		43		17	260	
Indeno(1,2,3-cd)pyrene	µg/kg		81		42	740	
cPAHs (MTCA TEQ-HalfND)	µg/kg		630		270	2200	
cPAHs (MTCA TEQ-ZeroND)	µg/kg		630		270	2200	
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Total LPAHs	µg/kg		1100		620	3800	
Naphthalene	µg/kg		82		150	280	
Acenaphthylene	µg/kg		20 U		44	96 U	
Acenaphthene	µg/kg		60		39	190	
Fluorene	µg/kg		110		52	300	
Phenanthrene	µg/kg		630		250	2500	
Anthracene	µg/kg		230		85	560	
1-Methylnaphthalene	µg/kg		36		69	82 J	
2-Methylnaphthalene	µg/kg		40		71	82 J	
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Total HPAHs	µg/kg		5900		3000	17000	
Fluoranthene	µg/kg		1700		1000	3500	

Table C.7
Chemistry Data for Sediment Samples

		Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
		Location	SG-06	SG-06	SG-07	SG-08	SG-08
		Sample ID	**SG-06-0-10-013113**	**SG-94-0-10-013113**	**SG-07-0-10-013113**	**SG-08-0-10-013113**	**SG-08-10-20-013113**
		Depth	0-10 cm	0-10 cm	0-10 cm	0-10 cm	10-20 cm
		Date	01/31/2013	01/31/2013	01/31/2013	01/31/2013	01/31/2013
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Pyrene	µg/kg		1300		820	3700	
Benzo(g,h,i)perylene	µg/kg		68		20 U	790	
Other SVOCs							
1,2,4-Trichlorobenzene	µg/kg		4.9 U		5 U	24 U	
1,2-Dichlorobenzene	µg/kg		2.6 J		2.9 J	24 U	
1,3-Dichlorobenzene	µg/kg		4.9 U		5 U	24 U	
2,4-Dimethylphenol	µg/kg		4.5 J		28	14 J	
2-Methylphenol	µg/kg		3.8 J		20	14 J	
4-Methylphenol	µg/kg		44		61	170 J	
Benzoic Acid	µg/kg		390 U		400 U	1900 U	
Benzyl Alcohol	µg/kg		78		20 U	96 U	
bis(2-Ethylhexyl) phthalate	µg/kg		140 UB		38 UB	120 U	
Butyl Benzyl Phthalate	µg/kg		28 J		3.7 J	24 U	
Dibenzofuran	µg/kg		74		55	110	
Diethylphthalate	µg/kg		49 U		50 U	240 U	
Dimethyl phthalate	µg/kg		16		8.2	24 U	
Di-n-butyl phthalate	µg/kg		20 U		20 U	96 U	
Di-n-octyl phthalate	µg/kg		20 U		20 U	96 U	
Hexachlorobenzene	µg/kg		4.8 U		4.7 U	4.8 U	
Hexachlorobutadiene	µg/kg		4.8 U		4.7 U	4.8 U	
Hexachloroethane	µg/kg		20 U		20 U	96 U	
N-Nitrosodiphenylamine	µg/kg		6.1 J		9 J	14 J	
Pentachlorophenol	µg/kg		47 J		50 U	240 U	
Phenol	µg/kg		290		34	96	
Other VOCs							
1,4-Dichlorobenzene	µg/kg		3.1 J		5 U	14 J	

Table C.7
Chemistry Data for Sediment Samples

		Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
		Location	SG-09	SG-10	SG-11	SG-12	SG-13
		Sample ID	**SG-09-0-10-013113**	**SG-10-0-10-013113**	**SG-11-0-10-013113**	**SG-12-0-10-013113**	**SG-13-0-10-013113**
		Depth	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm
		Date	01/31/2013	01/31/2013	01/31/2013	01/31/2013	01/31/2013
Conventionals							
Total Organic Carbon	%		2.94			2.82	1.96
Total Solids	%		50.5			40	34
Grain Size							
Gravel	%		5			0.2	0.1
GS 1000 - 2000 µm	%		3.2			1	3
GS 500 - 1000 µm	%		4.9			2.5	2.4
GS 250 - 500 µm	%		10.5			3.4	3.1
GS 125 - 250 µm	%		12.6			6.5	21.4
GS 62.5 - 125 µm	%		4.7			3.2	17.1
GS 31.3 - 62.5 µm	%		3.6			2.8	1.7
GS 15.6 - 31.3 µm	%		6.6			8.2	8.4
GS 7.8 - 15.6 µm	%		8.8			13.6	12.6
GS 3.9 - 7.8 µm	%		9.3			15.2	6.6
GS 1.95 - 3.9 µm	%		8.9			13.3	6
GS 0.98 - 1.95 µm	%		8.1			11.3	6.6
GS <0.98 µm	%		13.8			18.9	11
Fines	%		59.1			83.3	52.9
Metals							
Arsenic	mg/kg		13	14 J	10.6 J		
Cadmium	mg/kg		1.6				
Chromium	mg/kg		53.3				
Copper	mg/kg		78.9				
Lead	mg/kg		41				
Mercury	mg/kg		0.2	0.21	0.23		
Silver	mg/kg		0.5 U				
Zinc	mg/kg		122				
Polychlorinated Biphenyls (PCBs)							
Aroclor 1016	µg/kg		3.8 U	3.9 U	3.9 U		
Aroclor 1221	µg/kg		3.8 U	3.9 U	3.9 U		
Aroclor 1232	µg/kg		3.8 U	3.9 U	3.9 U		
Aroclor 1242	µg/kg		3.8 U	3.9 U	3.9 U		
Aroclor 1248	µg/kg		19 UY	18 UY	20 UY		
Aroclor 1254	µg/kg		19 UY	17	44		
Aroclor 1260	µg/kg		50	12	11		
Aroclor 1262	µg/kg		3.8 U				
Aroclor 1268	µg/kg		3.8 U				
Total PCBs	µg/kg		50	29	55		
Pesticide/Herbicides							
p,p'-DDD	µg/kg		4.9 U			4.8 U	5 U
p,p'-DDE	µg/kg		4.9 U			4.8 U	5 U
p,p'-DDT	µg/kg		4.9 U			4.8 U	5 U

Table C.7
Chemistry Data for Sediment Samples

		Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
		Location	SG-09	SG-10	SG-11	SG-12	SG-13
		Sample ID	**SG-09-0-10-013113**	**SG-10-0-10-013113**	**SG-11-0-10-013113**	**SG-12-0-10-013113**	**SG-13-0-10-013113**
		Depth	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm
		Date	01/31/2013	01/31/2013	01/31/2013	01/31/2013	01/31/2013
Dioxin/Furans							
2,3,7,8-TCDD (Dioxin)	pg/g					1.03	0.431 U
1,2,3,7,8-PeCDD	pg/g					6.54	2.18
1,2,3,4,7,8-HxCDD	pg/g					22.6	4.69
1,2,3,6,7,8-HxCDD	pg/g					34	18.6
1,2,3,7,8,9-HxCDD	pg/g					24.6	7.74
1,2,3,4,6,7,8-HpCDD	pg/g					363	304
Total OCDD	pg/g					1620	2230
2,3,7,8-TCDF	pg/g					23.5	5.17
1,2,3,7,8-PeCDF	pg/g					2.63 J	1.37 J
2,3,4,7,8-PeCDF	pg/g					2.75	1.47
1,2,3,4,7,8-HxCDF	pg/g					3.69 J	3.75 J
1,2,3,6,7,8-HxCDF	pg/g					2.21	1.89 J
1,2,3,7,8,9-HxCDF	pg/g					1.68 J	1.9 U
2,3,4,6,7,8-HxCDF	pg/g					3.4 J	1.98 U
1,2,3,4,6,7,8-HpCDF	pg/g					38 J	43.3 J
1,2,3,4,7,8,9-HpCDF	pg/g					2.66	2.64
Total OCDF	pg/g					92.4	96.1
Dioxin/Furans (MTCA TEQ-Hal	pg/g					24.6 J	11.5 J
Dioxin/Furans (MTCA TEQ-Zer	pg/g					24.6 J	11 J
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
Benz(a)anthracene	µg/kg		110	1100	100	140	94
Benzo(a)pyrene	µg/kg		110	1100	96	100	91
Benzofluoranthenes (total)	µg/kg		230	1700	190	280	220
Chrysene	µg/kg		200	1200	120	270	180
Dibenzo(a,h)anthracene	µg/kg		27	130	13 J	11	10
Indeno(1,2,3-cd)pyrene	µg/kg		63	570	48 J	23	11 J
cPAHs (MTCA TEQ-HalfND)	µg/kg		160	1500	130 J	150	130 J
cPAHs (MTCA TEQ-ZeroND)	µg/kg		160	1500	130 J	150	130 J
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Total LPAHs	µg/kg		490	2900	590	480 J	340 J
Naphthalene	µg/kg		160	410	170	170	67
Acenaphthylene	µg/kg		30	140	36	20 U	20 U
Acenaphthene	µg/kg		27	110	32	14 J	17 J
Fluorene	µg/kg		38	220	48	29	32
Phenanthrene	µg/kg		170	1300	220	210	160
Anthracene	µg/kg		66	720	80	60	63
1-Methylnaphthalene	µg/kg		22	100	32	13 J	20 U
2-Methylnaphthalene	µg/kg		33	130	54	21	20 U
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Total HPAHs	µg/kg		1700	13000	1300 J	2300 J	1200 J
Fluoranthene	µg/kg		490	3000	320	880	300

Table C.7
Chemistry Data for Sediment Samples

		Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
		Location	SG-09	SG-10	SG-11	SG-12	SG-13
		Sample ID	**SG-09-0-10-013113**	**SG-10-0-10-013113**	**SG-11-0-10-013113**	**SG-12-0-10-013113**	**SG-13-0-10-013113**
		Depth	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm
		Date	01/31/2013	01/31/2013	01/31/2013	01/31/2013	01/31/2013
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Pyrene	µg/kg		410	4000	380	600	260
Benzo(g,h,i)perylene	µg/kg		65	670	67	12 J	20 U
Other SVOCs							
1,2,4-Trichlorobenzene	µg/kg		4.7 U			5 U	4.9 U
1,2-Dichlorobenzene	µg/kg		4.7 U			5 U	4.9 U
1,3-Dichlorobenzene	µg/kg		4.7 U			5 U	4.9 U
2,4-Dimethylphenol	µg/kg		4.6 J			20 U	20 U
2-Methylphenol	µg/kg		24			5 U	5.7
4-Methylphenol	µg/kg		210			320	83
Benzoic Acid	µg/kg		380 U			150 J	250 J
Benzyl Alcohol	µg/kg		35			53	20 U
bis(2-Ethylhexyl) phthalate	µg/kg		160 UB			31 UB	57 UB
Butyl Benzyl Phthalate	µg/kg		4.7 U			3.6 J	4.9 U
Dibenzofuran	µg/kg		38	140	55	33	28
Diethylphthalate	µg/kg		47 U			50 U	49 U
Dimethyl phthalate	µg/kg		4.7 U			13	13
Di-n-butyl phthalate	µg/kg		19 U			20 U	20 U
Di-n-octyl phthalate	µg/kg		19 U			20 U	20 U
Hexachlorobenzene	µg/kg		4.9 U			6.4 UY	5 U
Hexachlorobutadiene	µg/kg		4.9 U			4.8 U	5 U
Hexachloroethane	µg/kg		19 U			20 U	20 U
N-Nitrosodiphenylamine	µg/kg		19 U			20 U	20 U
Pentachlorophenol	µg/kg		47 U			50 U	17 J
Phenol	µg/kg		150			69	63
Other VOCs							
1,4-Dichlorobenzene	µg/kg		2.7 J			2.5 J	2.4 J

Table C.7
Chemistry Data for Sediment Samples

	Event	Interim Action Sampling (Floyd|Snider)				
	Location	HA-12	HA-12	HA-12	HA-13	HA-13
	Sample ID	**HA-12-1-2-021015**	**HA-12-2-3-021015**	**HA-12-3-4-021015**	**HA-13-1-2-021015**	**HA-13-2-3-021015**
	Depth	1-2 ft	2-3 ft	3-4 ft	1-2 ft	2-3 ft
	Date	02/10/2015	02/10/2015	02/10/2015	02/10/2015	02/10/2015
Conventionals						
Total Organic Carbon	%	0.321 J	0.69		0.217	0.318
Total Solids	%	76.32	76.66		81.08	86.46
Metals						
Arsenic	mg/kg	90	80	60	140	120
Copper	mg/kg	526	463	410	744	740
Zinc	mg/kg	1160	1040	721 J	1660	1560
Polychlorinated Biphenyls (PCBs)						
Aroclor 1016	mg/kg	0.004 U	0.0038 U		0.0038 U	0.004 U
Aroclor 1221	mg/kg	0.004 U	0.0038 U		0.0038 U	0.004 U
Aroclor 1232	mg/kg	0.004 U	0.0094 UY		0.0057 UY	0.004 U
Aroclor 1242	mg/kg	0.004 U	0.0038 U		0.0038 U	0.004 U
Aroclor 1248	mg/kg	0.03 UY	0.0038 U		0.0038 U	0.004 U
Aroclor 1254	mg/kg	0.11	0.018 J		0.01	0.024 J
Aroclor 1260	mg/kg	0.026	0.0038 U		0.0096 J	0.0091 J
Total PCBs	mg/kg	0.14	0.018 J		0.02 J	0.033 J
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	mg/kg	0.088	0.018		0.043	0.011
Benzo(a)pyrene	mg/kg	0.059 J	0.0063 J		0.019 J	0.0042 JQ
Benzofluoranthenes (total)	mg/kg	0.25 J	0.063 J		0.093 J	0.028 J
Chrysene	mg/kg	0.15 J	0.051 J		0.062 J	0.018 J
Dibenzo(a,h)anthracene	mg/kg	0.027	0.0049		0.0073	0.0029 JQ
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	0.014		0.026	0.0083
cPAHs (MTCA TEQ-HalfND)	mg/kg	0.11 J	0.017 J		0.037 J	0.0094 J
cPAHs (MTCA TEQ-ZeroND)	mg/kg	0.11 J	0.017 J		0.037 J	0.0094 J
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAHs	mg/kg	0.33 J	0.04 J		0.063 J	0.02 J
Naphthalene	mg/kg	0.058	0.0081		0.0072	0.0028 JQ
Acenaphthylene	mg/kg	0.014	0.0046		0.003 JQ	0.0026 JQ
Acenaphthene	mg/kg	0.013	0.0046 U		0.003 JQ	0.0049 U
Fluorene	mg/kg	0.015	0.0046 U		0.0034 JQ	0.0049 U
Phenanthrene	mg/kg	0.2	0.02		0.037	0.011
Anthracene	mg/kg	0.025 J	0.0071 J		0.009 J	0.0034 JQ
1-Methylnaphthalene	mg/kg	0.013	0.0046 U		0.0029 JQ	0.0026 JQ
2-Methylnaphthalene	mg/kg	0.013	0.0038 JQ		0.0037 JQ	0.0032 JQ
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Total HPAHs	mg/kg	1.3 J	0.25 J		0.49 J	0.13 J
Fluoranthene	mg/kg	0.3 J	0.039 J		0.12 J	0.027 J
Pyrene	mg/kg	0.2 J	0.033 J		0.084 J	0.022 J
Benzo(g,h,i)perylene	mg/kg	0.14	0.02		0.031	0.011
Other SVOCs						
Dibenzofuran	mg/kg	0.025	0.0063		0.003 JQ	0.0049 U

Table C.7
Chemistry Data for Sediment Samples

Event	Interim Action Sampling (Floyd|Snider)				
Location	HA-12	HA-12	HA-12	HA-13	HA-13
Sample ID	**HA-12-1-2-021015**	**HA-12-2-3-021015**	**HA-12-3-4-021015**	**HA-13-1-2-021015**	**HA-13-2-3-021015**
Depth	1-2 ft	2-3 ft	3-4 ft	1-2 ft	2-3 ft
Date	02/10/2015	02/10/2015	02/10/2015	02/10/2015	02/10/2015

Table C.7
Chemistry Data for Sediment Samples

	Event	Interim Action Sampling (Floyd|Snider)				
	Location	HA-13	HA-14	SC-01	SC-01	SC-01
	Sample ID	**HA-13-3-4-021015**	**HA-14-1-2-021215**	**SC-01-0-0.39-021115**	**SC-01-1-2-021115**	**SC-01-2-3-021115**
	Depth	3-4 ft	1-2 ft	0-0.39 ft	1-2 ft	2-3 ft
	Date	02/10/2015	02/12/2015	02/11/2015	02/11/2015	02/11/2015
Conventionals						
Total Organic Carbon	%		0.825	2.95 J	2.8	1.16
Total Solids	%		80.63	44.64	64.39	76.7
Metals						
Arsenic	mg/kg	80	60	10.6 JQ	10	10
Copper	mg/kg	565	453	145	160	69.2
Zinc	mg/kg	1150	800	181	292	108
Polychlorinated Biphenyls (PCBs)						
Aroclor 1016	mg/kg		0.004 U	0.004 U	0.0039 U	0.0039 U
Aroclor 1221	mg/kg		0.004 U	0.004 U	0.0039 U	0.0039 U
Aroclor 1232	mg/kg		0.004 U	0.004 U	0.0039 U	0.0098 UY
Aroclor 1242	mg/kg		0.004 U	0.004 U	0.0039 U	0.0039 U
Aroclor 1248	mg/kg		0.012 UY	0.06 UY	0.039 UY	0.0039 U
Aroclor 1254	mg/kg		0.023	0.11	0.13	0.0039 U
Aroclor 1260	mg/kg		0.017 J	0.12 J	0.38	0.012 J
Total PCBs	mg/kg		0.04 J	0.23 J	0.51	0.012 J
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	mg/kg		0.028	1.1	0.54	0.69
Benzo(a)pyrene	mg/kg		0.046	1.2	0.62	0.68
Benzofluoranthenes (total)	mg/kg		0.09	2.3	1.1	0.96
Chrysene	mg/kg		0.043	1.5	0.74	0.7
Dibenzo(a,h)anthracene	mg/kg		0.017 U	0.17	0.096	0.1
Indeno(1,2,3-cd)pyrene	mg/kg		0.026	0.54	0.3	0.32
cPAHs (MTCA TEQ-HalfND)	mg/kg		0.062	1.6	0.83	0.89
cPAHs (MTCA TEQ-ZeroND)	mg/kg		0.061	1.6	0.83	0.89
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAHs	mg/kg		0.017 U	3	3	2.8
Naphthalene	mg/kg		0.017 U	0.6	0.75	0.27
Acenaphthylene	mg/kg		0.017 U	0.23	0.21	0.17
Acenaphthene	mg/kg		0.017 U	0.16	0.2	0.15
Fluorene	mg/kg		0.017 U	0.24	0.28	0.27
Phenanthrene	mg/kg		0.017 U	1.3	1.2	1.5
Anthracene	mg/kg		0.017 U	0.46	0.39	0.47
1-Methylnaphthalene	mg/kg		0.017 U	0.1	0.14	0.073
2-Methylnaphthalene	mg/kg		0.017 U	0.16	0.19	0.08
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Total HPAHs	mg/kg		0.52	12	7.4	7.4
Fluoranthene	mg/kg		0.092	2	1.7	1.7
Pyrene	mg/kg		0.16	2.3	1.9	1.8
Benzo(g,h,i)perylene	mg/kg		0.038	0.66	0.37	0.41
Other SVOCs						
Dibenzofuran	mg/kg		0.017 U	0.18	0.22	0.093

Table C.7
Chemistry Data for Sediment Samples

		Event	Interim Action Sampling (Floyd|Snider)				
		Location	HA-13	HA-14	SC-01	SC-01	SC-01
		Sample ID	**HA-13-3-4-021015**	**HA-14-1-2-021215**	**SC-01-0-0.39-021115**	**SC-01-1-2-021115**	**SC-01-2-3-021115**
		Depth	3-4 ft	1-2 ft	0-0.39 ft	1-2 ft	2-3 ft
		Date	02/10/2015	02/12/2015	02/11/2015	02/11/2015	02/11/2015
Total Petroleum Hydrocarbons (TPH)							
Diesel-Range Hydrocarbons	mg/kg			840			
Oil-Range Hydrocarbons	mg/kg			150			
EPH/VPH							
C8-C10 Aliphatics	mg/kg			2.4 UJ			
C10-C12 Aliphatics	mg/kg			9.4			
C12-C16 Aliphatics	mg/kg			230			
C16-C21 Aliphatics	mg/kg			210			
C21-C34 Aliphatics	mg/kg			54			
C8-C10 Aromatics	mg/kg			2.4 U			
C10-C12 Aromatics	mg/kg			2.4 U			
C12-C16 Aromatics	mg/kg			15			
C16-C21 Aromatics	mg/kg			110			
C21-C34 Aromatics	mg/kg			17			

Table C.7
Chemistry Data for Sediment Samples

	Event	Interim Action Sampling (Floyd|Snider)				
	Location	SC-01	SC-01	SC-01	SC-02	SC-02
	Sample ID	**SC-01-3-4-021115**	**SC-01-4-5-021115**	**SC-01-5-6-021115**	**SC-02-0-0.39-021215**	**SC-02-1-1.58-021215**
	Depth	3-4 ft	4-5 ft	5-6 ft	0-0.39 ft	1-1.58 ft
	Date	02/11/2015	02/11/2015	02/11/2015	02/12/2015	02/12/2015
Conventionals						
Total Organic Carbon	%				2.38	0.386
Total Solids	%				41.83	85.86
Metals						
Arsenic	mg/kg				10	3.14 JQ
Copper	mg/kg				442	99.3
Zinc	mg/kg				288	62
Polychlorinated Biphenyls (PCBs)						
Aroclor 1016	mg/kg				0.0039 U	0.0039 U
Aroclor 1221	mg/kg				0.0039 U	0.0039 U
Aroclor 1232	mg/kg				0.0039 U	0.0039 U
Aroclor 1242	mg/kg				0.0039 U	0.0039 U
Aroclor 1248	mg/kg				0.39 UY	0.0098 UY
Aroclor 1254	mg/kg				0.93 J	0.018
Aroclor 1260	mg/kg				0.75	0.038
Total PCBs	mg/kg				1.7 J	0.056
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	mg/kg	0.025	0.021	0.0048 U	0.79	0.024 J
Benzo(a)pyrene	mg/kg	0.025	0.022	0.0048 U	0.73	0.025 J
Benzofluoranthenes (total)	mg/kg	0.037	0.028	0.0048 U	1.5	0.052 J
Chrysene	mg/kg	0.027	0.022	0.0048 U	1.4	0.036 J
Dibenzo(a,h)anthracene	mg/kg	0.0038 JQ	0.0024 JQ	0.0048 U	0.1	0.0042 JQ
Indeno(1,2,3-cd)pyrene	mg/kg	0.012	0.01	0.0048 U	0.32	0.012
cPAHs (MTCA TEQ-HalfND)	mg/kg	0.033 J	0.028 J	0.0034 U	1	0.035 J
cPAHs (MTCA TEQ-ZeroND)	mg/kg	0.033 J	0.028 J	0.0048 U	1	0.035 J
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAHs	mg/kg	0.096	0.081	0.0067 J	2	0.063 J
Naphthalene	mg/kg	0.017	0.0068	0.0033 JQ	0.25	0.0095
Acenaphthylene	mg/kg	0.0061	0.006	0.0048 U	0.12	0.0046 JQ
Acenaphthene	mg/kg	0.0062	0.0046 U	0.0048 U	0.088	0.0049
Fluorene	mg/kg	0.0079	0.0059	0.0048 U	0.16	0.0054
Phenanthrene	mg/kg	0.045	0.051	0.0034 JQ	0.84	0.027 J
Anthracene	mg/kg	0.014	0.011	0.0048 U	0.56	0.012 J
1-Methylnaphthalene	mg/kg	0.0035 JQ	0.003 JQ	0.0048 U	0.057	0.0025 JQ
2-Methylnaphthalene	mg/kg	0.0058	0.0023 JQ	0.0048 U	0.14	0.0045 JQ
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Total HPAHs	mg/kg	0.28 J	0.24 J	0.0083 J	8.1	0.3 J
Fluoranthene	mg/kg	0.066	0.054	0.0043 JQ	1.3	0.052 J
Pyrene	mg/kg	0.068	0.064	0.004 JQ	1.6	0.077 J
Benzo(g,h,i)perylene	mg/kg	0.018	0.013	0.0048 U	0.37	0.014 J
Other SVOCs						
Dibenzofuran	mg/kg	0.005	0.0046 U	0.0048 U	0.096	0.0037 JQ

Table C.7
Chemistry Data for Sediment Samples

Event	Interim Action Sampling (Floyd|Snider)				
Location	SC-01	SC-01	SC-01	SC-02	SC-02
Sample ID	**SC-01-3-4-021115**	**SC-01-4-5-021115**	**SC-01-5-6-021115**	**SC-02-0-0.39-021215**	**SC-02-1-1.58-021215**
Depth	3-4 ft	4-5 ft	5-6 ft	0-0.39 ft	1-1.58 ft
Date	02/11/2015	02/11/2015	02/11/2015	02/12/2015	02/12/2015

Table C.7
Chemistry Data for Sediment Samples

		Event	Interim Action Sampling (Floyd|Snider)				
		Location	SC-03	SC-03	SC-03	SC-03	SC-04
		Sample ID	**SC-03-0-0.39-021115**	**SC-03-1-2-021115**	**SC-03-2-3-021115**	**SC-03-3-4-021115**	**SC-04-0-0.39-020915**
		Depth	0-0.39 ft	1-2 ft	2-3 ft	3-4 ft	0-0.39 ft
		Date	02/11/2015	02/11/2015	02/11/2015	02/11/2015	02/09/2015
Conventionals							
Total Organic Carbon	%		1.9	6.29	6.24		0.868
Total Solids	%		52.44	48.1	43.95		61.38
Metals							
Arsenic	mg/kg		20 U	20	10		40 U
Copper	mg/kg		195 J	206 J	177 J		610
Zinc	mg/kg		428 J	295 J	202 J		500
Polychlorinated Biphenyls (PCBs)							
Aroclor 1016	mg/kg		0.0039 U	0.0039 U	0.0068 U	0.0037 U	0.038 U
Aroclor 1221	mg/kg		0.0039 U	0.0039 U	0.0068 U	0.0037 U	0.038 U
Aroclor 1232	mg/kg		0.0039 U	0.0039 U	0.0068 U	0.0037 U	0.038 U
Aroclor 1242	mg/kg		0.0039 U	0.0039 U	0.0068 U	0.0037 U	0.038 U
Aroclor 1248	mg/kg		0.039 UY	0.18 UY	0.02 UY	0.0037 U	0.19 UY
Aroclor 1254	mg/kg		0.078	0.53 J	0.056 J	0.0037 U	0.92
Aroclor 1260	mg/kg		0.11	0.76	0.13 J	0.0037 U	0.095 UY
Total PCBs	mg/kg		0.19	1.3 J	0.19 J	0.0037 U	0.92
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
Benz(a)anthracene	mg/kg		1.6	1.5	0.76	0.0066	0.96
Benzo(a)pyrene	mg/kg		1.4	2	1.1	0.01	0.73
Benzofluoranthenes (total)	mg/kg		2.9	4	2.3	0.018	1.6
Chrysene	mg/kg		1.9	2.5	1.1	0.0091	1.8
Dibenzo(a,h)anthracene	mg/kg		0.24	0.24	0.15	0.0048 U	0.11
Indeno(1,2,3-cd)pyrene	mg/kg		0.69	0.75	0.5	0.0041 JQ	0.35
cPAHs (MTCA TEQ-HalfND)	mg/kg		2	2.7	1.5	0.013 J	1.1
cPAHs (MTCA TEQ-ZeroND)	mg/kg		2	2.7	1.5	0.013 J	1.1
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Total LPAHs	mg/kg		5.3	5.2	4.1	0.036 J	2.5
Naphthalene	mg/kg		0.36	1.1	1.1	0.0078	0.14
Acenaphthylene	mg/kg		0.073	0.23	0.31	0.0044 JQ	0.055
Acenaphthene	mg/kg		0.44	0.52	0.3	0.0025 JQ	0.082
Fluorene	mg/kg		0.5	0.5	0.4	0.0028 JQ	0.21
Phenanthrene	mg/kg		3	2.1	1.4	0.013	0.83
Anthracene	mg/kg		0.94	0.79	0.59	0.0054	1.2
1-Methylnaphthalene	mg/kg		0.076	0.22	0.13	0.0048 U	0.031
2-Methylnaphthalene	mg/kg		0.15	0.26	0.22	0.0024 JQ	0.062
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Total HPAHs	mg/kg		17	23	14	0.13	9.4
Fluoranthene	mg/kg		3.8	2.6	2	0.019	1.8
Pyrene	mg/kg		4.1	8.9	5.1	0.053	1.7
Benzo(g,h,i)perylene	mg/kg		0.74	0.9	0.6	0.0068	0.39
Other SVOCs							
Dibenzofuran	mg/kg		0.28	0.51	0.36	0.0048 U	0.1

Table C.7
Chemistry Data for Sediment Samples

Event	Interim Action Sampling (Floyd|Snider)				
Location	SC-03	SC-03	SC-03	SC-03	SC-04
Sample ID	**SC-03-0-0.39-021115**	**SC-03-1-2-021115**	**SC-03-2-3-021115**	**SC-03-3-4-021115**	**SC-04-0-0.39-020915**
Depth	0-0.39 ft	1-2 ft	2-3 ft	3-4 ft	0-0.39 ft
Date	02/11/2015	02/11/2015	02/11/2015	02/11/2015	02/09/2015

Table C.7
Chemistry Data for Sediment Samples

		Event	Interim Action Sampling (Floyd|Snider)				
		Location	SC-04	SC-04	SC-04	SC-04	SC-04
		Sample ID	**SC-04-1-2-020915**	**SC-04-2-3-020915**	**SC-04-3-4-020915**	**SC-04-4-5-020915**	**SC-04-5-6-020915**
		Depth	1-2 ft	2-3 ft	3-4 ft	4-5 ft	5-6 ft
		Date	02/09/2015	02/09/2015	02/09/2015	02/09/2015	02/09/2015
Conventionals							
Total Organic Carbon	%		1.75	0.585			
Total Solids	%		61.12	86.6			
Metals							
Arsenic	mg/kg		28	16			
Copper	mg/kg		357	67.4			
Zinc	mg/kg		515	164			
Polychlorinated Biphenyls (PCBs)							
Aroclor 1016	mg/kg		0.019 U	0.019 U	0.0037 U	0.0038 U	0.0038 U
Aroclor 1221	mg/kg		0.019 U	0.019 U	0.0037 U	0.0038 U	0.0038 U
Aroclor 1232	mg/kg		0.019 U	0.019 U	0.0037 U	0.0038 U	0.0038 U
Aroclor 1242	mg/kg		0.019 U	0.019 U	0.0037 U	0.0038 U	0.0038 U
Aroclor 1248	mg/kg		0.19 UY	0.057 UY	0.0056 UY	0.0038 U	0.0038 U
Aroclor 1254	mg/kg		0.38	0.23	0.021	0.0038 U	0.0038 U
Aroclor 1260	mg/kg		0.46	0.051	0.0055	0.0038 U	0.0038 U
Total PCBs	mg/kg		0.84	0.28	0.027	0.0038 U	0.0038 U
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
Benz(a)anthracene	mg/kg		0.41 J	0.033 J			
Benzo(a)pyrene	mg/kg		0.59 J	0.046 J			
Benzofluoranthenes (total)	mg/kg		1.3	0.083			
Chrysene	mg/kg		0.7 J	0.046 J			
Dibenzo(a,h)anthracene	mg/kg		0.086	0.0076			
Indeno(1,2,3-cd)pyrene	mg/kg		0.28	0.025			
cPAHs (MTCA TEQ-HalfND)	mg/kg		0.8 J	0.061 J			
cPAHs (MTCA TEQ-ZeroND)	mg/kg		0.8 J	0.061 J			
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Total LPAHs	mg/kg		2.5 J	0.14 J			
Naphthalene	mg/kg		0.68 J	0.026 J			
Acenaphthylene	mg/kg		0.21	0.01			
Acenaphthene	mg/kg		0.2	0.0077 J			
Fluorene	mg/kg		0.21	0.0097			
Phenanthrene	mg/kg		0.86	0.069 J			
Anthracene	mg/kg		0.29	0.02			
1-Methylnaphthalene	mg/kg		0.088	0.004 JQ			
2-Methylnaphthalene	mg/kg		0.21	0.0055			
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Total HPAHs	mg/kg		7.1 J	0.5 J			
Fluoranthene	mg/kg		1	0.097 J			
Pyrene	mg/kg		2.4	0.13 J			
Benzo(g,h,i)perylene	mg/kg		0.34	0.031			
Other SVOCs							
Dibenzofuran	mg/kg		0.2	0.0063			

Table C.7
Chemistry Data for Sediment Samples

Event	Interim Action Sampling (Floyd|Snider)				
Location	SC-04	SC-04	SC-04	SC-04	SC-04
Sample ID	**SC-04-1-2-020915**	**SC-04-2-3-020915**	**SC-04-3-4-020915**	**SC-04-4-5-020915**	**SC-04-5-6-020915**
Depth	1-2 ft	2-3 ft	3-4 ft	4-5 ft	5-6 ft
Date	02/09/2015	02/09/2015	02/09/2015	02/09/2015	02/09/2015

Table C.7
Chemistry Data for Sediment Samples

	Event	Interim Action Sampling (Floyd|Snider)				
	Location	SC-05	SC-05	SC-05	SC-06	SC-06
	Sample ID	**SC-05-0-0.39**	**SC-05-1-2-021215**	**SC-05-2-3-021215**	**SC-06-0-0.39-020915**	**SC-06-1-2-020915**
	Depth	0-0.39 ft	1-2 ft	2-3 ft	0-0.39 ft	1-2 ft
	Date	02/12/2015	02/12/2015	02/12/2015	02/09/2015	02/09/2015
Conventionals						
Total Organic Carbon	%	1.85	0.291	0.333	1.76	3.66
Total Solids	%	59.2	84.55	81.81	57.74	66.15
Grain Size						
Gravel	%					11.9
GS 1000 - 2000 µm	%					4.2
GS 500 - 1000 µm	%					9.2
GS 250 - 500 µm	%					16.6
GS 125 - 250 µm	%					21.9
GS 62.5 - 125 µm	%					8
GS 31.3 - 62.5 µm	%					2.6
GS 15.6 - 31.3 µm	%					2.5
GS 7.8 - 15.6 µm	%					4.4
GS 3.9 - 7.8 µm	%					4.5
GS 1.95 - 3.9 µm	%					3.6
GS 0.98 - 1.95 µm	%					3.2
GS <0.98 µm	%					7.3
Fines	%					28.1
Metals						
Arsenic	mg/kg	70	5.2 JQ	6	200	14
Copper	mg/kg	458	9.7	9.7	687	40.9
Zinc	mg/kg	908	27	21	1890	77
Polychlorinated Biphenyls (PCBs)						
Aroclor 1016	mg/kg	0.0039 U	0.0038 U	0.0039 U	0.019 U	0.02 U
Aroclor 1221	mg/kg	0.0039 U	0.0038 U	0.0039 U	0.019 U	0.02 U
Aroclor 1232	mg/kg	0.0039 U	0.0056 UY	0.0039 U	0.019 U	0.02 U
Aroclor 1242	mg/kg	0.0039 U	0.0038 U	0.0039 U	0.019 U	0.02 U
Aroclor 1248	mg/kg	0.02 UY	0.0038 U	0.0039 U	0.097 UY	0.02 U
Aroclor 1254	mg/kg	0.042	0.0038 U	0.0039 U	0.41	0.033 J
Aroclor 1260	mg/kg	0.048 J	0.0038 U	0.0039 U	0.086	0.1
Total PCBs	mg/kg	0.09 J	0.0056 UY	0.0039 U	0.5	0.13 J
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	mg/kg	0.1	0.0048 U	0.0047 U	0.16 J	0.054 J
Benzo(a)pyrene	mg/kg	0.13	0.003 JQ	0.0047 U	0.18 J	0.068 J
Benzofluoranthenes (total)	mg/kg	0.28	0.0029 JQ	0.0047 U	0.39	0.12
Chrysene	mg/kg	0.15	0.0048 U	0.0047 U	0.26 J	0.075 J
Dibenzo(a,h)anthracene	mg/kg	0.025	0.0048 U	0.0047 U	0.03	0.0099 JQ
Indeno(1,2,3-cd)pyrene	mg/kg	0.079	0.0048 U	0.0047 U	0.094	0.036
cPAHs (MTCA TEQ-HalfND)	mg/kg	0.18	0.004 J	0.0033 U	0.25 J	0.091 J
cPAHs (MTCA TEQ-ZeroND)	mg/kg	0.18	0.0033 J	0.0047 U	0.25 J	0.091 J
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAHs	mg/kg	0.54	0.014 J	0.0024 J	0.88 J	1 J

Table C.7
Chemistry Data for Sediment Samples

		Event	Interim Action Sampling (Floyd|Snider)				
		Location	SC-05	SC-05	SC-05	SC-06	SC-06
		Sample ID	**SC-05-0-0.39**	**SC-05-1-2-021215**	**SC-05-2-3-021215**	**SC-06-0-0.39-020915**	**SC-06-1-2-020915**
		Depth	0-0.39 ft	1-2 ft	2-3 ft	0-0.39 ft	1-2 ft
		Date	02/12/2015	02/12/2015	02/12/2015	02/09/2015	02/09/2015
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Naphthalene	mg/kg		0.16	0.0055	0.0024 JQ	0.24 J	0.39 J
Acenaphthylene	mg/kg		0.046	0.0028 JQ	0.0047 U	0.074	0.14
Acenaphthene	mg/kg		0.038	0.0048 U	0.0047 U	0.058	0.056
Fluorene	mg/kg		0.043	0.0048 U	0.0047 U	0.067	0.068
Phenanthrene	mg/kg		0.18	0.0056	0.0047 U	0.32 J	0.28 J
Anthracene	mg/kg		0.074	0.0048 U	0.0047 U	0.12	0.11
1-Methylnaphthalene	mg/kg		0.02	0.0048 U	0.0047 U	0.039	0.059
2-Methylnaphthalene	mg/kg		0.035	0.0048 U	0.0027 JQ	0.17	0.09
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Total HPAHs	mg/kg		1.5	0.03 J	0.0071 J	2.2 J	1 J
Fluoranthene	mg/kg		0.28	0.0084	0.0041 JQ	0.42 J	0.27 J
Pyrene	mg/kg		0.35	0.011	0.003 JQ	0.58 J	0.35 J
Benzo(g,h,i)perylene	mg/kg		0.094	0.0044 JQ	0.0047 U	0.11	0.052
Other SVOCs							
Dibenzofuran	mg/kg		0.046	0.0048 U	0.0047 U	0.072	0.07

Table C.7
Chemistry Data for Sediment Samples

	Event	Interim Action Sampling (Floyd|Snider)				
	Location	SC-06	SC-06	SC-07	SC-07	SC-07
	Sample ID	**SC-06-2-3-020915**	**SC-46-2-3-020915**	**SC-07-0-0.39-021015**	**SC-07-1-2-021015**	**SC-07-2-3-021015**
	Depth	2-3 ft	2-3 ft	0-0.39 ft	1-2 ft	2-3 ft
	Date	02/09/2015	02/09/2015	02/10/2015	02/10/2015	02/10/2015
Conventionals						
Total Organic Carbon	%	0.27	0.638	0.514	0.155	0.171
Total Solids	%	79.15	78.61	71.23	81.72	82.06
Grain Size						
Gravel	%					20.9
GS 1000 - 2000 µm	%					3.4
GS 500 - 1000 µm	%					20.5
GS 250 - 500 µm	%					6.1
GS 125 - 250 µm	%					21.9
GS 62.5 - 125 µm	%					15
GS 31.3 - 62.5 µm	%					3.5
GS 15.6 - 31.3 µm	%					2.1
GS 7.8 - 15.6 µm	%					1.3
GS 3.9 - 7.8 µm	%					0.9
GS 1.95 - 3.9 µm	%					0.9
GS 0.98 - 1.95 µm	%					0.8
GS <0.98 µm	%					2.5
Fines	%					12.2
Metals						
Arsenic	mg/kg	7	7	11	9	8
Copper	mg/kg	11.4	10.7	91.8	9.9	10.6
Zinc	mg/kg	40	36	58	25	23
Polychlorinated Biphenyls (PCBs)						
Aroclor 1016	mg/kg	0.0039 U	0.0039 U	0.0038 U	0.0038 U	0.0039 U
Aroclor 1221	mg/kg	0.0039 U	0.0039 U	0.0038 U	0.0038 U	0.0039 U
Aroclor 1232	mg/kg	0.0039 U	0.0039 U	0.0038 U	0.0038 U	0.0039 U
Aroclor 1242	mg/kg	0.0039 U	0.0039 U	0.0038 U	0.0038 U	0.0039 U
Aroclor 1248	mg/kg	0.0039 U	0.0059 UY	0.0057 UY	0.0038 U	0.0039 U
Aroclor 1254	mg/kg	0.0041	0.0066 J	0.013 J	0.0041	0.0039 U
Aroclor 1260	mg/kg	0.0034 JQ	0.0042	0.018 J	0.0038 U	0.0039 U
Total PCBs	mg/kg	0.0075 J	0.011 J	0.031 J	0.0041	0.0039 U
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	mg/kg	0.0069 J	0.033 J	0.12	0.0063	0.0049 U
Benzo(a)pyrene	mg/kg	0.0096 J	0.031 J	0.13	0.0088	0.0049 U
Benzofluoranthenes (total)	mg/kg	0.016	0.066	0.23	0.017	0.0049 U
Chrysene	mg/kg	0.0095 J	0.042 J	0.17	0.009	0.0049 U
Dibenzo(a,h)anthracene	mg/kg	0.0048 U	0.0073	0.02	0.0049 U	0.0049 U
Indeno(1,2,3-cd)pyrene	mg/kg	0.0052	0.019	0.067	0.0064	0.0049 U
cPAHs (MTCA TEQ-HalfND)	mg/kg	0.013 J	0.044 J	0.18	0.012	0.0035 U
cPAHs (MTCA TEQ-ZeroND)	mg/kg	0.013 J	0.044 J	0.18	0.012	0.0049 U
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAHs	mg/kg	0.066 J	0.12 J	0.81	0.079 J	0.0089 J

Table C.7
Chemistry Data for Sediment Samples

		Event	Interim Action Sampling (Floyd|Snider)				
		Location	SC-06	SC-06	SC-07	SC-07	SC-07
		Sample ID	**SC-06-2-3-020915**	**SC-46-2-3-020915**	**SC-07-0-0.39-021015**	**SC-07-1-2-021015**	**SC-07-2-3-021015**
		Depth	2-3 ft	2-3 ft	0-0.39 ft	1-2 ft	2-3 ft
		Date	02/09/2015	02/09/2015	02/10/2015	02/10/2015	02/10/2015
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Naphthalene	mg/kg		0.022 J	0.026 J	0.21	0.028	0.0052
Acenaphthylene	mg/kg		0.0068	0.0079	0.076	0.0098	0.0049 U
Acenaphthene	mg/kg		0.0037 JQ	0.0056 J	0.041	0.0044 JQ	0.0049 U
Fluorene	mg/kg		0.0048 JQ	0.0066	0.059	0.0046 JQ	0.0049 U
Phenanthrene	mg/kg		0.021 J	0.062 J	0.28	0.024	0.0037 JQ
Anthracene	mg/kg		0.0073	0.011	0.14	0.0078	0.0049 U
1-Methylnaphthalene	mg/kg		0.0035 JQ	0.0031 JQ	0.027	0.0043 JQ	0.0049 U
2-Methylnaphthalene	mg/kg		0.0049	0.0048 JQ	0.04	0.0054	0.0027 JQ
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Total HPAHs	mg/kg		0.12 J	0.39 J	1.6	0.13	0.0079 J
Fluoranthene	mg/kg		0.024 J	0.088 J	0.4	0.03	0.0034 JQ
Pyrene	mg/kg		0.038 J	0.086 J	0.4	0.038	0.0045 JQ
Benzo(g,h,i)perylene	mg/kg		0.0071	0.021	0.087	0.01	0.0049 U
Other SVOCs							
Dibenzofuran	mg/kg		0.0048 JQ	0.0048	0.047	0.0045 JQ	0.0049 U

Table C.7
Chemistry Data for Sediment Samples

		Event	Interim Action Sampling (Floyd|Snider)				
		Location	SC-08	SC-08	SC-08	SC-08	SC-09
		Sample ID	**SC-08-0-0.39-021015**	**SC-08-1-2-021015**	**SC-08-2-3-021015**	**SC-38-2-3-021015**	**SC-09-0-0.39-021015**
		Depth	0-0.39 ft	1-2 ft	2-3 ft	2-3 ft	0-0.39 ft
		Date	02/10/2015	02/10/2015	02/10/2015	02/10/2015	02/10/2015
Conventionals							
Total Organic Carbon	%		1.25	0.597	0.255	0.323	0.896
Total Solids	%		62.48	73.46	82.29	82.21	61.71
Grain Size							
Gravel	%			7.2			
GS 1000 - 2000 µm	%			3.4			
GS 500 - 1000 µm	%			11.4			
GS 250 - 500 µm	%			30.9			
GS 125 - 250 µm	%			26.7			
GS 62.5 - 125 µm	%			5.2			
GS 31.3 - 62.5 µm	%			0.1			
GS 15.6 - 31.3 µm	%			1.4			
GS 7.8 - 15.6 µm	%			2.4			
GS 3.9 - 7.8 µm	%			2.8			
GS 1.95 - 3.9 µm	%			1.9			
GS 0.98 - 1.95 µm	%			2.1			
GS <0.98 µm	%			4.5			
Fines	%			15.3			
Metals							
Arsenic	mg/kg		14	9	6 U	6 U	40 U
Copper	mg/kg		56.1	14.2	8.1	9.2	29
Zinc	mg/kg		76	34	20	21	44
Polychlorinated Biphenyls (PCBs)							
Aroclor 1016	mg/kg		0.0038 U	0.0039 U	0.0039 U	0.004 U	0.004 U
Aroclor 1221	mg/kg		0.0038 U	0.0039 U	0.0039 U	0.004 U	0.004 U
Aroclor 1232	mg/kg		0.0038 U	0.0039 U	0.0039 U	0.004 U	0.0099 UY
Aroclor 1242	mg/kg		0.0038 U	0.0039 U	0.0039 U	0.004 U	0.004 U
Aroclor 1248	mg/kg		0.0096 UY	0.0039 U	0.0039 U	0.004 U	0.004 U
Aroclor 1254	mg/kg		0.024	0.0039 U	0.0039 U	0.0046	0.004 U
Aroclor 1260	mg/kg		0.064 J	0.0039 U	0.0039 U	0.004 U	0.004 U
Total PCBs	mg/kg		0.088 J	0.0039 U	0.0039 U	0.0046	0.0099 UY
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
Benz(a)anthracene	mg/kg		0.095	0.034	0.0029 JQ	0.003 JQ	0.027
Benzo(a)pyrene	mg/kg		0.11	0.041	0.0037 JQ	0.0037 JQ	0.025
Benzofluoranthenes (total)	mg/kg		0.23	0.074	0.0058	0.0074	0.056
Chrysene	mg/kg		0.16	0.042	0.0052	0.0032 JQ	0.039
Dibenzo(a,h)anthracene	mg/kg		0.016	0.007	0.0048 U	0.0049 U	0.0051
Indeno(1,2,3-cd)pyrene	mg/kg		0.064	0.024	0.0048 U	0.0049 U	0.014
cPAHs (MTCA TEQ-HalfND)	mg/kg		0.15	0.055	0.0051	0.0053 J	0.036
cPAHs (MTCA TEQ-ZeroND)	mg/kg		0.15	0.055	0.0046	0.0048 J	0.036
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Total LPAHs	mg/kg		0.86	0.47	0.025 J	0.028 J	0.24

Table C.7
Chemistry Data for Sediment Samples

		Event	Interim Action Sampling (Floyd|Snider)				
		Location	SC-08	SC-08	SC-08	SC-08	SC-09
		Sample ID	**SC-08-0-0.39-021015**	**SC-08-1-2-021015**	**SC-08-2-3-021015**	**SC-38-2-3-021015**	**SC-09-0-0.39-021015**
		Depth	0-0.39 ft	1-2 ft	2-3 ft	2-3 ft	0-0.39 ft
		Date	02/10/2015	02/10/2015	02/10/2015	02/10/2015	02/10/2015
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Naphthalene	mg/kg		0.31	0.15	0.0095	0.014	0.086
Acenaphthylene	mg/kg		0.094	0.06	0.0032 JQ	0.0032 JQ	0.028
Acenaphthene	mg/kg		0.049	0.034	0.0048 U	0.0049 U	0.012
Fluorene	mg/kg		0.056	0.037	0.0048 U	0.0049 U	0.016
Phenanthrene	mg/kg		0.25	0.14	0.0085	0.0076	0.075
Anthracene	mg/kg		0.1	0.048	0.0033 JQ	0.0028 JQ	0.026
1-Methylnaphthalene	mg/kg		0.031	0.018	0.0048 U	0.0025 JQ	0.012
2-Methylnaphthalene	mg/kg		0.071	0.023	0.0048 U	0.0025 JQ	0.022
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Total HPAHs	mg/kg		1.4	0.6	0.042 J	0.044 J	0.38
Fluoranthene	mg/kg		0.29	0.15	0.0088	0.0093	0.09
Pyrene	mg/kg		0.37	0.2	0.012	0.014	0.11
Benzo(g,h,i)perylene	mg/kg		0.084	0.032	0.0033 JQ	0.0033 JQ	0.018
Other SVOCs							
Dibenzofuran	mg/kg		0.072	0.031	0.0048 U	0.0049 U	0.017

Table C.7
Chemistry Data for Sediment Samples

	Event	Interim Action Sampling (Floyd|Snider)				
	Location	SC-09	SC-09	SC-11	SC-11	SC-11
	Sample ID	**SC-09-1-2-021015**	**SC-09-2-3-021015**	**SC-11-0-0.39-021215**	**SC-11-1-2-021215**	**SC-11-2-3-021215**
	Depth	1-2 ft	2-3 ft	0-0.39 ft	1-2 ft	2-3 ft
	Date	02/10/2015	02/10/2015	02/12/2015	02/12/2015	02/12/2015
Conventionals						
Total Organic Carbon	%	0.555	0.349	1.93	0.275	0.36
Total Solids	%	71.08	78.76 J	51.19	82.27	82.98
Metals						
Arsenic	mg/kg	10	13	14	8	6
Copper	mg/kg	20.5	10.4	57.6	9.6	12.1
Zinc	mg/kg	41	24	98	21	21
Polychlorinated Biphenyls (PCBs)						
Aroclor 1016	mg/kg	0.004 U	0.0039 U	0.0039 U	0.0039 U	0.0039 U
Aroclor 1221	mg/kg	0.004 U	0.0039 U	0.0039 U	0.0039 U	0.0039 U
Aroclor 1232	mg/kg	0.004 U	0.0039 U	0.0039 U	0.0039 U	0.0039 U
Aroclor 1242	mg/kg	0.004 U	0.0039 U	0.0039 U	0.0039 U	0.0039 U
Aroclor 1248	mg/kg	0.004 U	0.0039 U	0.019 UY	0.0039 U	0.0039 U
Aroclor 1254	mg/kg	0.006 J	0.0039 U	0.017 J	0.0039 U	0.0039 U
Aroclor 1260	mg/kg	0.004 U	0.0039 U	0.019 J	0.0039 U	0.0039 U
Total PCBs	mg/kg	0.006 J	0.0039 U	0.036 J	0.0039 U	0.0039 U
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	mg/kg	0.059	0.01	0.26	0.088	0.0047 U
Benzo(a)pyrene	mg/kg	0.07	0.012	0.26	0.085	0.0047 U
Benzofluoranthenes (total)	mg/kg	0.13	0.019	0.49	0.14	0.0047 U
Chrysene	mg/kg	0.074	0.015	0.42	0.093	0.0047 U
Dibenzo(a,h)anthracene	mg/kg	0.0097	0.0048 U	0.043	0.014	0.0047 U
Indeno(1,2,3-cd)pyrene	mg/kg	0.039	0.0064	0.14	0.049	0.0047 U
cPAHs (MTCA TEQ-HalfND)	mg/kg	0.095	0.016	0.36	0.12	0.0033 U
cPAHs (MTCA TEQ-ZeroND)	mg/kg	0.095	0.016	0.36	0.12	0.0047 U
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAHs	mg/kg	0.97	0.11	1	0.33	0.0047 U
Naphthalene	mg/kg	0.38	0.041	0.3	0.01	0.0047 U
Acenaphthylene	mg/kg	0.15	0.015	0.055	0.015	0.0047 U
Acenaphthene	mg/kg	0.047	0.0062	0.039	0.0054	0.0047 U
Fluorene	mg/kg	0.056	0.0076	0.08	0.018	0.0047 U
Phenanthrene	mg/kg	0.25	0.033	0.34	0.24	0.0047 U
Anthracene	mg/kg	0.09	0.012	0.19	0.043	0.0047 U
1-Methylnaphthalene	mg/kg	0.046	0.0059	0.042	0.0036 JQ	0.0047 U
2-Methylnaphthalene	mg/kg	0.065	0.0089	0.071	0.0053	0.0047 U
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Total HPAHs	mg/kg	0.96	0.15	2.6	1	0.0047 U
Fluoranthene	mg/kg	0.25	0.034	0.39	0.26	0.0047 U
Pyrene	mg/kg	0.27	0.043	0.43	0.21	0.0047 U
Benzo(g,h,i)perylene	mg/kg	0.058	0.0096	0.18	0.056	0.0047 U
Other SVOCs						
Dibenzofuran	mg/kg	0.058	0.0066	0.07	0.0088	0.0047 U

Table C.7
Chemistry Data for Sediment Samples

Event	Interim Action Sampling (Floyd|Snider)				
Location	SC-09	SC-09	SC-11	SC-11	SC-11
Sample ID	**SC-09-1-2-021015**	**SC-09-2-3-021015**	**SC-11-0-0.39-021215**	**SC-11-1-2-021215**	**SC-11-2-3-021215**
Depth	1-2 ft	2-3 ft	0-0.39 ft	1-2 ft	2-3 ft
Date	02/10/2015	02/10/2015	02/12/2015	02/12/2015	02/12/2015

Table C.7
Chemistry Data for Sediment Samples

		Event	Interim Action Sampling (Floyd|Snider)				
		Location	SC-12	SC-12	SC-12	SC-13	SC-13
		Sample ID	**SC-12-0-0.39-021215**	**SC-12-1-2-021215**	**SC-12-2-3-021215**	**SC-13-1-2-021115**	**SC-13-2-3-021115**
		Depth	0-0.39 ft	1-2 ft	2-3 ft	1-2 ft	2-3 ft
		Date	02/12/2015	02/12/2015	02/12/2015	02/11/2015	02/11/2015
Conventionals							
Total Organic Carbon	%		2.64	2.3	1.54	1.21 J	0.712
Total Solids	%		49.08	53.06	51.9	76.68	81.56
Metals							
Arsenic	mg/kg		10.3 JQ	13.7 JQ	20 U	20 U	6 U
Copper	mg/kg		155	25	59.7	116 J	27.5 J
Zinc	mg/kg		99	62	56	144 J	65 J
Polychlorinated Biphenyls (PCBs)							
Aroclor 1016	mg/kg		0.0039 U	0.0038 U	0.0039 U	0.0042 U	0.0038 U
Aroclor 1221	mg/kg		0.0039 U	0.0038 U	0.0039 U	0.0042 U	0.0038 U
Aroclor 1232	mg/kg		0.0039 U	0.0058 UY	0.0059 UY	0.0042 U	0.0096 UY
Aroclor 1242	mg/kg		0.0039 U	0.0038 U	0.0039 U	0.0042 U	0.0038 U
Aroclor 1248	mg/kg		0.0059 UY	0.0038 U	0.0039 U	0.021 UY	0.0038 U
Aroclor 1254	mg/kg		0.024 J	0.0038 U	0.0039 U	0.02	0.0038 U
Aroclor 1260	mg/kg		0.02 J	0.0038 U	0.0039 U	0.023 J	0.0038 U
Total PCBs	mg/kg		0.044 J	0.0058 UY	0.0059 UY	0.043 J	0.0096 UY
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
Benz(a)anthracene	mg/kg		7.5	0.15	0.046	0.29	0.056 J
Benzo(a)pyrene	mg/kg		6.6	0.15	0.048	0.25	0.065 J
Benzofluoranthenes (total)	mg/kg		10	0.44	0.076	0.5	0.13 J
Chrysene	mg/kg		7.3	0.31	0.052	0.41	0.076 J
Dibenzo(a,h)anthracene	mg/kg		0.87	0.021	0.008	0.038	0.011
Indeno(1,2,3-cd)pyrene	mg/kg		2.8	0.08	0.031	0.12 J	0.035
cPAHs (MTCA TEQ-HalfND)	mg/kg		8.8	0.22	0.065	0.35 J	0.089 J
cPAHs (MTCA TEQ-ZeroND)	mg/kg		8.8	0.22	0.065	0.35 J	0.089 J
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Total LPAHs	mg/kg		9.7	0.55	0.39	1 J	0.27 J
Naphthalene	mg/kg		1.8	0.086	0.14	0.16 J	0.055 J
Acenaphthylene	mg/kg		0.81	0.032	0.034	0.074	0.016
Acenaphthene	mg/kg		0.18	0.015	0.012	0.055	0.025
Fluorene	mg/kg		0.97	0.038	0.031	0.093	0.028
Phenanthrene	mg/kg		2.8	0.32	0.13	0.47	0.1 J
Anthracene	mg/kg		3.1	0.062	0.04	0.18 J	0.042 J
1-Methylnaphthalene	mg/kg		0.16	0.013	0.058	0.034	0.011
2-Methylnaphthalene	mg/kg		0.31	0.018	0.076	0.046	0.018
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Total HPAHs	mg/kg		69	3.9	0.61	3.5 J	0.91 J
Fluoranthene	mg/kg		15	1.7	0.14	0.86	0.22
Pyrene	mg/kg		16	1	0.16	0.89	0.28
Benzo(g,h,i)perylene	mg/kg		3.4	0.089	0.048	0.14 J	0.041 J
Other SVOCs							
Dibenzofuran	mg/kg		0.31	0.018	0.024	0.06	0.02

Table C.7
Chemistry Data for Sediment Samples

Event	Interim Action Sampling (Floyd|Snider)				
Location	SC-12	SC-12	SC-12	SC-13	SC-13
Sample ID	**SC-12-0-0.39-021215**	**SC-12-1-2-021215**	**SC-12-2-3-021215**	**SC-13-1-2-021115**	**SC-13-2-3-021115**
Depth	0-0.39 ft	1-2 ft	2-3 ft	1-2 ft	2-3 ft
Date	02/12/2015	02/12/2015	02/12/2015	02/11/2015	02/11/2015

Table C.7
Chemistry Data for Sediment Samples

	Event	Interim Action Sampling (Floyd|Snider)				
	Location	SC-13	SC-14	SC-14	SC-14	SC-14
	Sample ID	**SC-43-2-3-021115**	**SC-14-1-2-020915**	**SC-14-2-3-020915**	**SC-14-3-4-020915**	**SC-14-4-5-020915**
	Depth	2-3 ft	1-2 ft	2-3 ft	3-4 ft	4-5 ft
	Date	02/11/2015	02/09/2015	02/09/2015	02/09/2015	02/09/2015
Conventionals						
Total Organic Carbon	%	0.243	0.797	1.26		
Total Solids	%	81.94	70.98	73.57		
Metals						
Arsenic	mg/kg	6 U	10	7		
Copper	mg/kg	38.4 J	500	334		
Zinc	mg/kg	63 J	245	250		
Polychlorinated Biphenyls (PCBs)						
Aroclor 1016	mg/kg	0.0038 U	0.0038 U	0.02 U	0.019 U	0.0039 U
Aroclor 1221	mg/kg	0.0038 U	0.0038 U	0.02 U	0.019 U	0.0039 U
Aroclor 1232	mg/kg	0.012 UY	0.0038 U	0.02 U	0.019 U	0.0039 U
Aroclor 1242	mg/kg	0.0038 U	0.0038 U	0.02 U	0.019 U	0.0039 U
Aroclor 1248	mg/kg	0.0038 U	0.094	0.2 UY	0.096 UY	0.0039 U
Aroclor 1254	mg/kg	0.0038 U	0.12	0.54	0.14	0.0039 U
Aroclor 1260	mg/kg	0.0038 U	0.048 J	0.9 J	0.28	0.0039 U
Total PCBs	mg/kg	0.012 UY	0.26 J	1.4 J	0.42	0.0039 U
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	mg/kg	0.19 J	0.28 J	0.17 J		
Benzo(a)pyrene	mg/kg	0.21 J	0.33 J	0.26 J		
Benzofluoranthenes (total)	mg/kg	0.38 J	0.74	0.69		
Chrysene	mg/kg	0.22 J	0.67 J	0.31 J		
Dibenzo(a,h)anthracene	mg/kg	0.034	0.052	0.043		
Indeno(1,2,3-cd)pyrene	mg/kg	0.12	0.15	0.13		
cPAHs (MTCA TEQ-HalfND)	mg/kg	0.28 J	0.46 J	0.37 J		
cPAHs (MTCA TEQ-ZeroND)	mg/kg	0.28 J	0.46 J	0.37 J		
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAHs	mg/kg	0.58 J	0.6 J	0.98 J		
Naphthalene	mg/kg	0.093 J	0.11 J	0.17 J		
Acenaphthylene	mg/kg	0.026	0.031	0.048		
Acenaphthene	mg/kg	0.041	0.064	0.16		
Fluorene	mg/kg	0.05	0.054	0.11		
Phenanthrene	mg/kg	0.28 J	0.23 J	0.35 J		
Anthracene	mg/kg	0.086 J	0.11	0.14		
1-Methylnaphthalene	mg/kg	0.023	0.03	0.08		
2-Methylnaphthalene	mg/kg	0.032	0.046	0.088		
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Total HPAHs	mg/kg	2.2 J	4 J	3.4 J		
Fluoranthene	mg/kg	0.47	0.5 J	0.43 J		
Pyrene	mg/kg	0.49	1.1 J	1.2 J		
Benzo(g,h,i)perylene	mg/kg	0.13 J	0.17	0.14		
Other SVOCs						
Dibenzofuran	mg/kg	0.038	0.058	0.16		

Table C.7
Chemistry Data for Sediment Samples

Event	Interim Action Sampling (Floyd|Snider)				
Location	SC-13	SC-14	SC-14	SC-14	SC-14
Sample ID	**SC-43-2-3-021115**	**SC-14-1-2-020915**	**SC-14-2-3-020915**	**SC-14-3-4-020915**	**SC-14-4-5-020915**
Depth	2-3 ft	1-2 ft	2-3 ft	3-4 ft	4-5 ft
Date	02/11/2015	02/09/2015	02/09/2015	02/09/2015	02/09/2015

Table C.7
Chemistry Data for Sediment Samples

	Event	Interim Action Sampling (Floyd|Snider)				
	Location	SC-14	SC-15	SC-15	SC-15	SC-16
	Sample ID	**SC-14-5-6-020915**	**SC-15-1-2-021115**	**SC-15-2-3-021115**	**SC-15-3-4-021115**	**SC-16-1-2-020915**
	Depth	5-6 ft	1-2 ft	2-3 ft	3-4 ft	1-2 ft
	Date	02/09/2015	02/11/2015	02/11/2015	02/11/2015	02/09/2015
Conventionals						
Total Organic Carbon	%		0.751	0.391		3.76
Total Solids	%		61.82	74.53		56.25
Metals						
Arsenic	mg/kg		40 U	30 U		80
Copper	mg/kg		86	156		654
Zinc	mg/kg		1040	219		1680
Polychlorinated Biphenyls (PCBs)						
Aroclor 1016	mg/kg	0.0038 U	0.004 U	0.0038 U	0.0039 U	0.039 U
Aroclor 1221	mg/kg	0.0038 U	0.004 U	0.0038 U	0.0039 U	0.039 U
Aroclor 1232	mg/kg	0.0038 U	0.004 U	0.0038 U	0.0039 U	0.039 U
Aroclor 1242	mg/kg	0.0038 U	0.004 U	0.0038 U	0.0039 U	0.039 U
Aroclor 1248	mg/kg	0.0038 U	0.02 UY	0.062	0.0039 U	0.2 UY
Aroclor 1254	mg/kg	0.0038 U	0.055	0.086	0.005	0.79
Aroclor 1260	mg/kg	0.0038 U	0.076 J	0.11	0.01	0.22
Total PCBs	mg/kg	0.0038 U	0.13 J	0.26	0.015	1
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	mg/kg		1.8	0.18		0.85
Benzo(a)pyrene	mg/kg		2.4	0.21		0.92
Benzofluoranthenes (total)	mg/kg		4.9	0.41		2.1
Chrysene	mg/kg		2	0.24		1.4
Dibenzo(a,h)anthracene	mg/kg		0.57	0.03		0.15
Indeno(1,2,3-cd)pyrene	mg/kg		1.7	0.11		0.46
cPAHs (MTCA TEQ-HalfND)	mg/kg		3.3	0.29		1.3
cPAHs (MTCA TEQ-ZeroND)	mg/kg		3.4	0.29		1.3
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAHs	mg/kg		4.5	0.39		2.4
Naphthalene	mg/kg		0.34	0.026		0.26
Acenaphthylene	mg/kg		0.96	0.021		0.095
Acenaphthene	mg/kg		0.059	0.021		0.18
Fluorene	mg/kg		0.35	0.033		0.22
Phenanthrene	mg/kg		2.2	0.2		1.2
Anthracene	mg/kg		0.62	0.091		0.46
1-Methylnaphthalene	mg/kg		0.099	0.0082		0.064
2-Methylnaphthalene	mg/kg		0.13	0.012		0.41
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Total HPAHs	mg/kg		21	2.5		11
Fluoranthene	mg/kg		3.2	0.37		1.9
Pyrene	mg/kg		2.6	0.77		3
Benzo(g,h,i)perylene	mg/kg		1.6	0.18		0.5
Other SVOCs						
Dibenzofuran	mg/kg		0.27	0.02		0.13

Table C.7
Chemistry Data for Sediment Samples

Event	Interim Action Sampling (Floyd|Snider)				
Location	SC-14	SC-15	SC-15	SC-15	SC-16
Sample ID	**SC-14-5-6-020915**	**SC-15-1-2-021115**	**SC-15-2-3-021115**	**SC-15-3-4-021115**	**SC-16-1-2-020915**
Depth	5-6 ft	1-2 ft	2-3 ft	3-4 ft	1-2 ft
Date	02/09/2015	02/11/2015	02/11/2015	02/11/2015	02/09/2015

Table C.7
Chemistry Data for Sediment Samples

		Event	Interim Action Sampling (Floyd|Snider)				
		Location	SC-16	SC-16	SC-16	SC-16	SC-16
		Sample ID	**SC-16-2-3-020915**	**SC-16-3-4-020915**	**SC-16-4-5-020915**	**SC-16-5-6-020915**	**SC-36-2-3-020915**
		Depth	2-3 ft	3-4 ft	4-5 ft	5-6 ft	2-3 ft
		Date	02/09/2015	02/09/2015	02/09/2015	02/09/2015	02/09/2015
Conventionals							
Total Organic Carbon	%		8.62				3.93
Total Solids	%		48.2				48.75
Metals							
Arsenic	mg/kg		25	12	5 U	30 U	20 U
Copper	mg/kg		243	99.3	11.2	15	354
Zinc	mg/kg		434	101	29	29	300
Polychlorinated Biphenyls (PCBs)							
Aroclor 1016	mg/kg		0.019 U	0.0037 U	0.0037 U	0.0037 U	0.02 U
Aroclor 1221	mg/kg		0.019 U	0.0037 U	0.0037 U	0.0037 U	0.02 U
Aroclor 1232	mg/kg		0.019 U	0.0037 U	0.0037 U	0.0037 U	0.02 U
Aroclor 1242	mg/kg		0.019 U	0.0037 U	0.0037 U	0.0037 U	0.02 U
Aroclor 1248	mg/kg		0.29 UY	0.037 UY	0.0037 U	0.0037 U	0.2 UY
Aroclor 1254	mg/kg		0.35	0.052	0.0024 JQ	0.0037 U	0.31
Aroclor 1260	mg/kg		0.34	0.1	0.0039	0.0037 U	0.34
Total PCBs	mg/kg		0.69	0.15	0.0063 J	0.0037 U	0.65
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
Benz(a)anthracene	mg/kg		1.2 J	0.14	0.0035 JQ	0.0047 U	1.1 J
Benzo(a)pyrene	mg/kg		1.5 J	0.15	0.0042 JQ	0.0047 U	1.2 J
Benzofluoranthenes (total)	mg/kg		3.2	0.33	0.0099	0.0047	2.9
Chrysene	mg/kg		2 J	0.22	0.005	0.0046 JQ	2
Dibenzo(a,h)anthracene	mg/kg		0.22	0.02	0.0048 U	0.0047 U	0.17
Indeno(1,2,3-cd)pyrene	mg/kg		0.69	0.07	0.0048 U	0.0047 U	0.58
cPAHs (MTCA TEQ-HalfND)	mg/kg		2.1 J	0.21	0.0061 J	0.0036 J	1.7 J
cPAHs (MTCA TEQ-ZeroND)	mg/kg		2.1 J	0.21	0.0056 J	0.00052 J	1.7 J
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Total LPAHs	mg/kg		4.2 J	0.5	0.011 J	0.0087 J	4 J
Naphthalene	mg/kg		0.28 J	0.079	0.0033 JQ	0.0048	0.34 J
Acenaphthylene	mg/kg		0.1	0.019	0.0048 U	0.0047 U	0.14
Acenaphthene	mg/kg		0.24	0.039	0.0048 U	0.0047 U	0.22
Fluorene	mg/kg		0.41	0.05	0.0048 U	0.0047 U	0.41
Phenanthrene	mg/kg		2.5 J	0.23	0.0051	0.0039 JQ	2.3
Anthracene	mg/kg		0.71	0.085	0.0026 JQ	0.0047 U	0.62
1-Methylnaphthalene	mg/kg		0.075	0.013	0.0048 U	0.0047 U	0.073
2-Methylnaphthalene	mg/kg		0.098	0.023	0.0048 U	0.0047 U	0.67
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Total HPAHs	mg/kg		17 J	2	0.051 J	0.02 J	15 J
Fluoranthene	mg/kg		3.2 J	0.38	0.01	0.0042 JQ	2.9
Pyrene	mg/kg		4.7 J	0.59	0.016	0.0064	3.6
Benzo(g,h,i)perylene	mg/kg		0.78	0.077	0.0028 JQ	0.0047 U	0.62
Other SVOCs							
Dibenzofuran	mg/kg		0.24	0.046	0.0048 U	0.0047 U	0.28

Table C.7
Chemistry Data for Sediment Samples

Event	Interim Action Sampling (Floyd|Snider)				
Location	SC-16	SC-16	SC-16	SC-16	SC-16
Sample ID	**SC-16-2-3-020915**	**SC-16-3-4-020915**	**SC-16-4-5-020915**	**SC-16-5-6-020915**	**SC-36-2-3-020915**
Depth	2-3 ft	3-4 ft	4-5 ft	5-6 ft	2-3 ft
Date	02/09/2015	02/09/2015	02/09/2015	02/09/2015	02/09/2015

Table C.7
Chemistry Data for Sediment Samples

		Event	Interim Action Sampling (Floyd|Snider)				
		Location	SC-17	SC-17	SC-17	SC-17	SC-17
		Sample ID	**SC-17-1-2-020915**	**SC-17-2-3-020915**	**SC-17-3-4-020915**	**SC-17-4-5-020915**	**SC-17-5-6-020915**
		Depth	1-2 ft	2-3 ft	3-4 ft	4-5 ft	5-6 ft
		Date	02/09/2015	02/09/2015	02/09/2015	02/09/2015	02/09/2015
Conventionals							
Total Organic Carbon	%		1.74	3.65			
Total Solids	%		52.83	53.44			
Metals							
Arsenic	mg/kg		20 U	20 U			
Copper	mg/kg		221	151			
Zinc	mg/kg		215	183			
Polychlorinated Biphenyls (PCBs)							
Aroclor 1016	mg/kg		0.02 U	0.019 U	0.0038 U	0.0038 U	0.0038 U
Aroclor 1221	mg/kg		0.02 U	0.019 U	0.0038 U	0.0038 U	0.0038 U
Aroclor 1232	mg/kg		0.02 U	0.019 U	0.0038 U	0.0038 U	0.0038 U
Aroclor 1242	mg/kg		0.02 U	0.019 U	0.0038 U	0.0038 U	0.0038 U
Aroclor 1248	mg/kg		0.098 UY	0.14 UY	0.0038 U	0.0038 U	0.0038 U
Aroclor 1254	mg/kg		0.14	0.43	0.0038 U	0.0038 U	0.0038 U
Aroclor 1260	mg/kg		0.1 J	0.7	0.01 J	0.0038 U	0.0038 U
Total PCBs	mg/kg		0.24 J	1.1	0.01 J	0.0038 U	0.0038 U
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
Benz(a)anthracene	mg/kg		0.77	1.2 J	0.83	0.069	0.0049 U
Benzo(a)pyrene	mg/kg		1	1.5 J	1	0.072	0.0049 U
Benzofluoranthenes (total)	mg/kg		2.3	3.7	1.8	0.14	0.0049 U
Chrysene	mg/kg		1.4	2.9 J	1.1	0.085	0.0049 U
Dibenzo(a,h)anthracene	mg/kg		0.14	0.19	0.13	0.0068	0.0049 U
Indeno(1,2,3-cd)pyrene	mg/kg		0.41	0.59	0.49	0.037	0.0049 U
cPAHs (MTCA TEQ-HalfND)	mg/kg		1.4	2.1 J	1.3	0.098	0.0035 U
cPAHs (MTCA TEQ-ZeroND)	mg/kg		1.4	2.1 J	1.3	0.098	0.0049 U
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Total LPAHs	mg/kg		1.5	4.8 J	5.4	0.74	0.016 J
Naphthalene	mg/kg		0.18	0.87 J	1.7	0.26	0.0075
Acenaphthylene	mg/kg		0.11	0.21	0.32	0.043	0.0049 U
Acenaphthene	mg/kg		0.083	0.43	0.36	0.052	0.0036 JQ
Fluorene	mg/kg		0.14	0.37	0.48	0.058	0.0049 U
Phenanthrene	mg/kg		0.57	2.1 J	1.8	0.23	0.0044 JQ
Anthracene	mg/kg		0.38	0.79	0.78	0.095	0.0049 U
1-Methylnaphthalene	mg/kg		0.038	0.16	0.22	0.032	0.0049 U
2-Methylnaphthalene	mg/kg		0.12	0.21	0.36	0.033	0.0049 U
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Total HPAHs	mg/kg		10	29 J	13	1	0.015
Fluoranthene	mg/kg		0.88	7.2	2.6	0.28	0.008
Pyrene	mg/kg		2.8	11	4	0.3	0.0073
Benzo(g,h,i)perylene	mg/kg		0.45	0.63	0.61	0.055	0.0049 U
Other SVOCs							
Dibenzofuran	mg/kg		0.1	0.36	0.45	0.05	0.0049 U

Table C.7
Chemistry Data for Sediment Samples

Event	Interim Action Sampling (Floyd|Snider)				
Location	SC-17	SC-17	SC-17	SC-17	SC-17
Sample ID	**SC-17-1-2-020915**	**SC-17-2-3-020915**	**SC-17-3-4-020915**	**SC-17-4-5-020915**	**SC-17-5-6-020915**
Depth	1-2 ft	2-3 ft	3-4 ft	4-5 ft	5-6 ft
Date	02/09/2015	02/09/2015	02/09/2015	02/09/2015	02/09/2015

Table C.7
Chemistry Data for Sediment Samples

		Event	Interim Action Sampling (Floyd|Snider)				
		Location	SC-18	SC-18	SC-19	SC-19	SC-19
		Sample ID	**SC-18-1-2-021115**	**SC-18-2-3-021115**	**SC-19-1-2-021115**	**SC-19-2-3-021115**	**SC-19-3-4-021115**
		Depth	1-2 ft	2-3 ft	1-2 ft	2-3 ft	3-4 ft
		Date	02/11/2015	02/11/2015	02/11/2015	02/11/2015	02/11/2015
Conventionals							
Total Organic Carbon	%		1.65	0.285	0.52	1.19	
Total Solids	%		63.91	92.13	61.86	70.17	
Grain Size							
Gravel	%				32.8		
GS 1000 - 2000 µm	%				23.6		
GS 500 - 1000 µm	%				15.3		
GS 250 - 500 µm	%				7.4		
GS 125 - 250 µm	%				2.9		
GS 62.5 - 125 µm	%				1.5		
GS 31.3 - 62.5 µm	%				0.9		
GS 15.6 - 31.3 µm	%				12.7		
GS 7.8 - 15.6 µm	%				0.4		
GS 3.9 - 7.8 µm	%				0.3		
GS 1.95 - 3.9 µm	%				0.2		
GS 0.98 - 1.95 µm	%				0.1		
GS <0.98 µm	%				1.7		
Fines	%				16.3		
Metals							
Arsenic	mg/kg		11	6	90	70	8
Copper	mg/kg		57.7 J	9.1	290 J	211 J	16.4
Zinc	mg/kg		242 J	26	883 J	559 J	36
Polychlorinated Biphenyls (PCBs)							
Aroclor 1016	mg/kg		0.0038 U	0.0039 U	0.0037 U	0.0049 U	0.0038 U
Aroclor 1221	mg/kg		0.0038 U	0.0039 U	0.0037 U	0.0049 U	0.0038 U
Aroclor 1232	mg/kg		0.0038 U	0.0039 U	0.0037 U	0.0049 U	0.0038 U
Aroclor 1242	mg/kg		0.0038 U	0.0039 U	0.0037 U	0.0049 U	0.0038 U
Aroclor 1248	mg/kg		0.019 UY	0.0039 U	0.019 UY	0.049 UY	0.0038 U
Aroclor 1254	mg/kg		0.033	0.0039 U	0.034	0.13	0.0052
Aroclor 1260	mg/kg		0.049 J	0.0054	0.05 J	0.39	0.012
Total PCBs	mg/kg		0.082 J	0.0054	0.084 J	0.52	0.017
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
Benz(a)anthracene	mg/kg		0.41	0.12	0.15	1.3	0.031
Benzo(a)pyrene	mg/kg		0.43	0.11	0.2 J	1	0.04
Benzofluoranthenes (total)	mg/kg		0.79	0.19	0.49 J	2.7	0.076
Chrysene	mg/kg		0.51	0.13	0.29	1.5	0.043
Dibenzo(a,h)anthracene	mg/kg		0.067	0.018	0.03	0.14	0.007
Indeno(1,2,3-cd)pyrene	mg/kg		0.2	0.053	0.088	0.45	0.036
cPAHs (MTCA TEQ-HalfND)	mg/kg		0.58	0.15	0.28 J	1.5	0.055
cPAHs (MTCA TEQ-ZeroND)	mg/kg		0.58	0.15	0.28 J	1.5	0.055
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Total LPAHs	mg/kg		1.2 J	0.31 J	0.38 J	1.4 J	0.19

Table C.7
Chemistry Data for Sediment Samples

		Event	Interim Action Sampling (Floyd|Snider)				
		Location	SC-18	SC-18	SC-19	SC-19	SC-19
		Sample ID	**SC-18-1-2-021115**	**SC-18-2-3-021115**	**SC-19-1-2-021115**	**SC-19-2-3-021115**	**SC-19-3-4-021115**
		Depth	1-2 ft	2-3 ft	1-2 ft	2-3 ft	3-4 ft
		Date	02/11/2015	02/11/2015	02/11/2015	02/11/2015	02/11/2015
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Naphthalene	mg/kg		0.23	0.016	0.053 J	0.22 J	0.058
Acenaphthylene	mg/kg		0.11	0.018	0.029	0.13	0.027
Acenaphthene	mg/kg		0.044	0.0043 JQ	0.017	0.072	0.0096
Fluorene	mg/kg		0.088	0.016	0.034	0.11	0.013
Phenanthrene	mg/kg		0.52	0.2	0.17	0.52	0.061
Anthracene	mg/kg		0.2 J	0.057	0.073	0.31 J	0.023
1-Methylnaphthalene	mg/kg		0.031	0.003 JQ	0.014	0.032	0.0094
2-Methylnaphthalene	mg/kg		0.058	0.0043 JQ	0.02	0.056	0.012
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Total HPAHs	mg/kg		5.3 J	1.3	3.1 J	15	0.49
Fluoranthene	mg/kg		1	0.29	0.42	3.4	0.091
Pyrene	mg/kg		1.7	0.29	1.3	3.8	0.12
Benzo(g,h,i)perylene	mg/kg		0.22 J	0.059	0.09 J	0.42	0.047
Other SVOCs							
Dibenzofuran	mg/kg		0.068	0.0071	0.031	0.086	0.0093

Table C.7
Chemistry Data for Sediment Samples

		Event	Interim Action Sampling (Floyd|Snider)				
		Location	SC-19	SC-19	SC-20	SC-20	SC-20
		Sample ID	**SC-19-4-5-021115**	**SC-19-5-6-021115**	**SC-20-1-2-021015**	**SC-20-2-3-021015**	**SC-20-3-4-021015**
		Depth	4-5 ft	5-6 ft	1-2 ft	2-3 ft	3-4 ft
		Date	02/11/2015	02/11/2015	02/10/2015	02/10/2015	02/10/2015
Conventionals							
Total Organic Carbon	%				1.74	3.11	
Total Solids	%				59.9	48.14	
Metals							
Arsenic	mg/kg		7	5 U	30	20	15
Copper	mg/kg		11.3	8.6	368	478 J	44.3
Zinc	mg/kg		33	25	483	333 J	92
Polychlorinated Biphenyls (PCBs)							
Aroclor 1016	mg/kg		0.0038 U	0.0037 U	0.0038 U	0.0039 U	0.0038 U
Aroclor 1221	mg/kg		0.0038 U	0.0037 U	0.0038 U	0.0039 U	0.0038 U
Aroclor 1232	mg/kg		0.0038 U	0.0037 U	0.0038 U	0.0039 U	0.0038 U
Aroclor 1242	mg/kg		0.0038 U	0.0037 U	0.0038 U	0.0039 U	0.0038 U
Aroclor 1248	mg/kg		0.0038 U	0.0037 U	0.15 UY	0.39 UY	0.0094 UY
Aroclor 1254	mg/kg		0.0038 U	0.0037 U	0.8	1.3	0.015
Aroclor 1260	mg/kg		0.0038 U	0.0037 U	0.2 J	0.43 J	0.076 UY
Total PCBs	mg/kg		0.0038 U	0.0037 U	1 J	1.7 J	0.015
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
Benz(a)anthracene	mg/kg		0.0048 U	0.0048 U	0.46	1.2	0.66
Benzo(a)pyrene	mg/kg		0.0048 U	0.0048 U	0.54	1.9	0.82
Benzofluoranthenes (total)	mg/kg		0.0048 U	0.0048 U	1.3	4.5	1.4
Chrysene	mg/kg		0.0048 U	0.0048 U	0.79	3.3	0.75
Dibenzo(a,h)anthracene	mg/kg		0.0048 U	0.0048 U	0.081	0.27	0.096
Indeno(1,2,3-cd)pyrene	mg/kg		0.0048 U	0.0048 U	0.26	0.83	0.44
cPAHs (MTCA TEQ-HalfND)	mg/kg		0.0034 U	0.0034 U	0.76	2.6	1.1
cPAHs (MTCA TEQ-ZeroND)	mg/kg		0.0048 U	0.0048 U	0.76	2.6	1.1
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Total LPAHs	mg/kg		0.019 J	0.0046 J	1.1	3	3.8
Naphthalene	mg/kg		0.0056	0.0046 JQ	0.13	0.76	1.1
Acenaphthylene	mg/kg		0.0048 U	0.0048 U	0.066	0.19	0.33
Acenaphthene	mg/kg		0.0028 JQ	0.0048 U	0.056	0.25	0.19
Fluorene	mg/kg		0.0048 U	0.0048 U	0.082	0.26	0.28
Phenanthrene	mg/kg		0.0081	0.0048 U	0.6	0.92	1.3
Anthracene	mg/kg		0.0024 JQ	0.0048 U	0.18	0.59	0.57
1-Methylnaphthalene	mg/kg		0.0048 U	0.0048 U	0.045	0.12	0.12
2-Methylnaphthalene	mg/kg		0.0048 U	0.0048 U	0.078	0.22	0.21
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Total HPAHs	mg/kg		0.031	0.0048 U	7.2	21	9.7
Fluoranthene	mg/kg		0.012	0.0048 U	1.4	2.5	2.1
Pyrene	mg/kg		0.019	0.0048 U	2.1	5.8	2.8
Benzo(g,h,i)perylene	mg/kg		0.0048 U	0.0048 U	0.29	0.91	0.68
Other SVOCs							
Dibenzofuran	mg/kg		0.0048 U	0.0048 U	0.067	0.25	0.24

Table C.7
Chemistry Data for Sediment Samples

Event	Interim Action Sampling (Floyd|Snider)				
Location	SC-19	SC-19	SC-20	SC-20	SC-20
Sample ID	**SC-19-4-5-021115**	**SC-19-5-6-021115**	**SC-20-1-2-021015**	**SC-20-2-3-021015**	**SC-20-3-4-021015**
Depth	4-5 ft	5-6 ft	1-2 ft	2-3 ft	3-4 ft
Date	02/11/2015	02/11/2015	02/10/2015	02/10/2015	02/10/2015

Table C.7
Chemistry Data for Sediment Samples

		Event	Interim Action Sampling (Floyd|Snider)				
		Location	SC-20	SC-20	SC-20	SC-21	SC-21
		Sample ID	**SC-20-4-5-021015**	**SC-20-5-6-021015**	**SC-30-1-2-021015**	**SC-21-1-2-021015**	**SC-21-2-3-021015**
		Depth	4-5 ft	5-6 ft	1-2 ft	1-2 ft	2-3 ft
		Date	02/10/2015	02/10/2015	02/10/2015	02/10/2015	02/10/2015
Conventionals							
Total Organic Carbon	%				1.41	0.659	0.253
Total Solids	%				58.34	81.48	87.1
Metals							
Arsenic	mg/kg		8	5 U	50	8	6 U
Copper	mg/kg		15	7.7	554	25.4	10.8
Zinc	mg/kg		34	27	1110	42	28
Polychlorinated Biphenyls (PCBs)							
Aroclor 1016	mg/kg		0.0037 U	0.0037 U	0.0038 U	0.0042 U	0.0029 U
Aroclor 1221	mg/kg		0.0037 U	0.0037 U	0.0038 U	0.0042 U	0.0029 U
Aroclor 1232	mg/kg		0.0037 U	0.0037 U	0.0038 U	0.0042 U	0.0029 U
Aroclor 1242	mg/kg		0.0037 U	0.0037 U	0.0038 U	0.0042 U	0.0029 U
Aroclor 1248	mg/kg		0.0037 U	0.0037 U	0.38 UY	0.01 UY	0.0029 U
Aroclor 1254	mg/kg		0.0037 U	0.0037 U	1.7	0.013	0.0029 U
Aroclor 1260	mg/kg		0.037 UY	0.0037 U	0.096 UY	0.027	0.0029 U
Total PCBs	mg/kg		0.037 UY	0.0037 U	1.7	0.04	0.0029 U
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
Benz(a)anthracene	mg/kg		0.045	0.0047 U	0.29	0.1	0.012
Benzo(a)pyrene	mg/kg		0.055	0.0047 U	0.46	0.13	0.016
Benzofluoranthenes (total)	mg/kg		0.089	0.0051	1.1	0.23	0.03
Chrysene	mg/kg		0.048	0.0047 U	0.66	0.13	0.016
Dibenzo(a,h)anthracene	mg/kg		0.009	0.0047 U	0.069	0.019	0.0048 U
Indeno(1,2,3-cd)pyrene	mg/kg		0.029	0.0047 U	0.21	0.066	0.0079
cPAHs (MTCA TEQ-HalfND)	mg/kg		0.073	0.0036	0.63	0.17	0.021
cPAHs (MTCA TEQ-ZeroND)	mg/kg		0.073	0.00051	0.63	0.17	0.021
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Total LPAHs	mg/kg		0.18	0.0055 J	0.96	0.59	0.053 J
Naphthalene	mg/kg		0.04	0.003 JQ	0.12	0.12	0.013
Acenaphthylene	mg/kg		0.019	0.0047 U	0.047	0.048	0.0035 JQ
Acenaphthene	mg/kg		0.0079	0.0047 U	0.061	0.033	0.0038 JQ
Fluorene	mg/kg		0.013	0.0047 U	0.084	0.054	0.005
Phenanthrene	mg/kg		0.072	0.0025 JQ	0.44	0.23	0.02
Anthracene	mg/kg		0.028	0.0047 U	0.21	0.1	0.0076
1-Methylnaphthalene	mg/kg		0.0052	0.0047 U	0.029	0.017	0.0028 JQ
2-Methylnaphthalene	mg/kg		0.0094	0.0047 U	0.055	0.025	0.0043 JQ
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Total HPAHs	mg/kg		0.62	0.015 J	5	1.5	0.18
Fluoranthene	mg/kg		0.13	0.0035 JQ	0.59	0.31	0.028
Pyrene	mg/kg		0.17	0.0064	1.4	0.44	0.064
Benzo(g,h,i)perylene	mg/kg		0.041	0.0047 U	0.23	0.099	0.011
Other SVOCs							
Dibenzofuran	mg/kg		0.01	0.0047 U	0.062	0.038	0.004 JQ

Table C.7
Chemistry Data for Sediment Samples

Event	Interim Action Sampling (Floyd|Snider)				
Location	SC-20	SC-20	SC-20	SC-21	SC-21
Sample ID	**SC-20-4-5-021015**	**SC-20-5-6-021015**	**SC-30-1-2-021015**	**SC-21-1-2-021015**	**SC-21-2-3-021015**
Depth	4-5 ft	5-6 ft	1-2 ft	1-2 ft	2-3 ft
Date	02/10/2015	02/10/2015	02/10/2015	02/10/2015	02/10/2015

Table C.7
Chemistry Data for Sediment Samples

		Event	Interim Action Sampling (Floyd|Snider)				
		Location	SC-22	SC-22	SC-23	SC-23	SC-24
		Sample ID	**SC-22-1-2-021015**	**SC-22-2-3-021015**	**SC-23-1-2-021015**	**SC-23-2-3-021015**	**SC-24-0-0.39-021315**
		Depth	1-2 ft	2-3 ft	1-2 ft	2-3 ft	0-0.39 ft
		Date	02/10/2015	02/10/2015	02/10/2015	02/10/2015	02/13/2015
Conventionals							
Total Organic Carbon	%		1.45	0.814	0.193	0.258	2.82
Total Solids	%		76.85	81.14	79.22	82.27	33.97
Grain Size							
Gravel	%						0.2
GS 1000 - 2000 µm	%						0.2
GS 500 - 1000 µm	%						0.4
GS 250 - 500 µm	%						0.6
GS 125 - 250 µm	%						0.9
GS 62.5 - 125 µm	%						1.1
GS 31.3 - 62.5 µm	%						5.1
GS 15.6 - 31.3 µm	%						12.1
GS 7.8 - 15.6 µm	%						19
GS 3.9 - 7.8 µm	%						14.7
GS 1.95 - 3.9 µm	%						12.9
GS 0.98 - 1.95 µm	%						11.1
GS <0.98 µm	%						21.7
Fines	%						96.7
Metals							
Arsenic	mg/kg		10	7	6 U	6	13.6 JQ
Copper	mg/kg		13.3	9.3	9	10.5	86.7
Zinc	mg/kg		30	21	19	22	147
Polychlorinated Biphenyls (PCBs)							
Aroclor 1016	mg/kg		0.0039 U	0.0038 U	0.0038 U	0.0038 U	0.004 U
Aroclor 1221	mg/kg		0.0039 U	0.0038 U	0.0038 U	0.0038 U	0.004 U
Aroclor 1232	mg/kg		0.0039 U	0.0038 U	0.0038 U	0.0038 U	0.004 U
Aroclor 1242	mg/kg		0.0039 U	0.0038 U	0.0038 U	0.0038 U	0.004 U
Aroclor 1248	mg/kg		0.0039 U	0.0038 U	0.0038 U	0.0038 U	0.02 UY
Aroclor 1254	mg/kg		0.0039 U	0.0038 U	0.0038 U	0.0038 U	0.03 J
Aroclor 1260	mg/kg		0.0039 U	0.0038 U	0.0038 U	0.0038 U	0.026 J
Total PCBs	mg/kg		0.0039 U	0.0038 U	0.0038 U	0.0038 U	0.056 J
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
Benz(a)anthracene	mg/kg		0.023	0.0047 U	0.0047 U	0.0047 U	0.12
Benzo(a)pyrene	mg/kg		0.029	0.0047 U	0.0047 U	0.0047 U	0.11
Benzofluoranthenes (total)	mg/kg		0.048	0.0047 U	0.0047 U	0.0047 U	0.25
Chrysene	mg/kg		0.031	0.0047 U	0.0047 U	0.0047 U	0.21
Dibenzo(a,h)anthracene	mg/kg		0.0043 JQ	0.0047 U	0.0047 U	0.0047 U	0.017
Indeno(1,2,3-cd)pyrene	mg/kg		0.016	0.0047 U	0.0047 U	0.0047 U	0.056
cPAHs (MTCA TEQ-HalfND)	mg/kg		0.038 J	0.0033 U	0.0033 U	0.0033 U	0.16
cPAHs (MTCA TEQ-ZeroND)	mg/kg		0.038 J	0.0047 U	0.0047 U	0.0047 U	0.16
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Total LPAHs	mg/kg		0.13	0.008 J	0.0047 U	0.0047 U	0.59

Table C.7
Chemistry Data for Sediment Samples

		Event	Interim Action Sampling (Floyd|Snider)				
		Location	SC-22	SC-22	SC-23	SC-23	SC-24
		Sample ID	**SC-22-1-2-021015**	**SC-22-2-3-021015**	**SC-23-1-2-021015**	**SC-23-2-3-021015**	**SC-24-0-0.39-021315**
		Depth	1-2 ft	2-3 ft	1-2 ft	2-3 ft	0-0.39 ft
		Date	02/10/2015	02/10/2015	02/10/2015	02/10/2015	02/13/2015
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Naphthalene	mg/kg		0.035	0.0044 JQ	0.0047 U	0.0047 U	0.16
Acenaphthylene	mg/kg		0.01	0.0047 U	0.0047 U	0.0047 U	0.027
Acenaphthene	mg/kg		0.0081	0.0047 U	0.0047 U	0.0047 U	0.025
Fluorene	mg/kg		0.01	0.0047 U	0.0047 U	0.0047 U	0.042
Phenanthrene	mg/kg		0.052	0.0036 JQ	0.0047 U	0.0047 U	0.23
Anthracene	mg/kg		0.019	0.0047 U	0.0047 U	0.0047 U	0.11
1-Methylnaphthalene	mg/kg		0.0049	0.0047 U	0.0047 U	0.0047 U	0.028
2-Methylnaphthalene	mg/kg		0.0094	0.0047 U	0.0047 U	0.0047 U	0.14
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Total HPAHs	mg/kg		0.33 J	0.011	0.0092 J	0.0047 U	1.5
Fluoranthene	mg/kg		0.067	0.0047	0.0044 JQ	0.0047 U	0.33
Pyrene	mg/kg		0.086	0.0067	0.0048	0.0047 U	0.34
Benzo(g,h,i)perylene	mg/kg		0.022	0.0047 U	0.0047 U	0.0047 U	0.072
Other SVOCs							
Dibenzofuran	mg/kg		0.0088	0.0047 U	0.0047 U	0.0047 U	0.054

Table C.7
Chemistry Data for Sediment Samples

		Event	Interim Action Sampling (Floyd|Snider)				
		Location	SC-25	SC-26			
		Sample ID	**SC-25-0-0.39-021315**	**SC-26-0-0.39-021315**			
		Depth	0-0.39 ft	0-0.39 ft			
		Date	02/13/2015	02/13/2015			
Conventionals							
Total Organic Carbon	%		2.65	2.48			
Total Solids	%		29.87	44.28			
Metals							
Arsenic	mg/kg		12.2 JQ	20			
Copper	mg/kg		81.1	117			
Zinc	mg/kg		142	176			
Polychlorinated Biphenyls (PCBs)							
Aroclor 1016	mg/kg		0.004 U	0.0039 U			
Aroclor 1221	mg/kg		0.004 U	0.0039 U			
Aroclor 1232	mg/kg		0.004 U	0.0039 U			
Aroclor 1242	mg/kg		0.004 U	0.0039 U			
Aroclor 1248	mg/kg		0.02 UY	0.039 UY			
Aroclor 1254	mg/kg		0.018 J	0.073			
Aroclor 1260	mg/kg		0.022 J	0.41			
Total PCBs	mg/kg		0.04 J	0.48			
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
Benz(a)anthracene	mg/kg		0.16	0.44			
Benzo(a)pyrene	mg/kg		0.11	0.44			
Benzofluoranthenes (total)	mg/kg		0.23	0.94			
Chrysene	mg/kg		0.21	0.66			
Dibenzo(a,h)anthracene	mg/kg		0.014	0.067			
Indeno(1,2,3-cd)pyrene	mg/kg		0.045	0.19			
cPAHs (MTCA TEQ-HalfND)	mg/kg		0.16	0.61			
cPAHs (MTCA TEQ-ZeroND)	mg/kg		0.16	0.61			
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Total LPAHs	mg/kg		0.5	1.2			
Naphthalene	mg/kg		0.094	0.22			
Acenaphthylene	mg/kg		0.021	0.083			
Acenaphthene	mg/kg		0.022	0.062			
Fluorene	mg/kg		0.055	0.096			
Phenanthrene	mg/kg		0.2	0.52			
Anthracene	mg/kg		0.11	0.25			
1-Methylnaphthalene	mg/kg		0.025	0.04			
2-Methylnaphthalene	mg/kg		0.056	0.073			
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Total HPAHs	mg/kg		1.5	5.3			
Fluoranthene	mg/kg		0.39	0.84			
Pyrene	mg/kg		0.32	1.5			
Benzo(g,h,i)perylene	mg/kg		0.054	0.23			
Other SVOCs							
Dibenzofuran	mg/kg		0.049	0.078			

Table C.7
Chemistry Data for Sediment Samples

Event	Interim Action Sampling (Floyd|Snider)				
Location	SC-25	SC-26			
Sample ID	**SC-25-0-0.39-021315**	**SC-26-0-0.39-021315**			
Depth	0-0.39 ft	0-0.39 ft			
Date	02/13/2015	02/13/2015			

Table C.8
Chemistry Data for Groundwater Samples

		Event	Phase 2 Groundwater Sampling (RETEC)				
		Location	MW-01	MW-01	MW-02	MW-02	MW-03
		Sample ID	**MW-1-98**	**MW-1-98-F**	**MW-2-98**	**MW-2-98-F**	**MW-3-98**
		Date	05/14/1998	05/14/1998	05/14/1998	05/14/1998	05/14/1998
Dissolved Metals							
Antimony	µg/L			1 U		5 U	
Arsenic	µg/L			4		2	
Beryllium	µg/L			1 U		1 U	
Cadmium	µg/L			2 U		2 U	
Chromium	µg/L			5 U		5 U	
Copper	µg/L			2 U		3	
Lead	µg/L			1 U		5 U	
Mercury (inorganic)	µg/L			0.1 U		0.1 U	
Nickel	µg/L			10 U		10 U	
Selenium	µg/L			2 U		10 U	
Silver	µg/L			3 U		3 U	
Thallium	µg/L			1 U		10 U	
Zinc	µg/L			4 U		71	
Total Metals							
Antimony	µg/L		3 J		6		1 U
Arsenic	µg/L		34		24		12
Beryllium	µg/L		2		1 U		1 U
Cadmium	µg/L		2 U		5		5
Chromium	µg/L		205		255		149
Copper	µg/L		248		194		72
Lead	µg/L		116		72		41
Mercury (inorganic)	µg/L		0.4		0.3		0.1 U
Nickel	µg/L		280		250		120
Selenium	µg/L		6		5 U		1 U
Silver	µg/L		3 U		3 U		3 U
Thallium	µg/L		5 U		5 U		5 U
Zinc	µg/L		352		459		163
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Naphthalene	µg/L		14		5 U		5 U
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH							
1,3,5-Trimethylbenzene	µg/L		6.4		1 U		1 U
Benzene	µg/L		1 U		1 U		1 U
Ethylbenzene	µg/L		1.4		1 U		1 U
Iso-Propylbenzene	µg/L		3.4		1 U		1 U
n-Propylbenzene	µg/L		2.9		1 U		1 U
Toluene	µg/L		1 U		1 U		1 U
Xylenes (meta & para)	µg/L		6.6		1 U		1 U
Xylene (ortho)	µg/L		2.5		1 U		1 U
Other VOCs							
1,2,4-Trimethylbenzene	µg/L		15		1 U		1 U
Acetone	µg/L		9 JB		5.9 JB		9.5 JB
Cymene	µg/L		4.5		1 U		1 U

Table C.8
Chemistry Data for Groundwater Samples

		Event	Phase 2 Groundwater Sampling (RETEC)				
		Location	MW-01	MW-01	MW-02	MW-02	MW-03
		Sample ID	**MW-1-98**	**MW-1-98-F**	**MW-2-98**	**MW-2-98-F**	**MW-3-98**
		Date	05/14/1998	05/14/1998	05/14/1998	05/14/1998	05/14/1998
Other VOCs							
n-Butylbenzene	µg/L		1.5		1 U		1 U
sec-Butylbenzene	µg/L		1.8		1 U		1 U
Total Petroleum Hydrocarbons (TPH)							
Gasoline-Range Hydrocarbons	µg/L		580		250 U		250 U
Diesel-Range Hydrocarbons	µg/L		4600		400		250 U
Oil-Range Hydrocarbons	µg/L		500 U		500 U		500 U

Table C.8
Chemistry Data for Groundwater Samples

	Event	Phase 2 Groundwater Sampling (RETEC)				
	Location	MW-03	MW-03	MW-03	MW-04	MW-04
	Sample ID	**MW-3-98 Dup**	**MW-3-98-F**	**MW-3-98-F Dup**	**MW-4-98**	**MW-4-98-F**
	Date	05/14/1998	05/14/1998	05/14/1998	05/14/1998	05/14/1998
Dissolved Metals						
Antimony	µg/L		1 U	1 U		1 U
Arsenic	µg/L		1 U	1 U		4
Beryllium	µg/L		1 U	1 U		1 U
Cadmium	µg/L		2 U	2 U		2 U
Chromium	µg/L		5 U	5 U		5 U
Copper	µg/L		2 U	2 U		4
Lead	µg/L		1 U	1 U		1 U
Mercury (inorganic)	µg/L		0.1 U	0.1 U		0.1 U
Nickel	µg/L		10 U	10 U		30
Selenium	µg/L		1 U	1 U		1 U
Silver	µg/L		3 U	3 U		3 U
Thallium	µg/L		1 U	1 U		1 U
Zinc	µg/L		4 U	4 U		4 U
Total Metals						
Antimony	µg/L	1 U			1 U	
Arsenic	µg/L	12			82	
Beryllium	µg/L	1 U			2	
Cadmium	µg/L	6			2 U	
Chromium	µg/L	151			176	
Copper	µg/L	83			310	
Lead	µg/L	47			102	
Mercury (inorganic)	µg/L	0.2			0.6	
Nickel	µg/L	120			330	
Selenium	µg/L	2 U			5 U	
Silver	µg/L	3 U			3 U	
Thallium	µg/L	5 U			5 U	
Zinc	µg/L	178			317	
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Naphthalene	µg/L	5 U			5 U	
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH						
1,3,5-Trimethylbenzene	µg/L	1 U			1 U	
Benzene	µg/L	1 U			1 U	
Ethylbenzene	µg/L	1 U			1 U	
Iso-Propylbenzene	µg/L	1 U			1 U	
n-Propylbenzene	µg/L	1 U			1 U	
Toluene	µg/L	1 U			1 U	
Xylenes (meta & para)	µg/L	1 U			1 U	
Xylene (ortho)	µg/L	1 U			1 U	
Other VOCs						
1,2,4-Trimethylbenzene	µg/L	1 U			1 U	
Acetone	µg/L	8.6 JB			5.5 JB	
Cymene	µg/L	1 U			1 U	

Table C.8
Chemistry Data for Groundwater Samples

		Event	Phase 2 Groundwater Sampling (RETEC)				
		Location	MW-03	MW-03	MW-03	MW-04	MW-04
		Sample ID	**MW-3-98 Dup**	**MW-3-98-F**	**MW-3-98-F Dup**	**MW-4-98**	**MW-4-98-F**
		Date	05/14/1998	05/14/1998	05/14/1998	05/14/1998	05/14/1998
Other VOCs							
n-Butylbenzene	µg/L		1 U			1 U	
sec-Butylbenzene	µg/L		1 U			1 U	
Total Petroleum Hydrocarbons (TPH)							
Gasoline-Range Hydrocarbons	µg/L		250 U			250 U	
Diesel-Range Hydrocarbons	µg/L		250 U			730	
Oil-Range Hydrocarbons	µg/L		500 U			500 U	

Table C.8
Chemistry Data for Groundwater Samples

		Event	Phase 2 Groundwater Sampling (RETEC)				
		Location	MW-05	MW-05			
		Sample ID	**MW-5-98**	**MW-5-98-F**			
		Date	05/14/1998	05/14/1998			
Dissolved Metals							
Antimony	µg/L			1 U			
Arsenic	µg/L			1 U			
Beryllium	µg/L			1 U			
Cadmium	µg/L			2 U			
Chromium	µg/L			5 U			
Copper	µg/L			3			
Lead	µg/L			1 U			
Mercury (inorganic)	µg/L			0.1 U			
Nickel	µg/L			10 U			
Selenium	µg/L			1 U			
Silver	µg/L			3 U			
Thallium	µg/L			1 U			
Zinc	µg/L			4 U			
Total Metals							
Antimony	µg/L		1 U				
Arsenic	µg/L		20				
Beryllium	µg/L		9				
Cadmium	µg/L		8				
Chromium	µg/L		2120				
Copper	µg/L		1730				
Lead	µg/L		150				
Mercury (inorganic)	µg/L		4.6				
Nickel	µg/L		3810				
Selenium	µg/L		10 U				
Silver	µg/L		6 U				
Thallium	µg/L		20 U				
Zinc	µg/L		1210				
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Naphthalene	µg/L		5 U				
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH							
1,3,5-Trimethylbenzene	µg/L		1 U				
Benzene	µg/L		1 U				
Ethylbenzene	µg/L		1 U				
Iso-Propylbenzene	µg/L		1 U				
n-Propylbenzene	µg/L		1 U				
Toluene	µg/L		1 U				
Xylenes (meta & para)	µg/L		1 U				
Xylene (ortho)	µg/L		1 U				
Other VOCs							
1,2,4-Trimethylbenzene	µg/L		1 U				
Acetone	µg/L		7.6 JB				
Cymene	µg/L		1 U				

Table C.8
Chemistry Data for Groundwater Samples

		Event	Phase 2 Groundwater Sampling (RETEC)				
		Location	MW-05	MW-05			
		Sample ID	**MW-5-98**	**MW-5-98-F**			
		Date	05/14/1998	05/14/1998			
Other VOCs							
n-Butylbenzene	µg/L		1 U				
sec-Butylbenzene	µg/L		1 U				
Total Petroleum Hydrocarbons (TPH)							
Gasoline-Range Hydrocarbons	µg/L		250 U				
Diesel-Range Hydrocarbons	µg/L		250 U				
Oil-Range Hydrocarbons	µg/L		500 U				

Table C.8
Chemistry Data for Groundwater Samples

		Event	Shipyard Sediments RI/FS Intertidal Data (RETEC)				
		Location	MW-04				
		Sample ID	**HAS-MW-4**				
		Date	08/17/2005				
Dissolved Metals							
Antimony	µg/L		50 U				
Arsenic	µg/L		2				
Cadmium	µg/L		2 U				
Chromium	µg/L		5 U				
Copper	µg/L		2 U				
Lead	µg/L		2				
Mercury (inorganic)	µg/L		0.1 U				
Nickel	µg/L		10 U				
Silver	µg/L		3 U				
Zinc	µg/L		6 U				
Total Metals							
Antimony	µg/L		50 U				
Arsenic	µg/L		2				
Cadmium	µg/L		2 U				
Chromium	µg/L		5 U				
Copper	µg/L		2 U				
Lead	µg/L		2				
Mercury (inorganic)	µg/L		0.1 U				
Nickel	µg/L		10				
Silver	µg/L		3 U				
Zinc	µg/L		6 U				
Polychlorinated Biphenyls (PCBs)							
Aroclor 1016	µg/L		1 U				
Aroclor 1221	µg/L		1 U				
Aroclor 1232	µg/L		1 U				
Aroclor 1242	µg/L		1 U				
Aroclor 1248	µg/L		1 U				
Aroclor 1254	µg/L		1 U				
Aroclor 1260	µg/L		1 U				
Total PCBs	µg/L		1 U				
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
Benz(a)anthracene	µg/L		1 U				
Benzo(a)pyrene	µg/L		1 U				
Benzo(b)fluoranthene	µg/L		1 U				
Benzo(k)fluoranthene	µg/L		1 U				
Benzofluoranthenes (total)	µg/L		1 U				
Chrysene	µg/L		1 U				
Dibenzo(a,h)anthracene	µg/L		1 U				
Indeno(1,2,3-cd)pyrene	µg/L		1 U				
cPAHs (MTCA TEQ-HalfND)	µg/L		0.76 U				
cPAHs (MTCA TEQ-ZeroND)	µg/L		0 U				
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							

Table C.8
Chemistry Data for Groundwater Samples

		Event	Shipyard Sediments RI/FS Intertidal Data (RETEC)				
		Location	MW-04				
		Sample ID	**HAS-MW-4**				
		Date	08/17/2005				
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Total LPAH	µg/L		1 U				
Naphthalene	µg/L		1 U				
Acenaphthylene	µg/L		1 U				
Acenaphthene	µg/L		1 U				
Fluorene	µg/L		1 U				
Phenanthrene	µg/L		1 U				
Anthracene	µg/L		1 U				
2-Methylnaphthalene	µg/L		1 U				
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Total HPAH	µg/L		1 U				
Fluoranthene	µg/L		1 U				
Pyrene	µg/L		1 U				
Benzo(g,h,i)perylene	µg/L		1 U				
Other SVOCs							
Dibenzofuran	µg/L		1 U				
Total Petroleum Hydrocarbons (TPH)							
Gasoline-Range Hydrocarbons	µg/L		250 U				
Diesel-Range Hydrocarbons	µg/L		250 U				
Oil-Range Hydrocarbons	µg/L		500 U				

Table C.8
Chemistry Data for Groundwater Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	FS-07	FS-09	FS-09	FS-15	FS-17
	Sample ID	**FS07-GW16-031611**	**FS09-GW17-031511**	**FS09A-GW17-031511**	**FS15-GW19-031411**	**FS17-GW17-031611**
	Date	03/16/2011	03/15/2011	03/15/2011	03/14/2011	03/16/2011
Dissolved Metals						
Arsenic	µg/L	47	4.9	5.8	7	3.5
Cadmium	µg/L	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U
Calcium	mg/L	160	0.17 U	0.17 U	0.17 U	38
Chromium	µg/L	7	0.59 U	0.59 U	0.59 U	0.59 U
Copper	µg/L	9	2.6 U	2.6 U	3.6	2.6 U
Lead	µg/L	1	0.62 U	0.62 U	0.62 U	0.62 U
Mercury (inorganic)	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	µg/L	14	1.7 U	1.7 U	1.7 U	2.3
Silver	µg/L	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U
Zinc	µg/L	19	25	27	3.9 U	3.9 U
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Naphthalene	µg/L	2 U	1100	1300	1.5	2 U
Other SVOCs						
1,2,4-Trichlorobenzene	µg/L	2 U	1 U	1 U	1 U	2 U
1,2-Dichlorobenzene	µg/L	2 U	1 U	1 U	1 U	2 U
1,3-Dichlorobenzene	µg/L	2 U	1 U	1 U	1 U	2 U
Hexachlorobutadiene	µg/L	2 U	1 U	1 U	1 U	2 U
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH						
1,3,5-Trimethylbenzene	µg/L	2 U	1 U	1 U	1 U	2 U
Benzene	µg/L	2 U	1 U	1 U	1 U	2 U
Ethylbenzene	µg/L	2 U	3.1	3.2	1 U	2 U
Iso-Propylbenzene	µg/L	2 U	1.8	1.9	1 U	2 U
n-Propylbenzene	µg/L	2 U	1.8	2	1 U	2 U
Toluene	µg/L	2 U	1 U	1 U	1 U	2 U
Xylenes (meta & para)	µg/L	4 U	2.5	2.6	2 U	4 U
Xylene (ortho)	µg/L	2 U	3.8	3.7	1 U	2 U
Xylenes (total)	µg/L	4 U	6.3	6.3	2 U	4 U
Other VOCs						
1,1,1,2-Tetrachloroethane	µg/L	2 U	1 U	1 U	1 U	2 U
1,1,1-Trichloroethane	µg/L	2 U	1 U	1 U	1 U	2 U
1,1,2,2-Tetrachloroethane	µg/L	2 U	1 U	1 U	1 U	2 U
1,1,2-Trichloroethane	µg/L	2 U	1 U	1 U	1 U	2 U
1,1-Dichloroethane	µg/L	2 U	1 U	1 U	1 U	2 U
1,1-Dichloroethene	µg/L	2 U	1 U	1 U	1 U	2 U
1,1-Dichloropropene	µg/L	2 U	1 U	1 U	1 U	2 U
1,2,3-Trichlorobenzene	µg/L	2 U	1 U	1 U	1 U	2 U
1,2,3-Trichloropropane	µg/L	2 U	1 U	1 U	1 U	2 U
1,2,4-Trimethylbenzene	µg/L	2 U	11	12	1 U	2 U
1,2-Dibromo-3-chloropropane	µg/L	10 U	1 U	1 U	1 U	10 U
1,2-Dibromoethane (EDB)	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dichloroethane (EDC)	µg/L	2 U	1 U	1 U	1 U	2 U
1,2-Dichloropropane	µg/L	2 U	1 U	1 U	1 U	2 U

Table C.8
Chemistry Data for Groundwater Samples

		Event	RI/FS Round 1 Sampling (Floyd|Snider)				
		Location	FS-07	FS-09	FS-09	FS-15	FS-17
		Sample ID	**FS07-GW16-031611**	**FS09-GW17-031511**	**FS09A-GW17-031511**	**FS15-GW19-031411**	**FS17-GW17-031611**
		Date	03/16/2011	03/15/2011	03/15/2011	03/14/2011	03/16/2011
Other VOCs							
1,3-Dichloropropane	µg/L		2 U	1 U	1 U	1 U	2 U
1,4-Dichlorobenzene	µg/L		2 U	1 U	1 U	1 U	2 U
2,2-Dichloropropane	µg/L		2 U	1 U	1 U	1 U	2 U
2-Chlorotoluene	µg/L		2 U	1 U	1 U	1 U	2 U
2-Hexanone	µg/L		10 U	2 U	2 U	2 U	10 U
4-Chlorotoluene	µg/L		2 U	1 U	1 U	1 U	2 U
Acetone	µg/L		25 U	2 U	2 U	2 U	25 U
Acrylonitrile	µg/L		10 U	1 U	1 U	1 U	10 U
Bromobenzene	µg/L		2 U	1 U	1 U	1 U	2 U
Bromochloromethane	µg/L		2 U	1 U	1 U	1 U	2 U
Bromodichloromethane	µg/L		2 U	1 U	1 U	1 U	2 U
Bromoform	µg/L		2 U	1 U	1 U	1 U	2 U
Bromomethane	µg/L		2 U	1 U	1 U	1 U	2 U
Carbon disulfide	µg/L		2 U	1 U	1 U	1 U	2 U
Carbon tetrachloride	µg/L		2 U	1 U	1 U	1 U	2 U
Chlorobenzene	µg/L		2 U	1 U	1 U	1 U	2 U
Chloroethane	µg/L		2 U	1 U	1 U	1 U	2 U
Chloroform	µg/L		2 U	1 U	1 U	1 U	2 U
Chloromethane	µg/L		2 U	1 U	1 U	1 U	2 U
cis-1,2-Dichloroethene	µg/L		2 U	1 U	1 U	1 U	2 U
cis-1,3-Dichloropropene	µg/L		2 U	1 U	1 U	1 U	2 U
Cymene	µg/L		2 U	2.2	2.6	1 U	2 U
Dibromochloromethane	µg/L		2 U	1 U	1 U	1 U	2 U
Dibromomethane	µg/L		2 U	1 U	1 U	1 U	2 U
Dichlorodifluoromethane	µg/L		2 U	1 U	1 U	1 U	2 U
Methyl ethyl ketone	µg/L		10 U	2 U	2 U	2 U	10 U
Methyl iso butyl ketone	µg/L		10 U	2 U	2 U	2 U	10 U
Methyl-Tert-Butyl Ether	µg/L		2 U	1 U	1 U	1 U	2 U
Methylene chloride	µg/L		5 U	1 U	1 U	1 U	5 U
n-Butylbenzene	µg/L		2 U	1 U	1 U	1 U	2 U
sec-Butylbenzene	µg/L		2 U	1 U	1 U	1 U	2 U
Styrene	µg/L		2 U	1 U	1 U	1 U	2 U
tert-Butylbenzene	µg/L		2 U	1 U	1 U	1 U	2 U
Tetrachloroethene	µg/L		2 U	1 U	1 U	1 U	2 U
trans-1,2-Dichloroethene	µg/L		2 U	1 U	1 U	1 U	2 U
trans-1,3-Dichloropropene	µg/L		2 U	1 U	1 U	1 U	2 U
Trichloroethene	µg/L		2 U	1 U	1 U	1 U	2 U
Trichlorofluoromethane	µg/L		2 U	1 U	1 U	1 U	2 U
Vinyl chloride	µg/L		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Total Petroleum Hydrocarbons (TPH)							
Gasoline-Range Hydrocarbons	µg/L		50 U	1900	1600	50 U	50 U
Diesel-Range Hydrocarbons	µg/L		130 U	3200	1600	820	130 U

Table C.8
Chemistry Data for Groundwater Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	FS-07	FS-09	FS-09	FS-15	FS-17
	Sample ID	**FS07-GW16-031611**	**FS09-GW17-031511**	**FS09A-GW17-031511**	**FS15-GW19-031411**	**FS17-GW17-031611**
	Date	03/16/2011	03/15/2011	03/15/2011	03/14/2011	03/16/2011
Total Petroleum Hydrocarbons (TPH)						
Oil-Range Hydrocarbons	µg/L	250 U	250 U	250 U	250 U	250 U

Table C.8
Chemistry Data for Groundwater Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	MW-01	MW-02A	MW-02A	MW-04	MW-05
	Sample ID	**MW1-GW-032311**	**MW02A-GW-032311**	**MW02A-GW-032311-D**	**MW4-GW-032211**	**MW5-GW-032311**
	Date	03/23/2011	03/23/2011	03/23/2011	03/22/2011	03/23/2011
Dissolved Metals						
Arsenic	µg/L	23	8.9 U	8.9 U	4.1	2
Cadmium	µg/L	0.27 U	1.4 U	1.4 U	0.27 U	0.27 U
Calcium	mg/L	140	240	230	130	19
Chromium	µg/L	1.4	3 U	3 U	0.59 U	2
Copper	µg/L	2.6 U	13 U	13 U	2.6 U	2.6 U
Lead	µg/L	0.73	3.3	4	0.62 U	0.62 U
Mercury (inorganic)	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	µg/L	3.9	18	19	2.1	4.5
Silver	µg/L	0.38 U	1.9 U	1.9 U	0.38 U	0.38 U
Zinc	µg/L	3.9 U	20 U	20 U	3.9 U	3.9 U
Polychlorinated Biphenyls (PCBs)						
Aroclor 1016	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Aroclor 1221	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Aroclor 1232	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Aroclor 1242	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Aroclor 1248	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Aroclor 1254	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Aroclor 1260	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Aroclor 1268	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Total PCBs	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	µg/L	2 U	2 U	2 U	2 U	2 U
Benzo(a)pyrene	µg/L	2 U	2 U	2 U	2 U	2 U
Benzo(b)fluoranthene	µg/L	2 U	2 U	2 U	2 U	2 U
Benzo(k)fluoranthene	µg/L	2 U	2 U	2 U	2 U	2 U
Benzofluoranthenes (total)	µg/L	2 U	2 U	2 U	2 U	2 U
Chrysene	µg/L	2 U	2 U	2 U	2 U	2 U
Dibenzo(a,h)anthracene	µg/L	2 U	2 U	2 U	2 U	2 U
Indeno(1,2,3-cd)pyrene	µg/L	2 U	2 U	2 U	2 U	2 U
cPAHs (MTCA TEQ-HalfND)	µg/L	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U
cPAHs (MTCA TEQ-ZeroND)	µg/L	2 U	2 U	2 U	2 U	2 U
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAH	µg/L	51.5	2 U	1.1	2 U	2 U
Naphthalene	µg/L	5.5	1 U	1.1	2 U	1 U
Acenaphthylene	µg/L	2 U	2 U	2 U	2 U	2 U
Acenaphthene	µg/L	21	2 U	2 U	2 U	2 U
Fluorene	µg/L	15	2 U	2 U	2 U	2 U
Phenanthrene	µg/L	10	2 U	2 U	2 U	2 U
Anthracene	µg/L	2 U	2 U	2 U	2 U	2 U
1-Methylnaphthalene	µg/L	78	2 U	2 U	2 U	2 U
2-Methylnaphthalene	µg/L	63	2 U	2 U	2 U	2 U
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						

Table C.8
Chemistry Data for Groundwater Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	MW-01	MW-02A	MW-02A	MW-04	MW-05
	Sample ID	**MW1-GW-032311**	**MW02A-GW-032311**	**MW02A-GW-032311-D**	**MW4-GW-032211**	**MW5-GW-032311**
	Date	03/23/2011	03/23/2011	03/23/2011	03/22/2011	03/23/2011
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Total HPAH	µg/L	2 U	2 U	2 U	2 U	2 U
Fluoranthene	µg/L	2 U	2 U	2 U	2 U	2 U
Pyrene	µg/L	2 U	2 U	2 U	2 U	2 U
Benzo(g,h,i)perylene	µg/L	2 U	2 U	2 U	2 U	2 U
Other SVOCs						
1,2,4-Trichlorobenzene	µg/L	1 U	1 U	1 U	2 U	1 U
1,2-Dichlorobenzene	µg/L	1 U	1 U	1 U	2 U	1 U
1,3-Dichlorobenzene	µg/L	1 U	1 U	1 U	2 U	1 U
2,3,4,6-Tetrachlorophenol	µg/L	2 U	2 U	2 U	2 U	2 U
2,4,5-Trichlorophenol	µg/L	2 U	2 U	2 U	2 U	2 U
2,4,6-Trichlorophenol	µg/L	2 U	2 U	2 U	2 U	2 U
2,4-Dichlorophenol	µg/L	2 U	2 U	2 U	2 U	2 U
2,4-Dimethylphenol	µg/L	2 U	2 U	2 U	2 U	2 U
2,4-Dinitrophenol	µg/L	10 U	10 U	10 U	10 U	10 U
2,4-Dinitrotoluene	µg/L	2 U	2 U	2 U	2 U	2 U
2,6-Dichlorophenol	µg/L	2 U	2 U	2 U	2 U	2 U
2,6-Dinitrotoluene	µg/L	2 U	2 U	2 U	2 U	2 U
2-Chloronaphthalene	µg/L	2 U	2 U	2 U	2 U	2 U
2-Chlorophenol	µg/L	2 U	2 U	2 U	2 U	2 U
2-Methylphenol	µg/L	2 U	2 U	2 U	2 U	2 U
2-Nitroaniline	µg/L	2 U	2 U	2 U	2 U	2 U
2-Nitrophenol	µg/L	2 U	2 U	2 U	2 U	2 U
3,3'-Dichlorobenzidine	µg/L	2 U	2 U	2 U	2 U	2 U
4,6 Dinitro-o-cresol	µg/L	2 U	2 U	2 U	2 U	2 U
4-Chloro-3-methylphenol	µg/L	2 U	2 U	2 U	2 U	2 U
4-Chloroaniline	µg/L	2 U	2 U	2 U	2 U	2 U
4-Nitrophenol	µg/L	2 U	2 U	2 U	2 U	2 U
Aniline	µg/L	2 U	2 U	2 U	2 U	2 U
Azobenzene	µg/L	2 U	2 U	2 U	2 U	2 U
Benzoic acid	µg/L	10 U	10 U	10 U	10 U	10 U
Benzyl alcohol	µg/L	2 U	2 U	2 U	2 U	2 U
bis(2-chloroethoxy)methane	µg/L	2 U	2 U	2 U	2 U	2 U
Bis(2-chloroethyl) ether	µg/L	2 U	2 U	2 U	2 U	2 U
Bis(2-ethylhexyl) phthalate	µg/L	2 U	2 U	2 U	2 U	2 U
Butyl benzyl phthalate	µg/L	2 U	2 U	2 U	2 U	2 U
Carbazole	µg/L	22	2 U	2 U	2 U	2 U
Dibenzofuran	µg/L	7.7	2 U	2 U	2 U	2 U
Diethyl phthalate	µg/L	2 U	2 U	2 U	2 U	2 U
Dimethyl phthalate	µg/L	2 U	2 U	2 U	2 U	2 U
Di-n-butyl phthalate	µg/L	2 U	2 U	2 U	2 U	2 U
Di-n-octyl phthalate	µg/L	2 U	2 U	2 U	2 U	2 U
Hexachlorobenzene	µg/L	2 U	2 U	2 U	2 U	2 U

Table C.8
Chemistry Data for Groundwater Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	MW-01	MW-02A	MW-02A	MW-04	MW-05
	Sample ID	**MW1-GW-032311**	**MW02A-GW-032311**	**MW02A-GW-032311-D**	**MW4-GW-032211**	**MW5-GW-032311**
	Date	03/23/2011	03/23/2011	03/23/2011	03/22/2011	03/23/2011
Other SVOCs						
Hexachlorobutadiene	µg/L	1 U	1 U	1 U	2 U	1 U
Hexachlorocyclopentadiene	µg/L	2 U	2 U	2 U	2 U	2 U
Hexachloroethane	µg/L	2 U	2 U	2 U	2 U	2 U
Isophorone	µg/L	2 U	2 U	2 U	2 U	2 U
m,p-Cresol (2:1 ratio)	µg/L	2 U	2 U	2 U	2 U	2 U
Nitrobenzene	µg/L	2 U	2 U	2 U	2 U	2 U
N-Nitrosodimethylamine	µg/L	2 U	2 U	2 U	2 U	2 U
N-Nitroso-di-n-propylamine	µg/L	2 U	2 U	2 U	2 U	2 U
N-Nitrosodiphenylamine	µg/L	2 U	2 U	2 U	2 U	2 U
Pentachlorophenol	µg/L	5 U	5 U	5 U	5 U	5 U
Phenol	µg/L	2 U	2 U	2 U	2 U	2 U
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH						
1,3,5-Trimethylbenzene	µg/L	1 U	1 U	1 U	2 U	1 U
Benzene	µg/L	1 U	1 U	1 U	2 U	1 U
Ethylbenzene	µg/L	1 U	1 U	1 U	2 U	1 U
Iso-Propylbenzene	µg/L	3	1 U	1 U	2 U	1 U
n-Propylbenzene	µg/L	2.7	1 U	1 U	2 U	1 U
Toluene	µg/L	1 U	1 U	1 U	2 U	1 U
Xylenes (meta & para)	µg/L	2.1	2 U	2 U	4 U	2 U
Xylene (ortho)	µg/L	1 U	1 U	1 U	2 U	1 U
Xylenes (total)	µg/L	2.1	2 U	2 U	4 U	2 U
Other VOCs						
1,1,1,2-Tetrachloroethane	µg/L	1 U	1 U	1 U	2 U	1 U
1,1,1-Trichloroethane	µg/L	1 U	1 U	1 U	2 U	1 U
1,1,2,2-Tetrachloroethane	µg/L	1 U	1 U	1 U	2 U	1 U
1,1,2-Trichloroethane	µg/L	1 U	1 U	1 U	2 U	1 U
1,1-Dichloroethane	µg/L	1 U	1 U	1 U	2 U	1 U
1,1-Dichloroethene	µg/L	1 U	1 U	1 U	2 U	1 U
1,1-Dichloropropene	µg/L	1 U	1 U	1 U	2 U	1 U
1,2,3-Trichlorobenzene	µg/L	1 U	1 U	1 U	2 U	1 U
1,2,3-Trichloropropane	µg/L	1 U	1 U	1 U	2 U	1 U
1,2,4-Trimethylbenzene	µg/L	1 U	1 U	1 U	2 U	1 U
1,2-Dibromo-3-chloropropane	µg/L	1 U	1 U	1 U	10 U	1 U
1,2-Dibromoethane (EDB)	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dichloroethane (EDC)	µg/L	1 U	1 U	1 U	2 U	1 U
1,2-Dichloropropane	µg/L	1 U	1 U	1 U	2 U	1 U
1,3-Dichloropropane	µg/L	1 U	1 U	1 U	2 U	1 U
1,4-Dichlorobenzene	µg/L	1 U	1 U	1 U	2 U	1 U
2,2-Dichloropropane	µg/L	1 U	1 U	1 U	2 U	1 U
2-Chlorotoluene	µg/L	1 U	1 U	1 U	2 U	1 U
2-Hexanone	µg/L	2 U	2 U	2 U	10 U	2 U
3-Nitroaniline	µg/L	5 U	5 U	5 U	5 U	5 U

Table C.8
Chemistry Data for Groundwater Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	MW-01	MW-02A	MW-02A	MW-04	MW-05
	Sample ID	**MW1-GW-032311**	**MW02A-GW-032311**	**MW02A-GW-032311-D**	**MW4-GW-032211**	**MW5-GW-032311**
	Date	03/23/2011	03/23/2011	03/23/2011	03/22/2011	03/23/2011
Other VOCs						
4-Bromophenyl phenyl ether	µg/L	2 U	2 U	2 U	2 U	2 U
4-Chlorophenyl phenyl ether	µg/L	2 U	2 U	2 U	2 U	2 U
4-Chlorotoluene	µg/L	1 U	1 U	1 U	2 U	1 U
4-Nitroaniline	µg/L	2 U	2 U	2 U	2 U	2 U
Acetone	µg/L	2 U	2 U	2 U	25 U	2 U
Acrylonitrile	µg/L	1 U	1 U	1 U	10 U	1 U
bis(2-chloroisopropyl)ether	µg/L	2 U	2 U	2 U	2 U	2 U
Bromobenzene	µg/L	1 U	1 U	1 U	2 U	1 U
Bromochloromethane	µg/L	1 U	1 U	1 U	2 U	1 U
Bromodichloromethane	µg/L	1 U	1 U	1 U	2 U	1 U
Bromoform	µg/L	1 U	1 U	1 U	2 U	1 U
Bromomethane	µg/L	1 U	1 U	1 U	2 U	1 U
Carbon disulfide	µg/L	1 U	1 U	1 U	2 U	1 U
Carbon tetrachloride	µg/L	1 U	1 U	1 U	2 U	1 U
Chlorobenzene	µg/L	1 U	1 U	1 U	2 U	1 U
Chloroethane	µg/L	1 U	1 U	1 U	2 U	1 U
Chloroform	µg/L	1 U	1 U	1 U	2 U	1 U
Chloromethane	µg/L	1 U	1 U	1 U	2 U	1 U
cis-1,2-Dichloroethene	µg/L	1 U	1 U	1 U	2 U	1 U
cis-1,3-Dichloropropene	µg/L	1 U	1 U	1 U	2 U	1 U
Cymene	µg/L	3.2	1 U	1 U	2 U	1 U
Dibromochloromethane	µg/L	1 U	1 U	1 U	2 U	1 U
Dibromomethane	µg/L	1 U	1 U	1 U	2 U	1 U
Dichlorodifluoromethane	µg/L	1 U	1 U	1 U	2 U	1 U
Methyl ethyl ketone	µg/L	2 U	2 U	2 U	10 U	2 U
Methyl iso butyl ketone	µg/L	2 U	2 U	2 U	10 U	2 U
Methyl-Tert-Butyl Ether	µg/L	1 U	1 U	1 U	2 U	1 U
Methylene chloride	µg/L	1 U	1 U	1 U	5 U	1 U
n-Butylbenzene	µg/L	1 U	1 U	1 U	2 U	1 U
Pyridine	µg/L	2 U	2 U	2 U	2 U	2 U
sec-Butylbenzene	µg/L	1.6	1 U	1 U	2 U	1 U
Styrene	µg/L	1 U	1 U	1 U	2 U	1 U
tert-Butylbenzene	µg/L	1 U	1 U	1 U	2 U	1 U
Tetrachloroethene	µg/L	1 U	1 U	1 U	2 U	1 U
trans-1,2-Dichloroethene	µg/L	1 U	1 U	1 U	2 U	1 U
trans-1,3-Dichloropropene	µg/L	1 U	1 U	1 U	2 U	1 U
Trichloroethene	µg/L	1 U	1 U	1 U	2 U	1 U
Trichlorofluoromethane	µg/L	1 U	1 U	1 U	2 U	1 U
Vinyl chloride	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Total Petroleum Hydrocarbons (TPH)						
Gasoline-Range Hydrocarbons	µg/L	730 J	50 U	50 U	50 U	50 U
Diesel-Range Hydrocarbons	µg/L	1400	130 U	130 U	130 U	130 U

Table C.8
Chemistry Data for Groundwater Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	MW-01	MW-02A	MW-02A	MW-04	MW-05
	Sample ID	**MW1-GW-032311**	**MW02A-GW-032311**	**MW02A-GW-032311-D**	**MW4-GW-032211**	**MW5-GW-032311**
	Date	03/23/2011	03/23/2011	03/23/2011	03/22/2011	03/23/2011
Total Petroleum Hydrocarbons (TPH)						
Oil-Range Hydrocarbons	µg/L	250 U	250 U	250 U	250 U	250 U

Table C.8
Chemistry Data for Groundwater Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	MW-06	MW-07	MW-08	MW-09	
	Sample ID	**MW06-GW-032211**	**MW07-GW-032311**	**MW08-GW-032211**	**MW09-GW-032211**	
	Date	03/22/2011	03/23/2011	03/22/2011	03/22/2011	
Dissolved Metals						
Arsenic	µg/L	4.6	4.4	4.8	6.7	
Cadmium	µg/L	0.27 U	0.27 U	0.27 U	0.27 U	
Calcium	mg/L	47	180	52	85	
Chromium	µg/L	0.59 U	2.1	0.59 U	0.61	
Copper	µg/L	2.6 U	2.6 U	2.6 U	2.6 U	
Lead	µg/L	0.62 U	0.62 U	0.62 U	0.62 U	
Mercury (inorganic)	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	
Nickel	µg/L	1.7 U	5.5	1.7 U	1.8	
Silver	µg/L	0.38 U	0.38 U	0.38 U	0.38 U	
Zinc	µg/L	3.9 U	3.9 U	3.9 U	3.9 U	
Polychlorinated Biphenyls (PCBs)						
Aroclor 1016	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	
Aroclor 1221	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	
Aroclor 1232	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	
Aroclor 1242	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	
Aroclor 1248	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	
Aroclor 1254	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	
Aroclor 1260	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	
Aroclor 1268	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	
Total PCBs	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	µg/L	4 U	2 U	2 U	2 U	
Benzo(a)pyrene	µg/L	4 U	2 U	2 U	2 U	
Benzo(b)fluoranthene	µg/L	4 U	2 U	2 U	2 U	
Benzo(k)fluoranthene	µg/L	4 U	2 U	2 U	2 U	
Benzofluoranthenes (total)	µg/L	4 U	2 U	2 U	2 U	
Chrysene	µg/L	4 U	2 U	2 U	2 U	
Dibenzo(a,h)anthracene	µg/L	4 U	2 U	2 U	2 U	
Indeno(1,2,3-cd)pyrene	µg/L	4 U	2 U	2 U	2 U	
cPAHs (MTCA TEQ-HalfND)	µg/L	3.2 U	1.6 U	1.6 U	1.6 U	
cPAHs (MTCA TEQ-ZeroND)	µg/L	4 U	2 U	2 U	2 U	
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAH	µg/L	4 U	2 U	2 U	5.4	
Naphthalene	µg/L	2 U	1 U	2 U	2 U	
Acenaphthylene	µg/L	4 U	2 U	2 U	2 U	
Acenaphthene	µg/L	4 U	2 U	2 U	2.2	
Fluorene	µg/L	4 U	2 U	2 U	3.2	
Phenanthrene	µg/L	4 U	2 U	2 U	2 U	
Anthracene	µg/L	4 U	2 U	2 U	2 U	
1-Methylnaphthalene	µg/L	4 U	2 U	2 U	32	
2-Methylnaphthalene	µg/L	4 U	2 U	2 U	4.1	
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						

Table C.8
Chemistry Data for Groundwater Samples

		Event	RI/FS Round 1 Sampling (Floyd|Snider)				
		Location	MW-06	MW-07	MW-08	MW-09	
		Sample ID	**MW06-GW-032211**	**MW07-GW-032311**	**MW08-GW-032211**	**MW09-GW-032211**	
		Date	03/22/2011	03/23/2011	03/22/2011	03/22/2011	
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Total HPAH	µg/L		4 U	2 U	2 U	2 U	
Fluoranthene	µg/L		4 U	2 U	2 U	2 U	
Pyrene	µg/L		4 U	2 U	2 U	2 U	
Benzo(g,h,i)perylene	µg/L		4 U	2 U	2 U	2 U	
Other SVOCs							
1,2,4-Trichlorobenzene	µg/L		2 U	1 U	2 U	2 U	
1,2-Dichlorobenzene	µg/L		2 U	1 U	2 U	2 U	
1,3-Dichlorobenzene	µg/L		2 U	1 U	2 U	2 U	
2,3,4,6-Tetrachlorophenol	µg/L		4 U	2 U	2 U	2 U	
2,4,5-Trichlorophenol	µg/L		4 U	2 U	2 U	2 U	
2,4,6-Trichlorophenol	µg/L		4 U	2 U	2 U	2 U	
2,4-Dichlorophenol	µg/L		4 U	2 U	2 U	2 U	
2,4-Dimethylphenol	µg/L		4 U	2 U	2 U	2 U	
2,4-Dinitrophenol	µg/L		20 U	10 U	10 U	10 U	
2,4-Dinitrotoluene	µg/L		4 U	2 U	2 U	2 U	
2,6-Dichlorophenol	µg/L		4 U	2 U	2 U	2 U	
2,6-Dinitrotoluene	µg/L		4 U	2 U	2 U	2 U	
2-Chloronaphthalene	µg/L		4 U	2 U	2 U	2 U	
2-Chlorophenol	µg/L		4 U	2 U	2 U	2 U	
2-Methylphenol	µg/L		4 U	2 U	2 U	2 U	
2-Nitroaniline	µg/L		4 U	2 U	2 U	2 U	
2-Nitrophenol	µg/L		4 U	2 U	2 U	2 U	
3,3'-Dichlorobenzidine	µg/L		4 U	2 U	2 U	2 U	
4,6 Dinitro-o-cresol	µg/L		4 U	2 U	2 U	2 U	
4-Chloro-3-methylphenol	µg/L		4 U	2 U	2 U	2 U	
4-Chloroaniline	µg/L		4 U	2 U	2 U	2 U	
4-Nitrophenol	µg/L		4 U	2 U	2 U	2 U	
Aniline	µg/L		4 U	2 U	2 U	2 U	
Azobenzene	µg/L		4 U	2 U	2 U	2 U	
Benzoic acid	µg/L		20 U	10 U	10 U	10 U	
Benzyl alcohol	µg/L		4 U	2 U	2 U	2 U	
bis(2-chloroethoxy)methane	µg/L		4 U	2 U	2 U	2 U	
Bis(2-chloroethyl) ether	µg/L		4 U	2 U	2 U	2 U	
Bis(2-ethylhexyl) phthalate	µg/L		4 U	2 U	2 U	2 U	
Butyl benzyl phthalate	µg/L		4 U	2 U	2 U	2 U	
Carbazole	µg/L		4 U	2 U	2 U	2.7	
Dibenzofuran	µg/L		4 U	2 U	2 U	2 U	
Diethyl phthalate	µg/L		4 U	2 U	2 U	2 U	
Dimethyl phthalate	µg/L		4 U	2 U	2 U	2 U	
Di-n-butyl phthalate	µg/L		4 U	2 U	2 U	2 U	
Di-n-octyl phthalate	µg/L		4 U	2 U	2 U	2 U	
Hexachlorobenzene	µg/L		4 U	2 U	2 U	2 U	

Table C.8
Chemistry Data for Groundwater Samples

		Event	RI/FS Round 1 Sampling (Floyd|Snider)				
		Location	MW-06	MW-07	MW-08	MW-09	
		Sample ID	**MW06-GW-032211**	**MW07-GW-032311**	**MW08-GW-032211**	**MW09-GW-032211**	
		Date	03/22/2011	03/23/2011	03/22/2011	03/22/2011	
Other SVOCs							
Hexachlorobutadiene	µg/L		2 U	1 U	2 U	2 U	
Hexachlorocyclopentadiene	µg/L		4 U	2 U	2 U	2 U	
Hexachloroethane	µg/L		4 U	2 U	2 U	2 U	
Isophorone	µg/L		4 U	2 U	2 U	2 U	
m,p-Cresol (2:1 ratio)	µg/L		4 U	2 U	2 U	2 U	
Nitrobenzene	µg/L		4 U	2 U	2 U	2 U	
N-Nitrosodimethylamine	µg/L		4 U	2 U	2 U	2 U	
N-Nitroso-di-n-propylamine	µg/L		4 U	2 U	2 U	2 U	
N-Nitrosodiphenylamine	µg/L		4 U	2 U	2 U	2 U	
Pentachlorophenol	µg/L		10 U	5 U	5 U	5 U	
Phenol	µg/L		4 U	2 U	2 U	2 U	
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH							
1,3,5-Trimethylbenzene	µg/L		2 U	1 U	2 U	2 U	
Benzene	µg/L		2 U	1 U	2 U	2 U	
Ethylbenzene	µg/L		2 U	1 U	2 U	2 U	
Iso-Propylbenzene	µg/L		2 U	1 U	2 U	2	
n-Propylbenzene	µg/L		2 U	1 U	2 U	2 U	
Toluene	µg/L		2 U	1 U	2 U	2 U	
Xylenes (meta & para)	µg/L		4 U	2 U	4 U	4 U	
Xylene (ortho)	µg/L		2 U	1 U	2 U	2 U	
Xylenes (total)	µg/L		4 U	2 U	4 U	4 U	
Other VOCs							
1,1,1,2-Tetrachloroethane	µg/L		2 U	1 U	2 U	2 U	
1,1,1-Trichloroethane	µg/L		2 U	1 U	2 U	2 U	
1,1,2,2-Tetrachloroethane	µg/L		2 U	1 U	2 U	2 U	
1,1,2-Trichloroethane	µg/L		2 U	1 U	2 U	2 U	
1,1-Dichloroethane	µg/L		2 U	1 U	2 U	2 U	
1,1-Dichloroethene	µg/L		2 U	1 U	2 U	2 U	
1,1-Dichloropropene	µg/L		2 U	1 U	2 U	2 U	
1,2,3-Trichlorobenzene	µg/L		2 U	1 U	2 U	2 U	
1,2,3-Trichloropropane	µg/L		2 U	1 U	2 U	2 U	
1,2,4-Trimethylbenzene	µg/L		2 U	1 U	2 U	2 U	
1,2-Dibromo-3-chloropropane	µg/L		10 U	1 U	10 U	10 U	
1,2-Dibromoethane (EDB)	µg/L		0.01 U	0.01 U	0.01 U	0.01 U	
1,2-Dichloroethane (EDC)	µg/L		2 U	1 U	2 U	2 U	
1,2-Dichloropropane	µg/L		2 U	1 U	2 U	2 U	
1,3-Dichloropropane	µg/L		2 U	1 U	2 U	2 U	
1,4-Dichlorobenzene	µg/L		2 U	1 U	2 U	2 U	
2,2-Dichloropropane	µg/L		2 U	1 U	2 U	2 U	
2-Chlorotoluene	µg/L		2 U	1 U	2 U	2 U	
2-Hexanone	µg/L		10 U	2 U	10 U	10 U	
3-Nitroaniline	µg/L		10 U	5 U	5 U	5 U	

Table C.8
Chemistry Data for Groundwater Samples

		Event	RI/FS Round 1 Sampling (Floyd|Snider)				
		Location	MW-06	MW-07	MW-08	MW-09	
		Sample ID	**MW06-GW-032211**	**MW07-GW-032311**	**MW08-GW-032211**	**MW09-GW-032211**	
		Date	03/22/2011	03/23/2011	03/22/2011	03/22/2011	
Other VOCs							
4-Bromophenyl phenyl ether	µg/L		4 U	2 U	2 U	2 U	
4-Chlorophenyl phenyl ether	µg/L		4 U	2 U	2 U	2 U	
4-Chlorotoluene	µg/L		2 U	1 U	2 U	2 U	
4-Nitroaniline	µg/L		4 U	2 U	2 U	2 U	
Acetone	µg/L		25 U	2 U	25 U	25 U	
Acrylonitrile	µg/L		10 U	1 U	10 U	10 U	
bis(2-chloroisopropyl)ether	µg/L		4 U	2 U	2 U	2 U	
Bromobenzene	µg/L		2 U	1 U	2 U	2 U	
Bromochloromethane	µg/L		2 U	1 U	2 U	2 U	
Bromodichloromethane	µg/L		2 U	1 U	2 U	2 U	
Bromoform	µg/L		2 U	1 U	2 U	2 U	
Bromomethane	µg/L		2 U	1 U	2 U	2 U	
Carbon disulfide	µg/L		2 U	1 U	2 U	2 U	
Carbon tetrachloride	µg/L		2 U	1 U	2 U	2 U	
Chlorobenzene	µg/L		2 U	1 U	2 U	2.7	
Chloroethane	µg/L		2 U	1 U	2 U	2 U	
Chloroform	µg/L		2 U	1 U	2 U	2 U	
Chloromethane	µg/L		2 U	1 U	2 U	2 U	
cis-1,2-Dichloroethene	µg/L		2 U	1 U	2 U	2 U	
cis-1,3-Dichloropropene	µg/L		2 U	1 U	2 U	2 U	
Cymene	µg/L		93	1 U	2 U	2.9	
Dibromochloromethane	µg/L		2 U	1 U	2 U	2 U	
Dibromomethane	µg/L		2 U	1 U	2 U	2 U	
Dichlorodifluoromethane	µg/L		2 U	1 U	2 U	2 U	
Methyl ethyl ketone	µg/L		10 U	2 U	10 U	10 U	
Methyl iso butyl ketone	µg/L		10 U	2 U	10 U	10 U	
Methyl-Tert-Butyl Ether	µg/L		2 U	1 U	2 U	2 U	
Methylene chloride	µg/L		5 U	1 U	5 U	5 U	
n-Butylbenzene	µg/L		2 U	1 U	2 U	2 U	
Pyridine	µg/L		4 U	2 U	2 U	2 U	
sec-Butylbenzene	µg/L		2 U	1 U	2 U	2 U	
Styrene	µg/L		2 U	1 U	2 U	2 U	
tert-Butylbenzene	µg/L		2 U	1 U	2 U	2 U	
Tetrachloroethene	µg/L		2 U	1 U	2 U	2 U	
trans-1,2-Dichloroethene	µg/L		2 U	1 U	2 U	2 U	
trans-1,3-Dichloropropene	µg/L		2 U	1 U	2 U	2 U	
Trichloroethene	µg/L		2 U	1 U	2 U	2 U	
Trichlorofluoromethane	µg/L		2 U	1 U	2 U	2 U	
Vinyl chloride	µg/L		0.2 U	0.2 U	0.2 U	0.2 U	
Total Petroleum Hydrocarbons (TPH)							
Gasoline-Range Hydrocarbons	µg/L		1000	50 U	50 U	520 J	
Diesel-Range Hydrocarbons	µg/L		3500	130 U	130 U	620	

Table C.8
Chemistry Data for Groundwater Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	MW-06	MW-07	MW-08	MW-09	
	Sample ID	**MW06-GW-032211**	**MW07-GW-032311**	**MW08-GW-032211**	**MW09-GW-032211**	
	Date	03/22/2011	03/23/2011	03/22/2011	03/22/2011	
Total Petroleum Hydrocarbons (TPH)						
Oil-Range Hydrocarbons	µg/L	1200	250 U	250 U	250 U	

Table C.8
Chemistry Data for Groundwater Samples

	Event	RI/FS Round 2 Sampling (Floyd|Snider)				
	Location	MW-01	MW-02A	MW-02A	MW-04	MW-05
	Sample ID	**MW1-GW-072911**	**MW2A-GW-072911**	**MW16B-GW-072911**	**MW4-GW-072911**	**MW5-GW-072911**
	Date	07/29/2011	07/29/2011	07/29/2011	07/29/2011	07/29/2011
Dissolved Metals						
Arsenic	µg/L	29	8	7.4	6.6	3.4
Cadmium	µg/L	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U
Chromium	µg/L	1.6	1.6	1.7	0.71	2.9
Copper	µg/L	2.7	7.7	5.8	3	5.6
Lead	µg/L	0.62 U	0.62 U	0.62 U	0.62 U	0.62 U
Mercury (inorganic)	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	µg/L	5.9	6.7	7.8	4.3	10
Silver	µg/L	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U
Zinc	µg/L	8.3	38	43	3.9 U	7.3
Polychlorinated Biphenyls (PCBs)						
Aroclor 1016	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Aroclor 1221	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Aroclor 1232	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Aroclor 1242	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Aroclor 1248	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Aroclor 1254	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Aroclor 1260	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Aroclor 1268	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Total PCBs	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	µg/L	2 U	2 U	2 U	2 U	2 U
Benzo(a)pyrene	µg/L	2 U	2 U	2 U	2 U	2 U
Benzo(b)fluoranthene	µg/L	2 U	2 U	2 U	2 U	2 U
Benzo(k)fluoranthene	µg/L	2 U	2 U	2 U	2 U	2 U
Benzofluoranthenes (total)	µg/L	2 U	2 U	2 U	2 U	2 U
Chrysene	µg/L	2 U	2 U	2 U	2 U	2 U
Dibenzo(a,h)anthracene	µg/L	2 U	2 U	2 U	2 U	2 U
Indeno(1,2,3-cd)pyrene	µg/L	2 U	2 U	2 U	2 U	2 U
cPAHs (MTCA TEQ-HalfND)	µg/L	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U
cPAHs (MTCA TEQ-ZeroND)	µg/L	2 U	2 U	2 U	2 U	2 U
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAH	µg/L	39.2	2 U	2 U	2 U	2 U
Naphthalene	µg/L	5.8	1 U	1 U	1 U	1 U
Acenaphthylene	µg/L	2 U	2 U	2 U	2 U	2 U
Acenaphthene	µg/L	20	2 U	2 U	2 U	2 U
Fluorene	µg/L	11	2 U	2 U	2 U	2 U
Phenanthrene	µg/L	2.4	2 U	2 U	2 U	2 U
Anthracene	µg/L	2 U	2 U	2 U	2 U	2 U
1-Methylnaphthalene	µg/L	54	2 U	2 U	2 U	2 U
2-Methylnaphthalene	µg/L	30	2 U	2 U	2 U	2 U
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Total HPAH	µg/L	2 U	2 U	2 U	2 U	2 U

Table C.8
Chemistry Data for Groundwater Samples

	Event	RI/FS Round 2 Sampling (Floyd|Snider)				
	Location	MW-01	MW-02A	MW-02A	MW-04	MW-05
	Sample ID	**MW1-GW-072911**	**MW2A-GW-072911**	**MW16B-GW-072911**	**MW4-GW-072911**	**MW5-GW-072911**
	Date	07/29/2011	07/29/2011	07/29/2011	07/29/2011	07/29/2011
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Fluoranthene	µg/L	2 U	2 U	2 U	2 U	2 U
Pyrene	µg/L	2 U	2 U	2 U	2 U	2 U
Benzo(g,h,i)perylene	µg/L	2 U	2 U	2 U	2 U	2 U
Other SVOCs						
1,2,4-Trichlorobenzene	µg/L	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	µg/L	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	µg/L	1 U	1 U	1 U	1 U	1 U
2,3,4,6-Tetrachlorophenol	µg/L	2 U	2 U	2 U	2 U	2 U
2,4,5-Trichlorophenol	µg/L	2 U	2 U	2 U	2 U	2 U
2,4,6-Trichlorophenol	µg/L	2 U	2 U	2 U	2 U	2 U
2,4-Dichlorophenol	µg/L	2 U	2 U	2 U	2 U	2 U
2,4-Dimethylphenol	µg/L	2 U	2 U	2 U	2 U	2 U
2,4-Dinitrophenol	µg/L	10 U	10 U	10 U	10 U	10 U
2,4-Dinitrotoluene	µg/L	2 U	2 U	2 U	2 U	2 U
2,6-Dichlorophenol	µg/L	2 U	2 U	2 U	2 U	2 U
2,6-Dinitrotoluene	µg/L	2 U	2 U	2 U	2 U	2 U
2-Chloronaphthalene	µg/L	2 U	2 U	2 U	2 U	2 U
2-Chlorophenol	µg/L	2 U	2 U	2 U	2 U	2 U
2-Methylphenol	µg/L	2 U	2 U	2 U	2 U	2 U
2-Nitroaniline	µg/L	2 U	2 U	2 U	2 U	2 U
2-Nitrophenol	µg/L	2 U	2 U	2 U	2 U	2 U
3,3'-Dichlorobenzidine	µg/L	2 U	2 U	2 U	2 U	2 U
4,6 Dinitro-o-cresol	µg/L	2 U	2 U	2 U	2 U	2 U
4-Chloro-3-methylphenol	µg/L	2 U	2 U	2 U	2 U	2 U
4-Chloroaniline	µg/L	2 U	2 U	2 U	2 U	2 U
4-Nitrophenol	µg/L	2 U	2 U	2 U	2 U	2 U
Aniline	µg/L	2 U	2 U	2 U	2 U	2 U
Azobenzene	µg/L	2 U	2 U	2 U	2 U	2 U
Benzoic acid	µg/L	10 U	10 U	10 U	10 U	10 U
Benzyl alcohol	µg/L	2 U	2 U	2 U	2 U	2 U
bis(2-chloroethoxy)methane	µg/L	2 U	2 U	2 U	2 U	2 U
Bis(2-chloroethyl) ether	µg/L	2 U	2 U	2 U	2 U	2 U
Bis(2-ethylhexyl) phthalate	µg/L	2 U	2 U	2 U	2 U	2 U
Butyl benzyl phthalate	µg/L	2 U	2 U	2 U	2 U	2 U
Carbazole	µg/L	25	2 U	2 U	2 U	2 U
Dibenzofuran	µg/L	5.6	2 U	2 U	2 U	2 U
Diethyl phthalate	µg/L	2 U	2 U	2 U	2 U	2 U
Dimethyl phthalate	µg/L	2 U	2 U	2 U	2 U	2 U
Di-n-butyl phthalate	µg/L	2 U	2 U	2 U	2 U	2 U
Di-n-octyl phthalate	µg/L	2 U	2 U	2 U	2 U	2 U
Hexachlorobenzene	µg/L	2 U	2 U	2 U	2 U	2 U
Hexachlorobutadiene	µg/L	1 U	1 U	1 U	1 U	1 U

Table C.8
Chemistry Data for Groundwater Samples

	Event	RI/FS Round 2 Sampling (Floyd|Snider)				
	Location	MW-01	MW-02A	MW-02A	MW-04	MW-05
	Sample ID	**MW1-GW-072911**	**MW2A-GW-072911**	**MW16B-GW-072911**	**MW4-GW-072911**	**MW5-GW-072911**
	Date	07/29/2011	07/29/2011	07/29/2011	07/29/2011	07/29/2011
Other SVOCs						
Hexachlorocyclopentadiene	µg/L	2 U	2 U	2 U	2 U	2 U
Hexachloroethane	µg/L	2 U	2 U	2 U	2 U	2 U
Isophorone	µg/L	2 U	2 U	2 U	2 U	2 U
m,p-Cresol (2:1 ratio)	µg/L	2 U	2 U	2 U	2 U	2 U
Nitrobenzene	µg/L	2 U	2 U	2 U	2 U	2 U
N-Nitrosodimethylamine	µg/L	2 U	2 U	2 U	2 U	2 U
N-Nitroso-di-n-propylamine	µg/L	2 U	2 U	2 U	2 U	2 U
N-Nitrosodiphenylamine	µg/L	2 U	2 U	2 U	2 U	2 U
Pentachlorophenol	µg/L	5 U	5 U	5 U	5 U	5 U
Phenol	µg/L	2 U	2 U	2 U	2 U	2 U
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH						
1,3,5-Trimethylbenzene	µg/L	1 U	1 U	1 U	1 U	1 U
Benzene	µg/L	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	µg/L	1 U	1 U	1 U	1 U	1 U
Iso-Propylbenzene	µg/L	2.7	1 U	1 U	1 U	1 U
n-Propylbenzene	µg/L	2.4	1 U	1 U	1 U	1 U
Toluene	µg/L	1 U	1 U	1 U	1 U	1 U
Xylenes (meta & para)	µg/L	2 U	2 U	2 U	2 U	2 U
Xylene (ortho)	µg/L	1 U	1 U	1 U	1 U	1 U
Xylenes (total)	µg/L	2 U	2 U	2 U	2 U	2 U
Other VOCs						
1,1,1,2-Tetrachloroethane	µg/L	1 U	1 U	1 U	1 U	1 U
1,1,1-Trichloroethane	µg/L	1 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	µg/L	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	µg/L	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	µg/L	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	µg/L	1 U	1 U	1 U	1 U	1 U
1,1-Dichloropropene	µg/L	1 U	1 U	1 U	1 U	1 U
1,2,3-Trichlorobenzene	µg/L	1 U	1 U	1 U	1 U	1 U
1,2,3-Trichloropropane	µg/L	1 U	1 U	1 U	1 U	1 U
1,2,4-Trimethylbenzene	µg/L	1 U	1 U	1 U	1 U	1 U
1,2-Dibromo-3-chloropropane	µg/L	1 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane (EDB)	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dichloroethane (EDC)	µg/L	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	µg/L	1 U	1 U	1 U	1 U	1 U
1,3-Dichloropropane	µg/L	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	µg/L	1 U	1 U	1 U	1 U	1 U
2,2-Dichloropropane	µg/L	1 U	1 U	1 U	1 U	1 U
2-Chlorotoluene	µg/L	1 U	1 U	1 U	1 U	1 U
2-Hexanone	µg/L	2 U	2 U	2 U	2 U	2 U
3-Nitroaniline	µg/L	5 U	5 U	5 U	5 U	5 U
4-Bromophenyl phenyl ether	µg/L	2 U	2 U	2 U	2 U	2 U

Table C.8
Chemistry Data for Groundwater Samples

		Event	RI/FS Round 2 Sampling (Floyd|Snider)				
		Location	MW-01	MW-02A	MW-02A	MW-04	MW-05
		Sample ID	**MW1-GW-072911**	**MW2A-GW-072911**	**MW16B-GW-072911**	**MW4-GW-072911**	**MW5-GW-072911**
		Date	07/29/2011	07/29/2011	07/29/2011	07/29/2011	07/29/2011
Other VOCs							
4-Chlorophenyl phenyl ether	µg/L		2 U	2 U	2 U	2 U	2 U
4-Chlorotoluene	µg/L		1 U	1 U	1 U	1 U	1 U
4-Nitroaniline	µg/L		2 U	2 U	2 U	2 U	2 U
Acetone	µg/L		14	3.4	2.6	2.6	3.9
Acrylonitrile	µg/L		1 U	1 U	1 U	1 U	1 U
bis(2-chloroisopropyl)ether	µg/L		2 U	2 U	2 U	2 U	2 U
Bromobenzene	µg/L		1 U	1 U	1 U	1 U	1 U
Bromochloromethane	µg/L		1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	µg/L		1 U	1 U	1 U	1 U	1 U
Bromoform	µg/L		1 U	1 U	1 U	1 U	1 U
Bromomethane	µg/L		1 U	1 U	1 U	1 U	1 U
Carbon disulfide	µg/L		1 U	1 U	1 U	1 U	1 U
Carbon tetrachloride	µg/L		1 U	1 U	1 U	1 U	1 U
Chlorobenzene	µg/L		1 U	1 U	1 U	1 U	1 U
Chloroethane	µg/L		1 U	1 U	1 U	1 U	1 U
Chloroform	µg/L		1.2	1 U	1 U	1 U	1 U
Chloromethane	µg/L		1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	µg/L		1 U	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	µg/L		1 U	1 U	1 U	1 U	1 U
Cymene	µg/L		2.2	1 U	1 U	1 U	1 U
Dibromochloromethane	µg/L		1 U	1 U	1 U	1 U	1 U
Dibromomethane	µg/L		1 U	1 U	1 U	1 U	1 U
Dichlorodifluoromethane	µg/L		1 U	1 U	1 U	1 U	1 U
Methyl ethyl ketone	µg/L		2 U	2 U	2 U	2 U	2 U
Methyl iso butyl ketone	µg/L		2 U	2 U	2 U	2 U	2 U
Methyl-Tert-Butyl Ether	µg/L		1 U	1 U	1 U	1 U	1 U
Methylene chloride	µg/L		1 U	2.5	1.6	1.3	1.4
n-Butylbenzene	µg/L		8.6	1 U	1 U	1 U	1 U
Pyridine	µg/L		2 U	2 U	2 U	2 U	2 U
sec-Butylbenzene	µg/L		1.6	1 U	1 U	1 U	1 U
Styrene	µg/L		1 U	1 U	1 U	1 U	1 U
tert-Butylbenzene	µg/L		1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	µg/L		1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	µg/L		1 U	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	µg/L		1 U	1 U	1 U	1 U	1 U
Trichloroethene	µg/L		1 U	1 U	1 U	1 U	1 U
Trichlorofluoromethane	µg/L		1 U	1 U	1 U	1 U	1 U
Vinyl chloride	µg/L		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Total Petroleum Hydrocarbons (TPH)							
Gasoline-Range Hydrocarbons	µg/L		770 J	50 U	50 U	50 U	50 U
Diesel-Range Hydrocarbons	µg/L		1900	130 U	160	130 U	130 U
Oil-Range Hydrocarbons	µg/L		250 U	250 U	250 U	250 U	250 U

Table C.8
Chemistry Data for Groundwater Samples

Event	RI/FS Round 2 Sampling (Floyd|Snider)				
Location	MW-01	MW-02A	MW-02A	MW-04	MW-05
Sample ID	**MW1-GW-072911**	**MW2A-GW-072911**	**MW16B-GW-072911**	**MW4-GW-072911**	**MW5-GW-072911**
Date	07/29/2011	07/29/2011	07/29/2011	07/29/2011	07/29/2011

Table C.8
Chemistry Data for Groundwater Samples

		Event	RI/FS Round 2 Sampling (Floyd|Snider)				
		Location	MW-06	MW-07	MW-08	MW-09	
		Sample ID	**MW6-GW-072911**	**MW7-GW-072911**	**MW8-GW-072911**	**MW9-GW-072911**	
		Date	07/29/2011	07/29/2011	07/29/2011	07/29/2011	
Dissolved Metals							
Arsenic	µg/L		16	4.9	6.4	12	
Cadmium	µg/L		0.27 U	0.27 U	0.27 U	0.27 U	
Chromium	µg/L		0.61	0.9	1.2	1.5	
Copper	µg/L		2.6 U	2.6 U	4.7	2.6 U	
Lead	µg/L		0.62 U	0.62 U	0.62 U	0.62 U	
Mercury (inorganic)	µg/L		0.2 U	0.2 U	0.2 U	0.2 U	
Nickel	µg/L		2.2	4.5	5.1	2.5	
Silver	µg/L		0.38 U	0.38 U	0.38 U	0.38 U	
Zinc	µg/L		3.9 U	16	3.9 U	8.4	
Polychlorinated Biphenyls (PCBs)							
Aroclor 1016	µg/L		0.01 U	0.01 U	0.01 U	0.01 U	
Aroclor 1221	µg/L		0.01 U	0.01 U	0.01 U	0.01 U	
Aroclor 1232	µg/L		0.01 U	0.01 U	0.01 U	0.01 U	
Aroclor 1242	µg/L		0.01 U	0.01 U	0.01 U	0.01 U	
Aroclor 1248	µg/L		0.01 U	0.01 U	0.01 U	0.01 U	
Aroclor 1254	µg/L		0.01 U	0.01 U	0.01 U	0.01 U	
Aroclor 1260	µg/L		0.01 U	0.01 U	0.01 U	0.01 U	
Aroclor 1268	µg/L		0.01 U	0.01 U	0.01 U	0.01 U	
Total PCBs	µg/L		0.01 U	0.01 U	0.01 U	0.01 U	
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
Benz(a)anthracene	µg/L		2 U	2 U	2 U	2 U	
Benzo(a)pyrene	µg/L		2 U	2 U	2 U	2 U	
Benzo(b)fluoranthene	µg/L		2 U	2 U	2 U	2 U	
Benzo(k)fluoranthene	µg/L		2 U	2 U	2 U	2 U	
Benzofluoranthenes (total)	µg/L		2 U	2 U	2 U	2 U	
Chrysene	µg/L		2 U	2 U	2 U	2 U	
Dibenzo(a,h)anthracene	µg/L		2 U	2 U	2 U	2 U	
Indeno(1,2,3-cd)pyrene	µg/L		2 U	2 U	2 U	2 U	
cPAHs (MTCA TEQ-HalfND)	µg/L		1.6 U	1.6 U	1.6 U	1.6 U	
cPAHs (MTCA TEQ-ZeroND)	µg/L		2 U	2 U	2 U	2 U	
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Total LPAH	µg/L		2 U	5	2 U	3.8	
Naphthalene	µg/L		1 U	1 U	1 U	1.2	
Acenaphthylene	µg/L		2 U	2 U	2 U	2 U	
Acenaphthene	µg/L		2 U	5	2 U	2 U	
Fluorene	µg/L		2 U	2 U	2 U	2.6	
Phenanthrene	µg/L		2 U	2 U	2 U	2 U	
Anthracene	µg/L		2 U	2 U	2 U	2 U	
1-Methylnaphthalene	µg/L		2.9	2 U	2 U	31	
2-Methylnaphthalene	µg/L		2 U	2 U	2 U	4.2	
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Total HPAH	µg/L		2 U	2 U	2 U	2 U	

Table C.8
Chemistry Data for Groundwater Samples

		Event	RI/FS Round 2 Sampling (Floyd|Snider)				
		Location	MW-06	MW-07	MW-08	MW-09	
		Sample ID	**MW6-GW-072911**	**MW7-GW-072911**	**MW8-GW-072911**	**MW9-GW-072911**	
		Date	07/29/2011	07/29/2011	07/29/2011	07/29/2011	
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Fluoranthene	µg/L		2 U	2 U	2 U	2 U	
Pyrene	µg/L		2 U	2 U	2 U	2 U	
Benzo(g,h,i)perylene	µg/L		2 U	2 U	2 U	2 U	
Other SVOCs							
1,2,4-Trichlorobenzene	µg/L		1 U	1 U	1 U	1 U	
1,2-Dichlorobenzene	µg/L		1 U	1 U	1 U	1 U	
1,3-Dichlorobenzene	µg/L		1 U	1 U	1 U	1 U	
2,3,4,6-Tetrachlorophenol	µg/L		2 U	2 U	2 U	2 U	
2,4,5-Trichlorophenol	µg/L		2 U	2 U	2 U	2 U	
2,4,6-Trichlorophenol	µg/L		2 U	2 U	2 U	2 U	
2,4-Dichlorophenol	µg/L		2 U	2 U	2 U	2 U	
2,4-Dimethylphenol	µg/L		2 U	2 U	2 U	2 U	
2,4-Dinitrophenol	µg/L		10 U	10 U	10 U	10 U	
2,4-Dinitrotoluene	µg/L		2 U	2 U	2 U	2 U	
2,6-Dichlorophenol	µg/L		2 U	2 U	2 U	2 U	
2,6-Dinitrotoluene	µg/L		2 U	2 U	2 U	2 U	
2-Chloronaphthalene	µg/L		2 U	2 U	2 U	2 U	
2-Chlorophenol	µg/L		2 U	2 U	2 U	2 U	
2-Methylphenol	µg/L		2 U	2 U	2 U	2 U	
2-Nitroaniline	µg/L		2 U	2 U	2 U	2 U	
2-Nitrophenol	µg/L		2 U	2 U	2 U	2 U	
3,3'-Dichlorobenzidine	µg/L		2 U	2 U	2.1 U	2 U	
4,6 Dinitro-o-cresol	µg/L		2 U	2 U	2.1 U	2 U	
4-Chloro-3-methylphenol	µg/L		2 U	2 U	2 U	2 U	
4-Chloroaniline	µg/L		2 U	2 U	2 U	2 U	
4-Nitrophenol	µg/L		2 U	2 U	2.1 U	2 U	
Aniline	µg/L		2 U	2 U	2.1 U	2 U	
Azobenzene	µg/L		2 U	2 U	2 U	2 U	
Benzoic acid	µg/L		10 U	10 U	10 U	10 U	
Benzyl alcohol	µg/L		2 U	2 U	2 U	2 U	
bis(2-chloroethoxy)methane	µg/L		2 U	2 U	2 U	2 U	
Bis(2-chloroethyl) ether	µg/L		2 U	2 U	2 U	2 U	
Bis(2-ethylhexyl) phthalate	µg/L		2 U	2 U	2 U	2 U	
Butyl benzyl phthalate	µg/L		2 U	2 U	2 U	2 U	
Carbazole	µg/L		2 U	2 U	2 U	2.3	
Dibenzofuran	µg/L		2 U	2 U	2 U	2 U	
Diethyl phthalate	µg/L		2 U	2 U	2 U	2 U	
Dimethyl phthalate	µg/L		2 U	2 U	2 U	2 U	
Di-n-butyl phthalate	µg/L		2 U	2 U	2 U	2 U	
Di-n-octyl phthalate	µg/L		2 U	2 U	2 U	2 U	
Hexachlorobenzene	µg/L		2 U	2 U	2 U	2 U	
Hexachlorobutadiene	µg/L		1 U	1 U	1 U	1 U	

Table C.8
Chemistry Data for Groundwater Samples

		Event	RI/FS Round 2 Sampling (Floyd|Snider)				
		Location	MW-06	MW-07	MW-08	MW-09	
		Sample ID	**MW6-GW-072911**	**MW7-GW-072911**	**MW8-GW-072911**	**MW9-GW-072911**	
		Date	07/29/2011	07/29/2011	07/29/2011	07/29/2011	
Other SVOCs							
Hexachlorocyclopentadiene	µg/L		2 U	2 U	2.1 U	2 U	
Hexachloroethane	µg/L		2 U	2 U	2.1 U	2 U	
Isophorone	µg/L		2 U	2 U	2 U	2 U	
m,p-Cresol (2:1 ratio)	µg/L		40	2 U	2 U	2 U	
Nitrobenzene	µg/L		2 U	2 U	2 U	2 U	
N-Nitrosodimethylamine	µg/L		2 U	2 U	2 U	2 U	
N-Nitroso-di-n-propylamine	µg/L		2 U	2 U	2.1 U	2 U	
N-Nitrosodiphenylamine	µg/L		2 U	2 U	2 U	2 U	
Pentachlorophenol	µg/L		5 U	5 U	5 U	5 U	
Phenol	µg/L		2 U	2 U	2 U	2 U	
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH							
1,3,5-Trimethylbenzene	µg/L		1 U	1 U	1 U	1 U	
Benzene	µg/L		1 U	1 U	1 U	1 U	
Ethylbenzene	µg/L		1 U	1 U	1 U	1 U	
Iso-Propylbenzene	µg/L		1 U	1 U	1 U	1.5	
n-Propylbenzene	µg/L		1 U	1 U	1 U	1 U	
Toluene	µg/L		1 U	1 U	1 U	1 U	
Xylenes (meta & para)	µg/L		2 U	2 U	2 U	2 U	
Xylene (ortho)	µg/L		1 U	1 U	1 U	1 U	
Xylenes (total)	µg/L		2 U	2 U	2 U	2 U	
Other VOCs							
1,1,1,2-Tetrachloroethane	µg/L		1 U	1 U	1 U	1 U	
1,1,1-Trichloroethane	µg/L		1 U	1 U	1 U	1 U	
1,1,2,2-Tetrachloroethane	µg/L		1 U	1 U	1 U	1 U	
1,1,2-Trichloroethane	µg/L		1 U	1 U	1 U	1 U	
1,1-Dichloroethane	µg/L		1 U	1 U	1 U	1 U	
1,1-Dichloroethene	µg/L		1 U	1 U	1 U	1 U	
1,1-Dichloropropene	µg/L		1 U	1 U	1 U	1 U	
1,2,3-Trichlorobenzene	µg/L		1 U	1 U	1 U	1 U	
1,2,3-Trichloropropane	µg/L		1 U	1 U	1 U	1 U	
1,2,4-Trimethylbenzene	µg/L		1 U	1 U	1 U	1 U	
1,2-Dibromo-3-chloropropane	µg/L		1 U	1 U	1 U	1 U	
1,2-Dibromoethane (EDB)	µg/L		0.01 U	0.01 U	0.01 U	0.01 U	
1,2-Dichloroethane (EDC)	µg/L		1 U	1 U	1 U	1 U	
1,2-Dichloropropane	µg/L		1 U	1 U	1 U	1 U	
1,3-Dichloropropane	µg/L		1 U	1 U	1 U	1 U	
1,4-Dichlorobenzene	µg/L		1 U	1 U	1 U	1 U	
2,2-Dichloropropane	µg/L		1 U	1 U	1 U	1 U	
2-Chlorotoluene	µg/L		1 U	1 U	1 U	1 U	
2-Hexanone	µg/L		2 U	2 U	2 U	2 U	
3-Nitroaniline	µg/L		5 U	5 U	5 U	5 U	
4-Bromophenyl phenyl ether	µg/L		2 U	2 U	2 U	2 U	

Table C.8
Chemistry Data for Groundwater Samples

		Event	RI/FS Round 2 Sampling (Floyd|Snider)				
		Location	MW-06	MW-07	MW-08	MW-09	
		Sample ID	**MW6-GW-072911**	**MW7-GW-072911**	**MW8-GW-072911**	**MW9-GW-072911**	
		Date	07/29/2011	07/29/2011	07/29/2011	07/29/2011	
Other VOCs							
4-Chlorophenyl phenyl ether	µg/L		2 U	2 U	2 U	2 U	
4-Chlorotoluene	µg/L		1 U	1 U	1 U	1 U	
4-Nitroaniline	µg/L		2 U	2 U	2.1 U	2 U	
Acetone	µg/L		4.9	6	2 U	6.6	
Acrylonitrile	µg/L		1 U	1 U	1 U	1 U	
bis(2-chloroisopropyl)ether	µg/L		2 U	2 U	2 U	2 U	
Bromobenzene	µg/L		1 U	1 U	1 U	1 U	
Bromochloromethane	µg/L		1 U	1 U	1 U	1 U	
Bromodichloromethane	µg/L		1 U	1 U	1 U	1 U	
Bromoform	µg/L		1 U	1 U	1 U	1 U	
Bromomethane	µg/L		1 U	1 U	1 U	1 U	
Carbon disulfide	µg/L		1 U	1 U	1 U	1 U	
Carbon tetrachloride	µg/L		1 U	1 U	1 U	1 U	
Chlorobenzene	µg/L		1 U	1 U	1 U	1	
Chloroethane	µg/L		1 U	1 U	1 U	1 U	
Chloroform	µg/L		1 U	1 U	1.2	1 U	
Chloromethane	µg/L		1 U	1 U	1 U	1 U	
cis-1,2-Dichloroethene	µg/L		1 U	1 U	1 U	1 U	
cis-1,3-Dichloropropene	µg/L		1 U	1 U	1 U	1 U	
Cymene	µg/L		120	1 U	1 U	1 U	
Dibromochloromethane	µg/L		1 U	1 U	1 U	1 U	
Dibromomethane	µg/L		1 U	1 U	1 U	1 U	
Dichlorodifluoromethane	µg/L		1 U	1 U	1 U	1 U	
Methyl ethyl ketone	µg/L		2 U	2 U	2 U	2 U	
Methyl iso butyl ketone	µg/L		2 U	2 U	2 U	2 U	
Methyl-Tert-Butyl Ether	µg/L		1 U	1 U	1 U	1 U	
Methylene chloride	µg/L		1.7	1.4	1 U	1.2	
n-Butylbenzene	µg/L		1 U	1.3	1 U	2.4	
Pyridine	µg/L		2 U	2 U	2.1 U	2 U	
sec-Butylbenzene	µg/L		1 U	1 U	1 U	1.2	
Styrene	µg/L		1 U	1 U	1 U	1 U	
tert-Butylbenzene	µg/L		1 U	1 U	1 U	1 U	
Tetrachloroethene	µg/L		1 U	1 U	1 U	1 U	
trans-1,2-Dichloroethene	µg/L		1 U	1 U	1 U	1 U	
trans-1,3-Dichloropropene	µg/L		1 U	1 U	1 U	1 U	
Trichloroethene	µg/L		1 U	1 U	1 U	1 U	
Trichlorofluoromethane	µg/L		1 U	1 U	1 U	1 U	
Vinyl chloride	µg/L		0.2 U	0.2 U	0.2 U	0.2 U	
Total Petroleum Hydrocarbons (TPH)							
Gasoline-Range Hydrocarbons	µg/L		380	50	50 U	450 J	
Diesel-Range Hydrocarbons	µg/L		1000	230	130 U	1300	
Oil-Range Hydrocarbons	µg/L		310	250 U	250 U	250 U	

Table C.8
Chemistry Data for Groundwater Samples

Event	RI/FS Round 2 Sampling (Floyd|Snider)				
Location	MW-06	MW-07	MW-08	MW-09	
Sample ID	**MW6-GW-072911**	**MW7-GW-072911**	**MW8-GW-072911**	**MW9-GW-072911**	
Date	07/29/2011	07/29/2011	07/29/2011	07/29/2011	

Table C.8
Chemistry Data for Groundwater Samples

	Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
	Location	FS-19	FS-19	FS-21	FS-21	FS-21
	Sample ID	**FS-19-GW-012913**	**FS-19-GWF-012913**	**FS-21-GW-013013**	**FS-79-GW-013013**	**FS-21-GWF-013013**
	Date	01/29/2013	01/29/2013	01/30/2013	01/30/2013	01/30/2013
Dissolved Metals						
Antimony	µg/L		0.247			0.41
Arsenic	µg/L		3.17			1.09
Beryllium	µg/L		0.048			0.013 U
Cadmium	µg/L		0.0738			0.121
Chromium	µg/L		16.4			0.199
Copper	µg/L		27.4			1.85
Lead	µg/L		13.7			0.0406
Nickel	µg/L		26.2			39.6
Selenium	µg/L		0.015 U			0.0231
Silver	µg/L		0.00289			0.002 U
Thallium	µg/L		0.008 U			0.0424
Zinc	µg/L		26.3			3.79
Total Metals						
Mercury (inorganic)	µg/L	0.875		0.00308	0.00286	
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	µg/L	0.018 U		0.49	0.018 U	
Benzo(a)pyrene	µg/L	0.012 J		0.087	0.04	
Benzo(b)fluoranthene	µg/L	0.02 J		0.13	0.067	
Benzo(k)fluoranthene	µg/L	0.007 U		0.12	0.063	
Chrysene	µg/L	0.043		0.42	0.29	
Dibenzo(a,h)anthracene	µg/L	0.008 J		0.028	0.0094 J	
Indeno(1,2,3-cd)pyrene	µg/L	0.005 U		0.012 J	0.005 U	
cPAHs (MTCA TEQ-HalfND)	µg/L	0.017 J		0.17 J	0.058 J	
cPAHs (MTCA TEQ-ZeroND)	µg/L	0.015 J		0.17 J	0.057 J	
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Naphthalene	µg/L	0.36		240	210	
Acenaphthylene	µg/L	0.02 U		0.25	0.19	
Acenaphthene	µg/L	3.3		65	48	
Fluorene	µg/L	1.6		37	29	
Phenanthrene	µg/L	1.9		68	58	
Anthracene	µg/L	0.13		71	5.2	
1-Methylnaphthalene	µg/L	5		39	30	
2-Methylnaphthalene	µg/L	4.1		59	45	
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Fluoranthene	µg/L	0.27		9.6	9.1	
Pyrene	µg/L	0.31		8.1	7	
Benzo(g,h,i)perylene	µg/L	0.02 U		0.057	0.02 U	
Other SVOCs						
1,2,4-Trichlorobenzene	µg/L	2 U		2 U	2 U	
1,2-Dichlorobenzene	µg/L	2 U		2 U	2 U	
1,3-Dichlorobenzene	µg/L	2 U		2 U	2 U	
2,3,4,6-Tetrachlorophenol	µg/L	2 U		2 U	2 U	

Table C.8
Chemistry Data for Groundwater Samples

		Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
		Location	FS-19	FS-19	FS-21	FS-21	FS-21
		Sample ID	**FS-19-GW-012913**	**FS-19-GWF-012913**	**FS-21-GW-013013**	**FS-79-GW-013013**	**FS-21-GWF-013013**
		Date	01/29/2013	01/29/2013	01/30/2013	01/30/2013	01/30/2013
Other SVOCs							
2,4,5-Trichlorophenol	µg/L		2 U		2 U	2 U	
2,4,6-Trichlorophenol	µg/L		2 U		2 U	2 U	
2,4-Dichlorophenol	µg/L		2 U		2 U	2 U	
2,4-Dimethylphenol	µg/L		2 U		5.1	4.7	
2,4-Dinitrophenol	µg/L		10 U		10 U	10 U	
2,4-Dinitrotoluene	µg/L		2 U		2 U	2 U	
2,6-Dichlorophenol	µg/L		2 U		2 U	2 U	
2,6-Dinitrotoluene	µg/L		2 U		2 U	2 U	
2-Chloronaphthalene	µg/L		2 U		2 U	2 U	
2-Chlorophenol	µg/L		2 U		2 U	2 U	
2-Methylphenol	µg/L		2 U		2 U	2 U	
2-Nitroaniline	µg/L		2 U		2 U	2 U	
2-Nitrophenol	µg/L		2 U		2 U	2 U	
3,3'-Dichlorobenzidine	µg/L		5 U		5 U	5 U	
4,6 Dinitro-o-cresol	µg/L		4 U		4 U	4 U	
4-Chloro-3-methylphenol	µg/L		2 U		2 U	2 U	
4-Chloroaniline	µg/L		2 U		2 U	2 U	
4-Nitrophenol	µg/L		5 U		5 U	5 U	
Aniline	µg/L		4 U		4 U	4 U	
Azobenzene	µg/L		2 U		2 U	2 U	
Benzoic acid	µg/L		10 U		10 U	10 U	
Benzyl alcohol	µg/L		2 U		2 U	2 U	
bis(2-chloroethoxy)methane	µg/L		2 U		2 U	2 U	
Bis(2-chloroethyl) ether	µg/L		1 U		1 U	1 U	
Bis(2-ethylhexyl) phthalate	µg/L		2 U		2 U	2 U	
Butyl benzyl phthalate	µg/L		1 U		1 U	1 U	
Carbazole	µg/L		4.4		48	39	
Dibenzofuran	µg/L		2 U		31	24	
Diethyl phthalate	µg/L		2 U		2 U	2 U	
Dimethyl phthalate	µg/L		2 U		2 U	2 U	
Di-n-butyl phthalate	µg/L		2 U		2 U	2 U	
Di-n-octyl phthalate	µg/L		1 U		1 U	1 U	
Hexachlorobenzene	µg/L		1 U		1 U	1 U	
Hexachlorobutadiene	µg/L		2 U		2 U	2 U	
Hexachlorocyclopentadiene	µg/L		4 U		4 U	4 U	
Hexachloroethane	µg/L		2 U		2 U	2 U	
Isophorone	µg/L		2 U		2 U	2 U	
m,p-Cresol (2:1 ratio)	µg/L		2 U		2 U	2 U	
Nitrobenzene	µg/L		2 U		2 U	2 U	
N-Nitrosodimethylamine	µg/L		2 U		2 U	2 U	
N-Nitroso-di-n-propylamine	µg/L		0.7 U		0.7 U	0.7 U	
N-Nitrosodiphenylamine	µg/L		2 U		2 U	2 U	

Table C.8
Chemistry Data for Groundwater Samples

		Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
		Location	FS-19	FS-19	FS-21	FS-21	FS-21
		Sample ID	**FS-19-GW-012913**	**FS-19-GWF-012913**	**FS-21-GW-013013**	**FS-79-GW-013013**	**FS-21-GWF-013013**
		Date	01/29/2013	01/29/2013	01/30/2013	01/30/2013	01/30/2013
Other SVOCs							
Pentachlorophenol	µg/L		5 U		5 U	5 U	
Phenol	µg/L		2 U		2 U	2 U	
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH							
Benzene	µg/L		1 U		1 U	1 U	
Ethylbenzene	µg/L		1 U		1 U	1 U	
Toluene	µg/L		1 U		1 U	1 U	
Xylenes (total)	µg/L		3 U		3 U	3 U	
Other VOCs							
1,4-Dichlorobenzene	µg/L		2 U		2 U	2 U	
3-Nitroaniline	µg/L		5 U		5 U	5 U	
4-Bromophenyl phenyl ether	µg/L		2 U		2 U	2 U	
4-Chlorophenyl phenyl ether	µg/L		2 U		2 U	2 U	
4-Nitroaniline	µg/L		4 U		4 U	4 U	
bis(2-chloroisopropyl)ether	µg/L		2 U		2 U	2 U	
Pyridine	µg/L		4 U		4 U	4 U	
Total Petroleum Hydrocarbons (TPH)							
Gasoline-Range Hydrocarbons	µg/L		110 JM		92 JM	100 JM	
Diesel-Range Hydrocarbons	µg/L		5500 JM		840 JM	730 JM	
Oil-Range Hydrocarbons	µg/L		1200 JM		250 U	250 U	

Table C.8
Chemistry Data for Groundwater Samples

		Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
		Location	FS-21	FS-22	FS-22	MW-01	MW-01
		Sample ID	**FS-79-GWF-013013**	**FS-22-GW-013013**	**FS-22-GWF-013013**	**MW-01-GW-021513**	**MW-01-GWF-021513**
		Date	01/30/2013	01/30/2013	01/30/2013	02/15/2013	02/15/2013
Dissolved Metals							
Antimony	µg/L		0.391		0.146		0.28
Arsenic	µg/L		1.15		1.02		14.4
Beryllium	µg/L		0.013 U		0.013 U		0.00563 U
Cadmium	µg/L		0.104		0.0399		0.015
Chromium	µg/L		0.211		0.528		0.192 U
Copper	µg/L		2.19		0.934		0.241 U
Lead	µg/L		0.0697		0.154		0.0183 U
Nickel	µg/L		39.2		10		4.19
Selenium	µg/L		0.067		0.015 U		0.1033
Silver	µg/L		0.002 U		0.00248		0.00263 U
Thallium	µg/L		0.0446		0.008 U		0.00113 U
Zinc	µg/L		4.37		1.18		8.26 U
Total Metals							
Mercury (inorganic)	µg/L			0.00132		0.0053	
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
Benz(a)anthracene	µg/L			0.049		0.018 U	
Benzo(a)pyrene	µg/L			0.0096 U		0.028 J	
Benzo(b)fluoranthene	µg/L			0.01 U		0.01 U	
Benzo(k)fluoranthene	µg/L			0.007 U		0.007 U	
Chrysene	µg/L			0.0064 U		0.049 UB	
Dibenzo(a,h)anthracene	µg/L			0.0062 U		0.012 J	
Indeno(1,2,3-cd)pyrene	µg/L			0.005 U		0.0087 J	
cPAHs (MTCA TEQ-HalfND)	µg/L			0.011		0.032 J	
cPAHs (MTCA TEQ-ZeroND)	µg/L			0.0049		0.03 J	
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Naphthalene	µg/L			0.032		4.6	
Acenaphthylene	µg/L			0.02 U		0.02 U	
Acenaphthene	µg/L			0.02 U		25	
Fluorene	µg/L			0.02 U		14	
Phenanthrene	µg/L			0.033		6.7	
Anthracene	µg/L			0.02 U		0.42	
1-Methylnaphthalene	µg/L			0.02 U		93	
2-Methylnaphthalene	µg/L			0.02 U		67	
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Fluoranthene	µg/L			0.02 U		0.88	
Pyrene	µg/L			0.033 U		0.49	
Benzo(g,h,i)perylene	µg/L			0.02 U		0.02 U	
Other SVOCs							
1,2,4-Trichlorobenzene	µg/L			2 U		1 U	
1,2-Dichlorobenzene	µg/L			2 U		2 U	
1,3-Dichlorobenzene	µg/L			2 U		2 U	
2,3,4,6-Tetrachlorophenol	µg/L			2 U		2 U	

Table C.8
Chemistry Data for Groundwater Samples

	Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
	Location	FS-21	FS-22	FS-22	MW-01	MW-01
	Sample ID	**FS-79-GWF-013013**	**FS-22-GW-013013**	**FS-22-GWF-013013**	**MW-01-GW-021513**	**MW-01-GWF-021513**
	Date	01/30/2013	01/30/2013	01/30/2013	02/15/2013	02/15/2013
Other SVOCs						
2,4,5-Trichlorophenol	µg/L		2 U		2 U	
2,4,6-Trichlorophenol	µg/L		2 U		2 U	
2,4-Dichlorophenol	µg/L		2 U		2 U	
2,4-Dimethylphenol	µg/L		2 U		2 U	
2,4-Dinitrophenol	µg/L		10 U		10 U	
2,4-Dinitrotoluene	µg/L		2 U		2 U	
2,6-Dichlorophenol	µg/L		2 U		2 U	
2,6-Dinitrotoluene	µg/L		2 U		2 U	
2-Chloronaphthalene	µg/L		2 U		2 U	
2-Chlorophenol	µg/L		2 U		2 U	
2-Methylphenol	µg/L		2 U		2 U	
2-Nitroaniline	µg/L		2 U		2 U	
2-Nitrophenol	µg/L		2 U		2 U	
3,3'-Dichlorobenzidine	µg/L		5 U		5 U	
4,6 Dinitro-o-cresol	µg/L		4 U		4 U	
4-Chloro-3-methylphenol	µg/L		2 U		2 U	
4-Chloroaniline	µg/L		2 U		2 U	
4-Nitrophenol	µg/L		5 U		5 U	
Aniline	µg/L		4 U		4 U	
Azobenzene	µg/L		2 U		2 U	
Benzoic acid	µg/L		10 U		10 U	
Benzyl alcohol	µg/L		2 U		2 U	
bis(2-chloroethoxy)methane	µg/L		2 U		2 U	
Bis(2-chloroethyl) ether	µg/L		1 U		1 U	
Bis(2-ethylhexyl) phthalate	µg/L		2 U		2 U	
Butyl benzyl phthalate	µg/L		1 U		1 U	
Carbazole	µg/L		2 U		49	
Dibenzofuran	µg/L		2 U		7.7	
Diethyl phthalate	µg/L		2 U		2 U	
Dimethyl phthalate	µg/L		2 U		2 U	
Di-n-butyl phthalate	µg/L		2 U		2 U	
Di-n-octyl phthalate	µg/L		1 U		1 U	
Hexachlorobenzene	µg/L		1 U		1 U	
Hexachlorobutadiene	µg/L		2 U		2 U	
Hexachlorocyclopentadiene	µg/L		4 U		4 U	
Hexachloroethane	µg/L		2 U		2 U	
Isophorone	µg/L		2 U		2 U	
m,p-Cresol (2:1 ratio)	µg/L		2 U		2 U	
Nitrobenzene	µg/L		2 U		2 U	
N-Nitrosodimethylamine	µg/L		2 U		2 U	
N-Nitroso-di-n-propylamine	µg/L		0.7 U		0.7 U	
N-Nitrosodiphenylamine	µg/L		2 U		2 U	

Table C.8
Chemistry Data for Groundwater Samples

	Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
	Location	FS-21	FS-22	FS-22	MW-01	MW-01
	Sample ID	**FS-79-GWF-013013**	**FS-22-GW-013013**	**FS-22-GWF-013013**	**MW-01-GW-021513**	**MW-01-GWF-021513**
	Date	01/30/2013	01/30/2013	01/30/2013	02/15/2013	02/15/2013
Other SVOCs						
Pentachlorophenol	µg/L		5 U		5 U	
Phenol	µg/L		2 U		2 U	
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH						
1,3,5-Trimethylbenzene	µg/L				2 U	
Benzene	µg/L		1 U		2 U	
Ethylbenzene	µg/L		1 U		2 U	
Iso-Propylbenzene	µg/L				3.1	
n-Propylbenzene	µg/L				2.5	
Toluene	µg/L		1 U		2 U	
Xylenes (meta & para)	µg/L				4 U	
Xylene (ortho)	µg/L				2 U	
Xylenes (total)	µg/L		3 U		3 U	
Other VOCs						
1,1,1,2-Tetrachloroethane	µg/L				2 U	
1,1,1-Trichloroethane	µg/L				2 U	
1,1,2,2-Tetrachloroethane	µg/L				2 U	
1,1,2-Trichloroethane	µg/L				2 U	
1,1-Dichloroethane	µg/L				2 U	
1,1-Dichloroethene	µg/L				2 U	
1,1-Dichloropropene	µg/L				2 U	
1,2,3-Trichlorobenzene	µg/L				2 U	
1,2,3-Trichloropropane	µg/L				2 U	
1,2,4-Trimethylbenzene	µg/L				2 U	
1,2-Dibromo-3-chloropropane	µg/L				10 U	
1,2-Dibromoethane (EDB)	µg/L				0.01 U	
1,2-Dichloroethane (EDC)	µg/L				2 U	
1,2-Dichloropropane	µg/L				2 U	
1,3-Dichloropropane	µg/L				2 U	
1,4-Dichlorobenzene	µg/L		2 U		2 U	
2,2-Dichloropropane	µg/L				2 U	
2-Chlorotoluene	µg/L				2 U	
2-Hexanone	µg/L				10 U	
3-Nitroaniline	µg/L		5 U		5 U	
4-Bromophenyl phenyl ether	µg/L		2 U		2 U	
4-Chlorophenyl phenyl ether	µg/L		2 U		2 U	
4-Chlorotoluene	µg/L				2 U	
4-Nitroaniline	µg/L		4 U		4 U	
Acetone	µg/L				25 U	
Acrylonitrile	µg/L				10 U	
bis(2-chloroisopropyl)ether	µg/L		2 U		2 U	
Bromobenzene	µg/L				2 U	
Bromochloromethane	µg/L				2 U	

Table C.8
Chemistry Data for Groundwater Samples

		Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
		Location	FS-21	FS-22	FS-22	MW-01	MW-01
		Sample ID	**FS-79-GWF-013013**	**FS-22-GW-013013**	**FS-22-GWF-013013**	**MW-01-GW-021513**	**MW-01-GWF-021513**
		Date	01/30/2013	01/30/2013	01/30/2013	02/15/2013	02/15/2013
Other VOCs							
Bromodichloromethane	µg/L					0.9 U	
Bromoform	µg/L					2 U	
Bromomethane	µg/L					2 U	
Carbon disulfide	µg/L					2 U	
Carbon tetrachloride	µg/L					1.6 U	
Chlorobenzene	µg/L					2 U	
Chloroethane	µg/L					2 U	
Chloroform	µg/L					2 U	
Chloromethane	µg/L					2 U	
cis-1,2-Dichloroethene	µg/L					2 U	
cis-1,3-Dichloropropene	µg/L					2 U	
Cymene	µg/L					3.1	
Dibromochloromethane	µg/L					2 U	
Dibromomethane	µg/L					2 U	
Dichlorodifluoromethane	µg/L					2 U	
Methyl ethyl ketone	µg/L					10 U	
Methyl iso butyl ketone	µg/L					10 U	
Methyl-Tert-Butyl Ether	µg/L					2 U	
Methylene chloride	µg/L					5 U	
n-Butylbenzene	µg/L					2 U	
Pyridine	µg/L			4 U		4 U	
sec-Butylbenzene	µg/L					2 U	
Styrene	µg/L					2 U	
tert-Butylbenzene	µg/L					2 U	
Tetrachloroethene	µg/L					2 U	
trans-1,2-Dichloroethene	µg/L					2 U	
trans-1,3-Dichloropropene	µg/L					2 U	
Trichloroethene	µg/L					2 U	
Trichlorofluoromethane	µg/L					2 U	
Vinyl chloride	µg/L					0.2 U	
Total Petroleum Hydrocarbons (TPH)							
Gasoline-Range Hydrocarbons	µg/L			50 U		680 JM	
Diesel-Range Hydrocarbons	µg/L			130 U		1500 JM	
Oil-Range Hydrocarbons	µg/L			250 U		250 U	
EPH/VPH							
C5-C6 Aliphatics	µg/L					50 U	
C6-C8 Aliphatics	µg/L					50 U	
C8-C10 Aliphatics	µg/L					50 U	
C10-C12 Aliphatics	µg/L					50 U	
C12-C16 Aliphatics	µg/L					50 U	
C16-C21 Aliphatics	µg/L					50 U	
C21-C34 Aliphatics	µg/L					50 U	

Table C.8
Chemistry Data for Groundwater Samples

	Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
	Location	FS-21	FS-22	FS-22	MW-01	MW-01
	Sample ID	**FS-79-GWF-013013**	**FS-22-GW-013013**	**FS-22-GWF-013013**	**MW-01-GW-021513**	**MW-01-GWF-021513**
	Date	01/30/2013	01/30/2013	01/30/2013	02/15/2013	02/15/2013
EPH/VPH						
C8-C10 Aromatics	µg/L				78	
C10-C12 Aromatics	µg/L				530	
C12-C16 Aromatics	µg/L				400	
C16-C21 Aromatics	µg/L				140	
C21-C34 Aromatics	µg/L				170	
n-Hexane	µg/L				2 U	

Table C.8
Chemistry Data for Groundwater Samples

		Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
		Location	MW-02A	MW-02A	MW-04	MW-04	MW-05
		Sample ID	**MW-02A-GW-021513**	**MW-02A-GWF-021513**	**MW-04-GW-021413**	**MW-04-GWF-021413**	**MW-05-GW-021413**
		Date	02/15/2013	02/15/2013	02/14/2013	02/14/2013	02/15/2013
Dissolved Metals							
Antimony	µg/L			1.99		0.257	
Arsenic	µg/L			1.48		1.81	
Beryllium	µg/L			0.00563 U		0.00563 U	
Cadmium	µg/L			0.276		0.0115	
Chromium	µg/L			0.192 U		0.192 U	
Copper	µg/L			9.09		2.07	
Lead	µg/L			0.0234		0.0291	
Nickel	µg/L			4.71		1.92	
Selenium	µg/L			0.0823 U		0.396	
Silver	µg/L			0.0164		0.0031	
Thallium	µg/L			0.0147		0.0037	
Zinc	µg/L			71		8.26 U	
Total Metals							
Mercury (inorganic)	µg/L	0.0058		0.0025		0.035	
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
Benz(a)anthracene	µg/L	0.018 U		0.018 U		0.018 U	
Benzo(a)pyrene	µg/L	0.0099 U		0.0096 U		0.0096 U	
Benzo(b)fluoranthene	µg/L	0.01 U		0.01 U		0.01 U	
Benzo(k)fluoranthene	µg/L	0.0073 U		0.007 U		0.007 U	
Chrysene	µg/L	0.0066 U		0.0064 U		0.0064 U	
Dibenzo(a,h)anthracene	µg/L	0.0064 U		0.0062 U		0.0062 U	
Indeno(1,2,3-cd)pyrene	µg/L	0.0051 U		0.005 U		0.005 U	
cPAHs (MTCA TEQ-HalfND)	µg/L	0.0073 UB		0.0071 U		0.0071 U	
cPAHs (MTCA TEQ-ZeroND)	µg/L	0.0099 U		0.0096 U		0.0096 U	
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Naphthalene	µg/L	0.063		0.02 U		0.02 U	
Acenaphthylene	µg/L	0.02 U		0.02 U		0.02 U	
Acenaphthene	µg/L	0.02 U		0.02 U		0.02 U	
Fluorene	µg/L	0.02 U		0.02 U		0.02 U	
Phenanthrene	µg/L	0.02 U		0.02 U		0.02 U	
Anthracene	µg/L	0.037		0.02 U		0.02 U	
1-Methylnaphthalene	µg/L	0.026		0.02 U		0.02 U	
2-Methylnaphthalene	µg/L	0.027		0.02 U		0.02 U	
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Fluoranthene	µg/L	0.02 U		0.02 U		0.02 U	
Pyrene	µg/L	0.034 U		0.033 U		0.094	
Benzo(g,h,i)perylene	µg/L	0.021 U		0.02 U		0.02 U	
Other SVOCs							
1,2,4-Trichlorobenzene	µg/L	1 U		1 U		1 U	
1,2-Dichlorobenzene	µg/L	2 U		2 U		2 U	
1,3-Dichlorobenzene	µg/L	2 U		2 U		2 U	
2,3,4,6-Tetrachlorophenol	µg/L	2 U		2 U		2 U	

Table C.8
Chemistry Data for Groundwater Samples

		Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
		Location	MW-02A	MW-02A	MW-04	MW-04	MW-05
		Sample ID	**MW-02A-GW-021513**	**MW-02A-GWF-021513**	**MW-04-GW-021413**	**MW-04-GWF-021413**	**MW-05-GW-021413**
		Date	02/15/2013	02/15/2013	02/14/2013	02/14/2013	02/15/2013
Other SVOCs							
2,4,5-Trichlorophenol	µg/L		2 U		2 U		2 U
2,4,6-Trichlorophenol	µg/L		2 U		2 U		2 U
2,4-Dichlorophenol	µg/L		2 U		2 U		2 U
2,4-Dimethylphenol	µg/L		2 U		2 U		2 U
2,4-Dinitrophenol	µg/L		10 U		10 U		10 U
2,4-Dinitrotoluene	µg/L		2 U		2 U		2 U
2,6-Dichlorophenol	µg/L		2 U		2 U		2 U
2,6-Dinitrotoluene	µg/L		2 U		2 U		2 U
2-Chloronaphthalene	µg/L		2 U		2 U		2 U
2-Chlorophenol	µg/L		2 U		2 U		2 U
2-Methylphenol	µg/L		2 U		2 U		2 U
2-Nitroaniline	µg/L		2 U		2 U		2 U
2-Nitrophenol	µg/L		2 U		2 U		2 U
3,3'-Dichlorobenzidine	µg/L		5 U		5 U		5 U
4,6 Dinitro-o-cresol	µg/L		4 U		4 U		4 U
4-Chloro-3-methylphenol	µg/L		2 U		2 U		2 U
4-Chloroaniline	µg/L		2 U		2 U		2 U
4-Nitrophenol	µg/L		5 U		5 U		5 U
Aniline	µg/L		4 U		4 U		4 U
Azobenzene	µg/L		2 U		2 U		2 U
Benzoic acid	µg/L		10 U		10 U		10 U
Benzyl alcohol	µg/L		2 U		2 U		2 U
bis(2-chloroethoxy)methane	µg/L		2 U		2 U		2 U
Bis(2-chloroethyl) ether	µg/L		1 U		1 U		1 U
Bis(2-ethylhexyl) phthalate	µg/L		2.8		2 U		2 U
Butyl benzyl phthalate	µg/L		1 U		1 U		1 U
Carbazole	µg/L		2 U		2 U		2 U
Dibenzofuran	µg/L		2 U		2 U		2 U
Diethyl phthalate	µg/L		2 U		2 U		2 U
Dimethyl phthalate	µg/L		2 U		2 U		2 U
Di-n-butyl phthalate	µg/L		3.3		2 U		2 U
Di-n-octyl phthalate	µg/L		1 U		1 U		1 U
Hexachlorobenzene	µg/L		1 U		1 U		1 U
Hexachlorobutadiene	µg/L		2 U		2 U		2 U
Hexachlorocyclopentadiene	µg/L		4 U		4 U		4 U
Hexachloroethane	µg/L		2.1 U		2 U		2 U
Isophorone	µg/L		2 U		2 U		2 U
m,p-Cresol (2:1 ratio)	µg/L		2 U		2 U		2 U
Nitrobenzene	µg/L		2 U		2 U		2 U
N-Nitrosodimethylamine	µg/L		2 U		2 U		2 U
N-Nitroso-di-n-propylamine	µg/L		0.72 U		0.7 U		0.7 U
N-Nitrosodiphenylamine	µg/L		2 U		2 U		2 U

Table C.8
Chemistry Data for Groundwater Samples

		Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
		Location	MW-02A	MW-02A	MW-04	MW-04	MW-05
		Sample ID	**MW-02A-GW-021513**	**MW-02A-GWF-021513**	**MW-04-GW-021413**	**MW-04-GWF-021413**	**MW-05-GW-021413**
		Date	02/15/2013	02/15/2013	02/14/2013	02/14/2013	02/15/2013
Other SVOCs							
Pentachlorophenol	µg/L		5 U		5 U		5 U
Phenol	µg/L		2 U		2 U		2 U
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH							
1,3,5-Trimethylbenzene	µg/L		2 U		2 U		2 U
Benzene	µg/L		2 U		2 U		2 U
Ethylbenzene	µg/L		2 U		2 U		2 U
Iso-Propylbenzene	µg/L		2 U		2 U		2 U
n-Propylbenzene	µg/L		2 U		2 U		2 U
Toluene	µg/L		2 U		2 U		2 U
Xylenes (meta & para)	µg/L		4 U		4 U		4 U
Xylene (ortho)	µg/L		2 U		2 U		2 U
Xylenes (total)	µg/L		3 U		3 U		3 U
Other VOCs							
1,1,1,2-Tetrachloroethane	µg/L		2 U		2 U		2 U
1,1,1-Trichloroethane	µg/L		2 U		2 U		2 U
1,1,2,2-Tetrachloroethane	µg/L		2 U		2 U		2 U
1,1,2-Trichloroethane	µg/L		2 U		2 U		2 U
1,1-Dichloroethane	µg/L		2 U		2 U		2 U
1,1-Dichloroethene	µg/L		2 U		2 U		2 U
1,1-Dichloropropene	µg/L		2 U		2 U		2 U
1,2,3-Trichlorobenzene	µg/L		2 U		2 U		2 U
1,2,3-Trichloropropane	µg/L		2 U		2 U		2 U
1,2,4-Trimethylbenzene	µg/L		2 U		2 U		2 U
1,2-Dibromo-3-chloropropane	µg/L		10 U		10 U		10 U
1,2-Dibromoethane (EDB)	µg/L		0.01 U		0.01 U		0.01 U
1,2-Dichloroethane (EDC)	µg/L		2 U		2 U		2 U
1,2-Dichloropropane	µg/L		2 U		2 U		2 U
1,3-Dichloropropane	µg/L		2 U		2 U		2 U
1,4-Dichlorobenzene	µg/L		2 U		2 U		2 U
2,2-Dichloropropane	µg/L		2 U		2 U		2 U
2-Chlorotoluene	µg/L		2 U		2 U		2 U
2-Hexanone	µg/L		10 U		10 U		10 U
3-Nitroaniline	µg/L		5 U		5 U		5 U
4-Bromophenyl phenyl ether	µg/L		2 U		2 U		2 U
4-Chlorophenyl phenyl ether	µg/L		2 U		2 U		2 U
4-Chlorotoluene	µg/L		2 U		2 U		2 U
4-Nitroaniline	µg/L		4 U		4 U		4 U
Acetone	µg/L		25 U		25 U		25 U
Acrylonitrile	µg/L		10 U		10 U		10 U
bis(2-chloroisopropyl)ether	µg/L		2 U		2 U		2 U
Bromobenzene	µg/L		2 U		2 U		2 U
Bromochloromethane	µg/L		2 U		2 U		2 U

Table C.8
Chemistry Data for Groundwater Samples

	Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
	Location	MW-02A	MW-02A	MW-04	MW-04	MW-05
	Sample ID	**MW-02A-GW-021513**	**MW-02A-GWF-021513**	**MW-04-GW-021413**	**MW-04-GWF-021413**	**MW-05-GW-021413**
	Date	02/15/2013	02/15/2013	02/14/2013	02/14/2013	02/15/2013
Other VOCs						
Bromodichloromethane	µg/L	0.9 U		0.9 U		0.9 U
Bromoform	µg/L	2 U		2 U		2 U
Bromomethane	µg/L	2 U		2 U		2 U
Carbon disulfide	µg/L	2 U		2 U		2 U
Carbon tetrachloride	µg/L	1.6 U		1.6 U		1.6 U
Chlorobenzene	µg/L	2 U		2 U		2 U
Chloroethane	µg/L	2 U		2 U		2 U
Chloroform	µg/L	2 U		2 U		2 U
Chloromethane	µg/L	2 U		2 U		2 U
cis-1,2-Dichloroethene	µg/L	2 U		2 U		2 U
cis-1,3-Dichloropropene	µg/L	2 U		2 U		2 U
Cymene	µg/L	2 U		2 U		2 U
Dibromochloromethane	µg/L	2 U		2 U		2 U
Dibromomethane	µg/L	2 U		2 U		2 U
Dichlorodifluoromethane	µg/L	2 U		2 U		2 U
Methyl ethyl ketone	µg/L	10 U		10 U		10 U
Methyl iso butyl ketone	µg/L	10 U		10 U		10 U
Methyl-Tert-Butyl Ether	µg/L	2 U		2 U		2 U
Methylene chloride	µg/L	5 U		5 U		5 U
n-Butylbenzene	µg/L	2 U		2 U		2 U
Pyridine	µg/L	4 U		4 U		4 U
sec-Butylbenzene	µg/L	2 U		2 U		2 U
Styrene	µg/L	2 U		2 U		2 U
tert-Butylbenzene	µg/L	2 U		2 U		2 U
Tetrachloroethene	µg/L	2 U		2 U		2 U
trans-1,2-Dichloroethene	µg/L	2 U		2 U		2 U
trans-1,3-Dichloropropene	µg/L	2 U		2 U		2 U
Trichloroethene	µg/L	2 U		2 U		2 U
Trichlorofluoromethane	µg/L	2 U		2 U		2 U
Vinyl chloride	µg/L	0.2 U		0.2 U		0.2 U
Total Petroleum Hydrocarbons (TPH)						
Gasoline-Range Hydrocarbons	µg/L	50 U		50 U		50 U
Diesel-Range Hydrocarbons	µg/L	340 JM		130 U		130 U
Oil-Range Hydrocarbons	µg/L	250 U		250 U		250 U

Table C.8
Chemistry Data for Groundwater Samples

	Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
	Location	MW-05	MW-06	MW-06	MW-06	MW-06
	Sample ID	**MW-05-GWF-021413**	**MW-06-GW-021413**	**MW-94-GW-021413**	**MW-06-GWF-021413**	**MW-94-GWF-021413**
	Date	02/14/2013	02/14/2013	02/14/2013	02/14/2013	02/14/2013
Dissolved Metals						
Antimony	µg/L	0.0689			0.29	0.309
Arsenic	µg/L	0.382			4.23	4.34
Beryllium	µg/L	0.00563 U			0.00563 U	0.00563 U
Cadmium	µg/L	0.011 U			0.0221	0.0137
Chromium	µg/L	0.446			0.192 U	0.192 U
Copper	µg/L	0.836			1.6	1.51
Lead	µg/L	0.0183 U			0.0183 U	0.0183 U
Nickel	µg/L	1.62			1.14	1.21
Selenium	µg/L	0.1749			0.0823 U	0.0823 U
Silver	µg/L	0.00263 U			0.00263 U	0.00263 U
Thallium	µg/L	0.00113 U			0.0013	0.0015
Zinc	µg/L	8.26 U			8.26 U	8.26 U
Total Metals						
Mercury (inorganic)	µg/L		0.00135 U	0.00135 U		
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	µg/L		0.018 U	0.018 U		
Benzo(a)pyrene	µg/L		0.0096 U	0.0096 U		
Benzo(b)fluoranthene	µg/L		0.01 U	0.01 U		
Benzo(k)fluoranthene	µg/L		0.007 U	0.007 U		
Chrysene	µg/L		0.0064 U	0.0064 U		
Dibenzo(a,h)anthracene	µg/L		0.0062 U	0.0062 U		
Indeno(1,2,3-cd)pyrene	µg/L		0.005 U	0.005 U		
cPAHs (MTCA TEQ-HalfND)	µg/L		0.0071 U	0.0071 U		
cPAHs (MTCA TEQ-ZeroND)	µg/L		0.0096 U	0.0096 U		
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Naphthalene	µg/L		0.02 U	0.02 U		
Acenaphthylene	µg/L		0.02 U	0.02 U		
Acenaphthene	µg/L		0.031	0.039		
Fluorene	µg/L		0.02 U	0.02 U		
Phenanthrene	µg/L		0.02 U	0.02 U		
Anthracene	µg/L		0.02 U	0.02 U		
1-Methylnaphthalene	µg/L		0.02 U	0.02 U		
2-Methylnaphthalene	µg/L		0.02 U	0.02 U		
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Fluoranthene	µg/L		0.02 U	0.02 U		
Pyrene	µg/L		0.033 U	0.033 U		
Benzo(g,h,i)perylene	µg/L		0.02 U	0.02 U		
Other SVOCs						
1,2,4-Trichlorobenzene	µg/L		1 U	1 U		
1,2-Dichlorobenzene	µg/L		2 U	2 U		
1,3-Dichlorobenzene	µg/L		2 U	2 U		
2,3,4,6-Tetrachlorophenol	µg/L		2 U	2 U		

Table C.8
Chemistry Data for Groundwater Samples

	Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
	Location	MW-05	MW-06	MW-06	MW-06	MW-06
	Sample ID	**MW-05-GWF-021413**	**MW-06-GW-021413**	**MW-94-GW-021413**	**MW-06-GWF-021413**	**MW-94-GWF-021413**
	Date	02/14/2013	02/14/2013	02/14/2013	02/14/2013	02/14/2013
Other SVOCs						
2,4,5-Trichlorophenol	µg/L		2 U	2 U		
2,4,6-Trichlorophenol	µg/L		2 U	2 U		
2,4-Dichlorophenol	µg/L		2 U	2 U		
2,4-Dimethylphenol	µg/L		2 U	2 U		
2,4-Dinitrophenol	µg/L		10 U	10 U		
2,4-Dinitrotoluene	µg/L		2 U	2 U		
2,6-Dichlorophenol	µg/L		2 U	2 U		
2,6-Dinitrotoluene	µg/L		2 U	2 U		
2-Chloronaphthalene	µg/L		2 U	2 U		
2-Chlorophenol	µg/L		2 U	2 U		
2-Methylphenol	µg/L		2 U	2 U		
2-Nitroaniline	µg/L		2 U	2 U		
2-Nitrophenol	µg/L		2 U	2 U		
3,3'-Dichlorobenzidine	µg/L		5 U	5 U		
4,6 Dinitro-o-cresol	µg/L		4 U	4 U		
4-Chloro-3-methylphenol	µg/L		2 U	2 U		
4-Chloroaniline	µg/L		2 U	2 U		
4-Nitrophenol	µg/L		5 U	5 U		
Aniline	µg/L		4 U	4 U		
Azobenzene	µg/L		2 U	2 U		
Benzoic acid	µg/L		10 U	10 U		
Benzyl alcohol	µg/L		2 U	2 U		
bis(2-chloroethoxy)methane	µg/L		2 U	2 U		
Bis(2-chloroethyl) ether	µg/L		1 U	1 U		
Bis(2-ethylhexyl) phthalate	µg/L		2 U	2 U		
Butyl benzyl phthalate	µg/L		1 U	1 U		
Carbazole	µg/L		2 U	2 U		
Dibenzofuran	µg/L		2 U	2 U		
Diethyl phthalate	µg/L		2 U	2 U		
Dimethyl phthalate	µg/L		2 U	2 U		
Di-n-butyl phthalate	µg/L		2 U	2 U		
Di-n-octyl phthalate	µg/L		1 U	1 U		
Hexachlorobenzene	µg/L		1 U	1 U		
Hexachlorobutadiene	µg/L		2 U	2 U		
Hexachlorocyclopentadiene	µg/L		4 U	4 U		
Hexachloroethane	µg/L		2 U	2 U		
Isophorone	µg/L		2 U	2 U		
m,p-Cresol (2:1 ratio)	µg/L		2 U	2 U		
Nitrobenzene	µg/L		2 U	2 U		
N-Nitrosodimethylamine	µg/L		2 U	2 U		
N-Nitroso-di-n-propylamine	µg/L		0.7 U	0.7 U		
N-Nitrosodiphenylamine	µg/L		2 U	2 U		

Table C.8
Chemistry Data for Groundwater Samples

		Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
		Location	MW-05	MW-06	MW-06	MW-06	MW-06
		Sample ID	**MW-05-GWF-021413**	**MW-06-GW-021413**	**MW-94-GW-021413**	**MW-06-GWF-021413**	**MW-94-GWF-021413**
		Date	02/14/2013	02/14/2013	02/14/2013	02/14/2013	02/14/2013
Other SVOCs							
Pentachlorophenol	µg/L			5 U	5 U		
Phenol	µg/L			2 U	2 U		
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH							
1,3,5-Trimethylbenzene	µg/L			2 U	2 U		
Benzene	µg/L			2 U	2 U		
Ethylbenzene	µg/L			2 U	2 U		
Iso-Propylbenzene	µg/L			2 U	2 U		
n-Propylbenzene	µg/L			2 U	2 U		
Toluene	µg/L			2 U	2 U		
Xylenes (meta & para)	µg/L			4 U	4 U		
Xylene (ortho)	µg/L			2 U	2 U		
Xylenes (total)	µg/L			3 U	3 U		
Other VOCs							
1,1,1,2-Tetrachloroethane	µg/L			2 U	2 U		
1,1,1-Trichloroethane	µg/L			2 U	2 U		
1,1,2,2-Tetrachloroethane	µg/L			2 U	2 U		
1,1,2-Trichloroethane	µg/L			2 U	2 U		
1,1-Dichloroethane	µg/L			2 U	2 U		
1,1-Dichloroethene	µg/L			2 U	2 U		
1,1-Dichloropropene	µg/L			2 U	2 U		
1,2,3-Trichlorobenzene	µg/L			2 U	2 U		
1,2,3-Trichloropropane	µg/L			2 U	2 U		
1,2,4-Trimethylbenzene	µg/L			2 U	2 U		
1,2-Dibromo-3-chloropropane	µg/L			10 U	10 U		
1,2-Dibromoethane (EDB)	µg/L			0.01 U	0.01 U		
1,2-Dichloroethane (EDC)	µg/L			2 U	2 U		
1,2-Dichloropropane	µg/L			2 U	2 U		
1,3-Dichloropropane	µg/L			2 U	2 U		
1,4-Dichlorobenzene	µg/L			2 U	2 U		
2,2-Dichloropropane	µg/L			2 U	2 U		
2-Chlorotoluene	µg/L			2 U	2 U		
2-Hexanone	µg/L			10 U	10 U		
3-Nitroaniline	µg/L			5 U	5 U		
4-Bromophenyl phenyl ether	µg/L			2 U	2 U		
4-Chlorophenyl phenyl ether	µg/L			2 U	2 U		
4-Chlorotoluene	µg/L			2 U	2 U		
4-Nitroaniline	µg/L			4 U	4 U		
Acetone	µg/L			25 U	25 U		
Acrylonitrile	µg/L			10 U	10 U		
bis(2-chloroisopropyl)ether	µg/L			2 U	2 U		
Bromobenzene	µg/L			2 U	2 U		
Bromochloromethane	µg/L			2 U	2 U		

Table C.8
Chemistry Data for Groundwater Samples

		Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
		Location	MW-05	MW-06	MW-06	MW-06	MW-06
		Sample ID	**MW-05-GWF-021413**	**MW-06-GW-021413**	**MW-94-GW-021413**	**MW-06-GWF-021413**	**MW-94-GWF-021413**
		Date	02/14/2013	02/14/2013	02/14/2013	02/14/2013	02/14/2013
Other VOCs							
Bromodichloromethane	µg/L			0.9 U	0.9 U		
Bromoform	µg/L			2 U	2 U		
Bromomethane	µg/L			2 U	2 U		
Carbon disulfide	µg/L			2 U	2 U		
Carbon tetrachloride	µg/L			1.6 U	1.6 U		
Chlorobenzene	µg/L			2 U	2 U		
Chloroethane	µg/L			2 U	2 U		
Chloroform	µg/L			2 U	2 U		
Chloromethane	µg/L			2 U	2 U		
cis-1,2-Dichloroethene	µg/L			2 U	2 U		
cis-1,3-Dichloropropene	µg/L			2 U	2 U		
Cymene	µg/L			2 U	2 U		
Dibromochloromethane	µg/L			2 U	2 U		
Dibromomethane	µg/L			2 U	2 U		
Dichlorodifluoromethane	µg/L			2 U	2 U		
Methyl ethyl ketone	µg/L			10 U	10 U		
Methyl iso butyl ketone	µg/L			10 U	10 U		
Methyl-Tert-Butyl Ether	µg/L			2 U	2 U		
Methylene chloride	µg/L			5 U	5 U		
n-Butylbenzene	µg/L			2 U	2 U		
Pyridine	µg/L			4 U	4 U		
sec-Butylbenzene	µg/L			2 U	2 U		
Styrene	µg/L			2 U	2 U		
tert-Butylbenzene	µg/L			2 U	2 U		
Tetrachloroethene	µg/L			2 U	2 U		
trans-1,2-Dichloroethene	µg/L			2 U	2 U		
trans-1,3-Dichloropropene	µg/L			2 U	2 U		
Trichloroethene	µg/L			2 U	2 U		
Trichlorofluoromethane	µg/L			2 U	2 U		
Vinyl chloride	µg/L			0.2 U	0.2 U		
Total Petroleum Hydrocarbons (TPH)							
Gasoline-Range Hydrocarbons	µg/L			50 U	50 U		
Diesel-Range Hydrocarbons	µg/L			130 U	130 U		
Oil-Range Hydrocarbons	µg/L			250 U	250 U		
EPH/VPH							
C5-C6 Aliphatics	µg/L			50 U	50 U		
C6-C8 Aliphatics	µg/L			50 U	50 U		
C8-C10 Aliphatics	µg/L			50 U	50 U		
C10-C12 Aliphatics	µg/L			50 U	50 U		
C12-C16 Aliphatics	µg/L			50 U	50 U		
C16-C21 Aliphatics	µg/L			50 U	50 U		
C21-C34 Aliphatics	µg/L			50 U	50 U		

Table C.8
Chemistry Data for Groundwater Samples

	Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
	Location	MW-05	MW-06	MW-06	MW-06	MW-06
	Sample ID	**MW-05-GWF-021413**	**MW-06-GW-021413**	**MW-94-GW-021413**	**MW-06-GWF-021413**	**MW-94-GWF-021413**
	Date	02/14/2013	02/14/2013	02/14/2013	02/14/2013	02/14/2013
EPH/VPH						
C8-C10 Aromatics	µg/L		50 U	50 U		
C10-C12 Aromatics	µg/L		50 U	50 U		
C12-C16 Aromatics	µg/L		50 U	50 U		
C16-C21 Aromatics	µg/L		50 U	50 U		
C21-C34 Aromatics	µg/L		50 U	50 U		
n-Hexane	µg/L		2 U	2 U		

Table C.8
Chemistry Data for Groundwater Samples

		Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
		Location	MW-06	MW-06	MW-07	MW-07	MW-08
		Sample ID	**MW-06-GW-021513**	**MW-06-GWF-021513**	**MW-07-GW-021413**	**MW-07-GWF-021413**	**MW-08-GW-021413**
		Date	02/15/2013	02/15/2013	02/14/2013	02/14/2013	02/14/2013
Dissolved Metals							
Antimony	µg/L			0.295		0.1762	
Arsenic	µg/L			3.5		0.834	
Beryllium	µg/L			0.00563 U		0.00563 U	
Cadmium	µg/L			0.0155		0.0649	
Chromium	µg/L			0.192 U		0.192 U	
Copper	µg/L			1.55		1.47	
Lead	µg/L			0.0183 U		0.0319	
Nickel	µg/L			1.2		7.09	
Selenium	µg/L			0.0823 U		0.0823 U	
Silver	µg/L			0.00263 U		0.00263 U	
Thallium	µg/L			0.0013		0.0042	
Zinc	µg/L			8.26 U		10.8	
Total Metals							
Mercury (inorganic)	µg/L	0.0017		0.0021		0.00135 U	
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
Benz(a)anthracene	µg/L			0.018 U		0.018 U	
Benzo(a)pyrene	µg/L			0.0096 U		0.0096 U	
Benzo(b)fluoranthene	µg/L			0.01 U		0.01 U	
Benzo(k)fluoranthene	µg/L			0.007 U		0.007 U	
Chrysene	µg/L			0.0064 U		0.0064 U	
Dibenzo(a,h)anthracene	µg/L			0.0062 U		0.0062 U	
Indeno(1,2,3-cd)pyrene	µg/L			0.005 U		0.005 U	
cPAHs (MTCA TEQ-HalfND)	µg/L			0.0071 U		0.0071 U	
cPAHs (MTCA TEQ-ZeroND)	µg/L			0.0096 U		0.0096 U	
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Naphthalene	µg/L			0.02 U		0.02 U	
Acenaphthylene	µg/L			0.026		0.02 U	
Acenaphthene	µg/L			0.96		0.02 U	
Fluorene	µg/L			0.02 U		0.02 U	
Phenanthrene	µg/L			0.02 U		0.02 U	
Anthracene	µg/L			0.02 U		0.02 U	
1-Methylnaphthalene	µg/L			0.02 U		0.02 U	
2-Methylnaphthalene	µg/L			0.02 U		0.02 U	
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Fluoranthene	µg/L			0.02 U		0.02 U	
Pyrene	µg/L			0.033 U		0.033 U	
Benzo(g,h,i)perylene	µg/L			0.02 U		0.02 U	
Other SVOCs							
1,2,4-Trichlorobenzene	µg/L			1 U		1 U	
1,2-Dichlorobenzene	µg/L			2 U		2 U	
1,3-Dichlorobenzene	µg/L			2 U		2 U	
2,3,4,6-Tetrachlorophenol	µg/L			2 U		2 U	

Table C.8
Chemistry Data for Groundwater Samples

	Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
	Location	MW-06	MW-06	MW-07	MW-07	MW-08
	Sample ID	**MW-06-GW-021513**	**MW-06-GWF-021513**	**MW-07-GW-021413**	**MW-07-GWF-021413**	**MW-08-GW-021413**
	Date	02/15/2013	02/15/2013	02/14/2013	02/14/2013	02/14/2013
Other SVOCs						
2,4,5-Trichlorophenol	µg/L			2 U		2 U
2,4,6-Trichlorophenol	µg/L			2 U		2 U
2,4-Dichlorophenol	µg/L			2 U		2 U
2,4-Dimethylphenol	µg/L			2 U		2 U
2,4-Dinitrophenol	µg/L			10 U		10 U
2,4-Dinitrotoluene	µg/L			2 U		2 U
2,6-Dichlorophenol	µg/L			2 U		2 U
2,6-Dinitrotoluene	µg/L			2 U		2 U
2-Chloronaphthalene	µg/L			2 U		2 U
2-Chlorophenol	µg/L			2 U		2 U
2-Methylphenol	µg/L			2 U		2 U
2-Nitroaniline	µg/L			2 U		2 U
2-Nitrophenol	µg/L			2 U		2 U
3,3'-Dichlorobenzidine	µg/L			5 U		5 U
4,6 Dinitro-o-cresol	µg/L			4 U		4 U
4-Chloro-3-methylphenol	µg/L			2 U		2 U
4-Chloroaniline	µg/L			2 U		2 U
4-Nitrophenol	µg/L			5 U		5 U
Aniline	µg/L			4 U		4 U
Azobenzene	µg/L			2 U		2 U
Benzoic acid	µg/L			10 U		10 U
Benzyl alcohol	µg/L			2 U		2 U
bis(2-chloroethoxy)methane	µg/L			2 U		2 U
Bis(2-chloroethyl) ether	µg/L			1 U		1 U
Bis(2-ethylhexyl) phthalate	µg/L			2 U		2 U
Butyl benzyl phthalate	µg/L			1 U		1 U
Carbazole	µg/L			2 U		2 U
Dibenzofuran	µg/L			2 U		2 U
Diethyl phthalate	µg/L			2 U		2 U
Dimethyl phthalate	µg/L			2 U		2 U
Di-n-butyl phthalate	µg/L			2 U		2 U
Di-n-octyl phthalate	µg/L			1 U		1 U
Hexachlorobenzene	µg/L			1 U		1 U
Hexachlorobutadiene	µg/L			2 U		2 U
Hexachlorocyclopentadiene	µg/L			4 U		4 U
Hexachloroethane	µg/L			2 U		2 U
Isophorone	µg/L			2 U		2 U
m,p-Cresol (2:1 ratio)	µg/L			2 U		2 U
Nitrobenzene	µg/L			2 U		2 U
N-Nitrosodimethylamine	µg/L			2 U		2 U
N-Nitroso-di-n-propylamine	µg/L			0.7 U		0.7 U
N-Nitrosodiphenylamine	µg/L			2 U		2 U

Table C.8
Chemistry Data for Groundwater Samples

		Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
		Location	MW-06	MW-06	MW-07	MW-07	MW-08
		Sample ID	**MW-06-GW-021513**	**MW-06-GWF-021513**	**MW-07-GW-021413**	**MW-07-GWF-021413**	**MW-08-GW-021413**
		Date	02/15/2013	02/15/2013	02/14/2013	02/14/2013	02/14/2013
Other SVOCs							
Pentachlorophenol	µg/L				5 U		5 U
Phenol	µg/L				2 U		2 U
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH							
1,3,5-Trimethylbenzene	µg/L				2 U		2 U
Benzene	µg/L				2 U		2 U
Ethylbenzene	µg/L				2 U		2 U
Iso-Propylbenzene	µg/L				2 U		2 U
n-Propylbenzene	µg/L				2 U		2 U
Toluene	µg/L				2 U		2 U
Xylenes (meta & para)	µg/L				4 U		4 U
Xylene (ortho)	µg/L				2 U		2 U
Xylenes (total)	µg/L				3 U		3 U
Other VOCs							
1,1,1,2-Tetrachloroethane	µg/L				2 U		2 U
1,1,1-Trichloroethane	µg/L				2 U		2 U
1,1,2,2-Tetrachloroethane	µg/L				2 U		2 U
1,1,2-Trichloroethane	µg/L				2 U		2 U
1,1-Dichloroethane	µg/L				2 U		2 U
1,1-Dichloroethene	µg/L				2 U		2 U
1,1-Dichloropropene	µg/L				2 U		2 U
1,2,3-Trichlorobenzene	µg/L				2 U		2 U
1,2,3-Trichloropropane	µg/L				2 U		2 U
1,2,4-Trimethylbenzene	µg/L				2 U		2 U
1,2-Dibromo-3-chloropropane	µg/L				10 U		10 U
1,2-Dibromoethane (EDB)	µg/L				0.01 U		0.01 U
1,2-Dichloroethane (EDC)	µg/L				2 U		2 U
1,2-Dichloropropane	µg/L				2 U		2 U
1,3-Dichloropropane	µg/L				2 U		2 U
1,4-Dichlorobenzene	µg/L				2 U		2 U
2,2-Dichloropropane	µg/L				2 U		2 U
2-Chlorotoluene	µg/L				2 U		2 U
2-Hexanone	µg/L				10 U		10 U
3-Nitroaniline	µg/L				5 U		5 U
4-Bromophenyl phenyl ether	µg/L				2 U		2 U
4-Chlorophenyl phenyl ether	µg/L				2 U		2 U
4-Chlorotoluene	µg/L				2 U		2 U
4-Nitroaniline	µg/L				4 U		4 U
Acetone	µg/L				25 U		25 U
Acrylonitrile	µg/L				10 U		10 U
bis(2-chloroisopropyl)ether	µg/L				2 U		2 U
Bromobenzene	µg/L				2 U		2 U
Bromochloromethane	µg/L				2 U		2 U

Table C.8
Chemistry Data for Groundwater Samples

		Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
		Location	MW-06	MW-06	MW-07	MW-07	MW-08
		Sample ID	**MW-06-GW-021513**	**MW-06-GWF-021513**	**MW-07-GW-021413**	**MW-07-GWF-021413**	**MW-08-GW-021413**
		Date	02/15/2013	02/15/2013	02/14/2013	02/14/2013	02/14/2013
Other VOCs							
Bromodichloromethane	µg/L				0.9 U		0.9 U
Bromoform	µg/L				2 U		2 U
Bromomethane	µg/L				2 U		2 U
Carbon disulfide	µg/L				2 U		2 U
Carbon tetrachloride	µg/L				1.6 U		1.6 U
Chlorobenzene	µg/L				2 U		2 U
Chloroethane	µg/L				2 U		2 U
Chloroform	µg/L				2 U		2 U
Chloromethane	µg/L				2 U		2 U
cis-1,2-Dichloroethene	µg/L				2 U		2 U
cis-1,3-Dichloropropene	µg/L				2 U		2 U
Cymene	µg/L				2 U		2 U
Dibromochloromethane	µg/L				2 U		2 U
Dibromomethane	µg/L				2 U		2 U
Dichlorodifluoromethane	µg/L				2 U		2 U
Methyl ethyl ketone	µg/L				10 U		10 U
Methyl iso butyl ketone	µg/L				10 U		10 U
Methyl-Tert-Butyl Ether	µg/L				2 U		2 U
Methylene chloride	µg/L				5 U		5 U
n-Butylbenzene	µg/L				2 U		2 U
Pyridine	µg/L				4 U		4 U
sec-Butylbenzene	µg/L				2 U		2 U
Styrene	µg/L				2 U		2 U
tert-Butylbenzene	µg/L				2 U		2 U
Tetrachloroethene	µg/L				2 U		2 U
trans-1,2-Dichloroethene	µg/L				2 U		2 U
trans-1,3-Dichloropropene	µg/L				2 U		2 U
Trichloroethene	µg/L				2 U		2 U
Trichlorofluoromethane	µg/L				2 U		2 U
Vinyl chloride	µg/L				0.2 U		0.2 U
Total Petroleum Hydrocarbons (TPH)							
Gasoline-Range Hydrocarbons	µg/L				50 U		50 U
Diesel-Range Hydrocarbons	µg/L				430 JM		130 U
Oil-Range Hydrocarbons	µg/L				250 U		250 U

Table C.8
Chemistry Data for Groundwater Samples

		Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
		Location	MW-08	MW-09	MW-09	MW-10	MW-10
		Sample ID	**MW-08-GWF-021413**	**MW-09-GW-021513**	**MW-09-GWF-021513**	**MW-10-GW-021413**	**MW-10-GWF-021413**
		Date	02/14/2013	02/15/2013	02/15/2013	02/14/2013	02/14/2013
Dissolved Metals							
Antimony	µg/L		0.324		0.2136		0.305
Arsenic	µg/L		0.919		4.58		3.89
Beryllium	µg/L		0.00563 U		0.00563 U		0.00563 U
Cadmium	µg/L		0.0578		0.011 U		0.1469
Chromium	µg/L		0.192 U		0.192 U		0.192 U
Copper	µg/L		1.22		0.241 U		0.438
Lead	µg/L		0.0183 U		0.0183 U		0.041
Nickel	µg/L		1.41		1.38		8.97
Selenium	µg/L		0.1541		0.0823 U		0.0823 U
Silver	µg/L		0.004		0.00263 U		0.0061
Thallium	µg/L		0.0072		0.00113 U		0.0069
Zinc	µg/L		8.26 U		8.26 U		8.26 U
Total Metals							
Mercury (inorganic)	µg/L			0.0088		0.0045	
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
Benz(a)anthracene	µg/L			0.018 U		0.019 U	
Benzo(a)pyrene	µg/L			0.0096 U		0.01 U	
Benzo(b)fluoranthene	µg/L			0.01 U		0.011 U	
Benzo(k)fluoranthene	µg/L			0.007 U		0.0077 U	
Chrysene	µg/L			0.0064 U		0.018 UB	
Dibenzo(a,h)anthracene	µg/L			0.0062 U		0.0067 U	
Indeno(1,2,3-cd)pyrene	µg/L			0.005 U		0.0054 U	
cPAHs (MTCA TEQ-HalfND)	µg/L			0.0071 U		0.0076 UB	
cPAHs (MTCA TEQ-ZeroND)	µg/L			0.0096 U		0.01 U	
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Naphthalene	µg/L			0.64		0.02 U	
Acenaphthylene	µg/L			0.02 U		0.02 U	
Acenaphthene	µg/L			2		0.02 U	
Fluorene	µg/L			3.9		0.02 U	
Phenanthrene	µg/L			0.02 U		0.02 U	
Anthracene	µg/L			0.092		0.02 U	
1-Methylnaphthalene	µg/L			52		0.02 U	
2-Methylnaphthalene	µg/L			4.3		0.02 U	
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Fluoranthene	µg/L			0.02 U		0.02 U	
Pyrene	µg/L			0.033 U		0.036 U	
Benzo(g,h,i)perylene	µg/L			0.02 U		0.022 U	
Other SVOCs							
1,2,4-Trichlorobenzene	µg/L			1 U		1 U	
1,2-Dichlorobenzene	µg/L			2 U		2 U	
1,3-Dichlorobenzene	µg/L			2 U		2 U	
2,3,4,6-Tetrachlorophenol	µg/L			2 U		2 U	

Table C.8
Chemistry Data for Groundwater Samples

	Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
	Location	MW-08	MW-09	MW-09	MW-10	MW-10
	Sample ID	**MW-08-GWF-021413**	**MW-09-GW-021513**	**MW-09-GWF-021513**	**MW-10-GW-021413**	**MW-10-GWF-021413**
	Date	02/14/2013	02/15/2013	02/15/2013	02/14/2013	02/14/2013
Other SVOCs						
2,4,5-Trichlorophenol	µg/L		2 U		2 U	
2,4,6-Trichlorophenol	µg/L		2 U		2 U	
2,4-Dichlorophenol	µg/L		2 U		2 U	
2,4-Dimethylphenol	µg/L		2 U		2 U	
2,4-Dinitrophenol	µg/L		10 U		10 U	
2,4-Dinitrotoluene	µg/L		2 U		2 U	
2,6-Dichlorophenol	µg/L		2 U		2 U	
2,6-Dinitrotoluene	µg/L		2 U		2 U	
2-Chloronaphthalene	µg/L		2 U		2 U	
2-Chlorophenol	µg/L		2 U		2 U	
2-Methylphenol	µg/L		2 U		2 U	
2-Nitroaniline	µg/L		2 U		2 U	
2-Nitrophenol	µg/L		2 U		2 U	
3,3'-Dichlorobenzidine	µg/L		5 U		5 U	
4,6 Dinitro-o-cresol	µg/L		4 U		4 U	
4-Chloro-3-methylphenol	µg/L		2 U		2 U	
4-Chloroaniline	µg/L		2 U		2 U	
4-Nitrophenol	µg/L		5 U		5 U	
Aniline	µg/L		4 U		4 U	
Azobenzene	µg/L		2 U		2 U	
Benzoic acid	µg/L		10 U		10 U	
Benzyl alcohol	µg/L		2 U		2 U	
bis(2-chloroethoxy)methane	µg/L		2 U		2 U	
Bis(2-chloroethyl) ether	µg/L		1 U		1 U	
Bis(2-ethylhexyl) phthalate	µg/L		2 U		2 U	
Butyl benzyl phthalate	µg/L		1 U		1 U	
Carbazole	µg/L		6.8		2 U	
Dibenzofuran	µg/L		2 U		2 U	
Diethyl phthalate	µg/L		2 U		2 U	
Dimethyl phthalate	µg/L		2 U		2 U	
Di-n-butyl phthalate	µg/L		2 U		2 U	
Di-n-octyl phthalate	µg/L		1 U		1 U	
Hexachlorobenzene	µg/L		1 U		1 U	
Hexachlorobutadiene	µg/L		2 U		2 U	
Hexachlorocyclopentadiene	µg/L		4 U		4 U	
Hexachloroethane	µg/L		2 U		2.2 U	
Isophorone	µg/L		2 U		2 U	
m,p-Cresol (2:1 ratio)	µg/L		2 U		2 U	
Nitrobenzene	µg/L		2 U		2 U	
N-Nitrosodimethylamine	µg/L		2 U		2 U	
N-Nitroso-di-n-propylamine	µg/L		0.7 U		0.76 U	
N-Nitrosodiphenylamine	µg/L		2 U		2 U	

Table C.8
Chemistry Data for Groundwater Samples

		Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
		Location	MW-08	MW-09	MW-09	MW-10	MW-10
		Sample ID	**MW-08-GWF-021413**	**MW-09-GW-021513**	**MW-09-GWF-021513**	**MW-10-GW-021413**	**MW-10-GWF-021413**
		Date	02/14/2013	02/15/2013	02/15/2013	02/14/2013	02/14/2013
Other SVOCs							
Pentachlorophenol	µg/L			5 U		5 U	
Phenol	µg/L			2 U		2 U	
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH							
1,3,5-Trimethylbenzene	µg/L			2 U		2 U	
Benzene	µg/L			2 U		2 U	
Ethylbenzene	µg/L			2 U		2 U	
Iso-Propylbenzene	µg/L			2.6		2 U	
n-Propylbenzene	µg/L			2 U		2 U	
Toluene	µg/L			2 U		2 U	
Xylenes (meta & para)	µg/L			4 U		4 U	
Xylene (ortho)	µg/L			2 U		2 U	
Xylenes (total)	µg/L			3 U		3 U	
Other VOCs							
1,1,1,2-Tetrachloroethane	µg/L			2 U		2 U	
1,1,1-Trichloroethane	µg/L			2 U		2 U	
1,1,2,2-Tetrachloroethane	µg/L			2 U		2 U	
1,1,2-Trichloroethane	µg/L			2 U		2 U	
1,1-Dichloroethane	µg/L			2 U		2 U	
1,1-Dichloroethene	µg/L			2 U		2 U	
1,1-Dichloropropene	µg/L			2 U		2 U	
1,2,3-Trichlorobenzene	µg/L			2 U		2 U	
1,2,3-Trichloropropane	µg/L			2 U		2 U	
1,2,4-Trimethylbenzene	µg/L			2 U		2 U	
1,2-Dibromo-3-chloropropane	µg/L			10 U		10 U	
1,2-Dibromoethane (EDB)	µg/L			0.01 U		0.01 U	
1,2-Dichloroethane (EDC)	µg/L			2 U		2 U	
1,2-Dichloropropane	µg/L			2 U		2 U	
1,3-Dichloropropane	µg/L			2 U		2 U	
1,4-Dichlorobenzene	µg/L			2 U		2 U	
2,2-Dichloropropane	µg/L			2 U		2 U	
2-Chlorotoluene	µg/L			2 U		2 U	
2-Hexanone	µg/L			10 U		10 U	
3-Nitroaniline	µg/L			5 U		5 U	
4-Bromophenyl phenyl ether	µg/L			2 U		2 U	
4-Chlorophenyl phenyl ether	µg/L			2 U		2 U	
4-Chlorotoluene	µg/L			2 U		2 U	
4-Nitroaniline	µg/L			4 U		4 U	
Acetone	µg/L			25 U		25 U	
Acrylonitrile	µg/L			10 U		10 U	
bis(2-chloroisopropyl)ether	µg/L			2 U		2 U	
Bromobenzene	µg/L			2 U		2 U	
Bromochloromethane	µg/L			2 U		2 U	

Table C.8
Chemistry Data for Groundwater Samples

	Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
	Location	MW-08	MW-09	MW-09	MW-10	MW-10
	Sample ID	**MW-08-GWF-021413**	**MW-09-GW-021513**	**MW-09-GWF-021513**	**MW-10-GW-021413**	**MW-10-GWF-021413**
	Date	02/14/2013	02/15/2013	02/15/2013	02/14/2013	02/14/2013
Other VOCs						
Bromodichloromethane	µg/L		0.9 U		0.9 U	
Bromoform	µg/L		2 U		2 U	
Bromomethane	µg/L		2 U		2 U	
Carbon disulfide	µg/L		2 U		2 U	
Carbon tetrachloride	µg/L		1.6 U		1.6 U	
Chlorobenzene	µg/L		3.3		2 U	
Chloroethane	µg/L		2 U		2 U	
Chloroform	µg/L		2 U		2 U	
Chloromethane	µg/L		2 U		2 U	
cis-1,2-Dichloroethene	µg/L		2 U		2 U	
cis-1,3-Dichloropropene	µg/L		2 U		2 U	
Cymene	µg/L		2 U		2 U	
Dibromochloromethane	µg/L		2 U		2 U	
Dibromomethane	µg/L		2 U		2 U	
Dichlorodifluoromethane	µg/L		2 U		2 U	
Methyl ethyl ketone	µg/L		10 U		10 U	
Methyl iso butyl ketone	µg/L		10 U		10 U	
Methyl-Tert-Butyl Ether	µg/L		2 U		2 U	
Methylene chloride	µg/L		5 U		5 U	
n-Butylbenzene	µg/L		2.8		2 U	
Pyridine	µg/L		4 U		4 U	
sec-Butylbenzene	µg/L		2.1		2 U	
Styrene	µg/L		2 U		2 U	
tert-Butylbenzene	µg/L		2 U		2 U	
Tetrachloroethene	µg/L		2 U		2 U	
trans-1,2-Dichloroethene	µg/L		2 U		2 U	
trans-1,3-Dichloropropene	µg/L		2 U		2 U	
Trichloroethene	µg/L		2 U		2 U	
Trichlorofluoromethane	µg/L		2 U		2 U	
Vinyl chloride	µg/L		0.2 U		0.2 U	
Total Petroleum Hydrocarbons (TPH)						
Gasoline-Range Hydrocarbons	µg/L		530 JM		50 U	
Diesel-Range Hydrocarbons	µg/L		1200 JM		130 U	
Oil-Range Hydrocarbons	µg/L		250 U		250 U	
EPH/VPH						
C5-C6 Aliphatics	µg/L		50 U			
C6-C8 Aliphatics	µg/L		50 U			
C8-C10 Aliphatics	µg/L		50 U			
C10-C12 Aliphatics	µg/L		50 U			
C12-C16 Aliphatics	µg/L		50 U			
C16-C21 Aliphatics	µg/L		50 U			
C21-C34 Aliphatics	µg/L		50 U			

Table C.8
Chemistry Data for Groundwater Samples

	Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
	Location	MW-08	MW-09	MW-09	MW-10	MW-10
	Sample ID	**MW-08-GWF-021413**	**MW-09-GW-021513**	**MW-09-GWF-021513**	**MW-10-GW-021413**	**MW-10-GWF-021413**
	Date	02/14/2013	02/15/2013	02/15/2013	02/14/2013	02/14/2013
EPH/VPH						
C8-C10 Aromatics	µg/L		71			
C10-C12 Aromatics	µg/L		420			
C12-C16 Aromatics	µg/L		300			
C16-C21 Aromatics	µg/L		100			
C21-C34 Aromatics	µg/L		63			
n-Hexane	µg/L		2 U			

Table C.8
Chemistry Data for Groundwater Samples

	Event	Interim Action Sampling (Floyd|Snider)				
	Location	MW-02A	MW-02A	MW-06	MW-06	MW-07
	Sample ID	**MW-2A-GW-022515**	**MW-2A-GWF-022515**	**MW-06-GW-022515**	**MW-06-GWF-022515**	**MW-07-GW-022515**
	Date	02/25/2015	02/25/2015	02/25/2015	02/25/2015	02/25/2015
Dissolved Metals						
Arsenic	µg/L		4.23		4.44	
Copper	µg/L		5.21		1.21	
Zinc	µg/L		94		0.5 U	
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	µg/L	0.01 U		0.01 U		0.01 U
Benzo(a)pyrene	µg/L	0.01 U		0.01 U		0.01 U
Benzofluoranthenes (total)	µg/L	0.02 U		0.02 U		0.02 U
Chrysene	µg/L	0.01 U		0.01 U		0.01 U
Dibenzo(a,h)anthracene	µg/L	0.01 U		0.01 U		0.01 U
Indeno(1,2,3-cd)pyrene	µg/L	0.01 U		0.01 U		0.01 U
cPAHs (MTCA TEQ-HalfND)	µg/L	0.0076 U		0.0076 U		0.0076 U
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAH	µg/L	0.031		0.057 J		0.035 J
Naphthalene	µg/L	0.02		0.05		0.029
Acenaphthylene	µg/L	0.01 U		0.01 U		0.01 U
Acenaphthene	µg/L	0.01 U		0.01 U		0.01 U
Fluorene	µg/L	0.01 U		0.0071 JQ		0.01 U
Phenanthrene	µg/L	0.01 U		0.01 U		0.01 U
Anthracene	µg/L	0.011		0.01 U		0.0063 JQ
1-Methylnaphthalene	µg/L	0.0051 JQ		0.026		0.0064 JQ
2-Methylnaphthalene	µg/L	0.01 U		0.015		0.0055 JQ
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Total HPAH	µg/L	0.02 U		0.02 U		0.0056 J
Fluoranthene	µg/L	0.01 U		0.01 U		0.01 U
Pyrene	µg/L	0.01 U		0.01 U		0.0056 JQ
Benzo(g,h,i)perylene	µg/L	0.01 U		0.01 U		0.01 U
Other SVOCs						
Dibenzofuran	µg/L	0.01		0.0078 JQ		0.0092 JQ
EPH/VPH						
C5-C6 Aliphatics	µg/L	50 U				
C6-C8 Aliphatics	µg/L	50 U				
C8-C10 Aliphatics	µg/L	40 U				
C10-C12 Aliphatics	µg/L	40 U				
C12-C16 Aliphatics	µg/L	40 U				
C16-C21 Aliphatics	µg/L	40 U				
C21-C34 Aliphatics	µg/L	40 U				
C8-C10 Aromatics	µg/L	40 U				
C10-C12 Aromatics	µg/L	40 U				
C12-C16 Aromatics	µg/L	40 U				
C16-C21 Aromatics	µg/L	40 U				
C21-C34 Aromatics	µg/L	40 U				
n-Decane	µg/L	5 U				

Table C.8
Chemistry Data for Groundwater Samples

	Event	Interim Action Sampling (Floyd|Snider)				
	Location	MW-02A	MW-02A	MW-06	MW-06	MW-07
	Sample ID	**MW-2A-GW-022515**	**MW-2A-GWF-022515**	**MW-06-GW-022515**	**MW-06-GWF-022515**	**MW-07-GW-022515**
	Date	02/25/2015	02/25/2015	02/25/2015	02/25/2015	02/25/2015
EPH/VPH						
n-Dodecane	µg/L	5 U				
n-Hexane	µg/L	5 U				
n-Octane	µg/L	5 U				
n-Pentane	µg/L	5 U				
Benzene	µg/L	5 U				
Toluene	µg/L	5 U				
Ethylbenzene	µg/L	5 U				
Xylenes (meta & para)	µg/L	10 U				
Xylene (ortho)	µg/L	5 U				
1,2,3-Trimethylbenzene	µg/L	5 U				
1-Methylnaphthalene	µg/L	5 U				
Methyl-Tert-Butyl Ether	µg/L	5 U				
Naphthalene	µg/L	5 U				

Table C.8
Chemistry Data for Groundwater Samples

		Event	Interim Action Sampling (Floyd|Snider)				
		Location	MW-07	MW-08	MW-08	MW-09	MW-09
		Sample ID	**MW-07-GWF-022515**	**MW-08-GW-022515**	**MW-08-GWF-022515**	**MW-09-GW-022515**	**MW-25-GW-022515**
		Date	02/25/2015	02/25/2015	02/25/2015	02/25/2015	02/25/2015
Dissolved Metals							
Arsenic	µg/L		1.66		1.87		
Copper	µg/L		1.38		1.11		
Zinc	µg/L		2.52 U		2.52 U		
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
Benz(a)anthracene	µg/L			0.01 U		0.01 U	0.01 U
Benzo(a)pyrene	µg/L			0.01 U		0.01 U	0.01 U
Benzofluoranthenes (total)	µg/L			0.02 U		0.02 U	0.02 U
Chrysene	µg/L			0.01 U		0.0064 JQ	0.01 U
Dibenzo(a,h)anthracene	µg/L			0.01 U		0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	µg/L			0.01 U		0.01 U	0.01 U
cPAHs (MTCA TEQ-HalfND)	µg/L			0.0076 U		0.0076 J	0.0076 U
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Total LPAH	µg/L			0.0078 J		7.2	6.8
Naphthalene	µg/L			0.0078 JQ		0.29	0.3
Acenaphthylene	µg/L			0.01 U		0.01 U	0.01 U
Acenaphthene	µg/L			0.01 U		2.8	2.6
Fluorene	µg/L			0.01 U		3.9	3.6
Phenanthrene	µg/L			0.01 U		0.18	0.19
Anthracene	µg/L			0.01 U		0.06	0.072
1-Methylnaphthalene	µg/L			0.0089 JQ		60	52
2-Methylnaphthalene	µg/L			0.01 U		12	10
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Total HPAH	µg/L			0.02 U		0.046 J	0.036
Fluoranthene	µg/L			0.01 U		0.016	0.018
Pyrene	µg/L			0.01 U		0.024	0.018
Benzo(g,h,i)perylene	µg/L			0.01 U		0.01 U	0.01 U
Other SVOCs							
Dibenzofuran	µg/L			0.01 U		0.28	0.28

Table C.8
Chemistry Data for Groundwater Samples

	Event	Interim Action Sampling (Floyd|Snider)				
	Location	MW-09	MW-11	MW-11	MW-12	MW-12
	Sample ID	**MW-09-GWF-022515**	**MW-11-GW-022515**	**MW-11-GWF-022515**	**MW-12-GW-022515**	**MW-12-GWF-022515**
	Date	02/25/2015	02/25/2015	02/25/2015	02/25/2015	02/25/2015
Dissolved Metals						
Arsenic	µg/L	21.7		8.13		3.88
Copper	µg/L	0.36		0.09 JQ		6.83
Zinc	µg/L	1.11		2.52 U		128
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	µg/L		0.1 U		0.1 U	
Benzo(a)pyrene	µg/L		0.1 U		0.1 U	
Benzofluoranthenes (total)	µg/L		0.1 U		0.1 U	
Chrysene	µg/L		0.1 U		0.1 U	
Dibenzo(a,h)anthracene	µg/L		0.1 U		0.1 U	
Indeno(1,2,3-cd)pyrene	µg/L		0.1 U		0.1 U	
cPAHs (MTCA TEQ-HalfND)	µg/L		0.071 U		0.071 U	
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAH	µg/L		1.4		0.05 J	
Naphthalene	µg/L		0.82		0.1 U	
Acenaphthylene	µg/L		0.1 U		0.1 U	
Acenaphthene	µg/L		0.51		0.1 U	
Fluorene	µg/L		0.11		0.1 U	
Phenanthrene	µg/L		0.1 U		0.1 U	
Anthracene	µg/L		0.1 U		0.05 JQ	
1-Methylnaphthalene	µg/L		0.22		0.1 U	
2-Methylnaphthalene	µg/L		0.1 U		0.1 U	
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Total HPAH	µg/L		0.1 U		0.1 U	
Fluoranthene	µg/L		0.1 U		0.1 U	
Pyrene	µg/L		0.1 U		0.1 U	
Benzo(g,h,i)perylene	µg/L		0.1 U		0.1 U	
Other SVOCs						
Dibenzofuran	µg/L		0.1 U		0.1 U	
EPH/VPH						
C5-C6 Aliphatics	µg/L		50 U		50 U	
C6-C8 Aliphatics	µg/L		50 U		50 U	
C8-C10 Aliphatics	µg/L		40 U		40 U	
C10-C12 Aliphatics	µg/L		40 U		40 U	
C12-C16 Aliphatics	µg/L		40 U		40 U	
C16-C21 Aliphatics	µg/L		40 U		40 U	
C21-C34 Aliphatics	µg/L		40 U		40 U	
C8-C10 Aromatics	µg/L		40 U		40 U	
C10-C12 Aromatics	µg/L		40 U		40 U	
C12-C16 Aromatics	µg/L		40 U		40 U	
C16-C21 Aromatics	µg/L		40 U		40 U	
C21-C34 Aromatics	µg/L		40 U		40 U	
n-Decane	µg/L		5 U		5 U	

Table C.8
Chemistry Data for Groundwater Samples

	Event	Interim Action Sampling (Floyd|Snider)				
	Location	MW-09	MW-11	MW-11	MW-12	MW-12
	Sample ID	**MW-09-GWF-022515**	**MW-11-GW-022515**	**MW-11-GWF-022515**	**MW-12-GW-022515**	**MW-12-GWF-022515**
	Date	02/25/2015	02/25/2015	02/25/2015	02/25/2015	02/25/2015
EPH/VPH						
n-Dodecane	µg/L		5 U		5 U	
n-Hexane	µg/L		5 U		5 U	
n-Octane	µg/L		5 U		5 U	
n-Pentane	µg/L		5 U		5 U	
Benzene	µg/L		5 U		5 U	
Toluene	µg/L		5 U		5 U	
Ethylbenzene	µg/L		5 U		5 U	
Xylenes (meta & para)	µg/L		10 U		10 U	
Xylene (ortho)	µg/L		5 U		5 U	
1,2,3-Trimethylbenzene	µg/L		5 U		5 U	
1-Methylnaphthalene	µg/L		5 U		5 U	
Methyl-Tert-Butyl Ether	µg/L		5 U		5 U	
Naphthalene	µg/L		5 U		5 U	

Table C.8
Chemistry Data for Groundwater Samples

	Event	Interim Action 2nd Quarter Groundwater (Floyd|Snider)				
	Location	MW-02A	MW-02A	MW-06	MW-06	MW-07
	Sample ID	**MW-2A-GW-052815**	**MW-2A-GWF-052815**	**MW-06-GW-052815**	**MW-06-GWF-052815**	**MW-07-GW-052815**
	Date	05/28/2015	05/28/2015	05/28/2015	05/28/2015	05/28/2015
Field Measurements						
Conductivity	µS/cm	16900		470		2500
ORP	mV	53		-18		92
pH	pH	6.76		6.89		6.72
Salinity	ppt	12.82		0.28		1.57
Temperature	°C	14.2		15.06		16.37
Turbidity	ntu	0		0		10
Dissolved Metals						
Arsenic	µg/L		3.12		5.67	
Copper	µg/L		4.75		0.9	
Zinc	µg/L		123		0.54	
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	µg/L	0.01 U		0.01 U		0.01 U
Benzo(a)pyrene	µg/L	0.01 U		0.01 U		0.01 U
Benzofluoranthenes (total)	µg/L	0.02 U		0.02 U		0.02 U
Chrysene	µg/L	0.01 U		0.01 U		0.01 U
Dibenzo(a,h)anthracene	µg/L	0.01 U		0.01 U		0.01 U
Indeno(1,2,3-cd)pyrene	µg/L	0.01 U		0.01 U		0.01 U
cPAHs (MTCA TEQ-HalfND)	µg/L	0.0076 U		0.0076 U		0.0076 U
cPAHs (MTCA TEQ-ZeroND)	µg/L	0.01 U		0.01 U		0.01 U
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAH	µg/L	0.064 J		0.042 J		0.041 J
Naphthalene	µg/L	0.041		0.029		0.034
Acenaphthylene	µg/L	0.0033 JQ		0.01 U		0.01 U
Acenaphthene	µg/L	0.004 JQ		0.0057 JQ		0.01 U
Fluorene	µg/L	0.0078 JQ		0.0077 JQ		0.01 U
Phenanthrene	µg/L	0.01 U		0.01 U		0.0034 JQ
Anthracene	µg/L	0.0083 JQ		0.01 U		0.0036 JQ
1-Methylnaphthalene	µg/L	0.0053 JQ		0.0061 JQ		0.0035 JQ
2-Methylnaphthalene	µg/L	0.0093 JQ		0.0085 JQ		0.0047 JQ
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Total HPAH	µg/L	0.02 U		0.02 U		0.0086 J
Fluoranthene	µg/L	0.01 U		0.01 U		0.0038 JQ
Pyrene	µg/L	0.01 U		0.01 U		0.0048 JQ
Benzo(g,h,i)perylene	µg/L	0.01 U		0.01 U		0.01 U
Other SVOCs						
Dibenzofuran	µg/L	0.015		0.012		0.0078 JQ

Table C.8
Chemistry Data for Groundwater Samples

	Event	Interim Action 2nd Quarter Groundwater (Floyd|Snider)				
	Location	MW-07	MW-08	MW-08	MW-09	MW-09
	Sample ID	**MW-07-GWF-052815**	**MW-08-GW-052815**	**MW-08-GWF-052815**	**MW-09-GW-052815**	**MW-25-GW-052815**
	Date	05/28/2015	05/28/2015	05/28/2015	05/28/2015	05/28/2015
Field Measurements						
Conductivity	µS/cm		5000		1250	
ORP	mV		123		-138	
pH	pH		7.04		6.73	
Salinity	ppt		3.47		0.806	
Temperature	°C		14.01		13.83	
Turbidity	ntu		1		0	
Dissolved Metals						
Arsenic	µg/L	3.1		1.52		
Copper	µg/L	0.25		1.16		
Zinc	µg/L	1.98		1.01 U		
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	µg/L		0.01 U		0.01 U	0.01 U
Benzo(a)pyrene	µg/L		0.01 U		0.01 U	0.01 U
Benzofluoranthenes (total)	µg/L		0.02 U		0.02 U	0.02 U
Chrysene	µg/L		0.01 U		0.01 U	0.01 U
Dibenzo(a,h)anthracene	µg/L		0.01 U		0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	µg/L		0.01 U		0.01 U	0.01 U
cPAHs (MTCA TEQ-HalfND)	µg/L		0.0076 U		0.0076 U	0.0076 U
cPAHs (MTCA TEQ-ZeroND)	µg/L		0.01 U		0.01 U	0.01 U
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAH	µg/L		0.056		5.4	5.2
Naphthalene	µg/L		0.056		0.22	0.22
Acenaphthylene	µg/L		0.01 U		0.075	0.11
Acenaphthene	µg/L		0.01 U		2.2	2.2
Fluorene	µg/L		0.01 U		2.7	2.5
Phenanthrene	µg/L		0.01 U		0.16	0.15
Anthracene	µg/L		0.01 U		0.051	0.043
1-Methylnaphthalene	µg/L		0.0043 JQ		39	39
2-Methylnaphthalene	µg/L		0.01		8.6	8.1
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Total HPAH	µg/L		0.02 U		0.033	0.031
Fluoranthene	µg/L		0.01 U		0.014	0.011
Pyrene	µg/L		0.01 U		0.019	0.02
Benzo(g,h,i)perylene	µg/L		0.01 U		0.01 U	0.01 U
Other SVOCs						
Dibenzofuran	µg/L		0.0058 JQ		0.2	0.21

Table C.8
Chemistry Data for Groundwater Samples

	Event	Interim Action 2nd Quarter Groundwater (Floyd|Snider)				
	Location	MW-09	MW-09	MW-11	MW-11	MW-12
	Sample ID	**MW-09-GWF-052815**	**MW-25-GWF-052815**	**MW-11-GW-052815**	**MW-11-GWF-052815**	**MW-12-GW-052815**
	Date	05/28/2015	05/28/2015	05/28/2015	05/28/2015	05/28/2015
Field Measurements						
Conductivity	µS/cm			2650		29700
ORP	mV			-42		76
pH	pH			6.73		6.75
Salinity	ppt			1.72		23.24
Temperature	°C			15.06		15.04
Turbidity	ntu			33		0
Dissolved Metals						
Arsenic	µg/L	19.4	20.5		8.59	
Copper	µg/L	0.52	0.41		0.11	
Zinc	µg/L	2.63	2.53		0.5 U	
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	µg/L			0.01 U		0.01 U
Benzo(a)pyrene	µg/L			0.01 U		0.01 U
Benzofluoranthenes (total)	µg/L			0.02 U		0.02 U
Chrysene	µg/L			0.01 U		0.01 U
Dibenzo(a,h)anthracene	µg/L			0.01 U		0.01 U
Indeno(1,2,3-cd)pyrene	µg/L			0.01 U		0.01 U
cPAHs (MTCA TEQ-HalfND)	µg/L			0.0076 U		0.0076 U
cPAHs (MTCA TEQ-ZeroND)	µg/L			0.01 U		0.01 U
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAH	µg/L			7.9		0.047 J
Naphthalene	µg/L			5		0.03
Acenaphthylene	µg/L			0.034		0.01 U
Acenaphthene	µg/L			2.1		0.0032 JQ
Fluorene	µg/L			0.54		0.0054 JQ
Phenanthrene	µg/L			0.21		0.01 U
Anthracene	µg/L			0.037		0.0079 JQ
1-Methylnaphthalene	µg/L			1		0.0042 JQ
2-Methylnaphthalene	µg/L			0.34		0.0076 JQ
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Total HPAH	µg/L			0.054		0.02 U
Fluoranthene	µg/L			0.031		0.01 U
Pyrene	µg/L			0.023		0.01 U
Benzo(g,h,i)perylene	µg/L			0.01 U		0.01 U
Other SVOCs						
Dibenzofuran	µg/L			0.39		0.0098 JQ

Table C.8
Chemistry Data for Groundwater Samples

		Event	Interim Action 2nd Quarter Groundwater (Floyd|Snider)				
		Location	MW-12				
		Sample ID	**MW-12-GWF-052815**				
		Date	05/28/2015				
Dissolved Metals							
Arsenic	µg/L		4.22				
Copper	µg/L		8.68				
Zinc	µg/L		279				

Table C.8
Chemistry Data for Groundwater Samples

	Event	Interim Action 3rd Quarter Groundwater (Floyd|Snider)				
	Location	MW-01	MW-01	MW-02A	MW-02A	MW-06
	Sample ID	**MW-01-GW-082715**	**MW-01-GWF-082715**	**MW-02A-GW-082715**	**MW-02A-GWF-082715**	**MW-06-GW-082715**
	Date	08/27/2015	08/27/2015	08/27/2015	08/27/2015	08/27/2015
Field Measurements						
Conductivity	µS/cm	1740		7660		650
ORP	mV	-77		14		-95
pH	pH	6.23		6.83		7.02
Salinity	ppt	0.6		22.5		0.3
Temperature	°C	19.61		17.35		15.4
Turbidity	ntu	10.4		0		0
Dissolved Metals						
Arsenic	µg/L		25.1		6.23	
Copper	µg/L		1.2		6.87	
Zinc	µg/L		4.98 U		93.4	
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	µg/L	0.1 U		0.01 U		0.01 U
Benzo(a)pyrene	µg/L	0.1 U		0.01 U		0.01 U
Benzofluoranthenes (total)	µg/L	0.2 U		0.02 U		0.02 U
Chrysene	µg/L	0.1 U		0.01 U		0.01 U
Dibenzo(a,h)anthracene	µg/L	0.1 U		0.01 U		0.01 U
Indeno(1,2,3-cd)pyrene	µg/L	0.1 U		0.01 U		0.01 U
cPAHs (MTCA TEQ-HalfND)	µg/L	0.076 U		0.0076 U		0.0076 U
cPAHs (MTCA TEQ-ZeroND)	µg/L	0.1 U		0.01 U		0.01 U
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAH	µg/L	55 U		0.02 U		0.12 U
Naphthalene	µg/L	6.2		0.016		0.047
Acenaphthylene	µg/L	0.41		0.01 U		0.0051 JQ
Acenaphthene	µg/L	32		0.01 U		0.02
Fluorene	µg/L	14		0.01 U		0.034
Phenanthrene	µg/L	1.8 J		0.01 U		0.0098 JQ
Anthracene	µg/L	0.3		0.0035 JQ		0.01 U
1-Methylnaphthalene	µg/L	25		0.0035 JQ		0.032
2-Methylnaphthalene	µg/L	9		0.01 U		0.02
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Total HPAH	µg/L	1.6		0.02 U		0.02 U
Fluoranthene	µg/L	1.1		0.01 U		0.01 U
Pyrene	µg/L	0.49		0.01 U		0.01 U
Benzo(g,h,i)perylene	µg/L	0.1 U		0.01 U		0.01 U
Other SVOCs						
Dibenzofuran	µg/L	9.3		0.01 U		0.028

Table C.8
Chemistry Data for Groundwater Samples

	Event	Interim Action 3rd Quarter Groundwater (Floyd|Snider)				
	Location	MW-06	MW-07	MW-07	MW-08	MW-08
	Sample ID	**MW-06-GWF-082715**	**MW-07-GW-082715**	**MW-07-GWF-082715**	**MW-08-GW-082715**	**MW-08-GWF-082715**
	Date	08/27/2015	08/27/2015	08/27/2015	08/27/2015	08/27/2015
Field Measurements						
Conductivity	µS/cm		3430		9990	
ORP	mV		-124		28	
pH	pH		6.97		6.56	
Salinity	ppt		1.8		5.6	
Temperature	°C		16.32		22	
Turbidity	ntu		0		0.1	
Dissolved Metals						
Arsenic	µg/L	4.69		6.01		4.26
Copper	µg/L	0.71 JQ		0.29 JQ		3.66
Zinc	µg/L	4.98 U		4.98 U		4.98 U
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	µg/L		0.01 U		0.01 U	
Benzo(a)pyrene	µg/L		0.01 U		0.01 U	
Benzofluoranthenes (total)	µg/L		0.02 U		0.02 U	
Chrysene	µg/L		0.01 U		0.01 U	
Dibenzo(a,h)anthracene	µg/L		0.01 U		0.01 U	
Indeno(1,2,3-cd)pyrene	µg/L		0.01 U		0.01 U	
cPAHs (MTCA TEQ-HalfND)	µg/L		0.0076 U		0.0076 U	
cPAHs (MTCA TEQ-ZeroND)	µg/L		0.01 U		0.01 U	
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAH	µg/L		0.081 U		0.095 U	
Naphthalene	µg/L		0.031		0.057	
Acenaphthylene	µg/L		0.0051 JQ		0.0037 JQ	
Acenaphthene	µg/L		0.0073 JQ		0.0078 JQ	
Fluorene	µg/L		0.022		0.018	
Phenanthrene	µg/L		0.011 J		0.0084 JQ	
Anthracene	µg/L		0.0048 JQ		0.01 U	
1-Methylnaphthalene	µg/L		0.008 JQ		0.0092 JQ	
2-Methylnaphthalene	µg/L		0.0097 JQ		0.016	
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Total HPAH	µg/L		0.018 U		0.011 U	
Fluoranthene	µg/L		0.0083 JQ		0.0054 JQ	
Pyrene	µg/L		0.0096 JQ		0.0052 JQ	
Benzo(g,h,i)perylene	µg/L		0.01 U		0.01 U	
Other SVOCs						
Dibenzofuran	µg/L		0.026		0.022	

Table C.8
Chemistry Data for Groundwater Samples

	Event	Interim Action 3rd Quarter Groundwater (Floyd|Snider)				
	Location	MW-09	MW-09	MW-09	MW-09	MW-11
	Sample ID	**MW-09-GW-082715**	**MW-25-GW-082715**	**MW-09-GWF-082715**	**MW-25-GWF-082715**	**MW-11-GW-082715**
	Date	08/27/2015	08/27/2015	08/27/2015	08/27/2015	08/27/2015
Field Measurements						
Conductivity	µS/cm	1760				1205
ORP	mV	-185				-46
pH	pH	6.9				6.4
Salinity	ppt	0.9				1.4
Temperature	°C	18.2				21.85
Turbidity	ntu	0				16.1
Dissolved Metals						
Arsenic	µg/L			20.3	19.2	
Copper	µg/L			0.35 JQ	0.25 JQ	
Zinc	µg/L			4.98 U	4.98 U	
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	µg/L	0.01 U	0.01 U			0.01 U
Benzo(a)pyrene	µg/L	0.0025 JQ	0.0027 JQ			0.01 U
Benzofluoranthenes (total)	µg/L	0.02 U	0.02 U			0.02 U
Chrysene	µg/L	0.0049 JQ	0.0053 JQ			0.01 U
Dibenzo(a,h)anthracene	µg/L	0.01 U	0.01 U			0.01 U
Indeno(1,2,3-cd)pyrene	µg/L	0.01 U	0.01 U			0.01 U
cPAHs (MTCA TEQ-HalfND)	µg/L	0.005 J	0.0053 J			0.0076 U
cPAHs (MTCA TEQ-ZeroND)	µg/L	0.0025 J	0.0028 J			0.01 U
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAH	µg/L	7.4 U	7.2 U			4.8 U
Naphthalene	µg/L	0.21	0.2			1.1
Acenaphthylene	µg/L	0.076	0.087			0.028
Acenaphthene	µg/L	3.3	3			3
Fluorene	µg/L	3.6	3.7			0.59
Phenanthrene	µg/L	0.19 J	0.2 J			0.069 JQ
Anthracene	µg/L	0.013	0.014			0.027
1-Methylnaphthalene	µg/L	48	47			0.73
2-Methylnaphthalene	µg/L	8.3 J	7.7 J			0.024
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Total HPAH	µg/L	0.046 U	0.042 U			0.05
Fluoranthene	µg/L	0.017	0.017			0.03
Pyrene	µg/L	0.022	0.017			0.02
Benzo(g,h,i)perylene	µg/L	0.01 U	0.01 U			0.01 U
Other SVOCs						
Dibenzofuran	µg/L	0.28	0.27			0.26

Table C.8
Chemistry Data for Groundwater Samples

		Event	Interim Action 3rd Quarter Groundwater (Floyd|Snider)				
		Location	MW-11	MW-12	MW-12		
		Sample ID	**MW-11-GWF-082715**	**MW-12-GW-082715**	**MW-12-GWF-082715**		
		Date	08/27/2015	08/27/2015	08/27/2015		
Field Measurements							
Conductivity	µS/cm			22200			
ORP	mV			107			
pH	pH			6.08			
Salinity	ppt			13.3			
Temperature	°C			19.61			
Turbidity	ntu			114			
Dissolved Metals							
Arsenic	µg/L		12.4		5.24		
Copper	µg/L		1 U		11.9		
Zinc	µg/L		4.98 U		387		
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
Benz(a)anthracene	µg/L			0.01 U			
Benzo(a)pyrene	µg/L			0.01 U			
Benzofluoranthenes (total)	µg/L			0.02 U			
Chrysene	µg/L			0.01 U			
Dibenzo(a,h)anthracene	µg/L			0.01 U			
Indeno(1,2,3-cd)pyrene	µg/L			0.01 U			
cPAHs (MTCA TEQ-HalfND)	µg/L			0.0076 U			
cPAHs (MTCA TEQ-ZeroND)	µg/L			0.01 U			
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Total LPAH	µg/L			0.068 U			
Naphthalene	µg/L			0.036			
Acenaphthylene	µg/L			0.01 U			
Acenaphthene	µg/L			0.0062 JQ			
Fluorene	µg/L			0.013			
Phenanthrene	µg/L			0.0079 JQ			
Anthracene	µg/L			0.0045 JQ			
1-Methylnaphthalene	µg/L			0.0062 JQ			
2-Methylnaphthalene	µg/L			0.01 JQ			
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Total HPAH	µg/L			0.0046 U			
Fluoranthene	µg/L			0.0046 JQ			
Pyrene	µg/L			0.01 U			
Benzo(g,h,i)perylene	µg/L			0.01 U			
Other SVOCs							
Dibenzofuran	µg/L			0.016			

Table C.8
Chemistry Data for Groundwater Samples

	Event	Interim Action 4th Quarter Groundwater (Floyd|Snider)				
	Location	MW-01	MW-01	MW-02A	MW-02A	MW-06
	Sample ID	**MW-01-GW-120315**	**MW-01-GWF-120315**	**MW-02A-GW-120315**	**MW-02A-GWF-120315**	**MW-06-GW-120315**
	Date	12/03/2015	12/03/2015	12/03/2015	12/03/2015	12/03/2015
Field Measurements						
Conductivity	µS/cm	1930		6600		305
ORP	mV	-115		191		76
pH	pH	6.76		6.49		6.66
Salinity	ppt	1.23		3.6		0.1
Temperature	°C	13.05		11.16		13.25
Turbidity	ntu	3.4		1.9		2.9
Dissolved Metals						
Arsenic	µg/L		17.9		2.79 JQ	
Copper	µg/L		1.15		10.4	
Zinc	µg/L		4.98 U		140	
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	µg/L	0.027		0.01 U		0.01 U
Benzo(a)pyrene	µg/L	0.0084 JQ		0.01 U		0.01 U
Benzofluoranthenes (total)	µg/L	0.019 JQ		0.02 U		0.02 U
Chrysene	µg/L	0.022		0.01 U		0.01 U
Dibenzo(a,h)anthracene	µg/L	0.01 U		0.01 U		0.01 U
Indeno(1,2,3-cd)pyrene	µg/L	0.01 U		0.01 U		0.01 U
cPAHs (MTCA TEQ-HalfND)	µg/L	0.014 J		0.0076 U		0.0076 U
cPAHs (MTCA TEQ-ZeroND)	µg/L	0.013 J		0.01 U		0.01 U
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAH	µg/L	77		0.012		0.005 J
Naphthalene	µg/L	18		0.01 U		0.01 U
Acenaphthylene	µg/L	0.31		0.01 U		0.01 U
Acenaphthene	µg/L	35		0.01 U		0.005 JQ
Fluorene	µg/L	17		0.01 U		0.01 U
Phenanthrene	µg/L	6.6		0.01 U		0.01 U
Anthracene	µg/L	0.44		0.012		0.01 U
1-Methylnaphthalene	µg/L	28		0.01 U		0.0043 JQ
2-Methylnaphthalene	µg/L	22		0.01 U		0.01 U
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Total HPAH	µg/L	2.1 J		0.02 U		0.02 U
Fluoranthene	µg/L	1.3		0.01 U		0.01 U
Pyrene	µg/L	0.68		0.01 U		0.01 U
Benzo(g,h,i)perylene	µg/L	0.01 U		0.01 U		0.01 U
Other SVOCs						
Dibenzofuran	µg/L	11		0.01 U		0.01 U

Table C.8
Chemistry Data for Groundwater Samples

	Event	Interim Action 4th Quarter Groundwater (Floyd|Snider)				
	Location	MW-06	MW-07	MW-07	MW-08	MW-08
	Sample ID	**MW-06-GWF-120315**	**MW-07-GW-120315**	**MW-07-GWF-120315**	**MW-08-GW-120315**	**MW-08-GWF-120315**
	Date	12/03/2015	12/03/2015	12/03/2015	12/03/2015	12/03/2015
Field Measurements						
Conductivity	µS/cm		5030		4790	
ORP	mV		189		-14	
pH	pH		6.78		7.95	
Salinity	ppt		2.7		3.06	
Temperature	°C		11.67		11.35	
Turbidity	ntu		19.3		0	
Dissolved Metals						
Arsenic	µg/L	1.71 JQ		1.77 JQ		2.1 JQ
Copper	µg/L	2.59		2.45		3.85
Zinc	µg/L	4.98 U		4.98 U		4.98 U
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	µg/L		0.01 U		0.01 U	
Benzo(a)pyrene	µg/L		0.01 U		0.01 U	
Benzofluoranthenes (total)	µg/L		0.02 U		0.02 U	
Chrysene	µg/L		0.01 U		0.01 U	
Dibenzo(a,h)anthracene	µg/L		0.01 U		0.01 U	
Indeno(1,2,3-cd)pyrene	µg/L		0.01 U		0.01 U	
cPAHs (MTCA TEQ-HalfND)	µg/L		0.0076 U		0.0076 U	
cPAHs (MTCA TEQ-ZeroND)	µg/L		0.01 U		0.01 U	
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAH	µg/L		0.01 U		0.0031 J	
Naphthalene	µg/L		0.01 U		0.01 U	
Acenaphthylene	µg/L		0.01 U		0.01 U	
Acenaphthene	µg/L		0.01 U		0.01 U	
Fluorene	µg/L		0.01 U		0.01 U	
Phenanthrene	µg/L		0.01 U		0.0031 JQ	
Anthracene	µg/L		0.01 U		0.01 U	
1-Methylnaphthalene	µg/L		0.01 U		0.01 U	
2-Methylnaphthalene	µg/L		0.01 U		0.01 U	
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Total HPAH	µg/L		0.02 U		0.0036 J	
Fluoranthene	µg/L		0.01 U		0.0036 JQ	
Pyrene	µg/L		0.01 U		0.01 U	
Benzo(g,h,i)perylene	µg/L		0.01 U		0.01 U	
Other SVOCs						
Dibenzofuran	µg/L		0.01 U		0.01 U	

Table C.8
Chemistry Data for Groundwater Samples

	Event	Interim Action 4th Quarter Groundwater (Floyd|Snider)				
	Location	MW-09	MW-09	MW-09	MW-09	MW-11
	Sample ID	**MW-09-GW-120315**	**MW-25-GW-120315**	**MW-09-GWF-120315**	**MW-25-GWF-120315**	**MW-11-GW-120315**
	Date	12/03/2015	12/03/2015	12/03/2015	12/03/2015	12/03/2015
Field Measurements						
Conductivity	µS/cm	782				4680
ORP	mV	16				-140
pH	pH	6.24				7.09
Salinity	ppt	0.501				2.99
Temperature	°C	12.41				12.17
Turbidity	ntu	12				4.4
Dissolved Metals						
Arsenic	µg/L			15.9	16.5	
Copper	µg/L			1 U	1 U	
Zinc	µg/L			4.98 U	4.98 U	
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	µg/L	0.01 U	0.01 U			0.012
Benzo(a)pyrene	µg/L	0.01 U	0.01 U			0.011
Benzofluoranthenes (total)	µg/L	0.02 U	0.02 U			0.024
Chrysene	µg/L	0.0038 JQ	0.005 JQ			0.023
Dibenzo(a,h)anthracene	µg/L	0.01 U	0.01 U			0.01 U
Indeno(1,2,3-cd)pyrene	µg/L	0.01 U	0.01 U			0.0035 JQ
cPAHs (MTCA TEQ-HalfND)	µg/L	0.0075 J	0.0076 J			0.016 J
cPAHs (MTCA TEQ-ZeroND)	µg/L	0.000038 J	0.00005 J			0.015 J
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAH	µg/L	4.9	4.5			2
Naphthalene	µg/L	0.16	0.15			0.2
Acenaphthylene	µg/L	0.06	0.061			0.031
Acenaphthene	µg/L	2.6	2.4			1.2
Fluorene	µg/L	1.9	1.8			0.46
Phenanthrene	µg/L	0.1	0.09			0.026
Anthracene	µg/L	0.039	0.039			0.048
1-Methylnaphthalene	µg/L	35	35			0.14
2-Methylnaphthalene	µg/L	5.7	5.4			0.01
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Total HPAH	µg/L	0.042 J	0.04 J			0.27 J
Fluoranthene	µg/L	0.018	0.016			0.11
Pyrene	µg/L	0.02	0.019			0.083
Benzo(g,h,i)perylene	µg/L	0.01 U	0.01 U			0.0054 JQ
Other SVOCs						
Dibenzofuran	µg/L	0.18	0.16			0.25

Table C.8
Chemistry Data for Groundwater Samples

		Event	Interim Action 4th Quarter Groundwater (Floyd|Snider)				
		Location	MW-11	MW-12	MW-12		
		Sample ID	**MW-11-GWF-120315**	**MW-12-GW-120315**	**MW-12-GWF-120315**		
		Date	12/03/2015	12/03/2015	12/03/2015		
Field Measurements							
Conductivity	µS/cm			29300			
ORP	mV			3			
pH	pH			6.47			
Salinity	ppt			18.2			
Temperature	°C			11.9			
Turbidity	ntu			8			
Dissolved Metals							
Arsenic	µg/L		5.57		2.17 JQ		
Copper	µg/L		1.39		13.1		
Zinc	µg/L		4.98 U		223		
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
Benz(a)anthracene	µg/L			0.01 U			
Benzo(a)pyrene	µg/L			0.01 U			
Benzofluoranthenes (total)	µg/L			0.02 U			
Chrysene	µg/L			0.01 U			
Dibenzo(a,h)anthracene	µg/L			0.01 U			
Indeno(1,2,3-cd)pyrene	µg/L			0.01 U			
cPAHs (MTCA TEQ-HalfND)	µg/L			0.0076 U			
cPAHs (MTCA TEQ-ZeroND)	µg/L			0.01 U			
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Total LPAH	µg/L			0.0078 J			
Naphthalene	µg/L			0.01 U			
Acenaphthylene	µg/L			0.01 U			
Acenaphthene	µg/L			0.01 U			
Fluorene	µg/L			0.01 U			
Phenanthrene	µg/L			0.01 U			
Anthracene	µg/L			0.0078 JQ			
1-Methylnaphthalene	µg/L			0.01 U			
2-Methylnaphthalene	µg/L			0.01 U			
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Total HPAH	µg/L			0.02 U			
Fluoranthene	µg/L			0.01 U			
Pyrene	µg/L			0.01 U			
Benzo(g,h,i)perylene	µg/L			0.01 U			
Other SVOCs							
Dibenzofuran	µg/L			0.01 U			

Table C.9
Chemistry Data for Soil Samples

	Event	Soil/Grit Samples (Department of Ecology)				
	Location	Soil 1-A/1-B	Soil 1-A/1-B	Soil 2-A/2-B	Soil 2-A/2-B	Soil 3-A/3-B
	Sample ID	**1-A**	**1-B**	**2-A**	**2-B**	**3-A**
	Depth	0-4 in	4-8 in	0-4 in	4-8 in	0-4 in
	Date	08/01/1993	08/01/1993	08/01/1993	08/01/1993	08/01/1993
Metals						
Antimony	mg/kg	8.4 J	3 UJ	7.3 J	3.3 J	10 J
Arsenic	mg/kg	240	21 UJ	160	41	360
Beryllium	mg/kg	0.5 UJ	0.25 UJ	0.31 UJ	0.18 UJ	0.43 UJ
Cadmium	mg/kg	1 J	0.34 J	1.3 J	0.49 J	2.5 J
Chromium	mg/kg	50 J	95 J	74 J	52 J	77 J
Copper	mg/kg	2700	290	2300	4700	2100
Lead	mg/kg	340 J	190 J	230 J	390 J	710 J
Mercury	mg/kg	0.14	0.078	0.24 J	18	0.043 J
Nickel	mg/kg	36 J	73 J	48 J	110 J	54 J
Selenium	mg/kg	0.4 UJ	0.4 UJ	0.4 UJ	0.4 UJ	0.4 UJ
Silver	mg/kg	0.86 UJ	0.3 U	0.55 UJ	0.3 U	1.5 UJ
Thallium	mg/kg	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Zinc	mg/kg	2700	300	2400	930	5300
Organometallics						
Butyltin	mg/kg	2.5 J	0.11 J	2.6 J	3.5 J	0.18 J
Dibutyltin	mg/kg	1.6 J	0.3 J	10 J	8.1 J	0.29 J
Tetrabutyltin	mg/kg	0.023 J	0.053 U	0.11 J	0.061 U	0.051 U
Tributyltin	mg/kg	4.5	0.81	14	8.8	0.77 J
Polychlorinated Biphenyls (PCBs)						
PCB Aroclor 1016/1242	mg/kg	0.067 U	0.067 U	0.067 U	1 U	0.067 U
Aroclor 1248	mg/kg	0.067 U	0.067 U	0.067 U	0.067 U	0.067 U
Aroclor 1254	mg/kg	0.27	0.067 U	0.64	4.8	0.13
Aroclor 1260	mg/kg	0.27 U	0.067 U	0.2	1.7	0.067 U
Aroclor 1268	mg/kg	1.7	0.13	0.067 U	0.067 U	0.067 U
PCBs (Total, Aroclors)	mg/kg	2	0.13	0.84	6.5	0.13
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	mg/kg	0.35	0.61	0.93	1.8	0.26
Benzo(a)pyrene	mg/kg	0.32	0.57	0.81	1.7 J	0.29 J
Benzofluoranthenes (total)	mg/kg	0.69	0.93	1.4	3.6 J	0.76 J
Chrysene	mg/kg	0.5	0.83	1.1	2.7	0.56
Dibenzo(a,h)anthracene	mg/kg	0.14	0.18	0.27	0.33 J	0.077 J
Indeno(1,2,3-cd)pyrene	mg/kg	0.39	0.49	0.75	0.71 J	0.21 J
cPAHs (MTCA TEQ-HalfND)	mg/kg	0.48	0.8	1.2	2.4 J	0.43 J
cPAHs (MTCA TEQ-ZeroND)	mg/kg	0.48	0.8	1.2	2.4 J	0.43 J
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAH	mg/kg	0.36 J	4 J	2.3	4.4	0.53 J
2-Methylnaphthalene	mg/kg	0.12 U	0.5	0.07	0.26	0.12 U
Naphthalene	mg/kg	0.12 U	1.3	0.17	0.14 U	0.12 U
Acenaphthene	mg/kg	0.12 U	0.52	0.12	0.18	0.12 U
Acenaphthylene	mg/kg	0.12 U	0.15	0.048	0.18	0.12 U
Anthracene	mg/kg	0.048 J	0.096 J	0.27	0.5	0.072 J

Table C.9
Chemistry Data for Soil Samples

	Event	Soil/Grit Samples (Department of Ecology)				
	Location	Soil 1-A/1-B	Soil 1-A/1-B	Soil 2-A/2-B	Soil 2-A/2-B	Soil 3-A/3-B
	Sample ID	**1-A**	**1-B**	**2-A**	**2-B**	**3-A**
	Depth	0-4 in	4-8 in	0-4 in	4-8 in	0-4 in
	Date	08/01/1993	08/01/1993	08/01/1993	08/01/1993	08/01/1993
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Fluorene	mg/kg	0.12 U	0.19	0.15	0.21	0.12 U
Phenanthrene	mg/kg	0.31	1.2	1.5	3.1	0.46
Benzo(g,h,i)perylene	mg/kg	0.37	0.43	0.69	0.51 J	0.18 J
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Total HPAH	mg/kg	3.9	7	10	21 J	4.1 J
Fluoranthene	mg/kg	0.69	1.8	2.8	5.3	1.2
Pyrene	mg/kg	0.47	1.2	1.4	3.9	0.57
Other SVOCs						
4-Methylphenol	mg/kg	0.12 U	0.13 U	0.12 U	0.15	0.12 U
Benzoic Acid	mg/kg	1.2 U	1.3 U	0.1 J	0.53 J	1.2 U
Bis(2-ethylhexyl) Phthalate	mg/kg	1.6	0.084	0.33 J	0.33 J	0.59
Butyl benzyl Phthalate	mg/kg	0.115	0.13 U	0.12 U	0.14 U	0.12 U
Carbazole	mg/kg	0.12 U	0.11	0.19	0.4	0.083 J
Dibenzofuran	mg/kg	0.12 U	0.26	0.1	0.12	0.12 U
Dimethyl Phthalate	mg/kg	0.12 U	0.13 U	0.23	0.17	0.12 U
Di-n-butyl Phthalate	mg/kg	0.12 U	0.13 U	0.12 U	0.14 U	0.066 J
N-Nitrosodiphenylamine	mg/kg	0.12 U	0.13 U	0.12 U	0.29	0.12 U
Pentachlorophenol	mg/kg	0.6 U	0.63 U	0.62 U	3.4	0.59 U

Table C.9
Chemistry Data for Soil Samples

		Event	Soil/Grit Samples (Department of Ecology)				
		Location	Soil 3-A/3-B				
		Sample ID	**3-B**				
		Depth	4-8 in				
		Date	08/01/1993				
Metals							
	Antimony	mg/kg	30 U				
	Arsenic	mg/kg	63 UJ				
	Beryllium	mg/kg	1 U				
	Cadmium	mg/kg	2 UJ				
	Chromium	mg/kg	440 J				
	Copper	mg/kg	690				
	Lead	mg/kg	120 J				
	Mercury	mg/kg	0.038 UJ				
	Nickel	mg/kg	430 J				
	Selenium	mg/kg	0.4 UJ				
	Silver	mg/kg	0.3 U				
	Thallium	mg/kg	0.5 U				
	Zinc	mg/kg	680				
Organometallics							
	Butyltin	mg/kg	0.053 U				
	Dibutyltin	mg/kg	0.053 U				
	Tetrabutyltin	mg/kg	0.053 U				
	Tributyltin	mg/kg	0.053 U				
Polychlorinated Biphenyls (PCBs)							
	PCB Aroclor 1016/1242	mg/kg	0.067 U				
	Aroclor 1248	mg/kg	0.067 U				
	Aroclor 1254	mg/kg	0.067 U				
	Aroclor 1260	mg/kg	0.067 U				
	Aroclor 1268	mg/kg	0.067 U				
	PCBs (Total, Aroclors)	mg/kg	0.067 U				
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
	Benz(a)anthracene	mg/kg	0.12 U				
	Benzo(a)pyrene	mg/kg	0.12 U				
	Benzofluoranthenes (total)	mg/kg	0.12 U				
	Chrysene	mg/kg	0.12 U				
	Dibenzo(a,h)anthracene	mg/kg	0.12 U				
	Indeno(1,2,3-cd)pyrene	mg/kg	0.12 U				
	cPAHs (MTCA TEQ-HalfND)	mg/kg	0.085 U				
	cPAHs (MTCA TEQ-ZeroND)	mg/kg	0.12 U				
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
	Total LPAH	mg/kg	0.12 U				
	2-Methylnaphthalene	mg/kg	0.12 U				
	Naphthalene	mg/kg	0.12 U				
	Acenaphthene	mg/kg	0.12 U				
	Acenaphthylene	mg/kg	0.12 U				
	Anthracene	mg/kg	0.12 U				

Table C.9
Chemistry Data for Soil Samples

		Event	Soil/Grit Samples (Department of Ecology)				
		Location	Soil 3-A/3-B				
		Sample ID	**3-B**				
		Depth	4-8 in				
		Date	08/01/1993				
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Fluorene	mg/kg		0.12 U				
Phenanthrene	mg/kg		0.12 U				
Benzo(g,h,i)perylene	mg/kg		0.12 U				
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Total HPAH	mg/kg		0.11 J				
Fluoranthene	mg/kg		0.05 J				
Pyrene	mg/kg		0.06 J				
Other SVOCs							
4-Methylphenol	mg/kg		0.12 U				
Benzoic Acid	mg/kg		1.2 U				
Bis(2-ethylhexyl) Phthalate	mg/kg		0.12 U				
Butyl benzyl Phthalate	mg/kg		0.12 U				
Carbazole	mg/kg		0.12 U				
Dibenzofuran	mg/kg		0.12 U				
Dimethyl Phthalate	mg/kg		0.12 U				
Di-n-butyl Phthalate	mg/kg		0.12 U				
N-Nitrosodiphenylamine	mg/kg		0.12 U				
Pentachlorophenol	mg/kg		0.61 U				

Table C.9
Chemistry Data for Soil Samples

		Event	Phase 2 Vadose Soils Sampling (RETEC)				
		Location	TP-3	TP-4	TP-6	TP-8	TP-9
		Sample ID	**TP-3 4'**	**TP-4 0.9'**	**TP-6 0.9'**	**TP-8 0.9'**	**TP-9 1.8'**
		Depth	4 ft	0.9 ft	0.9 ft	0.9 ft	1.8 ft
		Date	04/27/1998	04/27/1998	04/27/1998	04/27/1998	04/30/1998
Metals							
Antimony	mg/kg		6	40	20	60	5 U
Arsenic	mg/kg		9	750	210	1100	8
Beryllium	mg/kg		0.2	0.5 U	0.3	0.5 U	0.14
Cadmium	mg/kg		0.4	8.7	3.2	12	0.2 U
Chromium	mg/kg		120	76	81	83	38
Copper	mg/kg		74	3200	700	2400	29
Lead	mg/kg		67	670	260	1700	7
Mercury	mg/kg		0.09	0.33	0.09	0.12	0.05 U
Nickel	mg/kg		54	35	54	51	26
Selenium	mg/kg		6 U	20 U	10 U	30 U	5 U
Silver	mg/kg		0.3 U	2	1	3	0.3 U
Thallium	mg/kg		6 U	20 U	10 U	30 U	5 U
Zinc	mg/kg		490	8500	3700	10000	49
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
Benz(a)anthracene	mg/kg		3.4 J				0.11 U
Benzo(a)pyrene	mg/kg		3.8 J				0.11 U
Benzo(b)fluoranthene	mg/kg		4.2 J				0.13
Benzo(k)fluoranthene	mg/kg		3.7 J				0.11 U
Chrysene	mg/kg		5.2 J				0.18
Dibenzo(a,h)anthracene	mg/kg		0.65 J				0.11 U
Indeno(1,2,3-cd)pyrene	mg/kg		2.8 J				0.11 U
cPAHs (MTCA TEQ-HalfND)	mg/kg		5.3 J				0.092
cPAHs (MTCA TEQ-ZeroND)	mg/kg		5.3 J				0.015
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
2-Methylnaphthalene	mg/kg		0.25 J				3.2
Naphthalene	mg/kg		0.25 J				0.11 U
Acenaphthene	mg/kg		0.11 UJ				0.89
Acenaphthylene	mg/kg						0.11 U
Anthracene	mg/kg		0.74 J				0.19
Fluorene	mg/kg		0.3 J				3.8
Phenanthrene	mg/kg		2.9 J				4.5
Benzo(g,h,i)perylene	mg/kg		2.8 J				0.11 U
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Fluoranthene	mg/kg		5.9 J				0.44
Pyrene	mg/kg		8.5 J				0.5
Other SVOCs							
2,4-Dimethylphenol	mg/kg		0.34 U				1.4 U
Bis(2-ethylhexyl) Phthalate	mg/kg		0.26				0.45 U
Carbazole	mg/kg		0.6				0.45 U
Dibenzofuran	mg/kg		0.13				0.47
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH							

Table C.9
Chemistry Data for Soil Samples

		Event	Phase 2 Vadose Soils Sampling (RETEC)				
		Location	TP-3	TP-4	TP-6	TP-8	TP-9
		Sample ID	**TP-3 4'**	**TP-4 0.9'**	**TP-6 0.9'**	**TP-8 0.9'**	**TP-9 1.8'**
		Depth	4 ft	0.9 ft	0.9 ft	0.9 ft	1.8 ft
		Date	04/27/1998	04/27/1998	04/27/1998	04/27/1998	04/30/1998
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH							
1,3,5-Trimethylbenzene	mg/kg		0.0011 U				
Ethylbenzene	mg/kg		0.0011 U				
Iso-propylbenzene	mg/kg		0.0011 U				
n-Propylbenzene	mg/kg		0.0011 U				
Xylene (meta & para)	mg/kg		0.0022 U				
Xylene (ortho)	mg/kg		0.0011 U				
Other VOCs							
1,2,4-Trimethylbenzene	mg/kg		0.0011 U				
Acetone	mg/kg		0.0075 JB				
Cymene	mg/kg		0.0011 U				
n-Butylbenzene	mg/kg		0.0022 U				
sec-Butylbenzene	mg/kg		0.0011 U				
Total Petroleum Hydrocarbons (TPH)							
Gasoline-Range Hydrocarbons	mg/kg		5.5 U				230
Diesel-Range Hydrocarbons	mg/kg		270	560	330	86	12000
Oil-Range Hydrocarbons	mg/kg		1100	740	760	300	1700
EPH/VPH							
C5-C6 Aliphatics	mg/kg						2.7 U
C6-C8 Aliphatics	mg/kg						2.7 U
C8-C10 Aliphatics	mg/kg						4.5
C10-C12 Aliphatics	mg/kg						360 JB
C12-C16 Aliphatics	mg/kg						2000
C16-C18 Aliphatics	mg/kg						840
C18-C21 Aliphatics	mg/kg						930
C21-C36 Aliphatics	mg/kg						700
C8-C10 Aromatics	mg/kg						30
C10-C12 Aromatics	mg/kg						12
C12-C16 Aromatics	mg/kg						110
C16-C21 Aromatics	mg/kg						650
C21-C34 Aromatics	mg/kg						200

Table C.9
Chemistry Data for Soil Samples

		Event	Phase 2 Vadose Soils Sampling (RETEC)				
		Location	TP-9	TP-10	TP-13	TP-15	TP-15
		Sample ID	**TP-9 6'**	**TP-10 1.2'**	**TP-13 4'**	**TP-15 0.7'**	**TP-15 6'**
		Depth	6 ft	1.2 ft	4 ft	0.7 ft	6 ft
		Date	04/30/1998	04/27/1998	04/30/1998	04/27/1998	04/27/1998
Metals							
Antimony	mg/kg		6 U	70	10 U	5 U	5 U
Arsenic	mg/kg		10	1200	30	25	28
Beryllium	mg/kg		0.3	0.6	0.4	0.2	0.2
Cadmium	mg/kg		0.2 U	13	0.9	0.4	0.2 U
Chromium	mg/kg		50	81	53	59	56
Copper	mg/kg		27	3600	1400	370	43
Lead	mg/kg		3	1200	440	200	16
Mercury	mg/kg		0.05 U	0.09	0.43	2.9	0.06
Nickel	mg/kg		48	38	51	55	52
Selenium	mg/kg		6 U	20 U	10 U	5 U	5 U
Silver	mg/kg		0.3 U	3	1.2	0.3 U	0.3 U
Thallium	mg/kg		6 U	20 U	10 U	5 U	5 U
Zinc	mg/kg		44	13000	440	160	70
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
Benz(a)anthracene	mg/kg		0.12 U				7.4
Benzo(a)pyrene	mg/kg		0.12 U				4.5
Benzo(b)fluoranthene	mg/kg		0.12 U				5.2
Benzo(k)fluoranthene	mg/kg		0.12 U				3.3
Chrysene	mg/kg		0.12 U				6.2
Dibenzo(a,h)anthracene	mg/kg		0.12 U				0.3
Indeno(1,2,3-cd)pyrene	mg/kg		0.12 U				1.9
cPAHs (MTCA TEQ-HalfND)	mg/kg		0.091 U				6.4
cPAHs (MTCA TEQ-ZeroND)	mg/kg		0.12 U				6.4
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
2-Methylnaphthalene	mg/kg		3.2				31
Naphthalene	mg/kg		0.9				62
Acenaphthene	mg/kg		0.46				35
Acenaphthylene	mg/kg		0.12 U				
Anthracene	mg/kg		0.12 U				10
Fluorene	mg/kg		1.3				28
Phenanthrene	mg/kg		2.3				84
Benzo(g,h,i)perylene	mg/kg		0.12 U				1.9
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Fluoranthene	mg/kg		0.17				37
Pyrene	mg/kg		0.15				44
Other SVOCs							
2,4-Dimethylphenol	mg/kg						1.4
Bis(2-ethylhexyl) Phthalate	mg/kg						0.7
Carbazole	mg/kg						6.3
Dibenzofuran	mg/kg						15
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH							

Table C.9
Chemistry Data for Soil Samples

		Event	Phase 2 Vadose Soils Sampling (RETEC)				
		Location	TP-9	TP-10	TP-13	TP-15	TP-15
		Sample ID	**TP-9 6'**	**TP-10 1.2'**	**TP-13 4'**	**TP-15 0.7'**	**TP-15 6'**
		Depth	6 ft	1.2 ft	4 ft	0.7 ft	6 ft
		Date	04/30/1998	04/27/1998	04/30/1998	04/27/1998	04/27/1998
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH							
1,3,5-Trimethylbenzene	mg/kg		0.34				0.31
Ethylbenzene	mg/kg		0.22				0.048
Iso-propylbenzene	mg/kg		0.18				0.036
n-Propylbenzene	mg/kg		0.38				0.056
Xylene (meta & para)	mg/kg		0.31				0.048
Xylene (ortho)	mg/kg		0.12				0.082
Other VOCs							
1,2,4-Trimethylbenzene	mg/kg		1.6				0.41
Acetone	mg/kg		0.25 JB				0.18 JB
Cymene	mg/kg		0.42				0.19
n-Butylbenzene	mg/kg		0.56				0.2
sec-Butylbenzene	mg/kg		0.3				0.068
Total Petroleum Hydrocarbons (TPH)							
Gasoline-Range Hydrocarbons	mg/kg		170			100	470
Diesel-Range Hydrocarbons	mg/kg		2600		150	4300	4200
Oil-Range Hydrocarbons	mg/kg		24		460	1300	110
EPH/VPH							
C5-C6 Aliphatics	mg/kg		2.9 U				2.9 U
C6-C8 Aliphatics	mg/kg		2.9 U				2.9 U
C8-C10 Aliphatics	mg/kg		6				2.9 U
C10-C12 Aliphatics	mg/kg		140 JB				2.9 U
C12-C16 Aliphatics	mg/kg		530				550
C16-C18 Aliphatics	mg/kg		360				280
C18-C21 Aliphatics	mg/kg		140				230
C21-C36 Aliphatics	mg/kg		130				140
C8-C10 Aromatics	mg/kg		19				11
C10-C12 Aromatics	mg/kg		4.9				70
C12-C16 Aromatics	mg/kg		56				150
C16-C21 Aromatics	mg/kg		190				370
C21-C34 Aromatics	mg/kg		34				120

Table C.9
Chemistry Data for Soil Samples

		Event	Phase 2 Saturated Zone Soils Sampling (RETEC)				
		Location	B-1	MW-01	MW-01	MW-02	MW-03
		Sample ID	**B-1 6.5'**	**MW-1 10'**	**MW-1 10' Dup**	**MW-2 8.5'**	**MW-3 7.5'**
		Depth	6.5 ft	10 ft	10 ft	8.5 ft	7.5 ft
		Date	04/29/1998	04/28/1998	04/28/1998	04/28/1998	04/28/1998
Metals							
Antimony	mg/kg			5 U	5 U	6 U	5 U
Arsenic	mg/kg			8	7	11	6
Beryllium	mg/kg			0.2	0.2	0.2	0.1 U
Cadmium	mg/kg			0.2 U	0.2 U	1	0.2 U
Chromium	mg/kg			44	40	35	34
Copper	mg/kg			19	18	110	9.2
Lead	mg/kg			4	4	190	2 U
Mercury	mg/kg			0.05 U	0.05 U	0.19	0.04 U
Nickel	mg/kg			38	38	32	25
Selenium	mg/kg			5 U	5 U	6 U	5 U
Silver	mg/kg			0.3 U	0.3 U	0.3 U	0.3 U
Thallium	mg/kg			5 U	5 U	6 U	5 U
Zinc	mg/kg			32	33	280	24
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH							
1,3,5-Trimethylbenzene	mg/kg		0.001 U	0.022		0.0075 J	0.001 U
n-Propylbenzene	mg/kg		0.001 U	0.01		0.0045 UJ	0.001 U
Other VOCs							
1,1,2-Trichlorotrifluoroethane	mg/kg		0.0021 U	0.01 U		0.0091 UJ	0.0058
1,2,4-Trimethylbenzene	mg/kg		0.001 U	0.087		0.016 J	0.001 U
Acetone	mg/kg		0.0086 JB	0.059 JB		0.066 JB	0.0081 JB
Carbon Disulfide	mg/kg		0.001 U	0.0052 U		0.012 UJ	0.001 U
Cymene	mg/kg		0.001 U	0.034		0.0045 UJ	0.001 U
Methylene chloride	mg/kg		0.0021 U	0.011		0.0091 UJ	0.0031
n-Butylbenzene	mg/kg		0.0021 U	0.027		0.0091 UJ	0.002 U
sec-Butylbenzene	mg/kg		0.001 U	0.014		0.0045 UJ	0.001 U
Total Petroleum Hydrocarbons (TPH)							
Gasoline-Range Hydrocarbons	mg/kg		5.2 U	34		240	5.5 U
Diesel-Range Hydrocarbons	mg/kg		9.7	210	250	13000	6.3
Oil-Range Hydrocarbons	mg/kg		16	11 U	12	8000	11 U

Table C.9
Chemistry Data for Soil Samples

		Event	Phase 2 Saturated Zone Soils Sampling (RETEC)				
		Location	MW-04	MW-04	MW-05		
		Sample ID	**MW-4 2.5'**	**MW-4 8'**	**MW-5 7.5'**		
		Depth	2.5 ft	8 ft	7.5 ft		
		Date	04/28/1998	04/28/1998	04/29/1998		
Metals							
Antimony	mg/kg		7	5 U	5 U		
Arsenic	mg/kg		53	8	11		
Beryllium	mg/kg		0.2	0.2	0.2		
Cadmium	mg/kg		1	0.2 U	0.2 U		
Chromium	mg/kg		45	39	60		
Copper	mg/kg		400	43	37		
Lead	mg/kg		200	5	5		
Mercury	mg/kg		0.29	0.04 U	0.05 U		
Nickel	mg/kg		47	45	64		
Selenium	mg/kg		8	5 U	5 U		
Silver	mg/kg		0.3 U	0.3 U	0.3 U		
Thallium	mg/kg		6 U	5 U	5 U		
Zinc	mg/kg		900	51	40		
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH							
1,3,5-Trimethylbenzene	mg/kg		0.0011 U	0.0011 U	0.0011 U		
Benzene	mg/kg		0.0011 U				
Ethylbenzene	mg/kg		0.0011 U				
Iso-propylbenzene	mg/kg		0.0011 U				
n-Propylbenzene	mg/kg		0.0011 U	0.0011 U	0.0011 U		
Toluene	mg/kg		0.0011 U				
Xylene (meta & para)	mg/kg		0.0022 U				
Xylene (ortho)	mg/kg		0.0011 U				
Other VOCs							
1,1,2-Trichlorotrifluoroethane	mg/kg			0.0022 U	0.0022 U		
1,2,4-Trimethylbenzene	mg/kg		0.0011 U	0.0011 U	0.0011 U		
Acetone	mg/kg		0.013 JB	0.012 JB	0.0087 JB		
Carbon Disulfide	mg/kg			0.0011 U	0.0011 U		
Cymene	mg/kg		0.0011 U	0.0011 U	0.0011 U		
Methylene chloride	mg/kg			0.0022 U	0.0022 U		
n-Butylbenzene	mg/kg		0.0022 U	0.0022 U	0.0022 U		
sec-Butylbenzene	mg/kg		0.0011 U	0.0011 U	0.0011 U		
Total Petroleum Hydrocarbons (TPH)							
Gasoline-Range Hydrocarbons	mg/kg		5.6 U	5.5 U	5.5 U		
Diesel-Range Hydrocarbons	mg/kg		110	5.5 U	5.6 U		
Oil-Range Hydrocarbons	mg/kg		350	11 U	11 U		

Table C.9
Chemistry Data for Soil Samples

	Event	Shipyard Sediments RI/FS Intertidal Data (RETEC)				
	Location	S-3	S-3	S-4	S-4	S-4
	Sample ID	**HAS-S3-0-2**	**HAS-S3-2-4**	**HAS-S4-0-2**	**HAS-S4-2-4**	**HAS-S4-4-6**
	Depth	0-2 ft	2-4 ft	0-2 ft	2-4 ft	4-6 ft
	Date	08/19/2005	08/19/2005	08/19/2005	08/19/2005	08/19/2005
Conventionals						
Total Organic Carbon	%	1.88	0.452	0.422	0.501	0.197
Total Solids	%	82.5	84.2	90.3	86.9	80
Metals						
Antimony	mg/kg	20	10 U	10 U	7	6 U
Arsenic	mg/kg	340	70	50	35	6
Cadmium	mg/kg	4.1	7.2	0.9	0.4	0.2 U
Chromium	mg/kg	55	42	40	33	41
Copper	mg/kg	2400	790	880	350	24
Lead	mg/kg	450	160	160	68	4
Mercury	mg/kg	10	4.7	0.42	0.17	0.05 U
Nickel	mg/kg	62	64	48	21	39
Silver	mg/kg	0.9	0.8	0.8 U	0.3 U	0.4 U
Zinc	mg/kg	4000	4200	1600	510	41
Organometallics						
Tributyltin	mg/kg	6.2	0.82	0.36 J	0.16	0.0056 U
Polychlorinated Biphenyls (PCBs)						
Aroclor 1016	mg/kg	0.039 U	0.043 U	0.037 U	0.038 U	0.041 U
Aroclor 1221	mg/kg	0.039 U	0.043 U	0.037 U	0.038 U	0.041 U
Aroclor 1232	mg/kg	0.039 U	0.043 U	0.037 U	0.038 U	0.041 U
Aroclor 1242	mg/kg	0.039 U	0.043 U	0.037 U	0.038 U	0.041 U
Aroclor 1248	mg/kg	0.039 U	0.043 U	0.037 U	0.038 U	0.041 U
Aroclor 1254	mg/kg	0.039 U	0.13	0.055 U	0.075 U	0.041 U
Aroclor 1260	mg/kg	0.039 U	0.043 U	0.066	0.063	0.041 U
PCBs (Total, Aroclors)	mg/kg	0.039 U	0.13	0.066	0.063	0.041 U
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	mg/kg	1.3	1.2	0.073 U	0.075 U	0.082 U
Benzo(a)pyrene	mg/kg	1.6	1.4	0.073 U	0.075 U	0.082 U
Benzo(b)fluoranthene	mg/kg	1.8	1.4	0.073 U	0.075 U	0.082 U
Benzo(k)fluoranthene	mg/kg	1.7	1.4	0.073 U	0.075 U	0.082 U
Benzofluoranthenes (total)	mg/kg	3.5	2.8	0.073 U	0.075 U	0.082 U
Chrysene	mg/kg	1.5	1.3	0.073 U	0.079	0.082 U
Dibenzo(a,h)anthracene	mg/kg	0.13	0.14	0.073 U	0.075 U	0.082 U
Indeno(1,2,3-cd)pyrene	mg/kg	0.45	0.42	0.073 U	0.075 U	0.082 U
cPAHs (MTCA TEQ-HalfND)	mg/kg	2.2	1.9	0.022 U	0.057	0.062 U
cPAHs (MTCA TEQ-ZeroND)	mg/kg	2.2	1.9	0.073 U	0.00079	0.082 U
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAH	mg/kg	1.8	2.1	0.073 U	0.075 U	0.082 U
2-Methylnaphthalene	mg/kg	0.078 U	0.085 U	0.073 U	0.075 U	0.082 U
Naphthalene	mg/kg	0.078 U	0.007 U	0.0054 U	0.075 U	0.082 U
Acenaphthene	mg/kg	0.27	0.21	0.073 U	0.075 U	0.082 U
Acenaphthylene	mg/kg	0.078 U	0.085 U	0.073 U	0.075 U	0.082 U

Table C.9
Chemistry Data for Soil Samples

		Event	Shipyard Sediments RI/FS Intertidal Data (RETEC)				
		Location	S-3	S-3	S-4	S-4	S-4
		Sample ID	**HAS-S3-0-2**	**HAS-S3-2-4**	**HAS-S4-0-2**	**HAS-S4-2-4**	**HAS-S4-4-6**
		Depth	0-2 ft	2-4 ft	0-2 ft	2-4 ft	4-6 ft
		Date	08/19/2005	08/19/2005	08/19/2005	08/19/2005	08/19/2005
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Anthracene	mg/kg		0.46	0.65	0.073 U	0.075 U	0.082 U
Fluorene	mg/kg		0.18	0.095	0.073 U	0.075 U	0.082 U
Phenanthrene	mg/kg		0.88	1.1	0.073 U	0.075 U	0.082 U
Benzo(g,h,i)perylene	mg/kg		0.41	0.38	0.073 U	0.075 U	0.082 U
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Total HPAH	mg/kg		15	14	0.23	0.46	0.082 U
Fluoranthene	mg/kg		3.1	3.7	0.11	0.17	0.082 U
Pyrene	mg/kg		2.9	3	0.12	0.21	0.082 U
Other SVOCs							
1,2,4-Trichlorobenzene	mg/kg		0.006 U	0.007 U	0.073 U	0.022 U	0.082 U
1,2-Dichlorobenzene	mg/kg		0.0012 U	0.085 U	0.073 U	0.075 U	0.082 U
1,3-Dichlorobenzene	mg/kg		0.0012 U	0.0014 U	0.073 U	0.075 U	0.082 U
2,4,5-Trichlorophenol	mg/kg		0.39 U	0.43 U	0.36 U	0.38 U	0.41 U
2,4,6-Trichlorophenol	mg/kg		0.39 U	0.43 U	0.36 U	0.38 U	0.41 U
2,4-Dichlorophenol	mg/kg		0.39 U	0.43 U	0.36 U	0.38 U	0.41 U
2,4-Dimethylphenol	mg/kg		0.078 U	0.085 U	0.073 U	0.075 U	0.082 U
2,4-Dinitrophenol	mg/kg		0.78 U	0.85 U	0.73 U	0.75 U	0.82 U
2,4-Dinitrotoluene	mg/kg		0.39 U	0.43 U	0.36 U	0.38 U	0.41 U
2,6-Dinitrotoluene	mg/kg		0.39 U	0.43 U	0.36 U	0.38 U	0.41 U
2-Chloronaphthalene	mg/kg		0.078 U	0.085 U	0.073 U	0.075 U	0.082 U
2-Chlorophenol	mg/kg		0.078 U	0.085 U	0.073 U	0.075 U	0.082 U
2-Methylphenol	mg/kg		0.078 U	0.085 U	0.073 U	0.075 U	0.082 U
2-Nitroaniline	mg/kg		0.39 U	0.43 U	0.36 U	0.38 U	0.41 U
2-Nitrophenol	mg/kg		0.39 U	0.43 U	0.36 U	0.38 U	0.41 U
3,3'-Dichlorobenzidine	mg/kg		0.39 U	0.43 U	0.36 U	0.38 U	0.41 U
4,6-Dinitro-o-cresol	mg/kg		0.78 U	0.85 U	0.73 U	0.75 U	0.82 U
4-Chloro-3-methylphenol	mg/kg		0.39 U	0.43	0.36 U	0.38 U	0.41 U
4-Chloroaniline	mg/kg		0.39 U	0.43 U	0.36 U	0.38 U	0.41 U
4-Methylphenol	mg/kg		0.078 U	0.085 U	0.073 U	0.075 U	0.082 U
4-Nitrophenol	mg/kg		0.39 U	0.43 U	0.36 U	0.38 U	0.41 U
Benzoic Acid	mg/kg		0.78 U	0.85 U	0.73 U	0.75 U	0.82 U
Benzyl Alcohol	mg/kg		0.39 U	0.43 U	0.36 U	0.38 U	0.41 U
bis(2-chloroethoxy)methane	mg/kg		0.078 U	0.085 U	0.073 U	0.075 U	0.082 U
Bis(2-chloroethyl) Ether	mg/kg		0.078 U	0.085 U	0.073 U	0.075 U	0.082 U
Bis(2-ethylhexyl) Phthalate	mg/kg		0.52	0.24	0.073 U	0.18	0.082 U
Bis(2-chloro-1-methylethyl) eth	mg/kg		0.078 U	0.085 U	0.073 U	0.075 U	0.082 U
Butyl benzyl Phthalate	mg/kg		0.078 U	0.085 U	1	0.075 U	0.082 U
Carbazole	mg/kg		0.091	0.085 U	0.073 U	0.075 U	0.082 U
Dibenzofuran	mg/kg		0.078 U	0.085 U	0.073 U	0.075 U	0.082 U
Diethylphthalate	mg/kg		0.078 U	0.085 U	0.073 U	0.075 U	0.082 U
Dimethyl Phthalate	mg/kg		0.078 U	0.085 U	0.073 U	0.075 U	0.082 U

Table C.9
Chemistry Data for Soil Samples

		Event	Shipyard Sediments RI/FS Intertidal Data (RETEC)				
		Location	S-3	S-3	S-4	S-4	S-4
		Sample ID	**HAS-S3-0-2**	**HAS-S3-2-4**	**HAS-S4-0-2**	**HAS-S4-2-4**	**HAS-S4-4-6**
		Depth	0-2 ft	2-4 ft	0-2 ft	2-4 ft	4-6 ft
		Date	08/19/2005	08/19/2005	08/19/2005	08/19/2005	08/19/2005
Other SVOCs							
Di-n-butyl Phthalate	mg/kg		0.078 U	0.085 U	0.073 U	0.075 U	0.082 U
Di-n-octyl phthalate	mg/kg		0.078 U	0.085 U	0.073 U	0.075 U	0.082 U
Hexachlorobenzene	mg/kg		0.078 U	0.085 U	0.073 U	0.075 U	0.082 U
Hexachlorobutadiene	mg/kg		0.078 U	0.085 U	0.0054 U	0.075 U	0.082 U
Hexachlorocyclopentadiene	mg/kg		0.39 U	0.43 U	0.36 U	0.38 U	0.41 U
Hexachloroethane	mg/kg		0.078 U	0.085 U	0.073 U	0.075 U	0.082 U
Isophorone	mg/kg		0.078 U	0.085 U	0.073 U	0.075 U	0.082 U
Nitrobenzene	mg/kg		0.078 U	0.085 U	0.073 U	0.075 U	0.082 U
N-Nitroso-di-n-propylamine	mg/kg		0.39 U	0.43 U	0.36 U	0.38 U	0.41 U
N-Nitrosodiphenylamine	mg/kg		0.52 U	0.085 U	0.073 U	0.075 U	0.082 U
Pentachlorophenol	mg/kg		0.39 U	0.43 U	0.36 U	0.38 U	0.41 U
Phenol	mg/kg		0.078 U	0.085 U	0.073 U	0.075 U	0.082 U
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH							
1,3,5-Trimethylbenzene	mg/kg		0.0012 U	0.0014 U	0.0011 U	0.0045 U	
Benzene	mg/kg		0.0012 U	0.0014 U	0.0011 U	0.0045 U	
Ethylbenzene	mg/kg		0.0012 U	0.0014 U	0.0011 U	0.0045 U	
Iso-propylbenzene	mg/kg		0.0013 J	0.0014 U	0.0011 U	0.0045 U	
n-Propylbenzene	mg/kg		0.0012 U	0.0014 U	0.0011 U	0.0045 U	
Toluene	mg/kg		0.0012 U	0.0014 U	0.0011 U	0.0045 U	
Xylene (meta & para)	mg/kg		0.0026 J	0.0019 J	0.0011 J	0.0045 U	
Xylene (ortho)	mg/kg		0.0022 J	0.0014 U	0.0011 U	0.0045 U	
Other VOCs							
1,1,1,2-Tetrachloroethane	mg/kg		0.0012 U	0.0014 U	0.0011 U	0.0045 U	
1,1,1-Trichloroethane	mg/kg		0.0012 U	0.0014 U	0.0011 U	0.0045 U	
1,1,2,2-Tetrachloroethane	mg/kg		0.0012 U	0.0014 U	0.0011 U	0.0045 U	
1,1,2-Trichloroethane	mg/kg		0.0012 U	0.0014 U	0.0011 U	0.0045 U	
1,1,2-Trichlorotrifluoroethane	mg/kg		0.0024 U	0.0028 U	0.0022 U	0.0089 U	
1,1-Dichloroethane	mg/kg		0.0012 U	0.0014 U	0.0011 U	0.0045 U	
1,1-Dichloroethene	mg/kg		0.0012 U	0.0014 U	0.0011 U	0.0045 U	
1,1-Dichloropropene	mg/kg		0.0012 U	0.0014 U	0.0011 U	0.0045 U	
1,2,3-Trichlorobenzene	mg/kg		0.006 U	0.007 U	0.0054 U	0.022 U	
1,2,3-Trichloropropane	mg/kg		0.0024 U	0.0028 U	0.0022 U	0.0089 U	
1,2,4-Trimethylbenzene	mg/kg		0.0019 U	0.0014 U	0.0011 U	0.0045 U	
1,2-Dibromo-3-chloropropane	mg/kg		0.006 U	0.007 U	0.0054 U	0.022 U	
1,2-Dibromoethane (EDB)	mg/kg		0.0012 U	0.0014 U	0.0011 U	0.0045 U	
1,2-Dichloroethane (EDC)	mg/kg		0.0012 U	0.0014 U	0.0011 U	0.0045 U	
1,2-Dichloropropane	mg/kg		0.0012 U	0.0014 U	0.0011 U	0.0045 U	
1,3-Dichloropropane	mg/kg		0.0012 U	0.0014 U	0.0011 U	0.0045 U	
1,4-Dichlorobenzene	mg/kg		0.0012 U	0.0014 U	0.073 U	0.075 U	0.082 U
2,2-Dichloropropane	mg/kg		0.0012 U	0.0014 U	0.0011 U	0.0045 U	
2-Chloroethyl vinyl ether	mg/kg		0.006 U	0.007 U	0.0054 U	0.022 U	

Table C.9
Chemistry Data for Soil Samples

	Event	Shipyard Sediments RI/FS Intertidal Data (RETEC)				
	Location	S-3	S-3	S-4	S-4	S-4
	Sample ID	**HAS-S3-0-2**	**HAS-S3-2-4**	**HAS-S4-0-2**	**HAS-S4-2-4**	**HAS-S4-4-6**
	Depth	0-2 ft	2-4 ft	0-2 ft	2-4 ft	4-6 ft
	Date	08/19/2005	08/19/2005	08/19/2005	08/19/2005	08/19/2005
Other VOCs						
2-Chlorotoluene	mg/kg	0.0012 U	0.0014 U	0.0011 U	0.0045 U	
2-Hexanone	mg/kg	0.006 U	0.007 U	0.0054 U	0.022 U	
3-Nitroaniline	mg/kg	0.39 U	0.43 U	0.36 U	0.38 U	0.41 U
4-Bromophenyl phenyl ether	mg/kg	0.078 U	0.085 U	0.073 U	0.075 U	0.082 U
4-Chlorophenyl phenyl ether	mg/kg	0.078 U	0.085 U	0.073 U	0.075 U	0.082 U
4-Chlorotoluene	mg/kg	0.0012 U	0.0014 U	0.0011 U	0.0045 U	
4-Nitroaniline	mg/kg	0.39 U	0.43 U	0.36 U	0.38 U	0.41 U
Acetone	mg/kg	0.24	0.074	0.0054 U	0.022 U	
Acrolein	mg/kg	0.06 U	0.07 U	0.054 U	0.22 U	
Acrylonitrile	mg/kg	0.006 U	0.007 U	0.0054 U	0.022 U	
Bromobenzene	mg/kg	0.0012 U	0.0014 U	0.0011 U	0.0045 U	
Bromochloromethane	mg/kg	0.0012 U	0.0014 U	0.0011 U	0.0045 U	
Bromodichloromethane	mg/kg	0.0012 U	0.0014 U	0.0011 U	0.0045 U	
Bromoethane	mg/kg	0.0024 U	0.0028 U	0.0022 U	0.0089 U	
Bromoform	mg/kg	0.0012 U	0.0014 U	0.0011 U	0.0045 U	
Bromomethane	mg/kg	0.0012 U	0.0014 U	0.0011 U	0.0045 U	
Carbon Disulfide	mg/kg	0.006	0.0038	0.0011 U	0.0045 U	
Carbon Tetrachloride	mg/kg	0.0012 U	0.0014 U	0.0011 U	0.0045 U	
Chlorobenzene	mg/kg	0.0012 U	0.0014 U	0.0011 U	0.0045 U	
Chloroethane	mg/kg	0.0012 U	0.0014 U	0.0011 U	0.0045 U	
Chloroform	mg/kg	0.0012 U	0.0014 U	0.0011 U	0.0045 U	
Chloromethane	mg/kg	0.0012 U	0.0014 U	0.0011 U	0.0045 U	
cis-1,2-Dichloroethene	mg/kg	0.0012 U	0.0014 U	0.0011 U	0.0045 U	
cis-1,3-Dichloropropene	mg/kg	0.0012 U	0.0014 U	0.0011 U	0.0045 U	
Cymene	mg/kg	0.0012 U	0.0014 U	0.0011 U	0.0045 U	
Dibromochloromethane	mg/kg	0.0012 U	0.0014 U	0.0011 U	0.0045 U	
Dibromomethane	mg/kg	0.0012 U	0.0014 U	0.0011 U	0.0045 U	
Iodomethane	mg/kg	0.0012 U	0.0014 U	0.0011 U	0.0045 U	
Methyl Ethyl Ketone	mg/kg	0.021	0.012	0.0054 U	0.022 U	
Methyl Iso Butyl Ketone	mg/kg	0.006 U	0.007 U	0.0054 U	0.022 U	
Methylene chloride	mg/kg	0.0069 U	0.0065 U	0.0051 U	0.0089 U	
n-Butylbenzene	mg/kg	0.0012 U	0.0014 U	0.0011 U	0.0045 U	
sec-Butylbenzene	mg/kg	0.0018 U	0.0014 U	0.0011 U	0.0045 U	
Styrene	mg/kg	0.0012 U	0.0014 U	0.0011 U	0.0045 U	
tert-Butylbenzene	mg/kg	0.0012 U	0.0014 U	0.0011 U	0.0045 U	
Tetrachloroethene	mg/kg	0.0012 U	0.0014 U	0.0011 U	0.0045 U	
trans-1,2-Dichloroethene	mg/kg	0.0012 U	0.0014 U	0.0011 U	0.0045 U	
trans-1,3-Dichloropropene	mg/kg	0.0012 U	0.0014 U	0.0011 U	0.0045 U	
trans-1,4-Dichloro-2-butene	mg/kg	0.006 U	0.007 U	0.0054 U	0.022 U	
Trichloroethene	mg/kg	0.0012 U	0.0014 U	0.0011 U	0.0045 U	
Trichlorofluoromethane	mg/kg	0.0012 U	0.0014 U	0.0011 U	0.0045 U	

Table C.9
Chemistry Data for Soil Samples

	Event	Shipyard Sediments RI/FS Intertidal Data (RETEC)				
	Location	S-3	S-3	S-4	S-4	S-4
	Sample ID	**HAS-S3-0-2**	**HAS-S3-2-4**	**HAS-S4-0-2**	**HAS-S4-2-4**	**HAS-S4-4-6**
	Depth	0-2 ft	2-4 ft	0-2 ft	2-4 ft	4-6 ft
	Date	08/19/2005	08/19/2005	08/19/2005	08/19/2005	08/19/2005
Other VOCs						
Vinyl Acetate	mg/kg	0.006 U	0.007 U	0.0054 U	0.022 U	
Vinyl Chloride	mg/kg	0.0012 U	0.0014 U	0.0011 U	0.0045 U	
Total Petroleum Hydrocarbons (TPH)						
Gasoline-Range Hydrocarbons	mg/kg	310	270	52	120	18
Oil-Range Hydrocarbons	mg/kg	1100	1800	250	560	12 U
TPH by HCID						
Diesel	mg/kg	2600	6300	810	1800	17

Table C.9
Chemistry Data for Soil Samples

	Event	Shipyard Sediments RI/FS Intertidal Data (RETEC)				
	Location	S-4	S-5	S-5	S-5	S-5
	Sample ID	**HAS-S4-6-8**	**HAS-S5-0-2**	**HAS-S5-2-4**	**HAS-S5-4-6**	**HAS-S5-6-8**
	Depth	6-8 ft	0-2 ft	2-4 ft	4-6 ft	6-8 ft
	Date	08/19/2005	08/19/2005	08/19/2005	08/19/2005	08/19/2005
Conventionals						
Total Organic Carbon	%	0.615	0.986	1.74	1.24	0.434
Total Solids	%	85.1	93.2	87.8	92.7	91
Metals						
Antimony	mg/kg	6 U	10 U	5 U	7 U	6 U
Arsenic	mg/kg	6	20	19	30	6
Cadmium	mg/kg	0.2 U	0.5 U	0.5	0.3 U	0.2 U
Chromium	mg/kg	39	57	41	55	42
Copper	mg/kg	52	570	590	160	20
Lead	mg/kg	13	120	200	40	3
Mercury	mg/kg	0.15	0.43	3.1	0.11	0.05 U
Nickel	mg/kg	34	57	73	54	40
Silver	mg/kg	0.3 U	0.8 U	0.3 U	0.4 U	0.3 U
Zinc	mg/kg	89	410	400	180	36
Organometallics						
Tributyltin	mg/kg	0.028 U	0.078	0.064	0.06	0.048 U
Polychlorinated Biphenyls (PCBs)						
Aroclor 1016	mg/kg	0.041 U	0.036 U	0.038 U	0.036 U	0.036 U
Aroclor 1221	mg/kg	0.041 U	0.036 U	0.038 U	0.036 U	0.036 U
Aroclor 1232	mg/kg	0.041 U	0.036 U	0.038 U	0.036 U	0.036 U
Aroclor 1242	mg/kg	0.041 U	0.036 U	0.038 U	0.036 U	0.036 U
Aroclor 1248	mg/kg	0.041 U	0.036 U	0.038 U	0.036 U	0.036 U
Aroclor 1254	mg/kg	0.041 U	0.089	0.65	0.1	0.036 U
Aroclor 1260	mg/kg	0.041 U	0.055 U	0.15 U	0.054 U	0.036 U
PCBs (Total, Aroclors)	mg/kg	0.041 U	0.089	0.65	0.1	0.036 U
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	mg/kg	0.082 U	0.21	0.88	0.12	0.89
Benzo(a)pyrene	mg/kg	0.082 U	0.27	1	0.14	0.46
Benzo(b)fluoranthene	mg/kg	0.082 U	0.33	1.5	0.16	0.62
Benzo(k)fluoranthene	mg/kg	0.082 U	0.32	1.6	0.17	0.56
Benzofluoranthenes (total)	mg/kg	0.082 U	0.65	3.1	0.33	1.2
Chrysene	mg/kg	0.082 U	0.32	1.4	0.16	0.75
Dibenzo(a,h)anthracene	mg/kg	0.082 U	0.072 U	0.075 U	0.072 U	0.073 U
Indeno(1,2,3-cd)pyrene	mg/kg	0.082 U	0.1	0.31	0.072 U	0.074
cPAHs (MTCA TEQ-HalfND)	mg/kg	0.062 U	0.37	1.4	0.19	0.69
cPAHs (MTCA TEQ-ZeroND)	mg/kg	0.082 U	0.37	1.4	0.19	0.68
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAH	mg/kg	0.082 U	0.34	1.3 J	2.4	30
2-Methylnaphthalene	mg/kg	0.082 U	0.072 U	0.15	0.18	3.7
Naphthalene	mg/kg	0.082 U	0.072 U	0.075 U	0.77	12
Acenaphthene	mg/kg	0.082 U	0.072 U	0.097	0.11	4.1
Acenaphthylene	mg/kg	0.082 U	0.072 U	0.089 J	0.072 U	0.073 U

Table C.9
Chemistry Data for Soil Samples

		Event	Shipyard Sediments RI/FS Intertidal Data (RETEC)				
		Location	S-4	S-5	S-5	S-5	S-5
		Sample ID	**HAS-S4-6-8**	**HAS-S5-0-2**	**HAS-S5-2-4**	**HAS-S5-4-6**	**HAS-S5-6-8**
		Depth	6-8 ft	0-2 ft	2-4 ft	4-6 ft	6-8 ft
		Date	08/19/2005	08/19/2005	08/19/2005	08/19/2005	08/19/2005
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Anthracene	mg/kg		0.082 U	0.072 U	0.097	0.072 U	1.2
Fluorene	mg/kg		0.082 U	0.072 U	0.24	0.46	4.1
Phenanthrene	mg/kg		0.082 U	0.34	0.73	1.1	8.4
Benzo(g,h,i)perylene	mg/kg		0.082 U	0.095	0.28	0.072 U	0.073 U
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Total HPAH	mg/kg		0.24	2.7	11	1.6	13
Fluoranthene	mg/kg		0.12	0.6	1.8	0.44	6.1
Pyrene	mg/kg		0.12	0.44	2.7	0.44	3.8
Other SVOCs							
1,2,4-Trichlorobenzene	mg/kg		0.082 U	0.072 U	0.075 U	0.072 U	0.073 U
1,2-Dichlorobenzene	mg/kg		0.082 U	0.001 U	0.075 U	0.072 U	0.073 U
1,3-Dichlorobenzene	mg/kg		0.082 U	0.001 U	0.0011 U	0.072 U	0.073 U
2,4,5-Trichlorophenol	mg/kg		0.41 U	0.36 U	0.38 U	0.36 U	0.36 U
2,4,6-Trichlorophenol	mg/kg		0.41 U	0.36 U	0.38 U	0.36 U	0.36 U
2,4-Dichlorophenol	mg/kg		0.41 U	0.36 U	0.38 U	0.36 U	0.36 U
2,4-Dimethylphenol	mg/kg		0.082 U	0.072 U	0.075 U	0.072 U	0.073 U
2,4-Dinitrophenol	mg/kg		0.82 U	0.72 U	0.75 U	0.72 U	0.73 U
2,4-Dinitrotoluene	mg/kg		0.41 U	0.36 U	0.38 U	0.36 U	0.36 U
2,6-Dinitrotoluene	mg/kg		0.41 U	0.36 U	0.38 U	0.36 U	0.36 U
2-Chloronaphthalene	mg/kg		0.082 U	0.072 U	0.075 U	0.072 U	0.073 U
2-Chlorophenol	mg/kg		0.082 U	0.072 U	0.075 U	0.072 U	0.073 U
2-Methylphenol	mg/kg		0.082 U	0.072 U	0.075 U	0.072 U	0.073 U
2-Nitroaniline	mg/kg		0.41 U	0.36 U	0.38 U	0.36 U	0.36 U
2-Nitrophenol	mg/kg		0.41 U	0.36 U	0.38 U	0.36 U	0.36 U
3,3'-Dichlorobenzidine	mg/kg		0.41 U	0.36 U	0.38 U	0.36 U	0.36 U
4,6-Dinitro-o-cresol	mg/kg		0.82 U	0.72 U	0.75 U	0.72 U	0.73 U
4-Chloro-3-methylphenol	mg/kg		0.41 U	0.36 U	0.38 U	0.36 U	0.36 U
4-Chloroaniline	mg/kg		0.41 U	0.36 U	0.38 U	0.36 U	0.36 U
4-Methylphenol	mg/kg		0.082 U	0.072 U	0.075 U	0.072 U	0.073 U
4-Nitrophenol	mg/kg		0.41 U	0.36 U	0.38 U	0.36 U	0.36 U
Benzoic Acid	mg/kg		0.82 U	0.72 U	0.75 U	0.72 U	0.73 U
Benzyl Alcohol	mg/kg		0.41 U	0.36 U	0.38 U	0.36 U	0.36 U
bis(2-chloroethoxy)methane	mg/kg		0.082 U	0.072 U	0.075 U	0.072 U	0.073 U
Bis(2-chloroethyl) Ether	mg/kg		0.082 U	0.072 U	0.075 U	0.072 U	0.073 U
Bis(2-ethylhexyl) Phthalate	mg/kg		0.082 U	0.072 U	0.44	0.072 U	0.073 U
Bis(2-chloro-1-methylethyl) eth	mg/kg		0.082 U	0.072 U	0.075 U	0.072 U	0.073 U
Butyl benzyl Phthalate	mg/kg		0.082 U	0.072 U	0.075 U	0.072 U	0.073 U
Carbazole	mg/kg		0.082 U	0.072 U	0.12	0.072 U	0.31
Dibenzofuran	mg/kg		0.082 U	0.072 U	0.075 U	0.087	2.2
Diethylphthalate	mg/kg		0.082 U	0.072 U	0.075 U	0.072 U	0.073 U
Dimethyl Phthalate	mg/kg		0.082 U	0.072 U	0.075 U	0.072 U	0.073 U

Table C.9
Chemistry Data for Soil Samples

	Event	Shipyard Sediments RI/FS Intertidal Data (RETEC)				
	Location	S-4	S-5	S-5	S-5	S-5
	Sample ID	**HAS-S4-6-8**	**HAS-S5-0-2**	**HAS-S5-2-4**	**HAS-S5-4-6**	**HAS-S5-6-8**
	Depth	6-8 ft	0-2 ft	2-4 ft	4-6 ft	6-8 ft
	Date	08/19/2005	08/19/2005	08/19/2005	08/19/2005	08/19/2005
Other SVOCs						
Di-n-butyl Phthalate	mg/kg	0.082 U	0.072 U	0.075 U	0.072 U	0.073 U
Di-n-octyl phthalate	mg/kg	0.082 U	0.072 U	0.075 U	0.072 U	0.073 U
Hexachlorobenzene	mg/kg	0.082 U	0.072 U	0.075 U	0.072 U	0.073 U
Hexachlorobutadiene	mg/kg	0.082 U	0.072 U	0.0056 U	0.072 U	0.073 U
Hexachlorocyclopentadiene	mg/kg	0.41 U	0.36 U	0.38 U	0.36 U	0.36 U
Hexachloroethane	mg/kg	0.082 U	0.072 U	0.075 U	0.072 U	0.073 U
Isophorone	mg/kg	0.082 U	0.072 U	0.075 U	0.072 U	0.073 U
Nitrobenzene	mg/kg	0.082 U	0.072 U	0.075 U	0.072 U	0.073 U
N-Nitroso-di-n-propylamine	mg/kg	0.41 U	0.36 U	0.38 U	0.36 U	0.36 U
N-Nitrosodiphenylamine	mg/kg	0.082 U	0.072 U	0.075 U	0.072 U	0.073 U
Pentachlorophenol	mg/kg	0.41 U	0.36 U	0.38 U	0.36 U	0.36 U
Phenol	mg/kg	0.082 U	0.072 U	0.075 U	0.072 U	0.073 U
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH						
1,3,5-Trimethylbenzene	mg/kg		0.001 U	0.014 J		
Benzene	mg/kg		0.001 U	0.0011 U		
Ethylbenzene	mg/kg		0.001 U	0.0011 U		
Iso-propylbenzene	mg/kg		0.001 U	0.0025 J		
n-Propylbenzene	mg/kg		0.001 U	0.0011 U		
Toluene	mg/kg		0.001 U	0.0011 U		
Xylene (meta & para)	mg/kg		0.001 U	0.01 J		
Xylene (ortho)	mg/kg		0.001 U	0.011 J		
Other VOCs						
1,1,1,2-Tetrachloroethane	mg/kg		0.001 U	0.0011 U		
1,1,1-Trichloroethane	mg/kg		0.001 U	0.0011 U		
1,1,2,2-Tetrachloroethane	mg/kg		0.001 U	0.0011 U		
1,1,2-Trichloroethane	mg/kg		0.001 U	0.0011 U		
1,1,2-Trichlorotrifluoroethane	mg/kg		0.002 U	0.0023 U		
1,1-Dichloroethane	mg/kg		0.001 U	0.0011 U		
1,1-Dichloroethene	mg/kg		0.001 U	0.0011 U		
1,1-Dichloropropene	mg/kg		0.001 U	0.0011 U		
1,2,3-Trichlorobenzene	mg/kg		0.0051 U	0.0056 U		
1,2,3-Trichloropropane	mg/kg		0.002 U	0.0023 U		
1,2,4-Trimethylbenzene	mg/kg		0.001 U	0.023 J		
1,2-Dibromo-3-chloropropane	mg/kg		0.0051 U	0.0056 U		
1,2-Dibromoethane (EDB)	mg/kg		0.001 U	0.0011 U		
1,2-Dichloroethane (EDC)	mg/kg		0.001 U	0.0011 U		
1,2-Dichloropropane	mg/kg		0.001 U	0.0011 U		
1,3-Dichloropropane	mg/kg		0.001 U	0.0011 U		
1,4-Dichlorobenzene	mg/kg	0.082 U	0.001 U	0.0011 U	0.072 U	0.073 U
2,2-Dichloropropane	mg/kg		0.001 U	0.0011 U		
2-Chloroethyl vinyl ether	mg/kg		0.0051 U	0.0056 U		

Table C.9
Chemistry Data for Soil Samples

		Event	Shipyard Sediments RI/FS Intertidal Data (RETEC)				
		Location	S-4	S-5	S-5	S-5	S-5
		Sample ID	**HAS-S4-6-8**	**HAS-S5-0-2**	**HAS-S5-2-4**	**HAS-S5-4-6**	**HAS-S5-6-8**
		Depth	6-8 ft	0-2 ft	2-4 ft	4-6 ft	6-8 ft
		Date	08/19/2005	08/19/2005	08/19/2005	08/19/2005	08/19/2005
Other VOCs							
2-Chlorotoluene	mg/kg			0.001 U	0.0011 U		
2-Hexanone	mg/kg			0.0051 U	0.0056 U		
3-Nitroaniline	mg/kg		0.41 U	0.36 U	0.38 U	0.36 U	0.36 U
4-Bromophenyl phenyl ether	mg/kg		0.082 U	0.072 U	0.075 U	0.072 U	0.073 U
4-Chlorophenyl phenyl ether	mg/kg		0.082 U	0.072 U	0.075 U	0.072 U	0.073 U
4-Chlorotoluene	mg/kg			0.001 U	0.0011 U		
4-Nitroaniline	mg/kg		0.41 U	0.36 U	0.38 U	0.36 U	0.36 U
Acetone	mg/kg			0.0051 U	0.22 J		
Acrolein	mg/kg			0.051 U	0.056 U		
Acrylonitrile	mg/kg			0.0051 U	0.0056 U		
Bromobenzene	mg/kg			0.001 U	0.0011 U		
Bromochloromethane	mg/kg			0.001 U	0.0011 U		
Bromodichloromethane	mg/kg			0.001 U	0.0011 U		
Bromoethane	mg/kg			0.002 U	0.0023 U		
Bromoform	mg/kg			0.001 U	0.0011 U		
Bromomethane	mg/kg			0.001 U	0.0011 U		
Carbon Disulfide	mg/kg			0.001 U	0.0031 J		
Carbon Tetrachloride	mg/kg			0.001 U	0.0011 U		
Chlorobenzene	mg/kg			0.001 U	0.0011 U		
Chloroethane	mg/kg			0.001 U	0.0011 U		
Chloroform	mg/kg			0.001 U	0.0011 U		
Chloromethane	mg/kg			0.001 U	0.0011 U		
cis-1,2-Dichloroethene	mg/kg			0.001 U	0.0011 U		
cis-1,3-Dichloropropene	mg/kg			0.001 U	0.0011 U		
Cymene	mg/kg			0.001 U	0.0072 J		
Dibromochloromethane	mg/kg			0.001 U	0.0011 U		
Dibromomethane	mg/kg			0.001 U	0.0011 U		
Iodomethane	mg/kg			0.001 U	0.0011 U		
Methyl Ethyl Ketone	mg/kg			0.0051 U	0.0056 U		
Methyl Iso Butyl Ketone	mg/kg			0.0051 U	0.0056 U		
Methylene chloride	mg/kg			0.002 U	0.0064 U		
n-Butylbenzene	mg/kg			0.001 U	0.0066 U		
sec-Butylbenzene	mg/kg			0.001 U	0.0021 J		
Styrene	mg/kg			0.001 U	0.0011 U		
tert-Butylbenzene	mg/kg			0.001 U	0.0011 U		
Tetrachloroethene	mg/kg			0.001 U	0.0011 U		
trans-1,2-Dichloroethene	mg/kg			0.001 U	0.0011 U		
trans-1,3-Dichloropropene	mg/kg			0.001 U	0.0011 U		
trans-1,4-Dichloro-2-butene	mg/kg			0.0051 U	0.0056 U		
Trichloroethene	mg/kg			0.001 U	0.0011 U		
Trichlorofluoromethane	mg/kg			0.001 U	0.0011 U		

Table C.9
Chemistry Data for Soil Samples

	Event	Shipyard Sediments RI/FS Intertidal Data (RETEC)				
	Location	S-4	S-5	S-5	S-5	S-5
	Sample ID	**HAS-S4-6-8**	**HAS-S5-0-2**	**HAS-S5-2-4**	**HAS-S5-4-6**	**HAS-S5-6-8**
	Depth	6-8 ft	0-2 ft	2-4 ft	4-6 ft	6-8 ft
	Date	08/19/2005	08/19/2005	08/19/2005	08/19/2005	08/19/2005
Other VOCs						
Vinyl Acetate	mg/kg		0.0051 U	0.0056 U		
Vinyl Chloride	mg/kg		0.001 U	0.0011 U		
Total Petroleum Hydrocarbons (TPH)						
Gasoline-Range Hydrocarbons	mg/kg	120	17	210	97	480
Oil-Range Hydrocarbons	mg/kg	380	260	1400	540	440
TPH by HCID						
Diesel	mg/kg	1400	84	3800	2800	5700

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	FS-01	FS-01	FS-01	FS-01	FS-02
	Sample ID	**FS01-2.5-031411**	**FS01-14-031411**	**FS01-24-031411**	**FS01-24.8-031411**	**FS02-2.5-031611**
	Depth	2.5-3.5 ft	14-15 ft	24-24.8 ft	24.8-25 ft	2.5-3.5 ft
	Date	03/14/2011	03/14/2011	03/14/2011	03/14/2011	03/16/2011
Metals						
Arsenic	mg/kg	14	2.9	5.5	4.6	17
Cadmium	mg/kg	1 U	1 U	1 U	1 U	5 U
Calcium	mg/kg	21000	7400	6100	8700	66000
Chromium	mg/kg	41	40	51	39	50
Copper	mg/kg	130	24	26	21	930
Lead	mg/kg	190	3.9	1.9	3.2	47
Mercury	mg/kg	0.078	0.03	0.02 U	0.023	0.034
Nickel	mg/kg	64	41	69	48	39
Silver	mg/kg	0.34 U	0.36 U	0.35 U	0.35 U	1.7 U
Zinc	mg/kg	280	38	27	37	3700
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	mg/kg	0.17	0.1 U	9	0.1 U	0.17
Benzo(a)pyrene	mg/kg	0.24	0.1 U	5.1	0.1 U	0.18
Benzo(b)fluoranthene	mg/kg	0.25	0.1 U	4.3	0.1 U	0.14
Benzo(k)fluoranthene	mg/kg	0.23	0.1 U	4.5	0.1 U	0.17
Benzofluoranthenes (total)	mg/kg	0.48	0.1 U	8.8	0.1 U	0.31
Chrysene	mg/kg	0.24	0.1 U	14	0.1 U	0.18
Dibenzo(a,h)anthracene	mg/kg	0.1 U	0.1 U	0.57	0.1 U	0.1 U
Indeno(1,2,3-cd)pyrene	mg/kg	0.1 U	0.1 U	1	0.1 U	0.1 U
cPAHs (MTCA TEQ-HalfND)	mg/kg	0.32	0.076 U	7.2	0.076 U	0.24
cPAHs (MTCA TEQ-ZeroND)	mg/kg	0.31	0.1 U	7.2	0.1 U	0.23
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAH	mg/kg	0.27	0.83	35	0.19 J	0.26
1-Methylnaphthalene	mg/kg	0.1 U	0.48	0.22	0.1 U	0.1 U
2-Methylnaphthalene	mg/kg	0.1 U	0.63	0.2 U	0.1 U	0.1 U
Naphthalene	mg/kg	0.01 UJ	0.01 U	0.91	0.081 J	0.01 U
Acenaphthene	mg/kg	0.1 U	0.15	3.8	0.1 U	0.1 U
Acenaphthylene	mg/kg	0.1 U	0.1 U	0.2 U	0.1 U	0.1 U
Anthracene	mg/kg	0.1 U	0.1 U	11	0.1 U	0.1 U
Fluorene	mg/kg	0.1 U	0.2	14	0.1 U	0.1 U
Phenanthrene	mg/kg	0.27	0.48	5.1	0.11	0.26
Benzo(g,h,i)perylene	mg/kg	0.12	0.1 U	1.1	0.1 U	0.1 U
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Total HPAH	mg/kg	2.1	0.1 U	120	0.3	1.7
Fluoranthene	mg/kg	0.38	0.1 U	48	0.15	0.41
Pyrene	mg/kg	0.43	0.1 U	36	0.15	0.42
Other SVOCs						
1,2,4-Trichlorobenzene	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
1,2-Dichlorobenzene	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
1,3-Dichlorobenzene	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
2,3,4,6-Tetrachlorophenol	mg/kg	0.25 U	0.25 U	0.5 U	0.25 U	0.25 U

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	FS-01	FS-01	FS-01	FS-01	FS-02
	Sample ID	**FS01-2.5-031411**	**FS01-14-031411**	**FS01-24-031411**	**FS01-24.8-031411**	**FS02-2.5-031611**
	Depth	2.5-3.5 ft	14-15 ft	24-24.8 ft	24.8-25 ft	2.5-3.5 ft
	Date	03/14/2011	03/14/2011	03/14/2011	03/14/2011	03/16/2011
Other SVOCs						
2,4,5-Trichlorophenol	mg/kg	0.1 U	0.1 U	0.2 U	0.1 U	0.1 U
2,4,6-Trichlorophenol	mg/kg	0.1 U	0.1 U	0.2 U	0.1 U	0.1 U
2,4-Dichlorophenol	mg/kg	0.1 U	0.1 U	0.2 U	0.1 U	0.1 U
2,4-Dimethylphenol	mg/kg	0.1 U	0.1 U	0.2 U	0.1 U	0.1 U
2,4-Dinitrophenol	mg/kg	0.5 U	0.5 U	1 U	0.5 U	0.5 U
2,4-Dinitrotoluene	mg/kg	0.25 U	0.25 U	0.5 U	0.25 U	0.25 U
2,6-Dichlorophenol	mg/kg	0.1 U	0.1 U	0.2 U	0.1 U	0.1 U
2,6-Dinitrotoluene	mg/kg	0.25 U	0.25 U	0.5 U	0.25 U	0.25 U
2-Chloronaphthalene	mg/kg	0.1 U	0.1 U	0.2 U	0.1 U	0.1 U
2-Chlorophenol	mg/kg	0.1 U	0.1 U	0.2 U	0.1 U	0.1 U
2-Methylphenol	mg/kg	0.1 U	0.1 U	0.2 U	0.1 U	0.1 U
2-Nitroaniline	mg/kg	0.25 U	0.25 U	0.5 U	0.25 U	0.25 U
2-Nitrophenol	mg/kg	0.25 U	0.25 U	0.5 U	0.25 U	0.25 U
3,3'-Dichlorobenzidine	mg/kg	0.32 U	0.34 U	0.63 U	0.33 U	0.5 U
4,6-Dinitro-o-cresol	mg/kg	0.1 U	0.1 U	0.2 U	0.1 U	0.1 U
4-Chloro-3-methylphenol	mg/kg	0.1 U	0.1 U	0.2 U	0.1 U	0.1 U
4-Chloroaniline	mg/kg	0.1 U	0.1 U	0.2 U	0.1 U	0.1 U
4-Nitrophenol	mg/kg	0.5 U	0.5 U	1 U	0.5 U	0.5 U
Aniline	mg/kg	0.1 U	0.1 U	0.2 U	0.1 U	0.1 U
Azobenzene	mg/kg	0.1 U	0.1 U	0.2 U	0.1 U	0.1 U
Benzoic Acid	mg/kg	1 U	1 U	2 U	1 U	1 U
Benzyl Alcohol	mg/kg	0.1 U	0.1 U	0.2 U	0.1 U	0.1 U
bis(2-chloroethoxy)methane	mg/kg	0.1 U	0.1 U	0.2 U	0.1 U	0.1 U
Bis(2-chloroethyl) Ether	mg/kg	0.1 U	0.1 U	0.2 U	0.1 U	0.1 U
Bis(2-ethylhexyl) Phthalate	mg/kg	0.13 U	0.13 U	0.26 U	0.13 U	0.13 U
Butyl benzyl Phthalate	mg/kg	0.1 U	0.1 U	0.2 U	0.1 U	0.1 U
Carbazole	mg/kg	0.1 U	0.18	1.1	0.1 U	0.1 U
Dibenzofuran	mg/kg	0.1 U	0.1 U	3.5	0.1 U	0.1 U
Diethylphthalate	mg/kg	0.1 U	0.1 U	0.2 U	0.1 U	0.1 U
Dimethyl Phthalate	mg/kg	0.1 U	0.1 U	0.2 U	0.1 U	0.1 U
Di-n-butyl Phthalate	mg/kg	0.13 U	0.13 U	0.26 U	0.13 U	0.13 U
Di-n-octyl phthalate	mg/kg	0.1 U	0.1 U	0.2 U	0.1 U	0.1 U
Hexachlorobenzene	mg/kg	0.1 U	0.1 U	0.2 U	0.1 U	0.1 U
Hexachlorobutadiene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
Hexachlorocyclopentadiene	mg/kg	0.5 U	0.5 U	1 U	0.5 U	0.5 U
Hexachloroethane	mg/kg	0.1 U	0.1 U	0.2 U	0.1 U	0.1 U
Isophorone	mg/kg	0.1 U	0.1 U	0.2 U	0.1 U	0.1 U
m,p-Cresol (2:1 ratio)	mg/kg	0.1 U	0.1 U	0.2 U	0.1 U	0.1 U
Nitrobenzene	mg/kg	0.1 U	0.1 U	0.2 U	0.1 U	0.1 U
N-Nitrosodimethylamine	mg/kg	0.1 U	0.1 U	0.2 U	0.1 U	0.1 U
N-Nitroso-di-n-propylamine	mg/kg	0.1 U	0.1 U	0.2 U	0.1 U	0.1 U

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	FS-01	FS-01	FS-01	FS-01	FS-02
	Sample ID	**FS01-2.5-031411**	**FS01-14-031411**	**FS01-24-031411**	**FS01-24.8-031411**	**FS02-2.5-031611**
	Depth	2.5-3.5 ft	14-15 ft	24-24.8 ft	24.8-25 ft	2.5-3.5 ft
	Date	03/14/2011	03/14/2011	03/14/2011	03/14/2011	03/16/2011
Other SVOCs						
N-Nitrosodiphenylamine	mg/kg	0.1 U	0.1 U	0.2 U	0.1 U	0.1 U
Pentachlorophenol	mg/kg	0.5 U	0.5 U	1 U	0.5 U	0.5 U
Phenol	mg/kg	0.1 U	0.1 U	0.2 U	0.1 U	0.1 U
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH						
1,3,5-Trimethylbenzene	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
Benzene	mg/kg	0.005 UJ	0.005 U	0.005 U	0.005 UJ	0.005 U
Ethylbenzene	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
Iso-propylbenzene	mg/kg	0.01 UJ	0.011	0.01 U	0.01 UJ	0.01 U
n-Propylbenzene	mg/kg	0.01 UJ	0.012	0.01 U	0.01 UJ	0.01 U
Toluene	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
Xylene (meta & para)	mg/kg	0.02 UJ	0.02 U	0.02 U	0.02 UJ	0.02 U
Xylene (ortho)	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
Xylene (total)	mg/kg	0.02 UJ	0.02 U	0.02 U	0.02 UJ	0.02 U
Other VOCs						
1,1,1,2-Tetrachloroethane	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
1,1,1-Trichloroethane	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
1,1,2,2-Tetrachloroethane	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
1,1,2-Trichloroethane	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
1,1-Dichloroethane	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
1,1-Dichloroethene	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
1,1-Dichloropropene	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
1,2,3-Trichlorobenzene	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
1,2,3-Trichloropropane	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
1,2,4-Trimethylbenzene	mg/kg	0.01 UJ	0.011	0.01 U	0.01 UJ	0.01 U
1,2-Dibromo-3-chloropropane	mg/kg	0.05 UJ	0.05 U	0.05 U	0.05 UJ	0.05 U
1,2-Dibromoethane (EDB)	mg/kg	0.005 UJ	0.005 U	0.005 U	0.005 UJ	0.005 U
1,2-Dichloroethane (EDC)	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
1,2-Dichloropropane	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
1,3-Dichloropropane	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
1,4-Dichlorobenzene	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
2,2-Dichloropropane	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
2-Chlorotoluene	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
2-Hexanone	mg/kg	0.05 UJ	0.05 U	0.05 U	0.05 UJ	0.05 U
3-Nitroaniline	mg/kg	0.25 U	0.25 U	0.5 U	0.25 U	0.25 U
4-Bromophenyl phenyl ether	mg/kg	0.1 U	0.1 U	0.2 U	0.1 U	0.1 U
4-Chlorophenyl phenyl ether	mg/kg	0.1 U	0.1 U	0.2 U	0.1 U	0.1 U
4-Chlorotoluene	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
4-Nitroaniline	mg/kg	0.25 U	0.25 U	0.5 U	0.25 U	0.25 U
Acetone	mg/kg	0.05 UJ	0.05 U	0.05 U	0.05 UJ	0.05 U
Acrylonitrile	mg/kg	0.05 UJ	0.05 U	0.05 U	0.05 UJ	0.05 U
bis(2-chloroisopropyl)ether	mg/kg	0.1 U	0.1 U	0.2 U	0.1 U	0.1 U

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	FS-01	FS-01	FS-01	FS-01	FS-02
	Sample ID	**FS01-2.5-031411**	**FS01-14-031411**	**FS01-24-031411**	**FS01-24.8-031411**	**FS02-2.5-031611**
	Depth	2.5-3.5 ft	14-15 ft	24-24.8 ft	24.8-25 ft	2.5-3.5 ft
	Date	03/14/2011	03/14/2011	03/14/2011	03/14/2011	03/16/2011
Other VOCs						
Bromobenzene	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
Bromochloromethane	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
Bromodichloromethane	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
Bromoform	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
Bromomethane	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
Carbon Disulfide	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
Carbon Tetrachloride	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
Chlorobenzene	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
Chloroethane	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
Chloroform	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
Chloromethane	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
cis-1,2-Dichloroethene	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
cis-1,3-Dichloropropene	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
Cymene	mg/kg	0.01 UJ	0.022	0.01 U	0.01 UJ	0.01 U
Dibromochloromethane	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
Dibromomethane	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
Dichlorodifluoromethane	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
Methyl Ethyl Ketone	mg/kg	0.05 UJ	0.05 U	0.05 U	0.05 UJ	0.05 U
Methyl Iso Butyl Ketone	mg/kg	0.05 UJ	0.05 U	0.05 U	0.05 UJ	0.05 U
Methylene chloride	mg/kg	0.02 UJ	0.02 U	0.02 U	0.02 UJ	0.02 U
Methyl-tert-butyl ether	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
n-Butylbenzene	mg/kg	0.01 UJ	0.025	0.01 U	0.01 UJ	0.01 U
Pyridine	mg/kg	0.2 U	0.2 U	0.4 U	0.2 U	0.2 U
sec-Butylbenzene	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
Styrene	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
tert-Butylbenzene	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
Tetrachloroethene	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
trans-1,2-Dichloroethene	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
trans-1,3-Dichloropropene	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
Trichloroethene	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
Trichlorofluoromethane	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
Vinyl Chloride	mg/kg	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U
Total Petroleum Hydrocarbons (TPH)						
Gasoline-Range Hydrocarbons	mg/kg	4.5 J	250 J	3 U	3 U	3 U
Diesel-Range Hydrocarbons	mg/kg	25 U	190	160	78	41
Oil-Range Hydrocarbons	mg/kg	270	50 U	72	50 U	110

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	FS-02	FS-03	FS-03	FS-04	FS-04
	Sample ID	**FS02-18-031611**	**FS03-1.5-031611**	**FS03-11-031611**	**FS04-5-031611**	**FS04-11.5-031611**
	Depth	18-19 ft	1.5-2.5 ft	11-12 ft	5-6 ft	11.5-12.5 ft
	Date	03/16/2011	03/16/2011	03/16/2011	03/16/2011	03/16/2011
Metals						
Arsenic	mg/kg	3.1	82	14	16	4.6
Cadmium	mg/kg	1 U	1.2	1 U	1 U	1 U
Calcium	mg/kg	5700	22000	13000	37000	16000
Chromium	mg/kg	32	49	40	48	42
Copper	mg/kg	19	460	160	95	15
Lead	mg/kg	4.8	120	37	31	5.8
Mercury	mg/kg	0.066	0.06	0.028	0.02 U	0.02 U
Nickel	mg/kg	35	72	24	46	36
Silver	mg/kg	0.39 U	0.33 U	0.36 U	0.33 U	0.35 U
Zinc	mg/kg	32	1500	250	180	37
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Benzo(a)pyrene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Benzo(b)fluoranthene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Benzo(k)fluoranthene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Benzofluoranthenes (total)	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Chrysene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Dibenzo(a,h)anthracene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Indeno(1,2,3-cd)pyrene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
cPAHs (MTCA TEQ-HalfND)	mg/kg	0.076 U	0.076 U	0.076 U	0.076 U	0.076 U
cPAHs (MTCA TEQ-ZeroND)	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAH	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1-Methylnaphthalene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2-Methylnaphthalene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Naphthalene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Acenaphthene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Acenaphthylene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Anthracene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Fluorene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Phenanthrene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Benzo(g,h,i)perylene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Total HPAH	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Fluoranthene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Pyrene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Other SVOCs						
1,2,4-Trichlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dichlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,3-Dichlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
2,3,4,6-Tetrachlorophenol	mg/kg	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	FS-02	FS-03	FS-03	FS-04	FS-04
	Sample ID	**FS02-18-031611**	**FS03-1.5-031611**	**FS03-11-031611**	**FS04-5-031611**	**FS04-11.5-031611**
	Depth	18-19 ft	1.5-2.5 ft	11-12 ft	5-6 ft	11.5-12.5 ft
	Date	03/16/2011	03/16/2011	03/16/2011	03/16/2011	03/16/2011
Other SVOCs						
2,4,5-Trichlorophenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2,4,6-Trichlorophenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2,4-Dichlorophenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2,4-Dimethylphenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2,4-Dinitrophenol	mg/kg	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2,4-Dinitrotoluene	mg/kg	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
2,6-Dichlorophenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2,6-Dinitrotoluene	mg/kg	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
2-Chloronaphthalene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2-Chlorophenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2-Methylphenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2-Nitroaniline	mg/kg	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
2-Nitrophenol	mg/kg	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
3,3'-Dichlorobenzidine	mg/kg	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4,6-Dinitro-o-cresol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4-Chloro-3-methylphenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4-Chloroaniline	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4-Nitrophenol	mg/kg	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Aniline	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Azobenzene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Benzoic Acid	mg/kg	1 U	1 U	1 U	1 U	1 U
Benzyl Alcohol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
bis(2-chloroethoxy)methane	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Bis(2-chloroethyl) Ether	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Bis(2-ethylhexyl) Phthalate	mg/kg	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
Butyl benzyl Phthalate	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Carbazole	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Dibenzofuran	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Diethylphthalate	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Dimethyl Phthalate	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Di-n-butyl Phthalate	mg/kg	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
Di-n-octyl phthalate	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Hexachlorobenzene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Hexachlorobutadiene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Hexachlorocyclopentadiene	mg/kg	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Hexachloroethane	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Isophorone	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
m,p-Cresol (2:1 ratio)	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nitrobenzene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
N-Nitrosodimethylamine	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
N-Nitroso-di-n-propylamine	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	FS-02	FS-03	FS-03	FS-04	FS-04
	Sample ID	**FS02-18-031611**	**FS03-1.5-031611**	**FS03-11-031611**	**FS04-5-031611**	**FS04-11.5-031611**
	Depth	18-19 ft	1.5-2.5 ft	11-12 ft	5-6 ft	11.5-12.5 ft
	Date	03/16/2011	03/16/2011	03/16/2011	03/16/2011	03/16/2011
Other SVOCs						
N-Nitrosodiphenylamine	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Pentachlorophenol	mg/kg	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Phenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH						
1,3,5-Trimethylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzene	mg/kg	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Ethylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Iso-propylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
n-Propylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Toluene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Xylene (meta & para)	mg/kg	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Xylene (ortho)	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Xylene (total)	mg/kg	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Other VOCs						
1,1,1,2-Tetrachloroethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,1,1-Trichloroethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,1,2,2-Tetrachloroethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,1,2-Trichloroethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,1-Dichloroethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,1-Dichloroethene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,1-Dichloropropene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2,3-Trichlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2,3-Trichloropropane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2,4-Trimethylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dibromo-3-chloropropane	mg/kg	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
1,2-Dibromoethane (EDB)	mg/kg	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
1,2-Dichloroethane (EDC)	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dichloropropane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,3-Dichloropropane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,4-Dichlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
2,2-Dichloropropane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
2-Chlorotoluene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
2-Hexanone	mg/kg	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
3-Nitroaniline	mg/kg	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
4-Bromophenyl phenyl ether	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4-Chlorophenyl phenyl ether	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4-Chlorotoluene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
4-Nitroaniline	mg/kg	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Acetone	mg/kg	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Acrylonitrile	mg/kg	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
bis(2-chloroisopropyl)ether	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	FS-02	FS-03	FS-03	FS-04	FS-04
	Sample ID	**FS02-18-031611**	**FS03-1.5-031611**	**FS03-11-031611**	**FS04-5-031611**	**FS04-11.5-031611**
	Depth	18-19 ft	1.5-2.5 ft	11-12 ft	5-6 ft	11.5-12.5 ft
	Date	03/16/2011	03/16/2011	03/16/2011	03/16/2011	03/16/2011
Other VOCs						
Bromobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Bromochloromethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Bromodichloromethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Bromoform	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Bromomethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Carbon Disulfide	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Carbon Tetrachloride	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chloroethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chloroform	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chloromethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
cis-1,2-Dichloroethene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
cis-1,3-Dichloropropene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Cymene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibromochloromethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibromomethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dichlorodifluoromethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Methyl Ethyl Ketone	mg/kg	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Methyl Iso Butyl Ketone	mg/kg	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Methylene chloride	mg/kg	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Methyl-tert-butyl ether	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
n-Butylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Pyridine	mg/kg	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
sec-Butylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Styrene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
tert-Butylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Tetrachloroethene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
trans-1,2-Dichloroethene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
trans-1,3-Dichloropropene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Trichloroethene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Trichlorofluoromethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Vinyl Chloride	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Total Petroleum Hydrocarbons (TPH)						
Gasoline-Range Hydrocarbons	mg/kg	3 U	3 U	3 U	3 U	3 U
Diesel-Range Hydrocarbons	mg/kg	25 U	44	25 U	25 U	25 U
Oil-Range Hydrocarbons	mg/kg	50 U	180	50 U	50 U	50 U

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	FS-05	FS-05	FS-06	FS-06	FS-07
	Sample ID	**FS05-2.5-031611**	**FS05-13-031611**	**FS06-2.5-031611**	**FS06-19-031611**	**FS07-2-031611**
	Depth	2.5-3.5 ft	13-14 ft	2.5-3.5 ft	19-20 ft	2-3 ft
	Date	03/16/2011	03/16/2011	03/16/2011	03/16/2011	03/16/2011
Metals						
Arsenic	mg/kg	3.2	2.2	4.1	3.7	2.7
Cadmium	mg/kg	1 U	1 U	1 U	1 U	1 U
Calcium	mg/kg	13000	5400	5000	8000	23000
Chromium	mg/kg	29	36	34	34	27
Copper	mg/kg	11	23	38	23	13
Lead	mg/kg	1.8	3	85	5.6	3.5
Mercury	mg/kg	0.021	0.025	0.058	0.034	0.02 U
Nickel	mg/kg	23	39	31	44	26
Silver	mg/kg	0.35 U	0.37 U	0.34 U	0.39 U	0.33 U
Zinc	mg/kg	23	38	120	32	180
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	mg/kg	0.1 U	0.1 U	0.52	0.1 U	0.1 U
Benzo(a)pyrene	mg/kg	0.1 U	0.1 U	0.62	0.1 U	0.1 U
Benzo(b)fluoranthene	mg/kg	0.1 U	0.1 U	0.49	0.1 U	0.1 U
Benzo(k)fluoranthene	mg/kg	0.1 U	0.1 U	0.61	0.1 U	0.1 U
Benzofluoranthenes (total)	mg/kg	0.1 U	0.1 U	1.1	0.1 U	0.1 U
Chrysene	mg/kg	0.1 U	0.1 U	0.67	0.1 U	0.1 U
Dibenzo(a,h)anthracene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Indeno(1,2,3-cd)pyrene	mg/kg	0.1 U	0.1 U	0.27	0.1 U	0.1 U
cPAHs (MTCA TEQ-HalfND)	mg/kg	0.076 U	0.076 U	0.82	0.076 U	0.076 U
cPAHs (MTCA TEQ-ZeroND)	mg/kg	0.1 U	0.1 U	0.82	0.1 U	0.1 U
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAH	mg/kg	0.1 U	0.1 U	1.3	0.1 U	0.1 U
1-Methylnaphthalene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2-Methylnaphthalene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Naphthalene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Acenaphthene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Acenaphthylene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Anthracene	mg/kg	0.1 U	0.1 U	0.15	0.1 U	0.1 U
Fluorene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Phenanthrene	mg/kg	0.1 U	0.1 U	1.1	0.1 U	0.1 U
Benzo(g,h,i)perylene	mg/kg	0.1 U	0.1 U	0.27	0.1 U	0.1 U
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Total HPAH	mg/kg	0.1 U	0.1 U	6.2	0.1 U	0.1 U
Fluoranthene	mg/kg	0.1 U	0.1 U	1.3	0.1 U	0.1 U
Pyrene	mg/kg	0.1 U	0.1 U	1.4	0.1 U	0.1 U
Other SVOCs						
1,2,4-Trichlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dichlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,3-Dichlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
2,3,4,6-Tetrachlorophenol	mg/kg	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	FS-05	FS-05	FS-06	FS-06	FS-07
	Sample ID	**FS05-2.5-031611**	**FS05-13-031611**	**FS06-2.5-031611**	**FS06-19-031611**	**FS07-2-031611**
	Depth	2.5-3.5 ft	13-14 ft	2.5-3.5 ft	19-20 ft	2-3 ft
	Date	03/16/2011	03/16/2011	03/16/2011	03/16/2011	03/16/2011
Other SVOCs						
2,4,5-Trichlorophenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2,4,6-Trichlorophenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2,4-Dichlorophenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2,4-Dimethylphenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2,4-Dinitrophenol	mg/kg	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2,4-Dinitrotoluene	mg/kg	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
2,6-Dichlorophenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2,6-Dinitrotoluene	mg/kg	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
2-Chloronaphthalene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2-Chlorophenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2-Methylphenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2-Nitroaniline	mg/kg	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
2-Nitrophenol	mg/kg	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
3,3'-Dichlorobenzidine	mg/kg	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4,6-Dinitro-o-cresol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4-Chloro-3-methylphenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4-Chloroaniline	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4-Nitrophenol	mg/kg	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Aniline	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Azobenzene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Benzoic Acid	mg/kg	1 U	1 U	1 U	1 U	1 U
Benzyl Alcohol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
bis(2-chloroethoxy)methane	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Bis(2-chloroethyl) Ether	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Bis(2-ethylhexyl) Phthalate	mg/kg	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
Butyl benzyl Phthalate	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Carbazole	mg/kg	0.1 U	0.1 U	0.18	0.1 U	0.1 U
Dibenzofuran	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Diethylphthalate	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Dimethyl Phthalate	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Di-n-butyl Phthalate	mg/kg	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
Di-n-octyl phthalate	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Hexachlorobenzene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Hexachlorobutadiene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Hexachlorocyclopentadiene	mg/kg	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Hexachloroethane	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Isophorone	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
m,p-Cresol (2:1 ratio)	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nitrobenzene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
N-Nitrosodimethylamine	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
N-Nitroso-di-n-propylamine	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	FS-05	FS-05	FS-06	FS-06	FS-07
	Sample ID	**FS05-2.5-031611**	**FS05-13-031611**	**FS06-2.5-031611**	**FS06-19-031611**	**FS07-2-031611**
	Depth	2.5-3.5 ft	13-14 ft	2.5-3.5 ft	19-20 ft	2-3 ft
	Date	03/16/2011	03/16/2011	03/16/2011	03/16/2011	03/16/2011
Other SVOCs						
N-Nitrosodiphenylamine	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Pentachlorophenol	mg/kg	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Phenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH						
1,3,5-Trimethylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzene	mg/kg	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Ethylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Iso-propylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
n-Propylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Toluene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Xylene (meta & para)	mg/kg	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Xylene (ortho)	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Xylene (total)	mg/kg	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Other VOCs						
1,1,1,2-Tetrachloroethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,1,1-Trichloroethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,1,2,2-Tetrachloroethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,1,2-Trichloroethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,1-Dichloroethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,1-Dichloroethene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,1-Dichloropropene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2,3-Trichlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2,3-Trichloropropane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2,4-Trimethylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dibromo-3-chloropropane	mg/kg	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
1,2-Dibromoethane (EDB)	mg/kg	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
1,2-Dichloroethane (EDC)	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dichloropropane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,3-Dichloropropane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,4-Dichlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
2,2-Dichloropropane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
2-Chlorotoluene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
2-Hexanone	mg/kg	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
3-Nitroaniline	mg/kg	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
4-Bromophenyl phenyl ether	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4-Chlorophenyl phenyl ether	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4-Chlorotoluene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
4-Nitroaniline	mg/kg	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Acetone	mg/kg	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Acrylonitrile	mg/kg	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
bis(2-chloroisopropyl)ether	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	FS-05	FS-05	FS-06	FS-06	FS-07
	Sample ID	**FS05-2.5-031611**	**FS05-13-031611**	**FS06-2.5-031611**	**FS06-19-031611**	**FS07-2-031611**
	Depth	2.5-3.5 ft	13-14 ft	2.5-3.5 ft	19-20 ft	2-3 ft
	Date	03/16/2011	03/16/2011	03/16/2011	03/16/2011	03/16/2011
Other VOCs						
Bromobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Bromochloromethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Bromodichloromethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Bromoform	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Bromomethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Carbon Disulfide	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Carbon Tetrachloride	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chloroethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chloroform	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chloromethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
cis-1,2-Dichloroethene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
cis-1,3-Dichloropropene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Cymene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibromochloromethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibromomethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dichlorodifluoromethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Methyl Ethyl Ketone	mg/kg	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Methyl Iso Butyl Ketone	mg/kg	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Methylene chloride	mg/kg	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Methyl-tert-butyl ether	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
n-Butylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Pyridine	mg/kg	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
sec-Butylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Styrene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
tert-Butylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Tetrachloroethene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
trans-1,2-Dichloroethene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
trans-1,3-Dichloropropene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Trichloroethene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Trichlorofluoromethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Vinyl Chloride	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Total Petroleum Hydrocarbons (TPH)						
Gasoline-Range Hydrocarbons	mg/kg	3 U	3 U	3 U	3 U	3 U
Diesel-Range Hydrocarbons	mg/kg	25 U	25 U	36	25 U	25 U
Oil-Range Hydrocarbons	mg/kg	50 U	50 U	50 U	50 U	50 U

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	FS-07	FS-08	FS-08	FS-09	FS-09
	Sample ID	**FS07-12.5-031611**	**FS08-2-031511**	**FS08-21-031511**	**FS09-8-031511**	**FS09-18.5-031511**
	Depth	12.5-13.5 ft	2-3 ft	21-22 ft	8-8.5 ft	18.5-20 ft
	Date	03/16/2011	03/15/2011	03/15/2011	03/15/2011	03/15/2011
Metals						
Arsenic	mg/kg	3.4	3.2	3.6	3.2	3.3
Cadmium	mg/kg	1 U	1 U	1 U	1 U	1 U
Calcium	mg/kg	5200	8600	14000	7900	27000
Chromium	mg/kg	37	69	31	45	33
Copper	mg/kg	19	23	18	24	15
Lead	mg/kg	1.9	1.9	1.9	2.6	6.3
Mercury	mg/kg	0.024	0.021	0.02 U	0.02 U	0.023
Nickel	mg/kg	40	54	40	53	26
Silver	mg/kg	0.37 U	0.33 U	0.36 U	0.34 U	0.38 U
Zinc	mg/kg	31	31	27	40	36
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	mg/kg	0.1 U	0.1 U	0.1 U	20	0.1 U
Benzo(a)pyrene	mg/kg	0.1 U	0.1 U	0.1 U	10 U	0.1 U
Benzo(b)fluoranthene	mg/kg	0.1 U	0.1 U	0.1 U	11	0.1 U
Benzo(k)fluoranthene	mg/kg	0.1 U	0.1 U	0.1 U	10 U	0.1 U
Benzofluoranthenes (total)	mg/kg	0.1 U	0.1 U	0.1 U	11	0.1 U
Chrysene	mg/kg	0.1 U	0.1 U	0.1 U	14	0.1 U
Dibenzo(a,h)anthracene	mg/kg	0.1 U	0.1 U	0.1 U	10 U	0.1 U
Indeno(1,2,3-cd)pyrene	mg/kg	0.1 U	0.1 U	0.1 U	10 U	0.1 U
cPAHs (MTCA TEQ-HalfND)	mg/kg	0.076 U	0.076 U	0.076 U	9.7	0.076 U
cPAHs (MTCA TEQ-ZeroND)	mg/kg	0.1 U	0.1 U	0.1 U	3.2	0.1 U
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAH	mg/kg	0.63	0.011	0.1 U	490	0.1 U
1-Methylnaphthalene	mg/kg	0.1 U	0.1 U	0.1 U	27	0.1 U
2-Methylnaphthalene	mg/kg	0.1 U	0.1 U	0.1 U	39	0.1 U
Naphthalene	mg/kg	0.01 U	0.011	0.01 U	160	0.01 U
Acenaphthene	mg/kg	0.41	0.1 U	0.1 U	70	0.1 U
Acenaphthylene	mg/kg	0.1 U	0.1 U	0.1 U	10 U	0.1 U
Anthracene	mg/kg	0.1 U	0.1 U	0.1 U	21	0.1 U
Fluorene	mg/kg	0.22	0.1 U	0.1 U	61	0.1 U
Phenanthrene	mg/kg	0.1 U	0.1 U	0.1 U	180	0.1 U
Benzo(g,h,i)perylene	mg/kg	0.1 U	0.1 U	0.1 U	10 U	0.1 U
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Total HPAH	mg/kg	0.1 U	0.1 U	0.1 U	220	0.1 U
Fluoranthene	mg/kg	0.1 U	0.1 U	0.1 U	110	0.1 U
Pyrene	mg/kg	0.1 U	0.1 U	0.1 U	68	0.1 U
Other SVOCs						
1,2,4-Trichlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
1,2-Dichlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
1,3-Dichlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
2,3,4,6-Tetrachlorophenol	mg/kg	0.25 U	0.25 U	0.25 U	25 U	0.25 U

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	FS-07	FS-08	FS-08	FS-09	FS-09
	Sample ID	**FS07-12.5-031611**	**FS08-2-031511**	**FS08-21-031511**	**FS09-8-031511**	**FS09-18.5-031511**
	Depth	12.5-13.5 ft	2-3 ft	21-22 ft	8-8.5 ft	18.5-20 ft
	Date	03/16/2011	03/15/2011	03/15/2011	03/15/2011	03/15/2011
Other SVOCs						
2,4,5-Trichlorophenol	mg/kg	0.1 U	0.1 U	0.1 U	10 U	0.1 U
2,4,6-Trichlorophenol	mg/kg	0.1 U	0.1 U	0.1 U	10 U	0.1 U
2,4-Dichlorophenol	mg/kg	0.1 U	0.1 U	0.1 U	10 U	0.1 U
2,4-Dimethylphenol	mg/kg	0.1 U	0.1 U	0.1 U	10 U	0.1 U
2,4-Dinitrophenol	mg/kg	0.5 U	0.5 U	0.5 U	50 U	0.5 U
2,4-Dinitrotoluene	mg/kg	0.25 U	0.25 U	0.25 U	25 U	0.25 U
2,6-Dichlorophenol	mg/kg	0.1 U	0.1 U	0.1 U	10 U	0.1 U
2,6-Dinitrotoluene	mg/kg	0.25 U	0.25 U	0.25 U	25 U	0.25 U
2-Chloronaphthalene	mg/kg	0.1 U	0.1 U	0.1 U	10 U	0.1 U
2-Chlorophenol	mg/kg	0.1 U	0.1 U	0.1 U	10 U	0.1 U
2-Methylphenol	mg/kg	0.1 U	0.1 U	0.1 U	10 U	0.1 U
2-Nitroaniline	mg/kg	0.25 U	0.25 U	0.25 U	25 U	0.25 U
2-Nitrophenol	mg/kg	0.25 U	0.25 U	0.25 U	25 U	0.25 U
3,3'-Dichlorobenzidine	mg/kg	0.5 U	0.33 U	0.5 U	33 U	0.37 U
4,6-Dinitro-o-cresol	mg/kg	0.1 U	0.1 U	0.1 U	10 U	0.1 U
4-Chloro-3-methylphenol	mg/kg	0.1 U	0.1 U	0.1 U	10 U	0.1 U
4-Chloroaniline	mg/kg	0.1 U	0.1 U	0.1 U	10 U	0.1 U
4-Nitrophenol	mg/kg	0.5 U	0.5 U	0.5 U	50 U	0.5 U
Aniline	mg/kg	0.1 U	0.1 U	0.1 U	10 U	0.1 U
Azobenzene	mg/kg	0.1 U	0.1 U	0.1 U	10 U	0.1 U
Benzoic Acid	mg/kg	1 U	1 U	1 U	100 U	1 U
Benzyl Alcohol	mg/kg	0.1 U	0.1 U	0.1 U	10 U	0.1 U
bis(2-chloroethoxy)methane	mg/kg	0.1 U	0.1 U	0.1 U	10 U	0.1 U
Bis(2-chloroethyl) Ether	mg/kg	0.1 U	0.1 U	0.1 U	10 U	0.1 U
Bis(2-ethylhexyl) Phthalate	mg/kg	0.13 U	0.13 U	0.13 U	13 U	0.13 U
Butyl benzyl Phthalate	mg/kg	0.1 U	0.1 U	0.1 U	10 U	0.1 U
Carbazole	mg/kg	0.35	0.1 U	0.1 U	11	0.1 U
Dibenzofuran	mg/kg	0.1 U	0.1 U	0.1 U	47	0.1 U
Diethylphthalate	mg/kg	0.1 U	0.1 U	0.1 U	10 U	0.1 U
Dimethyl Phthalate	mg/kg	0.1 U	0.1 U	0.1 U	10 U	0.1 U
Di-n-butyl Phthalate	mg/kg	0.13 U	0.13 U	0.13 U	13 U	0.13 U
Di-n-octyl phthalate	mg/kg	0.1 U	0.1 U	0.1 U	10 U	0.1 U
Hexachlorobenzene	mg/kg	0.1 U	0.1 U	0.1 U	10 U	0.1 U
Hexachlorobutadiene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
Hexachlorocyclopentadiene	mg/kg	0.5 U	0.5 U	0.5 U	50 U	0.5 U
Hexachloroethane	mg/kg	0.1 U	0.1 U	0.1 U	10 U	0.1 U
Isophorone	mg/kg	0.1 U	0.1 U	0.1 U	10 U	0.1 U
m,p-Cresol (2:1 ratio)	mg/kg	0.1 U	0.1 U	0.1 U	10 U	0.1 U
Nitrobenzene	mg/kg	0.1 U	0.1 U	0.1 U	10 U	0.1 U
N-Nitrosodimethylamine	mg/kg	0.1 U	0.1 U	0.1 U	10 U	0.1 U
N-Nitroso-di-n-propylamine	mg/kg	0.1 U	0.1 U	0.1 U	10 U	0.1 U

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	FS-07	FS-08	FS-08	FS-09	FS-09
	Sample ID	**FS07-12.5-031611**	**FS08-2-031511**	**FS08-21-031511**	**FS09-8-031511**	**FS09-18.5-031511**
	Depth	12.5-13.5 ft	2-3 ft	21-22 ft	8-8.5 ft	18.5-20 ft
	Date	03/16/2011	03/15/2011	03/15/2011	03/15/2011	03/15/2011
Other SVOCs						
N-Nitrosodiphenylamine	mg/kg	0.1 U	0.1 U	0.1 U	10 U	0.1 U
Pentachlorophenol	mg/kg	0.5 U	0.5 U	0.5 U	50 U	0.5 U
Phenol	mg/kg	0.1 U	0.1 U	0.1 U	10 U	0.1 U
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH						
1,3,5-Trimethylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
Benzene	mg/kg	0.005 U	0.005 U	0.005 U	0.005 UJ	0.005 U
Ethylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
Iso-propylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
n-Propylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
Toluene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
Xylene (meta & para)	mg/kg	0.02 U	0.02 U	0.02 U	0.02 UJ	0.02 U
Xylene (ortho)	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
Xylene (total)	mg/kg	0.02 U	0.02 U	0.02 U	0.02 UJ	0.02 U
Other VOCs						
1,1,1,2-Tetrachloroethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
1,1,1-Trichloroethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
1,1,2,2-Tetrachloroethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
1,1,2-Trichloroethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
1,1-Dichloroethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
1,1-Dichloroethene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
1,1-Dichloropropene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
1,2,3-Trichlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
1,2,3-Trichloropropane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
1,2,4-Trimethylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.035 J	0.01 U
1,2-Dibromo-3-chloropropane	mg/kg	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 U
1,2-Dibromoethane (EDB)	mg/kg	0.005 U	0.005 U	0.005 U	0.005 UJ	0.005 U
1,2-Dichloroethane (EDC)	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
1,2-Dichloropropane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
1,3-Dichloropropane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
1,4-Dichlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
2,2-Dichloropropane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
2-Chlorotoluene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
2-Hexanone	mg/kg	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 U
3-Nitroaniline	mg/kg	0.25 U	0.25 U	0.25 U	25 U	0.25 U
4-Bromophenyl phenyl ether	mg/kg	0.1 U	0.1 U	0.1 U	10 U	0.1 U
4-Chlorophenyl phenyl ether	mg/kg	0.1 U	0.1 U	0.1 U	10 U	0.1 U
4-Chlorotoluene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
4-Nitroaniline	mg/kg	0.25 U	0.25 U	0.25 U	25 U	0.25 U
Acetone	mg/kg	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 U
Acrylonitrile	mg/kg	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 U
bis(2-chloroisopropyl)ether	mg/kg	0.1 U	0.1 U	0.1 U	10 U	0.1 U

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	FS-07	FS-08	FS-08	FS-09	FS-09
	Sample ID	**FS07-12.5-031611**	**FS08-2-031511**	**FS08-21-031511**	**FS09-8-031511**	**FS09-18.5-031511**
	Depth	12.5-13.5 ft	2-3 ft	21-22 ft	8-8.5 ft	18.5-20 ft
	Date	03/16/2011	03/15/2011	03/15/2011	03/15/2011	03/15/2011
Other VOCs						
Bromobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
Bromochloromethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
Bromodichloromethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
Bromoform	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
Bromomethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
Carbon Disulfide	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
Carbon Tetrachloride	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
Chlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
Chloroethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
Chloroform	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
Chloromethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
cis-1,2-Dichloroethene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
cis-1,3-Dichloropropene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
Cymene	mg/kg	0.01 U	0.01 U	0.01 U	0.015 J	0.01 U
Dibromochloromethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
Dibromomethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
Dichlorodifluoromethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
Methyl Ethyl Ketone	mg/kg	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 U
Methyl Iso Butyl Ketone	mg/kg	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 U
Methylene chloride	mg/kg	0.02 U	0.02 U	0.02 U	0.02 UJ	0.02 U
n-Butylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.039 J	0.01 U
Methyl-tert-butyl ether	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
Pyridine	mg/kg	0.2 U	0.2 U	0.2 U	20 U	0.2 U
sec-Butylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
Styrene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
tert-Butylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
Tetrachloroethene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
trans-1,2-Dichloroethene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
trans-1,3-Dichloropropene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
Trichloroethene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
Trichlorofluoromethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
Vinyl Chloride	mg/kg	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
Total Petroleum Hydrocarbons (TPH)						
Gasoline-Range Hydrocarbons	mg/kg	3 U	3 U	3 U	28 U	3 U
Diesel-Range Hydrocarbons	mg/kg	25 U	25 U	25 U	5300	25 U
Oil-Range Hydrocarbons	mg/kg	50 U	50 U	50 U	520 J	50 U

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	FS-09A	FS-09A(2)	FS-09A(2)	FS-09B	FS-09C
	Sample ID	**FS09A-6-031711**	**FS09A(2)-5-031711**	**FS09A(2)-14-031711**	**FS09B-15-031711**	**FS09C-8.5-031711**
	Depth	6-7 ft	5-6 ft	14-15 ft	14-15 ft	8.5-9.5 ft
	Date	03/17/2011	03/17/2011	03/17/2011	03/17/2011	03/17/2011
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	mg/kg	0.23 J	0.1 UJ	0.1 UJ	0.1 UJ	6 J
Benzo(a)pyrene	mg/kg	0.47 J	0.1 UJ	0.1 UJ	0.1 UJ	2.6 J
Benzo(b)fluoranthene	mg/kg	0.57 J	0.1 UJ	0.1 UJ	0.1 UJ	2.6 J
Benzo(k)fluoranthene	mg/kg	0.28 J	0.1 UJ	0.1 UJ	0.1 UJ	2.8 J
Benzofluoranthenes (total)	mg/kg	0.85 J	0.1 UJ	0.1 UJ	0.1 UJ	5.4 J
Chrysene	mg/kg	0.64 J	0.1 UJ	0.1 UJ	0.1 UJ	4.1 J
Dibenzo(a,h)anthracene	mg/kg	0.12 J	0.1 UJ	0.1 UJ	0.1 UJ	1 UJ
Indeno(1,2,3-cd)pyrene	mg/kg	0.26 J	0.1 UJ	0.1 UJ	0.1 UJ	1 UJ
cPAHs (MTCA TEQ-HalfND)	mg/kg	0.62 J	0.076 UJ	0.076 UJ	0.076 UJ	3.9 J
cPAHs (MTCA TEQ-ZeroND)	mg/kg	0.62 J	0.1 UJ	0.1 UJ	0.1 UJ	3.8 J
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAH	mg/kg	7.2 J	0.1 UJ	0.47 J	0.13 J	170 J
1-Methylnaphthalene	mg/kg	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	25 J
2-Methylnaphthalene	mg/kg	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	38 J
Naphthalene	mg/kg	6.9 J	0.01 UJ	0.01 UJ	0.01 UJ	40 J
Acenaphthene	mg/kg	0.14 J	0.1 UJ	0.3 J	0.13 J	29 J
Acenaphthylene	mg/kg	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	1 UJ
Anthracene	mg/kg	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	6.1 J
Fluorene	mg/kg	0.1 UJ	0.1 UJ	0.17 J	0.1 UJ	28 J
Phenanthrene	mg/kg	0.13 J	0.1 UJ	0.1 UJ	0.1 UJ	71 J
Benzo(g,h,i)perylene	mg/kg	0.29 J	0.1 UJ	0.1 UJ	0.1 UJ	1 UJ
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Total HPAH	mg/kg	3 J	0.1 UJ	0.1 UJ	0.1 UJ	72 J
Fluoranthene	mg/kg	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	31 J
Pyrene	mg/kg	0.17 J	0.1 UJ	0.1 UJ	0.1 UJ	23 J
Other SVOCs						
1,2,4-Trichlorobenzene	mg/kg	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
1,2-Dichlorobenzene	mg/kg	0.011 J	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
1,3-Dichlorobenzene	mg/kg	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
2,3,4,6-Tetrachlorophenol	mg/kg	0.25 UJ	0.25 UJ	0.25 UJ	0.25 UJ	2.5 UJ
2,4,5-Trichlorophenol	mg/kg	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	1 UJ
2,4,6-Trichlorophenol	mg/kg	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	1 UJ
2,4-Dichlorophenol	mg/kg	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	1 UJ
2,4-Dimethylphenol	mg/kg	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	1 UJ
2,4-Dinitrophenol	mg/kg	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	5 UJ
2,4-Dinitrotoluene	mg/kg	0.25 UJ	0.25 UJ	0.25 UJ	0.25 UJ	2.5 UJ
2,6-Dichlorophenol	mg/kg	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	1 UJ
2,6-Dinitrotoluene	mg/kg	0.25 UJ	0.25 UJ	0.25 UJ	0.25 UJ	2.5 UJ
2-Chloronaphthalene	mg/kg	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	1 UJ
2-Chlorophenol	mg/kg	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	1 UJ
2-Methylphenol	mg/kg	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	1 UJ

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	FS-09A	FS-09A(2)	FS-09A(2)	FS-09B	FS-09C
	Sample ID	**FS09A-6-031711**	**FS09A(2)-5-031711**	**FS09A(2)-14-031711**	**FS09B-15-031711**	**FS09C-8.5-031711**
	Depth	6-7 ft	5-6 ft	14-15 ft	14-15 ft	8.5-9.5 ft
	Date	03/17/2011	03/17/2011	03/17/2011	03/17/2011	03/17/2011
Other SVOCs						
2-Nitroaniline	mg/kg	0.25 UJ	0.25 UJ	0.25 UJ	0.25 UJ	2.5 UJ
2-Nitrophenol	mg/kg	0.25 UJ	0.25 UJ	0.25 UJ	0.25 UJ	2.5 UJ
3,3'-Dichlorobenzidine	mg/kg	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	5 UJ
4,6-Dinitro-o-cresol	mg/kg	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	1.7 J
4-Chloro-3-methylphenol	mg/kg	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	1 UJ
4-Chloroaniline	mg/kg	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	1 UJ
4-Nitrophenol	mg/kg	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	5 UJ
Aniline	mg/kg	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	1 UJ
Azobenzene	mg/kg	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	1 UJ
Benzoic Acid	mg/kg	1 UJ	1 UJ	1 UJ	1 UJ	10 UJ
Benzyl Alcohol	mg/kg	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	1 UJ
bis(2-chloroethoxy)methane	mg/kg	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	1 UJ
Bis(2-chloroethyl) Ether	mg/kg	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	1 UJ
Bis(2-ethylhexyl) Phthalate	mg/kg	0.13 UJ	0.13 UJ	0.13 UJ	0.13 UJ	1.3 UJ
Butyl benzyl Phthalate	mg/kg	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	1 UJ
Carbazole	mg/kg	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	3.9 J
Dibenzofuran	mg/kg	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	20 J
Diethylphthalate	mg/kg	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	1 UJ
Dimethyl Phthalate	mg/kg	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	1 UJ
Di-n-butyl Phthalate	mg/kg	0.13 UJ	0.13 UJ	0.13 UJ	0.13 UJ	1.3 UJ
Di-n-octyl phthalate	mg/kg	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	1 UJ
Hexachlorobenzene	mg/kg	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	1 UJ
Hexachlorobutadiene	mg/kg	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
Hexachlorocyclopentadiene	mg/kg	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	5 UJ
Hexachloroethane	mg/kg	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	1 UJ
Isophorone	mg/kg	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	1 UJ
m,p-Cresol (2:1 ratio)	mg/kg	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	1 UJ
Nitrobenzene	mg/kg	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	1 UJ
N-Nitrosodimethylamine	mg/kg	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	1 UJ
N-Nitroso-di-n-propylamine	mg/kg	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	1 UJ
N-Nitrosodiphenylamine	mg/kg	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	1.9 J
Pentachlorophenol	mg/kg	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	5 UJ
Phenol	mg/kg	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	1 UJ
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH						
1,3,5-Trimethylbenzene	mg/kg	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
Benzene	mg/kg	0.005 UJ	0.005 UJ	0.005 UJ	0.005 UJ	0.005 UJ
Ethylbenzene	mg/kg	0.014 J	0.01 UJ	0.01 UJ	0.01 UJ	0.037 J
Iso-propylbenzene	mg/kg	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.053 J
n-Propylbenzene	mg/kg	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.05 J
Toluene	mg/kg	0.033 J	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
Xylene (meta & para)	mg/kg	0.042 J	0.02 UJ	0.02 UJ	0.02 UJ	0.05 J

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	FS-09A	FS-09A(2)	FS-09A(2)	FS-09B	FS-09C
	Sample ID	**FS09A-6-031711**	**FS09A(2)-5-031711**	**FS09A(2)-14-031711**	**FS09B-15-031711**	**FS09C-8.5-031711**
	Depth	6-7 ft	5-6 ft	14-15 ft	14-15 ft	8.5-9.5 ft
	Date	03/17/2011	03/17/2011	03/17/2011	03/17/2011	03/17/2011
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH						
Xylene (ortho)	mg/kg	0.019 J	0.01 UJ	0.01 UJ	0.01 UJ	0.058 J
Xylene (total)	mg/kg	0.061 J	0.02 UJ	0.02 UJ	0.02 UJ	0.11 J
Other VOCs						
1,1,1,2-Tetrachloroethane	mg/kg	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
1,1,1-Trichloroethane	mg/kg	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
1,1,2,2-Tetrachloroethane	mg/kg	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
1,1,2-Trichloroethane	mg/kg	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
1,1-Dichloroethane	mg/kg	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
1,1-Dichloroethene	mg/kg	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
1,1-Dichloropropene	mg/kg	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
1,2,3-Trichlorobenzene	mg/kg	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
1,2,3-Trichloropropane	mg/kg	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
1,2,4-Trimethylbenzene	mg/kg	0.027 J	0.01 UJ	0.01 UJ	0.01 UJ	0.51 J
1,2-Dibromo-3-chloropropane	mg/kg	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
1,2-Dibromoethane (EDB)	mg/kg	0.005 UJ	0.005 UJ	0.005 UJ	0.005 UJ	0.005 UJ
1,2-Dichloroethane (EDC)	mg/kg	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
1,2-Dichloropropane	mg/kg	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
1,3-Dichloropropane	mg/kg	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
1,4-Dichlorobenzene	mg/kg	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
2,2-Dichloropropane	mg/kg	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
2-Chlorotoluene	mg/kg	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
2-Hexanone	mg/kg	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
3-Nitroaniline	mg/kg	0.25 UJ	0.25 UJ	0.25 UJ	0.25 UJ	2.5 UJ
4-Bromophenyl phenyl ether	mg/kg	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	1 UJ
4-Chlorophenyl phenyl ether	mg/kg	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	1 UJ
4-Chlorotoluene	mg/kg	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
4-Nitroaniline	mg/kg	0.25 UJ	0.25 UJ	0.25 UJ	0.25 UJ	2.5 UJ
Acetone	mg/kg	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Acrylonitrile	mg/kg	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
bis(2-chloroisopropyl)ether	mg/kg	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	1 UJ
Bromobenzene	mg/kg	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
Bromochloromethane	mg/kg	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
Bromodichloromethane	mg/kg	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
Bromoform	mg/kg	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
Bromomethane	mg/kg	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
Carbon Disulfide	mg/kg	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
Carbon Tetrachloride	mg/kg	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
Chlorobenzene	mg/kg	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
Chloroethane	mg/kg	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
Chloroform	mg/kg	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
Chloromethane	mg/kg	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ

Table C.9
Chemistry Data for Soil Samples

		Event	RI/FS Round 1 Sampling (Floyd|Snider)				
		Location	FS-09A	FS-09A(2)	FS-09A(2)	FS-09B	FS-09C
		Sample ID	**FS09A-6-031711**	**FS09A(2)-5-031711**	**FS09A(2)-14-031711**	**FS09B-15-031711**	**FS09C-8.5-031711**
		Depth	6-7 ft	5-6 ft	14-15 ft	14-15 ft	8.5-9.5 ft
		Date	03/17/2011	03/17/2011	03/17/2011	03/17/2011	03/17/2011
Other VOCs							
cis-1,2-Dichloroethene	mg/kg		0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
cis-1,3-Dichloropropene	mg/kg		0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
Cymene	mg/kg		0.061 J	0.01 UJ	0.01 UJ	0.01 UJ	0.27 J
Dibromochloromethane	mg/kg		0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
Dibromomethane	mg/kg		0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
Dichlorodifluoromethane	mg/kg		0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
Methyl Ethyl Ketone	mg/kg		0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Methyl Iso Butyl Ketone	mg/kg		0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Methylene chloride	mg/kg		0.02 UJ	0.02 UJ	0.02 UJ	0.02 UJ	0.02 UJ
Methyl-tert-butyl ether	mg/kg		0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
n-Butylbenzene	mg/kg		0.056 J	0.01 UJ	0.01 UJ	0.01 UJ	0.31 J
Pyridine	mg/kg		0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	2 UJ
sec-Butylbenzene	mg/kg		0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
Styrene	mg/kg		0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
tert-Butylbenzene	mg/kg		0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
Tetrachloroethene	mg/kg		0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
trans-1,2-Dichloroethene	mg/kg		0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
trans-1,3-Dichloropropene	mg/kg		0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
Trichloroethene	mg/kg		0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
Trichlorofluoromethane	mg/kg		0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
Vinyl Chloride	mg/kg		0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ
Total Petroleum Hydrocarbons (TPH)							
Gasoline-Range Hydrocarbons	mg/kg		3 UJ	3 UJ	3 UJ	3 U	180 UJ
Diesel-Range Hydrocarbons	mg/kg		25 UJ	25 UJ	25 UJ	25 UJ	3700 J
Oil-Range Hydrocarbons	mg/kg		50 UJ	50 UJ	50 UJ	50 UJ	100 UJ

Table C.9
Chemistry Data for Soil Samples

		Event	RI/FS Round 1 Sampling (Floyd|Snider)				
		Location	FS-09D	FS-10	FS-10	FS-11	FS-11
		Sample ID	**FS09D-5-031711**	**FS10-2-031511**	**FS10-14-031511**	**FS11-2-031411**	**FS11-12.5-031411**
		Depth	5-6 ft	2-3 ft	13-14 ft	1-2 ft	12.5-13.5 ft
		Date	03/17/2011	03/15/2011	03/15/2011	03/14/2011	03/14/2011
Metals							
Arsenic	mg/kg			3.4	9.2	7.2	4
Cadmium	mg/kg			1 U	1 U	1 U	1 U
Calcium	mg/kg			4700	6500	9700	9500
Chromium	mg/kg			58	36	65	48
Copper	mg/kg			24	22	310	32
Lead	mg/kg			2.4	2.9	35	4.4
Mercury	mg/kg			0.039	0.03	0.48	0.026
Nickel	mg/kg			53	42	59	61
Silver	mg/kg			0.36 U	0.38 U	0.39 U	0.38 U
Zinc	mg/kg			33	32	250	48
Organometallics							
Tributyltin	mg/kg			0.0094 UY	0.0036 U	1.3	0.0034 U
Polychlorinated Biphenyls (PCBs)							
Aroclor 1016	mg/kg			0.0038 U	0.0038 U	0.0039 U	0.0039 U
Aroclor 1221	mg/kg			0.0038 U	0.0038 U	0.0039 U	0.0039 U
Aroclor 1232	mg/kg			0.0038 U	0.0038 U	0.0039 U	0.0039 U
Aroclor 1242	mg/kg			0.0038 U	0.0038 U	0.0039 U	0.0039 U
Aroclor 1248	mg/kg			0.0038 U	0.0038 U	0.072	0.0039 U
Aroclor 1254	mg/kg			0.0044	0.0038 U	0.092	0.0039 U
Aroclor 1260	mg/kg			0.0038 U	0.0038 U	0.035	0.0039 U
Aroclor 1268	mg/kg			0.0038 U	0.0038 U	0.0039 U	0.0039 U
PCBs (Total, Aroclors)	mg/kg			0.0044	0.0038 U	0.2	0.0039 U
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
Benz(a)anthracene	mg/kg		0.2 UJ		0.1 U	0.29 J	0.1 U
Benzo(a)pyrene	mg/kg		0.2 UJ		0.1 U	0.39 J	0.1 U
Benzo(b)fluoranthene	mg/kg		0.2 UJ		0.1 U	0.36 J	0.1 U
Benzo(k)fluoranthene	mg/kg		0.2 UJ		0.1 U	0.29 J	0.1 U
Benzofluoranthenes (total)	mg/kg		0.2 UJ		0.1 U	0.65 J	0.1 U
Chrysene	mg/kg		0.2 UJ		0.1 U	0.37 J	0.1 U
Dibenzo(a,h)anthracene	mg/kg		0.2 UJ		0.1 U	0.2 U	0.1 U
Indeno(1,2,3-cd)pyrene	mg/kg		0.2 UJ		0.1 U	0.24 J	0.1 U
cPAHs (MTCA TEQ-HalfND)	mg/kg		0.15 UJ		0.076 U	0.52 J	0.076 U
cPAHs (MTCA TEQ-ZeroND)	mg/kg		0.2 UJ		0.1 U	0.51 J	0.1 U
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Total LPAH	mg/kg		1.1 J		0.1 U	7.6 J	0.1 U
1-Methylnaphthalene	mg/kg		0.2 UJ		0.1 U	3.8 J	0.1 U
2-Methylnaphthalene	mg/kg		0.2 UJ		0.1 U	0.2 U	0.1 U
Naphthalene	mg/kg		0.011 J		0.01 U	1.3	0.01 U
Acenaphthene	mg/kg		0.2 UJ		0.1 U	0.98 J	0.1 U
Acenaphthylene	mg/kg		0.2 UJ		0.1 U	0.2 U	0.1 U
Anthracene	mg/kg		0.2 UJ		0.1 U	0.36 J	0.1 U

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	FS-09D	FS-10	FS-10	FS-11	FS-11
	Sample ID	**FS09D-5-031711**	**FS10-2-031511**	**FS10-14-031511**	**FS11-2-031411**	**FS11-12.5-031411**
	Depth	5-6 ft	2-3 ft	13-14 ft	1-2 ft	12.5-13.5 ft
	Date	03/17/2011	03/15/2011	03/15/2011	03/14/2011	03/14/2011
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Fluorene	mg/kg	0.86 J		0.1 U	1.5 J	0.1 U
Phenanthrene	mg/kg	0.22 J		0.1 U	3.5 J	0.1 U
Benzo(g,h,i)perylene	mg/kg	0.2 UJ		0.1 U	0.24 J	0.1 U
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Total HPAH	mg/kg	0.2 UJ		0.1 U	3.9 J	0.1 U
Fluoranthene	mg/kg	0.2 UJ		0.1 U	0.72 J	0.1 U
Pyrene	mg/kg	0.2 UJ		0.1 U	0.99 J	0.1 U
Other SVOCs						
1,2,4-Trichlorobenzene	mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U
1,2-Dichlorobenzene	mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U
1,3-Dichlorobenzene	mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U
2,3,4,6-Tetrachlorophenol	mg/kg	0.5 UJ		0.25 U	0.5 UJ	0.25 U
2,4,5-Trichlorophenol	mg/kg	0.2 UJ		0.1 U	0.2 UJ	0.1 U
2,4,6-Trichlorophenol	mg/kg	0.2 UJ		0.1 U	0.2 UJ	0.1 U
2,4-Dichlorophenol	mg/kg	0.2 UJ		0.1 U	0.2 UJ	0.1 U
2,4-Dimethylphenol	mg/kg	0.2 UJ		0.1 U	0.2 UJ	0.1 U
2,4-Dinitrophenol	mg/kg	1 UJ		0.5 U	1 UJ	0.5 U
2,4-Dinitrotoluene	mg/kg	0.5 UJ		0.25 U	0.5 U	0.25 U
2,6-Dichlorophenol	mg/kg	0.2 UJ		0.1 U	0.2 UJ	0.1 U
2,6-Dinitrotoluene	mg/kg	0.5 UJ		0.25 U	0.5 U	0.25 U
2-Chloronaphthalene	mg/kg	0.2 UJ		0.1 U	0.2 U	0.1 U
2-Chlorophenol	mg/kg	0.2 UJ		0.1 U	0.2 UJ	0.1 U
2-Methylphenol	mg/kg	0.2 UJ		0.1 U	0.2 UJ	0.1 U
2-Nitroaniline	mg/kg	0.5 UJ		0.25 U	0.5 U	0.25 U
2-Nitrophenol	mg/kg	0.5 UJ		0.25 U	0.5 UJ	0.25 U
3,3'-Dichlorobenzidine	mg/kg	1 UJ		0.5 U	0.76 U	0.36 U
4,6-Dinitro-o-cresol	mg/kg	0.2 UJ		0.1 U	0.2 UJ	0.1 U
4-Chloro-3-methylphenol	mg/kg	0.2 UJ		0.1 U	0.2 UJ	0.1 U
4-Chloroaniline	mg/kg	0.2 UJ		0.1 U	0.2 U	0.1 U
4-Nitrophenol	mg/kg	1 UJ		0.5 U	1 UJ	0.5 U
Aniline	mg/kg	0.2 UJ		0.1 U	0.2 U	0.1 U
Azobenzene	mg/kg	0.2 UJ		0.1 U	0.2 U	0.1 U
Benzoic Acid	mg/kg	2 UJ		1 U	2 UJ	1 U
Benzyl Alcohol	mg/kg	0.2 UJ		0.1 U	0.2 UJ	0.1 U
bis(2-chloroethoxy)methane	mg/kg	0.2 UJ		0.1 U	0.2 U	0.1 U
Bis(2-chloroethyl) Ether	mg/kg	0.2 UJ		0.1 U	0.2 U	0.1 U
Bis(2-ethylhexyl) Phthalate	mg/kg	0.26 UJ		0.13 U	0.26 U	0.13 U
Butyl benzyl Phthalate	mg/kg	0.2 UJ		0.1 U	0.2 U	0.1 U
Carbazole	mg/kg	0.2 UJ		0.1 U	0.2 U	0.1 U
Dibenzofuran	mg/kg	0.2 UJ		0.1 U	0.57 J	0.1 U
Diethylphthalate	mg/kg	0.2 UJ		0.1 U	0.2 U	0.1 U

Table C.9
Chemistry Data for Soil Samples

	Event		RI/FS Round 1 Sampling (Floyd|Snider)				
	Location		FS-09D	FS-10	FS-10	FS-11	FS-11
	Sample ID		**FS09D-5-031711**	**FS10-2-031511**	**FS10-14-031511**	**FS11-2-031411**	**FS11-12.5-031411**
	Depth		5-6 ft	2-3 ft	13-14 ft	1-2 ft	12.5-13.5 ft
	Date		03/17/2011	03/15/2011	03/15/2011	03/14/2011	03/14/2011
Other SVOCs							
Dimethyl Phthalate		mg/kg	0.2 UJ		0.1 U	0.2 U	0.1 U
Di-n-butyl Phthalate		mg/kg	0.26 UJ		0.13 U	0.26 U	0.13 U
Di-n-octyl phthalate		mg/kg	0.2 UJ		0.1 U	0.2 U	0.1 U
Hexachlorobenzene		mg/kg	0.2 UJ		0.1 U	0.2 U	0.1 U
Hexachlorobutadiene		mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U
Hexachlorocyclopentadiene		mg/kg	1 UJ		0.5 U	1 U	0.5 U
Hexachloroethane		mg/kg	0.2 UJ		0.1 U	0.2 U	0.1 U
Isophorone		mg/kg	0.2 UJ		0.1 U	0.2 U	0.1 U
m,p-Cresol (2:1 ratio)		mg/kg	0.2 UJ		0.1 U	0.2 UJ	0.1 U
Nitrobenzene		mg/kg	0.2 UJ		0.1 U	0.2 U	0.1 U
N-Nitrosodimethylamine		mg/kg	0.2 UJ		0.1 U	0.2 U	0.1 U
N-Nitroso-di-n-propylamine		mg/kg	0.2 UJ		0.1 U	0.2 U	0.1 U
N-Nitrosodiphenylamine		mg/kg	0.46 J		0.1 U	0.2 U	0.1 U
Pentachlorophenol		mg/kg	1 UJ		0.5 U	1 UJ	0.5 U
Phenol		mg/kg	0.2 UJ		0.1 U	0.2 UJ	0.1 U
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH							
1,3,5-Trimethylbenzene		mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U
Benzene		mg/kg	0.005 UJ		0.005 U	0.005 U	0.005 U
Ethylbenzene		mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U
Iso-propylbenzene		mg/kg	0.01 UJ		0.01 U	0.04	0.01 U
n-Propylbenzene		mg/kg	0.01 UJ		0.01 U	0.43	0.01 U
Toluene		mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U
Xylene (meta & para)		mg/kg	0.02 UJ		0.02 U	0.02 U	0.02 U
Xylene (ortho)		mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U
Xylene (total)		mg/kg	0.02 UJ		0.02 U	0.02 U	0.02 U
Other VOCs							
1,1,1,2-Tetrachloroethane		mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U
1,1,1-Trichloroethane		mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U
1,1,2,2-Tetrachloroethane		mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U
1,1,2-Trichloroethane		mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U
1,1-Dichloroethane		mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U
1,1-Dichloroethene		mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U
1,1-Dichloropropene		mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U
1,2,3-Trichlorobenzene		mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U
1,2,3-Trichloropropane		mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U
1,2,4-Trimethylbenzene		mg/kg	0.01 UJ		0.01 U	2.8	0.01 U
1,2-Dibromo-3-chloropropane		mg/kg	0.05 UJ		0.05 U	0.05 U	0.05 U
1,2-Dibromoethane (EDB)		mg/kg	0.005 UJ		0.005 U	0.005 U	0.005 U
1,2-Dichloroethane (EDC)		mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U
1,2-Dichloropropane		mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U
1,3-Dichloropropane		mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U

Table C.9
Chemistry Data for Soil Samples

	Event		RI/FS Round 1 Sampling (Floyd|Snider)				
	Location		FS-09D	FS-10	FS-10	FS-11	FS-11
	Sample ID		**FS09D-5-031711**	**FS10-2-031511**	**FS10-14-031511**	**FS11-2-031411**	**FS11-12.5-031411**
	Depth		5-6 ft	2-3 ft	13-14 ft	1-2 ft	12.5-13.5 ft
	Date		03/17/2011	03/15/2011	03/15/2011	03/14/2011	03/14/2011
Other VOCs							
1,4-Dichlorobenzene		mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U
2,2-Dichloropropane		mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U
2-Chlorotoluene		mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U
2-Hexanone		mg/kg	0.05 UJ		0.05 U	0.05 U	0.05 U
3-Nitroaniline		mg/kg	0.5 UJ		0.25 U	0.5 U	0.25 U
4-Bromophenyl phenyl ether		mg/kg	0.2 UJ		0.1 U	0.2 U	0.1 U
4-Chlorophenyl phenyl ether		mg/kg	0.2 UJ		0.1 U	0.2 U	0.1 U
4-Chlorotoluene		mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U
4-Nitroaniline		mg/kg	0.5 UJ		0.25 U	0.5 U	0.25 U
Acetone		mg/kg	0.05 UJ		0.05 U	0.05 U	0.05 U
Acrylonitrile		mg/kg	0.05 UJ		0.05 U	0.05 U	0.05 U
bis(2-chloroisopropyl)ether		mg/kg	0.2 UJ		0.1 U	0.2 U	0.1 U
Bromobenzene		mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U
Bromochloromethane		mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U
Bromodichloromethane		mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U
Bromoform		mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U
Bromomethane		mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U
Carbon Disulfide		mg/kg	0.01 UJ		0.01 U	0.054	0.01 U
Carbon Tetrachloride		mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U
Chlorobenzene		mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U
Chloroethane		mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U
Chloroform		mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U
Chloromethane		mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U
cis-1,2-Dichloroethene		mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U
cis-1,3-Dichloropropene		mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U
Cymene		mg/kg	0.01 UJ		0.01 U	0.051	0.01 U
Dibromochloromethane		mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U
Dibromomethane		mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U
Dichlorodifluoromethane		mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U
Methyl Ethyl Ketone		mg/kg	0.05 UJ		0.05 U	0.05 U	0.05 U
Methyl Iso Butyl Ketone		mg/kg	0.05 UJ		0.05 U	0.05 U	0.05 U
Methylene chloride		mg/kg	0.02 UJ		0.02 U	0.02 U	0.02 U
Methyl-tert-butyl ether		mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U
n-Butylbenzene		mg/kg	0.01 J		0.01 U	1.1	0.01 U
Pyridine		mg/kg	0.4 UJ		0.2 U	0.4 U	0.2 U
sec-Butylbenzene		mg/kg	0.016 J		0.01 U	0.71	0.01 U
Styrene		mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U
tert-Butylbenzene		mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U
Tetrachloroethene		mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U
trans-1,2-Dichloroethene		mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U
trans-1,3-Dichloropropene		mg/kg	0.01 UJ		0.01 U	0.01 U	0.01 U

Table C.9
Chemistry Data for Soil Samples

		Event	RI/FS Round 1 Sampling (Floyd|Snider)				
		Location	FS-09D	FS-10	FS-10	FS-11	FS-11
		Sample ID	**FS09D-5-031711**	**FS10-2-031511**	**FS10-14-031511**	**FS11-2-031411**	**FS11-12.5-031411**
		Depth	5-6 ft	2-3 ft	13-14 ft	1-2 ft	12.5-13.5 ft
		Date	03/17/2011	03/15/2011	03/15/2011	03/14/2011	03/14/2011
Other VOCs							
Trichloroethene	mg/kg		0.01 UJ		0.01 U	0.01 U	0.01 U
Trichlorofluoromethane	mg/kg		0.01 UJ		0.01 U	0.01 U	0.01 U
Vinyl Chloride	mg/kg		0.01 UJ		0.01 U	0.01 U	0.01 U
Total Petroleum Hydrocarbons (TPH)							
Gasoline-Range Hydrocarbons	mg/kg		37 UJ		3 U	150 U	3 U
Diesel-Range Hydrocarbons	mg/kg		1700 J		25 U	5700	25 U
Oil-Range Hydrocarbons	mg/kg		50 UJ		50 U	1200	50 U

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	FS-12	FS-12	FS-12	FS-13	FS-13
	Sample ID	**FS12-2-031411**	**FS12-17-031411**	**FS12A-17-031411**	**FS13-4-031511**	**FS13-16-031511**
	Depth	2-3 ft	17-18 ft	17-18 ft	4-5 ft	16-17 ft
	Date	03/14/2011	03/14/2011	03/14/2011	03/15/2011	03/15/2011
Metals						
Arsenic	mg/kg	61	5.1	4.4	45	3.1
Cadmium	mg/kg	1.5	1 U	1 U	1 U	1 U
Calcium	mg/kg	6200	12000	9200	6500	16000
Chromium	mg/kg	69	45	68	60	46
Copper	mg/kg	410	21	30	370	21
Lead	mg/kg	690	2.9	2.8	170	2.6
Mercury	mg/kg	1.4	0.028	0.028	2.7	0.027
Nickel	mg/kg	65	57	80	52	69
Silver	mg/kg	0.34 U	0.36 U	0.34 U	0.35 U	0.34 U
Zinc	mg/kg	840	35	37	750	36
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	mg/kg	0.3	0.1 U	0.1 U	0.24	0.1 U
Benzo(a)pyrene	mg/kg	0.43	0.1 U	0.1 U	0.45	0.1 U
Benzo(b)fluoranthene	mg/kg	0.53	0.1 U	0.1 U	0.78	0.1 U
Benzo(k)fluoranthene	mg/kg	0.42	0.1 U	0.1 U	0.53	0.1 U
Benzofluoranthenes (total)	mg/kg	0.95	0.1 U	0.1 U	1.3	0.1 U
Chrysene	mg/kg	0.46	0.1 U	0.1 U	0.62	0.1 U
Dibenzo(a,h)anthracene	mg/kg	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U
Indeno(1,2,3-cd)pyrene	mg/kg	0.22	0.1 U	0.1 U	0.22	0.1 U
cPAHs (MTCA TEQ-HalfND)	mg/kg	0.59	0.076 U	0.076 U	0.64	0.076 U
cPAHs (MTCA TEQ-ZeroND)	mg/kg	0.58	0.1 U	0.1 U	0.63	0.1 U
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAH	mg/kg	0.54	0.1 U	0.1 U	0.34	0.1 U
1-Methylnaphthalene	mg/kg	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U
2-Methylnaphthalene	mg/kg	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U
Naphthalene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Acenaphthene	mg/kg	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U
Acenaphthylene	mg/kg	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U
Anthracene	mg/kg	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U
Fluorene	mg/kg	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U
Phenanthrene	mg/kg	0.54	0.1 U	0.1 U	0.34	0.1 U
Benzo(g,h,i)perylene	mg/kg	0.25	0.1 U	0.1 U	0.27	0.1 U
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Total HPAH	mg/kg	4	0.1 U	0.1 U	4.22	0.1 U
Fluoranthene	mg/kg	0.66	0.1 U	0.1 U	0.43	0.1 U
Pyrene	mg/kg	0.75	0.1 U	0.1 U	0.68	0.1 U
Other SVOCs						
1,2,4-Trichlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dichlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,3-Dichlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
2,3,4,6-Tetrachlorophenol	mg/kg	0.25 U	0.25 U	0.25 U	0.5 U	0.25 U

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	FS-12	FS-12	FS-12	FS-13	FS-13
	Sample ID	**FS12-2-031411**	**FS12-17-031411**	**FS12A-17-031411**	**FS13-4-031511**	**FS13-16-031511**
	Depth	2-3 ft	17-18 ft	17-18 ft	4-5 ft	16-17 ft
	Date	03/14/2011	03/14/2011	03/14/2011	03/15/2011	03/15/2011
Other SVOCs						
2,4,5-Trichlorophenol	mg/kg	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U
2,4,6-Trichlorophenol	mg/kg	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U
2,4-Dichlorophenol	mg/kg	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U
2,4-Dimethylphenol	mg/kg	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U
2,4-Dinitrophenol	mg/kg	0.5 U	0.5 U	0.5 U	1 U	0.5 U
2,4-Dinitrotoluene	mg/kg	0.25 U	0.25 U	0.25 U	0.5 U	0.25 U
2,6-Dichlorophenol	mg/kg	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U
2,6-Dinitrotoluene	mg/kg	0.25 U	0.25 U	0.25 U	0.5 U	0.25 U
2-Chloronaphthalene	mg/kg	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U
2-Chlorophenol	mg/kg	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U
2-Methylphenol	mg/kg	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U
2-Nitroaniline	mg/kg	0.25 U	0.25 U	0.25 U	0.5 U	0.25 U
2-Nitrophenol	mg/kg	0.25 U	0.25 U	0.25 U	0.5 U	0.25 U
3,3'-Dichlorobenzidine	mg/kg	0.33 U	0.34 U	0.36 U	0.71 U	0.33 U
4,6-Dinitro-o-cresol	mg/kg	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U
4-Chloro-3-methylphenol	mg/kg	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U
4-Chloroaniline	mg/kg	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U
4-Nitrophenol	mg/kg	0.5 U	0.5 U	0.5 U	1 U	0.5 U
Aniline	mg/kg	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U
Azobenzene	mg/kg	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U
Benzoic Acid	mg/kg	1 U	1 U	1 U	2 U	1 U
Benzyl Alcohol	mg/kg	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U
bis(2-chloroethoxy)methane	mg/kg	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U
Bis(2-chloroethyl) Ether	mg/kg	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U
Bis(2-ethylhexyl) Phthalate	mg/kg	0.13 U	0.13 U	0.13 U	0.26 U	0.13 U
Butyl benzyl Phthalate	mg/kg	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U
Carbazole	mg/kg	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U
Dibenzofuran	mg/kg	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U
Diethylphthalate	mg/kg	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U
Dimethyl Phthalate	mg/kg	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U
Di-n-butyl Phthalate	mg/kg	0.13 U	0.13 U	0.13 U	0.26 U	0.13 U
Di-n-octyl phthalate	mg/kg	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U
Hexachlorobenzene	mg/kg	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U
Hexachlorobutadiene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Hexachlorocyclopentadiene	mg/kg	0.5 U	0.5 U	0.5 U	1 U	0.5 U
Hexachloroethane	mg/kg	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U
Isophorone	mg/kg	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U
m,p-Cresol (2:1 ratio)	mg/kg	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U
Nitrobenzene	mg/kg	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U
N-Nitrosodimethylamine	mg/kg	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U
N-Nitroso-di-n-propylamine	mg/kg	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	FS-12	FS-12	FS-12	FS-13	FS-13
	Sample ID	**FS12-2-031411**	**FS12-17-031411**	**FS12A-17-031411**	**FS13-4-031511**	**FS13-16-031511**
	Depth	2-3 ft	17-18 ft	17-18 ft	4-5 ft	16-17 ft
	Date	03/14/2011	03/14/2011	03/14/2011	03/15/2011	03/15/2011
Other SVOCs						
N-Nitrosodiphenylamine	mg/kg	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U
Pentachlorophenol	mg/kg	0.5 U	0.5 U	0.5 U	1 U	0.5 U
Phenol	mg/kg	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH						
1,3,5-Trimethylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzene	mg/kg	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Ethylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Iso-propylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
n-Propylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Toluene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Xylene (meta & para)	mg/kg	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Xylene (ortho)	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Xylene (total)	mg/kg	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Other VOCs						
1,1,1,2-Tetrachloroethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,1,1-Trichloroethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,1,2,2-Tetrachloroethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,1,2-Trichloroethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,1-Dichloroethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,1-Dichloroethene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,1-Dichloropropene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2,3-Trichlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2,3-Trichloropropane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2,4-Trimethylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dibromo-3-chloropropane	mg/kg	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
1,2-Dibromoethane (EDB)	mg/kg	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
1,2-Dichloroethane (EDC)	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dichloropropane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,3-Dichloropropane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,4-Dichlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
2,2-Dichloropropane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
2-Chlorotoluene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
2-Hexanone	mg/kg	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
3-Nitroaniline	mg/kg	0.25 U	0.25 U	0.25 U	0.5 U	0.25 U
4-Bromophenyl phenyl ether	mg/kg	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U
4-Chlorophenyl phenyl ether	mg/kg	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U
4-Chlorotoluene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
4-Nitroaniline	mg/kg	0.25 U	0.25 U	0.25 U	0.5 U	0.25 U
Acetone	mg/kg	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Acrylonitrile	mg/kg	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
bis(2-chloroisopropyl)ether	mg/kg	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	FS-12	FS-12	FS-12	FS-13	FS-13
	Sample ID	**FS12-2-031411**	**FS12-17-031411**	**FS12A-17-031411**	**FS13-4-031511**	**FS13-16-031511**
	Depth	2-3 ft	17-18 ft	17-18 ft	4-5 ft	16-17 ft
	Date	03/14/2011	03/14/2011	03/14/2011	03/15/2011	03/15/2011
Other VOCs						
Bromobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Bromochloromethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Bromodichloromethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Bromoform	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Bromomethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Carbon Disulfide	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Carbon Tetrachloride	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chloroethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chloroform	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chloromethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
cis-1,2-Dichloroethene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
cis-1,3-Dichloropropene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Cymene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibromochloromethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibromomethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dichlorodifluoromethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Methyl Ethyl Ketone	mg/kg	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Methyl Iso Butyl Ketone	mg/kg	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Methylene chloride	mg/kg	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
n-Butylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Methyl-tert-butyl ether	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Pyridine	mg/kg	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U
sec-Butylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Styrene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
tert-Butylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Tetrachloroethene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
trans-1,2-Dichloroethene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
trans-1,3-Dichloropropene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Trichloroethene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Trichlorofluoromethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Vinyl Chloride	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Total Petroleum Hydrocarbons (TPH)						
Gasoline-Range Hydrocarbons	mg/kg	3 U	3 U	3 U	3 U	3 U
Diesel-Range Hydrocarbons	mg/kg	120	25 U	25 U	990	25 U
Oil-Range Hydrocarbons	mg/kg	210	50 U	50 U	160 J	50 U

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	FS-14	FS-14	FS-15	FS-15	FS-16
	Sample ID	**FS14-7-031511**	**FS14-17-031511**	**FS15-13-031411**	**FS15-23-031411**	**FS16-2-031511**
	Depth	7-8 ft	17-19 ft	13-14 ft	23-24 ft	2-2.5 ft
	Date	03/15/2011	03/15/2011	03/14/2011	03/14/2011	03/15/2011
Metals						
Arsenic	mg/kg	3.8	5.3	5.2	5	3.6
Cadmium	mg/kg	1 U	1 U	1 U	1 U	1 U
Calcium	mg/kg	8300	9000	22000	9600	4100
Chromium	mg/kg	45	43	41	45	38
Copper	mg/kg	28	23	26	23	20
Lead	mg/kg	2.7	2.9	16	2.2	2.1
Mercury	mg/kg	0.029	0.032	0.02 U	0.022	0.02 U
Nickel	mg/kg	66	59	52	62	38
Silver	mg/kg	0.35 U	0.35 U	0.36 U	0.35 U	0.33 U
Zinc	mg/kg	36	40	44	34	30
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Benzo(a)pyrene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Benzo(b)fluoranthene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Benzo(k)fluoranthene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Benzofluoranthenes (total)	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Chrysene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Dibenzo(a,h)anthracene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Indeno(1,2,3-cd)pyrene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
cPAHs (MTCA TEQ-HalfND)	mg/kg	0.076 U	0.076 U	0.076 U	0.076 U	0.076 U
cPAHs (MTCA TEQ-ZeroND)	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAH	mg/kg	1.8 J	0.1 U	2.5	0.1 U	0.1 U
1-Methylnaphthalene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2-Methylnaphthalene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Naphthalene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Acenaphthene	mg/kg	0.1 U	0.1 U	1.1	0.1 U	0.1 U
Acenaphthylene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Anthracene	mg/kg	0.11 J	0.1 U	0.31	0.1 U	0.1 U
Fluorene	mg/kg	0.46 J	0.1 U	1.1	0.1 U	0.1 U
Phenanthrene	mg/kg	1.2 J	0.1 U	0.1 U	0.1 U	0.1 U
Benzo(g,h,i)perylene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Total HPAH	mg/kg	0.1 U	0.1 U	0.71	0.1 U	0.1 U
Fluoranthene	mg/kg	0.1 U	0.1 U	0.4	0.1 U	0.1 U
Pyrene	mg/kg	0.1 U	0.1 U	0.31	0.1 U	0.1 U
Other SVOCs						
1,2,4-Trichlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dichlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,3-Dichlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
2,3,4,6-Tetrachlorophenol	mg/kg	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	FS-14	FS-14	FS-15	FS-15	FS-16
	Sample ID	**FS14-7-031511**	**FS14-17-031511**	**FS15-13-031411**	**FS15-23-031411**	**FS16-2-031511**
	Depth	7-8 ft	17-19 ft	13-14 ft	23-24 ft	2-2.5 ft
	Date	03/15/2011	03/15/2011	03/14/2011	03/14/2011	03/15/2011
Other SVOCs						
2,4,5-Trichlorophenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2,4,6-Trichlorophenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2,4-Dichlorophenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2,4-Dimethylphenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2,4-Dinitrophenol	mg/kg	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2,4-Dinitrotoluene	mg/kg	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
2,6-Dichlorophenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2,6-Dinitrotoluene	mg/kg	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
2-Chloronaphthalene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2-Chlorophenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2-Methylphenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2-Nitroaniline	mg/kg	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
2-Nitrophenol	mg/kg	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
3,3'-Dichlorobenzidine	mg/kg	0.35 U	0.33 U	0.35 U	0.34 U	0.32 U
4,6-Dinitro-o-cresol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4-Chloro-3-methylphenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4-Chloroaniline	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4-Nitrophenol	mg/kg	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Aniline	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Azobenzene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Benzoic Acid	mg/kg	1 U	1 U	1 U	1 U	1 U
Benzyl Alcohol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
bis(2-chloroethoxy)methane	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Bis(2-chloroethyl) Ether	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Bis(2-ethylhexyl) Phthalate	mg/kg	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
Butyl benzyl Phthalate	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Carbazole	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Dibenzofuran	mg/kg	0.12 J	0.1 U	0.1 U	0.1 U	0.1 U
Diethylphthalate	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Dimethyl Phthalate	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Di-n-butyl Phthalate	mg/kg	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
Di-n-octyl phthalate	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Hexachlorobenzene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Hexachlorobutadiene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Hexachlorocyclopentadiene	mg/kg	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Hexachloroethane	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Isophorone	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
m,p-Cresol (2:1 ratio)	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nitrobenzene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
N-Nitrosodimethylamine	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
N-Nitroso-di-n-propylamine	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	FS-14	FS-14	FS-15	FS-15	FS-16
	Sample ID	**FS14-7-031511**	**FS14-17-031511**	**FS15-13-031411**	**FS15-23-031411**	**FS16-2-031511**
	Depth	7-8 ft	17-19 ft	13-14 ft	23-24 ft	2-2.5 ft
	Date	03/15/2011	03/15/2011	03/14/2011	03/14/2011	03/15/2011
Other SVOCs						
N-Nitrosodiphenylamine	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Pentachlorophenol	mg/kg	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Phenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH						
1,3,5-Trimethylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzene	mg/kg	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Ethylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Iso-propylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
n-Propylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Toluene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Xylene (meta & para)	mg/kg	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Xylene (ortho)	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Xylene (total)	mg/kg	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Other VOCs						
1,1,1,2-Tetrachloroethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,1,1-Trichloroethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,1,2,2-Tetrachloroethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,1,2-Trichloroethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,1-Dichloroethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,1-Dichloroethene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,1-Dichloropropene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2,3-Trichlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2,3-Trichloropropane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2,4-Trimethylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dibromo-3-chloropropane	mg/kg	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
1,2-Dibromoethane (EDB)	mg/kg	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
1,2-Dichloroethane (EDC)	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dichloropropane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,3-Dichloropropane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,4-Dichlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
2,2-Dichloropropane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
2-Chlorotoluene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
2-Hexanone	mg/kg	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
3-Nitroaniline	mg/kg	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
4-Bromophenyl phenyl ether	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4-Chlorophenyl phenyl ether	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4-Chlorotoluene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
4-Nitroaniline	mg/kg	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Acetone	mg/kg	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Acrylonitrile	mg/kg	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
bis(2-chloroisopropyl)ether	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	FS-14	FS-14	FS-15	FS-15	FS-16
	Sample ID	**FS14-7-031511**	**FS14-17-031511**	**FS15-13-031411**	**FS15-23-031411**	**FS16-2-031511**
	Depth	7-8 ft	17-19 ft	13-14 ft	23-24 ft	2-2.5 ft
	Date	03/15/2011	03/15/2011	03/14/2011	03/14/2011	03/15/2011
Other VOCs						
Bromobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Bromochloromethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Bromodichloromethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Bromoform	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Bromomethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Carbon Disulfide	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Carbon Tetrachloride	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chloroethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chloroform	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chloromethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
cis-1,2-Dichloroethene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
cis-1,3-Dichloropropene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Cymene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibromochloromethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibromomethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dichlorodifluoromethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Methyl Ethyl Ketone	mg/kg	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Methyl Iso Butyl Ketone	mg/kg	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Methylene chloride	mg/kg	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Methyl-tert-butyl ether	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
n-Butylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Pyridine	mg/kg	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
sec-Butylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Styrene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
tert-Butylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Tetrachloroethene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
trans-1,2-Dichloroethene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
trans-1,3-Dichloropropene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Trichloroethene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Trichlorofluoromethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Vinyl Chloride	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Total Petroleum Hydrocarbons (TPH)						
Gasoline-Range Hydrocarbons	mg/kg	19 U	3 U	55 U	3 U	3 U
Diesel-Range Hydrocarbons	mg/kg	440	25 U	950	25 U	25 U
Oil-Range Hydrocarbons	mg/kg	50 U	50 U	50 U	50 U	50 U

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	FS-16	FS-17	FS-17	FS-17	FS-18
	Sample ID	**FS16-19-031511**	**FS17-6.5-031611**	**FS17-18-031611**	**FS17A-18-031611**	**FS18-3-031611**
	Depth	19-20 ft	6.5-7.5 ft	18-19 ft	18-19 ft	3-4 ft
	Date	03/15/2011	03/16/2011	03/16/2011	03/16/2011	03/16/2011
Metals						
Arsenic	mg/kg	5.6	9.4	5.6	3.2	3
Cadmium	mg/kg	1 U	1.8	1 U	1 U	1 U
Calcium	mg/kg	4100	7700	4000	4400	4600
Chromium	mg/kg	32	50	50	41	25
Copper	mg/kg	30	240	31	23	5.6
Lead	mg/kg	3	710	2.9	2	1.2
Mercury	mg/kg	0.021	0.097	0.024	0.028	0.02 U
Nickel	mg/kg	51	57	100	44	17
Silver	mg/kg	0.35 U	0.39 U	0.36 U	0.36 U	0.34 U
Zinc	mg/kg	33	1700	35	26	17
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	mg/kg	0.1 U	3.6	0.1 U	0.1 U	0.1 U
Benzo(a)pyrene	mg/kg	0.1 U	5.9	0.1 U	0.1 U	0.1 U
Benzo(b)fluoranthene	mg/kg	0.1 U	5.1	0.1 U	0.1 U	0.1 U
Benzo(k)fluoranthene	mg/kg	0.1 U	4.7	0.1 U	0.1 U	0.1 U
Benzofluoranthenes (total)	mg/kg	0.1 U	9.8	0.1 U	0.1 U	0.1 U
Chrysene	mg/kg	0.1 U	4.8	0.1 U	0.1 U	0.1 U
Dibenzo(a,h)anthracene	mg/kg	0.1 U	1.7	0.1 U	0.1 U	0.1 U
Indeno(1,2,3-cd)pyrene	mg/kg	0.1 U	4.3	0.1 U	0.1 U	0.1 U
cPAHs (MTCA TEQ-HalfND)	mg/kg	0.076 U	7.9	0.076 U	0.076 U	0.076 U
cPAHs (MTCA TEQ-ZeroND)	mg/kg	0.1 U	7.9	0.1 U	0.1 U	0.1 U
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAH	mg/kg	0.1 U	9.3	0.1 U	0.1 U	0.1 U
1-Methylnaphthalene	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
2-Methylnaphthalene	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
Naphthalene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Acenaphthene	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
Acenaphthylene	mg/kg	0.1 U	2	0.1 U	0.1 U	0.1 U
Anthracene	mg/kg	0.1 U	1	0.1 U	0.1 U	0.1 U
Fluorene	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
Phenanthrene	mg/kg	0.1 U	6.3	0.1 U	0.1 U	0.1 U
Benzo(g,h,i)perylene	mg/kg	0.1 U	5.1	0.1 U	0.1 U	0.1 U
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Total HPAH	mg/kg	0.1 U	53	0.1 U	0.1 U	0.1 U
Fluoranthene	mg/kg	0.1 U	8.2	0.1 U	0.1 U	0.1 U
Pyrene	mg/kg	0.1 U	9.9	0.1 U	0.1 U	0.1 U
Other SVOCs						
1,2,4-Trichlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dichlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,3-Dichlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
2,3,4,6-Tetrachlorophenol	mg/kg	0.25 U	1.2 U	0.25 U	0.25 U	0.25 U

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	FS-16	FS-17	FS-17	FS-17	FS-18
	Sample ID	**FS16-19-031511**	**FS17-6.5-031611**	**FS17-18-031611**	**FS17A-18-031611**	**FS18-3-031611**
	Depth	19-20 ft	6.5-7.5 ft	18-19 ft	18-19 ft	3-4 ft
	Date	03/15/2011	03/16/2011	03/16/2011	03/16/2011	03/16/2011
Other SVOCs						
2,4,5-Trichlorophenol	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
2,4,6-Trichlorophenol	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
2,4-Dichlorophenol	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
2,4-Dimethylphenol	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
2,4-Dinitrophenol	mg/kg	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
2,4-Dinitrotoluene	mg/kg	0.25 U	1.2 U	0.25 U	0.25 U	0.25 U
2,6-Dichlorophenol	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
2,6-Dinitrotoluene	mg/kg	0.25 U	1.2 U	0.25 U	0.25 U	0.25 U
2-Chloronaphthalene	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
2-Chlorophenol	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
2-Methylphenol	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
2-Nitroaniline	mg/kg	0.25 U	1.2 U	0.25 U	0.25 U	0.25 U
2-Nitrophenol	mg/kg	0.25 U	1.2 U	0.25 U	0.25 U	0.25 U
3,3'-Dichlorobenzidine	mg/kg	0.31 U	3.7 U	0.5 U	0.5 U	0.5 U
4,6-Dinitro-o-cresol	mg/kg	0.1 U	0.52 U	0.1 U	0.1 U	0.1 U
4-Chloro-3-methylphenol	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
4-Chloroaniline	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
4-Nitrophenol	mg/kg	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
Aniline	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
Azobenzene	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
Benzoic Acid	mg/kg	1 U	5 U	1 U	1 U	1 U
Benzyl Alcohol	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
bis(2-chloroethoxy)methane	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
Bis(2-chloroethyl) Ether	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
Bis(2-ethylhexyl) Phthalate	mg/kg	0.13 U	0.65 U	0.13 U	0.13 U	0.13 U
Butyl benzyl Phthalate	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
Carbazole	mg/kg	0.1 U	1.4	0.1 U	0.1 U	0.1 U
Dibenzofuran	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
Diethylphthalate	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
Dimethyl Phthalate	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
Di-n-butyl Phthalate	mg/kg	0.13 U	0.65 U	0.13 U	0.13 U	0.13 U
Di-n-octyl phthalate	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
Hexachlorobenzene	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
Hexachlorobutadiene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Hexachlorocyclopentadiene	mg/kg	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
Hexachloroethane	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
Isophorone	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
m,p-Cresol (2:1 ratio)	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
Nitrobenzene	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
N-Nitrosodimethylamine	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
N-Nitroso-di-n-propylamine	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	FS-16	FS-17	FS-17	FS-17	FS-18
	Sample ID	**FS16-19-031511**	**FS17-6.5-031611**	**FS17-18-031611**	**FS17A-18-031611**	**FS18-3-031611**
	Depth	19-20 ft	6.5-7.5 ft	18-19 ft	18-19 ft	3-4 ft
	Date	03/15/2011	03/16/2011	03/16/2011	03/16/2011	03/16/2011
Other SVOCs						
N-Nitrosodiphenylamine	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
Pentachlorophenol	mg/kg	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
Phenol	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH						
1,3,5-Trimethylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzene	mg/kg	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Ethylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Iso-propylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
n-Propylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Toluene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Xylene (meta & para)	mg/kg	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Xylene (ortho)	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Xylene (total)	mg/kg	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Other VOCs						
1,1,1,2-Tetrachloroethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,1,1-Trichloroethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,1,2,2-Tetrachloroethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,1,2-Trichloroethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,1-Dichloroethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,1-Dichloroethene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,1-Dichloropropene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2,3-Trichlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2,3-Trichloropropane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2,4-Trimethylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dibromo-3-chloropropane	mg/kg	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
1,2-Dibromoethane (EDB)	mg/kg	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
1,2-Dichloroethane (EDC)	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dichloropropane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,3-Dichloropropane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,4-Dichlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
2,2-Dichloropropane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
2-Chlorotoluene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
2-Hexanone	mg/kg	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
3-Nitroaniline	mg/kg	0.25 U	1.2 U	0.25 U	0.25 U	0.25 U
4-Bromophenyl phenyl ether	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
4-Chlorophenyl phenyl ether	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
4-Chlorotoluene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
4-Nitroaniline	mg/kg	0.25 U	1.2 U	0.25 U	0.25 U	0.25 U
Acetone	mg/kg	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Acrylonitrile	mg/kg	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
bis(2-chloroisopropyl)ether	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	FS-16	FS-17	FS-17	FS-17	FS-18
	Sample ID	**FS16-19-031511**	**FS17-6.5-031611**	**FS17-18-031611**	**FS17A-18-031611**	**FS18-3-031611**
	Depth	19-20 ft	6.5-7.5 ft	18-19 ft	18-19 ft	3-4 ft
	Date	03/15/2011	03/16/2011	03/16/2011	03/16/2011	03/16/2011
Other VOCs						
Bromobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Bromochloromethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Bromodichloromethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Bromoform	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Bromomethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Carbon Disulfide	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Carbon Tetrachloride	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chloroethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chloroform	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chloromethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
cis-1,2-Dichloroethene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
cis-1,3-Dichloropropene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Cymene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibromochloromethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibromomethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dichlorodifluoromethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Methyl Ethyl Ketone	mg/kg	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Methyl Iso Butyl Ketone	mg/kg	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Methylene chloride	mg/kg	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Methyl-tert-butyl ether	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
n-Butylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Pyridine	mg/kg	0.2 U	1 U	0.2 U	0.2 U	0.2 U
sec-Butylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Styrene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
tert-Butylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Tetrachloroethene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
trans-1,2-Dichloroethene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
trans-1,3-Dichloropropene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Trichloroethene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Trichlorofluoromethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Vinyl Chloride	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Total Petroleum Hydrocarbons (TPH)						
Gasoline-Range Hydrocarbons	mg/kg	3 U	1.5 U	3 U	3 U	3 U
Diesel-Range Hydrocarbons	mg/kg	25 U	1200	25 U	25 U	25 U
Oil-Range Hydrocarbons	mg/kg	50 U	5400	50 U	50 U	50 U

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	FS-18	MW-02A	MW-02A	MW-06	MW-06
	Sample ID	**FS18-14-031611**	**MW02A-7.5-031511**	**MW02A-13.5-031511**	**MW06-10-031411**	**MW06-14.5-031411**
	Depth	14-15 ft	7.5 ft	13.5 ft	10 ft	14.5 ft
	Date	03/16/2011	03/15/2011	03/15/2011	03/14/2011	03/14/2011
Metals						
Arsenic	mg/kg	3.6	4.7	6.5	2.8	2.2
Cadmium	mg/kg	1 U	1 U	1 U	1 U	1 U
Calcium	mg/kg	14000	4400	11000	8000	6000
Chromium	mg/kg	31	36	56	45	30
Copper	mg/kg	22	14	48	20	14
Lead	mg/kg	33	3.2	7.2	2.3	2
Mercury	mg/kg	0.027	0.033	0.074	0.02 U	0.02 U
Nickel	mg/kg	29	32	76	45	35
Silver	mg/kg	0.39 U	0.36 U	0.42 U	0.34 U	0.37 U
Zinc	mg/kg	32	45	71	34	26
Polychlorinated Biphenyls (PCBs)						
Aroclor 1016	mg/kg		0.0039 U	0.004 U	0.0039 U	0.0039 U
Aroclor 1221	mg/kg		0.0039 U	0.004 U	0.0039 U	0.0039 U
Aroclor 1232	mg/kg		0.0039 U	0.004 U	0.0039 U	0.0039 U
Aroclor 1242	mg/kg		0.018	0.004 U	0.0039 U	0.0039 U
Aroclor 1248	mg/kg		0.0039 U	0.004 U	0.0039 U	0.0039 U
Aroclor 1254	mg/kg		0.01 J	0.004 U	0.0039 U	0.0039 U
Aroclor 1260	mg/kg		0.0039 U	0.004 U	0.0039 U	0.0039 U
Aroclor 1268	mg/kg		0.0039 U	0.004 U	0.0039 U	0.0039 U
PCBs (Total, Aroclors)	mg/kg		0.028 J	0.004 U	0.0039 U	0.0039 U
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	mg/kg	0.1 U	0.63 U	0.1 U	0.1 U	0.1 U
Benzo(a)pyrene	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
Benzo(b)fluoranthene	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
Benzo(k)fluoranthene	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
Benzofluoranthenes (total)	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
Chrysene	mg/kg	0.1 U	0.64 J	0.1 U	0.1 U	0.1 U
Dibenzo(a,h)anthracene	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
Indeno(1,2,3-cd)pyrene	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
cPAHs (MTCA TEQ-HalfND)	mg/kg	0.076 U	0.39 J	0.076 U	0.076 U	0.076 U
cPAHs (MTCA TEQ-ZeroND)	mg/kg	0.1 U	0.0064 J	0.1 U	0.1 U	0.1 U
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAH	mg/kg	0.1 U	1.5 J	0.1 U	2.9 J	0.1 U
1-Methylnaphthalene	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
2-Methylnaphthalene	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
Naphthalene	mg/kg	0.01 U	0.3	0.01 U	0.042	0.01 U
Acenaphthene	mg/kg	0.1 U	1.2 J	0.1 U	0.22 J	0.1 U
Acenaphthylene	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
Anthracene	mg/kg	0.1 U	0.5 U	0.1 U	0.1 J	0.1 U
Fluorene	mg/kg	0.1 U	0.5 U	0.1 U	0.58 J	0.1 U
Phenanthrene	mg/kg	0.1 U	0.5 U	0.1 U	2 J	0.1 U

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	FS-18	MW-02A	MW-02A	MW-06	MW-06
	Sample ID	**FS18-14-031611**	**MW02A-7.5-031511**	**MW02A-13.5-031511**	**MW06-10-031411**	**MW06-14.5-031411**
	Depth	14-15 ft	7.5 ft	13.5 ft	10 ft	14.5 ft
	Date	03/16/2011	03/15/2011	03/15/2011	03/14/2011	03/14/2011
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Benzo(g,h,i)perylene	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Total HPAH	mg/kg	0.24	3.5 J	0.1 U	0.1 J	0.1 U
Fluoranthene	mg/kg	0.11	1.4 J	0.1 U	0.1 U	0.1 U
Pyrene	mg/kg	0.13	1.5 J	0.1 U	0.1 J	0.1 U
Other SVOCs						
1,2,4-Trichlorobenzene	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
1,2-Dichlorobenzene	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
1,3-Dichlorobenzene	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
2,3,4,6-Tetrachlorophenol	mg/kg	0.25 U	1.2 U	0.25 U	0.25 U	0.25 U
2,4,5-Trichlorophenol	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
2,4,6-Trichlorophenol	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
2,4-Dichlorophenol	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
2,4-Dimethylphenol	mg/kg	0.1 U	0.5 U	0.15	0.1 U	0.1 U
2,4-Dinitrophenol	mg/kg	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
2,4-Dinitrotoluene	mg/kg	0.25 U	1.2 U	0.25 U	0.25 U	0.25 U
2,6-Dichlorophenol	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
2,6-Dinitrotoluene	mg/kg	0.25 U	1.2 U	0.25 U	0.25 U	0.25 U
2-Chloronaphthalene	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
2-Chlorophenol	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
2-Methylphenol	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
2-Nitroaniline	mg/kg	0.25 U	1.2 U	0.25 U	0.25 U	0.25 U
2-Nitrophenol	mg/kg	0.25 U	1.2 U	0.25 U	0.25 U	0.25 U
3,3'-Dichlorobenzidine	mg/kg	0.5 U	2.8 U	0.37 U	0.37 U	0.37 U
4,6-Dinitro-o-cresol	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
4-Chloro-3-methylphenol	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
4-Chloroaniline	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
4-Nitrophenol	mg/kg	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
Aniline	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
Azobenzene	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
Benzoic Acid	mg/kg	1 U	5 U	1 U	1 U	1 U
Benzyl Alcohol	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
bis(2-chloroethoxy)methane	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
Bis(2-chloroethyl) Ether	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
Bis(2-ethylhexyl) Phthalate	mg/kg	0.13 U	0.65 U	0.13 U	0.13 U	0.13 U
Butyl benzyl Phthalate	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
Carbazole	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
Dibenzofuran	mg/kg	0.1 U	0.97 J	0.1 U	0.1 U	0.1 U
Diethylphthalate	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
Dimethyl Phthalate	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
Di-n-butyl Phthalate	mg/kg	0.13 U	0.65 U	0.15	0.13 U	0.13 U

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	FS-18	MW-02A	MW-02A	MW-06	MW-06
	Sample ID	**FS18-14-031611**	**MW02A-7.5-031511**	**MW02A-13.5-031511**	**MW06-10-031411**	**MW06-14.5-031411**
	Depth	14-15 ft	7.5 ft	13.5 ft	10 ft	14.5 ft
	Date	03/16/2011	03/15/2011	03/15/2011	03/14/2011	03/14/2011
Other SVOCs						
Di-n-octyl phthalate	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
Hexachlorobenzene	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
Hexachlorobutadiene	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
Hexachlorocyclopentadiene	mg/kg	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
Hexachloroethane	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
Isophorone	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
m,p-Cresol (2:1 ratio)	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
Nitrobenzene	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
N-Nitrosodimethylamine	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
N-Nitroso-di-n-propylamine	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
N-Nitrosodiphenylamine	mg/kg	0.1 U	0.5 U	0.1 U	0.58 J	0.1 U
Pentachlorophenol	mg/kg	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
Phenol	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH						
1,3,5-Trimethylbenzene	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
Benzene	mg/kg	0.005 U	0.005 UJ	0.005 U	0.005 U	0.005 U
Ethylbenzene	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
Iso-propylbenzene	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
n-Propylbenzene	mg/kg	0.01 U	0.016 J	0.01 U	0.01 U	0.01 U
Toluene	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
Xylene (meta & para)	mg/kg	0.02 U	0.02 UJ	0.02 U	0.02 U	0.02 U
Xylene (ortho)	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
Xylene (total)	mg/kg	0.02 U	0.02 UJ	0.02 U	0.02 U	0.02 U
Other VOCs						
1,1,1,2-Tetrachloroethane	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
1,1,1-Trichloroethane	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
1,1,2,2-Tetrachloroethane	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
1,1,2-Trichloroethane	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
1,1-Dichloroethane	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
1,1-Dichloroethene	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
1,1-Dichloropropene	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
1,2,3-Trichlorobenzene	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
1,2,3-Trichloropropane	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
1,2,4-Trimethylbenzene	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
1,2-Dibromo-3-chloropropane	mg/kg	0.05 U	0.05 UJ	0.05 U	0.05 U	0.05 U
1,2-Dibromoethane (EDB)	mg/kg	0.005 U	0.005 UJ	0.005 U	0.005 U	0.005 U
1,2-Dichloroethane (EDC)	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
1,2-Dichloropropane	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
1,3-Dichloropropane	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
1,4-Dichlorobenzene	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
2,2-Dichloropropane	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	FS-18	MW-02A	MW-02A	MW-06	MW-06
	Sample ID	**FS18-14-031611**	**MW02A-7.5-031511**	**MW02A-13.5-031511**	**MW06-10-031411**	**MW06-14.5-031411**
	Depth	14-15 ft	7.5 ft	13.5 ft	10 ft	14.5 ft
	Date	03/16/2011	03/15/2011	03/15/2011	03/14/2011	03/14/2011
Other VOCs						
2-Chlorotoluene	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
2-Hexanone	mg/kg	0.05 U	0.05 UJ	0.05 U	0.05 U	0.05 U
3-Nitroaniline	mg/kg	0.25 U	1.2 U	0.25 U	0.25 U	0.25 U
4-Bromophenyl phenyl ether	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
4-Chlorophenyl phenyl ether	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
4-Chlorotoluene	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
4-Nitroaniline	mg/kg	0.25 U	1.2 U	0.25 U	0.25 U	0.25 U
Acetone	mg/kg	0.05 U	0.05 UJ	0.05 U	0.05 U	0.05 U
Acrylonitrile	mg/kg	0.05 U	0.05 UJ	0.05 U	0.05 U	0.05 U
bis(2-chloroisopropyl)ether	mg/kg	0.1 U	0.5 U	0.1 U	0.1 U	0.1 U
Bromobenzene	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
Bromochloromethane	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
Bromodichloromethane	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
Bromoform	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
Bromomethane	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
Carbon Disulfide	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
Carbon Tetrachloride	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
Chlorobenzene	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
Chloroethane	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
Chloroform	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
Chloromethane	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
cis-1,2-Dichloroethene	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
cis-1,3-Dichloropropene	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
Cymene	mg/kg	0.01 U	0.01 UJ	0.01 U	0.3	0.01 U
Dibromochloromethane	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
Dibromomethane	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
Dichlorodifluoromethane	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
Methyl Ethyl Ketone	mg/kg	0.05 U	0.05 UJ	0.05 U	0.05 U	0.05 U
Methyl Iso Butyl Ketone	mg/kg	0.05 U	0.05 UJ	0.05 U	0.05 U	0.05 U
Methylene chloride	mg/kg	0.02 U	0.02 UJ	0.02 U	0.02 U	0.02 U
Methyl-tert-butyl ether	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
n-Butylbenzene	mg/kg	0.01 U	0.35	0.01 U	0.036	0.01 U
Pyridine	mg/kg	0.2 U	1 U	0.2 U	0.2 U	0.2 U
sec-Butylbenzene	mg/kg	0.01 U	0.36	0.01 U	0.01 U	0.01 U
Styrene	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
tert-Butylbenzene	mg/kg	0.01 U	0.012 J	0.01 U	0.01 U	0.01 U
Tetrachloroethene	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
trans-1,2-Dichloroethene	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
trans-1,3-Dichloropropene	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
Trichloroethene	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
Trichlorofluoromethane	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	FS-18	MW-02A	MW-02A	MW-06	MW-06
	Sample ID	**FS18-14-031611**	**MW02A-7.5-031511**	**MW02A-13.5-031511**	**MW06-10-031411**	**MW06-14.5-031411**
	Depth	14-15 ft	7.5 ft	13.5 ft	10 ft	14.5 ft
	Date	03/16/2011	03/15/2011	03/15/2011	03/14/2011	03/14/2011
Other VOCs						
Vinyl Chloride	mg/kg	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U
Total Petroleum Hydrocarbons (TPH)						
Gasoline-Range Hydrocarbons	mg/kg	3 U	280 J	3 U	85 J	3 U
Diesel-Range Hydrocarbons	mg/kg	25 U	18000	25 U	1700	25 U
Oil-Range Hydrocarbons	mg/kg	50 U	6300	50 U	50 U	50 U

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	MW-06	MW-07	MW-07	MW-08	MW-08
	Sample ID	**MW06-14.5-031411-D**	**MW07-5.5-031511**	**MW07-14-031511**	**MW08-4-031411**	**MW08-13.5-031411**
	Depth	14.5 ft	5.5 ft	14 ft	4 ft	13.5 ft
	Date	03/14/2011	03/15/2011	03/15/2011	03/14/2011	03/14/2011
Metals						
Arsenic	mg/kg	2.4	5.3	7.3	5.1	2.2
Cadmium	mg/kg	1 U	1 U	1 U	1 U	1 U
Calcium	mg/kg	6600	19000	13000	6400	7600
Chromium	mg/kg	31	29	62	33	23
Copper	mg/kg	14	17	47	37	6.1
Lead	mg/kg	2.1	3.8	6.2	9.6	1.2
Mercury	mg/kg	0.02 U	0.02 U	0.056	0.02 U	0.02 U
Nickel	mg/kg	36	28	77	27	18
Silver	mg/kg	0.36 U	0.34 U	0.39 U	0.33 U	0.38 U
Zinc	mg/kg	28	39	69	130	17
Polychlorinated Biphenyls (PCBs)						
Aroclor 1016	mg/kg	0.0039 U	0.004 U	0.004 U	0.0039 U	0.0039 U
Aroclor 1221	mg/kg	0.0039 U	0.004 U	0.004 U	0.0039 U	0.0039 U
Aroclor 1232	mg/kg	0.0039 U	0.004 U	0.004 U	0.0039 U	0.0039 U
Aroclor 1242	mg/kg	0.0039 U	0.004 U	0.004 U	0.0039 U	0.0039 U
Aroclor 1248	mg/kg	0.0039 U	0.004 U	0.004 U	0.0039 U	0.0039 U
Aroclor 1254	mg/kg	0.0039 U	0.004 U	0.004 U	0.0039 U	0.0039 U
Aroclor 1260	mg/kg	0.0039 U	0.004 U	0.004 U	0.0039 U	0.0039 U
Aroclor 1268	mg/kg	0.0039 U	0.004 U	0.004 U	0.0039 U	0.0039 U
PCBs (Total, Aroclors)	mg/kg	0.0039 U	0.004 U	0.004 U	0.0039 U	0.0039 U
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Benzo(a)pyrene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Benzo(b)fluoranthene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Benzo(k)fluoranthene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Benzofluoranthenes (total)	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Chrysene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Dibenzo(a,h)anthracene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Indeno(1,2,3-cd)pyrene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
cPAHs (MTCA TEQ-HalfND)	mg/kg	0.076 U	0.076 U	0.076 U	0.076 U	0.076 U
cPAHs (MTCA TEQ-ZeroND)	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAH	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1-Methylnaphthalene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2-Methylnaphthalene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Naphthalene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Acenaphthene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Acenaphthylene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Anthracene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Fluorene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Phenanthrene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	MW-06	MW-07	MW-07	MW-08	MW-08
	Sample ID	**MW06-14.5-031411-D**	**MW07-5.5-031511**	**MW07-14-031511**	**MW08-4-031411**	**MW08-13.5-031411**
	Depth	14.5 ft	5.5 ft	14 ft	4 ft	13.5 ft
	Date	03/14/2011	03/15/2011	03/15/2011	03/14/2011	03/14/2011
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Benzo(g,h,i)perylene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Total HPAH	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Fluoranthene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Pyrene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Other SVOCs						
1,2,4-Trichlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dichlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,3-Dichlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
2,3,4,6-Tetrachlorophenol	mg/kg	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
2,4,5-Trichlorophenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2,4,6-Trichlorophenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2,4-Dichlorophenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2,4-Dimethylphenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2,4-Dinitrophenol	mg/kg	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2,4-Dinitrotoluene	mg/kg	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
2,6-Dichlorophenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2,6-Dinitrotoluene	mg/kg	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
2-Chloronaphthalene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2-Chlorophenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2-Methylphenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2-Nitroaniline	mg/kg	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
2-Nitrophenol	mg/kg	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
3,3'-Dichlorobenzidine	mg/kg	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U
4,6-Dinitro-o-cresol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4-Chloro-3-methylphenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4-Chloroaniline	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4-Nitrophenol	mg/kg	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Aniline	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Azobenzene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Benzoic Acid	mg/kg	1 U	1 U	1 U	1 U	1 U
Benzyl Alcohol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
bis(2-chloroethoxy)methane	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Bis(2-chloroethyl) Ether	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Bis(2-ethylhexyl) Phthalate	mg/kg	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
Butyl benzyl Phthalate	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Carbazole	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Dibenzofuran	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Diethylphthalate	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Dimethyl Phthalate	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Di-n-butyl Phthalate	mg/kg	0.13 U	0.13 U	0.14 J	0.13 U	0.13 U

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	MW-06	MW-07	MW-07	MW-08	MW-08
	Sample ID	**MW06-14.5-031411-D**	**MW07-5.5-031511**	**MW07-14-031511**	**MW08-4-031411**	**MW08-13.5-031411**
	Depth	14.5 ft	5.5 ft	14 ft	4 ft	13.5 ft
	Date	03/14/2011	03/15/2011	03/15/2011	03/14/2011	03/14/2011
Other SVOCs						
Di-n-octyl phthalate	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Hexachlorobenzene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Hexachlorobutadiene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Hexachlorocyclopentadiene	mg/kg	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Hexachloroethane	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Isophorone	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
m,p-Cresol (2:1 ratio)	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nitrobenzene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
N-Nitrosodimethylamine	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
N-Nitroso-di-n-propylamine	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
N-Nitrosodiphenylamine	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Pentachlorophenol	mg/kg	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Phenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH						
1,3,5-Trimethylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzene	mg/kg	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Ethylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Iso-propylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
n-Propylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Toluene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Xylene (meta & para)	mg/kg	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Xylene (ortho)	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Xylene (total)	mg/kg	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Other VOCs						
1,1,1,2-Tetrachloroethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,1,1-Trichloroethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,1,2,2-Tetrachloroethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,1,2-Trichloroethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,1-Dichloroethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,1-Dichloroethene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,1-Dichloropropene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2,3-Trichlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2,3-Trichloropropane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2,4-Trimethylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dibromo-3-chloropropane	mg/kg	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
1,2-Dibromoethane (EDB)	mg/kg	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
1,2-Dichloroethane (EDC)	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dichloropropane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,3-Dichloropropane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,4-Dichlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
2,2-Dichloropropane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	MW-06	MW-07	MW-07	MW-08	MW-08
	Sample ID	**MW06-14.5-031411-D**	**MW07-5.5-031511**	**MW07-14-031511**	**MW08-4-031411**	**MW08-13.5-031411**
	Depth	14.5 ft	5.5 ft	14 ft	4 ft	13.5 ft
	Date	03/14/2011	03/15/2011	03/15/2011	03/14/2011	03/14/2011
Other VOCs						
2-Chlorotoluene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
2-Hexanone	mg/kg	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
3-Nitroaniline	mg/kg	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
4-Bromophenyl phenyl ether	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4-Chlorophenyl phenyl ether	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4-Chlorotoluene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
4-Nitroaniline	mg/kg	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Acetone	mg/kg	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Acrylonitrile	mg/kg	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
bis(2-chloroisopropyl)ether	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Bromobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Bromochloromethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Bromodichloromethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Bromoform	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Bromomethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Carbon Disulfide	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Carbon Tetrachloride	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chloroethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chloroform	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chloromethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
cis-1,2-Dichloroethene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
cis-1,3-Dichloropropene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Cymene	mg/kg	0.02	0.01 U	0.01 U	0.01 U	0.01 U
Dibromochloromethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibromomethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dichlorodifluoromethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Methyl Ethyl Ketone	mg/kg	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Methyl Iso Butyl Ketone	mg/kg	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Methylene chloride	mg/kg	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Methyl-tert-butyl ether	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
n-Butylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Pyridine	mg/kg	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
sec-Butylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Styrene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
tert-Butylbenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Tetrachloroethene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
trans-1,2-Dichloroethene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
trans-1,3-Dichloropropene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Trichloroethene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Trichlorofluoromethane	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	MW-06	MW-07	MW-07	MW-08	MW-08
	Sample ID	**MW06-14.5-031411-D**	**MW07-5.5-031511**	**MW07-14-031511**	**MW08-4-031411**	**MW08-13.5-031411**
	Depth	14.5 ft	5.5 ft	14 ft	4 ft	13.5 ft
	Date	03/14/2011	03/15/2011	03/15/2011	03/14/2011	03/14/2011
Other VOCs						
Vinyl Chloride	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Total Petroleum Hydrocarbons (TPH)						
Gasoline-Range Hydrocarbons	mg/kg	3 U	3 U	3 U	3 U	3 U
Diesel-Range Hydrocarbons	mg/kg	25 U	25 U	25 U	25 U	25 U
Oil-Range Hydrocarbons	mg/kg	50 U	50 U	50 U	50 U	50 U

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	MW-09	MW-09	MW-09		
	Sample ID	**MW09-4-031411**	**MW09-6-031411**	**MW09-10-031411**		
	Depth	4 ft	6-6.5 ft	10 ft		
	Date	03/14/2011	03/14/2011	03/14/2011		
Metals						
Arsenic	mg/kg	30	5.6	2.8		
Cadmium	mg/kg	1.1	1 U	1 U		
Calcium	mg/kg	15000	4400	7000		
Chromium	mg/kg	49	33	36		
Copper	mg/kg	350	18	21		
Lead	mg/kg	180	3.1	3.1		
Mercury	mg/kg	0.55	0.02 U	0.029		
Nickel	mg/kg	53	32	44		
Silver	mg/kg	0.35 U	0.37 U	0.39 U		
Zinc	mg/kg	790	36	39		
Polychlorinated Biphenyls (PCBs)						
Aroclor 1016	mg/kg	0.0038 U	0.0039 U	0.0038 U		
Aroclor 1221	mg/kg	0.0038 U	0.0039 U	0.0038 U		
Aroclor 1232	mg/kg	0.0038 U	0.0039 U	0.0038 U		
Aroclor 1242	mg/kg	0.0038 U	0.0039 U	0.0038 U		
Aroclor 1248	mg/kg	0.0096 UY	0.0039 U	0.0038 U		
Aroclor 1254	mg/kg	0.033	0.0039 U	0.0038 U		
Aroclor 1260	mg/kg	0.028	0.0039 U	0.0038 U		
Aroclor 1268	mg/kg	0.0038 U	0.0039 U	0.0038 U		
PCBs (Total, Aroclors)	mg/kg	0.061	0.0039 U	0.0038 U		
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	mg/kg	0.1 U	0.1 U	0.1 U		
Benzo(a)pyrene	mg/kg	0.11	0.1 U	0.1 U		
Benzo(b)fluoranthene	mg/kg	0.12	0.1 U	0.1 U		
Benzo(k)fluoranthene	mg/kg	0.1 U	0.1 U	0.1 U		
Benzofluoranthenes (total)	mg/kg	0.12	0.1 U	0.1 U		
Chrysene	mg/kg	0.12	0.1 U	0.1 U		
Dibenzo(a,h)anthracene	mg/kg	0.1 U	0.1 U	0.1 U		
Indeno(1,2,3-cd)pyrene	mg/kg	0.1 U	0.1 U	0.1 U		
cPAHs (MTCA TEQ-HalfND)	mg/kg	0.14	0.076 U	0.076 U		
cPAHs (MTCA TEQ-ZeroND)	mg/kg	0.12	0.1 U	0.1 U		
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAH	mg/kg	0.14	3.2	0.1 U		
1-Methylnaphthalene	mg/kg	0.1 U	2.5	0.1 U		
2-Methylnaphthalene	mg/kg	0.1 U	0.67	0.1 U		
Naphthalene	mg/kg	0.01 U	0.01 U	0.01 U		
Acenaphthene	mg/kg	0.1 U	0.52	0.1 U		
Acenaphthylene	mg/kg	0.1 U	0.1 U	0.1 U		
Anthracene	mg/kg	0.1 U	0.15	0.1 U		
Fluorene	mg/kg	0.1 U	1.6	0.1 U		
Phenanthrene	mg/kg	0.14	0.91	0.1 U		

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	MW-09	MW-09	MW-09		
	Sample ID	**MW09-4-031411**	**MW09-6-031411**	**MW09-10-031411**		
	Depth	4 ft	6-6.5 ft	10 ft		
	Date	03/14/2011	03/14/2011	03/14/2011		
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Benzo(g,h,i)perylene	mg/kg	0.11	0.1 U	0.1 U		
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Total HPAH	mg/kg	0.88	0.43	0.1 U		
Fluoranthene	mg/kg	0.19	0.22	0.1 U		
Pyrene	mg/kg	0.23	0.21	0.1 U		
Other SVOCs						
1,2,4-Trichlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U		
1,2-Dichlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U		
1,3-Dichlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U		
2,3,4,6-Tetrachlorophenol	mg/kg	0.25 U	0.25 U	0.25 U		
2,4,5-Trichlorophenol	mg/kg	0.1 U	0.1 U	0.1 U		
2,4,6-Trichlorophenol	mg/kg	0.1 U	0.1 U	0.1 U		
2,4-Dichlorophenol	mg/kg	0.1 U	0.1 U	0.1 U		
2,4-Dimethylphenol	mg/kg	0.1 U	0.1 U	0.1 U		
2,4-Dinitrophenol	mg/kg	0.5 U	0.5 U	0.5 U		
2,4-Dinitrotoluene	mg/kg	0.25 U	0.25 U	0.25 U		
2,6-Dichlorophenol	mg/kg	0.1 U	0.1 U	0.1 U		
2,6-Dinitrotoluene	mg/kg	0.25 U	0.25 U	0.25 U		
2-Chloronaphthalene	mg/kg	0.1 U	0.1 U	0.1 U		
2-Chlorophenol	mg/kg	0.1 U	0.1 U	0.1 U		
2-Methylphenol	mg/kg	0.1 U	0.1 U	0.1 U		
2-Nitroaniline	mg/kg	0.25 U	0.25 U	0.25 U		
2-Nitrophenol	mg/kg	0.25 U	0.25 U	0.25 U		
3,3'-Dichlorobenzidine	mg/kg	0.37 U	0.37 U	0.37 U		
4,6-Dinitro-o-cresol	mg/kg	0.1 U	0.1 U	0.1 U		
4-Chloro-3-methylphenol	mg/kg	0.1 U	0.1 U	0.1 U		
4-Chloroaniline	mg/kg	0.1 U	0.1 U	0.1 U		
4-Nitrophenol	mg/kg	0.5 U	0.5 U	0.5 U		
Aniline	mg/kg	0.1 U	0.1 U	0.1 U		
Azobenzene	mg/kg	0.1 U	0.1 U	0.1 U		
Benzoic Acid	mg/kg	1 U	1 U			
Benzyl Alcohol	mg/kg	0.1 U	0.1 U	0.1 U		
bis(2-chloroethoxy)methane	mg/kg	0.1 U	0.1 U	0.1 U		
Bis(2-chloroethyl) Ether	mg/kg	0.1 U	0.1 U	0.1 U		
Bis(2-ethylhexyl) Phthalate	mg/kg	0.13 U	0.13 U	0.13 U		
Butyl benzyl Phthalate	mg/kg	0.1 U	0.1 U	0.1 U		
Carbazole	mg/kg	0.1 U	0.12	0.1 U		
Dibenzofuran	mg/kg	0.1 U	0.21	0.1 U		
Diethylphthalate	mg/kg	0.1 U	0.1 U	0.1 U		
Dimethyl Phthalate	mg/kg	0.1 U	0.1 U	0.1 U		
Di-n-butyl Phthalate	mg/kg	0.13 U	0.13 U	0.13 U		

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	MW-09	MW-09	MW-09		
	Sample ID	**MW09-4-031411**	**MW09-6-031411**	**MW09-10-031411**		
	Depth	4 ft	6-6.5 ft	10 ft		
	Date	03/14/2011	03/14/2011	03/14/2011		
Other SVOCs						
Di-n-octyl phthalate	mg/kg	0.1 U	0.1 U	0.1 U		
Hexachlorobenzene	mg/kg	0.1 U	0.1 U	0.1 U		
Hexachlorobutadiene	mg/kg	0.01 U	0.01 U	0.01 U		
Hexachlorocyclopentadiene	mg/kg	0.5 U	0.5 U	0.5 U		
Hexachloroethane	mg/kg	0.1 U	0.1 U	0.1 U		
Isophorone	mg/kg	0.1 U	0.11	0.1 U		
m,p-Cresol (2:1 ratio)	mg/kg	0.1 U	0.1 U	0.1 U		
Nitrobenzene	mg/kg	0.1 U	0.1 U	0.1 U		
N-Nitrosodimethylamine	mg/kg	0.1 U	0.1 U	0.1 U		
N-Nitroso-di-n-propylamine	mg/kg	0.1 U	0.1 U	0.1 U		
N-Nitrosodiphenylamine	mg/kg	0.1 U	0.1 U	0.1 U		
Pentachlorophenol	mg/kg	0.5 U	0.5 U	0.5 U		
Phenol	mg/kg	0.1 U	0.1 U	0.1 U		
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH						
1,3,5-Trimethylbenzene	mg/kg	0.01 U	0.01 U	0.01 U		
Benzene	mg/kg	0.005 U	0.005 U	0.005 U		
Ethylbenzene	mg/kg	0.01 U	0.01 U	0.01 U		
Iso-propylbenzene	mg/kg	0.01 U	0.01 U	0.01 U		
n-Propylbenzene	mg/kg	0.01 U	0.01 U	0.01 U		
Toluene	mg/kg	0.01 U	0.01 U	0.01 U		
Xylene (meta & para)	mg/kg	0.02 U	0.02 U	0.02 U		
Xylene (ortho)	mg/kg	0.01 U	0.01 U	0.01 U		
Xylene (total)	mg/kg	0.02 U	0.02 U	0.02 U		
Other VOCs						
1,1,1,2-Tetrachloroethane	mg/kg	0.01 U	0.01 U	0.01 U		
1,1,1-Trichloroethane	mg/kg	0.01 U	0.01 U	0.01 U		
1,1,2,2-Tetrachloroethane	mg/kg	0.01 U	0.01 U	0.01 U		
1,1,2-Trichloroethane	mg/kg	0.01 U	0.01 U	0.01 U		
1,1-Dichloroethane	mg/kg	0.01 U	0.01 U	0.01 U		
1,1-Dichloroethene	mg/kg	0.01 U	0.01 U	0.01 U		
1,1-Dichloropropene	mg/kg	0.01 U	0.01 U	0.01 U		
1,2,3-Trichlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U		
1,2,3-Trichloropropane	mg/kg	0.01 U	0.01 U	0.01 U		
1,2,4-Trimethylbenzene	mg/kg	0.01 U	0.01 U	0.01 U		
1,2-Dibromo-3-chloropropane	mg/kg	0.05 U	0.05 U	0.05 U		
1,2-Dibromoethane (EDB)	mg/kg	0.005 U	0.005 U	0.005 U		
1,2-Dichloroethane (EDC)	mg/kg	0.01 U	0.01 U	0.01 U		
1,2-Dichloropropane	mg/kg	0.01 U	0.01 U	0.01 U		
1,3-Dichloropropane	mg/kg	0.01 U	0.01 U	0.01 U		
1,4-Dichlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U		
2,2-Dichloropropane	mg/kg	0.01 U	0.01 U	0.01 U		

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	MW-09	MW-09	MW-09		
	Sample ID	**MW09-4-031411**	**MW09-6-031411**	**MW09-10-031411**		
	Depth	4 ft	6-6.5 ft	10 ft		
	Date	03/14/2011	03/14/2011	03/14/2011		
Other VOCs						
2-Chlorotoluene	mg/kg	0.01 U	0.01 U	0.01 U		
2-Hexanone	mg/kg	0.05 U	0.05 U	0.05 U		
3-Nitroaniline	mg/kg	0.25 U	0.25 U	0.25 U		
4-Bromophenyl phenyl ether	mg/kg	0.1 U	0.1 U	0.1 U		
4-Chlorophenyl phenyl ether	mg/kg	0.1 U	0.1 U	0.1 U		
4-Chlorotoluene	mg/kg	0.01 U	0.01 U	0.01 U		
4-Nitroaniline	mg/kg	0.25 U	0.25 U	0.25 U		
Acetone	mg/kg	0.05 U	0.05 U	0.05 U		
Acrylonitrile	mg/kg	0.05 U	0.05 U	0.05 U		
bis(2-chloroisopropyl)ether	mg/kg	0.1 U	0.1 U	0.1 U		
Bromobenzene	mg/kg	0.01 U	0.01 U	0.01 U		
Bromochloromethane	mg/kg	0.01 U	0.01 U	0.01 U		
Bromodichloromethane	mg/kg	0.01 U	0.01 U	0.01 U		
Bromoform	mg/kg	0.01 U	0.01 U	0.01 U		
Bromomethane	mg/kg	0.01 U	0.01 U	0.01 U		
Carbon Disulfide	mg/kg	0.01 U	0.01 U	0.01 U		
Carbon Tetrachloride	mg/kg	0.01 U	0.01 U	0.01 U		
Chlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U		
Chloroethane	mg/kg	0.01 U	0.01 U	0.01 U		
Chloroform	mg/kg	0.01 U	0.01 U	0.01 U		
Chloromethane	mg/kg	0.01 U	0.01 U	0.01 U		
cis-1,2-Dichloroethene	mg/kg	0.01 U	0.01 U	0.01 U		
cis-1,3-Dichloropropene	mg/kg	0.01 U	0.01 U	0.01 U		
Cymene	mg/kg	0.01 U	0.01 U	0.01 U		
Dibromochloromethane	mg/kg	0.01 U	0.01 U	0.01 U		
Dibromomethane	mg/kg	0.01 U	0.01 U	0.01 U		
Dichlorodifluoromethane	mg/kg	0.01 U	0.01 U	0.01 U		
Methyl Ethyl Ketone	mg/kg	0.05 U	0.05 U	0.05 U		
Methyl Iso Butyl Ketone	mg/kg	0.05 U	0.05 U	0.05 U		
Methylene chloride	mg/kg	0.02 U	0.02 U	0.02 U		
n-Butylbenzene	mg/kg	0.01 U	0.019	0.01 U		
Methyl-tert-butyl ether	mg/kg	0.01 U	0.01 U	0.01 U		
Pyridine	mg/kg	0.2 U	0.2 U	0.2 U		
sec-Butylbenzene	mg/kg	0.01 U	0.017	0.01 U		
Styrene	mg/kg	0.01 U	0.01 U	0.01 U		
tert-Butylbenzene	mg/kg	0.01 U	0.01 U	0.01 U		
Tetrachloroethene	mg/kg	0.01 U	0.01 U	0.01 U		
trans-1,2-Dichloroethene	mg/kg	0.01 U	0.01 U	0.01 U		
trans-1,3-Dichloropropene	mg/kg	0.01 U	0.01 U	0.01 U		
Trichloroethene	mg/kg	0.01 U	0.01 U	0.01 U		
Trichlorofluoromethane	mg/kg	0.01 U	0.01 U	0.01 U		

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Round 1 Sampling (Floyd|Snider)				
	Location	MW-09	MW-09	MW-09		
	Sample ID	**MW09-4-031411**	**MW09-6-031411**	**MW09-10-031411**		
	Depth	4 ft	6-6.5 ft	10 ft		
	Date	03/14/2011	03/14/2011	03/14/2011		
Other VOCs						
Vinyl Chloride	mg/kg	0.01 U	0.01 U	0.01 U		
Total Petroleum Hydrocarbons (TPH)						
Gasoline-Range Hydrocarbons	mg/kg	5.6	230 J	3.6 U		
Diesel-Range Hydrocarbons	mg/kg	34	2600	25 U		
Oil-Range Hydrocarbons	mg/kg	74	100 U	50 U		

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
	Location	FS-19	FS-19	FS-19	FS-19	FS-19
	Sample ID	**FS-19-3.0-3.5-012913**	**FS-19-6.0-6.5-012913**	**FS-19-7.0-7.5-012913**	**FS-19-8.0-8.5-012913**	**FS-19-11.5-12.0-012913**
	Depth	3-3.5 ft	6-6.5 ft	7-7.5 ft	8-8.5 ft	11.5-12 ft
	Date	01/29/2013	01/29/2013	01/29/2013	01/29/2013	01/29/2013
Conventionals						
Total Solids	%		88.91			
Ash Content	%		98.88			
Organic Content	%		1.12			
Dry Density	PCF				114.4	
Wet Density	PCF				130.1	
Moisture	%				13.74	
Porosity	Std Units				0.33	
Specific gravity	Std Units				2.747	
Metals						
Antimony	mg/kg	0.87		0.5 U		0.5 U
Arsenic	mg/kg	29		2.5		1.9
Beryllium	mg/kg	0.5 U		0.5 U		0.5 U
Cadmium	mg/kg	0.81		0.5 U		0.5 U
Chromium	mg/kg	38		31		31
Copper	mg/kg	490		20		14
Lead	mg/kg	260		2.2		1.5
Mercury	mg/kg	3.1		0.02 U		0.02 U
Nickel	mg/kg	80		42		31
Selenium	mg/kg	5 U		5 U		5 U
Silver	mg/kg	0.5 U		0.5 U		0.5 U
Thallium	mg/kg	5 U		4.9 U		4.7 U
Zinc	mg/kg	400		29		23
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	mg/kg	0.44		0.025		0.015
Benzo(a)pyrene	mg/kg	0.56		0.017 U		0.017 U
Benzo(b)fluoranthene	mg/kg	1		0.02 U		0.02 U
Benzo(k)fluoranthene	mg/kg	0.74		0.02 U		0.02 U
Chrysene	mg/kg	0.87		0.048		0.015
Dibenzo(a,h)anthracene	mg/kg	0.44		0.018 U		0.018 U
Indeno(1,2,3-cd)pyrene	mg/kg	0.2 U		0.02 U		0.02 U
cPAHs (MTCA TEQ-HalfND)	mg/kg	0.84		0.015		0.014
cPAHs (MTCA TEQ-ZeroND)	mg/kg	0.83		0.003		0.0017
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
1-Methylnaphthalene	mg/kg	0.22		1.8		0.22
2-Methylnaphthalene	mg/kg	0.22		0.63		0.27
Naphthalene	mg/kg	0.23		0.031		0.02 U
Acenaphthene	mg/kg	0.19		0.28		0.089
Acenaphthylene	mg/kg	0.33		0.02 U		0.02 U
Anthracene	mg/kg	0.23		0.02 U		0.024
Fluorene	mg/kg	0.2 U		0.72		0.12
Phenanthrene	mg/kg	0.91		1.1		0.28

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
	Location	FS-19	FS-19	FS-19	FS-19	FS-19
	Sample ID	**FS-19-3.0-3.5-012913**	**FS-19-6.0-6.5-012913**	**FS-19-7.0-7.5-012913**	**FS-19-8.0-8.5-012913**	**FS-19-11.5-12.0-012913**
	Depth	3-3.5 ft	6-6.5 ft	7-7.5 ft	8-8.5 ft	11.5-12 ft
	Date	01/29/2013	01/29/2013	01/29/2013	01/29/2013	01/29/2013
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Benzo(g,h,i)perylene	mg/kg	0.73		0.02 U		0.02 U
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Fluoranthene	mg/kg	1.2		0.054		0.068
Pyrene	mg/kg	2.6		0.02 U		0.073
Other SVOCs						
1,2,4-Trichlorobenzene	mg/kg	0.1 U		0.01 U		0.01 U
1,2-Dichlorobenzene	mg/kg	0.2 U		0.02 U		0.02 U
1,3-Dichlorobenzene	mg/kg	1 U		0.1 U		0.1 U
2,3,4,6-Tetrachlorophenol	mg/kg	1 U		0.1 U		0.1 U
2,4,5-Trichlorophenol	mg/kg	1 U		0.1 U		0.1 U
2,4,6-Trichlorophenol	mg/kg	1 U		0.1 U		0.1 U
2,4-Dichlorophenol	mg/kg	0.2 U		0.02 U		0.02 U
2,4-Dimethylphenol	mg/kg	1 U		0.1 U		0.1 U
2,4-Dinitrophenol	mg/kg	1 U		0.1 U		0.1 U
2,4-Dinitrotoluene	mg/kg	0.1 U		0.01 U		0.01 U
2,6-Dichlorophenol	mg/kg	2.5 U		0.25 U		0.25 U
2,6-Dinitrotoluene	mg/kg	1 U		0.1 U		0.1 U
2-Chloronaphthalene	mg/kg	1 U		0.1 U		0.1 U
2-Chlorophenol	mg/kg	0.36 U		0.035 U		0.034 U
2-Methylphenol	mg/kg	1 U		0.1 U		0.1 U
2-Nitroaniline	mg/kg	1 U		0.1 U		0.1 U
2-Nitrophenol	mg/kg	1 U		0.1 U		0.1 U
3,3'-Dichlorobenzidine	mg/kg	1 U		0.1 U		0.1 U
4,6-Dinitro-o-cresol	mg/kg	1 U		0.1 U		0.1 U
4-Chloro-3-methylphenol	mg/kg	5 U		0.5 U		0.5 U
4-Chloroaniline	mg/kg	10 U		1 U		1 U
4-Nitrophenol	mg/kg	1 U		0.1 U		0.1 U
Aniline	mg/kg	1 U		0.1 U		0.1 U
Azobenzene	mg/kg	1 U		0.1 U		0.1 U
Benzoic Acid	mg/kg	10 U		1 U		1 U
Benzyl Alcohol	mg/kg	1 U		0.1 U		0.1 U
bis(2-chloroethoxy)methane	mg/kg	2.5 U		0.25 U		0.25 U
Bis(2-chloroethyl) Ether	mg/kg	1 U		0.1 U		0.1 U
Bis(2-ethylhexyl) Phthalate	mg/kg	1 U		0.1 U		0.1 U
Butyl benzyl Phthalate	mg/kg	1 U		0.1 U		0.1 U
Carbazole	mg/kg	2.5 U		0.25 U		0.25 U
Dibenzofuran	mg/kg	1 U		0.1 U		0.1 U
Diethylphthalate	mg/kg	1 U		0.1 U		0.1 U
Dimethyl Phthalate	mg/kg	1 U		0.1 U		0.1 U
Di-n-butyl Phthalate	mg/kg	1 U		0.1 U		0.1 U
Di-n-octyl phthalate	mg/kg	1 U		0.1 U		0.1 U

Table C.9
Chemistry Data for Soil Samples

		Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
		Location	FS-19	FS-19	FS-19	FS-19	FS-19
		Sample ID	**FS-19-3.0-3.5-012913**	**FS-19-6.0-6.5-012913**	**FS-19-7.0-7.5-012913**	**FS-19-8.0-8.5-012913**	**FS-19-11.5-12.0-012913**
		Depth	3-3.5 ft	6-6.5 ft	7-7.5 ft	8-8.5 ft	11.5-12 ft
		Date	01/29/2013	01/29/2013	01/29/2013	01/29/2013	01/29/2013
Other SVOCs							
Hexachlorobenzene	mg/kg		0.8 U		0.08 U		0.08 U
Hexachlorobutadiene	mg/kg		1 U		0.14 U		0.14 U
Hexachlorocyclopentadiene	mg/kg		1 U		0.1 U		0.1 U
Hexachloroethane	mg/kg		0.2 U		0.02 U		0.02 U
Isophorone	mg/kg		1 U		0.1 U		0.1 U
m,p-Cresol (2:1 ratio)	mg/kg		1 U		0.1 U		0.1 U
Nitrobenzene	mg/kg		1 U		0.1 U		0.1 U
N-Nitrosodimethylamine	mg/kg		1 U		0.1 U		0.1 U
N-Nitroso-di-n-propylamine	mg/kg		0.2 U		0.02 U		0.02 U
N-Nitrosodiphenylamine	mg/kg		1 U		0.1 U		0.1 U
Pentachlorophenol	mg/kg		1 U		0.1 U		0.1 U
Phenol	mg/kg		1 U		0.1 U		0.1 U
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH							
Benzene	mg/kg				0.03 U		0.03 U
Ethylbenzene	mg/kg				0.18		0.05 U
Toluene	mg/kg				0.05 U		0.05 U
Xylene (total)	mg/kg				0.28		0.2 U
Other VOCs							
1,4-Dichlorobenzene	mg/kg		0.05 U		0.005 U		0.005 U
3-Nitroaniline	mg/kg		10 U		1 U		1 U
4-Bromophenyl phenyl ether	mg/kg		1 U		0.1 U		0.1 U
4-Chlorophenyl phenyl ether	mg/kg		1 U		0.1 U		0.1 U
4-Nitroaniline	mg/kg		2.5 U		0.25 U		0.25 U
bis(2-chloroisopropyl)ether	mg/kg		2.5 U		0.25 U		0.25 U
Pyridine	mg/kg		2 U		0.2 U		0.2 U
Total Petroleum Hydrocarbons (TPH)							
Gasoline-Range Hydrocarbons	mg/kg				67 U		5.7 U
Diesel-Range Hydrocarbons	mg/kg				2800 JM		25 U
Oil-Range Hydrocarbons	mg/kg				160 JM		50 U
EPH/VPH							
C5-C6 Aliphatics	mg/kg				5 U		
C6-C8 Aliphatics	mg/kg				9.3		
C8-C10 Aliphatics	mg/kg				30		
C10-C12 Aliphatics	mg/kg				230		
C12-C16 Aliphatics	mg/kg				1200		
C16-C21 Aliphatics	mg/kg				1100		
C21-C34 Aliphatics	mg/kg				430		
C8-C10 Aromatics	mg/kg				56		
C10-C12 Aromatics	mg/kg				18		
C12-C16 Aromatics	mg/kg				200		
C16-C21 Aromatics	mg/kg				780		

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
	Location	FS-19	FS-19	FS-19	FS-19	FS-19
	Sample ID	**FS-19-3.0-3.5-012913**	**FS-19-6.0-6.5-012913**	**FS-19-7.0-7.5-012913**	**FS-19-8.0-8.5-012913**	**FS-19-11.5-12.0-012913**
	Depth	3-3.5 ft	6-6.5 ft	7-7.5 ft	8-8.5 ft	11.5-12 ft
	Date	01/29/2013	01/29/2013	01/29/2013	01/29/2013	01/29/2013
EPH/VPH						
C21-C34 Aromatics	mg/kg			240		
n-Hexane	mg/kg			0.2 U		

Table C.9
Chemistry Data for Soil Samples

		Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
		Location	FS-19	FS-19	FS-19	FS-20	FS-20
		Sample ID	**FS-19-19.0-19.5-012913**	**FS-19-19.5-20.0-012913**	**FS-19-27.0-27.5-012913**	**FS-20-2.5-3.0-012913**	**FS-20-10.5-11.0-012913**
		Depth	19-19.5 ft	19.5-20 ft	27-27.5 ft	2.5-3 ft	10.5-11 ft
		Date	01/29/2013	01/29/2013	01/29/2013	01/29/2013	01/29/2013
Conventionals							
Total Solids	%		87.23				
Ash Content	%		99.33				
Organic Content	%		0.67				
Dry Density	PCF			110.1			
Wet Density	PCF			123.7			
Moisture	%			12.32			
Porosity	Std Units			0.35			
Specific gravity	Std Units			2.726			
Metals							
Antimony	mg/kg				0.5 U	0.5 U	0.5 U
Arsenic	mg/kg				3.6	9.2	2.4
Beryllium	mg/kg				0.5 U	0.5 U	0.5 U
Cadmium	mg/kg				0.5 U	0.5 U	0.5 U
Chromium	mg/kg				36	36	32
Copper	mg/kg				21	19	19
Lead	mg/kg				2	2.5	3.9
Mercury	mg/kg				0.02 U	0.024	0.028
Nickel	mg/kg				52	40	37
Selenium	mg/kg				5 U	5 U	5 U
Silver	mg/kg				0.5 U	0.5 U	0.5 U
Thallium	mg/kg				4.9 U	4.8 U	5.2 U
Zinc	mg/kg				24	30	32
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
Benz(a)anthracene	mg/kg				0.0065 U	0.0065 U	0.32
Benzo(a)pyrene	mg/kg				0.017 U	0.017 U	0.42 U
Benzo(b)fluoranthene	mg/kg				0.02 U	0.02 U	0.5 U
Benzo(k)fluoranthene	mg/kg				0.02 U	0.02 U	0.5 U
Chrysene	mg/kg				0.0072 U	0.0072 U	0.28
Dibenzo(a,h)anthracene	mg/kg				0.018 U	0.018 U	0.45 U
Indeno(1,2,3-cd)pyrene	mg/kg				0.02 U	0.02 U	0.5 U
cPAHs (MTCA TEQ-HalfND)	mg/kg				0.013 U	0.013 U	0.034
cPAHs (MTCA TEQ-ZeroND)	mg/kg				0.017 U	0.017 U	0.035
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
1-Methylnaphthalene	mg/kg				0.02 U	0.02 U	6.6
2-Methylnaphthalene	mg/kg				0.02 U	0.02 U	6.2
Naphthalene	mg/kg				0.02 U	0.02 U	0.5 U
Acenaphthene	mg/kg				0.041	0.017 U	1.6
Acenaphthylene	mg/kg				0.02 U	0.02 U	0.5 U
Anthracene	mg/kg				0.02 U	0.02 U	0.5 U
Fluorene	mg/kg				0.02 U	0.02 U	2.9
Phenanthrene	mg/kg				0.02 U	0.02 U	4.7

Table C.9
Chemistry Data for Soil Samples

		Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
		Location	FS-19	FS-19	FS-19	FS-20	FS-20
		Sample ID	**FS-19-19.0-19.5-012913**	**FS-19-19.5-20.0-012913**	**FS-19-27.0-27.5-012913**	**FS-20-2.5-3.0-012913**	**FS-20-10.5-11.0-012913**
		Depth	19-19.5 ft	19.5-20 ft	27-27.5 ft	2.5-3 ft	10.5-11 ft
		Date	01/29/2013	01/29/2013	01/29/2013	01/29/2013	01/29/2013
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Benzo(g,h,i)perylene	mg/kg				0.02 U	0.02 U	0.5 U
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Fluoranthene	mg/kg				0.02 U	0.02 U	1.4
Pyrene	mg/kg				0.02 U	0.02 U	1.3
Other SVOCs							
1,2,4-Trichlorobenzene	mg/kg				0.01 U	0.01 U	0.25 U
1,2-Dichlorobenzene	mg/kg				0.02 U	0.02 U	0.5 U
1,3-Dichlorobenzene	mg/kg				0.1 U	0.1 U	2.5 U
2,3,4,6-Tetrachlorophenol	mg/kg				0.1 U	0.1 U	2.5 U
2,4,5-Trichlorophenol	mg/kg				0.1 U	0.1 U	2.5 U
2,4,6-Trichlorophenol	mg/kg				0.1 U	0.1 U	2.5 U
2,4-Dichlorophenol	mg/kg				0.02 U	0.02 U	0.5 U
2,4-Dimethylphenol	mg/kg				0.1 U	0.1 U	2.5 U
2,4-Dinitrophenol	mg/kg				0.1 U	0.1 U	2.5 U
2,4-Dinitrotoluene	mg/kg				0.01 U	0.01 U	0.25 U
2,6-Dichlorophenol	mg/kg				0.25 U	0.25 U	6.2 U
2,6-Dinitrotoluene	mg/kg				0.1 U	0.1 U	2.5 U
2-Chloronaphthalene	mg/kg				0.1 U	0.1 U	2.5 U
2-Chlorophenol	mg/kg				0.035 U	0.033 U	0.88 U
2-Methylphenol	mg/kg				0.1 U	0.1 U	2.5 U
2-Nitroaniline	mg/kg				0.1 U	0.1 U	2.5 U
2-Nitrophenol	mg/kg				0.1 U	0.1 U	2.5 U
3,3'-Dichlorobenzidine	mg/kg				0.1 U	0.1 U	2.5 U
4,6-Dinitro-o-cresol	mg/kg				0.1 U	0.1 U	2.5 U
4-Chloro-3-methylphenol	mg/kg				0.5 U	0.5 U	12 U
4-Chloroaniline	mg/kg				1 U	1 U	25 U
4-Nitrophenol	mg/kg				0.1 U	0.1 U	2.5 U
Aniline	mg/kg				0.1 U	0.1 U	2.5 U
Azobenzene	mg/kg				0.1 U	0.1 U	2.5 U
Benzoic Acid	mg/kg				1 U	1 U	25 U
Benzyl Alcohol	mg/kg				0.1 U	0.1 U	2.5 U
bis(2-chloroethoxy)methane	mg/kg				0.25 U	0.25 U	6.2 U
Bis(2-chloroethyl) Ether	mg/kg				0.1 U	0.1 U	2.5 U
Bis(2-ethylhexyl) Phthalate	mg/kg				0.1 U	0.1 U	2.5 U
Butyl benzyl Phthalate	mg/kg				0.1 U	0.1 U	2.5 U
Carbazole	mg/kg				0.25 U	0.25 U	6.2 U
Dibenzofuran	mg/kg				0.1 U	0.1 U	2.5 U
Diethylphthalate	mg/kg				0.1 U	0.1 U	2.5 U
Dimethyl Phthalate	mg/kg				0.1 U	0.1 U	2.5 U
Di-n-butyl Phthalate	mg/kg				0.1 U	0.1 U	2.5 U
Di-n-octyl phthalate	mg/kg				0.1 U	0.1 U	2.5 U

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
	Location	FS-19	FS-19	FS-19	FS-20	FS-20
	Sample ID	**FS-19-19.0-19.5-012913**	**FS-19-19.5-20.0-012913**	**FS-19-27.0-27.5-012913**	**FS-20-2.5-3.0-012913**	**FS-20-10.5-11.0-012913**
	Depth	19-19.5 ft	19.5-20 ft	27-27.5 ft	2.5-3 ft	10.5-11 ft
	Date	01/29/2013	01/29/2013	01/29/2013	01/29/2013	01/29/2013
Other SVOCs						
Hexachlorobenzene	mg/kg			0.08 U	0.08 U	2 U
Hexachlorobutadiene	mg/kg			0.14 U	0.13 U	2.5 U
Hexachlorocyclopentadiene	mg/kg			0.1 U	0.1 U	2.5 U
Hexachloroethane	mg/kg			0.02 U	0.02 U	0.5 U
Isophorone	mg/kg			0.1 U	0.1 U	2.5 U
m,p-Cresol (2:1 ratio)	mg/kg			0.1 U	0.1 U	2.5 U
Nitrobenzene	mg/kg			0.1 U	0.1 U	2.5 U
N-Nitrosodimethylamine	mg/kg			0.1 U	0.1 U	2.5 U
N-Nitroso-di-n-propylamine	mg/kg			0.02 U	0.02 U	0.5 U
N-Nitrosodiphenylamine	mg/kg			0.1 U	0.1 U	2.5 U
Pentachlorophenol	mg/kg			0.1 U	0.1 U	2.5 U
Phenol	mg/kg			0.1 U	0.1 U	2.5 U
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH						
Benzene	mg/kg			0.03 U		0.03 U
Ethylbenzene	mg/kg			0.05 U		0.076
Toluene	mg/kg			0.05 U		0.05 U
Xylene (total)	mg/kg			0.2 U		0.2 U
Other VOCs						
1,4-Dichlorobenzene	mg/kg			0.005 U	0.005 U	0.12 U
3-Nitroaniline	mg/kg			1 U	1 U	25 U
4-Bromophenyl phenyl ether	mg/kg			0.1 U	0.1 U	2.5 U
4-Chlorophenyl phenyl ether	mg/kg			0.1 U	0.1 U	2.5 U
4-Nitroaniline	mg/kg			0.25 U	0.25 U	6.2 U
bis(2-chloroisopropyl)ether	mg/kg			0.25 U	0.25 U	6.2 U
Pyridine	mg/kg			0.2 U	0.2 U	5 U
Total Petroleum Hydrocarbons (TPH)						
Gasoline-Range Hydrocarbons	mg/kg			3 U		94 U
Diesel-Range Hydrocarbons	mg/kg			25 U		2500 JM
Oil-Range Hydrocarbons	mg/kg			50 U		100 U
EPH/VPH						
C5-C6 Aliphatics	mg/kg			5 U		5 U
C6-C8 Aliphatics	mg/kg			5 U		5 U
C8-C10 Aliphatics	mg/kg			5 U		36
C10-C12 Aliphatics	mg/kg			5 U		220
C12-C16 Aliphatics	mg/kg			5 U		930
C16-C21 Aliphatics	mg/kg			5 U		750
C21-C34 Aliphatics	mg/kg			5 U		190
C8-C10 Aromatics	mg/kg			5 U		31
C10-C12 Aromatics	mg/kg			5 U		43
C12-C16 Aromatics	mg/kg			5 U		320
C16-C21 Aromatics	mg/kg			5 U		710

Table C.9
Chemistry Data for Soil Samples

		Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
		Location	FS-19	FS-19	FS-19	FS-20	FS-20
		Sample ID	**FS-19-19.0-19.5-012913**	**FS-19-19.5-20.0-012913**	**FS-19-27.0-27.5-012913**	**FS-20-2.5-3.0-012913**	**FS-20-10.5-11.0-012913**
		Depth	19-19.5 ft	19.5-20 ft	27-27.5 ft	2.5-3 ft	10.5-11 ft
		Date	01/29/2013	01/29/2013	01/29/2013	01/29/2013	01/29/2013
EPH/VPH							
C21-C34 Aromatics	mg/kg				5 U		150
n-Hexane	mg/kg				0.2 U		0.2 U

Table C.9
Chemistry Data for Soil Samples

		Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
		Location	FS-20	FS-21	FS-21	FS-21	FS-21
		Sample ID	**FS-20-15.5-16.0-012913**	**FS-21-0-0.5-013013**	**FS-21-3.5-4.0-013013**	**FS-21-8.0-9.0-013013**	**FS-21-13.5-14.0-013013**
		Depth	15.5-16 ft	0-0.5 ft	3.5-4 ft	8-9 ft	13.5-14 ft
		Date	01/29/2013	01/30/2013	01/29/2013	01/30/2013	01/30/2013
Metals							
Antimony	mg/kg		0.5 U		0.5 U	0.5 U	0.5 U
Arsenic	mg/kg		2.6		24	3.1	4
Beryllium	mg/kg		0.5 U		0.5 U	0.5 U	0.5 U
Cadmium	mg/kg		0.5 U		0.5 U	0.5 U	0.5 U
Chromium	mg/kg		33		42	37	34
Copper	mg/kg		10		37	21	24
Lead	mg/kg		1.7		9.4	2.4	15
Mercury	mg/kg		0.02 U		0.047	0.033	0.026
Nickel	mg/kg		29		54	44	32
Selenium	mg/kg		5 U		5 U	5 U	5 U
Silver	mg/kg		0.5 U		0.5 U	0.5 U	0.5 U
Thallium	mg/kg		5.7 U		5 U	5 U	5.5 U
Zinc	mg/kg		24		66	36	34
Dioxin/Furans							
2,3,7,8-TCDD (Dioxin)	pg/g			0.678 U			
1,2,3,7,8-PeCDD	pg/g			5.32			
1,2,3,4,7,8-HxCDD	pg/g			7.1			
1,2,3,6,7,8-HxCDD	pg/g			30.8			
1,2,3,7,8,9-HxCDD	pg/g			15.6			
1,2,3,4,6,7,8-HpCDD	pg/g			959			
Total OCDD	pg/g			9600 J			
2,3,7,8-TCDF	pg/g			2.06			
1,2,3,7,8-PeCDF	pg/g			1.52 J			
2,3,4,7,8-PeCDF	pg/g			2.15			
1,2,3,4,7,8-HxCDF	pg/g			6.08			
1,2,3,6,7,8-HxCDF	pg/g			5.21			
1,2,3,7,8,9-HxCDF	pg/g			1.64 U			
2,3,4,6,7,8-HxCDF	pg/g			5.43			
1,2,3,4,6,7,8-HpCDF	pg/g			195 J			
1,2,3,4,7,8,9-HpCDF	pg/g			11.4			
Total OCDF	pg/g			603			
Dioxin/Furans (MTCA TEQ-Hal	pg/g			28.4 J			
Dioxin/Furans (MTCA TEQ-Zer	pg/g			28 J			
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
Benz(a)anthracene	mg/kg		0.0065 U		38	0.52	24
Benzo(a)pyrene	mg/kg		0.017 U		16	0.32	16
Benzo(b)fluoranthene	mg/kg		0.02 U		20	0.43	16
Benzo(k)fluoranthene	mg/kg		0.02 U		23	0.27	12
Chrysene	mg/kg		0.0072 U		38	0.48	24
Dibenzo(a,h)anthracene	mg/kg		0.018 U		9 U	0.12	4.7
Indeno(1,2,3-cd)pyrene	mg/kg		0.02 U		10 U	0.044	2.1

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
	Location	FS-20	FS-21	FS-21	FS-21	FS-21
	Sample ID	**FS-20-15.5-16.0-012913**	**FS-21-0-0.5-013013**	**FS-21-3.5-4.0-013013**	**FS-21-8.0-9.0-013013**	**FS-21-13.5-14.0-013013**
	Depth	15.5-16 ft	0-0.5 ft	3.5-4 ft	8-9 ft	13.5-14 ft
	Date	01/29/2013	01/30/2013	01/29/2013	01/30/2013	01/30/2013
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
cPAHs (MTCA TEQ-HalfND)	mg/kg	0.013 U		25	0.46	22
cPAHs (MTCA TEQ-ZeroND)	mg/kg	0.017 U		25	0.46	22
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
1-Methylnaphthalene	mg/kg	0.033		80	0.43	73
2-Methylnaphthalene	mg/kg	0.027		140	0.65	130
Naphthalene	mg/kg	0.022		300	0.87	320
Acenaphthene	mg/kg	0.14		150	0.91	120
Acenaphthylene	mg/kg	0.02 U		10 U	0.02 U	2 U
Anthracene	mg/kg	0.02 U		63	0.47	40
Fluorene	mg/kg	0.031		130	0.79	100
Phenanthrene	mg/kg	0.02 U		450	2.6	330
Benzo(g,h,i)perylene	mg/kg	0.02 U		10 U	0.2	8.1
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Fluoranthene	mg/kg	0.02 U		200	2.1	130
Pyrene	mg/kg	0.02 U		190	2	120
Other SVOCs						
1,2,4-Trichlorobenzene	mg/kg	0.01 U		5 U	0.01 U	1 U
1,2-Dichlorobenzene	mg/kg	0.02 U		10 U	0.02 U	2 U
1,3-Dichlorobenzene	mg/kg	0.1 U		50 U	0.1 U	10 U
2,3,4,6-Tetrachlorophenol	mg/kg	0.1 U		50 U	0.1 U	10 U
2,4,5-Trichlorophenol	mg/kg	0.1 U		50 U	0.1 U	10 U
2,4,6-Trichlorophenol	mg/kg	0.1 U		50 U	0.1 U	10 U
2,4-Dichlorophenol	mg/kg	0.02 U		10 U	0.02 U	2 U
2,4-Dimethylphenol	mg/kg	0.1 U		50 U	0.1 U	10 U
2,4-Dinitrophenol	mg/kg	0.1 U		50 U	0.1 U	10 U
2,4-Dinitrotoluene	mg/kg	0.01 U		5 U	0.01 U	1 U
2,6-Dichlorophenol	mg/kg	0.25 U		120 U	0.25 U	25 U
2,6-Dinitrotoluene	mg/kg	0.1 U		50 U	0.1 U	10 U
2-Chloronaphthalene	mg/kg	0.1 U		50 U	0.1 U	10 U
2-Chlorophenol	mg/kg	0.04 U		17 U	0.034 U	5.4 U
2-Methylphenol	mg/kg	0.1 U		50 U	0.1 U	10 U
2-Nitroaniline	mg/kg	0.1 U		50 U	0.1 U	10 U
2-Nitrophenol	mg/kg	0.1 U		50 U	0.1 U	10 U
3,3'-Dichlorobenzidine	mg/kg	0.1 U		50 U	0.1 U	10 U
4,6-Dinitro-o-cresol	mg/kg	0.1 U		50 U	0.1 U	10 U
4-Chloro-3-methylphenol	mg/kg	0.5 U		250 U	0.5 U	50 U
4-Chloroaniline	mg/kg	1 U		500 U	1 U	100 U
4-Nitrophenol	mg/kg	0.1 U		50 U	0.1 U	10 U
Aniline	mg/kg	0.1 U		50 U	0.1 U	10 U
Azobenzene	mg/kg	0.1 U		50 U	0.1 U	10 U
Benzoic Acid	mg/kg	1 U		500 U	1 U	100 U

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
	Location	FS-20	FS-21	FS-21	FS-21	FS-21
	Sample ID	**FS-20-15.5-16.0-012913**	**FS-21-0-0.5-013013**	**FS-21-3.5-4.0-013013**	**FS-21-8.0-9.0-013013**	**FS-21-13.5-14.0-013013**
	Depth	15.5-16 ft	0-0.5 ft	3.5-4 ft	8-9 ft	13.5-14 ft
	Date	01/29/2013	01/30/2013	01/29/2013	01/30/2013	01/30/2013
Other SVOCs						
Benzyl Alcohol	mg/kg	0.1 U		50 U	0.1 U	10 U
bis(2-chloroethoxy)methane	mg/kg	0.25 U		120 U	0.25 U	25 U
Bis(2-chloroethyl) Ether	mg/kg	0.12 U		50 U	0.1 U	10 U
Bis(2-ethylhexyl) Phthalate	mg/kg	0.1 U		50 U	0.1 U	10 U
Butyl benzyl Phthalate	mg/kg	0.1 U		50 U	0.1 U	10 U
Carbazole	mg/kg	0.25 U		120 U	0.56	110
Dibenzofuran	mg/kg	0.1 U		94	0.53	76
Diethylphthalate	mg/kg	0.1 U		50 U	0.1 U	10 U
Dimethyl Phthalate	mg/kg	0.1 U		50 U	0.1 U	10 U
Di-n-butyl Phthalate	mg/kg	0.1 U		50 U	0.1 U	10 U
Di-n-octyl phthalate	mg/kg	0.1 U		50 U	0.1 U	10 U
Hexachlorobenzene	mg/kg	0.08 U		40 U	0.08 U	8 U
Hexachlorobutadiene	mg/kg	0.16 U		50 U	0.14 U	10 U
Hexachlorocyclopentadiene	mg/kg	0.1 U		50 U	0.1 U	10 U
Hexachloroethane	mg/kg	0.02 U		10 U	0.02 U	2 U
Isophorone	mg/kg	0.1 U		50 U	0.1 U	10 U
m,p-Cresol (2:1 ratio)	mg/kg	0.1 U		50 U	0.1 U	10 U
Nitrobenzene	mg/kg	0.1 U		50 U	0.1 U	10 U
N-Nitrosodimethylamine	mg/kg	0.1 U		50 U	0.1 U	10 U
N-Nitroso-di-n-propylamine	mg/kg	0.02 U		10 U	0.02 U	2 U
N-Nitrosodiphenylamine	mg/kg	0.1 U		50 U	0.1 U	10 U
Pentachlorophenol	mg/kg	0.1 U		50 U	0.1 U	10 U
Phenol	mg/kg	0.1 U		50 U	0.1 U	10 U
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH						
Benzene	mg/kg	0.03 U			0.03 U	0.06 U
Ethylbenzene	mg/kg	0.05 U			0.05 U	0.18
Toluene	mg/kg	0.05 U			0.05 U	0.1 U
Xylene (total)	mg/kg	0.2 U			0.2 U	0.6
Other VOCs						
1,4-Dichlorobenzene	mg/kg	0.005 U		2.5 U	0.005 U	0.5 U
3-Nitroaniline	mg/kg	1 U		500 U	1 U	100 U
4-Bromophenyl phenyl ether	mg/kg	0.1 U		50 U	0.1 U	10 U
4-Chlorophenyl phenyl ether	mg/kg	0.1 U		50 U	0.1 U	10 U
4-Nitroaniline	mg/kg	0.25 U		120 U	0.25 U	25 U
bis(2-chloroisopropyl)ether	mg/kg	0.25 U		120 U	0.25 U	25 U
Pyridine	mg/kg	0.2 U		100 U	0.2 U	20 U
Total Petroleum Hydrocarbons (TPH)						
Gasoline-Range Hydrocarbons	mg/kg	3 U			6.7 JM	72 JM
Diesel-Range Hydrocarbons	mg/kg	25 U			4100 JM	5600 JM
Oil-Range Hydrocarbons	mg/kg	50 U			510 JM	670 U
EPH/VPH						

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
	Location	FS-20	FS-21	FS-21	FS-21	FS-21
	Sample ID	**FS-20-15.5-16.0-012913**	**FS-21-0-0.5-013013**	**FS-21-3.5-4.0-013013**	**FS-21-8.0-9.0-013013**	**FS-21-13.5-14.0-013013**
	Depth	15.5-16 ft	0-0.5 ft	3.5-4 ft	8-9 ft	13.5-14 ft
	Date	01/29/2013	01/30/2013	01/29/2013	01/30/2013	01/30/2013
EPH/VPH						
C5-C6 Aliphatics	mg/kg				5 U	
C6-C8 Aliphatics	mg/kg				5 U	
C8-C10 Aliphatics	mg/kg				5 U	
C10-C12 Aliphatics	mg/kg				5 U	
C12-C16 Aliphatics	mg/kg				28	
C16-C21 Aliphatics	mg/kg				34	
C21-C34 Aliphatics	mg/kg				32	
C8-C10 Aromatics	mg/kg				10 J	
C10-C12 Aromatics	mg/kg				330 J	
C12-C16 Aromatics	mg/kg				640 J	
C16-C21 Aromatics	mg/kg				2300 J	
C21-C34 Aromatics	mg/kg				1000 J	
n-Hexane	mg/kg				0.2 U	

Table C.9
Chemistry Data for Soil Samples

		Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
		Location	FS-21	FS-22	FS-22	FS-22	FS-22
		Sample ID	**FS-21-22.0-22.5-013013**	**FS-22-3.0-3.5-013013**	**FS-22-7.0-8.0-013013**	**FS-78-7.0-8.0-013013**	**FS-22-11.5-12.0-013013**
		Depth	22-22.5 ft	3-3.5 ft	7-8 ft	7-8 ft	11.5-12 ft
		Date	01/30/2013	01/30/2013	01/30/2013	01/30/2013	01/30/2013
Conventionals							
Total Solids	%						88.5
Ash Content	%						99.4
Organic Content	%						0.6
Metals							
Antimony	mg/kg		0.5 U	0.5 U	0.5 U	0.5 U	
Arsenic	mg/kg		3	3.2	3.8	3.1	
Beryllium	mg/kg		0.5 U	0.5 U	0.5 U	0.5 U	
Cadmium	mg/kg		0.5 U	0.5 U	0.5 U	0.5 U	
Chromium	mg/kg		38	38	41	35	
Copper	mg/kg		17	20	23	19	
Lead	mg/kg		1.6	3.8	2.9	2.3	
Mercury	mg/kg		0.02 U	0.023	0.025	0.025	
Nickel	mg/kg		47	39	43	37	
Selenium	mg/kg		5 U	5 U	5 U	5 U	
Silver	mg/kg		0.5 U	0.5 U	0.5 U	0.5 U	
Thallium	mg/kg		4.9 U	4.8 U	4.9 U	4.7 U	
Zinc	mg/kg		24	33	43	35	
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
Benz(a)anthracene	mg/kg		0.021	0.0065 U	0.0065 U	0.0065 U	
Benzo(a)pyrene	mg/kg		0.017 U	0.017 U	0.017 U	0.017 U	
Benzo(b)fluoranthene	mg/kg		0.02 U	0.02 U	0.02 U	0.02 U	
Benzo(k)fluoranthene	mg/kg		0.02 U	0.02 U	0.02 U	0.02 U	
Chrysene	mg/kg		0.018	0.0072 U	0.0072 U	0.0072 U	
Dibenzo(a,h)anthracene	mg/kg		0.018 U	0.018 U	0.018 U	0.018 U	
Indeno(1,2,3-cd)pyrene	mg/kg		0.02 U	0.02 U	0.02 U	0.02 U	
cPAHs (MTCA TEQ-HalfND)	mg/kg		0.015	0.013 U	0.015 U	0.015 U	
cPAHs (MTCA TEQ-ZeroND)	mg/kg		0.0023	0.017 U	0.02 U	0.02 U	
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
1-Methylnaphthalene	mg/kg		0.02 U	0.02 U	0.02 U	0.02 U	
2-Methylnaphthalene	mg/kg		0.02 U	0.02 U	0.02 U	0.02 U	
Naphthalene	mg/kg		0.024	0.02 U	0.02 U	0.02 U	
Acenaphthene	mg/kg		0.036	0.017 U	0.017 U	0.017 U	
Acenaphthylene	mg/kg		0.02 U	0.02 U	0.02 U	0.02 U	
Anthracene	mg/kg		0.021	0.02 U	0.02 U	0.02 U	
Fluorene	mg/kg		0.044	0.02 U	0.02 U	0.02 U	
Phenanthrene	mg/kg		0.18	0.02 U	0.02 U	0.02 U	
Benzo(g,h,i)perylene	mg/kg		0.02 U	0.02 U	0.02 U	0.02 U	
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Fluoranthene	mg/kg		0.12	0.02 U	0.02 U	0.02 U	
Pyrene	mg/kg		0.098	0.02 U	0.02 U	0.02 U	
Other SVOCs							

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
	Location	FS-21	FS-22	FS-22	FS-22	FS-22
	Sample ID	**FS-21-22.0-22.5-013013**	**FS-22-3.0-3.5-013013**	**FS-22-7.0-8.0-013013**	**FS-78-7.0-8.0-013013**	**FS-22-11.5-12.0-013013**
	Depth	22-22.5 ft	3-3.5 ft	7-8 ft	7-8 ft	11.5-12 ft
	Date	01/30/2013	01/30/2013	01/30/2013	01/30/2013	01/30/2013
Other SVOCs						
1,2,4-Trichlorobenzene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	
1,2-Dichlorobenzene	mg/kg	0.02 U	0.02 U	0.02 U	0.02 U	
1,3-Dichlorobenzene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	
2,3,4,6-Tetrachlorophenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	
2,4,5-Trichlorophenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	
2,4,6-Trichlorophenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	
2,4-Dichlorophenol	mg/kg	0.02 U	0.02 U	0.02 U	0.02 U	
2,4-Dimethylphenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	
2,4-Dinitrophenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	
2,4-Dinitrotoluene	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	
2,6-Dichlorophenol	mg/kg	0.25 U	0.25 U	0.25 U	0.25 U	
2,6-Dinitrotoluene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	
2-Chloronaphthalene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	
2-Chlorophenol	mg/kg	0.035 U	0.033 U	0.034 U	0.033 U	
2-Methylphenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	
2-Nitroaniline	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	
2-Nitrophenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	
3,3'-Dichlorobenzidine	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	
4,6-Dinitro-o-cresol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	
4-Chloro-3-methylphenol	mg/kg	0.5 U	0.5 U	0.5 U	0.5 U	
4-Chloroaniline	mg/kg	1 U	1 U	1 U	1 U	
4-Nitrophenol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	
Aniline	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	
Azobenzene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	
Benzoic Acid	mg/kg	1 U	1 U	1 U	1 U	
Benzyl Alcohol	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	
bis(2-chloroethoxy)methane	mg/kg	0.25 U	0.25 U	0.25 U	0.25 U	
Bis(2-chloroethyl) Ether	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	
Bis(2-ethylhexyl) Phthalate	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	
Butyl benzyl Phthalate	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	
Carbazole	mg/kg	0.25 U	0.25 U	0.25 U	0.25 U	
Dibenzofuran	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	
Diethylphthalate	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	
Dimethyl Phthalate	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	
Di-n-butyl Phthalate	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	
Di-n-octyl phthalate	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	
Hexachlorobenzene	mg/kg	0.08 U	0.08 U	0.08 U	0.08 U	
Hexachlorobutadiene	mg/kg	0.14 U	0.13 U	0.14 U	0.13 U	
Hexachlorocyclopentadiene	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	
Hexachloroethane	mg/kg	0.02 U	0.02 U	0.02 U	0.02 U	
Isophorone	mg/kg	0.1 U	0.1 U	0.1 U	0.1 U	

Table C.9
Chemistry Data for Soil Samples

		Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
		Location	FS-21	FS-22	FS-22	FS-22	FS-22
		Sample ID	**FS-21-22.0-22.5-013013**	**FS-22-3.0-3.5-013013**	**FS-22-7.0-8.0-013013**	**FS-78-7.0-8.0-013013**	**FS-22-11.5-12.0-013013**
		Depth	22-22.5 ft	3-3.5 ft	7-8 ft	7-8 ft	11.5-12 ft
		Date	01/30/2013	01/30/2013	01/30/2013	01/30/2013	01/30/2013
Other SVOCs							
m,p-Cresol (2:1 ratio)	mg/kg		0.1 U	0.1 U	0.1 U	0.1 U	
Nitrobenzene	mg/kg		0.1 U	0.1 U	0.1 U	0.1 U	
N-Nitrosodimethylamine	mg/kg		0.1 U	0.1 U	0.1 U	0.1 U	
N-Nitroso-di-n-propylamine	mg/kg		0.02 U	0.02 U	0.02 U	0.02 U	
N-Nitrosodiphenylamine	mg/kg		0.1 U	0.1 U	0.1 U	0.1 U	
Pentachlorophenol	mg/kg		0.1 U	0.1 U	0.1 U	0.1 U	
Phenol	mg/kg		0.1 U	0.1 U	0.1 U	0.1 U	
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH							
Benzene	mg/kg		0.03 U		0.03 U	0.03 U	
Ethylbenzene	mg/kg		0.05 U		0.05 U	0.05 U	
Toluene	mg/kg		0.05 U		0.05 U	0.05 U	
Xylene (total)	mg/kg		0.2 U		0.2 U	0.2 U	
Other VOCs							
1,4-Dichlorobenzene	mg/kg		0.005 U	0.005 U	0.005 U	0.005 U	
3-Nitroaniline	mg/kg		1 U	1 U	1 U	1 U	
4-Bromophenyl phenyl ether	mg/kg		0.1 U	0.1 U	0.1 U	0.1 U	
4-Chlorophenyl phenyl ether	mg/kg		0.1 U	0.1 U	0.1 U	0.1 U	
4-Nitroaniline	mg/kg		0.25 U	0.25 U	0.25 U	0.25 U	
bis(2-chloroisopropyl)ether	mg/kg		0.25 U	0.25 U	0.25 U	0.25 U	
Pyridine	mg/kg		0.2 U	0.2 U	0.2 U	0.2 U	
Total Petroleum Hydrocarbons (TPH)							
Gasoline-Range Hydrocarbons	mg/kg		3 U		3 U	3 U	
Diesel-Range Hydrocarbons	mg/kg		25 U		25 U	25 U	
Oil-Range Hydrocarbons	mg/kg		50 U		50 U	50 U	

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
	Location	FS-22	FS-22	FS-23	FS-23	MW-10
	Sample ID	**FS-78-11.5-12.0-013013**	**FS-22-12.0-12.5-013013**	**FS-23-3.0-3.5-013013**	**FS-23-7.0-7.5-013013**	**MW-10-2.0-3.0-012913**
	Depth	11.5-12 ft	12-12.5 ft	3-3.5 ft	7-7.5 ft	2-3 ft
	Date	01/30/2013	01/30/2013	01/30/2013	01/30/2013	01/29/2013
Conventionals						
Total Solids	%	89.78				
Ash Content	%	99.61				
Organic Content	%	0.39				
Dry Density	PCF		121.9			
Wet Density	PCF		138.8			
Moisture	%		13.9			
Porosity	Std Units		0.29			
Specific gravity	Std Units		2.767			
Metals						
Antimony	mg/kg			13	0.5 U	0.5 U
Arsenic	mg/kg			150	2.3	5.2
Beryllium	mg/kg			0.5 U	0.5 U	0.5 U
Cadmium	mg/kg			1.7	0.5 U	0.5 U
Chromium	mg/kg			44	35	44
Copper	mg/kg			470	15	35
Lead	mg/kg			200	31	28
Mercury	mg/kg			0.11	0.021	0.063
Nickel	mg/kg			45	27	44
Selenium	mg/kg			5 U	5 U	5 U
Silver	mg/kg			0.5 U	0.5 U	0.5 U
Thallium	mg/kg			4.7 U	4.7 U	5 U
Zinc	mg/kg			1500	30	75
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	mg/kg			1.4	0.063	0.014
Benzo(a)pyrene	mg/kg			1.2	0.085	0.042
Benzo(b)fluoranthene	mg/kg			1	0.058	0.02 U
Benzo(k)fluoranthene	mg/kg			0.76	0.052	0.02 U
Chrysene	mg/kg			1.7	0.074	0.019
Dibenzo(a,h)anthracene	mg/kg			0.81	0.065	0.018 U
Indeno(1,2,3-cd)pyrene	mg/kg			0.86	0.047	0.02 U
cPAHs (MTCA TEQ-HalfND)	mg/kg			1.7	0.11	0.047
cPAHs (MTCA TEQ-ZeroND)	mg/kg			1.7	0.11	0.044
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
1-Methylnaphthalene	mg/kg			1.3	0.026	0.02 U
2-Methylnaphthalene	mg/kg			1.6	0.05	0.02 U
Naphthalene	mg/kg			1.2	0.12	0.02 U
Acenaphthene	mg/kg			3.5	0.017 U	0.017 U
Acenaphthylene	mg/kg			0.4 U	0.02 U	0.02 U
Anthracene	mg/kg			2	0.02 U	0.02 U
Fluorene	mg/kg			3	0.02 U	0.02 U
Phenanthrene	mg/kg			9.9	0.039	0.021

Table C.9
Chemistry Data for Soil Samples

		Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
		Location	FS-22	FS-22	FS-23	FS-23	MW-10
		Sample ID	**FS-78-11.5-12.0-013013**	**FS-22-12.0-12.5-013013**	**FS-23-3.0-3.5-013013**	**FS-23-7.0-7.5-013013**	**MW-10-2.0-3.0-012913**
		Depth	11.5-12 ft	12-12.5 ft	3-3.5 ft	7-7.5 ft	2-3 ft
		Date	01/30/2013	01/30/2013	01/30/2013	01/30/2013	01/29/2013
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Benzo(g,h,i)perylene	mg/kg				0.54	0.071	0.02 U
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Fluoranthene	mg/kg				5.6	0.11	0.029
Pyrene	mg/kg				6.5	0.13	0.038
Other SVOCs							
1,2,4-Trichlorobenzene	mg/kg				0.2 U	0.01 U	0.01 U
1,2-Dichlorobenzene	mg/kg				0.4 U	0.02 U	0.02 U
1,3-Dichlorobenzene	mg/kg				0.1 U	0.1 U	0.1 U
2,3,4,6-Tetrachlorophenol	mg/kg				0.1 U	0.1 U	0.1 U
2,4,5-Trichlorophenol	mg/kg				0.1 U	0.1 U	0.1 U
2,4,6-Trichlorophenol	mg/kg				0.1 U	0.1 U	0.1 U
2,4-Dichlorophenol	mg/kg				0.4 U	0.02 U	0.02 U
2,4-Dimethylphenol	mg/kg				0.1 U	0.1 U	0.1 U
2,4-Dinitrophenol	mg/kg				0.1 U	0.1 U	0.1 U
2,4-Dinitrotoluene	mg/kg				0.2 U	0.01 U	0.01 U
2,6-Dichlorophenol	mg/kg				0.25 U	0.25 U	0.25 U
2,6-Dinitrotoluene	mg/kg				0.1 U	0.1 U	0.1 U
2-Chloronaphthalene	mg/kg				0.1 U	0.1 U	0.1 U
2-Chlorophenol	mg/kg				0.033 U	0.033 U	0.035 U
2-Methylphenol	mg/kg				0.1 U	0.1 U	0.1 U
2-Nitroaniline	mg/kg				0.1 U	0.1 U	0.1 U
2-Nitrophenol	mg/kg				0.1 U	0.1 U	0.1 U
3,3'-Dichlorobenzidine	mg/kg				2 U	0.1 U	0.1 U
4,6-Dinitro-o-cresol	mg/kg				0.1 U	0.1 U	0.1 U
4-Chloro-3-methylphenol	mg/kg				0.5 U	0.5 U	0.5 U
4-Chloroaniline	mg/kg				1 U	1 U	1 U
4-Nitrophenol	mg/kg				0.1 U	0.1 U	0.1 U
Aniline	mg/kg				0.1 U	0.1 U	0.1 U
Azobenzene	mg/kg				0.1 U	0.1 U	0.1 U
Benzoic Acid	mg/kg				1 U	1 U	1 U
Benzyl Alcohol	mg/kg				0.1 U	0.1 U	0.1 U
bis(2-chloroethoxy)methane	mg/kg				0.25 U	0.25 U	0.25 U
Bis(2-chloroethyl) Ether	mg/kg				0.1 U	0.1 U	0.1 U
Bis(2-ethylhexyl) Phthalate	mg/kg				0.16	0.1 U	0.1 U
Butyl benzyl Phthalate	mg/kg				0.1 U	0.1 U	0.1 U
Carbazole	mg/kg				1.9	0.25 U	0.25 U
Dibenzofuran	mg/kg				1.8	0.1 U	0.1 U
Diethylphthalate	mg/kg				0.1 U	0.1 U	0.1 U
Dimethyl Phthalate	mg/kg				0.1 U	0.1 U	0.1 U
Di-n-butyl Phthalate	mg/kg				0.1 U	0.1 U	0.1 U
Di-n-octyl phthalate	mg/kg				0.1 U	0.1 U	0.1 U

Table C.9
Chemistry Data for Soil Samples

		Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
		Location	FS-22	FS-22	FS-23	FS-23	MW-10
		Sample ID	**FS-78-11.5-12.0-013013**	**FS-22-12.0-12.5-013013**	**FS-23-3.0-3.5-013013**	**FS-23-7.0-7.5-013013**	**MW-10-2.0-3.0-012913**
		Depth	11.5-12 ft	12-12.5 ft	3-3.5 ft	7-7.5 ft	2-3 ft
		Date	01/30/2013	01/30/2013	01/30/2013	01/30/2013	01/29/2013
Other SVOCs							
Hexachlorobenzene	mg/kg				0.08 U	0.08 U	0.08 U
Hexachlorobutadiene	mg/kg				0.13 U	0.13 U	0.14 U
Hexachlorocyclopentadiene	mg/kg				0.1 U	0.1 U	0.1 U
Hexachloroethane	mg/kg				0.4 U	0.02 U	0.02 U
Isophorone	mg/kg				0.1 U	0.1 U	0.1 U
m,p-Cresol (2:1 ratio)	mg/kg				0.1 U	0.1 U	0.1 U
Nitrobenzene	mg/kg				0.1 U	0.1 U	0.1 U
N-Nitrosodimethylamine	mg/kg				0.1 U	0.1 U	0.1 U
N-Nitroso-di-n-propylamine	mg/kg				0.4 U	0.02 U	0.02 U
N-Nitrosodiphenylamine	mg/kg				0.1 U	0.1 U	0.1 U
Pentachlorophenol	mg/kg				2 U	0.1 U	0.1 U
Phenol	mg/kg				0.1 U	0.1 U	0.1 U
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH							
Benzene	mg/kg					0.03 U	
Ethylbenzene	mg/kg					0.05 U	
Toluene	mg/kg					0.05 U	
Xylene (total)	mg/kg					0.2 U	
Other VOCs							
1,4-Dichlorobenzene	mg/kg				0.1 U	0.005 U	0.005 U
3-Nitroaniline	mg/kg				1 U	1 U	1 U
4-Bromophenyl phenyl ether	mg/kg				0.1 U	0.1 U	0.1 U
4-Chlorophenyl phenyl ether	mg/kg				0.1 U	0.1 U	0.1 U
4-Nitroaniline	mg/kg				0.25 U	0.25 U	0.25 U
bis(2-chloroisopropyl)ether	mg/kg				0.25 U	0.25 U	0.25 U
Pyridine	mg/kg				0.2 U	0.2 U	0.2 U
Total Petroleum Hydrocarbons (TPH)							
Gasoline-Range Hydrocarbons	mg/kg					3 U	
Diesel-Range Hydrocarbons	mg/kg					25 U	
Oil-Range Hydrocarbons	mg/kg					50 U	

Table C.9
Chemistry Data for Soil Samples

		Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
		Location	MW-10	SFS-01	SFS-01	SFS-02	
		Sample ID	**MW-10-11.0-11.5-012913**	**SFS-01-0-0.5-021413**	**SFS-99-0-0.5-021413**	**SFS-02-0-0.5-012913**	
		Depth	11-11.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	
		Date	01/29/2013	02/14/2013	02/14/2013	01/29/2013	
Metals							
Antimony	mg/kg		0.5 U				
Arsenic	mg/kg		1.7				
Beryllium	mg/kg		0.5 U				
Cadmium	mg/kg		0.5 U				
Chromium	mg/kg		38				
Copper	mg/kg		16				
Lead	mg/kg		2.1				
Mercury	mg/kg		0.02 U				
Nickel	mg/kg		38				
Selenium	mg/kg		5 U				
Silver	mg/kg		0.5 U				
Thallium	mg/kg		5 U				
Zinc	mg/kg		29				
Dioxin/Furans							
2,3,7,8-TCDD (Dioxin)	pg/g			0.352 U	0.367 U	0.77 U	
1,2,3,7,8-PeCDD	pg/g			2.44 U	2.82	5.7	
1,2,3,4,7,8-HxCDD	pg/g			3.41	4.37	10.8	
1,2,3,6,7,8-HxCDD	pg/g			15.6	19.9	61.4	
1,2,3,7,8,9-HxCDD	pg/g			7.23	9.51	20.4	
1,2,3,4,6,7,8-HpCDD	pg/g			387	472	2590	
Total OCDD	pg/g			3810	4650 J	31900 J	
2,3,7,8-TCDF	pg/g			0.743 U	0.925 U	1.05	
1,2,3,7,8-PeCDF	pg/g			0.79 U	1.22 U	1.9 J	
2,3,4,7,8-PeCDF	pg/g			1.59 U	1.91	1.92 J	
1,2,3,4,7,8-HxCDF	pg/g			4.79	5.87	7.97	
1,2,3,6,7,8-HxCDF	pg/g			2.69	3.37	6.48	
1,2,3,7,8,9-HxCDF	pg/g			1.44	1.53	2.37 J	
2,3,4,6,7,8-HxCDF	pg/g			2.53	5.32	4.89	
1,2,3,4,6,7,8-HpCDF	pg/g			49.5	61.5	286 J	
1,2,3,4,7,8,9-HpCDF	pg/g			3.24	3.84	25	
Total OCDF	pg/g			149	181	1550	
Dioxin/Furans (MTCA TEQ-Hal	pg/g			11	15.5 J	57.3 J	
Dioxin/Furans (MTCA TEQ-Zer	pg/g			9.35	15.2 J	56.9 J	
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
Benz(a)anthracene	mg/kg		0.0065 U				
Benzo(a)pyrene	mg/kg		0.017 U				
Benzo(b)fluoranthene	mg/kg		0.02 U				
Benzo(k)fluoranthene	mg/kg		0.02 U				
Chrysene	mg/kg		0.0072 U				
Dibenzo(a,h)anthracene	mg/kg		0.018 U				
Indeno(1,2,3-cd)pyrene	mg/kg		0.02 U				

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
	Location	MW-10	SFS-01	SFS-01	SFS-02	
	Sample ID	**MW-10-11.0-11.5-012913**	**SFS-01-0-0.5-021413**	**SFS-99-0-0.5-021413**	**SFS-02-0-0.5-012913**	
	Depth	11-11.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	
	Date	01/29/2013	02/14/2013	02/14/2013	01/29/2013	
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
cPAHs (MTCA TEQ-HalfND)	mg/kg	0.013 U				
cPAHs (MTCA TEQ-ZeroND)	mg/kg	0.017 U				
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
1-Methylnaphthalene	mg/kg	0.02 U				
2-Methylnaphthalene	mg/kg	0.02 U				
Naphthalene	mg/kg	0.02 U				
Acenaphthene	mg/kg	0.017 U				
Acenaphthylene	mg/kg	0.02 U				
Anthracene	mg/kg	0.02 U				
Fluorene	mg/kg	0.02 U				
Phenanthrene	mg/kg	0.02 U				
Benzo(g,h,i)perylene	mg/kg	0.02 U				
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Fluoranthene	mg/kg	0.02 U				
Pyrene	mg/kg	0.02 U				
Other SVOCs						
1,2,4-Trichlorobenzene	mg/kg	0.01 U				
1,2-Dichlorobenzene	mg/kg	0.02 U				
1,3-Dichlorobenzene	mg/kg	0.1 U				
2,3,4,6-Tetrachlorophenol	mg/kg	0.1 U				
2,4,5-Trichlorophenol	mg/kg	0.1 U				
2,4,6-Trichlorophenol	mg/kg	0.1 U				
2,4-Dichlorophenol	mg/kg	0.02 U				
2,4-Dimethylphenol	mg/kg	0.1 U				
2,4-Dinitrophenol	mg/kg	0.1 U				
2,4-Dinitrotoluene	mg/kg	0.01 U				
2,6-Dichlorophenol	mg/kg	0.25 U				
2,6-Dinitrotoluene	mg/kg	0.1 U				
2-Chloronaphthalene	mg/kg	0.1 U				
2-Chlorophenol	mg/kg	0.034 U				
2-Methylphenol	mg/kg	0.1 U				
2-Nitroaniline	mg/kg	0.1 U				
2-Nitrophenol	mg/kg	0.1 U				
3,3'-Dichlorobenzidine	mg/kg	0.1 U				
4,6-Dinitro-o-cresol	mg/kg	0.1 U				
4-Chloro-3-methylphenol	mg/kg	0.5 U				
4-Chloroaniline	mg/kg	1 U				
4-Nitrophenol	mg/kg	0.1 U				
Aniline	mg/kg	0.1 U				
Azobenzene	mg/kg	0.1 U				
Benzoic Acid	mg/kg	1 U				

Table C.9
Chemistry Data for Soil Samples

		Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
		Location	MW-10	SFS-01	SFS-01	SFS-02	
		Sample ID	**MW-10-11.0-11.5-012913**	**SFS-01-0-0.5-021413**	**SFS-99-0-0.5-021413**	**SFS-02-0-0.5-012913**	
		Depth	11-11.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	
		Date	01/29/2013	02/14/2013	02/14/2013	01/29/2013	
Other SVOCs							
Benzyl Alcohol	mg/kg		0.1 U				
bis(2-chloroethoxy)methane	mg/kg		0.25 U				
Bis(2-chloroethyl) Ether	mg/kg		0.1 U				
Bis(2-ethylhexyl) Phthalate	mg/kg		0.1 U				
Butyl benzyl Phthalate	mg/kg		0.1 U				
Carbazole	mg/kg		0.25 U				
Dibenzofuran	mg/kg		0.1 U				
Diethylphthalate	mg/kg		0.1 U				
Dimethyl Phthalate	mg/kg		0.1 U				
Di-n-butyl Phthalate	mg/kg		0.1 U				
Di-n-octyl phthalate	mg/kg		0.1 U				
Hexachlorobenzene	mg/kg		0.08 U				
Hexachlorobutadiene	mg/kg		0.14 U				
Hexachlorocyclopentadiene	mg/kg		0.1 U				
Hexachloroethane	mg/kg		0.02 U				
Isophorone	mg/kg		0.1 U				
m,p-Cresol (2:1 ratio)	mg/kg		0.1 U				
Nitrobenzene	mg/kg		0.1 U				
N-Nitrosodimethylamine	mg/kg		0.1 U				
N-Nitroso-di-n-propylamine	mg/kg		0.02 U				
N-Nitrosodiphenylamine	mg/kg		0.1 U				
Pentachlorophenol	mg/kg		0.1 U				
Phenol	mg/kg		0.1 U				
Volatile Organic Compounds (VOCs) Associated with Diesel- and Oil-range TPH							
Benzene	mg/kg		0.03 U				
Ethylbenzene	mg/kg		0.05 U				
Toluene	mg/kg		0.05 U				
Xylene (total)	mg/kg		0.2 U				
Other VOCs							
1,4-Dichlorobenzene	mg/kg		0.005 U				
3-Nitroaniline	mg/kg		1 U				
4-Bromophenyl phenyl ether	mg/kg		0.1 U				
4-Chlorophenyl phenyl ether	mg/kg		0.1 U				
4-Nitroaniline	mg/kg		0.25 U				
bis(2-chloroisopropyl)ether	mg/kg		0.25 U				
Pyridine	mg/kg		0.2 U				
Total Petroleum Hydrocarbons (TPH)							
Gasoline-Range Hydrocarbons	mg/kg		3 U				
Diesel-Range Hydrocarbons	mg/kg		25 U				
Oil-Range Hydrocarbons	mg/kg		50 U				

Table C.9
Chemistry Data for Soil Samples

Event	RI/FS Data Gaps Investigation Sampling (Floyd|Snider)				
Location	MW-10	SFS-01	SFS-01	SFS-02	
Sample ID	**MW-10-11.0-11.5-012913**	**SFS-01-0-0.5-021413**	**SFS-99-0-0.5-021413**	**SFS-02-0-0.5-012913**	
Depth	11-11.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	
Date	01/29/2013	02/14/2013	02/14/2013	01/29/2013	

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Interim Action Sampling (Floyd|Snider)				
	Location	FS-24	FS-24	FS-24	FS-25	FS-25
	Sample ID	**FS-24-0-1-020915**	**FS-24-1-2-020915**	**FS-24-2-3-020915**	**FS-25-0-1-020915**	**FS-25-1-2-020915**
	Depth	0-1 ft	1-2 ft	2-3 ft	0-1 ft	1-2 ft
	Date	02/09/2015	02/09/2015	02/09/2015	02/09/2015	02/09/2015
Metals						
Arsenic	mg/kg	70 J	14	9	80	12
Copper	mg/kg	480	170	150	1500	160
Zinc	mg/kg	1400	570	360	1500	79

Table C.9
Chemistry Data for Soil Samples

		Event	RI/FS Interim Action Sampling (Floyd|Snider)				
		Location	FS-25	FS-25	FS-26	FS-26	FS-26
		Sample ID	**FS-25-2-3-020915**	**FS-25-3.5-4.0-020915**	**FS-26-0-1-020915**	**FS-26-1-2-020915**	**FS-26-2-3-020915**
		Depth	2-3 ft	3.5-4 ft	0-1 ft	1-2 ft	2-3 ft
		Date	02/09/2015	02/09/2015	02/09/2015	02/09/2015	02/09/2015
Metals							
Arsenic	mg/kg		8	10	220	10	10 U
Copper	mg/kg		34	150	2200	190	140
Zinc	mg/kg		52	85	3600	240	110
Total Petroleum Hydrocarbons (TPH)							
Gasoline-Range Hydrocarbons	mg/kg						6.6 UJ
Diesel-Range Hydrocarbons	mg/kg						88
Oil-Range Hydrocarbons	mg/kg						160

Table C.9
Chemistry Data for Soil Samples

		Event	RI/FS Interim Action Sampling (Floyd|Snider)				
		Location	FS-26	FS-27	FS-27	FS-27	FS-28
		Sample ID	**FS-26-3-4-020915**	**FS-27-0-1-020915**	**FS-27-1-2-020915**	**FS-27-2-3-020915**	**FS-28-0-1-020915**
		Depth	3-4 ft	0-1 ft	1-2 ft	2-3 ft	0-1 ft
		Date	02/09/2015	02/09/2015	02/09/2015	02/09/2015	02/09/2015
Metals							
Arsenic	mg/kg			30	190 J	11	110
Copper	mg/kg			880	1400	88	2100
Zinc	mg/kg			740	2400	220	2500
Total Petroleum Hydrocarbons (TPH)							
Gasoline-Range Hydrocarbons	mg/kg		77 J				
Diesel-Range Hydrocarbons	mg/kg		1200				
Oil-Range Hydrocarbons	mg/kg		480				

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Interim Action Sampling (Floyd|Snider)				
	Location	FS-28	FS-28	FS-29	FS-29	FS-29
	Sample ID	**FS-28-1-2-020915**	**FS-28-2-3-020915**	**FS-29-0-1-020915**	**FS-29-1-2-020915**	**FS-29-2-3-020915**
	Depth	1-2 ft	2-3 ft	0-1 ft	1-2 ft	2-3 ft
	Date	02/09/2015	02/09/2015	02/09/2015	02/09/2015	02/09/2015
Metals						
Arsenic	mg/kg	60 J	7	30	9	9
Copper	mg/kg	310	32	100 J	100 J	45 J
Zinc	mg/kg	780	58	190 J	83 J	62 J

Table C.9
Chemistry Data for Soil Samples

		Event	RI/FS Interim Action Sampling (Floyd|Snider)				
		Location	FS-29	FS-30	FS-30	FS-30	FS-30
		Sample ID	**FS-29-3-4-020915**	**FS-30-0-1-020915**	**FS-30-1-2-020915**	**FS-30-2-3-020915**	**FS-30-3-4-020915**
		Depth	3-4 ft	0-1 ft	1-2 ft	2-3 ft	3-4 ft
		Date	02/09/2015	02/09/2015	02/09/2015	02/09/2015	02/09/2015
Metals							
Arsenic	mg/kg			40	80	80	110
Copper	mg/kg			530 J	580	1400 J	2300
Zinc	mg/kg			800 J	990	1700 J	2000
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
Benz(a)anthracene	mg/kg		0.25				
Benzo(a)pyrene	mg/kg		0.31				
Benzofluoranthenes (total)	mg/kg		0.91				
Chrysene	mg/kg		0.54				
Dibenzo(a,h)anthracene	mg/kg		0.097				
Indeno(1,2,3-cd)pyrene	mg/kg		0.35				
cPAHs (MTCA TEQ-HalfND)	mg/kg		0.48				
cPAHs (MTCA TEQ-ZeroND)	mg/kg		0.48				
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Total LPAH	mg/kg		3.4				
1-Methylnaphthalene	mg/kg		0.25				
2-Methylnaphthalene	mg/kg		0.33				
Naphthalene	mg/kg		0.12				
Acenaphthene	mg/kg		0.64				
Acenaphthylene	mg/kg		0.22				
Anthracene	mg/kg		0.36				
Fluorene	mg/kg		1.4				
Phenanthrene	mg/kg		0.65				
Benzo(g,h,i)perylene	mg/kg		0.35				
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Total HPAH	mg/kg		5				
Fluoranthene	mg/kg		0.71				
Pyrene	mg/kg		1.5				
Other SVOCs							
Dibenzofuran	mg/kg		0.29				
Total Petroleum Hydrocarbons (TPH)							
Diesel-Range Hydrocarbons	mg/kg		99000				
Oil-Range Hydrocarbons	mg/kg		28000				
EPH/VPH							
C8-C10 Aliphatics	mg/kg		61 J				
C10-C12 Aliphatics	mg/kg		600				
C12-C16 Aliphatics	mg/kg		3400				
C16-C21 Aliphatics	mg/kg		4000				
C21-C34 Aliphatics	mg/kg		2100				
C8-C10 Aromatics	mg/kg		2.7				
C10-C12 Aromatics	mg/kg		43				
C12-C16 Aromatics	mg/kg		560				

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Interim Action Sampling (Floyd|Snider)				
	Location	FS-29	FS-30	FS-30	FS-30	FS-30
	Sample ID	**FS-29-3-4-020915**	**FS-30-0-1-020915**	**FS-30-1-2-020915**	**FS-30-2-3-020915**	**FS-30-3-4-020915**
	Depth	3-4 ft	0-1 ft	1-2 ft	2-3 ft	3-4 ft
	Date	02/09/2015	02/09/2015	02/09/2015	02/09/2015	02/09/2015
EPH/VPH						
C16-C21 Aromatics	mg/kg	2100				
C21-C34 Aromatics	mg/kg	720				

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Interim Action Sampling (Floyd|Snider)				
	Location	FS-31	FS-31	FS-31	FS-31	FS-32
	Sample ID	**FS-31-0-1-020915**	**FS-31-1-2-020915**	**FS-31-2-3-020915**	**FS-31-4-5-020915**	**FS-32-0-1-020915**
	Depth	0-1 ft	1-2 ft	2-3 ft	4-5 ft	0-1 ft
	Date	02/09/2015	02/09/2015	02/09/2015	02/09/2015	02/09/2015
Metals						
Arsenic	mg/kg	490	140	6	5 U	240
Copper	mg/kg	1500 J	490 J	47 J	22 J	1300 J
Zinc	mg/kg	4800 J	1300 J	110 J	33 J	2100 J

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Interim Action Sampling (Floyd|Snider)				
	Location	FS-32	FS-32	FS-32	FS-33	FS-33
	Sample ID	**FS-32-1-2-020915**	**FS-32-2-3-020915**	**FS-32-3-4-020915**	**FS-33-0-1-020915**	**FS-33-1-2-020915**
	Depth	1-2 ft	2-3 ft	3-4 ft	0-1 ft	1-2 ft
	Date	02/09/2015	02/09/2015	02/09/2015	02/09/2015	02/09/2015
Metals						
Arsenic	mg/kg	15	80	7	230	19
Copper	mg/kg	290 J	950 J	73	920 J	290 J
Zinc	mg/kg	280 J	530 J	150	2300 J	840 J

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Interim Action Sampling (Floyd|Snider)				
	Location	FS-33	FS-34	FS-34	FS-34	FS-34
	Sample ID	**FS-33-2-3-020915**	**FS-34-0-1-020915**	**FS-34-1-2-020915**	**FS-34-2-3-020915**	**FS-34-3-4-020915**
	Depth	2-3 ft	0-1 ft	1-2 ft	2-3 ft	3-4 ft
	Date	02/09/2015	02/09/2015	02/09/2015	02/09/2015	02/09/2015
Metals						
Arsenic	mg/kg	130 J	150	220	160	60
Copper	mg/kg	1400	760	440	670	1200
Zinc	mg/kg	1100 J	1600 J	1100 J	750	710

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Interim Action Sampling (Floyd|Snider)				
	Location	FS-35	FS-35	FS-36	FS-36	FS-36
	Sample ID	**FS-35-0-1-020915**	**FS-35-1-2-020915**	**FS-36-0-1-020915**	**FS-36-1-2-020915**	**FS-36-2-3-020915**
	Depth	0-1 ft	1-2 ft	0-1 ft	1-2 ft	2-3 ft
	Date	02/09/2015	02/09/2015	02/09/2015	02/09/2015	02/09/2015
Metals						
Arsenic	mg/kg	120	9	28	80	30
Copper	mg/kg	2900	140	220	320	200
Zinc	mg/kg	3100 J	380 J	410 J	750 J	380 J

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Interim Action Sampling (Floyd|Snider)				
	Location	FS-36	FS-37	FS-37	FS-37	FS-38
	Sample ID	**FS-36-2-3-020915-Dup**	**FS-37-0-1-020915**	**FS-37-1-2-020915**	**FS-37-2-3-020915**	**FS-38-0-1-020915**
	Depth	2-3 ft	0-1 ft	1-2 ft	2-3 ft	0-1 ft
	Date	02/09/2015	02/09/2015	02/09/2015	02/09/2015	02/09/2015
Metals						
Arsenic	mg/kg	12	40	18	11	50
Copper	mg/kg	72	220	120	99	330 J
Zinc	mg/kg	120 J	430 J	220 J	140 J	500 J

Table C.9
Chemistry Data for Soil Samples

		Event	RI/FS Interim Action Sampling (Floyd|Snider)				
		Location	FS-38	FS-38	FS-38	FS-39	FS-39
		Sample ID	**FS-38-1-2-020915**	**FS-38-2-3-020915**	**FS-38-3-4-020915**	**FS-39-9-10-020915**	**FS-39-10-10.5-020915**
		Depth	1-2 ft	2-3 ft	3-4 ft	9-10 ft	10-10.5 ft
		Date	02/09/2015	02/09/2015	02/09/2015	02/09/2015	02/09/2015
Metals							
Arsenic	mg/kg		6	6	5 U		
Copper	mg/kg		20 J	23	22		
Zinc	mg/kg		42 J	35	28		
TPH by HCID							
Gasoline-Range Hydrocarbons	mg/kg					20 U	20 U
Diesel	mg/kg					50 U	50 U
Oil, Petroleum (Non-Polar)	mg/kg					100 U	100 U

Table C.9
Chemistry Data for Soil Samples

		Event	RI/FS Interim Action Sampling (Floyd|Snider)				
		Location	FS-39	FS-39	FS-40	FS-40	FS-40
		Sample ID	**FS-39-10.5-11.0-020915**	**FS-39-11.0-12.0-020915**	**FS-40-9-10-020915**	**FS-40-10-10.5-020915**	**FS-40-10.5-11-020915**
		Depth	10.5-11 ft	11-12 ft	9-10 ft	10-10.5 ft	10.5-11 ft
		Date	02/09/2015	02/09/2015	02/09/2015	02/09/2015	02/09/2015
Total Petroleum Hydrocarbons (TPH)							
Diesel-Range Hydrocarbons	mg/kg		510				15
Oil-Range Hydrocarbons	mg/kg		200				29
TPH by HCID							
Gasoline-Range Hydrocarbons	mg/kg		20 U	20 U	20 U	20 U	20 U
Diesel	mg/kg		50 U	50 U	50 U	50 U	50 U
Oil, Petroleum (Non-Polar)	mg/kg		100 U	100 U	100 U	100 U	100 U

Table C.9
Chemistry Data for Soil Samples

		Event	RI/FS Interim Action Sampling (Floyd|Snider)				
		Location	FS-40	FS-41	FS-41	FS-41	FS-41
		Sample ID	**FS-40-11-12-020915**	**FS-41-9-10-020915**	**FS-41-10-10.5-020915**	**FS-41-10.5-11-020915**	**FS-41-11-12-020915**
		Depth	11-12 ft	9-10 ft	10-10.5 ft	10.5-11 ft	11-12 ft
		Date	02/09/2015	02/09/2015	02/09/2015	02/09/2015	02/09/2015
Total Petroleum Hydrocarbons (TPH)							
Diesel-Range Hydrocarbons	mg/kg						190
Oil-Range Hydrocarbons	mg/kg						24
TPH by HCID							
Gasoline-Range Hydrocarbons	mg/kg		20 U	20 U	20 U	20 U	20 U
Diesel	mg/kg		50 U	50 U	50 U	50 U	50 U
Oil, Petroleum (Non-Polar)	mg/kg		100 U	100 U	100 U	100 U	100 U

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Interim Action Sampling (Floyd|Snider)				
	Location	FS-42	FS-42	FS-42	MW-11	MW-11
	Sample ID	**FS-42-9-10-020915**	**FS-42-10-10.5-020915**	**FS-42-11-12-020915**	**MW-11-0-1-020915**	**MW-11-1-2-020915**
	Depth	9-10 ft	10-10.5 ft	11-12 ft	0-1 ft	1-2 ft
	Date	02/09/2015	02/09/2015	02/09/2015	02/09/2015	02/09/2015
Metals						
Arsenic	mg/kg				250	330
Copper	mg/kg				2800	2400
Zinc	mg/kg				3400	5000
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	mg/kg		0.13			0.7
Benzo(a)pyrene	mg/kg		0.077			0.46
Benzofluoranthenes (total)	mg/kg		0.15			1.2
Chrysene	mg/kg		0.22			0.85
Dibenzo(a,h)anthracene	mg/kg		0.013			0.093
Indeno(1,2,3-cd)pyrene	mg/kg		0.038			0.32
cPAHs (MTCA TEQ-HalfND)	mg/kg		0.11			0.7
cPAHs (MTCA TEQ-ZeroND)	mg/kg		0.11			0.7
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAH	mg/kg		2.2 J			1.7
1-Methylnaphthalene	mg/kg		0.13			0.059
2-Methylnaphthalene	mg/kg		0.14			0.069
Naphthalene	mg/kg		0.018			0.016
Acenaphthene	mg/kg		0.091			0.081
Acenaphthylene	mg/kg		0.01 JQ			0.029
Anthracene	mg/kg		1.6			0.11
Fluorene	mg/kg		0.12			0.037
Phenanthrene	mg/kg		0.34			1.4
Benzo(g,h,i)perylene	mg/kg		0.044			0.37
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Total HPAH	mg/kg		1.9			8.3
Fluoranthene	mg/kg		0.65			2.5
Pyrene	mg/kg		0.54			1.8
Other SVOCs						
Dibenzofuran	mg/kg		0.015			0.15
Total Petroleum Hydrocarbons (TPH)						
Gasoline-Range Hydrocarbons	mg/kg	43				
Diesel-Range Hydrocarbons	mg/kg	1600	350	8.8		450
Oil-Range Hydrocarbons	mg/kg	140	65	13		580
TPH by HCID						
Gasoline-Range Hydrocarbons	mg/kg	20	20 U	20 U		
Diesel	mg/kg	50	50	50 U		
Oil, Petroleum (Non-Polar)	mg/kg	100 U	100 U	100 U		
EPH/VPH						
C5-C6 Aliphatics	mg/kg		6.8 U			
C6-C8 Aliphatics	mg/kg		6.8 U			
C8-C10 Aliphatics	mg/kg		2.2 UJ			

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Interim Action Sampling (Floyd|Snider)				
	Location	FS-42	FS-42	FS-42	MW-11	MW-11
	Sample ID	**FS-42-9-10-020915**	**FS-42-10-10.5-020915**	**FS-42-11-12-020915**	**MW-11-0-1-020915**	**MW-11-1-2-020915**
	Depth	9-10 ft	10-10.5 ft	11-12 ft	0-1 ft	1-2 ft
	Date	02/09/2015	02/09/2015	02/09/2015	02/09/2015	02/09/2015
EPH/VPH						
C10-C12 Aliphatics	mg/kg		12			
C12-C16 Aliphatics	mg/kg		77			
C16-C21 Aliphatics	mg/kg		85			
C21-C34 Aliphatics	mg/kg		20			
C8-C10 Aromatics	mg/kg		2.2 U			
C10-C12 Aromatics	mg/kg		2.2 U			
C12-C16 Aromatics	mg/kg		10			
C16-C21 Aromatics	mg/kg		37			
C21-C34 Aromatics	mg/kg		14			
n-Decane	mg/kg		0.68 U			
n-Dodecane	mg/kg		0.68 U			
n-Hexane	mg/kg		0.68 U			
n-Octane	mg/kg		0.68 U			
n-Pentane	mg/kg		0.68 U			
Benzene	mg/kg		0.68 U			
Toluene	mg/kg		0.68 U			
Ethylbenzene	mg/kg		0.68 U			
Xylene (meta & para)	mg/kg		1.4 U			
Xylene (ortho)	mg/kg		0.68 U			
1,2,3-Trimethylbenzene	mg/kg		0.68 U			
1-Methylnaphthalene	mg/kg		0.68 U			
Methyl-tert-butyl ether	mg/kg		0.68 U			
Naphthalene	mg/kg		0.68 U			

Table C.9
Chemistry Data for Soil Samples

		Event	RI/FS Interim Action Sampling (Floyd|Snider)				
		Location	MW-11	MW-11	MW-11	MW-11	MW-11
		Sample ID	**MW-11-2-3-020915**	**MW-11-5-6-020915**	**MW-11-6-7-020915**	**MW-11-7-8-020915**	**MW-11-8-9-020915**
		Depth	2-3 ft	5-6 ft	6-7 ft	7-8 ft	8-9 ft
		Date	02/09/2015	02/09/2015	02/09/2015	02/09/2015	02/09/2015
Metals							
Arsenic	mg/kg		100				
Copper	mg/kg		1400	27	130	21	30
Zinc	mg/kg		1700	36	110	50	37
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
Benz(a)anthracene	mg/kg				0.031		
Benzo(a)pyrene	mg/kg				0.03		
Benzofluoranthenes (total)	mg/kg				0.063		
Chrysene	mg/kg				0.042		
Dibenzo(a,h)anthracene	mg/kg				0.006		
Indeno(1,2,3-cd)pyrene	mg/kg				0.024		
cPAHs (MTCA TEQ-HalfND)	mg/kg				0.043		
cPAHs (MTCA TEQ-ZeroND)	mg/kg				0.043		
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Total LPAH	mg/kg				0.1 J		
1-Methylnaphthalene	mg/kg				0.0086		
2-Methylnaphthalene	mg/kg				0.011		
Naphthalene	mg/kg				0.0086		
Acenaphthene	mg/kg				0.011		
Acenaphthylene	mg/kg				0.0047 JQ		
Anthracene	mg/kg				0.01		
Fluorene	mg/kg				0.0061		
Phenanthrene	mg/kg				0.063		
Benzo(g,h,i)perylene	mg/kg				0.035		
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Total HPAH	mg/kg				0.47		
Fluoranthene	mg/kg				0.14		
Pyrene	mg/kg				0.097		
Other SVOCs							
Dibenzofuran	mg/kg				0.013		
Total Petroleum Hydrocarbons (TPH)							
Diesel-Range Hydrocarbons	mg/kg				59		
Oil-Range Hydrocarbons	mg/kg				74		
TPH by HCID							
Gasoline-Range Hydrocarbons	mg/kg			20 U	20 U	20 U	20 U
Diesel	mg/kg			50 U	50	50 U	50 U
Oil, Petroleum (Non-Polar)	mg/kg			100 U	100 U	100 U	100 U
EPH/VPH							
C5-C6 Aliphatics	mg/kg				10 UJ		
C6-C8 Aliphatics	mg/kg				10 UJ		
C8-C10 Aliphatics	mg/kg				2.2 U		
C10-C12 Aliphatics	mg/kg				2.2 U		

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Interim Action Sampling (Floyd|Snider)				
	Location	MW-11	MW-11	MW-11	MW-11	MW-11
	Sample ID	**MW-11-2-3-020915**	**MW-11-5-6-020915**	**MW-11-6-7-020915**	**MW-11-7-8-020915**	**MW-11-8-9-020915**
	Depth	2-3 ft	5-6 ft	6-7 ft	7-8 ft	8-9 ft
	Date	02/09/2015	02/09/2015	02/09/2015	02/09/2015	02/09/2015
EPH/VPH						
C12-C16 Aliphatics	mg/kg			4.4		
C16-C21 Aliphatics	mg/kg			15		
C21-C34 Aliphatics	mg/kg			18		
C8-C10 Aromatics	mg/kg			2.2 U		
C10-C12 Aromatics	mg/kg			2.2 U		
C12-C16 Aromatics	mg/kg			2.2 U		
C16-C21 Aromatics	mg/kg			4.1		
C21-C34 Aromatics	mg/kg			2.3		
n-Decane	mg/kg			1 UJ		
n-Dodecane	mg/kg			1 UJ		
n-Hexane	mg/kg			1 UJ		
n-Octane	mg/kg			1 UJ		
n-Pentane	mg/kg			1 UJ		
Benzene	mg/kg			1 UJ		
Toluene	mg/kg			1 UJ		
Ethylbenzene	mg/kg			1 UJ		
Xylene (meta & para)	mg/kg			2 UJ		
Xylene (ortho)	mg/kg			1 UJ		
1,2,3-Trimethylbenzene	mg/kg			1 UJ		
1-Methylnaphthalene	mg/kg			1 UJ		
Methyl-tert-butyl ether	mg/kg			1 UJ		
Naphthalene	mg/kg			1 UJ		

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Interim Action Sampling (Floyd|Snider)				
	Location	MW-12	MW-12	MW-12	MW-12	MW-12
	Sample ID	**MW-12-0-1-020915**	**MW-12-1-2-020915**	**MW-12-2-3-020915**	**MW-12-4-5-020915**	**MW-12-8-8.5-020915**
	Depth	0-1 ft	1-2 ft	2-3 ft	4-5 ft	8-8.5 ft
	Date	02/09/2015	02/09/2015	02/09/2015	02/09/2015	02/09/2015
Metals						
Arsenic	mg/kg	180	10 U	10 U		
Copper	mg/kg	960	81	79		490
Zinc	mg/kg	2400	270	170		1800
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)						
Benz(a)anthracene	mg/kg		0.006		0.47	
Benzo(a)pyrene	mg/kg		0.0067		0.31	
Benzofluoranthenes (total)	mg/kg		0.016		0.92	
Chrysene	mg/kg		0.0082		0.67	
Dibenzo(a,h)anthracene	mg/kg		0.0047 U		0.084	
Indeno(1,2,3-cd)pyrene	mg/kg		0.0078		0.26	
cPAHs (MTCA TEQ-HalfND)	mg/kg		0.01		0.49	
cPAHs (MTCA TEQ-ZeroND)	mg/kg		0.0098		0.49	
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)						
Total LPAH	mg/kg		0.016 J		7.3 J	
1-Methylnaphthalene	mg/kg		0.0047 U		1.4	
2-Methylnaphthalene	mg/kg		0.0033 JQ		1.4	
Naphthalene	mg/kg		0.0047 U		0.2	
Acenaphthene	mg/kg		0.0047 U		0.6	
Acenaphthylene	mg/kg		0.0026 JQ		0.16	
Anthracene	mg/kg		0.004 JQ		1.1	
Fluorene	mg/kg		0.0047 U		0.83	
Phenanthrene	mg/kg		0.0095		2.2	
Benzo(g,h,i)perylene	mg/kg		0.013		0.27	
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)						
Total HPAH	mg/kg		0.086		7	
Fluoranthene	mg/kg		0.015		2	
Pyrene	mg/kg		0.013		2	
Other SVOCs						
Dibenzofuran	mg/kg		0.0047 U		0.18	
Total Petroleum Hydrocarbons (TPH)						
Diesel-Range Hydrocarbons	mg/kg		11		12000	
Oil-Range Hydrocarbons	mg/kg		46		2400	
TPH by HCID						
Gasoline-Range Hydrocarbons	mg/kg					20 U
Diesel	mg/kg					50 U
Oil, Petroleum (Non-Polar)	mg/kg					100 U
EPH/VPH						
C5-C6 Aliphatics	mg/kg				8.5 UJ	
C6-C8 Aliphatics	mg/kg				8.5 UJ	
C8-C10 Aliphatics	mg/kg				38 J	
C10-C12 Aliphatics	mg/kg				740	

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Interim Action Sampling (Floyd|Snider)				
	Location	MW-12	MW-12	MW-12	MW-12	MW-12
	Sample ID	**MW-12-0-1-020915**	**MW-12-1-2-020915**	**MW-12-2-3-020915**	**MW-12-4-5-020915**	**MW-12-8-8.5-020915**
	Depth	0-1 ft	1-2 ft	2-3 ft	4-5 ft	8-8.5 ft
	Date	02/09/2015	02/09/2015	02/09/2015	02/09/2015	02/09/2015
EPH/VPH						
C12-C16 Aliphatics	mg/kg				5000	
C16-C21 Aliphatics	mg/kg				2400	
C21-C34 Aliphatics	mg/kg				1200	
C8-C10 Aromatics	mg/kg				28 J	
C10-C12 Aromatics	mg/kg				120 J	
C12-C16 Aromatics	mg/kg				700	
C16-C21 Aromatics	mg/kg				990	
C21-C34 Aromatics	mg/kg				200	
n-Decane	mg/kg				2.8 J	
n-Dodecane	mg/kg				14 J	
n-Hexane	mg/kg				0.85 UJ	
n-Octane	mg/kg				0.85 UJ	
n-Pentane	mg/kg				0.85 UJ	
Benzene	mg/kg				0.85 UJ	
Toluene	mg/kg				0.85 UJ	
Ethylbenzene	mg/kg				0.85 UJ	
Xylene (meta & para)	mg/kg				1.7 UJ	
Xylene (ortho)	mg/kg				0.85 UJ	
1,2,3-Trimethylbenzene	mg/kg				2 J	
1-Methylnaphthalene	mg/kg				0.85 UJ	
Methyl-tert-butyl ether	mg/kg				0.85 UJ	
Naphthalene	mg/kg				2.2 J	

Table C.9
Chemistry Data for Soil Samples

		Event	RI/FS Interim Action Sampling (Floyd|Snider)				
		Location	MW-12	MW-12	MW-12	MW-12	
		Sample ID	**MW-12-10.5-11-020915**	**MW-12-11-12-020915**	**MW-12-13-14-020915**	**MW-12-14-15-020915**	
		Depth	10.5-11 ft	11-12 ft	13-14 ft	14-15 ft	
		Date	02/09/2015	02/09/2015	02/09/2015	02/09/2015	
Metals							
Arsenic	mg/kg				10	10 U	
Copper	mg/kg		73	45	75	79	
Zinc	mg/kg		130	98	260	160	
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
Benz(a)anthracene	mg/kg		0.021		0.0066		
Benzo(a)pyrene	mg/kg		0.019		0.0074		
Benzofluoranthenes (total)	mg/kg		0.048		0.018		
Chrysene	mg/kg		0.031		0.01		
Dibenzo(a,h)anthracene	mg/kg		0.0046 JQ		0.0025 JQ		
Indeno(1,2,3-cd)pyrene	mg/kg		0.015		0.0087		
cPAHs (MTCA TEQ-HalfND)	mg/kg		0.028 J		0.011 J		
cPAHs (MTCA TEQ-ZeroND)	mg/kg		0.028 J		0.011 J		
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs)							
Total LPAH	mg/kg		0.26		0.03 J		
1-Methylnaphthalene	mg/kg		0.085		0.0026 JQ		
2-Methylnaphthalene	mg/kg		0.1		0.0044 JQ		
Naphthalene	mg/kg		0.021		0.0043 JQ		
Acenaphthene	mg/kg		0.032		0.0032 JQ		
Acenaphthylene	mg/kg		0.015		0.0025 JQ		
Anthracene	mg/kg		0.032		0.0044 JQ		
Fluorene	mg/kg		0.049		0.0048 U		
Phenanthrene	mg/kg		0.11		0.016		
Benzo(g,h,i)perylene	mg/kg		0.02		0.012		
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)							
Total HPAH	mg/kg		0.3 J		0.098 J		
Fluoranthene	mg/kg		0.078		0.019		
Pyrene	mg/kg		0.065		0.014		
Other SVOCs							
Dibenzofuran	mg/kg		0.012		0.0032 JQ		
Total Petroleum Hydrocarbons (TPH)							
Diesel-Range Hydrocarbons	mg/kg		160	71	10		
Oil-Range Hydrocarbons	mg/kg		62	26	39		
TPH by HCID							
Gasoline-Range Hydrocarbons	mg/kg		20 U	20 U			
Diesel	mg/kg		50	50			
Oil, Petroleum (Non-Polar)	mg/kg		100 U	100 U			
EPH/VPH							
C5-C6 Aliphatics	mg/kg		9.7 UJ				
C6-C8 Aliphatics	mg/kg		9.7 UJ				
C8-C10 Aliphatics	mg/kg		2.3 U				
C10-C12 Aliphatics	mg/kg		9				

Table C.9
Chemistry Data for Soil Samples

	Event	RI/FS Interim Action Sampling (Floyd|Snider)				
	Location	MW-12	MW-12	MW-12	MW-12	
	Sample ID	**MW-12-10.5-11-020915**	**MW-12-11-12-020915**	**MW-12-13-14-020915**	**MW-12-14-15-020915**	
	Depth	10.5-11 ft	11-12 ft	13-14 ft	14-15 ft	
	Date	02/09/2015	02/09/2015	02/09/2015	02/09/2015	
EPH/VPH						
C12-C16 Aliphatics	mg/kg	71				
C16-C21 Aliphatics	mg/kg	41				
C21-C34 Aliphatics	mg/kg	21				
C8-C10 Aromatics	mg/kg	2.3 U				
C10-C12 Aromatics	mg/kg	16 J				
C12-C16 Aromatics	mg/kg	8.5				
C16-C21 Aromatics	mg/kg	14				
C21-C34 Aromatics	mg/kg	4				
n-Decane	mg/kg	0.97 UJ				
n-Dodecane	mg/kg	3.6 JB				
n-Hexane	mg/kg	0.97 UJ				
n-Octane	mg/kg	0.97 UJ				
n-Pentane	mg/kg	0.97 UJ				
Benzene	mg/kg	0.97 UJ				
Toluene	mg/kg	0.97 UJ				
Ethylbenzene	mg/kg	0.97 UJ				
Xylene (meta & para)	mg/kg	1.9 UJ				
Xylene (ortho)	mg/kg	0.97 UJ				
1,2,3-Trimethylbenzene	mg/kg	0.97 UJ				
1-Methylnaphthalene	mg/kg	1.4 J				
Methyl-tert-butyl ether	mg/kg	0.97 UJ				
Naphthalene	mg/kg	0.97 UJ				

Table C.10
All EPH/VPH Sample Results for Soil and Groundwater

Event	Phase 2 Vadose Soils Sampling (RETEC)			RI/FS Data Gaps Investigation Sampling (Floyd|Snider)							
Location	TP-9		TP-15	FS-19		FS-20	FS-21	MW-01	MW-06		MW-09
Sample ID	TP-9 1.8'	TP-9 6'	TP-15 6'	FS-19-27.0-27.5-012913	FS-19-7.0-7.5-012913	FS-20-10.5-11.0-012913	FS-21-8.0-9.0-013013	MW-01-GW-021513	MW-06-GW-021413	MW-94-GW-021413	MW-09-GW-021513
Sample Depth	1.8 ft	6 ft	6 ft	27–27.5 ft	7–7.5 ft	10.5–11 ft	8–9 ft	5–15 ft	6–16 ft	6–16 ft	5–15 ft
Sample Date	04/30/1998	04/30/1998	04/27/1998	01/29/2013	01/29/2013	01/29/2013	01/30/2013	02/15/2013	02/14/2013	02/14/2013	02/15/2013
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/L	µg/L	µg/L	µg/L
C5-C6 Aliphatics	2.7 U	2.9 U	2.9 U	5 U	5 U	5 U	5 U	50 U	50 U	50 U	50 U
C6-C8 Aliphatics	2.7 U	2.9 U	2.9 U	5 U	9.3	5 U	5 U	50 U	50 U	50 U	50 U
C8-C10 Aliphatics	4.5	6	2.9 U	5 U	30	36	5 U	50 U	50 U	50 U	50 U
C10-C12 Aliphatics	360 JB	140 JB	2.9 U	5 U	230	220	5 U	50 U	50 U	50 U	50 U
C12-C16 Aliphatics	2,000	530	550	5 U	1,200	930	28	50 U	50 U	50 U	50 U
C16-C18 Aliphatics	840	360	280								
C18-C21 Aliphatics	930	140	230								
C21-C36 Aliphatics	700	130	140								
C16-C21 Aliphatics				5 U	1,100	750	34	50 U	50 U	50 U	50 U
C21-C34 Aliphatics				5 U	430	190	32	50 U	50 U	50 U	50 U
C8-C10 Aromatics	30	19	11	5 U	56	31	10 J	78	50 U	50 U	71
C10-C12 Aromatics	12	4.9	70	5 U	18	43	330 J	530	50 U	50 U	420
C12-C16 Aromatics	110	56	150	5 U	200	320	640 J	400	50 U	50 U	300
C16-C21 Aromatics	650	190	370	5 U	780	710	2,300 J	140	50 U	50 U	100
C21-C34 Aromatics	200	34	120	5 U	240	150	1,000 J	170	50 U	50 U	63
n-Hexane				0.2 U	0.2 U	0.2 U	0.2 U	2 U	2 U	2 U	2 U

Note:
Blank cells are intentional.

Abbreviations:

EPH	Extractable petroleum hydrocarbon
ft	Feet
µg/L	Micrograms per liter
mg/kg	Milligrams per liter
RETEC	The RETEC Group
RI/FS	Remedial Investigation/Feasibility Study
VPH	Volatile petroleum hydrocarbon

Qualifiers:

J	Analyte was detected, given result should be considered an estimate.
JB	Analyte was detected, given result should be considered an estimate due to blank contamination.
U	Analyte was not detected at the given reporting limit.

Table C.10
All EPH/VPH Sample Results for Soil and Groundwater

Event	RI/FS Interim Action Sampling (Floyd|Snider)								
Location	FS-29	FS-42	HA-14	MW-02A	MW-11		MW-12		
Sample ID	FS-29-3-4-020915	FS-42-10-10.5-020915	HA-14-1-2-021215	MW-2A-GW-022515	MW-11-6-7-020915	MW-11-GW-02152015	MW-12-4-5-020925	MW-12-10.5-11-020925	MW-12-GW-02252015
Sample Depth	3–4 ft	10–10.5 ft	1–2 ft	4–14 ft	6–7 ft	3.4–13.4 ft	4–5 ft	10.5–11 ft	5–15 ft
Sample Date	02/09/2015	02/09/2015	02/12/2015	02/25/2015	02/09/2015	02/25/2015	02/09/2015	02/09/2015	02/25/2015
Analyte	**mg/kg**	**mg/kg**	**mg/kg**	**µg/L**	**mg/kg**	**µg/L**	**mg/kg**	**mg/kg**	**µg/L**
C5-C6 Aliphatics		6.8 U		50 U	10 UJ	50 U	8.5 UJ	9.7 UJ	50 U
C6-C8 Aliphatics		6.8 U		50 U	10 UJ	50 U	8.5 UJ	9.7 UJ	50 U
C8-C10 Aliphatics	61 J	2.2 UJ	2.4 UJ	40 U	2.2 U	40 U	38 J	2.3 U	40 U
C10-C12 Aliphatics	600 JB	12	9.4	40 U	2.2 U	40 U	740	9.7 UJ	40 U
C12-C16 Aliphatics	3,400	77	230	40 U	4	40 U	5,000	9	40 U
C16-C21 Aliphatics	4,000	85	210	40 U	15	40 U	2,400	71	40 U
C21-C34 Aliphatics	2,100	20	54	40 U	18	40 U	1,200	41	40 U
C8-C10 Aromatics	2.7	2.2 U	2.4 U	40 U	2.2 U	40 U	28 J	21	40 U
C10-C12 Aromatics	43	2.2 U	2.4 U	40 U	2.2 U	40 U	120 J	16 J	40 U
C12-C16 Aromatics	560	10	15	40 U	2.2 U	40 U	700	8.5	40 U
C16-C21 Aromatics	2,100	37	110	40 U	4.1	40 U	990	14	40 U
C21-C34 Aromatics	720	14	17	40 U	2.3	40 U	200	4	40 U
Benzene		0.68 U		5 U	1 UJ	5 U	0.85 UJ	0.97 UJ	5 U
Toluene		0.68 U		5 U	1 UJ	5 U	0.85 UJ	0.97 UJ	5 U
Ethylbenzene		0.68 U		5 U	1 UJ	5 U	0.85 UJ	0.97 UJ	5 U
Xylene (meta & para)		1.4 U		10 U	2 UJ	10 U	1.7 UJ	1.9 UJ	10 U
Xylene (ortho)		0.68 U		5 U	1 UJ	5 U	0.85 UJ	0.97 UJ	5 U
1,2,3-Trimethylbenzene		0.68 U		5 U	1 UJ	5 U	2 J	0.97 UJ	5 U
1-Methylnaphthalene		0.68 U		5 U	1 UJ	5 U	0.85 UJ	1.4 J	5 U
Methyl-tert-butyl Ether		0.68 U		5 U	1 UJ	5 U	0.85 UJ	0.97 UJ	5 U
Naphthalene		0.68 U		5 U	1 UJ	5 U	2.2 J	0.97 UJ	5 U
n-Decane		0.68 U		5 U	1 UJ	5 U	2.8 J	0.97 UJ	5 U
n-Dodecane		0.68 U		5 U	1 UJ	5 U	14 J	3.6 JB	5 U
n-Hexane		0.68 U		5 U	1 UJ	5 U	0.85 UJ	0.97 UJ	5 U
n-Octane		0.68 U		5 U	1 UJ	5 U	0.85 UJ	0.97 UJ	5 U
n-Pentane		0.68 U		5 U	1 UJ	5 U	0.85 UJ	0.97 UJ	5 U

Note:

Blank cells are intentional.

Abbreviations:

EPH Extractable petroleum hydrocarbon
ft Feet
µg/L Micrograms per liter
mg/kg Milligrams per liter
RETEC The RETEC Group
RI/FS Remedial Investigation/Feasibility Study
VPH Volatile petroleum hydrocarbon

Qualifiers:

J Analyte was detected, given result should be considered an estimate.
JB Analyte was detected, given result should be considered an estimate due to blank contamination.
U Analyte was not detected at the given reporting limit.
UJ Analyte was not detected at the given reporting limit, detection limit should be considered an estimate.

Table C.11
All Geoprobe Sample Results for Groundwater

		Location	FS-07	FS-09	FS-09	FS-15	FS-17	FS-19	FS-19	FS-21	FS-21	FS-21	FS-21	FS-22	FS-22
		Field Sample ID	FS07-GW16-031611	FS09A-GW17-031511	FS09-GW17-031511	FS15-GW19-031411	FS17-GW17-031611	FS-19-GW-012913	FS-19-GWF-012913	FS-21-GW-013013	FS-21-GWF-013013	FS-79-GW-013013	FS-79-GWF-013013	FS-22-GW-013013	FS-22-GWF-013013
		Sample Date	03/16/2011	03/15/2011	03/15/2011	03/14/2011	03/16/2011	01/29/2013	01/29/2013	01/30/2013	01/30/2013	01/30/2013	01/30/2013	01/30/2013	01/30/2013
Analyte	**CAS No.**	**Units**													
Metals															
Arsenic, dissolved	7440-38-2	µg/L	47	5.8	4.9	7	3.5		3.17		1.09		1.15		1.02
Copper, dissolved	7440-50-8	µg/L	9	2.6 U	2.6 U	3.6	2.6 U		27.4		1.85		2.19		0.934
Lead, dissolved	7439-92-1	µg/L	1	0.62 U	0.62 U	0.62 U	0.62 U		13.7		0.0406		0.0697		0.154
Mercury, total	7439-97-6	µg/L						0.875		0.0031		0.00286		0.00132	
Nickel, dissolved	7440-02-0	µg/L	14	1.7 U	1.7 U	1.7 U	2.3		26.2		39.6		39.2		10
Polycyclic Aromatic Hydrocarbons (PAHs)															
Acenaphthene	83-32-9	µg/L						3.3		65		48		0.02 U	
Anthracene	120-12-7	µg/L						0.13		71		5.2		0.02 U	
Fluoranthene	206-44-0	µg/L						0.27		9.6		9.1		0.02 U	
Fluorene	86-73-7	µg/L						1.6		37		29		0.02 U	
Naphthalene	91-20-3	µg/L	2 U	1,300	1,100	1.5	2 U	0.36		240		210		0.032	
Benz(a)anthracene	56-55-3	µg/L						0.018 U		0.49		0.018 U		0.049	
Benzo(a)pyrene	50-32-8	µg/L						0.012 J		0.087		0.04		0.0096 U	
Benzo(b)fluoranthene	205-99-2	µg/L						0.02 J		0.13		0.067		0.01 U	
Benzo(k)fluoranthene	207-08-9	µg/L						0.007 U		0.12		0.063		0.007 U	
Chrysene	218-01-9	µg/L						0.043		0.42		0.29		0.0064 U	
Dibenzo(a,h)anthracene	53-70-3	µg/L						0.008 J		0.028		0.0094 J		0.0062 U	
Indeno(1,2,3-cd)pyrene	193-39-5	µg/L						0.005 U		0.012 J		0.005 U		0.005 U	
Total cPAHs TEQ (ND Half)	Total cPAHs TEF	µg/L						0.017 J		0.17 J		0.058 J		0.011	
Total Petroleum Hydrocarbons (TPHs)															
Diesel + Oil	Total TPH	µg/L	250 U	1,600	3,200	820	250 U	6,700 JM		840 JM		730 JM		250 U	

Note:
Blank cells are intentional.

Abbreviations:
CAS Chemical Abstracts Service
cPAH Carcinogenic polycyclic aromatic hydrocarbon
µg/L Micrograms per liter
ND Non-detect
TEF Toxic equivalent factor
TEQ Toxic equivalent

Qualifiers:
J Analyte was detected, given result should be considered an estimate.
JM The analyte was detected and the result should be considered an estimate due to a poor chromatographic match to the motor oil and/or diesel standards for the individual analyte results.
U Analyte was not detected at the given reporting limit.

Table C.12
All Seep Results

Event		Phase 2 Groundwater & Seep Sampling (RETEC)	
Location		Seep No. 1 (Former Outfall)	Seep No. 1 (Former Outfall)
Sample ID		Seep No. 1 (Former Outfall)	Seep No. 1 (Former Outfall)-F
Sample Date		5/14/1998	5/14/1998
Analyte	**Units**		
Total Metals			
Antimony	mg/L	0.005 U	
Arsenic	mg/L	0.002	
Beryllium	mg/L	0.002 U	
Cadmium	mg/L	0.004 U	
Chromium	mg/L	0.01 U	
Copper	mg/L	0.004 U	
Lead	mg/L	0.005 U	
Mercury	mg/L	0.0001 U	
Nickel	mg/L	0.02 U	
Selenium	mg/L	0.005 U	
Silver	mg/L	0.006 U	
Thallium	mg/L	0.001 U	
Zinc	mg/L	0.011 JB	
Dissolved Metals			
Antimony	mg/L		0.005 U
Arsenic	mg/L		0.001
Beryllium	mg/L		0.002 U
Cadmium	mg/L		0.004 U
Chromium	mg/L		0.01 U
Copper	mg/L		0.004 U
Lead	mg/L		0.005 U
Mercury	mg/L		0.0001 U
Nickel	mg/L		0.02 U
Selenium	mg/L		0.01 U
Silver	mg/L		0.006 U
Thallium	mg/L		0.005 U
Zinc	mg/L		0.008 U

Note:

Blank cells are intentional.

Abbreviations:

mg/L Milligrams per liter
RETEC The RETEC Group

Qualifiers:

JB Analyte was detected, value should be considered an estimate due to blank contamination.
U Analyte was not detected at the given reporting limit.

Table C.13
All Porewater Results

	Event	Shipyards PSDDA Investigation (RETEC)								Phase 2 Main Shipyard Grab Sampling (RETEC)			
	Location	HG-1	HG-2	HG-5	HG-6	HG-8	HG-10	HG-16	HG-18	HC-8	HC-10	HC-12	HC-23
	Sample ID	HG-1A-PW	HG-2A-PW	HG-5A-PW	HG-6A-PW	HG-8A-PW	HG-10A-PW	HG-16A-PW	HG-18A-PW	HC-1A-S1-PW	HC-1B-S1-PW	HC-2-S1-PW	HC-7B-S1-PW
	Sample Date	3/23/1998	3/24/1998	3/24/1998	3/24/1998	3/24/1998	3/24/1998	3/24/1998	3/23/1998	2/26/2004	2/26/2004	2/26/2004	2/27/2004
Analyte	**Units**												
Tributyltin	µg/L	0.04 JB	0.04 JB	0.02 JB	0.03 JB	0.04 JB	0.04 JB	0.04 JB	0.03 JB	0.022 U	0.022 U	0.028 U	0.022 U
Dibutyltin as Chlorine	µg/L									0.05 U	1	0.062 U	0.05 U
Monobutyltin Trichloride	µg/L									0.067 U	0.38	0.062 U	0.05 U

Note:

Blank cells are intentional.

Abbreviations:

µg/L Micrograms per liter
PSDDA Puget Sound Dredged Disposal Analysis
RETEC The RETEC Group

Qualifiers:

JB Analyte was detected, value should be considered an estimate due to blank contamination.
U Analyte was not detected at the given reporting limit.

Harris Avenue Shipyard

Remedial Investigation/ Feasibility Study

Appendix D
Data Gaps Investigation Summary

FINAL

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List of Abbreviations/Acronyms

Acronym/ Abbreviation	Definition
Arrowac	Arrowac Fisheries, Inc.
AST	Aboveground storage tank
bgs	Below ground surface
Cascade	Cascade Drilling
cm	Centimeter
COPC	Chemical of potential concern
DGI	Data Gaps Investigation
Ecology	Washington State Department of Ecology
EPH	Extractable petroleum hydrocarbon
NAPL	Non-aqueous-phase liquid
PID	Photoionization detector
QAPP	Quality Assurance Project Plan
RI/FS	Remedial Investigation/Feasibility Study
SAP	Sampling and Analysis Plan
SMS	Sediment Management Standards
SVOC	Semivolatile organic compound
TPH	Total petroleum hydrocarbons
USCS	Unified Soil Classification System
VPH	Volatile petroleum hydrocarbon

1.0 Introduction

Floyd|Snider completed a Data Gaps Investigation (DGI) in February 2013 to fill data gaps identified as part of the Supplemental Site Investigation in March 2011 and to collect upland and in-water samples to further define the nature and extent of known chemicals of potential concern (COPCs) for completion of the site-wide Remedial Investigation/Feasibility Study (RI/FS) of the Harris Avenue Shipyard (the Site). The scope of this additional investigation was provided to the Washington State Department of Ecology (Ecology) on November 12, 2012. This appendix includes a summary of the work completed. All analytical results and relevant observations have been incorporated into the RI/FS, as appropriate.

To supplement the DGI scope, the existing project Sampling and Analysis Plan/Quality Assurance Project Plan (SAP/QAPP) was revised to include the updated reporting limits and sampling methods used for the DGI. The revised SAP/QAPP (Floyd|Snider 2013) was approved by Ecology on January 22, 2013.

1.1 SCOPE OF WORK

Sampling was performed in both upland and in-water areas of the study area to further define the extent and depth of known COPCs. Locations were determined based on an interpretation and evaluation of existing analytical data, as well as recorded field conditions and site access.

All of the work was completed between January 28 and February 1, 2013, with the exception of the groundwater sampling, which was conducted on February 14 and 15, 2013 to allow the groundwater in the newly installed monitoring well, MW-10, to equilibrate.

1.1.1 Uplands

Upland areas were further characterized by the collection of soil and groundwater data from Geoprobe locations and the installation of one monitoring well (MW-10).

1.1.1.1 Soil

The following activities were completed to evaluate soil conditions:

- Inspected soils for potential petroleum hydrocarbon contamination at depths noted in the field observations during the drilling of FS-01.
- Collected deep subsurface geologic and hydrogeological/physical parameters data for calculation of site-specific cleanup levels.
- Delineated petroleum hydrocarbon contamination in the former aboveground storage tank (AST) area.
- Assessed the potential migration of total petroleum hydrocarbons (TPH) into the northeast corner of the study area (east of MW-06) by the installation of Monitoring Well MW-10.
- Analyzed samples from Geoprobe borings and Monitoring Well MW-10 for metals, semivolatile organic compounds (SVOCs), and TPH to better define the nature and extent of contamination.
- Evaluated volatile petroleum hydrocarbon (VPH)/extractable petroleum hydrocarbon (EPH) data to assess the composition and mobility of petroleum hydrocarbons.

- Collected surface soils for dioxin/furan analysis at one boring location and one surface grab location collocated with other site contaminants.
- Collected surface soils for dioxin/furan analysis at a location that is presumably free of site contamination to serve as background data.

1.1.1.2 Groundwater

The following activities were completed to evaluate groundwater conditions:

- Collected groundwater samples from all monitoring wells (including MW-10).
- Completed groundwater screening at Geoprobe boring locations to determine if step out contingency locations were necessary. Analyzed samples for SVOCs, volatile organic compounds (VOCs), and metals with lower reporting limits to assess the nature and extent of contamination relative to screening-level criteria.
- Evaluated petroleum hydrocarbon concentrations to better assess the nature and extent of contamination in the shoreline area near the location of the former AST and at MW-06.
- Evaluated VPH/EPH data to assess the composition and mobility of petroleum hydrocarbons in areas where petroleum may affect sediment or surface water quality.
- Made observation to determine the presence of non-aqueous-phase liquid (NAPL) in groundwater.
- Collected groundwater measurements in all monitoring wells to determine the potentiometric surface elevations to provide a better understanding of the groundwater characteristics and movement.

1.1.2 Sediment

The following activities were completed to evaluate sediment conditions:

- Analyzed intertidal sediment samples to identify the extent of sediment contamination adjacent to HA-02, where copper and zinc concentrations exceeded the Sediment Management Standards (SMS) criteria.
- Analyzed intertidal sediment samples to identify the extent of sediment contamination adjacent to HA-07, where lead was detected at a concentration greater than the SMS criterion.
- Analyzed surface sediment samples for SVOCs with lower reporting limits to assess the nature and extent of contamination in areas with previous known contamination and areas without previously collected data.
- Analyzed surface sediment samples to assess the extent of contamination (SVOCs, metals, and polychlorinated biphenyls [PCBs]) along the eastern portion of the in-water study area.
- Analyzed surface sediment samples for dioxins/furans in an area known to be affected by site activities to determine if they are collocated with other contaminants.
- Analyzed surface sediment samples for dioxins/furans in an area of the Site that is likely unaffected by site activities.

2.0 Sampling Methods and Observations

2.1 GEOPROBE SOIL AND GROUNDWATER SAMPLING

Five soil borings, FS-19 through FS-23, were advanced by Cascade Drilling of Woodinville, Washington (Cascade) using direct-push technology (i.e., Geoprobe), in accordance with the procedures described in the revised SAP/QAPP (Floyd|Snider 2013) and as shown in Figure 2.4 of the RI/FS. Soils were logged according to the Unified Soil Classification System (USCS). Boring logs are included in Appendix E of the RI/FS. Representative photographs of the soil boring advancement and sample collection are included in Appendix A of the RI/FS.

Soil Borings FS-21 through FS-23 were advanced to 25 feet below ground surface (bgs). FS-19 was intended to be advanced to 40 feet bgs, but the boring was stopped at 30 feet bgs because of refusal. In order to obtain deep geologic information, FS-20 was advanced to 40 feet bgs instead.

Field screening with a photoionization detector (PID) was conducted routinely throughout the core to identify intervals with potential contamination. Visual and olfactory indications of contamination such as sheen and odor were also monitored and documented on the boring logs, as discussed in Section 2.1.1. In general, at least three soil samples were collected in each soil boring location, one at approximately 3 to 4 feet bgs, one in the smear or contaminated zone (i.e., between 8 to 12 feet bgs), and one approximately 4 feet below the smear zone sample. Additional samples were collected when the field screening indicated hydrocarbon contamination or signs of other contamination. Soil and groundwater samples were analyzed for the chemical groups listed in Table D.1.

Samples were also collected for analysis of hydrogeologic/physical parameters (i.e., porosity, water content, bulk density, and organic carbon fraction) at two locations (FS-19 and FS-22).

Groundwater screening samples were collected directly from soil boring locations FS-19, FS-21, and FS-22 after soil sampling. Temporary well points were installed with 1-inch polyvinyl chloride (PVC) piping and retractable drop-down-type screen samplers made of stainless steel. Groundwater field parameters were measured during purging, and groundwater sampling was conducted after the parameters had stabilized.

Field decontamination and sample collection procedures were followed according to the methods described in the SAP/QAPP. Samples were delivered on ice to the appropriate laboratory, under standard chain-of-custody procedures, and analyzed using the analytical methods described in the SAP/QAPP.

2.1.1 Field Observations

Generally, fill consisting of sandy fine to coarse sand was observed from the ground surface to approximately 15 feet bgs. Gravel was present in the top 2 to 12 feet bgs in a couple locations. Shell fragments were observed in the fill material at most locations. Anthropogenic material, such as wood and brick fragments, was observed in a couple locations in the fill layer. Sandblast grit was observed in surface soil at only one location, FS-21.

In addition to anthropogenic debris, an odor of petroleum hydrocarbons and/or creosote, and the presence of a moderate to heavy sheen, were noted in the following borings (refer to Appendix E of the RI/FS for monitoring well and boring logs):

- FS-19: a moderate sheen and hydrocarbon odor were noted between 2 and 12 feet bgs, and an odor and slight sheen were noted from 15 to 20 feet bgs. During groundwater sampling, a slight sheen and petroleum odor were detected.
- FS-20: petroleum staining and a strong hydrocarbon odor were noted between 6.5 and 12 feet bgs.
- FS-21: a strong odor, possibly creosote, and a sheen were noted from 1 to 4 feet bgs. A petroleum odor and petroleum staining were noted from 9 to 19 feet bgs. During groundwater sampling, a slight naphthalene odor was detected.

Soil Borings FS-22 and FS-23 contained no visual or olfactory indications of contamination, and the PID measurements indicated no strong source of contamination. These observations at these locations indicated that there was no off-site source to the east and that the contamination from the Site was not spreading farther east onto the adjacent Arrowac Fisheries, Inc. (Arrowac) property. On the basis of these indications, the contingency soil borings on the Arrowac property were determined to be unnecessary.

2.2 MONITORING WELL INSTALLATION SOIL SAMPLING

One monitoring well, MW-10, was installed and developed by Cascade using standard hollow stem auger techniques following the “Minimum Standards for Construction and Maintenance of Wells” from Section 173-160 of the Washington Administrative Code (WAC 173-160) and procedures described in the SAP/QAPP (Floyd|Snider 2013). During installation, the well construction details were recorded on the monitoring well log, which is included in Appendix E of the RI/FS. Soil samples were analyzed for the chemical groups listed in Table D.1. Soil samples were collected every 2 feet using an 18-inch split-spoon sampler; they were described and classified according to the USCS and photographed. The soil sample information was documented on the monitoring well logs in Appendix E of the RI/FS. Select photographs are included in Appendix A of the RI/FS. Field screening and sampling were conducted according to the procedures described in Section 2.1. Samples were delivered on ice to the appropriate laboratory, under standard chain-of-custody procedures, and analyzed using the analytical methods described in the SAP/QAPP.

2.2.1 Field Observations

Subsurface soils encountered during the installation of MW-10 were similar to soils seen during the soil boring advancement. No evidence of petroleum contamination or other contamination was noted. Because no evidence of contamination was noted during the installation of MW-10, it was determined that the proposed contingency borings to the east of MW-10 were unnecessary.

2.3 MONITORING WELL SAMPLING

Groundwater samples were collected from all nine existing wells (including the newly installed MW-10) during one sampling event on February 14 and 15, 2013. Because of equipment malfunction, sampling of monitoring wells occurred over a 2-day period during a receding and low tide. In addition, two samples were collected on consecutive days from MW-06 to determine

whether there were any effects on water quality, specifically concentrations of TPH, during the tidal cycle. Groundwater levels were measured over a period of 15 minutes to minimize error with tidal fluctuation. Groundwater samples were analyzed for the chemical groups listed in Table D.1.

Before the sample collection, field parameters of water quality (i.e., turbidity, dissolved oxygen, salinity, etc.) were recorded on groundwater sampling forms. Groundwater elevations measured before the sample collection, and any observations such as sheen and/or odor, were also recorded. Field decontamination and sample collection procedures were followed in accordance with the methods described in the SAP/QAPP (Floyd|Snider 2013). Samples were delivered on ice to the appropriate laboratory, under standard chain-of-custody procedures, and analyzed using the analytical methods described in the SAP/QAPP.

2.3.1 Field Observations

A slight sheen and petroleum hydrocarbon odor were noted at MW-09. At MW-01, a slight sheen and a light petroleum odor were noted.

No NAPL was observed at any monitoring well location.

2.4 SURFACE SOIL SAMPLING

Surface soil samples were collected at two locations for analysis of dioxins/furans (SFS-01 and SFS-02[1]). The sample from SFS-01 was collected approximately 2 feet east of MW-08, an area that has minimal impacts due to shipyard activities and is currently used for parking. The sample from SFS-02 was collected near the marine railway area where heavier industrial use is currently active at the shipyard. Soil samples were analyzed for the chemical groups listed in Table D.1.

The methods for surface soil sampling were not included in the SAP/QAPP (Floyd|Snider 2013). At both locations, samples were collected from 0 to 0.5 feet bgs using a decontaminated hand trowel. The soil was visually classified, placed in a decontaminated stainless steel bowl, and homogenized until it was uniform in color and texture. The homogenized soil was then carefully placed into amber glass jars, labeled, and stored on ice.

Field decontamination procedures were followed in accordance with the methods described in the SAP/QAPP for other soil sampling. Samples were delivered on ice to the appropriate laboratory, under standard chain-of-custody procedures, and analyzed using the analytical methods described in the SAP/QAPP.

2.4.1 Field Observations

Both samples were collected from areas that have hard compacted gravel surfaces. The gravel was scraped off until bare soil was exposed. The sample from SFS-01 consisted of hard compacted dark gray to dark brown well-graded fine and coarse sands with gravel. The sample from SFS-02 consisted of hard compacted dark brown sand and gravelly fill including pieces of metal and glass. At 0.5 feet bgs at SFS-02, sand blast grit was observed. No sheen, odor, or staining was observed in surface soil at either location.

[1] Dioxins and furans were also collected from surface soils at FS-21 during Geoprobe advancement, as described in Section 2.1. FS-21 is also located near the marine railway area.

2.5 INTERTIDAL SURFACE SEDIMENT SAMPLING

Intertidal sediment samples were collected from three locations, HA-09, HA-10, and HA-11, using a hand trowel to scoop the 0 to 10[2] centimeters (cm) of surface sediment, as measured with a ruler. The sediment was visually classified, placed in a decontaminated stainless steel bowl, and homogenized until it was uniform in color and texture. The homogenized sediment was then carefully placed into glass jars, labeled, and stored on ice.

All field decontamination and sample collection procedures were followed in accordance with the methods described in the SAP/QAPP (Floyd|Snider 2013). Samples were delivered on ice to the appropriate laboratory, under standard chain-of-custody procedures, and analyzed using the analytical methods described in the SAP/QAPP. Sediment samples were analyzed for the chemical groups listed in Table D.1.

All intertidal sediment sample locations were surveyed using a Trimble GeoXH portable differential global positioning system (GPS) capable of providing positions within approximately 1 meter (in real-time). Select photographs of the intertidal sediment samples are included in Appendix A of the RI/FS.

2.5.1 Field Observations

In general, intertidal surface sediment samples consisted of light brown and dark gray fine to medium graded sands, with abundant shell fragments in all samples. The samples from locations HA-10 and HA-11 included some larger gravel and cobbles (refer to Table D.2 for grain size results). No odor, sheen, or staining was observed in the intertidal surface sediment sample locations.

2.6 NEARSHORE MARINE SURFACE SEDIMENT SAMPLING

Nearshore surface sediment samples were collected from nine locations using a Power Grab sampler mounted to a vessel operated by Research Support Services of Bainbridge Island, Washington. The sample from SG-05 was collected to assess sediment quality near the shoreline and near HA-09. The samples from SG-08 though SG-11 were collected to evaluate the nature and extent of contamination on the east side of the Site. The samples from SG-10 and SG-11 were archived, with further analysis contingent upon the results from SG-08 and SG-09. SG-06 and SG-07 are located in active areas of the Site known to have impacted sediments, and SG-12 and SG-13 are located on the outer edge of the study area, which is assumed to be relatively free of contamination. Sediment samples were analyzed for the chemical groups listed in Table D.1.

All sediment samples were visually classified, and the total penetration of the sampler was measured. The sediment descriptions, time of sample collection, and coordinates were recorded on sample collection forms, which are included in Attachment D.1. Photographs of the nearshore marine sediment sampling are included in Appendix A of the RI/FS. Samples were collected from the top 0 to 10[3] cm of sediment. In addition to the top 0- to 10-cm depth interval, the lower 10- to 20-cm depth interval was visually classified and sampled, and the samples were frozen and archived at the laboratory. This is a deviation from the SAP/QAPP, as described in Section 3.3.

[2] Per the SAP/QAPP, the surface sample was supposed to be collected from the 0- to 12-cm interval but was mistakenly collected from the 0- to 10-cm interval, as described in Section 3.3.
[3] Refer to Footnote 1.

The individual sediment samples were placed in a decontaminated stainless steel bowl and homogenized until the sediment was uniform in color and texture. The homogenized sediment was then carefully placed into glass jars, labeled, and stored on ice. All field decontamination and sample collection procedures were followed in accordance with the methods described in the SAP/QAPP (Floyd|Snider 2013). Samples were delivered on ice to the appropriate laboratory, under standard chain-of-custody procedures, and analyzed using the analytical methods described in the SAP/QAPP.

2.6.1 Field Observations

In general, grain size was observed to become increasingly fine moving offshore within the main shipyard area and west of the study area. At SG-05, located east of the main pier and just offshore, the sediment consisted of fine to coarse gravel in the top 0- to 10-cm interval. In the 10- to 20-cm interval, the material transitioned to a fine to coarse sand. At SG-06 and SG-07, located between the dry dock and the main pier, the sediment consisted of a silty sand in both depth intervals. In contrast, the sediment at the other six locations consisted of a fine sandy silt in both depth intervals.

An analysis of sediment grain size was performed at all the sampled locations (Table D.2). The greatest percentage of fine particles (combined silt and clay fraction) was found in sediments located offshore (i.e., SG-09, SG-12, and SG-13) and ranged from 52.9 to 93.3 percent. In locations within the active shipyard. the fine fractions in sediment ranged from 0.1 to 32.8 percent, as observed during sampling.

In addition to sediment texture, vegetation and fauna were observed on the sediment surface during the visual classification of the sediment in the Power Grab sampler before sample collection. For complete descriptions, refer to the sediment sampling forms in Attachment D.1. In general, eel grass and other sea vegetation were observed at SG-06, SG-08, SG-09, and SG-13. Fauna such as hermit crabs, mussels, and clams were observed at SG-06, SG-07, SG-08, SG-10, SG-11, and SG-13.

Anthropogenic debris was observed at some of the locations and included metal fragments, mesh, unidentified composite material, and glass bottles. Wood debris was noted at SG-06 and SG-09, but it is unknown whether the source was anthropogenic. A sheen was observed at SG-06, SG-07, and SG-10. At all of the locations, the sheen was very slight and not distinguishable as petroleum or organic material.

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3.0 Results and Deviations

3.1 ANALYTICAL RESULTS AND DATA VALIDATION

All of the analytical laboratory results for the DGI are included in Attachment D.2. The data validation report is included in Attachment D.3. In general, all of the analytical data were usable, as discussed in Attachment D.3.It should be noted that the mercury sample from the 0- to 10-cm sample at SG-08 was unexpectedly high (12.4 mg/kg) compared to all historical data. Additional archived sediment samples were analyzed from nearby locations (i.e., SG-09, SG-10, and SG-11) in order to better understand the results. In addition, the 10- to 20-cm archived sample from SG-08 and two additional aliquots from the 0- to 10-cm sample jar from SG-08 were also analyzed. All results from these additional analyses ranged from 0.016 to 0.47 mg/kg, which is less than SMS criteria. This indicates that the initial mercury result at SG-08 of 12.4 mg/kg was an anomaly and likely a paint fleck and not representative of sediment concentrations in this area. The result was rejected and the other two results (ireanalyses of the separate aliquots) were retained.

An evaluation of the analytical results is included in the RI/FS.

3.2 DEVIATIONS

During a preliminary site visit, it was determined that a location for a proposed nested well pair (MW-10A and MW-10B) was not feasible because of the proximity of the main dock, the difficult terrain of the riprap on the nearby slope, and access issues related to utilities and fencing. It was determined that natural attenuation parameters could be obtained from nearby Wells MW-01 and MW-09 and that deep geologic and groundwater information could be obtained from a 40-foot-deep direct-push probe (FS-19) located just west of MW-06. This deviation from the SAP/QAPP and the proposed scope was approved by Ecology on January 22, 2013.

At the time of boring advancement, FS-19 could not be drilled to 40 feet due to refusal at 30 feet. A nearby location, FS-20, was drilled to 40 feet bgs to obtain deep geologic data from 30 to 40 feet bgs.

As described in Sections 2.5 and 2.6, all surface sediment samples were inadvertently collected from the 0- to 10-cm depth interval rather than the 0- to 12-cm depth interval, as specified in the SAP/QAPP.

Per the SAP/QAPP and the proposed scope of work, only the top 12 cm of sediment were supposed to be sampled; however, it was determined that it would be beneficial to collect a deeper sample from the 10- to 20-cm depth interval while the boat was mobilized in the area. These samples were archived in case future analysis is determined to be necessary.

No other deviations from the proposed scope or revised SAP/QAPP occurred during the DGI.

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4.0 Investigation-Derived Waste

All water generated during well construction, development, groundwater sampling, and equipment decontamination activities was collected and transferred to new, U.S. Department of Transportation-approved 55-gallon steel drums. The drums were lidded, sealed, labeled with an indelible marker, and stored on-site while material profiling was completed.

In May 2013, five drums containing investigation-derived waste in the form of soil cuttings and water generated during the January and February DGI were transported from the Site to a Subtitle D landfill in Seattle, Washington, by Phillip Services Corporation for disposal.

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5.0 Reference

Floyd|Snider. 2013. *Data Gaps Investigation Sampling and Analysis Plan and Quality Assurance Project Plan*. Prepared for Port of Bellingham. 4 January.

Harris Avenue Shipyard

Remedial Investigation/ Feasibility Study

Appendix D
Data Gaps Investigation Summary

Tables

FINAL

Table D.1
Sample Analytical Summary

Location	Depth/ Interval	Media Type	Analysis and Number of Samples by Location								
			VOCs	SVOCs	TPH	VPH/ EPH	Metals	Dioxins/ Furans	PCBs	TOC	Physical Parameters[1]
Soil and Groundwater											
FS-19	Various	Soil	--	4	3	2	4	--	--	--	4
		DP-GW	--	1	1	--	1	--	--	--	--
FS-20	Various	Soil	--	3	2	1	3	--	--	--	--
		DP-GW	--	1	1	--	1	--	--	--	--
FS-21	Various	Soil	--	3	3	1	2	1	--	--	--
		DP-GW	--	1	1	--	1	--	--	--	--
FS-22	Various	Soil	--	1	1	--	2	--	--	--	2
		DP-GW	--	1	1	--	--	--	--	--	--
FS-23	Various	Soil	--	2	1	--	2	--	--	--	--
MW-10	20 ft bgs	Soil	--	2	2	--	2	--	--	--	1
		MW-GW	1	1	1	--	--	--	--	--	--
Existing Monitoring Wells[2]	Various	MW-GW	8	8	8	3	10	--	--	--	--
SFS-01	0–6 in	Soil	--	--	--	--	--	1	--	--	--
SFS-02	0–6 in	Soil	--	--	--	--	--	1	--	--	--
Sediments[3]											
HA-09	0–10 cm	Sediment	--	1	--	--	1	--	1	1	1
HA-10	0–10 cm	Sediment	--	--	--	--	1	--	--	--	1
HA-11	0–10 cm	Sediment	--	--	--	--	1	--	--	--	1
SG-05	0–10 cm	Sediment	--	1	--	--	1	--	1	1	1

Table D.1
Sample Analytical Summary

Location	Depth/ Interval	Media Type	Analysis and Number of Samples by Location								
			VOCs	SVOCs	TPH	VPH/ EPH	Metals	Dioxins/ Furans	PCBs	TOC	Physical Parameters[1]
Sediments (continued)[3]											
SG-06	0–10 cm	Sediment	--	1	--	--	--	1	--	1	1
SG-07	0–10 cm	Sediment	--	1	--	--	--	1	--	1	1
SG-08	0–10 cm	Sediment	--	1	--	--	1	--	1	1	1
SG-09	0–10 cm	Sediment	--	1	--	--	1	--	1	1	1
SG-10	0–10 cm	Sediment	--	1	--	--	1	--	1	1	1
SG-11	0–10 cm	Sediment	--	1	--	--	1	--	1	1	1
SG-12	0–10 cm	Sediment	--	1	--	--	--	1	--	1	1
SG-13	0–10 cm	Sediment	--	1	--	--	--	1	--	1	1

Notes:

-- Not analyzed.

1 Physical parameters include porosity, water content, bulk density, and organic carbon fraction (for soil only), and total solids and grain size (for sediments).

2 Existing monitoring wells include MW-1, MW-02A, MW-4, MW-5, MW-06, MW-07, MW-08, and MW-09.

3 Additional samples were collected from 10 to 20 cm and archived for possible future analyses pending the data results for the shallow samples collected from 0 to 10 cm. Based on the results, only the deeper sample from SG-08 was analyzed for mercury to confirm that the elevated detection from the 0 to 10 cm sample was an anomaly.

Abbreviations:

bgs Below ground surface.
cm Centimeters.
DP-GW Groundwater sample collected by direct-push probe.
EPH Extractable petroleum hydrocarbon.
ft Feet.
in. Inches.
MW-GW Groundwater collected from monitoring well.
PAH Polycyclic aromatic hydrocarbon.
PCB Polychlorinated biphenyl.
SVOC Semivolatile organic compound.
TOC Total organic carbon.
TPH Total petroleum hydrocarbon.
VOC Volatile organic compound.
VPH Volatile petroleum hydrocarbon.

Table D.2
Summary of Grain Size Testing

		Grain Size Type	Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt				Clay		Fines	
		Fractions	>2000 µm	1,000–2,000 µm	500–1,000 µm	250–500 µm	125–250 µm	62.5–125 µm	31.3–62.5 µm	15.6–31.3 µm	7.8–15.6 µm	3.9–7.8 µm	1.95–3.9 µm	0.98–1.95 µm	<0.98 µm	Total Fines
Location	Sample ID[1]	Sample Date	%	%	%	%	%	%	%	%	%	%	%	%	%	%
HA-09	HA-09-0-10-013013	01/30/2013	7.4	2.6	11.5	61.1	17.1	0.1	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3
HA-10	HA-10-0-10-013013	01/30/2013	82.1	8.2	4.7	1.9	0.8	0.3	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1
HA-11	HA-11-0-10-013013	01/30/2013	61	8	16.9	8.7	1.9	0.7	2.8 U	2.8 U	2.8 U	2.8 U	2.8 U	2.8 U	2.8 U	2.8
SG-05	SG-05-0-10-013113	01/31/2013	75.5	9.9	6.5	5.4	2.3	0.3	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1
SG-05	SG-95-0-10-013113	01/31/2013	72	10.5	7.9	6.2	2.6	0.3	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6
SG-06	SG-06-0-10-013113	01/31/2013	10.8	5.2	5.9	17.8	31.9	9.9	4.9	1.2	2.7	1.6	1.9	2.6	3.7	18.6
SG-07	SG-07-0-10-013113	01/31/2013	40.1	16.8	11.4	9.3	9.9	3.6	1.3	0.5	1	1.3	1.4	1.7	1.7	8.9
SG-08	SG-08-0-10-013113	01/31/2013	40	10.9	5.3	4.5	4.4	2.1	5	16.5	3	1.3	1.1	1.8	4	32.8
SG-09	SG-09-0-10-013113	01/31/2013	5	3.2	4.9	10.5	12.6	4.7	3.6	6.6	8.8	9.3	8.9	8.1	13.8	59.1
SG-12	SG-12-0-10-013113	01/31/2013	0.2	1	2.5	3.4	6.5	3.2	2.8	8.2	13.6	15.2	13.3	11.3	18.9	83.3
SG-13	SG-13-0-10-013113	01/31/2013	0.1	3	2.4	3.1	21.4	17.1	1.7	8.4	12.6	6.6	6	6.6	11	52.9

Note:

1 All samples taken from 0 to 10 cm.

Abbreviations:

cm Centimeters.

µm Micrometers.

Qualifier:

U Indicates grain size was minimal in this range. Refer to total fines column for results.

Harris Avenue Shipyard

Remedial Investigation/ Feasibility Study

Appendix D
Data Gaps Investigation Summary

Attachment D.1
Data Gaps Investigation Field Records

FINAL

GROUNDWATER OR SURFACE WATER SAMPLE COLLECTION FORM

Project Name: POB - Harris Date of Collection: 1/29/13

Project Number: T-4030 Field Personnel: Erin Murray

Purge Data

Well ID: FS-19 Secure: ☐ Yes ☑ No Well Condition/Damage Description: temp. 3/4" PVC

Depth Sounder decontaminated Prior to Placement in Well: ☐ Yes ☐ No (NA) One Casing Volume (gal):

Depth of water (from top of well casing): NA Well Casing Type/Diameter/Screened Interval: 21-26'/PVC S/OHCI Sch 80

After 5 minutes of purging (from top of casing): NA

Begin purge (time): 1200

End purge (time): 1355

Gallons purged: ~5

Purge water disposal method: Drum

Volume of Schedule 40 PVC Pipe				
Diameter	O.D.	I.D.	Volume (Gal/Linear Ft.)	Weight of Water (Lbs/Lineal Ft.)
1 ¼"	1.660"	1.380"	0.08	0.64
2"	2.375"	2.067"	0.17	1.45
3"	3.500"	3.068"	0.38	3.2
4"	4.500"	4.026"	0.66	5.51
6"	6.625"	6.065"	1.5	12.5

5' x 3/4"

Time	Depth to Water	Vol. Purged	pH	DO mg/L	Conductivity mS/cm	Turbidity NTU	Temp °C	ORP mV	Sal ppt	Comments
1215		2	8.12	3.17	3.79	800*	8.13	-211		
1230		2.25	7.50	1.23	2.88	0.0	8.22	-184	1.5	Water cloudy -
1245		3.0	7.53	0.73	2.86	0.0	9.17	-231	1.0	Turb not
1300		3.5	7.53	0.70	2.84	0.0	9.19	-234	1.0	correct.

* Turbidity reading high but water fairly clear. Stopped pump & cleaned Horiba ~~turb~~ turb lowered

Sampling Data

Sample No: FS-19-GW-012913 & (GWF) Location and Depth: FS-19; 21-26'

Date Collected (mo/dy/yr): 1/29/13 Time Collected: 1315 ☐ AM ☑ Weather: cloudy; 45°F

Type: ☑ Ground Water ☐ Surface Water Other: Sample: ☑ Filtered ☑ Unfiltered Other: Both

Sample Collected with: ☐ Bailer ☑ Pump Other: Type: Atgis Regenerative

Water Quality Instrument Data Collected with: Type: ☐ Hanna 9828 ☑ Horiba U-50 Other:

Sample Decon Procedure: Sample collected with (circle one): decontaminated all tubing, disposable and/or dedicated silicon and poly-tubing Other:

Sample Description (Color, Turbidity, Odor, Other): cloudy; fair/slight sheen; slight petroleum odor
→ cleaned Horiba (rinsed cleaned) Turb went down

Sample Analyses

See Below

TPH-D	(HCl) ☑	Chlor / Fluor	(unpres) ☐	COD / TOC	(H2SO4) ☐	Orthophos	(FILTER) ☐	Diss. Metals	(HNO3) ☑		
TPH-G	(HCl) ☑	BTEX	(HCl) ☑	Total Metals	(HNO3) ☑	TKN/Phos	(N2SO4) ☐	VOCs	(HCl) ☐		

Additional Information

Types of Sample Containers:	Quantity:	Duplicate Sample Numbers:	Comments:
½ L Amber	2	1	TPH-DX
VOA vial	2	NA	GX/BTEX HCL preserv.
500mL poly	1		HNO_3 Total Hg
500mL poly	1		HNO_3 - Dissolved/field filtered Metals (no Hg)
1 L Amber	2	1	SVOC

Signature: Date: 1/29/13

GROUNDWATER OR SURFACE WATER SAMPLE COLLECTION FORM

Project Name: POB- Harris
Date of Collection: 1/30/13
Project Number:
Field Personnel: Erin Murray

Purge Data

Well ID: FS-21 Secure: ☐ Yes ☑ No Well Condition/Damage Description: Temp well

Depth Sounder decontaminated Prior to Placement in Well: ☐ Yes ☐ No NA
One Casing Volume (gal): Sch 80 PVC 5'X3/4"
Depth of water (from top of well casing): NA
Well Casing Type/Diameter/Screened Interval: 20' 3/4" / 20-25'
After 5 minutes of purging (from top of casing): NA
Begin purge (time): 0935
End purge (time): 1145
Gallons purged: ~4
Purge water disposal method: Drum

Volume of Schedule 40 PVC Pipe				
Diameter	O.D.	I.D.	Volume (Gal/Linear Ft.)	Weight of Water (Lbs/Lineal Ft.)
1 ¼"	1.660"	1.380"	0.08	0.64
2"	2.375"	2.067"	0.17	1.45
3"	3.500"	3.068"	0.38	3.2
4"	4.500"	4.026"	0.66	5.51
6"	6.625"	6.065"	1.5	12.5

	Time	Depth to Water	Vol. Purged	pH	DO mg/L	Conductivity mS/cm	Turbidity NTU	Temp °C	ORP mV	Sal ppt	Comments
1000			1.5		2.78		180	11.01	-148	1.4	
1015	NA		2	7.14	1.42	3.04	146	10.66	-133	1.6	No visible
1030		NA	~2.5	7.14	1.18	2.96	17.2	11.00	-165	1.5	sheen
1045			3.0	7.13	0.78	2.94	10.0	11.14	-174	1.5	
1150			3.25	7.13	0.72	2.94	7.0	11.13	-178	1.5	

Sampling Data

Sample No: FS-21-GW-013013 & MS/MSD GWF Location and Depth: FS-21; 20-25'
Date Collected (mo/dy/yr): 1/30/13 Time Collected: 1055 ☑ AM ☐ Weather: cloudy
Type: ☐ Ground Water ☐ Surface Water Other: Sample: ☐ Filtered ☐ Unfiltered Other: Both
Sample Collected with: ☐ Bailer ☑ Pump Other: Type: Alexis (Peg arms Peristaltic)
Water Quality Instrument Data Collected with: Type: ☐ Hanna 9828 ☑ Horiba U-50 Other:
Sample Decon Procedure: Sample collected with (circle one): decontaminated all tubing; (disposable and/or dedicated silicon and poly tubing) Other:
Sample Description (Color, Turbidity, Odor, Other): Brown, turbid; Slight naphthalene odor - no sheen

Sample Analyses

See Below

TPH-D	(HCl) ☐	Chlor / Fluor	(unpres) ☐	COD / TOC	(H2SO4) ☐	Orthophos	(FILTER) ☐	Diss. Metals	(HNO3) ☐
TPH-G	(HCl) ☐	BTEX	(HCl) ☐	Total Metals	(HNO3) ☐	TKN/Phos	(N2SO4) ☐	VOCs	(HCl) ☐

Additional Information

Types of Sample Containers:	Quantity:	Duplicate Sample Numbers:	Comments:
1 liter Amber (SVOC)	4	FS-79-GW-013013	1130 Time
½ L Amber TPH-Dx	4		
500 mL poly Tot/Diss. Metals & Hg	4		Dissolved - field filtered
GHSI 40 mL VOA	4		

Signature: [signature] Date: 1/30/13

GROUNDWATER OR SURFACE WATER SAMPLE COLLECTION FORM

Project Name: POTB-Harris Date of Collection: 1/30/13

Project Number: Field Personnel: Erin Murray

Purge Data

Well ID: FS-22 Secure: ☐ Yes ☑ No Well Condition/Damage Description: Temp well

Temp. well

Depth Sounder decontaminated Prior to Placement in Well: ☐ Yes ☑ No One Casing Volume (gal):

Depth of water (from top of well casing): NA Well Casing Type/Diameter/Screened Interval: Sch 80 PVC 5"x 3/4" / 20-25' bgs

After 5 minutes of purging (from top of casing): NA

Begin purge (time): 1420

End purge (time): 1615

Gallons purged: ~5

Purge water disposal method: Drum

Volume of Schedule 40 PVC Pipe				
Diameter	O.D.	I.D.	Volume (Gal/Linear Ft.)	Weight of Water (Lbs/Lineal Ft.)
1 ¼"	1.660"	1.380"	0.08	0.64
2"	2.375"	2.067"	0.17	1.45
3"	3.500"	3.068"	0.38	3.2
4"	4.500"	4.026"	0.66	5.51
6"	6.625"	6.065"	1.5	12.5

Time	Depth to Water	Vol. Purged	pH	DO mg/L	Conductivity mS/cm	Turbidity NTU	Temp °C	ORP mV	Sal ppt	Comments
1445		3.5	7.47	2.54	7.39	414	10.65	-96	4.0	Turb. High
1500		3.75	7.23	2.21	6.42	302	11.00	-100	3.7	cleaned out flowthrough cell.
1520	NA	4.25	7.23	0.86	7.47	54	11.52	-169	4.0	
1530		4.5	7.24	0.75	7.47	33	11.64	-177	4.1	
1545		~5	7.24	0.68	7.47	29	11.63	-181	4.1	

Drillers started purging at 1330. Purged for 45 min. Stopped until SM sampling.

Sampling Data

Sample No: FS-22-GW-013013 & GWF Location and Depth: FS-22 / 20-25' bgs

Date Collected (mo/dy/yr): 1/30/13 Time Collected: 1550 ☐ AM ☐ Weather: Rain 45°F

Type: ☑ Ground Water ☐ Surface Water Other: Sample: ☐ Filtered ☑ Unfiltered Other: Both

Sample Collected with: ☐ Bailer ☑ Pump Other: Type: Alexis Peristaltic

Water Quality Instrument Data Collected with: Type: ☐ Hanna 9828 ☑ Horiba U-50 Other:

Sample Decon Procedure: Sample collected with (circle one): decontaminated all tubing; disposable and/or dedicated silicon and poly tubing Other:

Sample Description (Color, Turbidity, Odor, Other): Slightly cloudy; no odor; no sheen

Sample Analyses

See Below

TPH-D	(HCl) ☐	Chlor / Fluor	(unpres) ☐	COD / TOC	(H2SO4) ☐	Orthophos	(FILTER) ☐	Diss. Metals	(HNO3) ☐
TPH-G	(HCl) ☐	BTEX	(HCl) ☐	Total Metals	(HNO3) ☐	TKN/Phos	(N2SO4) ☐	VOCs	(HCl) ☐

Additional Information

Types of Sample Containers:	Quantity:	Duplicate Sample Numbers:	Comments:
2 1 Liter Ambers	2	NA	SVOCs
2 ½ Liter amber	2		TPH-Dx
2 500mL poly	2		Tot Metals Dissolved Metals (field filtered)
40mL VOA	2		TPH-Gx / BTEX HCl preserv.

Signature: Date: 1/30/13

GROUNDWATER OR SURFACE WATER SAMPLE COLLECTION FORM

Project Name: Harris Ave Shipyard Date of Collection: 2/15/2013

Project Number: POB-Harris Field Personnel: E. Ramirez / D. Graves.

Purge Data

Well ID: MW-01 Secure: ☐ Yes ☐ No Well Condition/Damage Description: Good, but needs new well cap.

Depth Sounder decontaminated Prior to Placement in Well: ☐ Yes ☐ No One Casing Volume (gal):

Depth of water (from top of well casing): 7.76 (1222) Well Casing Type/Diameter/Screened Interval: 2" PVC 14'

After 5 minutes of purging (from top of casing):

Begin purge (time): 1228

End purge (time): 1300

Gallons purged: 2.5 gal.

Purge water disposal method: Stored in drums onsite.

Volume of Schedule 40 PVC Pipe				
Diameter	O.D.	I.D.	Volume (Gal/Linear Ft.)	Weight of Water (Lbs/Lineal Ft.)
1 ¼"	1.660"	1.380"	0.08	0.64
2"	2.375"	2.067"	0.17	1.45
3"	3.500"	3.068"	0.38	3.2
4"	4.500"	4.026"	0.66	5.51
6"	6.625"	6.065"	1.5	12.5

Time	Depth to Water	Vol. Purged (g)	pH	DO (mg/L)	Conductivity (mS/cm)	Turbidity	Temp	ORP	TDS (g/L)	Comments	Sal ppt
1237	8.06	0.25	6.63	1.56	1.58	34.8	10.11	-32	1.01		0.8
1245	8.13	0.75	6.66	1.00	1.64	43.7	10.42	-51	1.05		0.8
1250	8.19	1.25	6.67	0.67	1.62	32.0	10.51	-57	1.04		0.8
1255	8.15	2	6.67	0.58	1.61	24.1	10.57	-60	1.03		0.8
1300	8.14	2.5	6.67	0.57	1.60	23.1	10.67	-63	1.02		0.8
(2) 1350	8.26	N/A	6.68	1.17	1.65	6.0	11.49	22	1.06		0.8

Sampling Data

Sample No: MW-01-GW(F)-021513 Location and Depth: MW-01 midpoint of water column

Date Collected (mo/dy/yr): 2/15/2013 Time Collected: 1305 ☐ AM ☒ PM Weather: Sunny / clear

Type: ☒ Ground Water ☐ Surface Water Other: Sample: ☒ Filtered ☒ Unfiltered Other:

Sample Collected with: ☐ Bailer ☒ Pump Other: peristaltic Type: Master flex

Water Quality Instrument Data Collected with: Type: ☐ Hanna 9828 ☒ Horiba U-50 Other: (2) after sampling parameters

Sample Decon Procedure: Sample collected with (circle one): decontaminated all tubing; disposable and/or dedicated silicon and poly tubing Other:

Sample Description (Color, Turbidity, Odor, Other): clear, slight sheen, light petroleum odor

Sample Analyses

TPH-D	(HCl) ☐	Chlor / Fluor	(unpres) ☐	COD / TOC	(H2SO4) ☐	Orthophos	(FILTER) ☐	Diss. Metals	(HNO3) ☐
TPH-G	(HCl) ☐	BTEX	(HCl) ☐	Total Metals	(HNO3) ☐	TKN/Phos	(N2SO4) ☐	VOCs	(HCl) ☐

Additional Information

Types of Sample Containers:	Quantity:	Duplicate Sample Numbers:	Comments:
3 VOAs w/ HCl	VOCs		VOAs have small bubbles due to effervescence
2 VOAs w/ HCl	TPHg		
2 VOAs w/ HCl	TPH		
2 1-L Amber (UP)	EPH		
2 1-L Amb (UP)	SVOCs		
2 500mL Amber (UP)	TPHdx		

Signature: R. Ec Date: 2/15/2013

GROUNDWATER OR SURFACE WATER SAMPLE COLLECTION FORM

Project Name: Harris Ave Shipyard Date of Collection: 2/15/2013

Project Number: POB-Harris Field Personnel: E. Ramirez / J. Graves

Purge Data

Well ID: MW-02A Secure: ☐ Yes ☐ No Well Condition/Damage Description: good condition

Depth Sounder decontaminated Prior to Placement in Well: ☒ Yes ☐ No One Casing Volume (gal): —

Depth of water (from top of well casing): 10.14 (1405) Well Casing Type/Diameter/Screened Interval: 2" PVC 4-14'

After 5 minutes of purging (from top of casing): 10.55 (1424)

Begin purge (time): 1420

End purge (time): * 1515

Gallons purged:

Purge water disposal method:

Volume of Schedule 40 PVC Pipe				
Diameter	O.D.	I.D.	Volume (Gal/Linear Ft.)	Weight of Water (Lbs/Lineal Ft.)
1 ¼"	1.660"	1.380"	0.08	0.64
2"	2.375"	2.067"	0.17	1.45
3"	3.500"	3.068"	0.38	3.2
4"	4.500"	4.026"	0.66	5.51
6"	6.625"	6.065"	1.5	12.5

Time	Depth to Water	Vol. Purged	pH	DO mg/L	Conductivity mS/cm	Turbidity NTU	Temp °C	ORP mV	TDS g/L	Comments Sal (ppt)
1425	10.55	0.25	6.61	3.46	5.66	7.9	10.62	50	3.38	3.1
1430	10.98	0.75	6.63	5.84	9.91	4.9	9.59	94	6.23	5.6
1435	11.20	1.25	6.77	5.35	10.2	0.0	9.54	102	6.31	5.6
1442	11.37	2	6.78	5.08	10.2	0.0	9.57	105	6.34	5.7
1447	11.48	2.5	6.80	4.82	10.3	0.0	9.59	109	6.38	5.7
* 1515	11.70	N/A	6.82	4.91	10.5	0.0	9.55	119	6.48	5.8

Sampling Data

Sample No: MW-02A-GW(F)-021513 Location and Depth: MW-02A (midpoint of water column 2 feet below DTW)

Date Collected (mo/dy/yr): 2/15/2013 Time Collected: 1450 ☐ AM ☒ PM Weather: sunny/clear/light breeze

Type: ☒ Ground Water ☐ Surface Water Other: Sample: ☐ Filtered ☒ Unfiltered Other:

Sample Collected with: ☐ Bailer ☒ Pump Other: peristaltic Type: Master Flex

Water Quality Instrument Data Collected with: Type: ☐ Hanna 9828 ☒ Horiba U-50 Other:

Sample Decon Procedure: Sample collected with (circle one): decontaminated all tubing; disposable and/or dedicated silicon and poly tubing Other:

Sample Description (Color, Turbidity, Odor, Other): higher salinity, well, clear, No apparent sheen, no apparent odor

Sample Analyses

See below.

TPH-D	(HCl) ☐	Chlor / Fluor	(unpres) ☐	COD / TOC	(H2SO4) ☐	Orthophos	(FILTER) ☐	Diss. Metals	(HNO3) ☐
TPH-G	(HCl) ☐	BTEX	(HCl) ☐	Total Metals	(HNO3) ☐	TKN/Phos	(N2SO4) ☐	VOCs	(HCl) ☐

Additional Information

Types of Sample Containers: Quantity:	~~Duplicate~~ Sample Numbers:	Comments:
3 VOAs w/ HCl – VOCs		
2 VOAs w/ HCl – TPHg		
2- 500ml glass amber – TPHdx		
2- 1L amberglass – SVOCs		
2- 40ml ofs clear D/T Hg		
1- 125ml poly – D Metals		

Signature: R El Date: 2/15/2013

* after sampling

GROUNDWATER OR SURFACE WATER SAMPLE COLLECTION FORM

Project Name: POB-Hams Date of Collection: 2/14/13

Project Number: T. 4030 Field Personnel: Erin M / & Jenny G.

Purge Data

Well ID: MW-04 Secure: ☑ Yes ☐ No Well Condition/Damage Description: Good

Depth Sounder decontaminated Prior to Placement in Well: ☑ Yes ☐ No One Casing Volume (gal):

Depth of water (from top of well casing): 10.17 (1537) Well Casing Type/Diameter/Screened Interval: PVC 2" / 5-15'

After 5 minutes of purging (from top of casing): 10.18 (1542)

Begin purge (time): 1537

End purge (time): 1640

Liters / Gallons purged: 7

Purge water disposal method: Drum

Volume of Schedule 40 PVC Pipe				
Diameter	O.D.	I.D.	Volume (Gal/Linear Ft.)	Weight of Water (Lbs/Lineal Ft.)
1 ¼"	1.660"	1.380"	0.08	0.64
2"	2.375"	2.067"	0.17	1.45
3"	3.500"	3.068"	0.38	3.2
4"	4.500"	4.026"	0.66	5.51
6"	6.625"	6.065"	1.5	12.5

Time	Depth to Water ft	Vol. Purged L	pH	DO mg/L	Conductivity mS/cm	Turbidity NTU	Temp °C	ORP mV	Comments: Sal ppt	TDS g/L
1542	10.18	0.5	7.18	12.21	0.003	224	11.02	190	0.1	0.210
1547	10.22	1.0	7.40	4.46	1.36	25.0	10.69	157	0.7	0.872
1552	10.23	2.0	6.98	3.85	1.35	8.3	10.81	168	0.7	0.864
1557	10.23	3.5	6.91	3.30	1.35	8.7	10.74	172	0.7	0.864
1602	10.22	4.5	6.90	3.07	1.35	6.0	10.74	174	0.7	0.861
1607	10.22	5.2	6.90	3.04	1.35	4.1	10.74	176	0.7	0.862

Sampling Data

Sample No: MW-04-GW & GWF-021413 Location and Depth: MW-04; 10' & have to pull tubing up 3' be tides

Date Collected (mo/dy/yr): 2/14/13 Time Collected: 1610 ☐ AM ☑ Weather:

Type: ☑ Ground Water ☐ Surface Water Other: Sample: ☐ Filtered ☑ Unfiltered Other:

Sample Collected with: ☐ Bailer ☑ Pump Other: Type:

Water Quality Instrument Data Collected with: Type: ☐ Hanna 9828 ☑ Horiba U-50 Other:

Sample Decon Procedure: Sample collected with (circle one): decontaminated all tubing; disposable and/or dedicated silicon and poly tubing Other:

Sample Description (Color, Turbidity, Odor, Other): clear; no odor

Sample Analyses

See Below

TPH-D	(HCl) ☐	Chlor / Fluor	(unpres) ☐	COD / TOC	(H2SO4) ☐	Orthophos	(FILTER)☐	Diss. Metals	(HNO3) ☐
TPH-G	(HCl) ☐	BTEX	(HCl) ☐	Total Metals	(HNO3) ☐	TKN/Phos	(N2SO4) ☐	VOCs	(HCl) ☐

Additional Information

Types of Sample Containers:	Quantity:	Duplicate Sample Numbers:	Comments:
1 Liter Amber Glass	2		SVOCs
½ Liter Amber Glass	2		TPH-Dx
40 mL VOA	3	NA	VOCs - HCL preserv.
40 mL VOA	2		TPH-Gx - HCL preserv.
40 mL VOA	2		(1) tot Hg (1) Dissolved Hg (ff)
125 mL HDPE	1		Dissolved Metals (ff)

Signature: Date: 2/14/13

GROUNDWATER OR SURFACE WATER SAMPLE COLLECTION FORM

Project Name: POB-Hamis
Project Number: T. 4036
Date of Collection: 2/14/13
Field Personnel: Jenny G. / Erin M.

Purge Data

Well ID: MW-05
Secure: ☒ Yes ☐ No
Well Condition/Damage Description: Good but needs new well cap.

Depth Sounder decontaminated Prior to Placement in Well: ☒ Yes ☐ No
One Casing Volume (gal):
Depth of water (from top of well casing): 7.82 (12:37)
Well Casing Type/Diameter/Screened Interval: 5-15' 2" PVC
After 5 minutes of purging (from top of casing): 8.49
Begin purge (time): 12:37
End purge (time): 1350
Gallons purged: 8 Liters
Purge water disposal method: Drum

Volume of Schedule 40 PVC Pipe				
Diameter	O.D.	I.D.	Volume (Gal/Linear Ft.)	Weight of Water (Lbs/Lineal Ft.)
1 ¼"	1.660"	1.380"	0.08	0.64
2"	2.375"	2.067"	0.17	1.45
3"	3.500"	3.068"	0.38	3.2
4"	4.500"	4.026"	0.66	5.51
6"	6.625"	6.065"	1.5	12.5

Time	Depth to Water	Vol. (L) Purged	pH	mg/L DO	mS/cm Conductivity	NTU Turbidity	°C Temp	mV ORP	Sal (ppt) ↓	Comments	TDS (g/L)
1240			6.10	4.71	0.191	44.0	9.62	188			
1245	8.49	2	6.10	4.54	0.189	41.3	9.66	185	0.1		0.122
1250	9.08	4	6.14	3.55	0.184	62.1	9.70	182	0.1		
1255	9.15	5	6.13	3.42	0.185	92.6	9.84	184	0.1		0.120
1300	9.32	5.75	6.15	3.28	0.185	108	9.86	185	0.1		0.120
1305	9.45	6.5	6.15	3.22	0.186	108	9.97	185	0.1		0.121

Sampling Data

Sample No: MW-05-GW & GWF-021413
Location and Depth: MW-05; 9'
Date Collected (mo/dy/yr): 2/14/13
Time Collected: 1310 ☐ AM ☑
Weather: 40°F
Type: ☑ Ground Water ☐ Surface Water Other:
Sample: ☑ Filtered ☑ Unfiltered Other:
Sample Collected with: ☐ Bailer ☑ Pump Other:
Type: Cole Parmer Peristaltic
Water Quality Instrument Data Collected with: Type: ☐ Hanna 9828 ☑ Horiba U-50 Other:
Sample Decon Procedure: Sample collected with (circle one): decontaminated all tubing; disposable and/or dedicated silicon and poly tubing Other:
Sample Description (Color, Turbidity, Odor, Other): light pinkish gray, cloudy, no odor

Sample Analyses

See Below

TPH-D	(HCl) ☐	Chlor / Fluor	(unpres) ☐	COD / TOC	(H2SO4) ☐	Orthophos	(FILTER) ☐	Diss. Metals	(HNO3) ☐		
TPH-G	(HCl) ☐	BTEX	(HCl) ☐	Total Metals	(HNO3) ☐	TKN/Phos	(N2SO4) ☐	VOCs	(HCl) ☐		

Additional Information

Types of Sample Containers:	Quantity:	Duplicate Sample Numbers:	Comments:
(5) 1-L Amber	2		SVOCs
500mL Amber	2		NWTPH-Dx
40 mL glass VOA	3	NA	VOCs - preserv. HCL
"	2		NWTPH-Gx - preserv. HCL
"	2		(1) Tot Hg (1) Diss Hg (ff)
125mL HDPE	1		Dissolved Metals (ff)

Signature:
Date: 2/14/13

GROUNDWATER OR SURFACE WATER SAMPLE COLLECTION FORM

Project Name: Harris Ave Shipyard. Date of Collection: 2/15/2013

Project Number: POB-Harris Field Personnel: E. Ramirez / J. Graves.

Purge Data

Well ID: MW-06 Secure: ☒ Yes ☐ No Well Condition/Damage Description: Good shape.

Depth Sounder decontaminated Prior to Placement in Well: ☐ Yes ☐ No One Casing Volume (gal):

Depth of water (from top of well casing): 8.29 (1102) Well Casing Type/Diameter/Screened Interval: 2" PVC 4 to 19 ft.

After 5 minutes of purging (from top of casing):

Begin purge (time): 1129

End purge (time): 1145

Gallons purged: ~3 gal

Purge water disposal method: on-site drum storage.

Volume of Schedule 40 PVC Pipe				
Diameter	O.D.	I.D.	Volume (Gal/Linear Ft.)	Weight of Water (Lbs/Lineal Ft.)
1 ¼"	1.660"	1.380"	0.08	0.64
2"	2.375"	2.067"	0.17	1.45
3"	3.500"	3.068"	0.38	3.2
4"	4.500"	4.026"	0.66	5.51
6"	6.625"	6.065"	1.5	12.5

Time	Depth to Water	Vol. Purged	pH	DO (mg/L)	Conductivity (mS/cm)	Turbidity	Temp °C	ORP mV	TDS	Comments	Sal (ppt)
1129	8.53	0.25 gal	6.57	1.96	0.514	4.9	10.58	177	0.321		0.2
1134	8.95	0.75	6.92	1.10	0.505	1.9	10.75	162	0.322		0.2
1139	9.11	1.25	7.00	0.88	0.502	1.2	10.87	153	0.321		0.2
1145	9.22	1.50	7.02	0.78	0.502	1.5	10.93	147	0.321		0.2
1212	9.24	3.0	7.09	3.55	0.502	0.0	11.15	155	0.321		0.2

Sampling Data

Sample No: MW-06-GW(F)-021513 Location and Depth: MW-06 - midpoint of water column

Date Collected (mo/dy/yr): 2/15/2013 Time Collected: 1150 ☒ AM ☐ Weather: Sunny / clear

Type: ☒ Ground Water ☐ Surface Water Other: Sample: ☒ Filtered ☒ Unfiltered Other:

Sample Collected with: ☐ Bailer ☒ Pump Other: peristaltic Type: Masterflex

Water Quality Instrument Data Collected with: Type: ☐ Hanna 9828 ☒ Horiba U-50 Other:

Sample Decon Procedure: Sample collected with (circle one): decontaminated all tubing; disposable and/or dedicated silicon and poly tubing Other:

Sample Description (Color, Turbidity, Odor, Other): clear, low turbidity, no odor, no sheen

Sample Analyses

See below

TPH-D	(HCl) ☐	Chlor / Fluor	(unpres) ☐	COD / TOC	(H2SO4) ☐	Orthophos	(FILTER) ☐	Diss. Metals	(HNO3) ☐		
TPH-G	(HCl) ☐	BTEX	(HCl) ☐	Total Metals	(HNO3) ☐	TKN/Phos	(N2SO4) ☐	VOCs	(HCl) ☐		

Additional Information

Types of Sample Containers:	Quantity:	Duplicate Sample Numbers:	Comments:
3-VOAs w/ HCl	VOC	MW-06-GW-021513	
2-VOAs w/ HCl	TPH-g		
2-1L Amber glass	SVOCs		
2-500mL Amber glass	TPH-d		
2-40ml VOA (UP)	Hg (0.2)	MW-06-GWF-021513	
1-125 ml poly (unpres.)	Metals		

Signature: R. Ramirez Date: 2/15/2013

GROUNDWATER OR SURFACE WATER SAMPLE COLLECTION FORM

Project Name: Harris Ave Shipyard Date of Collection: 2/14/2013

Project Number: POB-Harris Field Personnel: E. Ramirez / L. Neoli

Purge Data

Well ID: MW-06 Secure: ☒ Yes ☐ No Well Condition/Damage Description: Good shape

Depth Sounder decontaminated Prior to Placement in Well: ☐ Yes ☐ No One Casing Volume (gal):

Depth of water (from top of well casing): 8.82 (1556) Well Casing Type/Diameter/Screened Interval:

After 5 minutes of purging (from top of casing): 9.1

Begin purge (time): 1600

End purge (time): 1634

Gallons purged: ~5

Purge water disposal method: drummed for offsite disposal

Volume of Schedule 40 PVC Pipe				
Diameter	O.D.	I.D.	Volume (Gal/Linear Ft.)	Weight of Water (Lbs/Lineal Ft.)
1 ¼"	1.660"	1.380"	0.08	0.64
2"	2.375"	2.067"	0.17	1.45
3"	3.500"	3.068"	0.38	3.2
4"	4.500"	4.026"	0.66	5.51
6"	6.625"	6.065"	1.5	12.5

Time	Depth to Water	Vol. Purged	pH	DO (mg/L)	Conductivity (mS/m)	Turbidity (NTU)	Temp. °C	ORP mV	Comments	Sal %
1603	9.3	0.5	7.64	4.5	69.1	32	10.5	88	No sheen	0.0
1606	9.5	0.75	7.44	4.2	66.7	29	10.7	76		0.0
1612	9.55	1.5	7.22	3.2	64.2	23.7	11.0	33		0.0
1618	9.71	2	7.15	2.9	63.3	20.2	11.0	12		0.0
1623	9.73	2.5	7.12	2.8	62.5	18.4	11.2	4		0.0
1629	9.75	2.75	7.10	2.6	61.4	22.0	11.3	4		0.0
*1730	9.74	5.00	7.19	7.0	59.3	17.3	11.0	140	TDS - 0.38	0.0

TDS (g/L)

Sampling Data

Sample No: MW-06-GW(F)-021413 Location and Depth: MW-06

Date Collected (mo/dy/yr): 02/14/13 Time Collected: ☐ AM ☐ Weather: gray/overcast

Type: ☒ Ground Water ☐ Surface Water Other: Sample: ☒ Filtered ☒ Unfiltered Other:

Sample Collected with: ☐ Bailer ☒ Pump Other: GeoPump Type: peristaltic

Water Quality Instrument Data Collected with: Type: ☐ Hanna 9828 ☐ Horiba U-50 Other: Horiba U-22

Sample Decon Procedure: Sample collected with (circle one): decontaminated all tubing; disposable and/or dedicated silicon and poly tubing Other:

Sample Description (Color, Turbidity, Odor, Other): No sheen, No obvious odor, clear

Sample Analyses

* Last reading collected after sampling

TPH-D (HCl) ☐ Chlor / Fluor (unpres) ☐ COD / TOC (H2SO4) ☐ Orthophos (FILTER) ☐ Diss. Metals (HNO3) ☐

TPH-G (HCl) ☐ BTEX (HCl) ☐ Total Metals (HNO3) ☐ TKN/Phos (N2SO4) ☐ VOCs (HCl) ☐

see below

Additional Information

Types of Sample Containers:	Quantity:	Duplicate Sample Numbers:	Comments:
3-VOAs w/HCl	(x2) VOCs	MW-94-GW-021413	MW-06-GW-021413
2-VOAs w/HCl	(x2) TPHg		
2-500mL (UP)	(X2) TPHdx		
2-1L Amber (UP)	(X2) SVOCs	↓	↓
1-125 mL Poly (UP)	(X2) Metals	MW-94-GWF-021413	MW-06-GWF-021413
2-40mL Glass (UP)	(X2) TOC	↓ (except Tot Hg)	not ↓ (except Tot Hg) - no F
2-1L Amber (UP)	EPH	MW-94-GW-021413	MW-06-GW-021413
2-VOAs w/HCl	VPH		

Signature: Date: 2/14/2013

GROUNDWATER OR SURFACE WATER SAMPLE COLLECTION FORM

Project Name: POB-Harris — Date of Collection: 2/14/13

Project Number: T. 4030 — Field Personnel: Erin Murray / Jenny Graves

Purge Data

Well ID: MW-07 — Secure: ☑ Yes ☐ No — Well Condition/Damage Description: Good

Depth Sounder decontaminated Prior to Placement in Well: ☑ Yes ☐ No — One Casing Volume (gal): ______

Depth of water (from top of well casing): 9.46 1648 — Well Casing Type/Diameter/Screened Interval: PVC 2"/ 5-15' *

* supposed to be 14' but measured total depth at 15.05'

After 5 minutes of purging (from top of casing): 9.75 1657

Begin purge (time): 1652

End purge (time): 1745

~~Gallons~~ Liters purged: ~ 7.5

Purge water disposal method: Drums onsite

Volume of Schedule 40 PVC Pipe

Diameter	O.D.	I.D.	Volume (Gal/Linear Ft.)	Weight of Water (Lbs/Lineal Ft.)
1 ¼"	1.660"	1.380"	0.08	0.64
2"	2.375"	2.067"	0.17	1.45
3"	3.500"	3.068"	0.38	3.2
4"	4.500"	4.026"	0.66	5.51
6"	6.625"	6.065"	1.5	12.5

Time	Depth to Water	Vol (L) Purged	pH	DO mg/L	Conductivity mS/cm	Turbidity NTU	Temp. °C	ORP mV	Comments: Sal ppt	TDS g/L
1657	9.75	1.0	6.93	1.97	7.25	92.2	9.73	175	3.9	4.59
1702	9.75	1.75	6.96	1.54	7.47	67.7	9.79	155	4.1	4.74
1707	9.75	2.25	6.98	1.21	7.81	28.5	9.82	136	4.3	4.94
1712	9.76	3.0	6.99	1.03	7.94	23.6	9.87	124	4.3	5.01
1717	9.76	4.0	6.99	0.88	7.95	6.1	9.87	114	4.3	5.01

Sampling Data

Sample No: MW-07-GW & GWF-021413 — Location and Depth: MW-07

Date Collected (mo/dy/yr): 2/14/13 — Time Collected: 1725 ☐ AM ☑ PM — Weather: 40°F

Type: ☑ Ground Water ☐ Surface Water Other: ______ — Sample: ☑ Filtered ☑ Unfiltered Other: ______

Sample Collected with: ☐ Bailer ☑ Pump Other: ______ — Type: Cole-Parmer Peri

Water Quality Instrument Data Collected with: Type: ☐ Hanna 9828 ☑ Horiba U-50 Other: ______

Sample Decon Procedure: Sample collected with (circle one): decontaminated all tubing; disposable ~~and/or dedicated silicon and poly~~ tubing Other: ______

Sample Description (Color, Turbidity, Odor, Other): no odor, clear

Sample Analyses

TPH-D	(HCl) ☐	Chlor / Fluor	(unpres) ☐	COD / TOC	(H2SO4) ☐	Orthophos	(FILTER) ☐	Diss. Metals	(HNO3) ☐
TPH-G	(HCl) ☐	BTEX	(HCl) ☐	Total Metals	(HNO3) ☐	TKN/Phos	(N2SO4) ☐	VOCs	(HCl) ☐

Additional Information

Types of Sample Containers:	Quantity:	Duplicate Sample Numbers:	Comments:
1 Liter Amber	2		SVOCs
1/2 Liter Amber	2		TPH-DX
40 mL VOAs	3		VOCs - HCL preserv.
"	2		TPH-Gx - HCL preserv.
"	2		(1) tot Hg (1) Diss. Hg (ff)
125 mL HDPE	1		Dissolved Metals (ff)

Signature: R. [signature] for Erin Murray — Date: 2/14/2013

GROUNDWATER OR SURFACE WATER SAMPLE COLLECTION FORM

Project Name: POB-Harris Date of Collection: 2/14/13

Project Number: T. # 4036 Field Personnel: Jenny Graves / Erin M.

Purge Data

Well ID: MW-08 Secure: ☑ Yes ☐ No Well Condition/Damage Description: Good

Depth Sounder decontaminated Prior to Placement In Well: ☑ Yes ☐ No One Casing Volume (gal):

Depth of water (from top of well casing): 8.62' (1410) Well Casing Type/Diameter/Screened Interval: 2" PVC / 5'-20'

After 5 minutes of purging (from top of casing): 8.65' (1415)

Begin purge (time): 1410

End purge (time): 1515

Gallons purged: 8 Liters

Purge water disposal method: Drum

Volume of Schedule 40 PVC Pipe				
Diameter	O.D.	I.D.	Volume (Gal/Linear Ft.)	Weight of Water (Lbs/Lineal Ft.)
1 ¼"	1.660"	1.380"	0.08	0.64
2"	2.375"	2.067"	0.17	1.45
3"	3.500"	3.068"	0.38	3.2
4"	4.500"	4.026"	0.66	5.51
6"	6.625"	6.065"	1.5	12.5

Time	Depth to Water	Vol. Purged (L)	pH	DO mg/L	Conductivity mS/cm	Turbidity NTU	Temp °C	ORP mV	Comments Sal (ppt)	Comments TDS g/L
1415	8.65	1.0	6.5	3.57	6.99	13.3	10.03	239	3.8	4.43
1420	8.65	2.0	7.02	2.93	6.97	12.0	9.77	221	3.8	4.39
1425	8.66	3.0	7.28	2.62	7.03	10.0	9.82	204	3.8	4.43
1430	8.66	4.0	7.38	2.45	7.06	9.2	9.75	196	3.8	4.46
1435	8.67	5.0	7.44	2.25	7.07	7.1	9.78	188	3.8	4.46

Sampling Data

Sample No: MW-08-GW & GWF-021413 Location and Depth: MW-08 12'

Date Collected (mo/dy/yr): 2/14/13 Time Collected: 1440 ☐ AM ☑ PM Weather: 40s

Type: ☑ Ground Water ☐ Surface Water Other: Sample: ☑ Filtered ☑ Unfiltered Other:

Sample Collected with: ☐ Bailer ☑ Pump Other: Type: Cole Parmer Peri

Water Quality Instrument Data Collected with: Type: ☐ Hanna 9828 ☑ Horiba U-50 Other: Cole Parmer

Sample Decon Procedure: Sample collected with (circle one): decontaminated all tubing; disposable and/or dedicated silicon and poly tubing Other:

Sample Description (Color, Turbidity, Odor, Other): Clear, no odor

Sample Analyses

TPH-D	(HCl) ☐	Chlor / Fluor	(unpres) ☐	COD / TOC (See B/M)	(H2SO4) ☐	Orthophos	(FILTER) ☐	Diss. Metals	(HNO3) ☐
TPH-G	(HCl) ☐	BTEX	(HCl) ☐	Total Metals	(HNO3) ☐	TKN/Phos	(N2SO4) ☐	VOCs	(HCl) ☐

Additional Information

Types of Sample Containers:	Quantity:	Duplicate Sample Numbers:	Comments:
2 Liter Amber Glass	2		SVOC
½ L Amber glass	2		TPH-Dx
40 mL glass VOA	3	NA	VOCs – HCL preserv
"	2		TPH-Gx – HCL preserv
"	2		(1) tot Hg (1) Diss Hg (ff)
125mL HDPE	1		Dissolved Metals (ff)

Signature: Date: 2/14/13

GROUNDWATER OR SURFACE WATER SAMPLE COLLECTION FORM

Project Name: Harris Ave Shipyard
Date of Collection: 2/15/2013
Project Number: POB – Harris
Field Personnel: E. Ramirez / J. Graves

Purge Data

Well ID: MW-09
Secure: ☒ Yes ☐ No
Well Condition/Damage Description: good condition

Depth Sounder decontaminated Prior to Placement in Well: ☒ Yes ☐ No
One Casing Volume (gal):
Depth of water (from top of well casing): 5.47 (1545)
Well Casing Type/Diameter/Screened Interval: 2" PVC (4-14)
After 5 minutes of purging (from top of casing): 5.65 (1605)
Begin purge (time): 1600
End purge (time):
Gallons purged:
Purge water disposal method:

Volume of Schedule 40 PVC Pipe

Diameter	O.D.	I.D.	Volume (Gal/Linear Ft.)	Weight of Water (Lbs/Lineal Ft.)
1 ¼"	1.660"	1.380"	0.08	0.64
2"	2.375"	2.067"	0.17	1.45
3"	3.500"	3.068"	0.38	3.2
4"	4.500"	4.026"	0.66	5.51
6"	6.625"	6.065"	1.5	12.5

Time	Depth to Water	Vol. Purged gal	pH	DO mg/L	Conductivity mS/cm	Turbidity NTU	Temp °C	ORP mV	Comments TDS g/L	Salinity ppt
1605	5.65	0.5	6.98	3.55	2.16	0.0	9.76	-53	1.38	1.1
1610	5.59	0.75	6.94	1.90	2.14	0.0	9.87	-56	1.37	1.1
1618	5.60	1.0	6.93	1.35	2.14	0.0	9.95	-58	1.37	1.1
1630	5.62	1.5	6.91	0.85	2.15	0.0	9.90	-60	1.38	1.1

Sampling Data

Sample No: MW-09-GW(F)-021513
Location and Depth: MW-09
Date Collected (mo/dy/yr): 2/15/2013
Time Collected: 1630 (?)
☐ AM ☒ PM Weather: Sunny/clear/light breeze
Type: ☒ Ground Water ☐ Surface Water Other:
Sample: ☒ Filtered ☒ Unfiltered Other:
Sample Collected with: ☐ Bailer ☒ Pump Other: peristaltic Type: Masterflex
Water Quality Instrument Data Collected with: Type: ☐ Hanna 9828 ☐ Horiba U-50 Other:
Sample Decon Procedure: Sample collected with (circle one): decontaminated all tubing; disposable and/or dedicated silicon and poly tubing Other:
Sample Description (Color, Turbidity, Odor, Other): clear, low turbidity, possible slight odor, possible slight sheen.

Sample Analyses

see below.

TPH-D	(HCl) ☐	Chlor / Fluor	(unpres) ☐	COD / TOC	(H2SO4) ☐	Orthophos	(FILTER) ☐	Diss. Metals	(HNO3) ☐		
TPH-G	(HCl) ☐	BTEX	(HCl) ☐	Total Metals	(HNO3) ☐	TKN/Phos	(N2SO4) ☐	VOCs	(HCl) ☐		

Additional Information

Types of Sample Containers:	Quantity:	Duplicate Sample Numbers:	Comments:
3 VOAs w/ HCl – VOCs			
2 VOAs w/ HCl – TPHg			
2 VOAs w/ HCl – VPH			
1 – 500mL gls Amber – TPHdx			
1 – 1L gls Amber SVOCs			
1 – 1L gls Amber EPH			
2 – 40ml gls clear – T/D Hg			
1 – 125mL poly – D. nutrients			

Signature: R E
Date: 15 Feb. 2013

GROUNDWATER OR SURFACE WATER SAMPLE COLLECTION FORM

Project Name: Harris Ave Shipyard
Project Number: POB-Harris
Date of Collection: 14 Feb. 2013
Field Personnel: E. Ramirez / L. Meoli

Purge Data

Well ID: MW-10
Secure: ☒ Yes ☐ No
Well Condition/Damage Description: Good condition

Depth Sounder decontaminated Prior to Placement in Well: ☒ Yes ☐ No
One Casing Volume (gal):
Depth of water (from top of well casing): 8.54 8.70 9.40
Well Casing Type/Diameter/Screened Interval: PVC / 2" / 5-20ft
After 5 minutes of purging (from top of casing):
Begin purge (time): 1404
End purge (time): 1500
Gallons purged: ~4.5
Purge water disposal method: Drummed

Volume of Schedule 40 PVC Pipe				
Diameter	O.D.	I.D.	Volume (Gal/Linear Ft.)	Weight of Water (Lbs/Lineal Ft.)
1 ¼"	1.660"	1.380"	0.08	0.64
2"	2.375"	2.067"	0.17	1.45
3"	3.500"	3.068"	0.38	3.2
4"	4.500"	4.026"	0.66	5.51
6"	6.625"	6.065"	1.5	12.5

Time	Depth to Water ft	Vol. Purged	pH	DO	Conductivity (mS)	Turbidity NTU	Temp	ORP	Comments	Sal ‰
1404	8.70	0.5	6.24	6.5	1.87	37.1	9.5	155	Pretty clear no sheen	1.1
1411	9.68	0.75	6.53	5.8	1.85	145	9.4	150	—	1.1
1414	10.00	1.25	6.66	3.6	1.82	106.0	9.5	143	—	1.0
1423	10.30	2	6.69	/	1.78	199.0	/	/	pump issue	
1440	10.00	2.5	6.70	6.1	1.81	165.00	9.8	0	"	1.0
1446	11.40	2.75	6.80	5.3	1.80	128	9.9	-1	"	1.0
1450	"	3.0	6.83	5.1	1.71	270	9.8	0	"	1.0
1455	"	3.25	6.85	5.0	1.70	338	9.8	3	"	

Sampling Data

Sample No: MW-10-GW-021413
Location and Depth:
Date Collected (mo/dy/yr): 2/14/13
Time Collected: 15:05 ☐ AM ☒
Weather: Cloudy
Type: ☒ Ground Water ☐ Surface Water Other:
Sample: ☒ Filtered ☐ Unfiltered Other:
Sample Collected with: ☐ Bailer ☒ Pump Other: Geopump Type: peristaltic
Water Quality Instrument Data Collected with: Type: ☐ Hanna 9828 ☐ Horiba U-50 Other: U-22
Sample Decon Procedure: Sample collected with (circle one): decontaminated all tubing; disposable and/or dedicated silicon and poly tubing Other:
Sample Description (Color, Turbidity, Odor, Other): Slightly turbid - may need to be redeveloped before sampling again.

Sample Analyses

See below

TPH-D	~~(HCl)~~ ☐	Chlor / Fluor	(unpres) ☐	COD / TOC	(H2SO4) ☐	Orthophos	(FILTER) ☐	Diss. Metals	(HNO3) ☐
TPH-G	(HCl) ☒	BTEX	(HCl) ☒	Diss Total Metals	~~(HNO3)~~ ☒	TKN/Phos	(N2SO4) ☐	VOCs	(HCl) ☒

Additional Information

Types of Sample Containers:	Quantity:	Duplicate Sample Numbers:	Comments:
2-1L Amber glass	SVOCs		MW-10-GW-021413
2-500mL Amber glass	TPH-dx		
2-VOAs w/HCl	THGs		
3-VOAs w/HCl	VOCs		
1-125 poly (F)	diss nutrients		MW-10 GWF-021413
1-VOA (F)	Diss Hg		
1-VOA	Tot Hg		

Signature:
Date: 02/14/13

SURFACE SEDIMENT SAMPLE COLLECTION FORM

POB-Harris

Date/Time Collected: 1/31/13 -1215

Weather: Rainy/Overcast

Field Personnel: E. Murray / E. Ramirez

Sample Type:

☑ 1. Surface Sample (0–10 cm)

☐ 1. Sub-surface Sample (10–20 cm)

Sample ID/Design. SG-05-0-10-013113

Sample Method (Power Grab/Hand Auger)

Datum (Horizontal/Vertical) NAD 83/98 ; NAVD 88

Leadline-Water Dept: 3.2' (A)

Predicted Tide Elevation _____ (B)

Mudline Elevation _____ (B-A)

Actual Tide Elevation _____

Run # or Composite Pt	Time	Latitude (Northing)	Longitude (Easting	Sample Criteria (Surface Grab Only) 1	2	3	4	5	Accept Sample Y/N	Comments (Include depth of sample)
#1	1208	632346.63	1234682.63	T	T	T	T	T	Yes	0-10cm

Acceptance criteria: 1 Overlying water is present, 2 Water has low turbidity, 3 Sampler is not over filled, 4 Sample surface is flat, 5 Desired sample depth is reached

Decon Procedure (Alconox Wash, DI water rinse, other): Yes bottle

Sediment Sample Description

Sediment Sample Description (density, moisture, color, minor constituents, major constituents, other observations - *see field ref cards):

Fine to course subrounded gravels. Shell fragments throughout. Material becomes less course with depth becoming fine to coarse sand. Metal debris present

Sample containers filled (number and type):

2 16 oz Plastic WM

2 4 oz Glass WM

2 8 oz Glass WM

2 1 liter glass (rinsate)

Sample taken at 1215

Dup SG-15 taken 1230 (Grain size and SVOCs & PCBs) Metals, TOC, Total Solids

Laboratory analysis:

Grainsize SVOCs

Total Solids PCBs

TOC

Metals

*Rinsate SG-05-ER 013113 @ 1455 for SVOCs and PCBs

POB Harris - Harris Ave Shipyard

Surface Sediment Sample Collection Form

Date 31 January 2013

Weather: Gray/Overcast/Rainy

Field Personnel: E. Murray / E. Ramirez

Sample Type:

☐ 1. Surface Sample (0–10 cm)

☒ 1. Sub-surface Sample (10–20 cm)

Sample ID/Design. SG-05-10-20-013113

Sample Method (Power Grab/Hand Auger)

Datum (Horizontal/Vertical) NAD 83/98; NAVD 88

Leadline Water Dept: 3.2 (real) (A)

Predicted Tide Elevation _____ (B)

Mudline Elevation _____ (B-A)

Actual Tide Elevation _____

Run # or Composite Pt	Time	Latitude (Northing)	Longitude (Easting	Sample Criteria (Surface Grab Only) 1	2	3	4	5	Accept Sample Y/N	Comments (Include depth of sample)
1	1208	632366.63	1234682.63	✓	✓	✓	✓	✓	Y	10-20 cm

Acceptance criteria: 1 Overlying water is present, 2 Water has low turbidity, 3 Sampler is not over filled, 4 Sample surface is flat, 5 Desired sample depth is reached

Decon Procedure (Alconox Wash, DI water rinse, other): Yes!

Sediment Sample Description

Sediment Sample Description (density, moisture, color, minor constituents, major constituents, other observations - *see field ref cards):

Loose, saturated, multi-colored gravelly sand, fine to coarse gravel (subrounded), shell fragments & whole shells throughout. Grain size decreases w/ depth. fine to coarse sands, trace silts. Contains some metal debris.

Sample containers filled (number and type):

Sample collected @ 1235.

8oz glass WM - SVOCs/Metals/PCBs

4oz glass WM - Total Solids/TOC/Metals

16oz plastic WM - grainsize

Laboratory analysis:

Archive sample.

SURFACE SEDIMENT SAMPLE COLLECTION FORM

POB-Harris

Date/Time Collected: 1/31/13 1140

Weather: Drizzle 45°F

Field Personnel: E. Murray / E. Ramirez

Sample Type:

☑ 1. Surface Sample (0–10 cm)

☐ 1. Sub-surface Sample (10–20 cm)

Sample ID/Design. SG-06-0-10-01313

Sample Method (Power Grab/Hand Auger)

Datum (Horizontal/Vertical) NAD 83/98; NAVD88

Leadline Water Dept: 8.9' (A)

Predicted Tide Elevation _____ (B)

Mudline Elevation _____ (B-A)

Actual Tide Elevation _____

Run # or Composite Pt	Time	Latitude (Northing)	Longitude (Easting	Sample Criteria (Surface Grab Only) 1	2	3	4	5	Accept Sample Y/N	Comments (Include depth of sample)
#1	1122	632421.94	1234523.75	T	T	T	F	T	Y	Irregular surface — Marine Railway

Acceptance criteria: 1 Overlying water is present, 2 Water has low turbidity, 3 Sampler is not over filled, 4 Sample surface is flat, 5 Desired sample depth is reached

Decon Procedure (Alconox Wash, DI water rinse, other): yes - both

Sediment Sample Description

Sediment Sample Description (density, moisture, color, minor constituents, major constituents, other observations - *see field ref cards):

Brown silty SAND. Eel grass on entire surface - some living. Living crabs, sea snails and eels scattered. Trace wood debris. Color transitions to black below ½ cm. Slight sheen on crab. unknown if petroleum or organic. Slight sheen in some areas after homogenization. Metals shards present. (2)

Sample containers filled (number and type):

1 16 oz Plastic WM Sample 1140

1 4 oz. Glass WM

1 8 oz Glass WM

1 8 oz Glass Amber WM

Laboratory analysis:

Grainsize

TOC

total solids

SVOCs

Dioxins/Furans

POB Harris – Harris Ave Shipyard

Surface Sediment Sample Collection Form

31 January 2013

Weather: Gray / Overcast / Rainy

Field Personnel: E. Murray / E. Ramirez

Sample Type:

☐ 1. Surface Sample (0–10 cm)

☒ 1. Sub-surface Sample (10–20 cm)

Sample ID/Design. SG-06-10-20-013113

Sample Method (Power Grab/Hand Auger)

Datum (Horizontal/Vertical) NAD 83/98; NAVD88

Leadline Water Depth: 8.9 ft (A)

Predicted Tide Elevation: _____ (B)

Mudline Elevation _____ (B-A)

Actual Tide Elevation _____

Run # or Composite Pt	Time	Latitude (Northing)	Longitude (Easting	Sample Criteria (Surface Grab Only) 1	2	3	4	5	Accept Sample Y/N	Comments (Include depth of sample)
1	1122	632421.94	1234523.75	✓	✓	✓	⊕	✓	Y	Irregular surface collected in marine railway

Acceptance criteria: 1 Overlying water is present, 2 Water has low turbidity, 3 Sampler is not over filled, 4 Sample surface is flat, 5 Desired sample depth is reached

Decon Procedure (Alconox Wash, DI water rinse, other): _____

Sediment Sample Description

Sediment Sample Description (density, moisture, color, minor constituents, major constituents, other observations - *see field ref cards):

Black ~~Brown~~ silt, sand, contains wood debris, metal shards, slight worsening with depth, living worms. Odor – unknown (not typical petroleum or sulfur, but more reminiscient of new leather.

Sample containers filled (number and type): Samples collected @ 1150

8oz clean WM for SVOCs

8oz amber WM for Dioxins/Furans

4oz clear WM for Total Solids/TOC

16oz plastic WM for grainsize.

Laboratory analysis:

Sample was archived.

SURFACE SEDIMENT SAMPLE COLLECTION FORM

POB-Harris

Date/Time Collected: 1/31/13 1105

Weather: Rainy

Field Personnel: E. Murray / ~~E. Hart~~ 2nd E. Ramirez

Sample Type:

☑ 1. Surface Sample (0–10 cm)

☐ 1. Sub-surface Sample (10–20 cm)

Sample ID/Design. SG-07-0-10-013113

Sample Method (Power Grab/Hand Auger)

Datum (Horizontal/Vertical) NAD83/98; NAVD88

Leadline Water Dept: 34.21 / 33.9' 2nd Attempt (A)

Predicted Tide Elevation _____ (B)

Mudline Elevation _____ (B-A)

Actual Tide Elevation _____

Run # or Composite Pt	Time	Latitude (Northing)	Longitude (Easting	Sample Criteria (Surface Grab Only) 1	2	3	4	5	Accept Sample Y/N	Comments (Include depth of sample)
#1	1040								N	Not enough sediment
#2	1052	632572.56	1234154.13	T	T	T	T	T	Y	0-10 cm

Acceptance criteria: 1 Overlying water is present, 2 Water has low turbidity, 3 Sampler is not over filled, 4 Sample surface is flat, 5 Desired sample depth is reached

Decon Procedure (Alconox Wash, DI water rinse, other): yes - both

Sediment Sample Description

Sediment Sample Description (density, moisture, color, minor constituents, major constituents, other observations - *see field ref cards):

Medium ~~brownish~~ grayish brown silty SAND (fine to medium sand). Some subangular gravels, Shell fragments. Living hermit crabs and bivalves present in surface. Worms present. Slight sheen in one small area noted.

Sample containers filled (number and type):

1 14oz Plastic WM Sample taken at 1105

1 4 oz glass WM

1 8oz glass WM

1 8oz glass Amber WM

Laboratory analysis:

Grainsize

TOC

total solids

SVOCs

Dioxins/furans

POB Harris – Harris Ave Shipyard

Surface Sediment Sample Collection Form

Date 31 January 20B

Weather: Gray/Overcast/Rainy

Field Personnel: E. Murray / E. Ramirez

Sample Type:

☐ 1. Surface Sample (0–10 cm)

☒ 1. Sub-surface Sample (10–20 cm)

Sample ID/Design. SG-07-10-20-013113

Sample Method (Power Grab/Hand Auger)

Datum (Horizontal/Vertical) NAD 83/98; NAVD88 ← 2nd Attempt

Leadline Water Dept: 34.2/33.9ft (A)

Predicted Tide Elevation _____ (B)

Mudline Elevation _____ (B-A)

Actual Tide Elevation _____

Run # or Composite Pt	Time	Latitude (Northing)	Longitude (Easting	Sample Criteria (Surface Grab Only) 1	2	3	4	5	Accept Sample Y/N	Comments (Include depth of sample)
#1	1040	—	—	☒	NA	✓	☒	☒	N	inadequate sample vol.
#2	1052	632572.56	1234454.13	✓	✓	✓	✓	✓	Y	

RSC

Acceptance criteria: 1 Overlying water is present, 2 Water has low turbidity, 3 Sampler is not over filled, 4 Sample surface is flat, 5 Desired sample depth is reached

Decon Procedure (Alconox Wash, DI water rinse, other): Yes Alconox + DI Rinse

Sediment Sample Description

Sediment Sample Description (density, moisture, color, minor constituents, major constituents, other observations - *see field ref cards):

Dark grayish silty sand (fine to medium sand. Some coarsening of grain sizes w/ depth. Shell fragments throughout. Color transitions to grayish brown approximately ⅓ the way through sample depth. Trace subrounded gravels (coarse to fine).

Sample containers filled (number and type): Sample collected @ 1110.

8oz clear glass WM for SVOCs.

8oz amber glass WM for Dioxins/Furans

4oz clear glass WM for. TOTAL Solids/TOC

16oz plastic WM for grainsize

Laboratory analysis:

Archived

RSC

SURFACE SEDIMENT SAMPLE COLLECTION FORM

POB-Harris

Date/Time Collected: 1/31/13

Weather: Rainy / Cloudy

Field Personnel: E. Murray / E. Ramirez

Sample Type:

☑ 1. Surface Sample (0–10 cm)

☐ 1. Sub-surface Sample (10–20 cm)

Sample ID/Design. SG-08-0-10-013/13

Sample Method (Power Grab/Hand Auger)

Datum (Horizontal/Vertical) NAD 83/98; NAVD 88

Leadline Water Dept: 27.2' (A)

Predicted Tide Elevation _____ (B)

Mudline Elevation _____ (B-A)

Actual Tide Elevation _____

Run # or Composite Pt	Time	Latitude (Northing)	Longitude (Easting	Sample Criteria (Surface Grab Only)					Accept Sample Y/N	Comments (Include depth of sample)
				1	2	3	4	5		
# 1	1240	632606.52	1234738	T	T	T	T	T	Yes	0-10 cm

Acceptance criteria: 1 Overlying water is present, 2 Water has low turbidity, 3 Sampler is not over filled, 4 Sample surface is flat, 5 Desired sample depth is reached

Decon Procedure (Alconox Wash, DI water rinse, other): yes - both

Sediment Sample Description

Sediment Sample Description (density, moisture, color, minor constituents, major constituents, other observations - *see field ref cards):

Brown thin layer of silt present on surface. Directly underneath becomes dark gray / black. Sandy silt. Mussels, others shell fragments over entire surface. Misc. critters. Sulfur odor present.

Sample containers filled (number and type):

1 16 oz plastic WM — Sample time: 1255

1 4 oz glass WM

1 8 oz glass WM

Laboratory analysis:

Grainsize

TOC

total solids

metals

SVOCs

POB Harris - Harris Ave Shipyard
Surface Sediment Sample Collection Form.

31 January 2013
Weather: Rainy / Overcast / Gray
Field Personnel: E. Murray / E. Ramirez

Sample Type:

☐ 1. Surface Sample (0–10 cm)
☒ 1. Sub-surface Sample (10–20 cm)

Sample ID/Design. SG-08-10-20-013113

Sample Method (Power Grab/Hand Auger)

Datum (Horizontal/Vertical) NAD 83/98; NAVD 88

Leadline Water Dept: 27.2ft (A)
Predicted Tide Elevation _____ (B)
Mudline Elevation _____ (B-A)
Actual Tide Elevation _____

Run # or Composite Pt	Time	Latitude (Northing)	Longitude (Easting	Sample Criteria (Surface Grab Only) 1	2	3	4	5	Accept Sample Y/N	Comments (Include depth of sample)
#1	1240	632606.56	1234738	✓	✓	✓	✓	✓	Y	

Acceptance criteria: 1 Overlying water is present, 2 Water has low turbidity, 3 Sampler is not over filled, 4 Sample surface is flat, 5 Desired sample depth is reached

Decon Procedure (Alconox Wash, DI water rinse, other): Alconox Wash + DI Rinse.

Sediment Sample Description

Sediment Sample Description (density, moisture, color, minor constituents, major constituents, other observations - *see field ref cards):
Dark gray / black sandy silt, organic rich, saturated, sulfur odor, shell fragments. Contains pieces of metal (stainless steel)

Sample containers filled (number and type): Sample collected at 1300.
8oz clear glass WM for SVOCs/PCBs
4oz clear glass WM for Metals/Total Solids/TOC
16oz plastic WM for grainsize

Laboratory analysis:
Archived.

SURFACE SEDIMENT SAMPLE COLLECTION FORM

POB-Harris

Date/Time Collected: 1/3/2013

Weather: Rainy / overcast

Field Personnel: Erin Murray / Glenn Ramirez

Sample Type:

☑ 1. Surface Sample (0–10 cm)

☐ 1. Sub-surface Sample (10–20 cm)

Sample ID/Design. SG-09-0-10-013113

Sample Method (Power Grab/Hand Auger)

Datum (Horizontal/Vertical) NAD 83/98; NAVD 88

Leadline Water Dept: 3 ft. 8' (A)

Predicted Tide Elevation _____ (B)

Mudline Elevation _____ (B-A)

Actual Tide Elevation _____

Run # or Composite Pt	Time	Latitude (Northing)	Longitude (Easting	Sample Criteria (Surface Grab Only) 1	2	3	4	5	Accept Sample Y/N	Comments (Include depth of sample)
# 1	1310	032701.88	1234737.6	T	T	T	T	T	Yes	0-10cm

Acceptance criteria: 1 Overlying water is present, 2 Water has low turbidity, 3 Sampler is not over filled, 4 Sample surface is flat, 5 Desired sample depth is reached

Decon Procedure (Alconox Wash, DI water rinse, other): yes - both

Sediment Sample Description

Sediment Sample Description (density, moisture, color, minor constituents, major constituents, other observations - *see field ref cards):

Brown layer of silt present ½ cm. underneath dark gray to black sandy silt. High organic content. Wood debris, glass bottles present on surface. Misc debris - composite, mesh pieces. Shell fragments scattered. Large pieces of tree bark present throughout.

Sample containers filled (number and type):

1 16 oz Plastic WM — Sample taken at 1325

1 4 oz glass WM

1 8oz glass WM

Laboratory analysis:

Grainsize — SVOCs

total solids — PCBs

TOC

Metals

POB Harris - Harris Ave Shipyards

Surface Sediment Sample Collection Form

31 January 2013

Weather: Gray/Overcast/Rainy 40's

Field Personnel: E. Murray / E.

Sample Type:

☐ 1. Surface Sample (0–10 cm)

☒ 1. Sub-surface Sample (10–20 cm)

Sample ID/Design. SG-09-10-20-013113

Sample Method (Power Grab/Hand Auger)

Datum (Horizontal/Vertical) NAD 83/98; NAVD88

Leadline Water Dept: 34.8ft (A)

Predicted Tide Elevation _____ (B)

Mudline Elevation _____ (B-A)

Actual Tide Elevation _____

Run # or Composite Pt	Time	Latitude (Northing)	Longitude (Easting	Sample Criteria (Surface Grab Only) 1	2	3	4	5	Accept Sample Y/N	Comments (Include depth of sample)
#1	1330	632701.88	1234737.6	✓	✓	✓	✓	✓	Y	

RSL

Acceptance criteria: 1 Overlying water is present, 2 Water has low turbidity, 3 Sampler is not over filled, 4 Sample surface is flat, 5 Desired sample depth is reached

Decon Procedure (Alconox Wash, DI water rinse, other): Alconox + DI Rinse

Sediment Sample Description

Sediment Sample Description (density, moisture, color, minor constituents, major constituents, other observations - *see field ref cards):

Dark Gray organic-rich/spongy sandy silt. Wood debris, glass bottles (on surface of sample), composite-mesh-screen-textile fabric shell fragments, bark - not very decomposed.

Sample containers filled (number and type): Sample collected @ 1330.

8oz glass clear WM @ SVOCs/PCBs

4oz clear glass WM for Metals/Total Solids/TOC

16oz Plastic WM for grainsize

Laboratory analysis:

Archived sample.

RSL

SURFACE SEDIMENT SAMPLE COLLECTION FORM

POB-Harris

Date/Time Collected: 1/31/13 1400

Weather: overcast; Drizzle

Field Personnel: E. Murray / E. Ramirez

Sample Type:

☑ 1. Surface Sample (0–10 cm)

☐ 1. Sub-surface Sample (10–20 cm)

Sample ID/Design. SG-10-0-10-013113

Sample Method (Power Grab/Hand Auger)

Datum (Horizontal/Vertical) NAD 83/98; NAVD 88

Leadline Water Dept: 32.2' (A)

Predicted Tide Elevation _____ (B)

Mudline Elevation _____ (B-A)

Actual Tide Elevation _____

Run # or Composite Pt	Time	Latitude (Northing)	Longitude (Easting	Sample Criteria (Surface Grab Only) 1	2	3	4	5	Accept Sample Y/N	Comments (Include depth of sample)
#1	1340	632645.25	1237818.5	T	T	T	T	T	Yes	0-10 cm

Acceptance criteria: 1 Overlying water is present, 2 Water has low turbidity, 3 Sampler is not over filled, 4 Sample surface is flat, 5 Desired sample depth is reached

Decon Procedure (Alconox Wash, DI water rinse, other): Yes - both

Sediment Sample Description

Sediment Sample Description (density, moisture, color, minor constituents, major constituents, other observations - *see field ref cards):

Brown layer of silt on surface. Dark brown/black gray (right below surface) silty SAND or sandy silt. Shell fragments and whole shells present on surface and throughout. Worms present. Floating, slight sheen. Unknown origin - doesn't look like petroleum.

Sample containers filled (number and type):

1 16 oz. Plastic WM — Sample taken 1400

1 4 oz. glass WM

1 8 oz glass WM

Laboratory analysis:

Grain size (dry)

total solids

metals

TOC

SVOCs

→ Archive

POB Harris – Harris Ave Shipyard

Surface Sediment Sample Collection Form

31 January 2013

Weather: overcast/rainy

Field Personnel: E. Murray / E. Ramirez

Sample Type:

☐ 1. Surface Sample (0–10 cm)

☒ 1. Sub-surface Sample (10–20 cm)

Sample ID/Design. SG-10-10-20-013113

Sample Method (Power Grab/Hand Auger)

Datum (Horizontal/Vertical) NAD 83/98; NAVD 88

Leadline Water Dept: 32.2' (A)

Predicted Tide Elevation: _____ (B)

Mudline Elevation _____ (B-A)

Actual Tide Elevation _____

Run # or Composite Pt	Time	Latitude (Northing)	Longitude (Easting	Sample Criteria (Surface Grab Only) 1	2	3	4	5	Accept Sample Y/N	Comments (Include depth of sample)
#1	1340	632645.25	1234818.5	✓	✓	✓	✓	✓	Yes	10-20cm

Acceptance criteria: 1 Overlying water is present, 2 Water has low turbidity, 3 Sampler is not over filled, 4 Sample surface is flat, 5 Desired sample depth is reached

Decon Procedure (Alconox Wash, DI water rinse, other): Yes - Alconox + DI

Sediment Sample Description

Sediment Sample Description (density, moisture, color, minor constituents, major constituents, other observations - *see field ref cards):

Dark brownish gray sandy silt becomes black, saturated, soft, worms present. Slight sheen on beds on water in homogenizing bowls - appears very, very light.

Sample containers filled (number and type):

8oz clear glass WM - SVOCs / PCBs

4oz clear glass WM - Metals / Total Solids / TOC

16oz plastic WM - grain size

Laboratory analysis:

Sample was archived.

RGP

SURFACE SEDIMENT SAMPLE COLLECTION FORM

POB-Harris

Date/Time Collected: 1/31/13 1425

Weather: Rain

Field Personnel: G. Murray / G. Ramirez

Sample Type:

☑ 1. Surface Sample (0–10 cm)

☐ 1. Sub-surface Sample (10–20 cm)

Sample ID/Design. SG-11-0-10-013113

Sample Method (Power Grab/Hand Auger)

Datum (Horizontal/Vertical) NAD 83/98; NAVD 88

Leadline Water Dept: 34.5' (A)

Predicted Tide Elevation _____ (B)

Mudline Elevation _____ (B-A)

Actual Tide Elevation _____

Run # or Composite Pt	Time	Latitude (Northing)	Longitude (Easting	Sample Criteria (Surface Grab Only) 1	2	3	4	5	Accept Sample Y/N	Comments (Include depth of sample)
H1	1442	632738.25	1234819.63	T	T	T	T	T	Yes	0-10cm

Acceptance criteria: 1 Overlying water is present, 2 Water has low turbidity, 3 Sampler is not over filled, 4 Sample surface is flat, 5 Desired sample depth is reached

Decon Procedure (Alconox Wash, DI water rinse, other): Yes - both

Sediment Sample Description

Sediment Sample Description (density, moisture, color, minor constituents, major constituents, other observations - *see field ref cards):

Thin layer of brown silt on surface. Directly underneath dark gray brandy silty sand. Trace shell fragments. No visible organisms present.

Sample containers filled (number and type):

1 16 oz plastic – Grainsize Sample taken at 1425

1 4 oz glass WM – total solids, metals, TOC

1 8 oz glass WM – SVOCs / PCBs

Laboratory analysis:

Archive

POB Harris

Surface Sediment Sample Collection Form

Weather: 31 January 2013 overcast/gray

Field Personnel: E. Murray / E. Ramirez

Sample Type:

☐ 1. Surface Sample (0–10 cm)

☒ 1. Sub-surface Sample (10–20 cm)

Sample ID/Design. SG-11-10-20-013113

Sample Method (Power Grab/Hand Auger)

Datum (Horizontal/Vertical) NAD 83/98; NAVD 88

Leadline Water Dept: 34.5 ft (A)

Predicted Tide Elevation: _____ (B)

Mudline Elevation _____ (B-A)

Actual Tide Elevation _____

Run # or Composite Pt	Time	Latitude (Northing)	Longitude (Easting	Sample Criteria (Surface Grab Only) 1	2	3	4	5	Accept Sample Y/N	Comments (Include depth of sample)
#1	1412	632738.2	1234819.6	✓	✓	✓	✓	✓	Y	10-20

Acceptance criteria: 1 Overlying water is present, 2 Water has low turbidity, 3 Sampler is not over filled, 4 Sample surface is flat, 5 Desired sample depth is reached

Decon Procedure (Alconox Wash, DI water rinse, other): Both (Alconox/DI).

Sediment Sample Description

Sediment Sample Description (density, moisture, color, minor constituents, major constituents, other observations - *see field ref cards):

Dark gray sandy silt, saturated, sticky/cohesive/organic rich trace shell fragments.

Sample containers filled (number and type):

8oz. clear glass WM – SVOCs/PCBs

4oz clear glass WM – Metals/Total Solids/TOC

16oz Plastic WM – grain size

Laboratory analysis:

Sample was archived.

SURFACE SEDIMENT SAMPLE COLLECTION FORM

POB-Harris

Date/Time Collected: 1/31/13 0935

Weather: Rain

Field Personnel: E. Murray / E. Ramirez

Sample Type:

☑ 1. Surface Sample (0–10 cm)

☐ 1. Sub-surface Sample (10–20 cm)

Sample ID/Design. SG-12-0-10-073113

Sample Method (Power Grab/Hand Auger)

Datum (Horizontal/Vertical) NAD 83/98; NAVD 88

Leadline-Water Dept: 56.8' (A)

Predicted Tide Elevation _____ (B)

Mudline Elevation _____ (B-A)

Actual Tide Elevation _____

Run # or Composite Pt	Time	Latitude (Northing)	Longitude (Easting	Sample Criteria (Surface Grab Only) 1	2	3	4	5	Accept Sample Y/N	Comments (Include depth of sample)
#1	0925	632183.81	1234103.88	T	T	T	T	T	Y	6-10 cm

Acceptance criteria: 1 Overlying water is present, 2 Water has low turbidity, 3 Sampler is not over filled, 4 Sample surface is flat, 5 Desired sample depth is reached

Decon Procedure (Alconox Wash, DI water rinse, other): Both - yes

Sediment Sample Description

Sediment Sample Description (density, moisture, color, minor constituents, major constituents, other observations - *see field ref cards): Sandy SILT. ~~Brown silty sand~~. Shells and worms present. Becomes gray underneath surface material.

Sample containers filled (number and type):

1 16 oz Plastic Time 0935

1 4 oz glass WM

1 8 oz glass WM

1 8 oz glass WM Amber

Laboratory analysis:

Grainsize Dioxins/Furans

Total Solids

TOC

SVOC

POB Harris - Harris Ave Shipyard

Date 31 January 2013

Weather: Gray / Overcast / Rainy

Field Personnel: Erin Murray / Elena Ramirez

Sample Type:

☐ 1. Surface Sample (0–10 cm)

☒ 1. Sub-surface Sample (10–20 cm)

Sample ID/Design. SG-RER12-10-20-013113

Sample Method (Power Grab/Hand Auger)

Datum (Horizontal/Vertical) NAD 83/98; NAVD 88.

Leadline Water Dept: 56.8 ft. (A)

Predicted Tide Elevation _____ (B)

Mudline Elevation _____ (B-A)

Actual Tide Elevation _____

Run # or Composite Pt	Time	Latitude (Northing)	Longitude (Easting	Sample Criteria (Surface Grab Only) 1	2	3	4	5	Accept Sample Y/N	Comments (Include depth of sample)
1	0940	632983.81	1234103.88	✓	✓	✓	✓	✓	Y	10-20cm

RER

Acceptance criteria: 1 Overlying water is present, 2 Water has low turbidity, 3 Sampler is not over filled, 4 Sample surface is flat, 5 Desired sample depth is reached

Decon Procedure (Alconox Wash, DI water rinse, other): Decon (Y)

Sediment Sample Description

Sediment Sample Description (density, moisture, color, minor constituents, major constituents, other observations - *see field ref cards):

Black sandy (fine) silt. wet, saturated, soft, organic-rich.

Sample containers filled (number and type):

8oz - glass clear SVOCs

8oz - glass amber Dioxins/Furans

4oz - glass clear Total Solids / TOC

16oz - plastic grain size

Laboratory analysis:

Archive sample

RER

SURFACE SEDIMENT SAMPLE COLLECTION FORM

POB-Harris

Date/Time Collected: 1/31/13 1070

Weather: Rainy 45°F

Field Personnel: Erin M/Elena R.

Sample Type:

☑ 1. Surface Sample (0–10 cm)

☐ 1. Sub-surface Sample (10–20 cm)

Sample ID/Design. SG-13-0-10-013113

Sample Method (~~Power Grab~~/Hand Auger)

Datum (Horizontal/Vertical) NAD 83/98 ; NAVD 88

Leadline Water Dept: 37.1' (A)

Predicted Tide Elevation _____ (B)

Mudline Elevation _____ (B-A)

Actual Tide Elevation _____

Run # or Composite Pt	Time	Latitude (Northing)	Longitude (Easting	Sample Criteria (Surface Grab Only) 1	2	3	4	5	Accept Sample Y/N	Comments (Include depth of sample)
#1	1000	631866.31	1234060.25	T	T	T	T	T	yes	0-10cm

Acceptance criteria: 1 Overlying water is present, 2 Water has low turbidity, 3 Sampler is not over filled, 4 Sample surface is flat, 5 Desired sample depth is reached

Decon Procedure (Alconox Wash, DI water rinse, other): yes - both

Sediment Sample Description

Sediment Sample Description (density, moisture, color, minor constituents, major constituents, other observations - *see field ref cards):

Medium grayish brown sandy SILT. Eel grass seaweed present on entire surface. Large clam shell on surface.

Sulfur odor present.

Sample containers filled (number and type):

1 16 oz plastic WM — Sample time 1010

1 4 oz glass WM

1 8 oz glass WM

1 8 oz glass WM (amber)

Laboratory analysis:

Grainsize — Dioxins/Furans

total solids

TOC

SVOCs

POB-Harris – Harris Ave Shipyard

Date: 31 January 2013
Weather: Gray / Overcast / Raining
Field Personnel: E. Murray / E. Ramirez

Sample Type:

☐ 1. Surface Sample (0–10 cm)
☒ 1. Sub-surface Sample (10–20 cm)

Sample ID/Design. SG-13-10-20-013113

Sample Method (Power Grab/Hand Auger)

Datum (Horizontal/Vertical) NAD 83/98; NAVD 88

Leadline Water Dept: 37.1 ft. (A)
Predicted Tide Elevation _____ (B)
Mudline Elevation _____ (B-A)
Actual Tide Elevation _____

Run # or Composite Pt	Time	Latitude (Northing)	Longitude (Easting	Sample Criteria (Surface Grab Only) 1	2	3	4	5	Accept Sample Y/N	Comments (Include depth of sample)
#1	1000	631866.31	1234060.45	✓	✓	✓	✓	✓	Y	10-20 cm

RER

Acceptance criteria: 1 Overlying water is present, 2 Water has low turbidity, 3 Sampler is not over filled, 4 Sample surface is flat, 5 Desired sample depth is reached

Decon Procedure (Alconox Wash, DI water rinse, other): Both

Sediment Sample Description

Sediment Sample Description (density, moisture, color, minor constituents, major constituents, other observations - *see field ref cards):
Dark grayish brown. Sandy silt. Sulfurious odor, soft, saturated.

Sample containers filled (number and type):
8oz glass clear
8oz glass amber
4oz glass clear
16oz plastic

Laboratory analysis:
Archive sample

SURFACE SEDIMENT SAMPLE COLLECTION FORM

POB-Harris

Date/Time Collected: 1/30/13 1430

Weather: Partly cloudy 50°F

Field Personnel: Erin Murray

Sample Type:

☑ 1. Surface Sample (0–10 cm)

☐ 1. Sub-surface Sample (10–20 cm)

Sample ID/Design. HA-09-0-10-013013

Sample Method (Power Grab/Hand Auger)

Datum (Horizontal/Vertical) NAD 83/98 NAVD 88

Leadline Water Dept: 1 (A)

Predicted Tide Elevation NA (B)

Mudline Elevation 1 (B-A)

Actual Tide Elevation 1

Run # or Composite Pt	Time	Latitude (Northing)	Longitude (Easting	Sample Criteria (Surface Grab Only) 1	2	3	4	5	Accept Sample Y/N	Comments (Include depth of sample)
#1	1430	632311.9	1234694.0							0-10 cm
			NA							

Acceptance criteria: 1 Overlying water is present, 2 Water has low turbidity, 3 Sampler is not over filled, 4 Sample surface is flat, 5 Desired sample depth is reached

Decon Procedure (Alconox Wash, DI water rinse, other): Yes - both

Sediment Sample Description

Sediment Sample Description (density, moisture, color, minor constituents, major constituents, other observations - *see field ref cards):

Poorly graded light to medium brown fine to medium grained SAND. Shell fragments throughout.

Sample containers filled (number and type):

1 16 oz Plastic NM

1 4 oz Glass WM

1 8 oz Plastic & glass WM

Laboratory analysis:

Grainsize PCBs Time 1430

total solids

metals

TOC

SVOCs

SURFACE SEDIMENT SAMPLE COLLECTION FORM

POB-Harris

Date/Time Collected: 1/30/13 1435

Weather: Partly cloudy 50°F

Field Personnel: Erin Murray

Sample Type:

☐ 1. Surface Sample (0–10 cm)

☑ 1. Sub-surface Sample (10–20 cm)

Sample ID/Design. HA-09-10-20-013013

Sample Method (Power Grab/~~Hand Auger~~)

Datum (Horizontal/Vertical) NAD 83/98/NAVD 88

Leadline Water Dept: / (A)

Predicted Tide Elevation NA (B)

Mudline Elevation _____ (B-A)

Actual Tide Elevation /

Run # or Composite Pt	Time	Latitude (Northing)	Longitude (Easting	Sample Criteria (Surface Grab Only) 1	2	3	4	5	Accept Sample Y/N	Comments (Include depth of sample)
#1		632311.1	1234694.0							
			NA							

Acceptance criteria: 1 Overlying water is present, 2 Water has low turbidity, 3 Sampler is not over filled, 4 Sample surface is flat, 5 Desired sample depth is reached

Decon Procedure (Alconox Wash, DI water rinse, other): yes - both

Sediment Sample Description

Sediment Sample Description (density, moisture, color, minor constituents, major constituents, other observations - *see field ref cards):

light brown to medium poorly graded fine to medium SAND. Shell fragments throughout

Sample containers filled (number and type):

1 16 oz Plastic

1 4 oz Glass

1 8 oz ~~Plastic~~ glass

Laboratory analysis:

Grainsize gm Time 1435

Archive

SURFACE SEDIMENT SAMPLE COLLECTION FORM

POB-Harris

Date/Time Collected: 1/30/13

Weather: Clear

Field Personnel: Erin Murray

Sample Type:

☑ 1. Surface Sample (0–10 cm)

☐ 1. Sub-surface Sample (10–20 cm)

Sample ID/Design. HA-~~10~~ 10-0-10-013013

Sample Method (Power Grab/Hand Auger)

Datum (Horizontal/Vertical) NAD 83/98 / NAVD88

Leadline Water Dept: 1 (A)

Predicted Tide Elevation NA (B)

Mudline Elevation _____ (B-A)

Actual Tide Elevation 1

Run # or Composite Pt	Time	Latitude (Northing)	Longitude (Easting	Sample Criteria (Surface Grab Only) 1	2	3	4	5	Accept Sample Y/N	Comments (Include depth of sample)
		632038.5	1234227.8							
			NA							

Acceptance criteria: 1 Overlying water is present, 2 Water has low turbidity, 3 Sampler is not over filled, 4 Sample surface is flat, 5 Desired sample depth is reached

Decon Procedure (Alconox Wash, DI water rinse, other): yes – both

Sediment Sample Description

Sediment Sample Description (density, moisture, color, minor constituents, major constituents, other observations - *see field ref cards):

Brownish gray well graded SAND with rounded cobbles and silt. Moist to wet. Moderate shell fragments throughout.

Sample containers filled (number and type):

1 16 oz Plastic WM

1 4 oz Glass WM

1 8 oz ~~Plastic~~ Glass WM

Sample time 1645

Laboratory analysis:

Grainsize SVOCs

Total Solids PCBs

Metals

~~TOC~~ EM

* Note – no 10-20 cm sample collected due to hardness of sediments below surface interval.

SURFACE SEDIMENT SAMPLE COLLECTION FORM

POB-Harris

Date/Time Collected: 1/30/13 1620

Weather: Partly cloudy, 50°F

Field Personnel: Erin Murray

Sample Type:

☑ 1. Surface Sample (0–10 cm)

☐ 1. Sub-surface Sample (10–20 cm)

Sample ID/Design. ~~HA~~-11-0-10-013013

Sample Method (Power Grab/~~Hand Auger~~)

Datum (Horizontal/Vertical) NAD 83/98 / NAVD 88

Leadline Water Dept: / (A)

Predicted Tide Elevation NA (B)

Mudline Elevation / (B-A)

Actual Tide Elevation

Run # or Composite Pt	Time	Latitude (Northing)	Longitude (Easting	Sample Criteria (Surface Grab Only) 1	2	3	4	5	Accept Sample Y/N	Comments (Include depth of sample)
			NA							

Acceptance criteria: 1 Overlying water is present, 2 Water has low turbidity, 3 Sampler is not over filled, 4 Sample surface is flat, 5 Desired sample depth is reached

Decon Procedure (Alconox Wash, DI water rinse, other): yes – both

Sediment Sample Description

Sediment Sample Description (density, moisture, color, minor constituents, major constituents, other observations - *see field ref cards):

Medium gray well-graded SAND, some silt. Large gravels and shell fragments throughout.

Sample containers filled (number and type):

1 16 oz plastic WM

1 4 oz glass WM

1 8 oz glass WM

Sample taken at 1620

Laboratory analysis:

Grainsize

total Solids

metals

* Note- no 10-20 cm sample collected due to the hardness of sediments below the surface interval

SURFACE SOIL SAMPLE COLLECTION FORM POB-Harris

Date/Time Collected: 2/14/13

Weather: 40°F cloudy

Field Personnel: Erin Murray

Sample Type:

☑ 1. Surface Sample (0-6 in)

Sample ID: SFS-01-0-0.5-021413 & / Duplicate 1700 SFS-97-0-0.5-021413

Sample Location: SFS-01 (2' directly east of MW-08)

Sample Method (Hand Auger/Hand Trowel)

Soil Sample Description

Soil Sample Description (density, moisture, color, minor constituents, major constituents, other observations - *see field ref cards):

Dark gray to dark brown med graded fine to coarse SAND with gravel and trace fines, ~~moist~~ slightly moist. Very compact.

Sample containers filled (number and type):

~~2~~ 8 oz SM Time 1500

2 8 oz amber glass widemouth

Laboratory analysis:

Dioxins/Furans USEPA 1613B

SURFACE SOIL SAMPLE COLLECTION FORM POB-Harris

Date/Time Collected: 1/29/13

Weather: Rain

Field Personnel: L. Meoli

Sample Type:

☒ 1. Surface Sample (0-6 in)

Sample ID: SFS-02

Sample Location: Near Marine Railway - upland

Sample Method (Hand Auger/Hand Trowel)

Soil Sample Description

Soil Sample Description (density, moisture, color, minor constituents, major constituents, other observations - *see field ref cards):

Hard compacted gravel, moist, dark brown, sand and gravelly fill (~20% rounded gravels) w/ broken glass. At 5" bgs dark gray sand that resembles sand blast grit, moist.

Sample containers filled (number and type): No odor, no sheen, no staining observed.
1-8oz amber jar

Laboratory analysis:
Dioxins/Furans

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	Groundwater Sampling Location	Bottle Type (Preservative)	MW-01	MW-02A	MW-04	MW-05	MW-06[1]	MW-06 Dup	MW-06 Rep[2]	MW-07	MW-08	MW-09	MW-10
GWE Before Sampling	Sampling Team		A	Z	Z	Z	A	A	A	Z	Z	A	A
	Date		2/14/13				2/14/13					2/14/13	2/14/13
	Time		12:04				12:09					12:14	11:59
	Evidence of Free Product (Y/N)		N				N					N	N
	Depth to Water		7.78				8.55					5.07	8.50
	Measured Well Depth		14.18				19.47					15.16	20.19
	Well Depth (ft)		15	14	15	15	19	--	--	14	19	14	20
	Screened Interval (ft bgs)		5 to 15	4 to 14	5 to 15	5 to 15	4 to 19	--	--	4 to 14	4 to 19	4 to 14	5 to 20
	Sample ID Format		MW-XX-GW(F)-MMDDYY, XX= Well Number (with leading zero, if applicable),GW = Unfiltered GW, GWF = Filtered GW, MMDDYY = Date in Month, day, year format.										
Applied Speciation	Field filter all dissolved metals samples (except total mercury)!!												
	Dissolved Low Level Metals (EPA 200.8)[3]	1-125 ml HDPE (unpreserved)	X	X	X	X	X	X	X	X	X	X	X
	Total Low Level Mercury (EPA 245.1)[3]	1-40 ml clear (unpreserved)	X	X	X	X	X	X	X	X	X	X	X
	Dissolved Low Level Mercury (EPA 245.1)[3]	1-40 ml clear (unpreserved)	Collect and Hold[4]	Collect and Hold[4]	Collect and Hold[4]	Collect and Hold[4]	Collect and Hold[4]	Collect and Hold[4]	Collect and Hold[4]	Collect and Hold[4]	Collect and Hold[4]	Collect and Hold[4]	Collect and Hold[4]
ALS - Everett	NWTPD-G w/ BTEX (EPA-8021)	2-40 ml glass VOA vial (HCl)	X	X	X	X	X	X	X	X	X	X	X
	NWTPD-Dx	2-500 ml glass Amber (unpreserved)	X	X	X	X	X	X	X	X	X	X	X
	NW-VPHw/ EPA 8021	2-40 ml glass VOA vial (HCl)	X	--	--	--	X	--	--	--	--	X	--
	NW-EPH	2-1000 ml glass Amber (unpreserved)	X	--	--	--	X	--	--	--	--	X	--
	VOCs (EPA 8260C)	3-40 ml glass VOA vial (HCl)	X	X	X	X	X	X	X	X	X	X	X
	SVOCs (EPA-8270/SIM)	2-1000 ml glass Amber (unpreserved)	X	X	X	X	X	X	X	X	X	X	X

Notes:

1 Collect MW-06 at low-tide.
2 Collect MW-06 Replicate during the rising tide. Place all analyses on HOLD pending results of primary and duplicate samples from MW-06.
3 Site-specific metals list for dissolved metals analyses. Collect metals/Hg bottle blanks for lab and expose mercury blank during sampling.
4 Collect samples in required bottles and note on COC that samples should be held pending results of Total Hg analysis.

On COC for Applied Speciation, please note salinity/conductivity of sample.
On groundwater sampling sheets, please list both salinity and specific conductance on the field forms. If the meter doesn't provide a reading, please use conversion chart.
Please use the following sample ID for the filter blank for Applied Speciation **MW-03-GWF-MMDDYY.**
For "trip" blanks please use the following sample IDs:
For Applied Speciation (Hg blank), **MW-03-TB-MMDDYY.**
For ALS (trip blank), **MW-06-TB-MMDDYY.**

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	Groundwater Sampling Location	Bottle Type (Preservative)	MW-01	MW-02A	MW-04	MW-05	MW-06[1]	MW-06 Dup	MW-06 Rep[2]	MW-07	MW-08	MW-09	MW-10
GWE Before Sampling	Sampling Team		A	Z	Z	Z	A	A	A	Z	Z	A	A
	Date			2/14/13	2/14/13	2/14/13				2/14/13	2/14/13		
	Time			12:10	12:05	11:58				12:08	12:02		
	Evidence of Free Product (Y/N)												
	Depth to Water			9.59	9.66	7.82				9.35	8.21		
	Measured Well Depth				14.83	14.2				15.05	20'		
	Well Depth (ft)		15	14	15	15	19	--	--	14	19	14	20
	Screened Interval (ft bgs)		5 to 15	4 to 14	5 to 15	5 to 15	4 to 19	--	--	~~4~~ to ~~15~~ 14	4 to 19	4 to 14	5 to 20
	Sample ID Format		MW-XX-GW(F)-MMDDYY, XX= Well Number (with leading zero, if applicable),GW = Unfiltered GW, GWF = Filtered GW, MMDDYY = Date in Month, day, year format.										
Applied Speciation	Field filter all dissolved metals samples (except total mercury)!!												
	Dissolved Low Level Metals (EPA 200.8)[3]	1-125 ml HDPE (unpreserved)	X	X	X	X	X	X	X	X	X	X	X
	Total Low Level Mercury (EPA 245.1)[3]	1-40 ml clear (unpreserved)	X	X	X	X	X	X	X	X	X	X	X
	Dissolved Low Level Mercury (EPA 245.1)[3]	1-40 ml clear (unpreserved)	Collect and Hold[4]	Collect and Hold[4]	Collect and Hold[4]	Collect and Hold[4]	Collect and Hold[4]	Collect and Hold[4]	Collect and Hold[4]	Collect and Hold[4]	Collect and Hold[4]	Collect and Hold[4]	Collect and Hold[4]
ALS - Everett	NWTPD-G w/ BTEX (EPA-8021)	2-40 ml glass VOA vial (HCl)	X	X	X	X	X	X	X	X	X	X	X
	NWTPD-Dx	2-500 ml glass Amber (unpreserved)	X	X	X	X	X	X	X	X	X	X	X
	NW-VPHw/ EPA 8021	2-40 ml glass VOA vial (HCl)	X	--	--	--	X	--	--	--	--	X	--
	NW-EPH	2-1000 ml glass Amber (unpreserved)	X	--	--	--	X	--	--	--	--	X	--
	VOCs (EPA 8260C)	3-40 ml glass VOA vial (HCl)	X	X	X	X	X	X	X	X	X	X	X
	SVOCs (EPA-8270/SIM)	2-1000 ml glass Amber (unpreserved)	X	X	X	X	X	X	X	X	X	X	X

Notes:

1 Collect MW-06 at low-tide.
2 Collect MW-06 Replicate during the rising tide. Place all analyses on HOLD pending results of primary and duplicate samples from MW-06.
3 Site-specific metals list for dissolved metals analyses. Collect metals/Hg bottle blanks for lab and expose mercury blank during sampling.
4 Collect samples in required bottles and note on COC that samples should be held pending results of Total Hg analysis.

On COC for Applied Speciation, please note salinity/conductivity of sample.
On groundwater sampling sheets, please list both salinity and specific conductance on the field forms. If the meter doesn't provide a reading, please use conversion chart.
Please use the following sample ID for the filter blank for Applied Speciation **MW-03-GWF-MMDDYY.**
For "trip" blanks please use the following sample IDs:
For Applied Speciation (Hg blank), **MW-03-TB-MMDDYY.**
For ALS (trip blank), **MW-06-TB-MMDDYY.**

Harris Avenue Shipyard

Remedial Investigation/ Feasibility Study

Appendix D
Data Gaps Investigation Summary

Attachment D.2
Laboratory Analytical Data Reports (provided as separate file)

FINAL

Harris Avenue Shipyard

Remedial Investigation/ Feasibility Study

Appendix D
Data Gaps Investigation Summary

Attachment D.3
Data Validation Reports

FINAL

Port of Bellingham
Harris Avenue Shipyard

Data Validation Report

Prepared for

Port of Bellingham
PO Box 1677
Bellingham, Washington 98227

Prepared by

FLOYD | SNIDER
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July 2013

ECOLOGY REVIEW DRAFT

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List of Abbreviations and Acronyms

Abbreviation/ Acronym	Definition
%D	Percent drift
ALS	ALS Environmental
ARI	Analytical Resources, Inc.
BTEX	Benzene, toluene, ethylbenzene, and xylenes
CLP	Contract Laboratory Program

Abbreviation/ Acronym	Definition
cm	Centimeters
DNR	Do Not Report
EcoChem	EcoChem, Inc.
LCS	Laboratory control sample
LCSD	Laboratory control sample duplicate
LOQ	Limit of quantiation
mg/kg	Milligrams per kilogram
MS	Matrix spike
MSD	Matrix spike duplicate
PAH	Polycyclic aromatic hydrocarbon
PCB	Polychlorinated biphenyl
PSDDA	Puget Sound Dredged Disposal Analysis
RPD	Relative percent difference
QC	Quality control
SDG	Sample delivery group
SVOC	Semivolatile organic compound
TPH	Total petroleum hydrocarbons
USEPA	U.S. Environmental Protection Agency
VOC	Volatile organic compound

1.0 Project Narrative

1.1 OVERVIEW OF DATA VALIDATION

This report summarizes the results of the Compliance Screening (Level I) performed on the soil, sediment and groundwater sample data for the 2013 Data Gaps Investigation Sampling Event.

The chemical analyses were performed by Analytical Resources, Inc. (ARI) located in Tukwila, WA, ALS Environmental (ALS) located in Everett, WA, and Applied Speciation and Consulting, LLC located in Bothell, WA.

Data validation of the ARI dioxin/furan analyses of two soil samples and five sediment samples was conducted by EcoChem, Inc. (EcoChem) and the results of that review is documented in a separate data validation memorandum. Data validation of the ALS extractable petroleum hydrocarbon (EPH)/volatile petroleum hydrocarbon (VPH) analysis of four soil and four groundwater samples was conducted by EcoChem and the results of that review is documented in a separate data validation memorandum.

1.1.1 Sediment

A total of 23 sediment samples and a rinse blank sample were collected between January 30 and 31, 2013 and submitted to ARI for chemical analysis. Under direction of the project field staff, 11 samples were originally archived by the lab. The analytical methods include the following:

- Metals—U.S. Environmental Protection Agency (USEPA) Methods 6010C and 7471A
- Semivolatile organic compounds (SVOCs)—USEPA Methods 8270D and 8270D-SIM
- Pesticides—Puget Sound Dredged Disposal Analysis (PSDDA) Modified USEPA Method 8081B
- Aroclor polychlorinated biphenyls (PCBs)—PSDDA Modified USEPA Method 8082A

Three of the archived samples were later analyzed in triplicate for mercury by USEPA Method 7471A.

1.1.2 Soil

A total of 11 soil samples were collected between January 29, 2013 and February 14, 2013 and submitted to ARI for analyses of conventional parameters, including: grain size, total organic carbon, fractional organic carbon, total solids, total porosity, moisture content and bulk density. However these conventional parameters do not have data quality compliance requirements, and therefore the results were not included in this data validation report.

Between January 29 and 30, 2013, 21 soil samples and 3 trip blank samples were collected and submitted to ALS for chemical analyses. Under direction of the project field staff, three of these samples were archived by the lab. The analytical methods include the following:

- Metals—USEPA Methods 6020 and 7471
- SVOCs—USEPA Method 8270
- Polycyclic aromatic hydrocarbons (PAHs)—USEPA Method 8270D-SIM
- Total petroleum hydrocarbons (TPHs)—NWTPH-Dx/Gx
- Benzene, toluene, ethylbenzene, and xylenes (BTEX)—USEPA Method 8021

1.1.3 Groundwater

A total of 30 groundwater samples were collected between January 29, 2013 and February 14, 2013 and submitted to Applied Speciation for chemical analysis of metals by USEPA Method 200.8. Additional sample volume for 16 of these groundwater samples and a trip blank was also submitted to ALS for chemical analysis. Under direction of the project field staff, one of the samples was archived by ALS. The analytical methods include the following:

- Volatile organic compounds (VOCs)—USEPA Method 8260B
- SVOCs—USEPA Method 8270
- PAHs—USEPA Method 8270D-SIM
- TPHs—NWTPH-Dx/Gx
- BTEX—USEPA Method 8021

A complete list of the analyses performed on each sample and by which laboratory is provided in Table 1.

The data were reviewed using guidance and quality control (QC) criteria documented in the analytical methods*: Harris Avenue Shipyard, Data Gaps Investigation Sampling Analysis Plan and Quality Assurance Project Plan* (Floyd|Snider, January 4, 2013), *National Functional Guidelines for Inorganic Data Review* (USEPA 1994 and 2004), and *National Functional Guidelines for Organic Data Review* (USEPA 1999 and 2008).

Floyd|Snider's goal in assigning data assessment qualifiers is to assist in proper data interpretation. If values are estimated (J or UJ), data may be used for site evaluation and risk assessment purposes, but reasons for data qualification should be taken into consideration when interpreting sample concentrations. If values are assigned an R, the data are to be rejected and should not be used for any site evaluation purposes. When compounds are analyzed at multiple dilutions, select results will be assigned a Do Not Report (DNR) qualification as a more appropriate result is reported from another dilution. If values have no data qualifier assigned, then the data meet the data quality objectives as stated in the documents and methods referenced above.

Data qualifier definitions, reasons, and validation criteria are included as Appendix A. The Qualified Data Summary Table is included in Appendix B. Data validation worksheets (excel worksheets) will be kept on file at Floyd|Snider.

2.0 Overall Data Usability

As part of the data quality review process, Floyd|Snider also assesses the usability of the data. To assess the usability of the data it is important to understand the intended use of the data and to evaluate the following: Do the data meet the project-specific data quality objectives? Are the data in compliance with the analytical method requirements? If there are deviations from the project-specific data quality objectives, what is the appropriate use of the data? The data usability assessment is done within the context of the project questions to determine if the quality of the environmental analytical data is sufficient to support the project's intended purpose.

There were multiple instances where the reported chemical results did not achieve the project-specific detection limits and those instances were brought to the attention of the project team and are described in detail in the Remedial Investigation.

2.1 MERCURY RESULT ANOMALY

The detected concentration of mercury in sediment Sample SG-08-0-10-013113 was 12.4 milligrams per kilogram (mg/kg) and unexpectedly high compared to all historical site data. Therefore, the analysis of additional sediment samples surrounding SG-08-10-013113 were performed in order to better understand the initial mercury result. Additionally, it was requested that the laboratory (ARI) analyze two additional aliquots from the remaining sediment from SG-08-0-10-013113. The surrounding sediments, represented by Samples SG-08-10-20-013113, SG-09-0-10-013113, SG-10-0-10-013113, and SG-11-0-10-013313, were analyzed for three separate aliquots. The results of these additional analyses are shown in the following table.

Location	Field Sample ID	Lab Sample ID	Depth	Units	Result
SG-08	SG-08-0-10-013113	13-2430-WC32G	0–10 cm	mg/kg	12.4 R1
SG-08	SG-08-0-10-013113	13-4034-WF78A	0–10 cm	mg/kg	0.31 J
SG-08	SG-08-0-10-013113	13-4280-WH44A	0–10 cm	mg/kg	0.13
SG-08	SG-08-10-20-013113	13-5283-WH44D	10–20 cm	mg/kg	0.19
SG-08	SG-08-10-20-013113	13-5284-WH44E	10–20 cm	mg/kg	0.33
SG-08	SG-08-10-20-013113	13-5285-WH44F	10–20 cm	mg/kg	0.15
SG-09	SG-09-0-10-013113	13-2431-WC32H	0–10 cm	mg/kg	0.016
SG-09	SG-09-0-10-013113	13-5281-WH44B	0–10 cm	mg/kg	0.4
SG-09	SG-09-0-10-013113	13-5282-WH44C	0–10 cm	mg/kg	0.23
SG-10	SG-10-0-10-013113	13-5286-WH44G	0–10 cm	mg/kg	0.47
SG-10	SG-10-0-10-013113	13-5287-WH44H	0–10 cm	mg/kg	0.21
SG-10	SG-10-0-10-013113	13-5288-WH44I	0–10 cm	mg/kg	0.22
SG-11	SG-11-0-10-013113	13-5289-WH44J	0–10 cm	mg/kg	0.23

Location	Field Sample ID	Lab Sample ID	Depth	Units	Result
SG-11	SG-11-0-10-013113	13-5290-WH44K	0–10 cm	mg/kg	0.23
SG-11	SG-11-0-10-013113	13-5291-WH44L	0–10 cm	mg/kg	0.24

Abbreviations:
cm Centimeters
mg/kg Milligrams per kilogram

Qualifiers:
J Value is considered an estimate.
R1 Rejected in favor of a result from another analysis or dilution.

Based on the results of the multiple aliquot analyses, Dr. Teri A. Floyd, the project chemist, determined that it was appropriate to reject the original sample result for location SG-08 at 0 to 10 centimeters (cm; 12.4 mg/kg) as it did not appear to be representative of site conditions as determined by the subsequent aliquot results. The rejected SG-08 result at 0 to 10 cm is retained in the project database with the data qualifier R1; the other two subsequent results (reanalysis of separate aliquots) for the same sample are also retained and identified as the appropriate data for project use.

2.2 ANALYTES WITH RESULTS FROM MULTIPLE METHODS

The sediment samples that were collected during the January 30 and 31, 2013 field event were analyzed by both USEPA Method 8270D and 8270D-SIM for the following analytes: 1,2,4-trichlorobenzene, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 2,4-dimethylphenol, 2-methylphenol, benzyl alcohol, butyl benzyl phthalate, dibenzo(a,h)anthracene, dimethyl phthalate, n-nitrosodiphenylamine, and pentachlorophenol. For all samples, the results from the USEPA Method 8270D analyses were qualified DNR in favor of the results from Method 8270D-SIM, which provided lower detection limits due to the select ion monitoring utilized by the method.

All project sediment samples were also analyzed by USEPA Method 8270D, 8270D-SIM, and PSSDA Modified 8081B for hexachlorobenze and hexachlorobutadiene. For all samples, the results from the USPEA Method 8270D and 8270D-SIM analyses were qualified DNR in favor of the results from PSSDA Modified 8081B, which provided lower detection limits due to the larger sample size utilized by the method.

In sample delivery group (SDG) EV13020091, 10 groundwater samples were analyzed by both USEPA Methods 8270 and 8260B for the following analytes: 1,2,4-trichlorobenzene, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, and hexachlorobutadiene. For all samples the results from the USEPA Method 8270 analyses were qualified DNR in favor of the results from USEPA Method 8260B, which provided lower detection limits.

In SDG EV13020091, 10 groundwater samples were analyzed by both USEPA Methods 8021 and 8260B for benzene, ethylbenzene, and toluene. For all samples the results from the USEPA Method 8021 analyses, which utilizes time to make the analyte identification, were qualified DNR in favor of the results from USEPA Method 8260B, which utilized mass spectrometry to make the identification.

In SDG EV13020091, 10 groundwater samples were analyzed by both USEPA Methods 8260B and 8270D-SIM for napthalene. With the exception of one sample (MW-01-GW-021513), the results from USEPA Method 8260B analyses were qualified DNR in favor of the results from the

USEPA Method 8270D-SIM analysis, which provided lower detection limits due to the select ion monitoring utilized by the method. Conservatively, for Sample MW-01-GW-021513, the higher analytical result of 4.6 µg/L from the USEPA Method 8260B analysis was retained rather than the 4 µg/L result from the USEPA Method 8270D-SIM analysis.

Refer to the Qualified Data Summary Table in Appendix B for a complete listing of all samples and analytes that were qualified due to analysis by multiple methods.

3.0 Metals by USEPA Methods 200.8, 6010C, 6020, 7471, and 7471A

This report documents the review of analytical data from the analyses of soil, sediment, and groundwater samples and the associated laboratory QC samples. Soil samples were analyzed by ALS for SDGs EV13010138 and EV13020005 by USEPA Methods 6020 and 7471; sediment samples were analyzed by ARI for SDGs WC32, WC33, WF78, and WH44 by USEPA Methods 6010C and 7471A; and groundwater were samples analyzed by Applied Speciation for SDGs F130201A and F130216A by USEPA Method 200.8. Compliance Screening (Level I) data quality review was performed on all analytical results by Chell Black as the primary data reviewer, and secondary review was performed by Jessi Massingale.

3.1 DATA PACKAGE COMPLETENESS

The laboratories submitted all required deliverables. The laboratories followed adequate corrective action processes and all anomalies were discussed in the case narratives.

3.2 TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

QC Requirements

	Cooler temperature and preservation	[2]	Laboratory sample duplicates
	Extraction and analysis holding times		Field duplicates
	Blank contamination		Reporting limits and reported results
	Laboratory control samples (LCS)		Target analyte list
[1]	Matrix spikes (MS)		

Notes:
1 Quality control results are discussed below, but no data were qualified.
2 Quality control outliers that impact the reported data were noted. Data qualifiers were issued, as discussed below.

Appendix A presents data validation criteria tables for inorganic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and had exceptions to the validation criteria are discussed below.

3.2.1 Matrix Spikes

ARI processed sediment samples in SDGs WC32 and WC33 together utilizing Sample HA-09-0-10-013013 as the representative QC sample for both groups for the analysis of select metals by USEPA Method 6010C. The MS recovery for copper and zinc were outside the laboratory control limits (75 to 125 percent), low for both analytes. Copper and zinc MS recoveries were 56.3 percent and 19.4 percent, respectively. The original concentrations in the sample for both analytes was greater than four times the spiked concentration; therefore, per USEPA guidelines, the control limits are not applicable, and the data are sufficient for use and reported unqualified. Therefore, with professional judgment, no copper or zinc results were qualified based on the MS recovery results.

3.2.2 Lab Sample Duplicates

ARI processed sediment samples in SDGs WC32 and WC33 together utilizing Sample HA-09-0-10-013013 as the representative QC sample for both groups for the analysis of select metals by USEPA Method 6010C. The laboratory sample to laboratory sample duplicate relative percent difference (RPD) for lead was 34.4 percent and outside the laboratory control limit of 20 percent. Due to the heterogeneity of the site sediment matrix, and that sediment Sample HA-09-0-10-013013 is not fully representative of the other sediment sample matrices in the SDGs, it is with professional judgment that only the lead result for Sample HA-09-0-10-013013 be qualified J as estimated. Refer to the Qualified Data Summary Table in Appendix B for validation details.

3.3 OVERALL ASSESSMENT

As was determined by this evaluation, the laboratories followed the specified analytical methods. Accuracy was acceptable, as demonstrated by the MS and LCS percent recovery values. Precision was acceptable, as demonstrated by the laboratory sample/laboratory sample duplicate RPDs, as discussed above.

All data are acceptable for use as qualified. Refer to Appendix B for details.

4.0 BTEX by USEPA Method 8021

This report documents the review of analytical data from the analyses of soil and groundwater samples and the associated laboratory QC samples. Samples were analyzed by ALS for SDGs EV13010138, EV13020005, and EV13020091 by USEPA Method 8021. Compliance Screening (Level I) data quality review was performed on all analytical results by Chell Black as the primary data reviewer, and secondary review was performed by Jessi Massingale.

4.1 DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

4.2 TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

QC Requirements

Cooler temperature and preservation	LCS and LCS duplicate (LCSD)
Extraction and analysis holding times	Field duplicates
Blank contamination	Reporting limits and reported results
Surrogate recoveries	Target analyte list

All QC requirements were met without exception, and did not require further evaluation.

4.3 OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate, LCS, and LCSD percent recovery values. Precision was acceptable, as demonstrated by the MS LCS/LSCD RPDs.

All data, as reported by the lab, are acceptable for use.

5.0 Pesticides by PSDDA Modified USEPA Method 8081B

This report documents the review of analytical data from the analyses of sediment samples and the associated laboratory QC samples. Samples were analyzed by ARI for SDGs WC32 and WC33 by PSDDA Modified USEPA Method 8081B. Compliance Screening (Level I) data quality review was performed on all analytical results by Chell Black as the primary data reviewer, and secondary review was performed by Jessi Massingale.

5.1 DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

5.2 TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

QC Requirements

Cooler temperature and preservation	[1] MS and Matrix Spike Duplicate (MSD)
Extraction and analysis holding times	Field duplicates
Blank contamination	Reporting limits and reported results
Surrogate recoveries	Target analyte list
LCS and LCSD	

Notes:
1 Quality control results are discussed below, but no data were qualified.

Appendix A presents data validation criteria tables for organic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and had exceptions to the validation criteria are discussed below.

5.2.1 Matrix Spike and Matrix Spike Duplicate

ARI processed sediment samples in SDGs WC32 and WC33 together utilizing Sample SG-08-0-10-013113 as the representative QC sample for both groups for the analysis of pesticides by PSDDA Modified USEPA Method 8081B. The MSD recovery (176 percent) was outside of the established control limits (62 to 119 percent), high for hexachlorobenzene, resulting in a MS/MSD RPD of 57.1 percent. Per USEPA guidelines, data are not qualified based on MS/MSD information alone. As the LCS/LCSD recoveries and associated RPD were within laboratory control limits, demonstrating acceptable accuracy and precision for the method, it is with professional judgment that no hexachlorobenzene results from this analysis be qualified based on this MS/MSD information.

5.3 OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate, LCS and LCSD percent recovery values. Precision was acceptable, as demonstrated by the LCS/LSCD RPDs.

All data, as reported by the lab, are acceptable for use.

6.0 Aroclor PCBs by USEPA Method 8082A and PSDDA Modified USEPA Method 8082A

This report documents the review of analytical data from the analyses of sediment and rinsate blank samples and the associated laboratory QC samples. Sediment samples were analyzed by ARI for SDGs WC32 and WC33 by PSDDA Modified USEPA Method 8082A, and the rinsate blank sample from SDG WC32 was analyzed by ARI by USEPA Method 8082A. Compliance Screening (Level I) data quality review was performed on all analytical results by Chell Black as the primary data reviewer, and secondary review was performed by Jessi Massingale.

6.1 DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

6.2 TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

QC Requirements

Cooler temperature and preservation	[1] MS and MSD
Extraction and analysis holding times	Field duplicates
Blank contamination	Reporting limits and reported results
Surrogate recoveries	Target analyte list
LCS and LCSD	

Notes:
1 Quality control results are discussed below, but no data were qualified.

Appendix A presents data validation criteria tables for organic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and had exceptions to the validation criteria are discussed below.

6.2.1 Matrix Spike and Matrix Spike Duplicate

ARI processed sediment samples in SDGs WC32 and WC33 together utilizing Sample SG-08-0-10-013113 as the representative QC sample for both groups for the analysis of Aroclors by PSDDA Modified USEPA Method 8082A. The MS recoveries were outside of laboratory control limits for both Aroclor 1016 (578 percent) and Aroclor 1260 (258 percent), with RPD's of 145 percent for Aroclor 1016 and 101 percent for Aroclor 1260, as the MSD recoveries were within control limits. As the LCS/LCSD recoveries and associated RPD were within laboratory control limits, demonstrating acceptable accuracy and precision for the method, it is with professional judgment that no Aroclor results from this analysis be qualified based on this MS/MSD information.

6.3 OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate and LCS percent recovery values. Precision was acceptable, as demonstrated by the LCS/LSCD RPDs.

All data, as reported by the lab, are acceptable for use.

7.0 VOCs by USEPA Method 8260B

This report documents the review of analytical data from the analyses of groundwater samples and the associated laboratory QC samples. Groundwater samples were analyzed by ALS for SDG EV13020091 USEPA Method 8260B. Compliance Screening (Level I) data quality review was performed on all analytical results by Chell Black as the primary data reviewer, and secondary review was performed by Jessi Massingale.

7.1 DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

7.2 TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

QC Requirements

Cooler temperature and preservation	LCS and LCSD
Extraction and analysis holding times	Field duplicates
Blank contamination	Reporting limits and reported results
Surrogate recoveries	Target analyte list

All QC requirements were met without exception, and did not require further evaluation.

7.3 OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the MS and LCS percent recovery values. Precision was acceptable, as demonstrated by the MS/MSD RPDs and LCS/LSCD RPDs.

All data, as reported by the lab, are acceptable for use.

8.0 SVOCs by USEPA Method 8270, 8270-SIM, 8270D, and 8270D-SIM

This report documents the review of analytical data from the analyses of soil, sediment and groundwater samples and the associated laboratory QC samples. Soil samples were analyzed by ALS for SDGs EV13010138 and EV13020005 by USEPA Methods 8270 and 8270-SIM; sediment samples were analyzed by ARI for SDGs WC32 and WC33 by USEPA Methods 8270D and 8270D-SIM; and groundwater samples were analyzed by ALS for SDGs EV13010138, EV13020005 and EV13020091 by USEPA Methods 8270 and 8270-SIM. Compliance Screening (Level I) data quality review was performed on all analytical results by Chell Black as the primary data reviewer, and secondary review was performed by Jessi Massingale.

8.1 DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

8.2 TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

QC Requirements

	Cooler temperature and preservation	[1]	MS and MSD
	Extraction and analysis holding times		Field duplicates
[2]	Blank contamination	[1]	Reporting limits and reported results
[2]	Surrogate recoveries		Target analyte list
[1]	LCS and LCSD	[2]	Continuing calibrations

Notes:
1 Quality control results are discussed below, but no data were qualified.
2 Quality control outliers that impact the reported data were noted. Data qualifiers were issued, as discussed below.

Appendix A presents data validation criteria tables for organic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and had exceptions to the validation criteria are discussed below.

8.2.1 Blank Contamination

ARI processed sediment samples in SDGs WC32 and WC33 together utilizing the same method blank sample for both groups for the analysis of SVOCs by USEPA Method 8270D. A common phthalate contaminant, bis(2-ethylhexyl)phthalate, was detected in the method blank sample at a concentration of 45 micrograms per kilogram (µg/kg). Per USEPA guidelines, any detected compound that was also detected in the associated blank is qualified if the sample concentration is less than 10 times the blank concentration for common phthalate contaminants. The quantitation limit is then elevated to the concentration found in the sample and qualified "UB" to be reported as non-detect due to blank contamination. Therefore, seven sediment

samples received a UB qualifier and the quantitation limit was elevated to the concentration detected in the individual samples as described above. Refer to the Qualified Data Summary Table in Appendix B for the list of samples where bis(2-ethylhexyl)phthalate was qualified.

ALS processed groundwater samples in SDG EV13020091 for the analysis of SVOCs by USEPA Method 8270SIM. Chrysene was detected in the method blank sample at a concentration of 0.019 µg/L. There were two groundwater samples with detected concentrations of chrysene: MW-10-GW-021413 (0.018 µg/L) and MW-01-GW-021513 (0.049 µg/L). Per USEPA guidelines, if the compound is detected in the sample that was also detected in the blank, it is qualified if the sample concentration is less than 5 times the blank concentration. The quantitation limit is elevated to the result of the sample and flagged UB to be reported as non-detect due to blank contamination. Therefore, the chrysene results for both groundwater samples are qualified as UB as their respective results were both less than 5 times the amount found in the method blank. Refer to the Qualified Data Summary Table in Appendix B for a list of samples where chrysene was qualified.

8.2.2 Surrogate Recoveries

ALS processed SDGs EV13010138, EV13020005, and EV13020091 for the analysis of SVOCs by USEPA Method 8270. Surrogate recoveries were out of control limits for multiple samples. Per USEPA guidelines, no action is taken unless two or more surrogates from the same acid or base neutral fraction are out of control limits. A summary of surrogate recovery considerations and any resulting actions is provided below by sample:

- FS-19-3.0-3.5-012913: One acid surrogate (2,4,6-tribromophenol) was outside control limits high (1030 percent) due to the high dilution factor (X10) of the sample. Therefore, no action was taken.
- FS-19-7.0-7.5-012913: One acid surrogate (2,4,6-tribromophenol) was outside control limits high (800 percent). The laboratory stated that this was due to effects of the matrix, therefore no action was taken.
- FS-19-27.0-27.5-012913: Two acid surrogates (2-flurophenol and phenol-d5) were outside control limits low (33.8 and 13.4 percent, respectively). The laboratory stated it was due to effects of the matrix. All target analytes were non-detect and, per USEPA guidelines, were qualified as UJ. Refer to the Qualified Data Summary Table in Appendix B for a complete list of analytes qualified for this sample.
- FS-20-2.5-3.0-012913: Two acid surrogates (2-flurophenol and phenol-d5) were outside control limits low (43.6 and 23.3 percent, respectively). The lab noted it was due to matrix effect. All target analytes were non-detect and, per USEPA guidelines, were qualified as UJ. See the Qualified Data Summary Table in Appendix B for a complete list of analytes qualified for this sample.
- FS-20-10.5-11.0-012913: One acid surrogate (2,4,6-tribromophenol) was outside control limits high (311 percent) due to the high dilution factor (X25) of the sample. No action taken.
- FS-20-15.5-16.0-012913: Two acid surrogates (2-fluorophenol and phenol-d5) were outside control limits low, (10.5 and 24.2 percent, respectively). The lab noted it was due to matrix effect. All target analytes were non-detect and, per USEPA guidelines, qualified as UJ. See the Qualified Data Summary Table in Appendix B for a complete list of analytes qualified for this sample.

- MW-10-2.0-3.0-012913: Two acid surrogates (2-flurophenol and phenol-d5) and one base/neutral surrogate (nitrobenzene-d5) were outside specifications low, (4.39, 16.7, and 37 percent, respectively). In addition, the fluorophenol had a recovery of less than 10 percent, which the lab noted was due to matrix effect. Per the USEPA Contract Laboratory Program (CLP) guidance, those non-detected semivolatile target compounds (acid fraction) that are represented by the acid surrogates could be qualified as unusable. However, with professional judgment the acid fraction semivolatile compounds (phenol, 2-chlorophenol, benzyl alcohol, 2-methylphenol, 3&4-methylphenol, 2-nitrophenol, 2,4-dimethylphenol, benzoic acid, 2,6-dichlorophenol, 4-chloro-3-methylphenol, 2,4,6-trichlorophenol, 2,4,5-trichlorophenol, 2,4-dinitrophenol, 4-nitrophenol, 2,3,4,6-tetrachlorophenol, and 4,6-dinitro-2-methylphenol) are UJ qualified as estimated, rather than unusable based on the following considerations:
  - The acid surrogate recoveries for the analytical control samples MS/MSDs and LCS were all within acceptable laboratory and CLP control limits.
  - The non-detected semivolatile target compounds (acid fraction) were also non-detect in the analytical control samples MS/MSDs and LCS, and in other sampling event soil samples with adequate acid surrogate recoveries.
  - The non-detected semivolatile target compounds (acid fraction) were also non-detect in the previous project soil sampling events that included sample collection from within the same area and similar matrix to this sampling event and with adequate acid surrogate recoveries.

  See the Qualified Data Summary Table in Appendix B for a complete list of analytes qualified for this sample.
- MW-10-11.0-11.5-012913: Two acid surrogates (2-fluorphenol and phenol-d5) were outside specifications low (40.7 percent and 30.5 percent, respectively). The lab noted it was due to matrix effect. All target analytes were non-detect and, per USEPA guidelines, qualified as UJ. See the Qualified Data Summary Table in Appendix B for a complete list of analytes qualified for this sample.
- FS-21-3.5-4.0-013013: All surrogates were out of control limits high due to the high dilution factor (X500) of the sample. No action taken.
- FS-21-8.0-9.0-013013: Two acid surrogates (2-fluorophenol and phenol-d5) were outside specifications low (13.3 and 31.5 percent, respectively). All target analytes were non-detect and, per USEPA guidelines, qualified as UJ. See the Qualified Data Summary Table in Appendix B for a complete list of analytes qualified for this sample.
- FS-21-13.5-14.0-013013: One acid surrogate (2,4,6-tribromophenol) was outside specifications high (246 percent). The lab noted it was due to matrix effect. No action taken.
- FS-23-3.0-2.3-013013: One acid surrogate (2,4,6-tribromophenol) was outside specifications high (376 percent. The lab noted it was due to matrix effect. No action taken.
- FS-23-7.0-7.5-013013: Two acid surrogates (2-fluorophenol and phenol-d5) were outside specifications low (8.88 and 20.7 percent, respectively). In addition, the 2-fluorophenol had a recovery of less than 10 percent. The lab noted it was due to matrix effect. All target analytes were non-detect; therefore, it is with professional

judgment, based on the same considerations as identified above for Sample MW-10-2.0-3.0-012913, that the non-detect target analytes are being qualified UJ and not rejected. See the Qualified Data Summary Table in Appendix B for a complete list of analytes qualified for this sample.

- FS-22-3.0-3.5-013013: Two acid surrogates (2-fluorophenol and phenol-d5) and one base/neutral surrogate (2-fluorobiphenyl) were outside specifications low (4.38, 10.6, and 44.7 percent, respectively). In addition, the 2-fluorophenol had a recovery of less than 10 percent. The lab noted it was due to matrix effect. All target analytes were non-detect; therefore, it is with professional judgment, based on the same considerations as identified above for Sample MW-10-2.0-3.0-012913, that the non-detect target analytes are being qualified UJ and not rejected. See the Qualified Data Summary Table in Appendix B for a complete list of analytes qualified for this sample.
- FS-22-7.0-8.0-013013: Two acid surrogates (2-fluorophenol and phenol-d5) were outside specifications low (14.6 and 21.5 percent, respectively). The lab noted it was due to matrix effect. All target analytes were non-detect and, per USEPA guidelines, qualified as UJ. See the Qualified Data Summary Table in Appendix B for a complete list of analytes qualified for this sample.
- MW-07-GW-021413: One acid surrogate (2-fluorophenol) was outside specifications high (91.9 percent). No action taken.

8.2.3 Lab Control Samples and Lab Control Sample Duplicates

ARI processed sediment samples in SDGs WC32 and WC33 together utilizing the same LCS for both groups for the analysis of SVOCs by USEPA Method 8270D. The recovery for benzo(g,h,i)perylene from LCS-020813 was 28.8 percent and outside control limits (31 to 139 percent) low. The LCSD recovery and the LCS/LSCD RPD were within control limits. It is with professional judgment that no benzo(g,h,i)perylene results be qualified based on this LCS recovery as all other quality assurance (QA)/QC objectives for this analyte were met.

8.2.4 Matrix Spike and Matrix Spike Duplicates

ALS processed soil samples in SDGs EV13010138 and EV1302005 together utilizing Sample FS-21-8.0-9.0-013013 from EV13010138 as the MS/MSD sample for soil for both groups for the analysis of SVOCs by USEPA Method 8270. The MS/MSD recoveries of multiple analytes were outside laboratory control limits. The RPD for n-nitroso-di-n-proplyamine was also outside control limits. As noted by the laboratory this was attributed to the matrix effect of the soil. The LCS/LSCD recoveries and associated RPDs were within laboratory control limits for this method. Per USEPA guidelines, no action is taken on MS/MSD data alone, therefore it is with professional judgment that no results be qualified based on this MS/MSD recovery information.

ARI processed sediment samples in SDGs WC32 and WC33 together utilizing the MS/MSD sample for both groups for the analysis of SVOCs by USEPA Method 8270D. Several MS/MSD recoveries were outside control limits with wide RPDs, or not recovered due to high concentrations of the analytes in the original sample. Per USEPA guidelines, data are not qualified based on MS/MSD information alone; therefore, it is with professional judgment that no results be qualified based on this MS/MSD recovery information

8.2.5 Reporting Limits and Reported Results

ARI processed sediment samples in SDGs WC32 and WC33 together for the analysis of SVOCs by USEPA Method 8270D. Multiple analytes for multiple samples were reported as estimated detections ("J" flagged) at levels less than the reporting limit. Within this range the signal:noise ration is low and it is difficult to accurately measure the signal. The limit of quantiation (LOQ) is considered the lowest concentration that can be accurately measured as opposed to just detected and is often used as the reporting limit. However, per SMS criteria they are to be reported as "J" flagged detections between the method detection limit (MDL) and LOQ. Therefore, the results are presented as reported by the laboratory and not raised to the reporting limit and reported as non-detects.

8.2.6 Continuing Calibrations

ARI processed sediment samples in SDGs WC32 and WC33 together for the analysis of SVOCs by USEPA Method 8270D-SIM. The laboratory noted that the continuing calibration conducted on February 15 and 16, 2013 fell outside the laboratory control limits (±20 percent) low for pentachlorophenol (-64.3 and -72.3 percent, respectively) and outside control limits high for dibenzo(a,h)anthracene (20.5 and 24.9 percent, respectively) and butylbenzylphthalate (26.8 and 31.9 percent, respectively).

The only detected results for pentachlorophenol associated with these calibrations were for the MS sample; therefore, no field sample results for pentachlorophenol were qualified based on this continuing calibration information.

The continuing calibration of dibenzo(a,h)anthracene and associated percent drift (%D) from initial calibration was 20.5 and 24.9 percent, and outside of the laboratory-specific 20 percent QC limit, but within the USEPA CLP method 25 percent QC limit. All other initial and ongoing calibrations were within laboratory and guidance QC limits. Therefore, it is with professional judgment that no dibenzo(a,h)anthracene results be qualified based on this continuing calibration information.

The continuing calibration of butylbenzylphthalate and associated %D from initial calibration was 26.8 and 31.9 percent, and outside of both the laboratory-specific 20 percent QC limit and the USEPA CLP method 25 percent QC limit. Butlybenzylphthalate was detected in two samples that were associated with the continuing calibrations drift (SG-06-0-10-013113 and SG-06-0-10-013113), and, per USEPA guidelines, they have been qualified J as estimated. Refer to the Qualified Data Summary Table in Appendix B for full details.

8.3 OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Overall accuracy was acceptable, as demonstrated by the MS/MSD, LCS/LCSD percent recovery values, except as discussed above. Precision was acceptable, as demonstrated by the LCS/LSCD RPDs.

All data are acceptable for use as qualified. Refer to Appendix B for details.

9.0 TPH by NWTPH-Dx/Gx

This report documents the review of analytical data from the analyses of soil and groundwater samples and the associated laboratory QC samples. Soil samples were analyzed by ALS for SDGs EV13010138 and EV13020005 by NWTPH-Dx and NWTPH-Gx; and groundwater samples were analyzed by ALS for SDGs EV13010138, EV13020005, and EV13020091 using NWTPH-Dx and NWTPH-Gx. Compliance Screening (Level I) data quality review was performed on all analytical results by Chell Black as the primary data reviewer, and secondary review was performed by Jessi Massingale.

9.1 DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and any anomalies were discussed in the case narrative.

9.2 TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

QC Requirements

Cooler temperature and preservation		Field duplicates
Extraction and analysis holding times		Reporting limits and reported results
Blank contamination		Target analyte list
Surrogate recoveries	[1]	Chromatographic match to TPH standards

Notes:
1 Quality control outliers that impact the reported data were noted. Data qualifiers were issued, as discussed below.

Appendix A presents data validation criteria tables for diesel-range hydrocarbon analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and had exceptions to the validation criteria are discussed below.

9.2.1 Chromatographic Match to TPH Standards

As part of the validation of TPH data, the detectable hydrocarbons and/or organics within the diesel-, gasoline-, or residual hydrocarbon chromatogram-ranges are reviewed relative to the appropriate laboratory standard. If the hydrocarbons are not identifiable based on a poor chromatographic match with the standards, the data will be qualified “MP” to reflect a poor match, and the interpretive qualifier to be used for database entry and project reporting is a “J” to indicate estimated concentrations. Similarly, if the hydrocarbons provide a good chromatographic match with the standards, the data will be qualified “MG” to reflect a good match, and no interpretive qualifier will be used for database entry or project reporting. The poor or good standard match will also be noted in the data validation report or data quality section of the project report.

Chromatograms were compared to the ALS Blank Spike standards for diesel or gasoline, as appropriate, that were provided with the data package. The oil-range results were compared to ALS's Motor Oil library standards. As noted by the laboratory, the chromatograms did not match the standards for any detected TPH-range results. Most often they were noted by the laboratory as being weathered gasoline, weathered diesel, unidentified diesel-range product, or lube oil. Refer to the Qualified Data Summary Table in Appendix B for complete details.

9.3 OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the MS and standard reference material percent recovery values. Precision was acceptable, as demonstrated by the MS/MSD RPDs, and LCS/LSCD RPDs.

All data are acceptable for use as qualified, refer to Appendix B for details.

Port of Bellingham
Harris Avenue Shipyard

Data Validation Report

Table

ECOLOGY REVIEW DRAFT

Table 1
Project Sample Index

						Metals					BTEX	Pesticides	Aroclor PCBs		VOCs	SVOCs		PAHs	TPH		EPH/VPH	Dioxin/ Furans	Grain Size	Density	Moisture	Porosity	Specific Gravity	Total Organic Carbon	Total Solids	
Sample Delivery Group	Media	Field Sample ID	Internal Lab Sample ID	Sample Date	Laboratory	USEPA 200.8	USEPA 6010C	USEPA 6020	USEPA 7471	USEPA 7471A	USEPA 8021	PSDDA 8081B	USEPA 8082A	PSDDA 8082A	USEPA 8260B	USEPA 8270	USEPA 8270D	USEPA 8270D-SIM	NWTPH-Dx	NWTPH-Gx	MTCA EPH/VPH	USEPA 1613B	PSEP	ASTM D7263	ASTM D2216	USEPA 9100	ASTM D854	USEPA 9060M	ASTM D2974	SM 2540B
EV13010138	Soil	FS-19-3.0-3.5-012913	EV13010138-01	01/29/2013	ALS			X	X							X		X												
EV13010138	Soil	FS-19-7.0-7.5-012913	EV13010138-02	01/29/2013	ALS			X	X		X					X		X	X	X	X									
EV13010138	Soil	FS-19-11.5-12.0-012913	EV13010138-03	01/29/2013	ALS			X	X		X					X		X	X	X										
EV13010138	Soil	FS-19-27.0-27.5-012913	EV13010138-04	01/29/2013	ALS			X	X		X					X		X	X	X	X									
EV13010138	Soil	FS-20-2.5-3.0-012913	EV13010138-05	01/29/2013	ALS			X	X							X		X												
EV13010138	Soil	FS-20-10.5-11.0-012913	EV13010138-06	01/29/2013	ALS			X	X		X					X		X	X	X	X									
EV13010138	Groundwater	FS-19-GW-012913	EV13010138-07	01/29/2013	ALS						X					X		X	X	X										
EV13010138	Soil	FS-20-15.5-16.0-012913	EV13010138-08	01/29/2013	ALS			X	X		X					X		X	X	X										
EV13010138	Soil	MW-10-2.0-3.0-012913	EV13010138-09	01/29/2013	ALS			X	X							X		X												
EV13010138	Soil	MW-10-11.0-11.5-012913	EV13010138-10	01/29/2013	ALS			X	X		X					X		X	X	X										
EV13010138	Soil	MW-10-15.0-15.5-012913	EV13010138-11	1/29/2013	ALS	ARCHIVED																								
EV13010138	Soil	FS-21-3.5-4.0-013013	EV13010138-12	01/29/2013	ALS			X	X							X		X												
EV13010138	Soil	FS-21-8.0-9.0-013013	EV13010138-13	01/30/2013	ALS			X	X		X					X		X	X	X	X									
EV13010138	Soil	FS-21-13.5-14.0-013013	EV13010138-14	01/30/2013	ALS			X	X		X					X		X	X	X										
EV13010138	Groundwater	FS-21-GW-013013	EV13010138-15	01/30/2013	ALS						X					X		X	X	X										
EV13010138	Groundwater	FS-79-GW-013013	EV13010138-16	01/30/2013	ALS						X					X		X	X	X										
EV13010138	Soil	FS-21-22.0-22.5-013013	EV13010138-17	01/30/2013	ALS			X	X		X					X		X	X	X										
EV13010138	Trip Blank	FS-19-TB-012913	EV13010138-18	01/29/2013	ALS						X									X										
EV13010138	Trip Blank	FS-21-TB-013013	EV13010138-19	01/30/2013	ALS						X									X										
EV13020005	Soil	FS-23-3.0-3.5-013013	EV13020005-01	01/30/2013	ALS			X	X							X		X												
EV13020005	Soil	FS-23-7.0-7.5-013013	EV13020005-02	01/30/2013	ALS			X	X		X					X		X	X	X										
EV13020005	Soil	FS-23-13.0-13.5-013013	EV13020005-03	1/30/2103	ALS	ARCHIVED																								
EV13020005	Groundwater	FS-22-GW-013013	EV13020005-04	01/30/2013	ALS						X					X		X	X	X										
EV13020005	Soil	FS-22-3.0-3.5-013013	EV13020005-05	01/30/2013	ALS			X	X							X		X												
EV13020005	Soil	FS-22-7.0-8.0-013013	EV13020005-06	01/30/2013	ALS			X	X		X					X		X	X	X										
EV13020005	Soil	FS-78-7.0-8.0-013013	EV13020005-07	01/30/2013	ALS			X	X		X					X		X	X	X										
EV13020005	Soil	FS-22-15.0-15.5-013013	EV13020005-08	1/30/2013	ALS	ARCHIVED																								
EV13020005	Trip Blank	FS-23-TB-013013	EV13020005-09	01/30/2013	ALS						X									X										
EV13020091	Groundwater	MW-10-GW-021413	EV13020091-01	02/14/2013	ALS						X				X	X		X	X	X										
EV13020091	Groundwater	MW-06-GW-021413	EV13020091-02	02/14/2013	ALS						X				X	X		X	X	X	X									
EV13020091	Groundwater	MW-94-GW-021413	EV13020091-03	02/14/2013	ALS						X				X	X		X	X	X	X									
EV13020091	Groundwater	MW-04-GW-021413	EV13020091-04	02/14/2013	ALS						X				X	X		X	X	X										
EV13020091	Groundwater	MW-05-GW-021413	EV13020091-05	02/15/2013	ALS						X				X	X		X	X	X										
EV13020091	Groundwater	MW-07-GW-021413	EV13020091-06	02/14/2013	ALS						X				X	X		X	X	X										
EV13020091	Groundwater	MW-08-GW-021413	EV13020091-07	02/14/2013	ALS						X				X	X		X	X	X										
EV13020091	Trip Blank	MW-06-TB-021413	EV13020091-08	02/14/2013	ALS										X															
EV13020091	Groundwater	MW-06-GW-021513	EV13020091-09	2/15/2013	ALS	ARCHIVED																								
EV13020091	Groundwater	MW-01-GW-021513	EV13020091-10	02/15/2013	ALS						X				X	X		X	X	X	X									
EV13020091	Groundwater	MW-02A-GW-021513	EV13020091-11	02/15/2013	ALS						X				X	X		X	X	X										
EV13020091	Groundwater	MW-09-GW-021513	EV13020091-12	02/15/2013	ALS						X				X	X		X	X	X	X									
F130201A	Groundwater	FS-19-GW-012913	--	01/29/2013	Applied Speciation	X																								
F130201A	Groundwater	FS-19-GWF-012913	--	01/29/2013	Applied Speciation	X																								
F130201A	Groundwater	FS-21-GW-013013	--	01/30/2013	Applied Speciation	X																								
F130201A	Groundwater	FS-21-GWF-013013	--	01/30/2013	Applied Speciation	X																								
F130201A	Groundwater	FS-22-GW-013013	--	01/30/2013	Applied Speciation	X																								
F130201A	Groundwater	FS-22-GWF-013013	--	01/30/2013	Applied Speciation	X																								
F130201A	Groundwater	FS-79-GW-013013	--	01/30/2013	Applied Speciation	X																								
F130201A	Groundwater	FS-79-GWF-013013	--	01/30/2013	Applied Speciation	X																								
F130216A	Groundwater	MW-01-GW-021513	--	02/15/2013	Applied Speciation	X																								
F130216A	Groundwater	MW-01-GWF-021513	--	02/15/2013	Applied Speciation	X																								
F130216A	Groundwater	MW-02A-GW-021513	--	02/15/2013	Applied Speciation	X																								
F130216A	Groundwater	MW-02A-GWF-021513	--	02/15/2013	Applied Speciation	X																								
F130216A	Groundwater	MW-04-GW-021413	--	02/14/2013	Applied Speciation	X																								
F130216A	Groundwater	MW-04-GWF-021413	--	02/14/2013	Applied Speciation	X																								
F130216A	Groundwater	MW-05-GW-021413	--	02/15/2013	Applied Speciation	X																								
F130216A	Groundwater	MW-05-GWF-021413	--	02/14/2013	Applied Speciation	X																								
F130216A	Groundwater	MW-06-GW-021413	--	02/14/2013	Applied Speciation	X																								
F130216A	Groundwater	MW-06-GW-021513	--	02/15/2013	Applied Speciation	X																								
F130216A	Groundwater	MW-06-GWF-021413	--	02/14/2013	Applied Speciation	X																								
F130216A	Groundwater	MW-06-GWF-021513	--	02/15/2013	Applied Speciation	X																								
F130216A	Groundwater	MW-07-GW-021413	--	02/14/2013	Applied Speciation	X																								
F130216A	Groundwater	MW-07-GWF-021413	--	02/14/2013	Applied Speciation	X																								
F130216A	Groundwater	MW-08-GW-021413	--	02/14/2013	Applied Speciation	X																								
F130216A	Groundwater	MW-08-GWF-021413	--	02/14/2013	Applied Speciation	X																								
F130216A	Groundwater	MW-09-GW-021513	--	02/15/2013	Applied Speciation	X																								
F130216A	Groundwater	MW-09-GWF-021513	--	02/15/2013	Applied Speciation	X																								
F130216A	Groundwater	MW-10-GW-021413	--	02/14/2013	Applied Speciation	X																								
F130216A	Groundwater	MW-10-GWF-021413	--	02/14/2013	Applied Speciation	X																								

Table 1
Project Sample Index

						Metals					BTEX	Pesticides	Aroclor PCBs		VOCs	SVOCs		PAHs	TPH		EPH/VPH	Dioxin/ Furans	Grain Size	Density	Moisture	Porosity	Specific Gravity	Total Organic Carbon	Total Solids	
Sample Delivery Group	Media	Field Sample ID	Internal Lab Sample ID	Sample Date	Laboratory	USEPA 200.8	USEPA 6010C	USEPA 6020	USEPA 7471	USEPA 7471A	USEPA 8021	PSDDA 8081B	USEPA 8082A	PSDDA 8082A	USEPA 8260B	USEPA 8270	USEPA 8270D	USEPA 8270D-SIM	NWTPH-Dx	NWTPH-Gx	MTCA EPH/VPH	USEPA 1613B	PSEP	ASTM D7263	ASTM D2216	USEPA 9100	ASTM D854	USEPA 9060M	ASTM D2974	SM 2540B
F130216A	Groundwater	MW-94-GW-021413	--	02/14/2013	Applied Speciation	X																								
F130216A	Groundwater	MW-94-GWF-021413	--	02/14/2013	Applied Speciation	X																								
WC32	Sediment	SG-12-0-10-013113	13-2424-WC32A	01/31/2013	ARI							X					X	X				X	X					X		X
WC32	Sediment	SG-13-0-10-013113	13-2425-WC32B	01/31/2013	ARI							X					X	X				X	X					X		X
WC32	Sediment	SG-07-0-10-013113	13-2426-WC32C	01/31/2013	ARI							X					X	X				X	X					X		X
WC32	Sediment	SG-06-0-10-013113	13-2427-WC32D	01/31/2013	ARI							X					X	X				X	X					X		X
WC32	Sediment	SG-05-0-10-013113	13-2428-WC32E	01/31/2013	ARI		X			X		X		X			X	X					X					X		X
WC32	Sediment	SG-95-0-10-013113	13-2429-WC32F	01/31/2013	ARI		X			X		X		X			X	X					X					X		X
WC32	Sediment	SG-08-0-10-013113	13-2430-WC32G	01/31/2013	ARI		X					X		X			X	X					X					X		X
WC32	Sediment	SG-09-0-10-013113	13-2431-WC32H	01/31/2013	ARI		X			X		X		X			X	X					X					X		X
WC32	Rinse Blank	SG-05-ER-013113	13-2432-WC32I	01/31/2013	ARI								X				X													
WC32	Sediment	SG-12-10-20-013113	13-2433-WC32J	01/31/2013	ARI	ARCHIVED																								
WC32	Sediment	SG-13-10-20-013113	13-2434-WC32K	01/31/2013	ARI	ARCHIVED																								
WC32	Sediment	SG-07-10-20-013113	13-2435-WC32L	01/31/2013	ARI	ARCHIVED																								
WC32	Sediment	SG-06-10-20-013113	13-2436-WC32M	01/31/2013	ARI	ARCHIVED																								
WC32	Sediment	SG-94-0-10-013113	13-2437-WC32N	01/31/2013	ARI																	X								
WC32	Sediment	SG-05-10-20-013113	13-2438-WC32O	01/31/2013	ARI	ARCHIVED																								
WC32	Sediment	SG-08-10-20-013113	13-2489-WC32P	01/31/2013	ARI	ARCHIVED																								
WC32	Sediment	SG-09-10-20-013113	13-2440-WC32Q	01/31/2013	ARI	ARCHIVED																								
WC32	Sediment	SG-10-0-10-013113	13-2441-WC32R	01/31/2013	ARI	ARCHIVED																								
WC32	Sediment	SG-10-10-20-013113	13-2442-WC32S	01/31/2013	ARI	ARCHIVED																								
WC32	Sediment	SG-11-0-10-013113	13-2443-WC32T	01/31/2013	ARI	ARCHIVED																								
WC32	Sediment	SG-11-10-20-013113	13-2444-WC32U	01/31/2013	ARI	ARCHIVED																								
WC33	Soil	FS-19-6.0-6.5-012913	13-2445-WC33A	01/29/2013	ARI																								X	
WC33	Soil	FS-19-8.0-8.5-012913	13-2446-WC33B	01/29/2013	ARI																			X	X	X	X			
WC33	Soil	FS-19-19.0-19.5-012913	13-2447-WC33C	01/29/2013	ARI																								X	
WC33	Soil	FS-19-19.5-20.0-012913	13-2448-WC33D	01/29/2013	ARI																			X	X	X	X			
WC33	Soil	SFS-02-0-0.5-012913	13-2449-WC33E	01/29/2013	ARI																	X								
WC33	Soil	FS-21-0-0.5-013013	13-2450-WC33F	01/30/2013	ARI																	X								
WC33	Sediment	HA-09-0-10-013013	13-2451-WC33G	01/30/2013	ARI		X			X		X		X			X	X					X					X		X
WC33	Sediment	HA-10-0-10-013013	13-2452-WC33H	01/30/2013	ARI		X			X													X							X
WC33	Sediment	HA-11-0-10-013013	13-2453-WC33I	01/30/2013	ARI		X			X													X							X
WC33	Soil	FS-22-11.5-12.0-013013	13-2454-WC33J	01/30/2013	ARI																								X	
WC33	Soil	FS-22-12.0-12.5-013013	13-2455-WC33K	01/30/2013	ARI																			X	X	X	X			
WC33	Soil	FS-78-11.5-12.0-013013	13-2456-WC33L	01/30/2013	ARI																								X	
WC33	Soil	SFS-01-012913	13-2457-WC33M	01/29/2013	ARI	ARCHIVED																								
WC33	Soil	SFS-99-012913	13-2458-WC33N	01/29/2013	ARI	ARCHIVED																								
WC33	Sediment	HA-09-10-20-013013	13-2459-WC33O	01/30/2013	ARI	ARCHIVED																								
WE03	Soil	SFS-01-0-0.5-021413	13-3229-WE03A	02/14/2013	ARI																	X								
WE03	Soil	SFS-99-0-0.5-021413	13-3230-WE03B	02/14/2013	ARI																	X								
WF78	Sediment	SG-08-0-10-013113	13-4034-WF78A	01/31/2013	ARI					X																				
WH44	Sediment	SG-08-0-10-013113	13-5280-WH44A	01/31/2013	ARI					X																				
WH44	Sediment	SG-09-0-10-013113	13-5281-WH44B	01/31/2013	ARI					X																				
WH44	Sediment	SG-09-0-10-013113	13-5282-WH44C	01/31/2013	ARI					X																				
WH44	Sediment	SG-08-10-20-013113	13-5283-WH44D	01/31/2013	ARI					X																				
WH44	Sediment	SG-08-10-20-013113	13-5284-WH44E	01/31/2013	ARI					X																				
WH44	Sediment	SG-08-10-20-013113	13-5285-WH44F	01/31/2013	ARI					X																				
WH44	Sediment	SG-10-0-10-013113	13-5286-WH44G	01/31/2013	ARI					X																				
WH44	Sediment	SG-10-0-10-013113	13-5287-WH44H	01/31/2013	ARI					X																				
WH44	Sediment	SG-10-0-10-013113	13-5288-WH44I	01/31/2013	ARI					X																				
WH44	Sediment	SG-11-0-10-013113	13-5289-WH44J	01/31/2013	ARI					X																				
WH44	Sediment	SG-11-0-10-013113	13-5290-WH44K	01/31/2013	ARI					X																				
WH44	Sediment	SG-11-0-10-013113	13-5291-WH44L	01/31/2013	ARI					X																				

Abbreviations:

ALS ALS Environmental.
ARI Analytical Resources Inc.
BTEX Benzene, toluene, ethylbenzene, and xylene.
EPH Extractable petroleum hydrocarbon.
PCB Polychlorinated biphenyl.
PSDDA Puget Sound Dredged Disposal Analysis.
PSEP Puget Sound Estuary Program.
SVOC Semivolatile organic compound.
TPH Total petroleum hydrocarbon.
USEPA U.S. Environmental Protection Agency.
VOC Volatile organic compound.
VPH Volatile petroleum hydrocarbon.

Port of Bellingham
Harris Avenue Shipyard

Data Validation Report

Appendix A
Qualifier Codes and
Data Validation Guidelines

ECOLOGY REVIEW DRAFT

DATA VALIDATION QUALIFIER CODES
National Functional Guidelines

The following definitions provide brief explanations of the qualifiers assigned to results in the data review process.

U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a “tentative identification”.
NJ	The analysis indicates the presence of an analyte that has been “tentatively identified” and the associated numerical value represents the approximate concentration.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

The following is a Floyd|Snider qualifier that may also be assigned during the data review process:

DNR	Do not report; a more appropriate result is reported from another analysis or dilution.

Floyd|Snider Validation Guidelines for Metals Analysis by ICP-MS (Based on Inorganic NFG 1994 & 2004)

Validation QC Element	Acceptance Criteria	Action
Cooler Temperature and Preservation	Cooler temperature: 4°C ±2° Waters: Nitric Acid to pH < 2 For Dissolved Metals: 0.45um filter & preserve after filtration	Floyd|Snider Professional Judgment—no qualification based on cooler temperature outliers J/UJ if pH preservation requirements are not met
Holding Time	180 days from date sampled Frozen tissues—HT extended to 2 years	J/UJ if holding time exceeded
Tune	Prior to ICAL monitoring compounds analyzed 5 times wih Std Dev. < 5% mass calibration <0.1 amu from True Value Resolution < 0.9 AMU @ 10% peak height or <0.75 amu @ 5% peak height	Use Professional Judgment to evaluate tune J/UJ if tune criteria not met
Initial Calibration	Blank + minimum 1 standard If more than 1 standard, r>0.995	J/UJ if r<0.995 (for multi point cal)
Initial Calibration Verification (ICV)	Independent source analyzed immediately after calibration %R within ±10% of true value	J/UJ if %R 75–89% J if %R = 111-125% R if %R > 125% R if %R < 75%
Continuing Calibration Verification (CCV)	Every ten samples, immediately following ICV/ICB and at end of run ±10% of true value	J/UJ if %R = 75–89% J if %R 111-125% R if %R > 125% R if %R < 75%

Initial and Continuing Calibration Blanks (ICB/CCB)	After each ICV and CCV
	every ten samples and end of run
	| blank | < IDL (MDL)
		Action level is 5x absolute value of blank conc.
		For (+)blanks, U results < action level
		For (-) blanks, J/UJ results < action level

Validation QC Element	Acceptance Criteria	Action
Reporting Limit Standard (CRI)	2x RL analyzed beginning of run Not required for Al, Ba, Ca, Fe, Mg, Na, K %R = 70%-130% (50%-150% Co,Mn, Zn)	R, < 2x RL if %R < 50% (< 30% Co,Mn, Zn) J < 2x RL, UJ if %R 50-69% (30%-49% Co,Mn, Zn) J < 2x RL if %R 130%-180% (150%-200% Co,Mn, Zn) R < 2x RL if %R > 180% (200% Co, Mn, Zn)
Interference Check Samples (ICSA/ICSAB)	Required by SW 6020, but not 200.8 ICSAB %R 80% - 120% for all spiked elements | ICSA | < IDL (MDL) for all unspiked elements	For samples with Al, Ca, Fe, or Mg > ICS levels R if %R < 50% J if %R >120% J/UJ if %R = 50% to 79% Use Professional Judgment for ICSA to determine if bias is present
Method Blank	One per matrix per batch (batch not to exceed 20 samples) blank < MDL	Action level is 5x blank concentration U results < action level
Laboratory Control Sample (LCS)	One per matrix per batch Blank Spike: %R within 80%-120%	R if %R < 50% J/UJ if %R = 50-79% J if %R >120%
	CRM: Result within manufacturer's certified acceptance range or project guidelines	J/UJ if < LCL, J if > UCL
Matrix Spike/ Matrix Spike Duplicate (MS/MSD)	One per matrix per batch 75-125% for samples where results do not exceed 4x spike level	J if %R>125% J/UJ if %R <75% J/R if %R<30% or J/UJ if Post Spike %R 75%-125% Qualify all samples in batch
Post-digestion Spike	If Matrix Spike is outside 75-125%, Spike parent sample at 2x the sample conc.	No qualifiers assigned based on this element
Laboratory Duplicate (or MS/MSD)	One per matrix per batch RPD < 20% for samples > 5x RL Diff < RL for samples > RL and < 5 x RL (Diff < 2x RL for solids)	J/UJ if RPD > 20% or diff > RL All samples in batch
Serial Dilution	5x dilution one per matrix %D < 10% for original sample values > 50x MDL	J/UJ if %D >10% All samples in batch

Validation QC Element	Acceptance Criteria	Action
Internal Standards	Every sample SW6020: 60%-125% of cal blank IS 200.8: 30%-120% of cal blank IS	J /UJ all analytes associated with IS outlier
Field Blank	Blank < MDL	Action level is 5x blank conc. U sample values < AL in associated field samples only
Field Duplicate	For results > 5x RL: Water: RPD < 35% Solid: RPD < 50% For results < 5 x RL: Water: Diff < RL Solid: Diff < 2x RL	J/UJ in parent samples only
Linear Range	Sample concentrations must fall within range	J values over range

Floyd|Snider Validation Guidelines for Semivolatile Analysis by GC/MS (Based on Organic NFG 1999)

Validation QC Element	Acceptance Criteria	Action
Cooler Temperature	4°C ± 2°	J/UJ if greater than 6 deg. C (Floyd|Snider PJ)
Holding Time	Water: 7 days from collection Soil: 14 days from collection Analysis: 40 days from extraction	Water: J/UJ if ext. > 7 and < 21 days J/R if ext > 21 days (Floyd|Snider PJ) Solids/Wastes: J/UJ if ext. > 14 and < 42 days J/R if ext. > 42 days (Floyd|Snider PJ) J/UJ if analysis >40 days
Tuning	DFTPP Beginning of each 12 hour period Method acceptance criteria	R all analytes in all samples associated with the tune
Initial Calibration (Minimum 5 stds.)	RRF > 0.05	(Floyd|Snider PJ) If MDL= reporting limit: J/R if RRF < 0.05 If reporting limit > MDL: note in worksheet if RRF <0.05
	%RSD < 30%	(Floyd|Snider PJ) J if %RSD > 30%
Continuing Calibration (Prior to each 12 hr. shift)	RRF > 0.05	(Floyd|Snider PJ) If MDL= reporting limit: J/R if RRF < 0.05 If reporting limit > MDL: note in worksheet if RRF < 0.05
	%D <25%	(Floyd|Snider PJ) If > +/-90%: J/RIf -90% to -26%: J (high bias) If 26% to 90%: J/UJ (low bias)
Method Blank	One per matrix per batch No results > CRQL	U if sample result is less than CRQL and less than appropriate 5X or 10X rule (raise sample value to CRQL)
		U if sample result is greater than or equal to CRQL and less than appropriate 5X and 10X rule (at reported sample value)

Validation QC Element	**Acceptance Criteria**	**Action**
Method Blank (continued)	No TICs present	RTICs using 10X rule
Field Blanks (Not Required)	No results > CRQL	Apply 5X/10X rule; U < action level
MS/MSD (recovery)	One per matrix per batch Use method acceptance criteria	Qualify parent only unless other QC indicates systematic problems: J if both %R > UCL J/UJ if both %R < LCL J/R if both %R < 10% Floyd|Snider PJ if only one %R outlier
MS/MSD (RPD)	One per matrix per batch Use method acceptance criteria	J in parent sample if RPD > CL
LCS CLP **low conc. H2O only**	One per lab batch Within method control limits	J assoc. cmpd if > UCL J/R assoc. cmpd if < LCL J/R all cmpds if half are < LCL
LCS **regular SVOA (H2O & solid)**	One per lab batch Lab or method control limits	J if %R > UCL J/UJ if %R <LCL J /R if %R < 10% (Floyd|Snider PJ)
LCS/LCSD *(if required)*	One set per matrix and batch of 20 samples RPD < 35%	J/UJ associated compounds in all samples
Surrogates	Minimum of 3 acid and 3 base/neutral compounds Use method acceptance criteria	Do not qualify if only 1 acid and/or 1 B/N surrogate is out unless <10% J if %R > UCL J/UJ if %R < LCL J/R if %R < 10%
Internal Standards	Added to all samples Acceptable Range: IS area 50% to 200% of CCAL area RT within 30 seconds of CC RT	J if > 200% J/UJ if < 50% J/R if < 25% RT>30 seconds, narrate and Notify PM
Field Duplicates	Use QAPP limits. If no QAPP: Solids: RPD <50% OR absolute diff. < 2X RL (for results < 5X RL) Aqueous: RPD <35% OR absolute diff. < 1X RL (for results < 5X RL)	Narrate and qualify if required by project (Floyd|Snider PJ)

Validation QC Element	Acceptance Criteria	Action
TICs	Major ions (>10%) in reference must be present in sample; intensities agree within 20%; check identification	NJ the TIC unless: R common laboratory contaminants See Technical Director for ID issues
Quantitation/ Identification	RRT within 0.06 of standard RRT Ion relative intensity within 20% of standard All ions in std. at > 10% intensity must be present in sample	See Technical Director if outliers

Abbreviation:
PJ Professional judgment

Floyd|Snider Validation Guidelines for Volatile Analysis by GC/MS (Based on Organic NFG 1999)

Validation QC Element	Acceptance Criteria	Action
Cooler Temperature	4°C±2°C Water: HCl to pH < 2	J/UJ if greater than 6 deg. C (Floyd|Snider PJ)
Hold Time	Waters: 14 days preserved 7 Days: unpreserved (for aromatics) Solids: 14 Days	J/UJ if hold times exceeded If exceeded by > 3X HT: J/R (Floyd|Snider PJ)
Tuning	BFB Beginning of each 12 hour period Method acceptance criteria	R all analytes in all samples associated with the tune
Initial Calibration (Minimum 5 stds.)	RRF > 0.05	(Floyd|Snider PJ) If MDL= reporting limit: J/R if RRF < 0.05 If reporting limit > MDL: note in worksheet if RRF <0.05
	%RSD < 30%	(Floyd|Snider PJ) J if %RSD > 30%
Continuing Calibration (Prior to each 12 hr. shift)	RRF > 0.05	(Floyd|Snider PJ) If MDL= reporting limit: J/R if RRF < 0.05 If reporting limit > MDL: note in worksheet if RRF <0.05
	%D <25%	(Floyd|Snider PJ) If > +/-90%: J/RIf -90% to -26%: J (high bias) If 26% to 90%: J/UJ (low bias)
Method Blank	One per matrix per batch No results > CRQL	U if sample result is less than CRQL and less than appropriate 5X or 10X rule (raise sample value to CRQL)
		U if sample result is greater than or equal to CRQL and less than appropriate 5X and 10X rule (at reported sample value)
	No TICs present	R TICs using 10X rule
Storage Blank	One per SDG <CRQL	U the specific analyte(s) results in all assoc. samples using the 5x or 10x rule

Validation QC Element	**Acceptance Criteria**	**Action**
Trip Blank	Frequency as per project QAPP	Same as method blank for positive results remaining in trip blank after method blank qualifiers are assigned
Field Blanks (if required in QAPP)	No results > CRQL	Apply 5X/10X rule; U < action level
MS/MSD (recovery)	One per matrix per batch Use method acceptance criteria	Qualify parent only unless other QC indicates systematic problems: J if both %R > UCL J/UJ if both %R < LCL J/R if both %R < 10% PJ if only one %R outlier
MS/MSD (RPD)	One per matrix per batch Use method acceptance criteria	J in parent sample if RPD > CL
LCS *low conc. H2O VOA*	One per lab batch Within method control limits	J assoc. cmpd if > UCL J/R assoc. cmpd if < LCL J/R all cmpds if half are < LCL
LCS *regular VOA (H2O & solid)*	One per lab batch Lab or method control limits	J if %R > UCL J/UJ if %R <LCL J/R if %R < 10% (Floyd|Snider PJ)
LCS/LCSD *(if required)*	One set per matrix and batch of 20 samples RPD < 35%	J/UJ assoc. cmpd. in all samples
Surrogates	Added to all samples Within method control limits	J if %R >UCL J/UJ if %R <LCL but >10% J/R if <10%
Internal Standard (IS)	Added to all samples Acceptable Range: IS area 50% to 200% of CCAL area RT within 30 seconds of CC RT	J if > 200% J/UJ if < 50% J/R if < 25% RT>30 seconds, narrate and Notify PM
Field Duplicates	Use QAPP limits. If no QAPP: Solids: RPD <50% OR absolute diff. < 2X RL (for results < 5X RL) Aqueous: RPD <35% OR absolute diff. < 1X RL (for results < 5X RL)	Narrate and qualify if required by project (Floyd|Snider PJ)
TICs	Major ions (>10%) in reference must be present in sample; intensities agree within 20%; check identification	NJ the TIC unless: R common laboratory contaminants See Technical Director for ID issues

Validation QC Element	Acceptance Criteria	Action
Quantitation/ Identification	RRT within 0.06 of standard RRT Ion relative intensity within 20% of standard All ions in std. at > 10% intensity must be present in sample	See Technical Director if outliers

Notes:

PJ[1] No action if there are 4+ surrogates and only 1 outlier

Floyd|Snider Validation Guidelines for Total Petroleum Hydrocarbons-Diesel & Residual Range and Gasoline Range (Based on USEPA National Functional Guidelines as applied to criteria in NWTPH-Dx and NWTPH-Gx, June 1997, Ecology & Oregon DEQ)

Validation QC Element	Acceptance Criteria	Action
Cooler Temperature & Preservation	4°C± 2°C Water: HCl to pH < 2	J/UJ if greater than 6 deg. C
Holding Time	Ext. Waters: 14 days preserved 7 days unpreserved Ext. Solids: 14 Days Analysis: 40 days from extraction	J/UJ if hold times exceeded J/R if exceeded > 3X (Floyd|Snider PJ)
Initial Calibration	5 calibration points (All within 15% of true value) Linear Regression: R2 >0.990 If used, RSD of response factors <20%	Narrate if fewer than 5 calibration levels or if %R >15% J/UJ if R2 <0.990 J/UJ if %RSD > 20%
Mid-range Calibration Check Std.	Analyzed before and after each analysis shift & every 20 samples. Recovery range 85% to 115%	Narrate if frequency not met. J/UJ if %R < 85% J if %R >115%
Method Blank	At least one per batch (<10 samples) Method Blank No results >RL	U (at the RL) if sample result is < RL & < 5X blank result.
		U (at reported sample value) if sample result is > RL and < 5X blank result
Field Blanks (if required by project)	No results > RL	Action is same as method blank for positive results remaining in the field blank after method blank qualifiers are assigned.
MS samples (accuracy) (if required by project)	%R within lab control limits	Qualify parent only, unless other QC indicates systematic problems. J if both %R > upper control limit (UCL) J/UJ(-) if both %R < lower control limit (LCL) No action if parent conc. >5X the amount spiked. Use PJ if only one %R outlier
Precision: MS/MSD or LCS/LCSD or sample/dup	At least one set per batch (<10 samples) RPD < lab control limit	J if RPD > lab control limits

Validation QC Element	Acceptance Criteria	Action
LCS (not required by method)	%R within lab control limits	J/UJ if %R < LCL J if %R > UCL J/R if any %R <10% (Floyd|Snider PJ)
Surrogates	2-fluorobiphenyl, p-terphenyl, o-terphenyl, and/or pentacosane added to all samples (inc. QC samples). %R = 50-150%	J/UJ if %R < LCL J if %R > UCL J/R if any %R <10% No action if 2 or more surrogates are used, and only one is outside control limits. (Floyd|Snider PJ)
Pattern Identification	Compare sample chromatogram to standard chromatogram to ensure range and pattern are reasonable match. Laboratory may flag results which have poor match.	J
Field Duplicates	Use project control limits, if stated in QAPP Floyd|Snider default: water: RPD < 35% solids: RPD < 50%	Narrate (Floyd|Snider PJ to qualify)
Two analyses for one sample (dilution)	Report only one result per analyte	"DNR" (or client requested qualifier) all results that should not be reported

Abbreviation:
PJ Professional judgment

Port of Bellingham
Harris Avenue Shipyard

Data Validation Report

Appendix B
Qualified Data Summary Table

ECOLOGY REVIEW DRAFT

Appendix B
Qualified Data Summary Table

Sample Delivery Group	FieldSample ID	Lab ID	Analysis Method	Analyte	CAS	Result	Unit	Lab Qualifier	DV Qualifier	Interpreted Qualifier
EV13010138	FS-19-7.0-7.5-012913	EV13010138-02	NWTPH-Dx	Diesel-range Organics		2,800	mg/kg		MP	JM
EV13010138	FS-19-7.0-7.5-012913	EV13010138-02	NWTPH-Dx	Oil-range Organics		160	mg/kg		MP	JM
EV13010138	FS-20-10.5-11.0-012913	EV13010138-06	NWTPH-Dx	Diesel-range Organics		2,500	mg/kg		MP	JM
EV13010138	FS-19-GW-012913	EV13010138-07	NWTPH-Dx	Diesel-range Organics		5,500	µg/L		MP	JM
EV13010138	FS-19-GW-012913	EV13010138-07	NWTPH-Dx	Oil-range Organics		1,200	µg/L		MP	JM
EV13010138	FS-19-GW-012913	EV13010138-07	NWTPH-Gx	Gasoline-range Organics		110	µg/L		MP	JM
EV13010138	FS-21-8.0-9.0-013013	EV13010138-13	NWTPH-Dx	Diesel-range Organics		4,100	mg/kg		MP	JM
EV13010138	FS-21-8.0-9.0-013013	EV13010138-13	NWTPH-Dx	Oil-range Organics		510	mg/kg		MP	JM
EV13010138	FS-21-8.0-9.0-013013	EV13010138-13	NWTPH-Gx	Gasoline-range Organics		6.7	mg/kg		MP	JM
EV13010138	FS-21-13.5-14.0-013013	EV13010138-14	NWTPH-Dx	Diesel-range Organics		5,600	mg/kg		MP	JM
EV13010138	FS-21-13.5-14.0-013013	EV13010138-14	NWTPH-Gx	Gasoline-range Organics		72	mg/kg		MP	JM
EV13010138	FS-21-GW-013013	EV13010138-15	NWTPH-Dx	Diesel-range Organics		840	µg/L		MP	JM
EV13010138	FS-21-GW-013013	EV13010138-15	NWTPH-Gx	Gasoline-range Organics		92	µg/L		MP	JM
EV13010138	FS-79-GW-013013	EV13010138-16	NWTPH-Dx	Diesel-range Organics		730	µg/L		MP	JM
EV13010138	FS-79-GW-013013	EV13010138-16	NWTPH-Gx	Gasoline-range Organics		100	µg/L		MP	JM
EV13020091	MW-10-GW-021413	EV13020091-01	USEPA 8021	Benzene	71-43-2	1	µg/L	U	DNR	DNR
EV13020091	MW-10-GW-021413	EV13020091-01	USEPA 8021	Ethylbenzene	100-41-4	1	µg/L	U	DNR	DNR
EV13020091	MW-10-GW-021413	EV13020091-01	USEPA 8021	Toluene	108-88-3	1	µg/L	U	DNR	DNR
EV13020091	MW-10-GW-021413	EV13020091-01	USEPA 8260B	Naphthalene	91-20-3	2	µg/L	U	DNR	DNR
EV13020091	MW-10-GW-021413	EV13020091-01	USEPA 8270	1,2,4-Trichlorobenzene	120-82-1	2	µg/L	U	DNR	DNR
EV13020091	MW-10-GW-021413	EV13020091-01	USEPA 8270	1,2-Dichlorobenzene	95-50-1	2	µg/L	U	DNR	DNR
EV13020091	MW-10-GW-021413	EV13020091-01	USEPA 8270	1,3-Dichlorobenzene	541-73-1	2	µg/L	U	DNR	DNR
EV13020091	MW-10-GW-021413	EV13020091-01	USEPA 8270	1,4-Dichlorobenzene	106-46-7	2	µg/L	U	DNR	DNR
EV13020091	MW-10-GW-021413	EV13020091-01	USEPA 8270	Hexachlorobutadiene	87-68-3	2.1	µg/L	U	DNR	DNR
EV13020091	MW-10-GW-021413	EV13020091-01	USEPA 8270D-SIM	Chrysene	218-01-9	0.018	µg/L	B	U	UB
EV13020091	MW-06-GW-021413	EV13020091-02	USEPA 8021	Benzene	71-43-2	1	µg/L	U	DNR	DNR
EV13020091	MW-06-GW-021413	EV13020091-02	USEPA 8021	Ethylbenzene	100-41-4	1	µg/L	U	DNR	DNR
EV13020091	MW-06-GW-021413	EV13020091-02	USEPA 8021	Toluene	108-88-3	1	µg/L	U	DNR	DNR
EV13020091	MW-06-GW-021413	EV13020091-02	USEPA 8260B	Naphthalene	91-20-3	2	µg/L	U	DNR	DNR
EV13020091	MW-06-GW-021413	EV13020091-02	USEPA 8270	1,2,4-Trichlorobenzene	120-82-1	2	µg/L	U	DNR	DNR
EV13020091	MW-06-GW-021413	EV13020091-02	USEPA 8270	1,2-Dichlorobenzene	95-50-1	2	µg/L	U	DNR	DNR
EV13020091	MW-06-GW-021413	EV13020091-02	USEPA 8270	1,3-Dichlorobenzene	541-73-1	2	µg/L	U	DNR	DNR
EV13020091	MW-06-GW-021413	EV13020091-02	USEPA 8270	1,4-Dichlorobenzene	106-46-7	2	µg/L	U	DNR	DNR
EV13020091	MW-06-GW-021413	EV13020091-02	USEPA 8270	Hexachlorobutadiene	87-68-3	2	µg/L	U	DNR	DNR
EV13020091	MW-94-GW-021413	EV13020091-03	USEPA 8021	Benzene	71-43-2	1	µg/L	U	DNR	DNR
EV13020091	MW-94-GW-021413	EV13020091-03	USEPA 8021	Ethylbenzene	100-41-4	1	µg/L	U	DNR	DNR
EV13020091	MW-94-GW-021413	EV13020091-03	USEPA 8021	Toluene	108-88-3	1	µg/L	U	DNR	DNR
EV13020091	MW-94-GW-021413	EV13020091-03	USEPA 8260B	Naphthalene	91-20-3	2	µg/L	U	DNR	DNR
EV13020091	MW-94-GW-021413	EV13020091-03	USEPA 8270	1,2,4-Trichlorobenzene	120-82-1	2	µg/L	U	DNR	DNR
EV13020091	MW-94-GW-021413	EV13020091-03	USEPA 8270	1,2-Dichlorobenzene	95-50-1	2	µg/L	U	DNR	DNR
EV13020091	MW-94-GW-021413	EV13020091-03	USEPA 8270	1,3-Dichlorobenzene	541-73-1	2	µg/L	U	DNR	DNR
EV13020091	MW-94-GW-021413	EV13020091-03	USEPA 8270	1,4-Dichlorobenzene	106-46-7	2	µg/L	U	DNR	DNR
EV13020091	MW-94-GW-021413	EV13020091-03	USEPA 8270	Hexachlorobutadiene	87-68-3	2	µg/L	U	DNR	DNR
EV13020091	MW-04-GW-021413	EV13020091-04	USEPA 8021	Benzene	71-43-2	1	µg/L	U	DNR	DNR
EV13020091	MW-04-GW-021413	EV13020091-04	USEPA 8021	Ethylbenzene	100-41-4	1	µg/L	U	DNR	DNR
EV13020091	MW-04-GW-021413	EV13020091-04	USEPA 8021	Toluene	108-88-3	1	µg/L	U	DNR	DNR
EV13020091	MW-04-GW-021413	EV13020091-04	USEPA 8260B	Naphthalene	91-20-3	2	µg/L	U	DNR	DNR
EV13020091	MW-04-GW-021413	EV13020091-04	USEPA 8270	1,2,4-Trichlorobenzene	120-82-1	2	µg/L	U	DNR	DNR
EV13020091	MW-04-GW-021413	EV13020091-04	USEPA 8270	1,2-Dichlorobenzene	95-50-1	2	µg/L	U	DNR	DNR
EV13020091	MW-04-GW-021413	EV13020091-04	USEPA 8270	1,3-Dichlorobenzene	541-73-1	2	µg/L	U	DNR	DNR
EV13020091	MW-04-GW-021413	EV13020091-04	USEPA 8270	1,4-Dichlorobenzene	106-46-7	2	µg/L	U	DNR	DNR
EV13020091	MW-04-GW-021413	EV13020091-04	USEPA 8270	Hexachlorobutadiene	87-68-3	2	µg/L	U	DNR	DNR
EV13020091	MW-05-GW-021413	EV13020091-05	USEPA 8021	Benzene	71-43-2	1	µg/L	U	DNR	DNR
EV13020091	MW-05-GW-021413	EV13020091-05	USEPA 8021	Ethylbenzene	100-41-4	1	µg/L	U	DNR	DNR
EV13020091	MW-05-GW-021413	EV13020091-05	USEPA 8021	Toluene	108-88-3	1	µg/L	U	DNR	DNR
EV13020091	MW-05-GW-021413	EV13020091-05	USEPA 8260B	Naphthalene	91-20-3	2	µg/L	U	DNR	DNR
EV13020091	MW-05-GW-021413	EV13020091-05	USEPA 8270	1,2,4-Trichlorobenzene	120-82-1	2	µg/L	U	DNR	DNR
EV13020091	MW-05-GW-021413	EV13020091-05	USEPA 8270	1,2-Dichlorobenzene	95-50-1	2	µg/L	U	DNR	DNR
EV13020091	MW-05-GW-021413	EV13020091-05	USEPA 8270	1,3-Dichlorobenzene	541-73-1	2	µg/L	U	DNR	DNR
EV13020091	MW-05-GW-021413	EV13020091-05	USEPA 8270	1,4-Dichlorobenzene	106-46-7	2	µg/L	U	DNR	DNR
EV13020091	MW-05-GW-021413	EV13020091-05	USEPA 8270	Hexachlorobutadiene	87-68-3	2	µg/L	U	DNR	DNR
EV13020091	MW-07-GW-021413	EV13020091-06	USEPA 8021	Benzene	71-43-2	1	µg/L	U	DNR	DNR
EV13020091	MW-07-GW-021413	EV13020091-06	USEPA 8021	Ethylbenzene	100-41-4	1	µg/L	U	DNR	DNR
EV13020091	MW-07-GW-021413	EV13020091-06	USEPA 8021	Toluene	108-88-3	1	µg/L	U	DNR	DNR
EV13020091	MW-07-GW-021413	EV13020091-06	USEPA 8260B	Naphthalene	91-20-3	2	µg/L	U	DNR	DNR
EV13020091	MW-07-GW-021413	EV13020091-06	USEPA 8270	1,2,4-Trichlorobenzene	120-82-1	2	µg/L	U	DNR	DNR
EV13020091	MW-07-GW-021413	EV13020091-06	USEPA 8270	1,2-Dichlorobenzene	95-50-1	2	µg/L	U	DNR	DNR
EV13020091	MW-07-GW-021413	EV13020091-06	USEPA 8270	1,3-Dichlorobenzene	541-73-1	2	µg/L	U	DNR	DNR
EV13020091	MW-07-GW-021413	EV13020091-06	USEPA 8270	1,4-Dichlorobenzene	106-46-7	2	µg/L	U	DNR	DNR
EV13020091	MW-07-GW-021413	EV13020091-06	USEPA 8270	Hexachlorobutadiene	87-68-3	2	µg/L	U	DNR	DNR
EV13020091	MW-07-GW-021413	EV13020091-06	NWTPH-Dx	Diesel-range Organics		430	µg/L		MP	JM
EV13020091	MW-08-GW-021413	EV13020091-07	USEPA 8021	Benzene	71-43-2	1	µg/L	U	DNR	DNR
EV13020091	MW-08-GW-021413	EV13020091-07	USEPA 8021	Ethylbenzene	100-41-4	1	µg/L	U	DNR	DNR
EV13020091	MW-08-GW-021413	EV13020091-07	USEPA 8021	Toluene	108-88-3	1	µg/L	U	DNR	DNR
EV13020091	MW-08-GW-021413	EV13020091-07	USEPA 8260B	Naphthalene	91-20-3	2	µg/L	U	DNR	DNR
EV13020091	MW-08-GW-021413	EV13020091-07	USEPA 8270	1,2,4-Trichlorobenzene	120-82-1	2	µg/L	U	DNR	DNR
EV13020091	MW-08-GW-021413	EV13020091-07	USEPA 8270	1,2-Dichlorobenzene	95-50-1	2	µg/L	U	DNR	DNR
EV13020091	MW-08-GW-021413	EV13020091-07	USEPA 8270	1,3-Dichlorobenzene	541-73-1	2	µg/L	U	DNR	DNR
EV13020091	MW-08-GW-021413	EV13020091-07	USEPA 8270	1,4-Dichlorobenzene	106-46-7	2	µg/L	U	DNR	DNR
EV13020091	MW-08-GW-021413	EV13020091-07	USEPA 8270	Hexachlorobutadiene	87-68-3	2	µg/L	U	DNR	DNR
EV13020091	MW-01-GW-021513	EV13020091-10	USEPA 8021	Benzene	71-43-2	1	µg/L	U	DNR	DNR
EV13020091	MW-01-GW-021513	EV13020091-10	USEPA 8021	Ethylbenzene	100-41-4	1.3	µg/L		DNR	DNR
EV13020091	MW-01-GW-021513	EV13020091-10	USEPA 8021	Toluene	108-88-3	1	µg/L	U	DNR	DNR
EV13020091	MW-01-GW-021513	EV13020091-10	USEPA 8270	1,2,4-Trichlorobenzene	120-82-1	2	µg/L	U	DNR	DNR
EV13020091	MW-01-GW-021513	EV13020091-10	USEPA 8270	1,2-Dichlorobenzene	95-50-1	2	µg/L	U	DNR	DNR
EV13020091	MW-01-GW-021513	EV13020091-10	USEPA 8270	1,3-Dichlorobenzene	541-73-1	2	µg/L	U	DNR	DNR
EV13020091	MW-01-GW-021513	EV13020091-10	USEPA 8270	1,4-Dichlorobenzene	106-46-7	2	µg/L	U	DNR	DNR
EV13020091	MW-01-GW-021513	EV13020091-10	USEPA 8270	Hexachlorobutadiene	87-68-3	2	µg/L	U	DNR	DNR
EV13020091	MW-01-GW-021513	EV13020091-10	USEPA 8270D-SIM	Chrysene	218-01-9	0.049	µg/L	B	U	UB
EV13020091	MW-01-GW-021513	EV13020091-10	USEPA 8270D-SIM	Naphthalene	91-20-3	4	µg/L		DNR	DNR
EV13020091	MW-01-GW-021513	EV13020091-10	NWTPH-Dx	Diesel-range Organics		1,500	µg/L		MP	JM
EV13020091	MW-01-GW-021513	EV13020091-10	NWTPH-Gx	Gasoline-range Organics		680	µg/L		MP	JM
EV13020091	MW-02A-GW-021513	EV13020091-11	USEPA 8021	Benzene	71-43-2	1	µg/L	U	DNR	DNR
EV13020091	MW-02A-GW-021513	EV13020091-11	USEPA 8021	Ethylbenzene	100-41-4	1	µg/L	U	DNR	DNR
EV13020091	MW-02A-GW-021513	EV13020091-11	USEPA 8021	Toluene	108-88-3	1	µg/L	U	DNR	DNR
EV13020091	MW-02A-GW-021513	EV13020091-11	USEPA 8260B	Naphthalene	91-20-3	2	µg/L	U	DNR	DNR
EV13020091	MW-02A-GW-021513	EV13020091-11	USEPA 8270	1,2,4-Trichlorobenzene	120-82-1	2	µg/L	U	DNR	DNR
EV13020091	MW-02A-GW-021513	EV13020091-11	USEPA 8270	1,2-Dichlorobenzene	95-50-1	2	µg/L	U	DNR	DNR
EV13020091	MW-02A-GW-021513	EV13020091-11	USEPA 8270	1,3-Dichlorobenzene	541-73-1	2	µg/L	U	DNR	DNR
EV13020091	MW-02A-GW-021513	EV13020091-11	USEPA 8270	1,4-Dichlorobenzene	106-46-7	2	µg/L	U	DNR	DNR
EV13020091	MW-02A-GW-021513	EV13020091-11	USEPA 8270	Hexachlorobutadiene	87-68-3	2	µg/L	U	DNR	DNR
EV13020091	MW-02A-GW-021513	EV13020091-11	NWTPH-Dx	Diesel-range Organics		340	µg/L		MP	JM
EV13020091	MW-09-GW-021513	EV13020091-12	USEPA 8021	Benzene	71-43-2	1	µg/L	U	DNR	DNR
EV13020091	MW-09-GW-021513	EV13020091-12	USEPA 8021	Ethylbenzene	100-41-4	1	µg/L	U	DNR	DNR
EV13020091	MW-09-GW-021513	EV13020091-12	USEPA 8021	Toluene	108-88-3	1	µg/L	U	DNR	DNR
EV13020091	MW-09-GW-021513	EV13020091-12	USEPA 8260B	Naphthalene	91-20-3	2	µg/L	U	DNR	DNR
EV13020091	MW-09-GW-021513	EV13020091-12	USEPA 8270	1,2,4-Trichlorobenzene	120-82-1	2	µg/L	U	DNR	DNR
EV13020091	MW-09-GW-021513	EV13020091-12	USEPA 8270	1,2-Dichlorobenzene	95-50-1	2	µg/L	U	DNR	DNR
EV13020091	MW-09-GW-021513	EV13020091-12	USEPA 8270	1,3-Dichlorobenzene	541-73-1	2	µg/L	U	DNR	DNR
EV13020091	MW-09-GW-021513	EV13020091-12	USEPA 8270	1,4-Dichlorobenzene	106-46-7	2	µg/L	U	DNR	DNR
EV13020091	MW-09-GW-021513	EV13020091-12	USEPA 8270	Hexachlorobutadiene	87-68-3	2	µg/L	U	DNR	DNR
EV13020091	MW-09-GW-021513	EV13020091-12	NWTPH-Dx	Diesel-range Organics		1,200	µg/L		MP	JM
EV13020091	MW-09-GW-021513	EV13020091-12	NWTPH-Gx	Gasoline-range Organics		530	µg/L		MP	JM

Appendix B
Qualified Data Summary Table

Sample Delivery Group	FieldSample ID	Lab ID	Analysis Method	Analyte	CAS	Result	Unit	Lab Qualifier	DV Qualifier	Interpreted Qualifier
WC32	SG-12-0-10-013113	13-2424-WC32A	USEPA 8270D	1,2,4-Trichlorobenzene	120-82-1	20	µg/kg	U	DNR	DNR
WC32	SG-12-0-10-013113	13-2424-WC32A	USEPA 8270D	1,2-Dichlorobenzene	95-50-1	20	µg/kg	U	DNR	DNR
WC32	SG-12-0-10-013113	13-2424-WC32A	USEPA 8270D	1,3-Dichlorobenzene	541-73-1	20	µg/kg	U	DNR	DNR
WC32	SG-12-0-10-013113	13-2424-WC32A	USEPA 8270D	1,4-Dichlorobenzene	106-46-7	20	µg/kg	U	DNR	DNR
WC32	SG-12-0-10-013113	13-2424-WC32A	USEPA 8270D	2,4-Dimethylphenol	105-67-9	40	µg/kg	U	DNR	DNR
WC32	SG-12-0-10-013113	13-2424-WC32A	USEPA 8270D	2-Methylphenol	95-48-7	20	µg/kg	U	DNR	DNR
WC32	SG-12-0-10-013113	13-2424-WC32A	USEPA 8270D	Benzyl alcohol	100-51-6	46	µg/kg		DNR	DNR
WC32	SG-12-0-10-013113	13-2424-WC32A	USEPA 8270D	bis(2-ethylhexyl)phthalate	117-81-7	31	µg/kg	B	U	UB
WC32	SG-12-0-10-013113	13-2424-WC32A	USEPA 8270D	Butyl benzyl phthalate	85-68-7	20	µg/kg	U	DNR	DNR
WC32	SG-12-0-10-013113	13-2424-WC32A	USEPA 8270D	Dibenzo(a,h)anthracene	53-70-3	20	µg/kg	U	DNR	DNR
WC32	SG-12-0-10-013113	13-2424-WC32A	USEPA 8270D	Dimethyl phthalate	131-11-3	20	µg/kg	U	DNR	DNR
WC32	SG-12-0-10-013113	13-2424-WC32A	USEPA 8270D	Hexachlorobenzene	118-74-1	20	µg/kg	U	DNR	DNR
WC32	SG-12-0-10-013113	13-2424-WC32A	USEPA 8270D	Hexachlorobutadiene	87-68-3	20	µg/kg	U	DNR	DNR
WC32	SG-12-0-10-013113	13-2424-WC32A	USEPA 8270D	N-Nitrosodiphenylamine	86-30-6	20	µg/kg	U	DNR	DNR
WC32	SG-12-0-10-013113	13-2424-WC32A	USEPA 8270D	Pentachlorophenol	87-86-5	200	µg/kg	U	DNR	DNR
WC32	SG-12-0-10-013113	13-2424-WC32A	USEPA 8270D-SIM	Hexachlorobenzene	118-74-1	5	µg/kg	U	DNR	DNR
WC32	SG-12-0-10-013113	13-2424-WC32A	USEPA 8270D-SIM	Hexachlorobutadiene	87-68-3	5	µg/kg	U	DNR	DNR
WC32	SG-13-0-10-013113	13-2425-WC32B	USEPA 8270D	1,2,4-Trichlorobenzene	120-82-1	20	µg/kg	U	DNR	DNR
WC32	SG-13-0-10-013113	13-2425-WC32B	USEPA 8270D	1,2-Dichlorobenzene	95-50-1	20	µg/kg	U	DNR	DNR
WC32	SG-13-0-10-013113	13-2425-WC32B	USEPA 8270D	1,3-Dichlorobenzene	541-73-1	20	µg/kg	U	DNR	DNR
WC32	SG-13-0-10-013113	13-2425-WC32B	USEPA 8270D	1,4-Dichlorobenzene	106-46-7	20	µg/kg	U	DNR	DNR
WC32	SG-13-0-10-013113	13-2425-WC32B	USEPA 8270D	2,4-Dimethylphenol	105-67-9	39	µg/kg	U	DNR	DNR
WC32	SG-13-0-10-013113	13-2425-WC32B	USEPA 8270D	2-Methylphenol	95-48-7	20	µg/kg	U	DNR	DNR
WC32	SG-13-0-10-013113	13-2425-WC32B	USEPA 8270D	Benzyl alcohol	100-51-6	20	µg/kg	U	DNR	DNR
WC32	SG-13-0-10-013113	13-2425-WC32B	USEPA 8270D	bis(2-ethylhexyl)phthalate	117-81-7	57	µg/kg	B	U	UB
WC32	SG-13-0-10-013113	13-2425-WC32B	USEPA 8270D	Butyl benzyl phthalate	85-68-7	20	µg/kg	U	DNR	DNR
WC32	SG-13-0-10-013113	13-2425-WC32B	USEPA 8270D	Dibenzo(a,h)anthracene	53-70-3	20	µg/kg	U	DNR	DNR
WC32	SG-13-0-10-013113	13-2425-WC32B	USEPA 8270D	Dimethyl phthalate	131-11-3	20	µg/kg	U	DNR	DNR
WC32	SG-13-0-10-013113	13-2425-WC32B	USEPA 8270D	Hexachlorobenzene	118-74-1	20	µg/kg	U	DNR	DNR
WC32	SG-13-0-10-013113	13-2425-WC32B	USEPA 8270D	Hexachlorobutadiene	87-68-3	20	µg/kg	U	DNR	DNR
WC32	SG-13-0-10-013113	13-2425-WC32B	USEPA 8270D	N-Nitrosodiphenylamine	86-30-6	20	µg/kg	U	DNR	DNR
WC32	SG-13-0-10-013113	13-2425-WC32B	USEPA 8270D	Pentachlorophenol	87-86-5	200	µg/kg	U	DNR	DNR
WC32	SG-13-0-10-013113	13-2425-WC32B	USEPA 8270D-SIM	Hexachlorobenzene	118-74-1	4.9	µg/kg	U	DNR	DNR
WC32	SG-13-0-10-013113	13-2425-WC32B	USEPA 8270D-SIM	Hexachlorobutadiene	87-68-3	4.9	µg/kg	U	DNR	DNR
WC32	SG-07-0-10-013113	13-2426-WC32C	USEPA 8270D	1,2,4-Trichlorobenzene	120-82-1	20	µg/kg	U	DNR	DNR
WC32	SG-07-0-10-013113	13-2426-WC32C	USEPA 8270D	1,2-Dichlorobenzene	95-50-1	20	µg/kg	U	DNR	DNR
WC32	SG-07-0-10-013113	13-2426-WC32C	USEPA 8270D	1,3-Dichlorobenzene	541-73-1	20	µg/kg	U	DNR	DNR
WC32	SG-07-0-10-013113	13-2426-WC32C	USEPA 8270D	1,4-Dichlorobenzene	106-46-7	20	µg/kg	U	DNR	DNR
WC32	SG-07-0-10-013113	13-2426-WC32C	USEPA 8270D	2,4-Dimethylphenol	105-67-9	26	µg/kg	J	DNR	DNR
WC32	SG-07-0-10-013113	13-2426-WC32C	USEPA 8270D	2-Methylphenol	95-48-7	17	µg/kg	J	DNR	DNR
WC32	SG-07-0-10-013113	13-2426-WC32C	USEPA 8270D	Benzyl alcohol	100-51-6	20	µg/kg	U	DNR	DNR
WC32	SG-07-0-10-013113	13-2426-WC32C	USEPA 8270D	bis(2-ethylhexyl)phthalate	117-81-7	38	µg/kg	B	U	UB
WC32	SG-07-0-10-013113	13-2426-WC32C	USEPA 8270D	Butyl benzyl phthalate	85-68-7	20	µg/kg	U	DNR	DNR
WC32	SG-07-0-10-013113	13-2426-WC32C	USEPA 8270D	Dibenzo(a,h)anthracene	53-70-3	17	µg/kg	J	DNR	DNR
WC32	SG-07-0-10-013113	13-2426-WC32C	USEPA 8270D	Dimethyl phthalate	131-11-3	20	µg/kg	U	DNR	DNR
WC32	SG-07-0-10-013113	13-2426-WC32C	USEPA 8270D	Hexachlorobenzene	118-74-1	20	µg/kg	U	DNR	DNR
WC32	SG-07-0-10-013113	13-2426-WC32C	USEPA 8270D	Hexachlorobutadiene	87-68-3	20	µg/kg	U	DNR	DNR
WC32	SG-07-0-10-013113	13-2426-WC32C	USEPA 8270D	N-Nitrosodiphenylamine	86-30-6	20	µg/kg	U	DNR	DNR
WC32	SG-07-0-10-013113	13-2426-WC32C	USEPA 8270D	Pentachlorophenol	87-86-5	200	µg/kg	U	DNR	DNR
WC32	SG-07-0-10-013113	13-2426-WC32C	USEPA 8270D-SIM	Hexachlorobenzene	118-74-1	5	µg/kg	U	DNR	DNR
WC32	SG-07-0-10-013113	13-2426-WC32C	USEPA 8270D-SIM	Hexachlorobutadiene	87-68-3	5	µg/kg	U	DNR	DNR
WC32	SG-06-0-10-013113	13-2427-WC32D	USEPA 8270D	1,2,4-Trichlorobenzene	120-82-1	20	µg/kg	U	DNR	DNR
WC32	SG-06-0-10-013113	13-2427-WC32D	USEPA 8270D	1,2-Dichlorobenzene	95-50-1	20	µg/kg	U	DNR	DNR
WC32	SG-06-0-10-013113	13-2427-WC32D	USEPA 8270D	1,3-Dichlorobenzene	541-73-1	20	µg/kg	U	DNR	DNR
WC32	SG-06-0-10-013113	13-2427-WC32D	USEPA 8270D	1,4-Dichlorobenzene	106-46-7	20	µg/kg	U	DNR	DNR
WC32	SG-06-0-10-013113	13-2427-WC32D	USEPA 8270D	2,4-Dimethylphenol	105-67-9	39	µg/kg	U	DNR	DNR
WC32	SG-06-0-10-013113	13-2427-WC32D	USEPA 8270D	2-Methylphenol	95-48-7	20	µg/kg	U	DNR	DNR
WC32	SG-06-0-10-013113	13-2427-WC32D	USEPA 8270D	Benzyl alcohol	100-51-6	70	µg/kg		DNR	DNR
WC32	SG-06-0-10-013113	13-2427-WC32D	USEPA 8270D	bis(2-ethylhexyl)phthalate	117-81-7	140	µg/kg	B	U	UB
WC32	SG-06-0-10-013113	13-2427-WC32D	USEPA 8270D	Butyl benzyl phthalate	85-68-7	22	µg/kg		DNR	DNR
WC32	SG-06-0-10-013113	13-2427-WC32D	USEPA 8270D	Dibenzo(a,h)anthracene	53-70-3	43	µg/kg		DNR	DNR
WC32	SG-06-0-10-013113	13-2427-WC32D	USEPA 8270D	Dimethyl phthalate	131-11-3	20	µg/kg	U	DNR	DNR
WC32	SG-06-0-10-013113	13-2427-WC32D	USEPA 8270D	Hexachlorobenzene	118-74-1	20	µg/kg	U	DNR	DNR
WC32	SG-06-0-10-013113	13-2427-WC32D	USEPA 8270D	Hexachlorobutadiene	87-68-3	20	µg/kg	U	DNR	DNR
WC32	SG-06-0-10-013113	13-2427-WC32D	USEPA 8270D	N-Nitrosodiphenylamine	86-30-6	20	µg/kg	U	DNR	DNR
WC32	SG-06-0-10-013113	13-2427-WC32D	USEPA 8270D	Pentachlorophenol	87-86-5	200	µg/kg	U	DNR	DNR
WC32	SG-06-0-10-013113	13-2427-WC32D	USEPA 8270D-SIM	Butyl benzyl phthalate	85-68-7	28	µg/kg	Q	J	J
WC32	SG-06-0-10-013113	13-2427-WC32D	USEPA 8270D-SIM	Hexachlorobenzene	118-74-1	4.9	µg/kg	U	DNR	DNR
WC32	SG-06-0-10-013113	13-2427-WC32D	USEPA 8270D-SIM	Hexachlorobutadiene	87-68-3	4.9	µg/kg	U	DNR	DNR
WC32	SG-05-0-10-013113	13-2428-WC32E	USEPA 8270D	1,2,4-Trichlorobenzene	120-82-1	19	µg/kg	U	DNR	DNR
WC32	SG-05-0-10-013113	13-2428-WC32E	USEPA 8270D	1,2-Dichlorobenzene	95-50-1	19	µg/kg	U	DNR	DNR
WC32	SG-05-0-10-013113	13-2428-WC32E	USEPA 8270D	1,3-Dichlorobenzene	541-73-1	19	µg/kg	U	DNR	DNR
WC32	SG-05-0-10-013113	13-2428-WC32E	USEPA 8270D	1,4-Dichlorobenzene	106-46-7	19	µg/kg	U	DNR	DNR
WC32	SG-05-0-10-013113	13-2428-WC32E	USEPA 8270D	2,4-Dimethylphenol	105-67-9	38	µg/kg	U	DNR	DNR
WC32	SG-05-0-10-013113	13-2428-WC32E	USEPA 8270D	2-Methylphenol	95-48-7	19	µg/kg	U	DNR	DNR
WC32	SG-05-0-10-013113	13-2428-WC32E	USEPA 8270D	Benzyl alcohol	100-51-6	19	µg/kg	U	DNR	DNR
WC32	SG-05-0-10-013113	13-2428-WC32E	USEPA 8270D	bis(2-ethylhexyl)phthalate	117-81-7	33	µg/kg	B	U	UB
WC32	SG-05-0-10-013113	13-2428-WC32E	USEPA 8270D	Butyl benzyl phthalate	85-68-7	19	µg/kg	U	DNR	DNR
WC32	SG-05-0-10-013113	13-2428-WC32E	USEPA 8270D	Dibenzo(a,h)anthracene	53-70-3	19	µg/kg	U	DNR	DNR
WC32	SG-05-0-10-013113	13-2428-WC32E	USEPA 8270D	Dimethyl phthalate	131-11-3	19	µg/kg	U	DNR	DNR
WC32	SG-05-0-10-013113	13-2428-WC32E	USEPA 8270D	Hexachlorobenzene	118-74-1	19	µg/kg	U	DNR	DNR
WC32	SG-05-0-10-013113	13-2428-WC32E	USEPA 8270D	Hexachlorobutadiene	87-68-3	19	µg/kg	U	DNR	DNR
WC32	SG-05-0-10-013113	13-2428-WC32E	USEPA 8270D	N-Nitrosodiphenylamine	86-30-6	19	µg/kg	U	DNR	DNR
WC32	SG-05-0-10-013113	13-2428-WC32E	USEPA 8270D	Pentachlorophenol	87-86-5	190	µg/kg	U	DNR	DNR
WC32	SG-05-0-10-013113	13-2428-WC32E	USEPA 8270D-SIM	Butyl benzyl phthalate	85-68-7	9.4	µg/kg	Q	J	J
WC32	SG-05-0-10-013113	13-2428-WC32E	USEPA 8270D-SIM	Hexachlorobenzene	118-74-1	4.8	µg/kg	U	DNR	DNR
WC32	SG-05-0-10-013113	13-2428-WC32E	USEPA 8270D-SIM	Hexachlorobutadiene	87-68-3	4.8	µg/kg	U	DNR	DNR
WC32	SG-95-0-10-013113	13-2429-WC32F	USEPA 8270D	1,2,4-Trichlorobenzene	120-82-1	19	µg/kg	U	DNR	DNR
WC32	SG-95-0-10-013113	13-2429-WC32F	USEPA 8270D	1,2-Dichlorobenzene	95-50-1	19	µg/kg	U	DNR	DNR
WC32	SG-95-0-10-013113	13-2429-WC32F	USEPA 8270D	1,3-Dichlorobenzene	541-73-1	19	µg/kg	U	DNR	DNR
WC32	SG-95-0-10-013113	13-2429-WC32F	USEPA 8270D	1,4-Dichlorobenzene	106-46-7	19	µg/kg	U	DNR	DNR
WC32	SG-95-0-10-013113	13-2429-WC32F	USEPA 8270D	2,4-Dimethylphenol	105-67-9	38	µg/kg	U	DNR	DNR
WC32	SG-95-0-10-013113	13-2429-WC32F	USEPA 8270D	2-Methylphenol	95-48-7	19	µg/kg	U	DNR	DNR
WC32	SG-95-0-10-013113	13-2429-WC32F	USEPA 8270D	Benzyl alcohol	100-51-6	19	µg/kg	U	DNR	DNR
WC32	SG-95-0-10-013113	13-2429-WC32F	USEPA 8270D	bis(2-ethylhexyl)phthalate	117-81-7	30	µg/kg	B	U	UB
WC32	SG-95-0-10-013113	13-2429-WC32F	USEPA 8270D	Butyl benzyl phthalate	85-68-7	19	µg/kg	U	DNR	DNR
WC32	SG-95-0-10-013113	13-2429-WC32F	USEPA 8270D	Dibenzo(a,h)anthracene	53-70-3	58	µg/kg		DNR	DNR
WC32	SG-95-0-10-013113	13-2429-WC32F	USEPA 8270D	Dimethyl phthalate	131-11-3	19	µg/kg	U	DNR	DNR
WC32	SG-95-0-10-013113	13-2429-WC32F	USEPA 8270D	Hexachlorobenzene	118-74-1	19	µg/kg	U	DNR	DNR
WC32	SG-95-0-10-013113	13-2429-WC32F	USEPA 8270D	Hexachlorobutadiene	87-68-3	19	µg/kg	U	DNR	DNR
WC32	SG-95-0-10-013113	13-2429-WC32F	USEPA 8270D	N-Nitrosodiphenylamine	86-30-6	19	µg/kg	U	DNR	DNR
WC32	SG-95-0-10-013113	13-2429-WC32F	USEPA 8270D	Pentachlorophenol	87-86-5	190	µg/kg	U	DNR	DNR
WC32	SG-95-0-10-013113	13-2429-WC32F	USEPA 8270D-SIM	Hexachlorobenzene	118-74-1	4.7	µg/kg	U	DNR	DNR
WC32	SG-95-0-10-013113	13-2429-WC32F	USEPA 8270D-SIM	Hexachlorobutadiene	87-68-3	4.7	µg/kg	U	DNR	DNR
WC32	SG-08-0-10-013113	13-2430-WC32G	USEPA 7471A	Mercury	7439-97-6	12.4	mg/kg		DNR	DNR
WC32	SG-08-0-10-013113	13-2430-WC32G	USEPA 8270D	1,2,4-Trichlorobenzene	120-82-1	96	µg/kg	U	DNR	DNR
WC32	SG-08-0-10-013113	13-2430-WC32G	USEPA 8270D	1,2-Dichlorobenzene	95-50-1	96	µg/kg	U	DNR	DNR
WC32	SG-08-0-10-013113	13-2430-WC32G	USEPA 8270D	1,3-Dichlorobenzene	541-73-1	96	µg/kg	U	DNR	DNR
WC32	SG-08-0-10-013113	13-2430-WC32G	USEPA 8270D	1,4-Dichlorobenzene	106-46-7	96	µg/kg	U	DNR	DNR
WC32	SG-08-0-10-013113	13-2430-WC32G	USEPA 8270D	2,4-Dimethylphenol	105-67-9	190	µg/kg	U	DNR	DNR
WC32	SG-08-0-10-013113	13-2430-WC32G	USEPA 8270D	2-Methylphenol	95-48-7	96	µg/kg	U	DNR	DNR
WC32	SG-08-0-10-013113	13-2430-WC32G	USEPA 8270D	Benzyl alcohol	100-51-6	96	µg/kg	U	DNR	DNR
WC32	SG-08-0-10-013113	13-2430-WC32G	USEPA 8270D	Butyl benzyl phthalate	85-68-7	96	µg/kg	U	DNR	DNR

Appendix B
Qualified Data Summary Table

Sample Delivery Group	FieldSample ID	Lab ID	Analysis Method	Analyte	CAS	Result	Unit	Lab Qualifier	DV Qualifier	Interpreted Qualifier
WC32	SG-08-0-10-013113	13-2430-WC32G	USEPA 8270D	Dibenzo(a,h)anthracene	53-70-3	300	µg/kg		DNR	DNR
WC32	SG-08-0-10-013113	13-2430-WC32G	USEPA 8270D	Dimethyl phthalate	131-11-3	96	µg/kg	U	DNR	DNR
WC32	SG-08-0-10-013113	13-2430-WC32G	USEPA 8270D	Hexachlorobenzene	118-74-1	96	µg/kg	U	DNR	DNR
WC32	SG-08-0-10-013113	13-2430-WC32G	USEPA 8270D	Hexachlorobutadiene	87-68-3	96	µg/kg	U	DNR	DNR
WC32	SG-08-0-10-013113	13-2430-WC32G	USEPA 8270D	N-Nitrosodiphenylamine	86-30-6	96	µg/kg	U	DNR	DNR
WC32	SG-08-0-10-013113	13-2430-WC32G	USEPA 8270D	Pentachlorophenol	87-86-5	960	µg/kg	U	DNR	DNR
WC32	SG-08-0-10-013113	13-2430-WC32G	USEPA 8270D-SIM	Hexachlorobenzene	118-74-1	24	µg/kg	U	DNR	DNR
WC32	SG-08-0-10-013113	13-2430-WC32G	USEPA 8270D-SIM	Hexachlorobutadiene	87-68-3	24	µg/kg	U	DNR	DNR
WC32	SG-09-0-10-013113	13-2431-WC32H	USEPA 8270D	1,2,4-Trichlorobenzene	120-82-1	19	µg/kg	U	DNR	DNR
WC32	SG-09-0-10-013113	13-2431-WC32H	USEPA 8270D	1,2-Dichlorobenzene	95-50-1	19	µg/kg	U	DNR	DNR
WC32	SG-09-0-10-013113	13-2431-WC32H	USEPA 8270D	1,3-Dichlorobenzene	541-73-1	19	µg/kg	U	DNR	DNR
WC32	SG-09-0-10-013113	13-2431-WC32H	USEPA 8270D	1,4-Dichlorobenzene	106-46-7	19	µg/kg	U	DNR	DNR
WC32	SG-09-0-10-013113	13-2431-WC32H	USEPA 8270D	2,4-Dimethylphenol	105-67-9	38	µg/kg	U	DNR	DNR
WC32	SG-09-0-10-013113	13-2431-WC32H	USEPA 8270D	2-Methylphenol	95-48-7	19	µg/kg	U	DNR	DNR
WC32	SG-09-0-10-013113	13-2431-WC32H	USEPA 8270D	Benzyl alcohol	100-51-6	36	µg/kg		DNR	DNR
WC32	SG-09-0-10-013113	13-2431-WC32H	USEPA 8270D	bis(2-ethylhexyl)phthalate	117-81-7	160	µg/kg	B	U	UB
WC32	SG-09-0-10-013113	13-2431-WC32H	USEPA 8270D	Butyl benzyl phthalate	85-68-7	19	µg/kg	U	DNR	DNR
WC32	SG-09-0-10-013113	13-2431-WC32H	USEPA 8270D	Dibenzo(a,h)anthracene	53-70-3	22	µg/kg		DNR	DNR
WC32	SG-09-0-10-013113	13-2431-WC32H	USEPA 8270D	Dimethyl phthalate	131-11-3	19	µg/kg	U	DNR	DNR
WC32	SG-09-0-10-013113	13-2431-WC32H	USEPA 8270D	Hexachlorobenzene	118-74-1	19	µg/kg	U	DNR	DNR
WC32	SG-09-0-10-013113	13-2431-WC32H	USEPA 8270D	Hexachlorobutadiene	87-68-3	19	µg/kg	U	DNR	DNR
WC32	SG-09-0-10-013113	13-2431-WC32H	USEPA 8270D	N-Nitrosodiphenylamine	86-30-6	19	µg/kg	U	DNR	DNR
WC32	SG-09-0-10-013113	13-2431-WC32H	USEPA 8270D	Pentachlorophenol	87-86-5	190	µg/kg	U	DNR	DNR
WC32	SG-09-0-10-013113	13-2431-WC32H	USEPA 8270D-SIM	Hexachlorobenzene	118-74-1	4.7	µg/kg	U	DNR	DNR
WC32	SG-09-0-10-013113	13-2431-WC32H	USEPA 8270D-SIM	Hexachlorobutadiene	87-68-3	4.7	µg/kg	U	DNR	DNR
WC33	HA-09-0-10-013013	13-2451-WC33G	USEPA 6010C	Lead	7439-92-1	125	mg/kg		J	J
WC33	HA-09-0-10-013013	13-2451-WC33G	USEPA 8270D	1,2,4-Trichlorobenzene	120-82-1	19	µg/kg	U	DNR	DNR
WC33	HA-09-0-10-013013	13-2451-WC33G	USEPA 8270D	1,2-Dichlorobenzene	95-50-1	19	µg/kg	U	DNR	DNR
WC33	HA-09-0-10-013013	13-2451-WC33G	USEPA 8270D	1,3-Dichlorobenzene	541-73-1	19	µg/kg	U	DNR	DNR
WC33	HA-09-0-10-013013	13-2451-WC33G	USEPA 8270D	1,4-Dichlorobenzene	106-46-7	19	µg/kg	U	DNR	DNR
WC33	HA-09-0-10-013013	13-2451-WC33G	USEPA 8270D	2,4-Dimethylphenol	105-67-9	38	µg/kg	U	DNR	DNR
WC33	HA-09-0-10-013013	13-2451-WC33G	USEPA 8270D	2-Methylphenol	95-48-7	19	µg/kg	U	DNR	DNR
WC33	HA-09-0-10-013013	13-2451-WC33G	USEPA 8270D	Benzyl alcohol	100-51-6	19	µg/kg	U	DNR	DNR
WC33	HA-09-0-10-013013	13-2451-WC33G	USEPA 8270D	Butyl benzyl phthalate	85-68-7	19	µg/kg	U	DNR	DNR
WC33	HA-09-0-10-013013	13-2451-WC33G	USEPA 8270D	Dibenzo(a,h)anthracene	53-70-3	19	µg/kg	U	DNR	DNR
WC33	HA-09-0-10-013013	13-2451-WC33G	USEPA 8270D	Dimethyl phthalate	131-11-3	19	µg/kg	U	DNR	DNR
WC33	HA-09-0-10-013013	13-2451-WC33G	USEPA 8270D	Hexachlorobenzene	118-74-1	19	µg/kg	U	DNR	DNR
WC33	HA-09-0-10-013013	13-2451-WC33G	USEPA 8270D	Hexachlorobutadiene	87-68-3	19	µg/kg	U	DNR	DNR
WC33	HA-09-0-10-013013	13-2451-WC33G	USEPA 8270D	N-Nitrosodiphenylamine	86-30-6	19	µg/kg	U	DNR	DNR
WC33	HA-09-0-10-013013	13-2451-WC33G	USEPA 8270D	Pentachlorophenol	87-86-5	190	µg/kg	U	DNR	DNR
WC33	HA-09-0-10-013013	13-2451-WC33G	USEPA 8270D-SIM	Hexachlorobenzene	118-74-1	4.7	µg/kg	U	DNR	DNR
WC33	HA-09-0-10-013013	13-2451-WC33G	USEPA 8270D-SIM	Hexachlorobutadiene	87-68-3	4.7	µg/kg	U	DNR	DNR
WF78	SG-08-0-10-013113	13-4034-WF78A	USEPA 7471A	Mercury	7439-97-6	0.31	mg/kg		J	J

Abbreviations:

CAS Chemical abstract number.
DV Data Validation.
µg/kg Micrograms per kilogram.
µg/L Micrograms per liter.
mg/kg Milligrams per kilogram.
USEPA U.S. Environmental Protection Agency.

Qualifiers:

Lab Qualifiers:

B Indicates possible/probable blank contamination. Flagged when the analyte is detected in the blank as well as the sample.
J Estimated concentration when value is less than established reporting limits.
Q Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria.
U Indicates that the target analyte was not detected at the reported concentration.

Validation Qualifiers:

DNR Do not report. A more appropriate result is reported from another dilution or analysis.
J Result should be considered estimated due to QA/QC concerns.
MP Poor chromatographic match to analyte standard.

Interpreted Qualifiers:

DNR Do not report. A more appropriate result is reported from another dilution or analysis.
JM Concentration should be considered estimated due to poor chromatographic match with analyte standard.
UB Analyte is considered not detected at an elevated reporting limit due to blank contamination.

Harris Avenue Shipyard

Remedial Investigation/ Feasibility Study

Appendix E
Boring Logs, Monitoring Well Construction Logs, and Sediment Core Logs

FINAL

RETEC

BORING LOG
B-1

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: 3-3579-150 Phase 2 Sampling		CLIENT: Port of Bellingham
LOCATION: Bellingham, Washington; Harris Avenue Shipyard, NE of Sand Blast Shed		DRILLING CO.: Cascade Drilling
START DATE: 04/29/98 TIME: 08:15	BORING ID: 8 inches	DRILLER: Rodney
COMPLETION DATE: 04/29/98 TIME: 10:00	BORING DEPTH: 14.0 feet bgs	RIG TYPE: Limited Access
WATER LEVEL DURING DRILLING: 10.0' bgs	SURFACE ELEV.:	METHOD: Hollow-stem Auger
DATE MEASURED: 14/29/98	M. P. ELEVATION:	LOGGED BY: J. J. Henley

DEPTH (in feet)	SAMPLE DATA TYPE	DEPTH	BLOWS/6"	% RECOVERY	PID (ppm)	U.S.C.S.	LITHOLOGY	SOIL DESCRIPTION
0						GW		ASPHALT
								FILL: Appears clean; no evidence of wood debris, paint chips or sand blast grit.
	H				11.2	SW		SAND WITH GRAVEL: Brown; fine- to coarse-grained; with fine to coarse gravel; trace fine cobbles; trace to 5% fines; damp; no sheen; no odor.
5	SS		50 50/3"	33	20.3			*5.0'* – Trace fine cobbles (one in shoe); damp to slightly moist; no sheen; no odor.
	SS		20 50	80	22.4			*6.5'–7.5'* – No cobbles.
	SS		50	28	6.8	SW		SAND WITH SILT: Brown with slight gray tint; very fine- to coarse-grained; with 5% to 10% silt; trace clay; moist; no sheen; no odor.
								8.0' – Brown with slight tan tint; with 5% silt; with 5% fine to medium gravels; moist; no sheen; no odor.
10	SS			0		▽		NO RECOVERY
	SS		37 50/4"	33	8.5	SW		SAND: Brown/gray; very fine- to coarse-grained; with 5% to 10% silt; with fine gravel; trace medium gravel; trace clay; saturated; no sheen; no odor.
	SS		37 50	44	2.1			*12.5'* – With 5% fine to medium gravel.
15								Total depth = 14.0 feet bgs.
20								

REMARKS: Boring was backfilled with bentonite chips.
H – Hand Auger
SS – Split Spoon
■ – Analytical Sample
▨ – Sample Interval

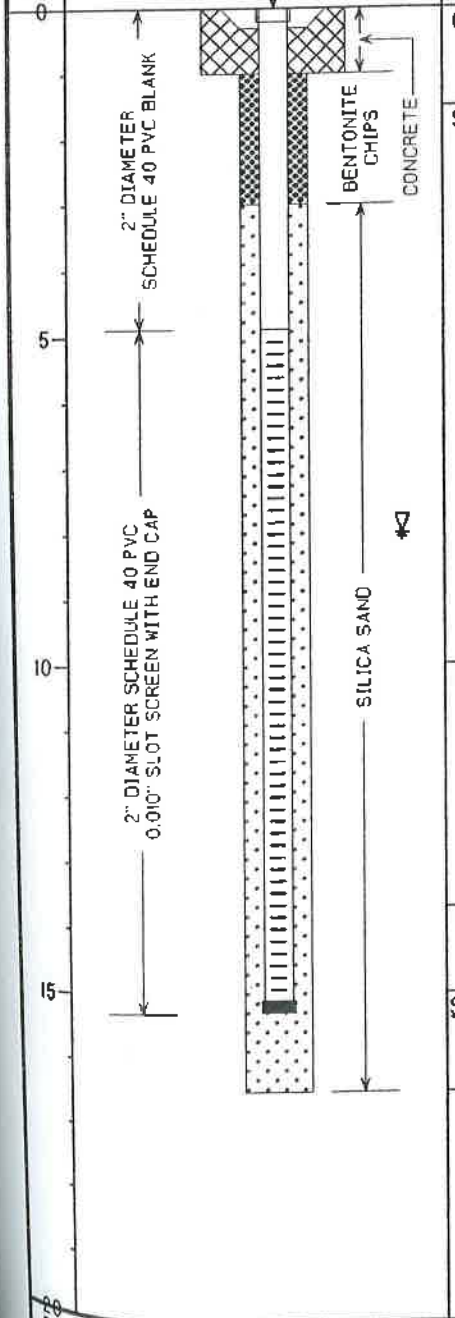
D-1-1-H-00427

RETEC

WELL INSTALLATION LOG
Monitoring Well MW-1

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: 3-3579-150 Phase 2 Sampling		CLIENT: Port of Bellingham
LOCATION: Bellingham, Washington; E of Marine Railway, S of Pier Building		DRILLING CO.: Cascade Drilling
START DATE: 04/28/98 TIME: 17:00	BORING ID: 8 inches	DRILLER: Rodney
COMPLETION DATE: 04/28/98 TIME: 18:30	TOTAL DEPTH: 16.5 feet bgs	RIG TYPE: Limited Access
WATER LEVEL DURING DRILLING: 8.0' bgs	TOP OF CASING: 13.96 feet MLLW	METHOD: Hollow-stem Auger
SURFACE ELEV.: 14.30 feet MLLW	MP ELEV.: 13.96 feet MLLW	LOGGED BY: J. J. Henley



DEPTH (in feet)	U.S.C.S.	LITHOLOGY	SOIL DESCRIPTION	TYPE	DEPTH	BLOWS/6"	% RECOVERY	PID (ppm)
0	GP		GRAVEL WITH SAND: Gray/black; tightly packed.					
			0.5' – Trace wood debris; nail.					
	SW		SAND WITH GRAVEL: Gray/black; very fine- to coarse-grained; with fine to medium gravel; 10% fines; no sheen; no odor.	H				7.0
5			5.0' – Brown; trace fine gravel.	SS		16 50	33	3.0
			5.2'-5.5' – Gray; trace fine gravel; moist.					
			7.5'-8.0' – Moist.	SS		16 32 50/4"	60	150
10			8.5'-9.0' – Grades to fine- to coarse-grained sand; with fine gravel; 5% to 10% fines; very moist to saturated; slight LNAPL on surface; petroleum odor.					
	SP		SAND: Gray; very fine- to medium-grained; 10% fines; saturated; slight sheen; slight petroleum odor.	SS		NR	80	7.4
			12.5'-13.7' – Grades to fine- to medium-grained sand; trace fine gravel; little to no fines; saturated; no sheen; no odor.	SS		20 50	90	2.6
	SM		SILTY SAND: Gray; very fine-grained; trace clay; not sticky; no sheen; no odor.					
15	SP-SM		SAND WITH SILT: Gray; very fine-grained, with fine-grained; with silt; 5% to 10% shell material; trace clay; trace fine cobble; trace coarse gravel; very saturated; no sheen; no odor.	SS		30 50/5"	60	2.1
			Total depth = 16.5 feet bgs.					
20								

REMARKS:
H – Hand Auger
NR – Not Recorded
SS – Split Spoon
■ – Analytical Sample
⊠ – Sample Interval

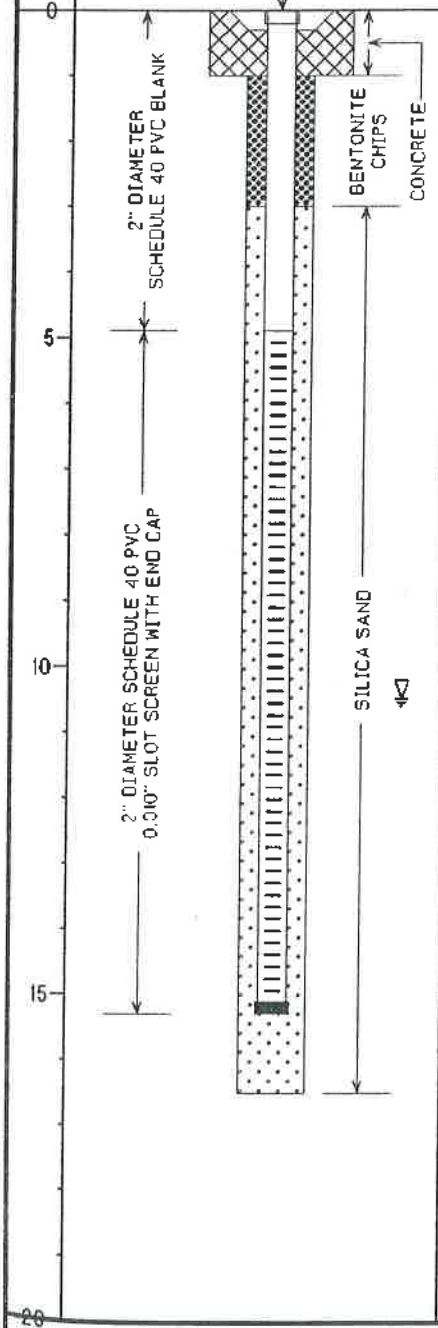
D-1-1-H-00428

RETEC

WELL INSTALLATION LOG
Monitoring Well MW-2

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-3579-150 Phase 2 Sampling*		CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington; Harris Ave. Shipyard N of Water Treatment Building*		DRILLING CO.: *Cascade Drilling*
START DATE: *04/28/98* TIME: *12:18*	BORING ID: *8 inches*	DRILLER: *Rodney*
COMPLETION DATE: *04/28/98* TIME: *13:20*	TOTAL DEPTH: *16.5 feet bgs*	RIG TYPE: *Limited Access*
WATER LEVEL DURING DRILLING: *10.5' bgs*	TOP OF CASING: *15.05 feet MLLW*	METHOD: *Hollow-stem Auger*
SURFACE ELEV.: *15.32 feet MLLW*	MP ELEV.: *15.05 feet MLLW*	LOGGED BY: *J. J. Henley*



DEPTH (in feet)	U.S.C.S.	LITHOLOGY	SOIL DESCRIPTION	TYPE	DEPTH	BLOWS/6"	% RECOVERY	PID (ppm)
0	SW		SAND: Brown; fine- to coarse-grained; 5% fine to medium gravel; 5% to 10% fines; damp; no sheen; no odor.	H				25
5	SW		SAND: Brown; fine- to coarse-grained; with 5% to 10% fines; damp; no sheen; no odor.	SS		50 50/3"	NR	5.7
	SP		SAND: Black (oily appearance); very fine- to fine-grained; trace fines; moist to very moist; LNAPL on surface during shake test; strong petroleum odor.	SS		32 47 48	NR	44.7
10	SW		*9.5'-10.0'* - Grades to brown gravelly sand; slight petroleum odor.	SS		8 11 14	67	6.1
			SAND: Brown/gray; very fine- to coarse-grained; ~10% fines; trace coarse gravel; very moist; no sheen; no odor.	SS		21 27 30	33	4.8
			10.5'-10.8' - Grades to gray very fine- to fine-grained.					
			10.8'-11.0' - With 10% fine to medium gravel; saturated.					
15	SP		*12.0'* - Grades to brown/gray very fine- to coarse-grained; 10% fines; trace fine gravel; very saturated.	SS		50 50/3"	44	2.8
			SAND: Gray; very fine- to fine-grained, trace coarse-grained; 10% to 15% fines; very saturated; no sheen; no odor.					
20			Total depth = 16.5 feet bgs.					

REMARKS:
H - Hand Auger
NR - Not Recorded
SS - Split Spoon
■ - Analytical Sample
▣ - Sample Interval

D-1-1-H-00429

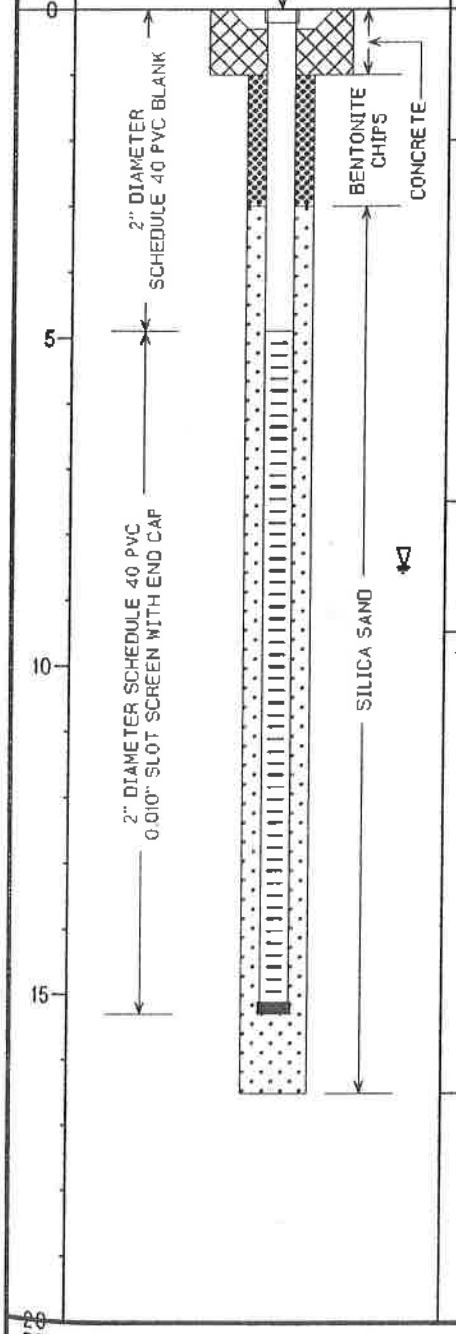
REMEDIATION TECHNOLOGIES, INC.
A Thermo Electron Company

RETEC

WELL INSTALLATION LOG
Monitoring Well MW-3

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: 3-3579-150 Phase 2 Sampling		CLIENT: Port of Bellingham
LOCATION: Bellingham, Washington; Harris Ave. Shipyard, W of Fabrication Building		DRILLING CO.: Cascade Drilling
START DATE: 04/28/98 TIME: 10:49	BORING ID: 8 inches	DRILLER: Rodney
COMPLETION DATE: 04/28/98 TIME: 11:50	TOTAL DEPTH: 16.5 feet bgs	RIG TYPE: Limited Access
WATER LEVEL DURING DRILLING: 8.5' bgs	TOP OF CASING: 14.78 feet MLLW	METHOD: Hollow-stem Auger
SURFACE ELEV.: 15.27 feet MLLW	MP ELEV.: 14.78 feet MLLW	LOGGED BY: J. J. Henley



DEPTH (in feet)	U.S.C.S.	LITHOLOGY	SOIL DESCRIPTION	TYPE	DEPTH	BLOWS/6"	% RECOVERY	PID (ppm)
0	GW		GRAVEL: Gray; appears clean (new).					
			1.5' – Darker; appears clean.					
	SW		SAND: Brown; very fine- to fine-grained; trace shell fragments; dry to damp; no sheen; no odor.	H		NR	NR	0.0
5			*5.0'* – No sheen; no odor.	SS		55	20	1.8
			5.5' – Rocks.					
	SW		SAND WITH GRAVEL: Gray/brown; fine- to coarse-grained; with fine gravel, trace medium gravel; ~5% shell fragments; moist; no sheen; no odor.	SS		47 42 32	33	4.2
10	SP		SAND: Gray; very fine- to fine-grained; trace fines; 5% shells; very moist to saturated; no sheen; no odor.	SS		16 16 19	95	0.0
			10.5' – Trace wood debris.					
			10.5'–11.2' – 10% shell fragments.					
			12.5' – 5% to 10% fines; trace to 5% wood/plant debris; 5% shell fragments; saturated; sand-size brown particles; no sheen; no odor.	SS		12 13 17	80	0.0
15				SS		22 30 35	75	0.0
			Total depth = 16.5 feet bgs.					
20								

REMARKS: Blow counts for 7.5' & 12.5' inaccurate due to insufficient rig height
H – Hand Auger
SS – Split Spoon
▮ – Analytical Sample
▯ – Sample Interval

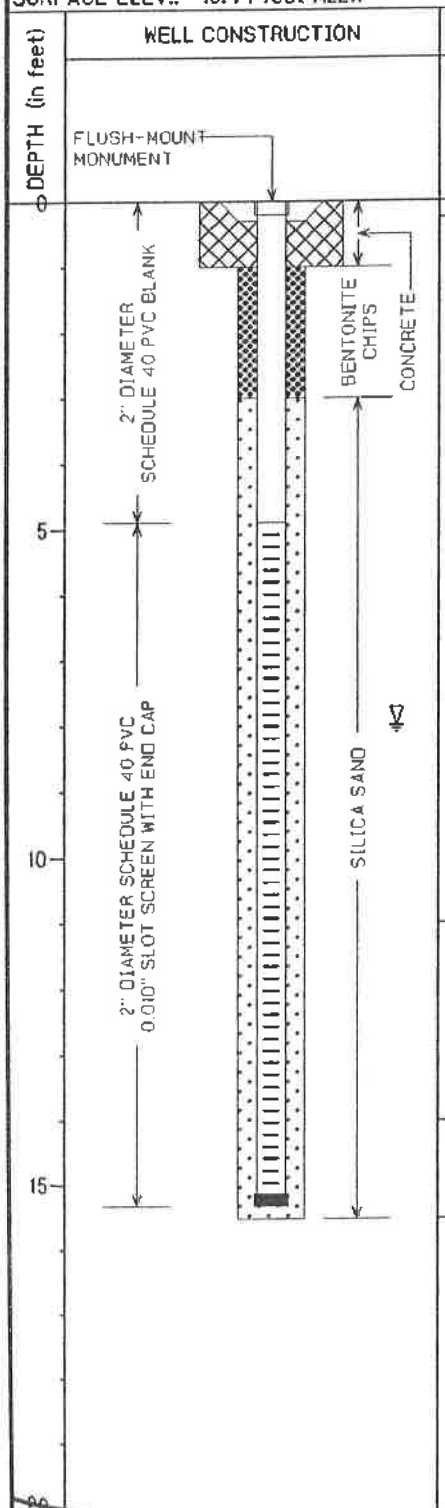
D-1-1-H-00430

RETEC

WELL INSTALLATION LOG
Monitoring Well MW-4

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-3579-150 Phase 2 Sampling*		CLIENT: *Port of Bellingham*	
LOCATION: *Bellingham, Washington; Harris Ave. Shipyard, N of Sand Blast Shed*		DRILLING CO.: *Cascade Drilling*	
START DATE: *04/28/98* TIME: *14:20*	BORING ID: *8 inches*	DRILLER: *Rodney*	
COMPLETION DATE: *04/28/98* TIME: *16:40*	TOTAL DEPTH: *15.5 feet bgs*	RIG TYPE: *Limited Access*	
WATER LEVEL DURING DRILLING: *8.0' bgs*	TOP OF CASING: *16.01 feet MLLW*	METHOD: *Hollow-stem Auger*	
SURFACE ELEV.: *16.44 feet MLLW*	MP ELEV.: *16.01 feet MLLW*	LOGGED BY: *J. J. Henley*	



DEPTH (in feet)	U.S.C.S.	LITHOLOGY	SOIL DESCRIPTION	TYPE	DEPTH	BLOWS/6"	% RECOVERY	PID (ppm)
0	SW		ASPHALT SAND: Black/brown; very fine- to fine-grained; with fine to coarse gravel; ~5% to 10% fines; 5% wood debris (¼-inch particles); organic odor.					
			1.5' – Metal plate (1 foot long, 3 inches wide).	H				23.5
			2.0'–3.0' – Trace 1-inch wood fragments.	H				27.2
			3.0' – Brown; damp; no sheen; organic odor.	H				0.0
5			*5.0'–5.5'* – Grades to very fine- to coarse-grained; trace fine gravel; trace small wood debris (¼-inch particles); dense; no sheen; no odor.	SS		9 12 15	44	0.0
			6.5' – Brown/tan; 10% fines; moderately densely packed; no sheen; no odor.	SS		12 15 19	100	0.0
			8.0' – Brown; very fine- to medium-grained, with trace coarse-grained; ~10% fines; moist; no sheen; no odor.	SS		20 27 32	61	0.0
10			*9.5'* – Very moist.	SS		25 30 37	39	0.0
				SS		50 50/ 5"	0	
			NO RECOVERY	SS		23 27 28	0	
15	SW		SAND: Gray/brown; fine- to coarse-grained; with fine to coarse gravel; trace fines; very saturated; moderately dense; no sheen; no odor.	SS		32 45 47	80	0.0
			Total depth = 15.5 feet bgs.					
20								

REMARKS:
H – Hand Auger
SS – Split Spoon
■ – Analytical Sample
▯ – Sample Interval

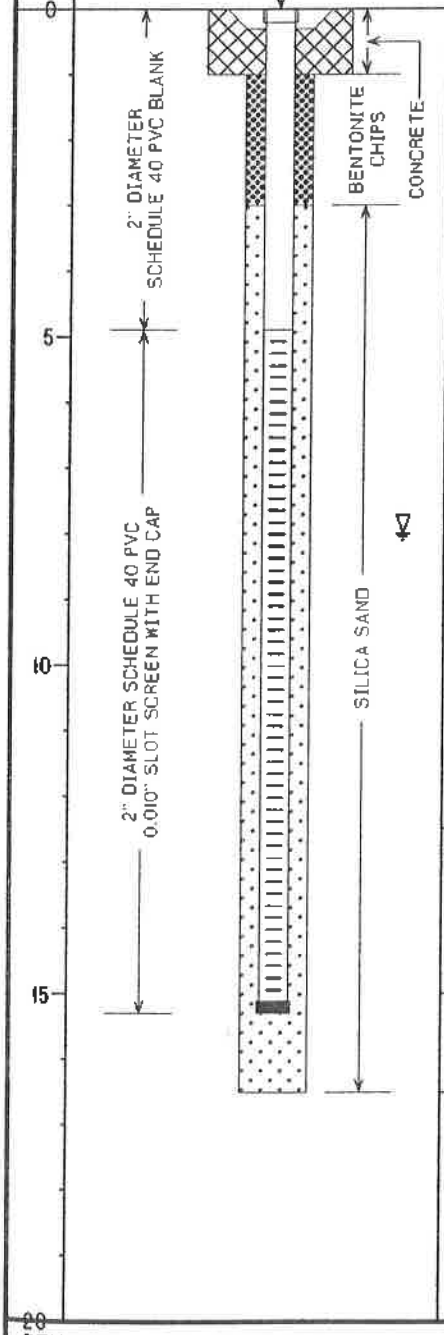
D-1-1-H-00431

RETEC

WELL INSTALLATION LOG
Monitoring Well MW-5

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: 3-3579-150 Phase 2 Sampling		CLIENT: Port of Bellingham
LOCATION: Bellingham, Washington; Harris Avenue Shipyard, SE of Main Office		DRILLING CO.: Cascade Drilling
START DATE: 04/29/98 TIME: 10:40	BORING ID: 8 inches	DRILLER: Rodney
COMPLETION DATE: 04/29/98 TIME: 12:10	TOTAL DEPTH: 16.5 feet bgs	RIG TYPE: Limited Access
WATER LEVEL DURING DRILLING: 8.0' bgs	TOP OF CASING: 15.43 feet MLLW	METHOD: Hollow-stem Auger
SURFACE ELEV.: 15.67 feet MLLW	MP ELEV.: 15.43 feet MLLW	LOGGED BY: J. J. Henley



DEPTH (in feet)	U.S.C.S.	LITHOLOGY	SOIL DESCRIPTION	TYPE	DEPTH	BLOWS/6"	% RECOVERY	PID (ppm)
0	GW		GRAVEL: Clean (new).					
	SW		SAND: Brown with very slight orange tint; very fine- to coarse-grained; fine to coarse gravel; with 10% silt; trace clay; damp; no sheen; no odor.	H				0.0
5	ML		SILT WITH SAND AND GRAVEL: Brown; very fine-grained sand; fine to medium gravel; discontinuous ¼-inch line of black sandy silt (does not appear to be sand blast grit); trace clay; densely packed; no sheen; no odor.	SS		37 50/ 4"	33	0.0
	SM		SILTY SAND: Brown; fine to medium gravel; moist to very moist; no sheen; no odor.	SS		23 50/ 4"	65	0.0
	SP		7.9' - Trace coarse gravel.					
10			SAND WITH GRAVEL: Brown with an orange tint; very fine- to coarse-grained; with fine gravel; 5% to 10% silt; very moist to saturated; dense; no sheen; no odor.	SS		50	33	0.0
			10.0'-10.5' - Very small discontinuous silt/clay lense (coating around gravel); weathered rock; saturated; no sheen; no odor.					
	SP-SM		SAND WITH SILT: Brown; very fine- to fine-grained with trace coarse-grained; with silt; trace clay; 3-inch cobble and angular gravel in shoe; very saturated; no sheen; no odor.	SS		50/ 5"	11	0.0
15	SP		SAND: Brown; very fine- to coarse-grained; with fine to medium gravel; trace silt; very saturated; moderately densely packed; no sheen; no odor.	SS		38 50/ 4"	80	NR
			Total depth = 16.5 feet bgs.					
20								

REMARKS:
H - Hand Auger
NR - Not Recorded
SS - Split Spoon
▪ - Analytical Sample
⊠ - Sample Interval

D-1-1-H-00432

REMEDIATION TECHNOLOGIES, INC.
A Thermo Electron Company

RETEC

TEST PIT LOG
TP-2

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-3579-130 Phase 2 Sampling*		CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington; Harris Avenue Shipyard, SE of Paint Shop*		CONTRACTOR: *CECon*
START DATE: *04/27/98* TIME: *09:00*	TEST PIT DEPTH: *8.0 feet bgs*	OPERATOR:
COMPLETION DATE: *04/27/98* TIME: *09:30*	SURFACE ELEV.:	EQUIPMENT: *Backhoe*
WATER LEVEL, IF ENCOUNTERED: *' bgs*	DATE MEASURED:	LOGGED BY: *J. J. Henley*

DEPTH (in feet)	SAMPLE DATA: TYPE	DEPTH	PID (ppm)	U.S.C.S.	LITHOLOGY	SOIL DESCRIPTION
0	G		0.0	GW		GRAVEL: Gray-tan; clean.
	G		0.0	GP		SANDY GRAVEL: Fine to medium; with medium-grained sand; trace fines; dry to slightly moist; very dense; no odor.
5				SP		GRAVELLY SAND: Dark brown-orange; fine- to medium-grained; trace fines; with fine to coarse gravel; ~20% debris (wood boards, metal fragments, glass); no sheen; no odor. *2.5'* – Glacial outwash; very dense gravel and fines.
	G		0.0	SP		SAND WITH GRAVEL: Brown to light orange; medium- to coarse-grained; with 5% fine gravel; trace fines; moist; no sheen; no odor.
10						Total depth = 8.0 feet bgs.
15						
20						

REMARKS: G – Grab Sample
0 – Sample Interval

D-1-1-H-00411

RETEC

TEST PIT LOG
TP-3

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: 3-3579-130 Phase 2 Sampling		CLIENT: Port of Bellingham
LOCATION: Bellingham, Washington; Harris Avenue Shipyard, SW of Paint Shop		CONTRACTOR: CECon
START DATE: 04/27/98 TIME: 14:30	TEST PIT DEPTH: 8.0 feet bgs	OPERATOR:
COMPLETION DATE: 04/27/98 TIME: 15:25	SURFACE ELEV.:	EQUIPMENT: Backhoe
WATER LEVEL, IF ENCOUNTERED: 'bgs	DATE MEASURED:	LOGGED BY: J. J. Henley

DEPTH (in feet)	SAMPLE DATA: TYPE	DEPTH	PID (ppm)	U.S.C.S.	LITHOLOGY	SOIL DESCRIPTION
0				GW		GRAVEL: Gray; appears clean.
	G		0.0	SP		SAND WITH GRAVEL: Brown; fine to medium gravel.
						0.7' – Encountered concrete footing.
						0.8' – Medium to coarse gravel; with fine cobble; no evidence of debris.
	G		24.0			3.5' – Dark gray with brown; fine- to medium-grained; with fine gravel; trace debris (bricks, wood fragments); no sheen; petroleum odor.
5						4.5' – >3" cobbles encountered; no sheen; slight petroleum odor.
	G		3.0			7.0' – Light brown; no evidence of debris; no sheen; no odor.
						Total depth = 8.0 feet bgs.
10						
15						
20						

REMARKS: G - Grab Sample
0 - Sample Interval

D-1-1-H-00412

RETEC

TEST PIT LOG
TP-4

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-3579-130 Phase 2 Sampling*		CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington; Harris Avenue Shipyard, S of Sand Blast Shed*		CONTRACTOR: *CECon*
START DATE: *04/27/98* TIME: *13:40*	TEST PIT DEPTH: *8.0 feet bgs*	OPERATOR:
COMPLETION DATE: *04/27/98* TIME: *14:25*	SURFACE ELEV.:	EQUIPMENT: *Backhoe*
WATER LEVEL, IF ENCOUNTERED: *'bgs*	DATE MEASURED:	LOGGED BY: *J. J. Henley*

DEPTH (in feet)	SAMPLE DATA: TYPE	SAMPLE DATA: DEPTH	SAMPLE DATA: PID (ppm)	U.S.C.S.	LITHOLOGY	SOIL DESCRIPTION
0	G			GW		GRAVEL: Gray; clean.
	G			SP		*0.5'* – Brown.
	G					SAND WITH GRAVEL: Dark brown/black/orange; fine- to medium-grained, trace coarse-grained; with fine to medium gravel; ~20% sand blast grit; <5% debris.
	G					*1.6'* – ¼" to ½" wood debris layer.
						2.0' – Another wood layer; pieces of rope; concrete fragments; metal rod.
						3.0' – Tan/light brown; ~5% fines; appears to be less debris; no sheen; no odor.
5						*3.0'–5.0'* – Wood debris.
	G					*5.0'* – Trace medium cobble; little to no debris.
						6.0'–8.0' – No debris.
10						Total depth = 8.0 feet bgs.
15						
20						

REMARKS: G – Grab Sample
▯ – Sample Interval

D-1-1-H-00413

RETEC

TEST PIT LOG
TP-5

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-3579-130 Phase 2 Sampling*		CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington; N of Trailer Adjacent to Fabrication Building*		CONTRACTOR: *CECon*
START DATE: *04/27/98* TIME: *11:50*	TEST PIT DEPTH: *7.5 feet bgs*	OPERATOR:
COMPLETION DATE: *04/27/98* TIME: *12:35*	SURFACE ELEV.:	EQUIPMENT: *Backhoe*
WATER LEVEL, IF ENCOUNTERED: *' bgs*	DATE MEASURED:	LOGGED BY: *J. J. Henley*

DEPTH (in feet)	SAMPLE DATA: TYPE	SAMPLE DATA: DEPTH	SAMPLE DATA: PID (ppm)	U.S.C.S.	LITHOLOGY	SOIL DESCRIPTION
0	G		0.0	GW		GRAVEL; Clean; very dense.
						0.7'-1.2' - Darker appearance.
	G			SP		SAND; Dark brown; very fine- to medium-grained; ~5% silt; fine to medium gravel; debris layer; <5% metal fragments.
				SP		SAND WITH GRAVEL; Fine- to coarse-grained; with fine gravel; trace shell fragments; trace fines; damp; no sheen; no odor.
				SP		*3.0'-3.2'* - With 15% shells.
5	ARCH					SAND; Brown; fine- to medium-grained; trace shell fragments; appears clean; no sheen; no odor.
						5.0'-7.5' - Grades to very fine- to medium-grained; 10% shell fragments; moist; moderately loose; no sheen; no odor.
10						Total depth = 7.5 feet bgs.
15						
20						

REMARKS: ARCH - Archived Grab Sample
G - Grab Sample
⊠ - Sample Interval

D-1-1-H-00414

RETEC

TEST PIT LOG
TP-6

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: 3-3579-130 Phase 2 Sampling		CLIENT: Port of Bellingham
LOCATION: Bellingham, Washington; Harris Avenue Shipyard, SW of Fabrication Building		CONTRACTOR: CECon
START DATE: 04/27/98 TIME: 09:40	TEST PIT DEPTH: 8.0 feet bgs	OPERATOR:
COMPLETION DATE: 04/27/98 TIME: 10:20	SURFACE ELEV.:	EQUIPMENT: Backhoe
WATER LEVEL, IF ENCOUNTERED: 'bgs	DATE MEASURED:	LOGGED BY: J. J. Henley

DEPTH (in feet)	SAMPLE DATA: TYPE	DEPTH	PID (ppm)	U.S.C.S.	LITHOLOGY	SOIL DESCRIPTION
0	G		0.0	GP		GRAVEL WITH SAND; Brown to dark brown; fine to medium; with very fine-grained sand; and silt (outwash); ~20% debris (wood, metal); dense; rusty odor.
	G		0.0			*1.3'-1.5'* – Wood debris; ~3" diameter tree.
				SP		SAND; Tan; very fine- to fine-grained; damp; no odor.
	G					*2.5'* – Shell layer; ~15% white shells.
						3.0' – Grades to fine- to medium-grained; with trace shell debris; appears very clean.
5	G		0.0			*6.5'* – Medium tan; mixed with white shells; moist to very moist.
				GP		GRAVEL WITH SAND; Gray-brown; fine to medium with trace coarse; fine- to coarse-grained sand; ~10% shell fragments; very moist; no sheen; no odor.
						Total depth = 8.0 feet bgs.
10						
15						
20						

REMARKS: G – Grab Sample
▯ – Sample Interval

D-1-1-H-00415

RETEC

TEST PIT LOG
TP-7

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-3579-130 Phase 2 Sampling*		CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington; Harris Avenue Shipyard, W of Fabrication Building*		CONTRACTOR: *CECon*
START DATE: *04/27/98* TIME: *10:30*	TEST PIT DEPTH: *7.0 feet bgs*	OPERATOR:
COMPLETION DATE: *04/27/98* TIME: *11:00*	SURFACE ELEV.:	EQUIPMENT: *Backhoe*
WATER LEVEL, IF ENCOUNTERED: *' bgs*	DATE MEASURED:	LOGGED BY: *J. J. Henley*

DEPTH (in feet)	SAMPLE DATA: TYPE	DEPTH	PID (ppm)	U.S.C.S.	LITHOLOGY	SOIL DESCRIPTION
0	G		0.0	GW		GRAVEL; Clean.
				GP		GRAVEL WITH SAND; Fine to medium; with medium-, trace fine-grained sand; trace shell fragments; no sheen; no odor.
	ARCH		0.0	SP		SAND WITH GRAVEL; 10% shell fragments; moist; no odor.
	ARCH		0.0	SP		SAND; Tan; fine- to medium-grained; trace shell fragments; no sheen; no odor.
	ARCH					*3.2'-5.0'* - Gray-tan; coarse-grained (trace medium-grained); fine gravel; 15% shell fragments; moist to very moist; moderately loose; no sheen; no odor.
5						*5.0'-7.0'* - With 5% coarse gravel; trace fine cobble.
						Total depth = 7.0 feet bgs.
10						
15						
20						

REMARKS: ARCH - Archived Grab Sample
G - Grab Sample
▯ - Sample Interval

D-1-1-H-00416

RETEC

TEST PIT LOG
TP-8

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-3579-130 Phase 2 Sampling*		CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington; Harris Avenue Shipyard, NW of Fabrication Building*		CONTRACTOR: *CECon*
START DATE: *04/27/98* TIME: *11:05*	TEST PIT DEPTH: *5.0 feet bgs*	OPERATOR:
COMPLETION DATE: *04/27/98* TIME: *11:37*	SURFACE ELEV.:	EQUIPMENT: *Backhoe*
WATER LEVEL, IF ENCOUNTERED: *'bgs*	DATE MEASURED:	LOGGED BY: *J. J. Henley*

DEPTH (in feet)	SAMPLE DATA: TYPE	DEPTH	PID (ppm)	U.S.C.S.	LITHOLOGY	SOIL DESCRIPTION
0	6		0.0	GW		GRAVEL: Tan/gray; some patches of sand blast grit noted on surface.
						0.5' – Metal debris (2' metal fragment, metal nails); wood debris; ¼" thick layer of sand blast grit; black gravel with sand; densely packed; no sheen; no odor.
	6		0.0	SP		SAND WITH GRAVEL: Brown/gray; very fine- to medium-grained; with fine to medium gravel; trace shell fragments; trace fines; no sheen; no odor.
						1.2' – With ~5% shell fragments; moist; no sheen; no odor.
	ARCH		0.0			
5						Total depth = 5.0 feet bgs.
10						
15						
20						

REMARKS:
ARCH – Archived Grab Sample
G – Grab Sample
▯ – Sample Interval

D-1-1-H-00417

RETEC

TEST PIT LOG
TP-9

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: 3-3579-130 Phase 2 Sampling		CLIENT: Port of Bellingham
LOCATION: Bellingham, Washington; Harris Ave. Shipyard, S of Water Treatment Bldg.		CONTRACTOR: CECon
START DATE: 04/30/98 TIME: 13:45	TEST PIT DEPTH: 8.1 feet bgs	OPERATOR:
COMPLETION DATE: 04/30/98 TIME: 14:15	SURFACE ELEV.:	EQUIPMENT: Backhoe
WATER LEVEL, IF ENCOUNTERED: 'bgs	DATE MEASURED:	LOGGED BY: J. J. Henley

DEPTH (in feet)	SAMPLE DATA: TYPE	DEPTH	PID (ppm)	U.S.C.S.	LITHOLOGY	SOIL DESCRIPTION
0	G			GW		GRAVEL: Clean.
	G		101	SW		*0.3'* – ½" layer of sand blast grit.
				SP		SAND WITH GRAVEL: Brown; fine- to coarse-grained; with fine to coarse gravel; fine cobbles; wood debris (1' long section); damp.
				ML		SAND: Black/dark gray; very fine- to medium-grained; with fine gravel; LNAPL on surface during sheen test; strong petroleum odor.
						2.0'-2.5' – Black/white shells; wet; petroleum odor.
5						SILT WITH SAND: Gray/green; with very fine-grained (trace medium- to coarse-) sand; ~5% clay; moist; slight sheen on surface; strong petroleum odor.
	G		160			
	G		171			*7.0'* – 10% to 15% clay; very moist; moderately densely packed; slight sheen; petroleum odor.
	G		58			*8.0'* – Densely packed.
						Total depth = 8.1 feet.
10						
15						
20						

REMARKS: G – Grab Sample
B – Sample Interval

D-1-1-H-00418

RETEC

TEST PIT LOG
TP-10

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: 3-3579-130 Phase 2 Sampling		CLIENT: Port of Bellingham
LOCATION: Bellingham, Washington; Harris Avenue Shipyard, E of Water Treatment		CONTRACTOR: CECon
START DATE: 04/27/98 TIME: 16:20	TEST PIT DEPTH: 8.0 feet bgs	OPERATOR:
COMPLETION DATE: 04/27/98 TIME: 16:45	SURFACE ELEV.:	EQUIPMENT: Backhoe
WATER LEVEL, IF ENCOUNTERED: 'bgs	DATE MEASURED:	LOGGED BY: J. J. Henley

DEPTH (in feet)	SAMPLE DATA: TYPE	SAMPLE DATA: DEPTH	SAMPLE DATA: PID (ppm)	U.S.C.S.	LITHOLOGY	SOIL DESCRIPTION
0	G			GW		GRAVEL: Appears clean.
						1.2' – 2" layer of sand blast grit.
				SP		SAND: Brown; fine- to medium-grained (trace coarse-); trace medium to coarse gravel; trace shells; <5% wood debris; no sheen; no odor.
	ARCH					
5						5.0' – Gray; very fine- to fine-grained; with fine to medium gravel; and 5% fines; moist; no sheen; no odor.
						8.0' – Moist to very moist.
						Total depth = 8.0 feet bgs.
10						
15						
20						

REMARKS:
ARCH – Archived Grab Sample
G – Grab Sample
Ø – Sample Interval

D-1-1-H-00419

RETEC

TEST PIT LOG
TP-11

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-3579-130 Phase 2 Sampling*			CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington; Harris Ave. Shipyard, NE of Water Treatment Bldg.*			CONTRACTOR: *CECon*
START DATE: *04/30/98* TIME: *08:00*	TEST PIT DEPTH: *5.0 feet bgs*		OPERATOR:
COMPLETION DATE: *04/30/98* TIME: *08:50*	SURFACE ELEV.:		EQUIPMENT: *Backhoe*
WATER LEVEL, IF ENCOUNTERED: *' bgs*	DATE MEASURED:		LOGGED BY: *J. J. Henley*

DEPTH (in feet)	SAMPLE DATA: TYPE	DEPTH	PID (ppm)	U.S.C.S.	LITHOLOGY	SOIL DESCRIPTION
0				GW		GRAVEL: Clean (on top of cloth).
	G		2.4	SP		SAND: Brown; medium- to coarse-grained; dry; very dense; no odor.
				GP		GRAVEL WITH COBBLES: Medium to coarse- with cobbles; with sand; very densely packed.
				SP-SM		
	G		20	SP		SAND WITH SILT: Dark gray/black; very fine-grained; with silt; with gravel; no odor.
	G		4.8	SP		SAND: Brown; fine- to coarse-grained; with fine gravel; with 5% to 10% silt; trace shell fragments; trace wood debris; damp to slightly moist; no sheen; no odor.
5						SAND WITH GRAVEL: Brown; fine- to coarse-grained; with 5% fine to medium gravel; ~5% to 10% shell fragments; trace rootlets; little to no fines; no sheen; no odor.
						4.3' – Wooden piling laying down parallel (north-south) with pit; ~2' long metal rod encountered between piling and concrete; trace other wood debris.
						5.0' – Encountered large (>5") concrete blocks; unable to remove.
						Total depth = 5.0 feet bgs.
10						
15						
20						

REMARKS: G – Grab Sample
▮ – Sample Interval

D-1-1-H-00420

RETEC

TEST PIT LOG
TP–13

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-3579-130 Phase 2 Sampling*			CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington; Harris Avenue Shipyard, SW of Pier Building*			CONTRACTOR: *CECon*
START DATE: *04/30/98* TIME: *12:15*	TEST PIT DEPTH: *7.0 feet bgs*		OPERATOR:
COMPLETION DATE: *04/30/98* TIME: *13:10*	SURFACE ELEV.:		EQUIPMENT: *Backhoe*
WATER LEVEL, IF ENCOUNTERED: *' bgs*	DATE MEASURED:		LOGGED BY: *J. J. Henley*

DEPTH (in feet)	SAMPLE DATA: TYPE	DEPTH	PID (ppm)	U.S.C.S.	LITHOLOGY	SOIL DESCRIPTION
0				SP		GRAVELLY SAND: Light brown/tan; dry; densely packed; sand blast grit on surface.
	6		0.0	SP		SAND WITH GRAVEL: Dark gray to black; very fine- to fine-grained; with fine to medium gravel; with 5% to 10% silt; 5% shell fragments; damp; trace sand-blast grit; no sheen; no odor.
	6		0.0			
	6		0.0	ML		*2.5'* – Rusty conduit encountered (abandoned, nothing inside); three boards (2 x 4) encountered; no evidence of sand blast grit.
	6		0.0			SILT WITH SAND: Gray/green; with very fine-grained sand; trace clay; with fine to medium gravel; damp to slightly moist; no sheen; no odor.
5	6		0.0	SP-SM		SAND WITH SILT: Dark gray to black; very fine-grained; with silt; fine to medium gravel; trace wood debris; 0.5% sand blast grit; moist; no sheen; no odor.
	6		0.0	SW		SAND AND SILT WITH CLAY: Green/gray; very fine- to coarse-grained; and silt; with 5% to 10% clay; with trace fine gravel (glacial outwash); no sheen.
						7.0' – Encountered large boulder.
						Refusal. Total depth = 7.0 feet bgs.
10						
15						
20						

REMARKS: G - Grab Sample
Ø - Sample Interval

D-1-1-H-00421

TEST PIT LOG
TP-14

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-3579-130 Phase 2 Sampling*			CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington; Harris Avenue Shipyard, SE of Pier Building*			CONTRACTOR: *CECon*
START DATE: *04/30/98* TIME: *09:15*	TEST PIT DEPTH: *5.0 feet bgs*		OPERATOR:
COMPLETION DATE: *04/30/98* TIME: *10:00*	SURFACE ELEV.:		EQUIPMENT: *Backhoe*
WATER LEVEL, IF ENCOUNTERED: *' bgs*	DATE MEASURED:		LOGGED BY: *J. J. Henley*

DEPTH (in feet)	SAMPLE DATA: TYPE	DEPTH	PID (ppm)	U.S.C.S.	LITHOLOGY	SOIL DESCRIPTION
0	G		1.8	SP		SAND WITH GRAVEL: Brown; very fine- to medium-grained; with fine to coarse gravel; dry to damp; no odor.
				SW		SAND WITH GRAVEL: Dark gray to black; very fine- to coarse-grained; with fine to medium gravel; 5% to 10% fines; trace wood debris; trace concrete debris; trace concrete pipe debris; trace shell fragments; slight sheen on water; motor oil odor.
	G		49			*2.5'-4.0'* - LNAPL on surface during sheen test; motor oil/diesel odor.
	G		47			*4.0'-5.0'* - Trace wood debris (piling); diesel/motor oil odor.
5	G		72.3			Total depth = 5.0 feet bgs.
10						
15						
20						

REMARKS: G - Grab Sample
⊠ - Sample Interval

D-1-1-H-00422

TEST PIT LOG
TP-15

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-3579-130 Phase 2 Sampling*			CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington; Harris Avenue Shipyard, SE of Pier Building*			CONTRACTOR: *CECon*
START DATE: *04/27/98* TIME: *16:45*	TEST PIT DEPTH: *8.6 feet bgs*		OPERATOR:
COMPLETION DATE: *04/27/98* TIME: *17:30*	SURFACE ELEV.:		EQUIPMENT: *Backhoe*
WATER LEVEL, IF ENCOUNTERED: *' bgs*	DATE MEASURED:		LOGGED BY: *J. J. Henley*

DEPTH (in feet)	SAMPLE DATA: TYPE	DEPTH	PID (ppm)	U.S.C.S.	LITHOLOGY	SOIL DESCRIPTION
0	G		67.6	SP		SAND: Gray; very fine- to fine-grained (trace coarse-grained); ~10% fines; <5% debris (wood, bricks, cloth material); no sheen; petroleum odor.
	G		41			
5	G		31			*5.0'* – With coarse gravel.
	G		72.5			*6.0'* – Encountered vertical piling on north wall of pit; strong petroleum odor.
	G		49.7			*8.0'* – Petroleum odor.
	G		12.5			
						Total depth = 8.6 feet bgs.
10						
15						
20						

REMARKS: G – Grab Sample
Ø – Sample Interval

D-1-1-H-00423

REMEDIATION TECHNOLOGIES, INC.
A Thermo Electron Company

RETEC

TEST PIT LOG
TP-16

1011 S.W. Klickitat Way
Suite #207
Seattle, Washington 98134
(206) 624-9349

PROJECT NO: *3-3579-130 Phase 2 Sampling*		CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington; Harris Avenue Shipyard, S of Fabrication Building*		CONTRACTOR: *CECon*
START DATE: *04/30/98* TIME: *10:20*	TEST PIT DEPTH: *8.1 feet bgs*	OPERATOR:
COMPLETION DATE: *04/30/98* TIME: *11:00*	SURFACE ELEV.:	EQUIPMENT: *Backhoe*
WATER LEVEL, IF ENCOUNTERED: *' bgs*	DATE MEASURED:	LOGGED BY: *J. J. Henley*

DEPTH (in feet)	SAMPLE DATA TYPE	DEPTH	PID (ppm)	U.S.C.S.	LITHOLOGY	SOIL DESCRIPTION
0	G		0.0	SP-SM		SAND AND SILT (TOP SOIL): Black; very fine-grained; and silt; with fine to coarse gravels; 5% clay; rootlets; wood debris; dry; no sheen; no odor.
				ML		SILT WITH SAND: Tan/light brown; with very fine-grained sand (trace medium- to coarse-grained); 5% to 10% clay.
	G		0.0			DREDGED FILL: 0.5- to 1-foot layers of 20% to 60% shell fragments; very fine- to coarse-grained sand; with fine to medium gravels; and 10% to 20% silt; no sheen; no odor.
5	G		0.0			
	G		0.0	SM		SILTY SAND (NATIVE): Brown; very fine-grained; with 10% to 15% shell fragments; fine to medium gravels; trace clay; no sheen; no odor.
	G		0.0			Total depth = 8.1 feet bgs.
10						
15						
20						

REMARKS: G - Grab Sample
@ - Sample Interval

D-1-1-H-00424

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Monitoring Well ID: MW-2A

Drill Date: March 15, 2011
Logged By: Lisa Meoli
Drilled By: Scott Krueger/Cascade Drilling
Drill Type: Hollow Stem Auger
Sample Method: 18" split spoon
Boring Diameter: 2 inches
Boring Depth (ft bgs): 15 ft
Groundwater ATD (ft bgs): 8 ft

Client: Port of Bellingham
Project: POB-Harris
Site Location: Harris Ave Shipyard
201 Harris Avenue

Ground Surf Elev. & Datum: 15.37
Coord. System: NAD 83/89, NAVD 88 vert
Latitude/Northing: 632258
Longitude/Easting: 1234456
Casing Elevation: 14.95

Remarks:

PID (ppm)	DRIVE / RECOVERY	SAMPLE INTERVAL	DEPTH (ft bgs)	USCS SYMBOL	SOIL DESCRIPTION: (color, grading, primary classification/description, (optional size fraction), secondary classification/description, moisture)	MONITORING WELL DETAIL
0.0			0–1	SP	Dark brown, grading gravelly SAND loose, dry. Rusted metal and nails (FILL).	Flush Mount Monument; Concrete Seal; 2" Sch 40 PVC Blank Casing; Bentonite Chips
0.0			1–4			
25			4–6	SM	Reddish brown, silty SAND with gravel, moist.	
6.3		7.5	6–8	SP	Gray, very fine SAND with gravel, wet. Strong petroleum odor and sheen present.	
5.7			8–12			#2/12 Sand; 2" Sch 40 PVC .010-inch Slotted Screen
0.0			12–13	ML	Gray sandy SILT, medium stiff. Slight petroleum odor and sheen.	
0.0		13.5	13–15		Petroleum odor and sheen diminish.	
			15–20			

Notes:
ft bgs = feet below ground surface
ppm = parts per million
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Monitoring Well ID: MW-06

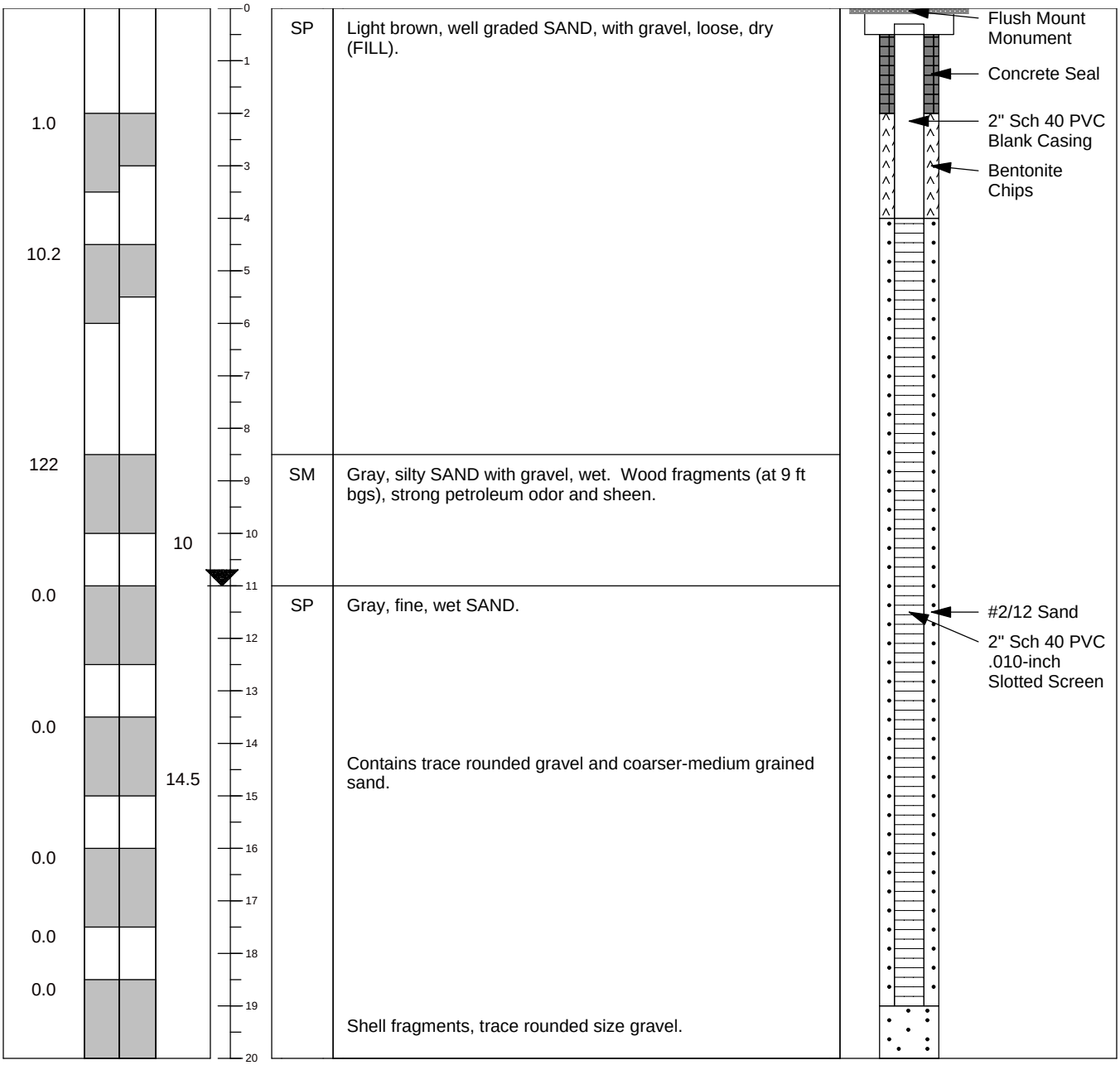
Drill Date: March 14, 2011
Logged By: Lisa Meoli
Drilled By: Scott Krueger/Cascade Drilling
Drill Type: Hollow Stem Auger
Sample Method: 18" split spoon
Boring Diameter: 2 inches
Boring Depth (ft bgs): 20 ft
Groundwater ATD (ft bgs): 11 ft

Client: Port of Bellingham
Project: POB-Harris
Site Location: Harris Ave Shipyard
201 Harris Avenue

Ground Surf Elev. & Datum: 14.58
Coord. System: NAD 83/89, NAVD 88 vert
Latitude/Northing: 632248
Longitude/Easting: 1234636
Casing Elevation: 14.22

Remarks:

PID (ppm)	DRIVE / RECOVERY	SAMPLE INTERVAL	DEPTH (ft bgs)	USCS SYMBOL	SOIL DESCRIPTION: (color, grading, primary classification/description, (optional size fraction), secondary classification/description, moisture)	MONITORING WELL DETAIL
1.0				SP	Light brown, well graded SAND, with gravel, loose, dry (FILL).	
10.2						
122				SM	Gray, silty SAND with gravel, wet. Wood fragments (at 9 ft bgs), strong petroleum odor and sheen.	
		10				
0.0				SP	Gray, fine, wet SAND.	
0.0					Contains trace rounded gravel and coarser-medium grained sand.	
		14.5				
0.0						
0.0						
0.0					Shell fragments, trace rounded size gravel.	



Notes:
ft bgs = feet below ground surface
ppm = parts per million
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Monitoring Well ID: MW-07

Drill Date: March 15, 2011
Logged By: Lisa Meoli
Drilled By: Scott Krueger/Cascade Drilling
Drill Type: Hollow Stem Auger
Sample Method: 18" split spoon
Boring Diameter: 2 inches
Boring Depth (ft bgs): 15 ft
Groundwater ATD (ft bgs): 8 ft

Client: Port of Bellingham
Project: POB-Harris
Site Location: Harris Ave Shipyard
201 Harris Avenue

Ground Surf Elev. & Datum: 15.37
Coord. System: NAD 83/89, NAVD 88 vert
Latitude/Northing: 632127
Longitude/Easting: 1234337
Casing Elevation: 14.95

Remarks:

PID (ppm)	DRIVE / RECOVERY	SAMPLE INTERVAL	DEPTH (ft bgs)	USCS SYMBOL	SOIL DESCRIPTION: (color, grading, primary classification/description, (optional size fraction), secondary classification/description, moisture)	MONITORING WELL DETAIL
0.0			0	SP	Dark brown, grading, gravelly SAND, dry to moist. Loose, shell fragments.	Flush Mount Monument
0.0			1			Concrete Seal
25			2			2" Sch 40 PVC Blank Casing
			3			Bentonite Chips
			4			
			5			
			6			
			7			
		7.5	8		Gray, coarser grained SAND.	
6.3			9	SM	Reddish brown to gray silty SAND with coarse gravel, wet. Shell fragments.	
5.7			10	SP	Reddish brown, silty SAND, minor gravel, shell fragments, no odor, no sheen.	
0.0			11			
			12			
			13			
		13.5	14	ML	Gray sandy SILT, medium stiff.	#2/12 Sand
			15			2" Sch 40 PVC .010-inch Slotted Screen
			16			
			17			
			18			
			19			
			20			

Notes:
ft bgs = feet below ground surface
ppm = parts per million
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Monitoring Well ID: MW-08

Drill Date: March 14, 2011
Logged By: Lisa Meoli
Drilled By: Scott Krueger/Cascade Drilling
Drill Type: Hollow Stem Auger
Sample Method: 18" split spoon
Boring Diameter: 2 inches
Boring Depth (ft bgs): 20 ft
Groundwater ATD (ft bgs): 8 ft

Client: Port of Bellingham
Project: POB-Harris
Site Location: Harris Ave Shipyard
201 Harris Avenue

Ground Surf Elev. & Datum: 13.90
Coord. System: NAD 83/89, NAVD 88 vert
Latitude/Northing: 631999
Longitude/Easting: 1234273
Casing Elevation: 13.42

Remarks:

PID (ppm)	DRIVE / RECOVERY	SAMPLE INTERVAL	DEPTH (ft bgs)	USCS SYMBOL	SOIL DESCRIPTION: (color, grading, primary classification/description, (optional size fraction), secondary classification/description, moisture)	MONITORING WELL DETAIL
0.0		4	0–8	GW	Grayish brown, grading coarse sandy GRAVEL. Loose, shell fragments, dry (FILL). Becomes moist to wet.	Flush Mount Monument; Concrete Seal; 2" Sch 40 PVC Blank Casing; Bentonite Chips
0.0			8–10	SP	Brown,grading medium SAND, with gravel, loose, shell fragments, wet.	
0.0		13.5	10–20	SM	Gray, very fine grading silty SAND. Shell fragments, wet.	2" Sch 40 PVC .010-Slotted Screen; #2/12 Sand
0.0						
0.0						

Notes:
ft bgs = feet below ground surface
ppm = parts per million
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Monitoring Well ID: MW-09

Drill Date: March 14, 2011
Logged By: Lisa Meoli
Drilled By: Scott Krueger/Cascade Drilling
Drill Type: Hollow Stem Auger
Sample Method: 18" split spoon
Boring Diameter: 2 inches
Boring Depth (ft bgs): 15 ft
Groundwater ATD (ft bgs): 8 ft

Client: Port of Bellingham
Project: POB-Harris
Site Location: Harris Ave Shipyard
201 Harris Avenue

Ground Surf Elev. & Datum: 11.16
Coord. System: NAD 83/89, NAVD 88 vert
Latitude/Northing: 632259
Longitude/Easting: 1234582
Casing Elevation: 10.58

Remarks:

PID (ppm)	DRIVE / RECOVERY	SAMPLE INTERVAL	DEPTH (ft bgs)	USCS SYMBOL	SOIL DESCRIPTION: (color, grading, primary classification/description, (optional size fraction), secondary classification/description, moisture)	MONITORING WELL DETAIL
1.2		4	0–5	SM	Grayish brown grading silty SAND, with gravel. Loose, moist (FILL).	Flush Mount Monument; Concrete Seal; 2" Sch 40 PVC Blank Casing; Bentonite Chips
172			5–7	SP	Grayish brown very fine SAND, poorly graded, with gravel, moist. Woody debris, strong petroleum odor and heavy sheen present in split spoon and on paper towel test.	
25.2		10	7–15	SM	Gray silty grading SAND with gravel, wet. Loose, moderate petroleum odor and slight sheen present in split spoon.	2" Sch 40 PVC .010-inch Slotted Screen; #2/12 Sand
15.7			15–20			

Notes:
ft bgs = feet below ground surface
ppm = parts per million
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Soil Boring ID: FS-01

Drill Date: 3/14/2011
Logged By: Kristin Anderson
Drilled By: Eli Floyd/Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: Direct Push 2"x5' core
Boring Diameter: 2"
Boring Depth (ft bgs): 25'
Groundwater ATD (ft bgs): 14'

Coordinate System: NAD83/98
Ground Surface Elevation: 14.46; NAVD88
Latitude/Northing: 632230.63
Longitude/Easting: 1234614.39
Boring Location: See below.

Client: Port of Bellingham
Project: POB-Harris
Task: 4000
Address: Fairhaven Shipyard
Bellingham, Wa

Remarks: Boring located in the Former Union Oil AST Area.

PID (ppm)	SAMPLE INTERVAL (ft bgs)	SAMPLE ID	DRIVE / RECOVERY	DEPTH (ft bgs)	USCS SYMBOL	LITHOLOGIC DESCRIPTION AND OBSERVATIONS (color, grading, Group Name [with MAJOR and minor constituents], moisture content, etc.)
0.1	2.5-3.5	FS01-2.5 -031411		0	GW	Brown well graded fine angular GRAVEL with fine sand, dry. (FILL)
28.9				5	SP	Dark brown poorly graded medium to coarse SAND, trace gravel, dry. Contains sandblast grit.
30.3				10	SM	Dark brown grading to dark gray poorly graded SILTY fine SAND, trace small gravel, moist. Hydrocarbon odor and moderate sheen.
						At 11 feet, gray silty SAND with fine gravel, wet. Hydrocarbon odor, no sheen.
40	14-15	FS01-14 -031411		14		
				15		Contains shell fragments.
1.4				18		Same as above. Shell fragments no longer present.
8.8				23	GW-GM	Gray well graded GRAVEL with silt and fine to medium sand, wet.
	24-24.8	FS01-24.8 -031411		24		Becomes black with heavy sheen on core and contains NAPL droplets inside core barrel. Strong hydrocrabon odor. 2-inch lense of dark brown, poorly graded silty fine SAND at 24.8 ft.
3.3				25		Total depth = 25.0 ft bgs.
				28		

Notes:
ft bgs = feet below ground surface
ppm = parts per million
--- Gradational unit contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Soil Boring ID: FS-01

Drill Date: 3/14/2011
Logged By: Kristin Anderson
Drilled By: Eli Floyd/Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: Direct Push 2"x5' core
Boring Diameter: 2"
Boring Depth (ft bgs): 25'
Groundwater ATD (ft bgs): 14'

Coordinate System: NAD83/98
Ground Surface Elevation: 14.46; NAVD88
Latitude/Northing: 632230.63
Longitude/Easting: 1234614.39
Boring Location: See below.

Client: Port of Bellingham
Project: POB-Harris
Task: 4000
Address: Fairhaven Shipyard
Bellingham, Wa

Remarks: Boring located in the Former Union Oil AST Area.

PID (ppm)	SAMPLE INTERVAL (ft bgs)	SAMPLE ID	DRIVE / RECOVERY	DEPTH (ft bgs)	USCS SYMBOL	LITHOLOGIC DESCRIPTION AND OBSERVATIONS (color, grading, Group Name [with MAJOR and minor constituents], moisture content, etc.)
8.8	24-24.8	FS01-24.8 -031411		20 21 22 23 24 25	GW-GM	Gray well graded GRAVEL with silt and fine to medium sand, wet. Becomes black with heavy sheen on core and contains NAPL droplets on core barrel. Strong hydrocrabon odor. 2-inch lense of dark brown, poorly graded silty fine SAND at 24.8 ft.
3.3						

Total depth = 25.0 ft bgs.

Notes:
ft bgs = feet below ground surface
ppm = parts per million
--- Gradational unit contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Soil Boring ID: FS-02

Drill Date: 3/16/2011
Logged By: Kristin Anderson
Drilled By: Eli Floyd/Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: Direct Push 2"x5' core
Boring Diameter: 2"
Boring Depth (ft bgs): 20'
Groundwater ATD (ft bgs): 10'

Coordinate System: NAD83/98
Ground Surface Elevation: 14.79; NAVD88
Latitude/Northing: 632247.74
Longitude/Easting: 1234380.75
Boring Location: See below.

Client: Port of Bellingham
Project: POB-Harris
Task: 4000
Address: Fairhaven Shipyard
Bellingham, Wa

Remarks: Boring located in the Northern Shoreline Area.

PID (ppm)	SAMPLE INTERVAL (ft bgs)	SAMPLE ID	DRIVE / RECOVERY	DEPTH (ft bgs)	USCS SYMBOL	LITHOLOGIC DESCRIPTION AND OBSERVATIONS (color, grading, Group Name [with MAJOR and minor constituents], moisture content, etc.)
0.0				0	SW	Dark brown well graded medium SAND with gravel, trace silt, dry. Sandblast grit present at 1.5 ft and from 2 to 2.5 ft.
0.0	2.5-3.5	FS02-2.5 -031611		3		
0.0				5		
0.0				6	SM	Dark brown to light brown SILTY fine SAND with orange speckles. Moist to wet, gray and orange mottling. Silt slightly plastic to 11.5 ft, becomes non-plastic below.
0.0				9		
0.0				10		
0.0				12	GW	Gray-brown well graded coarse GRAVEL with silt and sand, wet.
0.0				15	SM	Brown SILTY SAND with gravel. Wet. Becomes gray with increasing gravel content with depth. Contains shell fragments at 16.5' bgs.
0.0	18-19	FS02-14 -031611		18	SP-SM	Gray, poorly graded fine SAND, wet. Grading to gray silty SAND. No odor and no sheen. Total depth = 20.0 ft bgs.
				20		

Notes:
ft bgs = feet below ground surface
ppm = parts per million
--- Gradational unit contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Soil Boring ID: FS-03

Drill Date: 3/16/2011
Logged By: Kristin Anderson
Drilled By: Eli Floyd/Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: Direct Push 2"x5' core
Boring Diameter: 2"
Boring Depth (ft bgs): 20'
Groundwater ATD (ft bgs): 10.5'

Coordinate System: NAD83/98
Ground Surface Elevation: 15.07; NAVD88
Latitude/Northing: 632185.90
Longitude/Easting: 1234372.52
Boring Location: See below.

Client: Port of Bellingham
Project: POB-Harris
Task: 4000
Address: Fairhaven Shipyard
Bellingham, Wa

Remarks: Boring located in the Northern Shoreline Area.

PID (ppm)	SAMPLE INTERVAL (ft bgs)	SAMPLE ID	DRIVE / RECOVERY	DEPTH (ft bgs)	USCS SYMBOL	LITHOLOGIC DESCRIPTION AND OBSERVATIONS (color, grading, Group Name [with MAJOR and minor constituents], moisture content, etc.)
0.0	1.5-2.5	FS03-2.5 -031611		0	SW	Grayish brown to brown well graded medium SAND with fine gravel, trace silt, dry.
0.0				3		Contains shell fragments and cemented silt at 3.5 ft.
0.4				5		Grades to gray brown and gravel diameter increases to medium fine with depth.
0.3	11-12	FS03-11 -031611		10	SP-SM	Brown poorly graded fine SAND with silt, wet. Grain size increases with depth. Contains fine gravels to cobbles.
				20		Total depth = 20.0 ft bgs.

Notes:
ft bgs = feet below ground surface
ppm = parts per million
--- Gradational unit contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Soil Boring ID: FS-04

Drill Date: 3/16/2011
Logged By: Kristin Anderson
Drilled By: Eli Floyd/Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: Direct Push 2"x5' core
Boring Diameter: 2"
Boring Depth (ft bgs): 20'
Groundwater ATD (ft bgs): 12.0'

Coordinate System: NAD83/98
Ground Surface Elevation: 14.54; NAVD88
Latitude/Northing: 632108.13
Longitude/Easting: 1234312.29
Boring Location: See below.

Client: Port of Bellingham
Project: POB-Harris
Task: 4000
Address: Fairhaven Shipyard
Bellingham, Wa

Remarks: Boring located in the Northern Shoreline Area.

PID (ppm)	SAMPLE INTERVAL (ft bgs)	SAMPLE ID	DRIVE / RECOVERY	DEPTH (ft bgs)	USCS SYMBOL	LITHOLOGIC DESCRIPTION AND OBSERVATIONS (color, grading, Group Name [with MAJOR and minor constituents], moisture content, etc.)
0.1	11.5-12.5			0	SW	Grayish brown well graded medium to coarse SAND with gravel, trace silt, moist. Wood fragments from 1 to 1.25 ft bgs.
0.0				1		
				2		
				3		
				4		
	5-6	FS04-5 -031611		5		
0.1				6		
				7		3" lense of gray SILT at 7 ft.
0.0				8	SP	Grayish brown poorly graded coarse SAND with gravel, trace silt, moist. Grades to fine SAND at 8.25 ft.
				9		
				10		
				11	SW-SM	Grayish brown to brown, well graded medium and coarse SAND with gravel to SILTY SAND with gravel, moist.
		FS04-11.5-031611		12	SP-SM	Brown poorly graded SAND with silt and gravel, large wood fragments.
0.1				13		
				14		
				15		
0.0				16		
				17		
				18		
				19		Total depth = 20.0 ft bgs.
				20		

Notes:
ft bgs = feet below ground surface
ppm = parts per million
--- Gradational unit contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Soil Boring ID: FS-05

Drill Date: 3/16/2011
Logged By: Kristin Anderson
Drilled By: Eli Floyd/Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: Direct Push 2"x5' core
Boring Diameter: 2"
Boring Depth (ft bgs): 15'
Groundwater ATD (ft bgs): 11'

Coordinate System: NAD83/98
Ground Surface Elevation: 15.02; NAVD88
Latitude/Northing: 632001.26
Longitude/Easting: 1234357.39
Boring Location: See below.

Client: Port of Bellingham
Project: POB-Harris
Task: 4000
Address: Fairhaven Shipyard
Bellingham, Wa

Remarks: Boring located in the Northern Shoreline Area.
No PID readings as PID was malfunctioning.

PID (ppm)	SAMPLE INTERVAL (ft bgs)	SAMPLE ID	DRIVE / RECOVERY	DEPTH (ft bgs)	USCS SYMBOL	LITHOLOGIC DESCRIPTION AND OBSERVATIONS (color, grading, Group Name [with MAJOR and minor constituents], moisture content, etc.)
no PID				0–1	SW	Brown to grayish brownwell graded medium to coarse SAND with gravel, moist.
	2.5-3.5	FS05-2.5 -031611		2–4	SP	Brown poorly graded fine SAND, moist. Grain size increases with depth. Contains shell fragments.
				5–10	SW	Brown to grayish brownwell graded SAND with gravel, moist. Interbedded lenses of coarse and fine sand.
	13-14	FS05-13 -031611		11–15	SW-SM	Grades to grayish brown well graded SAND with silt and gravel from 10.5 to 11 ft., moist to wet. 3" lense of black organic matter at 12 ft. Total depth = 15.0 ft bgs.

Notes:
ft bgs = feet below ground surface
ppm = parts per million

--- Gradational unit contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Soil Boring ID: FS-06

Drill Date: 3/16/2011
Logged By: Erin Murray
Drilled By: Eli Floyd/Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: Direct Push 2"x5' core
Boring Diameter: 2"
Boring Depth (ft bgs): 20'
Groundwater ATD (ft bgs): 12'

Coordinate System: NAD83/98
Ground Surface Elevation: 15.73; NAVD88
Latitude/Northing: 632071.82
Longitude/Easting: 1234403.53
Boring Location: See below.

Client: Port of Bellingham
Project: POB-Harris
Task: 4000
Address: Fairhaven Shipyard
Bellingham, Wa

Remarks: Boring located in the Northern Shoreline Area.

PID (ppm)	SAMPLE INTERVAL (ft bgs)	SAMPLE ID	DRIVE / RECOVERY	DEPTH (ft bgs)	USCS SYMBOL	LITHOLOGIC DESCRIPTION AND OBSERVATIONS (color, grading, Group Name [with MAJOR and minor constituents], moisture content, etc.)
0.0	2.5-3.5	FS06-2.5 -031611		0	GW-GM	Dark brown to medium gray well graded GRAVEL with silt and fine and medium sand, moist. (FILL)
0.0				1		Sandblast grit from 1 to 1.2 ft bgs.
				2		
				3		Silt increases with depth.
1.1				4		
				5		
1.0				6	SM	Medium gray silty fine SAND, trace fine gravel, moist.
				7		
0.0				8	SW-SM	Medium brown well graded fine to coarse SAND with silt, trace fine gravel, moist.
				9		
				10		
				11	GW-GM	Medium brown well graded GRAVEL with silt and fine to coarse sand, moist.
				12		
				13	SW-SM	Brown to gray well graded SAND with silty and fine to coarse gravel, wet.
1.1				14		
				15		
0.0				16		Coarse gravel.
				17	SM	Gray silty fine SAND, trace coarse gravel, wet.
0.0				18	SP-SM	Gray poorly graded fine SAND with silt, wet. Shell fragments present.
				19		
0.0	19-20	FS06-19 -031611		20		Total depth = 20.0 ft bgs.

Notes:
ft bgs = feet below ground surface
ppm = parts per million
--- Gradational unit contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Soil Boring ID: FS-07

Drill Date: 3/16/2011
Logged By: Kristin Aderson
Drilled By: Eli Floyd/Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: Direct Push 2"x5' core
Boring Diameter: 2"
Boring Depth (ft bgs): 15'
Groundwater ATD (ft bgs): 12'

Coordinate System: NAD83/98
Ground Surface Elevation: 15.45; NAVD88
Latitude/Northing: 632106.71
Longitude/Easting: 1234379.69
Boring Location: See below.

Client: Port of Bellingham
Project: POB-Harris
Task: 4000
Address: Fairhaven Shipyard
Bellingham, Wa

Remarks: Boring located in the Northern Shoreline Area.

PID (ppm)	SAMPLE INTERVAL (ft bgs)	SAMPLE ID	DRIVE / RECOVERY	DEPTH (ft bgs)	USCS SYMBOL	LITHOLOGIC DESCRIPTION AND OBSERVATIONS (color, grading, Group Name [with MAJOR and minor constituents], moisture content, etc.)
0.1	2-3	FS07-2 -031611		0	SW	Dark brown grading medium to coarse SAND with gravel and trace silt, dry. Sandblast grit from 0.75 to 1 ft bgs.
0.0				1		
0.0				2		
				3		
				4		
				5		
				6		
				7	SW-SM	Brown well graded fine to coarse SAND with silt and gravel, dry. No odor.
				8		
				9		
				10		
				11	SM	Brown medium to coarse SILTY SAND, moist.
0.0	12-16 12.5-13.5	FS07-GW -031611 FS07-12.5 -031611		12	SP	Gray poorly graded medium to coarse SAND with gravel, trace silt, wet.
				13		
				14		
				15		Total depth = 15.0 ft bgs.
				16		
				17		
				18		
				19		
				20		

Notes:
ft bgs = feet below ground surface
ppm = parts per million

--- Gradational unit contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Soil Boring ID: FS-08

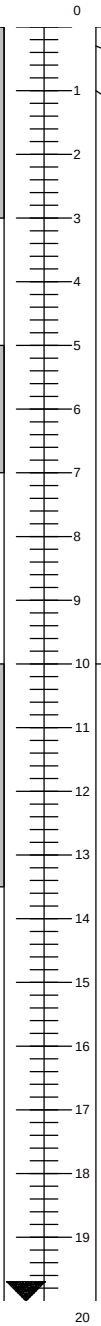
Drill Date: 3/15/2011
Logged By: Kristin Aderson
Drilled By: Eli Floyd/Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: Direct Push 2"x5' core
Boring Diameter: 2"
Boring Depth (ft bgs): 25'
Groundwater ATD (ft bgs): 13'

Coordinate System: NAD83/98
Ground Surface Elevation: 15.22; NAVD88
Latitude/Northing: 632093.44
Longitude/Easting: 1234458.01
Boring Location: See below.

Client: Port of Bellingham
Project: POB-Harris
Task: 4000
Address: Fairhaven Shipyard
Bellingham, Wa

Remarks: Boring located in the Northern Shoreline Area.

PID (ppm)	SAMPLE INTERVAL (ft bgs)	SAMPLE ID	DRIVE / RECOVERY	DEPTH (ft bgs)	USCS SYMBOL	LITHOLOGIC DESCRIPTION AND OBSERVATIONS (color, grading, Group Name [with MAJOR and minor constituents], moisture content, etc.)
					SW-SM	Asphalt surfacing.
0.0					SW	Dark brown well graded coarse SAND with silt and gravel, moist.
	2-3	FS08-2 -031511				Brown well graded coarse SAND with gravel, trace silt.
0.0						
0.3						Lense of organic matter at 6 ft.
					SM	Brown to gray grading SILTY fine SAND with small gravels, moist.
0.4						



Notes:
ft bgs = feet below ground surface
ppm = parts per million

--- Gradational unit contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Soil Boring ID: FS-08

Drill Date: 3/15/2011
Logged By: Kristin Aderson
Drilled By: Eli Floyd/Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: Direct Push 2"x5' core
Boring Diameter: 2"
Boring Depth (ft bgs): 25'
Groundwater ATD (ft bgs): 13'

Coordinate System: NAD83/98
Ground Surface Elevation: 15.22; NAVD88
Latitude/Northing: 632093.44
Longitude/Easting: 1234458.01
Boring Location: See below.

Client: Port of Bellingham
Project: POB-Harris
Task: 4000
Address: Fairhaven Shipyard
Bellingham, Wa

Remarks: Boring located in the Northern Shoreline Area.

PID (ppm)	SAMPLE INTERVAL (ft bgs)	SAMPLE ID	DRIVE / RECOVERY	DEPTH (ft bgs)	USCS SYMBOL	LITHOLOGIC DESCRIPTION AND OBSERVATIONS (color, grading, Group Name [with MAJOR and minor constituents], moisture content, etc.)
0.1	21-22.5	FS08-21 -031511		20 21 22 23 24 25	SM	Brown SILTY fine SAND with fine to coarse gravel, wet. Grades to coarse. Total depth = 25.0 ft bgs.

Notes:
ft bgs = feet below ground surface
ppm = parts per million
--- Gradational unit contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Soil Boring ID: FS-09

Drill Date: 3/15/2011
Logged By: Kristin Anderson
Drilled By: Eli Floyd/Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: Direct Push 2"x5' core
Boring Diameter: 2"
Boring Depth (ft bgs): 20'
Groundwater ATD (ft bgs): 10'

Coordinate System: NAD83/98
Ground Surface Elevation: 15.23; NAVD88
Latitude/Northing: 632128.44
Longitude/Easting: 1234433.64
Boring Location: See below.

Client: Port of Bellingham
Project: POB-Harris
Task: 4000
Address: Fairhaven Shipyard
Bellingham, Wa

Remarks: Boring located in the Northern Shoreline Area.

PID (ppm)	SAMPLE INTERVAL (ft bgs)	SAMPLE ID	DRIVE / RECOVERY	DEPTH (ft bgs)	USCS SYMBOL	LITHOLOGIC DESCRIPTION AND OBSERVATIONS (color, grading, Group Name [with MAJOR and minor constituents], moisture content, etc.)
				0	SW	Brown, well graded fine and medium SAND with gravel, dry to moist. Contains sandblast grit at 1 ft bgs. Slight hydrocarbon odor.
93.4				5	SM	Dark brown grading to gray SO:TU SAND with rounded gravel, moist. Strong hydrocarbon odor at 4.5 ft.
178.9	8-8.5	FS09-8 -031511		8	SW	Contains charred wood and brick fragments at 7 ft.
				10		Gray well graded medium and coarse SAND with gravel, trace silt. Strong hydrocarbon odor, heavy brown oily sheen and non-aqueous phase liquid droplets in soil.
0.4	13-17	FS09-GW 17 031511		14	SW-SM	Grayish brown well graded medium and coarse SAND with silt and gravel, wet. Sheen on core barre; and strong hydrocarbon odor.
5.3				16	SP	Gray poorly graded fine to coarse SAND with trace silt, wet. Moderate hydrocarbon odor. Sheen on core barrel at 16 ft.
	18.5-20	FS09-18.5 031511		18	ML	Gray SILT, very soft, wet. Moderate hydrocarbon odor. Woody lense at 18 ft.
				20	SM	Gray SILTY coarse SAND with coarse rounded gravel, wet. Total depth = 20.0 ft bgs.

Notes:
ft bgs = feet below ground surface
ppm = parts per million
--- Gradational unit contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Soil Boring ID: FS-09a

Drill Date: 3/17/2011
Logged By: Erin Murray
Drilled By: Eli Floyd/Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: Direct Push 2"x5' core
Boring Diameter: 2"
Boring Depth (ft bgs): 10'
Groundwater ATD (ft bgs): NA

Coordinate System: NAD83/98
Ground Surface Elevation: 15.23; NAVD88
Latitude/Northing: NA
Longitude/Easting: NA
Boring Location: See below.

Client: Port of Bellingham
Project: POB-Harris
Task: 4000
Address: Fairhaven Shipyard
Bellingham, Wa

Remarks: Boring located in the Northern Shoreline Area 5 feet south of FS-09.

PID (ppm)	SAMPLE INTERVAL (ft bgs)	SAMPLE ID	DRIVE / RECOVERY	DEPTH (ft bgs)	USCS SYMBOL	LITHOLOGIC DESCRIPTION AND OBSERVATIONS (color, grading, Group Name [with MAJOR and minor constituents], moisture content, etc.)
25				0	Wood	Drilled directly into piling saturated with creosote. Strong naphthalene odor present.
50	6-7	FS09a -6-031711		1		
68				2		
				3		
				4		
				5		
				6		
				7		
				8		
				9		
				10		Refusal at 10 ft bgs. Total Depth = 10 ft bgs.
				11		
				12		
				13		
				14		
				15		
				16		
				17		
				18		
				19		
				20		

Notes:
ft bgs = feet below ground surface
ppm = parts per million

--- Gradational unit contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Soil Boring ID: FS-09a(2)

Drill Date: 3/17/2011
Logged By: Erin Murray
Drilled By: Eli Floyd/Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: Direct Push 2"x5' core
Boring Diameter: 2"
Boring Depth (ft bgs): 15'
Groundwater ATD (ft bgs): 12'

Coordinate System: NAD83/98
Ground Surface Elevation: 15.23; NAVD88
Latitude/Northing: NA
Longitude/Easting: NA
Boring Location: See below.

Client: Port of Bellingham
Project: POB-Harris
Task: 4000
Address: Fairhaven Shipyard
Bellingham, Wa

Remarks: Boring located in the Northern Shoreline Area 10 feet south of FS-09.
This boring was located 5' south of FS-09a to avoid going through pilings that were encountered there.

PID (ppm)	SAMPLE INTERVAL (ft bgs)	SAMPLE ID	DRIVE / RECOVERY	DEPTH (ft bgs)	USCS SYMBOL	LITHOLOGIC DESCRIPTION AND OBSERVATIONS (color, grading, Group Name [with MAJOR and minor constituents], moisture content, etc.)
				0	GW	Gray well graded GRAVEL with fine sand and silt, dry. Sandblast grit from 1.0 to 1.2 ft bgs (FILL).
0.3				2	SP	Light gray poorly graded fine to medium SAND, dry.
0.5	5-6	FS09a(2) -5-031511		3	SM	Brown silty fine SAND with fine to coarse gravel, dry.
0.1				7		Sand coarsens with depth. Becomes moist.
				10	SW	Medium gray well graded fine and medium SAND with gravel, moist to wet.
	14-15	FS09a(2) -14-031511		14	SW-SM	Gray well graded fine to coarse SAND with silt, wet.
				15		Total depth = 15 ft bgs.
				20		

Notes:
ft bgs = feet below ground surface
ppm = parts per million
--- Gradational unit contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Soil Boring ID: FS-09b

Drill Date: 3/17/2011
Logged By: Erin Murray
Drilled By: Eli Floyd/Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: Direct Push 2"x5' core
Boring Diameter: 2"
Boring Depth (ft bgs): 15'
Groundwater ATD (ft bgs): 10'

Coordinate System: NAD83/98
Ground Surface Elevation: 15.23; NAVD88
Latitude/Northing: NA
Longitude/Easting: NA
Boring Location: See below.

Client: Port of Bellingham
Project: POB-Harris
Task: 4000
Address: Fairhaven Shipyard
Bellingham, Wa

Remarks: Boring located in the Northern Shoreline Area 15' east of FS-09.

PID (ppm)	SAMPLE INTERVAL (ft bgs)	SAMPLE ID	DRIVE / RECOVERY	DEPTH (ft bgs)	USCS SYMBOL	LITHOLOGIC DESCRIPTION AND OBSERVATIONS (color, grading, Group Name [with MAJOR and minor constituents], moisture content, etc.)
0.1				0	GW	Medium brown well graded GRAVEL with silt, dry (FILL). Sandblast grit from 0.5 to 0.8 ft bgs.
0.1				1	SP	Light gray poorly graded fine to medium SAND, little silt, dry to moist.
0.1				2	SM	Dark brown silty fine SAND, trace coarse gravel, moist, mottled. Slight odor with no sheen.
0.1				3	SW-SM	Dark brown well graded SAND with silt and gravel, moist.
0.1				4		
0.2				5		
				6		
				7		
				8		
				9		
				10	SW	Medium gray well graded SAND, trace silt, wet.
0.8	14-15	FS09b-15-031511		11		Total Depth = 15.0 ft bgs.
				12		
				13		
				14		
				15		
				16		
				17		
				18		
				19		
				20		

Notes:
ft bgs = feet below ground surface
ppm = parts per million

--- Gradational unit contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Soil Boring ID: FS-09c

Drill Date: 3/17/2011
Logged By: Erin Murray
Drilled By: Eli Floyd/Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: Direct Push 2"x5' core
Boring Diameter: 2"
Boring Depth (ft bgs): 20'
Groundwater ATD (ft bgs): 10'

Coordinate System: NAD83/98
Ground Surface Elevation: 15.23; NAVD88
Latitude/Northing: NA
Longitude/Easting: NA
Boring Location: See below.

Client: Port of Bellingham
Project: POB-Harris
Task: 4000
Address: Fairhaven Shipyard
Bellingham, Wa

Remarks: Boring located in the Northern Shoreline Area approximately 12' east of FS-09.

PID (ppm)	SAMPLE INTERVAL (ft bgs)	SAMPLE ID	DRIVE / RECOVERY	DEPTH (ft bgs)	USCS SYMBOL	LITHOLOGIC DESCRIPTION AND OBSERVATIONS (color, grading, Group Name [with MAJOR and minor constituents], moisture content, etc.)
				0	GW	Gray well graded GRAVEL with silt, dry (FILL).
28.1				1	SP	Light gray to brown poorly graded fine and medium SAND, trace silt, dry. Scattered shell fragments.
37.2				2	SM	Brown silty fine SAND with coarse gravel, dry. Strong naphthalene and hydrocarbon odor present starting at 5 ft bgs.
11.7				3		Odor increasing with depth.
11.8				4		
29.7				5		
68.5	8.5-9.5	FS09c-8.5 -031711		6		
				7		
				8		
				9		
				10	SW-SM	Dark gray well graded fine to medium SAND with silt and gravel, wet. Strong hydrocarbon and naphthalene odor.
1.1				11		
				12		
				13		
1.2				14		
				15		No gravel.
				16	SM/ML	Dark gray silty fine SAND with silt, moist. Moderate odor.
0.3				17		
				18		
	19-20	FS09c-19 -031711		19	SW-SM	Gray medium to coarse well graded SAND with silt and coarse gravel. No odor. Total Depth = 20.0 ft bgs.
0.4				20		

Notes:
ft bgs = feet below ground surface
ppm = parts per million
--- Gradational unit contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Soil Boring ID: FS-10

Drill Date: 3/15/2011
Logged By: Erin Murray
Drilled By: Eli Floyd/Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: Direct Push 2"x5' core
Boring Diameter: 2"
Boring Depth (ft bgs): 15'
Groundwater ATD (ft bgs): 11'

Coordinate System: NAD83/98
Ground Surface Elevation: 13.33; NAVD88
Latitude/Northing: 632197.02
Longitude/Easting: 1234505.89
Boring Location: See below.

Client: Port of Bellingham
Project: POB-Harris
Task: 4000
Address: Fairhaven Shipyard
Bellingham, Wa

Remarks: Boring located in the Marine Railway Area.

PID (ppm)	SAMPLE INTERVAL (ft bgs)	SAMPLE ID	DRIVE / RECOVERY	DEPTH (ft bgs)	USCS SYMBOL	LITHOLOGIC DESCRIPTION AND OBSERVATIONS (color, grading, Group Name [with MAJOR and minor constituents], moisture content, etc.)
				0	GP-GM	Brown poorly graded fine GRAVEL with silt and fine sand, moist (FILL). Sandblast grit present in top 2 inches.
0.0	2-3	FS10-2 -031511		1	SM	Light to medium brown silty fine SAND with gravel, moist (FILL). Orange mottling.
				2		
				3		
				4		
				5		
				6		
0.0				7	SP	Medium gray poorly graded medium SAND, trace fine to coarse gravel, trace silt, moist.
				8	SM	Tan grading silty fine SAND with rounded gravel, moist.
				9		
				10		
				11	SP	Gray poorly graded medium and coarse SAND with gravel, wet.
0.0	13-14	FS10-14 031511		12		
				13		
				14		Total Depth = 15.0 ft bgs.
				15		
				16		
				17		
				18		
				19		
				20		

Notes:
ft bgs = feet below ground surface
ppm = parts per million
--- Gradational unit contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Soil Boring ID: FS-11

Drill Date: 3/14/2011
Logged By: Erin Murray
Drilled By: Eli Floyd/Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: Direct Push 2"x5' core
Boring Diameter: 2"
Boring Depth (ft bgs): 20'
Groundwater ATD (ft bgs): 2'

Coordinate System: NAD83/98
Ground Surface Elevation: 10.59; NAVD88
Latitude/Northing: 632249.09
Longitude/Easting: 1234543.67
Boring Location: See below.

Client: Port of Bellingham
Project: POB-Harris
Task: 4000
Address: Fairhaven Shipyard
Bellingham, Wa

Remarks: Boring located in the Marine Railway Area, near shoreline.

PID (ppm)	SAMPLE INTERVAL (ft bgs)	SAMPLE ID	DRIVE / RECOVERY	DEPTH (ft bgs)	USCS SYMBOL	LITHOLOGIC DESCRIPTION AND OBSERVATIONS (color, grading, Group Name [with MAJOR and minor constituents], moisture content, etc.)
0.5				0	SP	Light brown to black poorly graded medium SAND, dry (FILL). Contains wood debris.
0.5				1	GW	Dark gray to black well graded GRAVEL with sand, wet. Slight sheen. Creosote like consistency and strong odor. Sandblast grit and wood debris.
0.5	2-3	FS11-02 -031411		2		
				3		
				4		
2.4				5	SP-SM	Black to medium gray poorly graded fine SAND with silt, wet, slight sheen.
				6		
				7		
				8		
				9		
0.9				10	SP/SM	Becomes light brown to gray, moist, slight odor.
0.1				11		
				12	ML	Gray SILT, stiff, moist.
0.1	12.5-13.5	FS10-12.5 -031411		13	SW-SM	Medium gray grading SAND with silt and rounded gravel, wet. Shell fragments.
				14		
				15	SP	Brown poorly graded fine and medium SAND with fine rounded gravel, moist.
				16		
				17		
				18		
				19		Total Depth = 20.0 ft bgs.
				20		

Notes:
ft bgs = feet below ground surface
ppm = parts per million
--- Gradational unit contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Soil Boring ID: FS-12

Drill Date: 3/14/2011
Logged By: Kristin Anderson
Drilled By: Eli Floyd/Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: Direct Push 2"x5' core
Boring Diameter: 2"
Boring Depth (ft bgs): 20'
Groundwater ATD (ft bgs): NA

Coordinate System: NAD83/98
Ground Surface Elevation: 15.92; NAVD88
Latitude/Northing: 632183.88
Longitude/Easting: 1234627.99
Boring Location: See below.

Client: Port of Bellingham
Project: POB-Harris
Task: 4000
Address: Fairhaven Shipyard
Bellingham, Wa

Remarks: Boring located in the Former Union Oil AST Area.

PID (ppm)	SAMPLE INTERVAL (ft bgs)	SAMPLE ID	DRIVE / RECOVERY	DEPTH (ft bgs)	USCS SYMBOL	LITHOLOGIC DESCRIPTION AND OBSERVATIONS (color, grading, Group Name [with MAJOR and minor constituents], moisture content, etc.)
				0	SW	Dark brown SAND with gravel and silt, dry.
	2-3	FS12-02 -031411		2	SM	Brown poorly graded SILTY fine SAND, moist.
				3	ML	Brown SILT with sand, trace gravel, soft, moist.
0.0				5	SM-ML	Brown SILTY SAND with gravel interbedded with SILT, moist.
				7	SP	Gray poorly graded fine SAND with gravel, trace silt and trace large cobbles, moist. Contains wood debris.
0.8				10		Increasing silt content with depth.
				11	SM	Gray, poorly graded SILTY SAND with gravel, wet.
				12		Contains red brick fragments at 12 ft.
0.0				15		
				16		Gravelly lense and very slight blebs of sheen at 16 ft.
	17-18	FS12-17 -031411		18		
0.0				20		Total depth = 20.0 ft.

Notes:
ft bgs = feet below ground surface
ppm = parts per million

--- Gradational unit contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Soil Boring ID: FS-13

Drill Date: 3/15/2011
Logged By: Kristin Anderson
Drilled By: Eli Floyd/Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: Direct Push 2"x5' core
Boring Diameter: 2"
Boring Depth (ft bgs): 20'
Groundwater ATD (ft bgs): 11'

Coordinate System: NAD83/98
Ground Surface Elevation: 16.50; NAVD88
Latitude/Northing: 632101.29
Longitude/Easting: 1234622.88
Boring Location: See below.

Client: Port of Bellingham
Project: POB-Harris
Task: 4000
Address: Fairhaven Shipyard
Bellingham, Wa

Remarks: Boring located in the Former Union Oil AST Area.

PID (ppm)	SAMPLE INTERVAL (ft bgs)	SAMPLE ID	DRIVE / RECOVERY	DEPTH (ft bgs)	USCS SYMBOL	LITHOLOGIC DESCRIPTION AND OBSERVATIONS (color, grading, Group Name [with MAJOR and minor constituents], moisture content, etc.)
0.0	4-5	FS13-04 -031511		0	SW	Dark brown to gray well graded medium SAND with small angular gravels, trace silt, moist.
				1		
				2		Contains small woody fragments at 2 ft.
				3		
				4		
				5		
				6	SM	Brown poorly graded SILTY fine SAND, moist.
				7	SW	6" gray GRAVEL lense and crushed rock at 6 ft.
				8		Gray well graded medium SAND with gravel, moist.
				9		Silt increasing with depth and gravel decreasing with depth.
				10		
0.2				11	SM	Brown SILTY SAND, moist to wet.
				12		Trace gravel, becomes grayish brown.
				13		
				14		
0.0				15	SM	Grades to gray with depth. Slight coarse (2-3") gravel.
	16-17	FS13-16 -031511		16		
0.3				17		
				18		
				19		Total depth = 20.0 ft bgs.
				20		

Notes:
ft bgs = feet below ground surface
ppm = parts per million

--- Gradational unit contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Soil Boring ID: FS-14

Drill Date: 3/15/2011
Logged By: Kristin Anderson
Drilled By: Eli Floyd/Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: Direct Push 2"x5' core
Boring Diameter: 2"
Boring Depth (ft bgs): 20'
Groundwater ATD (ft bgs): 10'

Coordinate System: NAD83/98
Ground Surface Elevation: 16.74; NAVD88
Latitude/Northing: 632116.41
Longitude/Easting: 1234589.11
Boring Location: See below.

Client: Port of Bellingham
Project: POB-Harris
Task: 4000
Address: Fairhaven Shipyard
Bellingham, Wa

Remarks: Boring located in the Former Union Oil AST Area.

PID (ppm)	SAMPLE INTERVAL (ft bgs)	SAMPLE ID	DRIVE / RECOVERY	DEPTH (ft bgs)	USCS SYMBOL	LITHOLOGIC DESCRIPTION AND OBSERVATIONS (color, grading, Group Name [with MAJOR and minor constituents], moisture content, etc.)
				0	SW	Dark brown well graded coarse SAND with gravel, trace silt, moist. Wood fragments at 6 inches.
				1	SM	Brown poorly graded SILTY coarse SAND, coarse gravel, moist. Contains plastic debris fragments.
				2		
				3		
				4		
				5		
				6		6 inch lense of concrete debris at 6 ft.
58.2	7-8	FS14-07 -031511		7		
				8		Hydrocarbon odor and slight sheen at 7.5 ft.
				9		
				10		
				11		
				12		
10.4				13		
				14		
				15		Sand grain size decreases to fine with depth.
				16		
	17-19	FS14-17 -031511		17		
				18		
0.4				19		Total Depth = 20.0 ft bgs.
				20		

Notes:
ft bgs = feet below ground surface
ppm = parts per million
--- Gradational unit contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Soil Boring ID: FS-15

Drill Date: 3/14/2011
Logged By: Erin Murray
Drilled By: Eli Floyd/Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: Direct Push 2"x5' core
Boring Diameter: 2"
Boring Depth (ft bgs): 25'
Groundwater ATD (ft bgs): 12'

Coordinate System: NAD83/98
Ground Surface Elevation: 16.62; NAVD88
Latitude/Northing: 632141.03
Longitude/Easting: 1234569.18
Boring Location: See below.

Client: Port of Bellingham
Project: POB-Harris
Task: 4000
Address: Fairhaven Shipyard
Bellingham, Wa

Remarks: Boring located in the Former Union Oil AST Area.

PID (ppm)	SAMPLE INTERVAL (ft bgs)	SAMPLE ID	DRIVE / RECOVERY	DEPTH (ft bgs)	USCS SYMBOL	LITHOLOGIC DESCRIPTION AND OBSERVATIONS (color, grading, Group Name [with MAJOR and minor constituents], moisture content, etc.)
0.0				0	SW-SM	Brown to gray well graded fine and medium SAND with silt and angular gravel, moist (FILL).
6.5				1		
3.2				2		
4.0				3		
10.8				4	GW-GM	Medium brown well graded GRAVEL with silt and fine sand, moist. Charcoal-like fragments at 5.8 ft bgs.
0.5				5		
0.3				6		
				7		
				8		
				9		
				10		
				11	SP-SM	Brownish gray poorly graded fine SAND with silt and angular gravel, moist to wet.
34.9				12	GW-GM	Medium gray well graded GRAVEL with silt and medium to coarse sand, wet. Moderate sheen and odor present.
	13-14	FS15-13 -031411		13	SP	Brownish gray poorly graded fine SAND with angular gravel, moist.
				14		
				15		Becomes wet.
				16		
				17		
21.4				18		Silt increases between 18 and 19 ft bgs.
				19		
				20		

Notes:
ft bgs = feet below ground surface
ppm = parts per million

--- Gradational unit contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Soil Boring ID: FS-15

Drill Date: 3/14/2011
Logged By: Erin Murray
Drilled By: Eli Floyd/Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: Direct Push 2"x5' core
Boring Diameter: 2"
Boring Depth (ft bgs): 25'
Groundwater ATD (ft bgs): 12'

Coordinate System: NAD83/98
Ground Surface Elevation: 16.62; NAVD88
Latitude/Northing: 632141.03
Longitude/Easting: 1234569.18
Boring Location: See below.

Client: Port of Bellingham
Project: POB-Harris
Task: 4000
Address: Fairhaven Shipyard
Bellingham, Wa

Remarks: Boring located in the Former Union Oil AST Area.

PID (ppm)	SAMPLE INTERVAL (ft bgs)	SAMPLE ID	DRIVE / RECOVERY	DEPTH (ft bgs)	USCS SYMBOL	LITHOLOGIC DESCRIPTION AND OBSERVATIONS (color, grading, Group Name [with MAJOR and minor constituents], moisture content, etc.)
1.5				20 21 22 23 24 25 26	SP	
					GW	Gray well graded GRAVEL with sand, wet.
					SM	Brown grading silty SAND, moist.
						Total Depth = 25.0 ft bgs.

Notes:
ft bgs = feet below ground surface
ppm = parts per million
--- Gradational unit contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Soil Boring ID: FS-16

Drill Date: 3/15/2011
Logged By: Kristin Anderson
Drilled By: Eli Floyd/Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: Direct Push 2"x5' core
Boring Diameter: 2"
Boring Depth (ft bgs): 20'
Groundwater ATD (ft bgs): 10'

Coordinate System: NAD83/98
Ground Surface Elevation: 15.03; NAVD88
Latitude/Northing: 632022.79
Longitude/Easting: 1234518.45
Boring Location: See below.

Client: Port of Bellingham
Project: POB-Harris
Task: 4000
Address: Fairhaven Shipyard
Bellingham, Wa

Remarks: Boring located in the Paint Shop and Sandblast Shed Area.

PID (ppm)	SAMPLE INTERVAL (ft bgs)	SAMPLE ID	DRIVE / RECOVERY	DEPTH (ft bgs)	USCS SYMBOL	LITHOLOGIC DESCRIPTION AND OBSERVATIONS (color, grading, Group Name [with MAJOR and minor constituents], moisture content, etc.)
				0		Asphalt surfacing.
	2-2.5	FS16-2 -031511		1	SW	Dark brown well graded coarse SAND with trace silt and gravel, dry to moist.
				2		6 inch medium brown fine sandy lense with trace small gravel at 1.5 ft.
				3		
				4		
				5	SW	Cobble (>3inch diameter at 6 ft. 6 inch lens of concrete and crushed shells below.
0.8				6		
				7		
				8		
				9		
				10	SW-SM	Brown well graded coarse SAND with silt and gravel, wet. Contains shell fragments.
1.0				11	SM	Gray SILTY fine SAND with gravel, wet. Contains interbedded silt and gravel lenses.
				12		
				13		
				14	SW	Brown well graded coarse SAND with gravel and trace silt, wet.
0.8				15		
				16		
0.0				17		
				18		
	19-20	FS16-19 -031511		19		Total depth = 20.0 ft bgs.
				20		

Notes:
ft bgs = feet below ground surface
ppm = parts per million

--- Gradational unit contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Soil Boring ID: FS-17

Drill Date: 3/16/2011
Logged By: Kristin Anderson
Drilled By: Eli Floyd/Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: Direct Push 2"x5' core
Boring Diameter: 2"
Boring Depth (ft bgs): 20'
Groundwater ATD (ft bgs): 12.5'

Coordinate System: NAD83/98
Ground Surface Elevation: 15.91; NAVD88
Latitude/Northing: 631940.24
Longitude/Easting: 1234536.88
Boring Location: See below.

Client: Port of Bellingham
Project: POB-Harris
Task: 4000
Address: Fairhaven Shipyard
Bellingham, Wa

Remarks: Boring located in the Paint Shop and Sandblast Shed area, east of All American Marine.

PID (ppm)	SAMPLE INTERVAL (ft bgs)	SAMPLE ID	DRIVE / RECOVERY	DEPTH (ft bgs)	USCS SYMBOL	LITHOLOGIC DESCRIPTION AND OBSERVATIONS (color, grading, Group Name [with MAJOR and minor constituents], moisture content, etc.)
				0	SW	Dark brown poorly graded medium SAND with gravel, trace silt, dry (FILL).
				1	GW	Gray well graded fine angular GRAVEL with fine pulverized concrete-like material/possible limestone, dry (FILL).
				2	SW	Dark brown well graded SAND with gravel, dry to moist.
				3		
				4		Contains wood material at 3.5 ft.
				5		
				6		
0.0	6.5-7.5	FS17-6.5 -031611		7		Becomes black; contains brick and wood debris from 6.2 to 6.8 ft.
				8	SW-SM	Brown well graded medium and coarse SAND with silt and gravel, moist.
				9		
				10		Becomes very moist.
0.0				11		
				12		Becomes wet.
	13-17	FS17-GW17-031611		13		
				14		
				15		
				16		
				17		
	18-19	FS17-18 031611 FS17A-18 031611		18		
				19		
				20		Total depth = 20.0 ft bgs.

Notes:
ft bgs = feet below ground surface
ppm = parts per million
--- Gradational unit contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Soil Boring ID: FS-18

Drill Date: 3/16/2011
Logged By: Erin Murray
Drilled By: Eli Floyd/Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: Direct Push 2"x5' core
Boring Diameter: 2"
Boring Depth (ft bgs): 20'
Groundwater ATD (ft bgs): 10'

Coordinate System: NAD83/98
Ground Surface Elevation: 15.35; NAVD88
Latitude/Northing: 631918.75
Longitude/Easting: 1234463.05
Boring Location: See below.

Client: Port of Bellingham
Project: POB-Harris
Task: 4000
Address: Fairhaven Shipyard
Bellingham, Wa

Remarks: Boring located in the Paint Shop and Sandblast Shed area, east of All American Marine.

PID (ppm)	SAMPLE INTERVAL (ft bgs)	SAMPLE ID	DRIVE / RECOVERY	DEPTH (ft bgs)	USCS SYMBOL	LITHOLOGIC DESCRIPTION AND OBSERVATIONS (color, grading, Group Name [with MAJOR and minor constituents], moisture content, etc.)
				0	GW	Dark brown poorly graded silty gravel with sand, moist (Fill).
				1	Concrete	Concrete.
0.3				2	SP	Tan to gray poorly graded fine SAND, trace silt, moist.
	3-4	FS18-3 -031611		3		
				4		Shell fragments and fine gravel at 3.5 ft bgs.
0.7				5		Sands show lamination.
				6		
0.0				7		
				8		
				9		
0.0				10	SW-SM	Tan well graded fine to coarse SAND with gravel and silt, wet.
				11		
				12		
				13		
0.0	14-15	FS18-14 -031611		14	SM	Dark gray silty fine SAND with gravel, wet. Shell fragments. Total Depth = 15.0 ft bgs.
				15		
				16		
				17		
				18		
				19		
				20		

Notes:
ft bgs = feet below ground surface
ppm = parts per million
--- Gradational unit contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

37-2E-2N

RESOURCE PROTECTION WELL REPORT

(SUBMIT ONE WELL REPORT PER WELL INSTALLED)

CURRENT
Notice of Intent No. SE43342

Construction/Decommission

☒ Construction 429970

☐ Decommission *ORIGINAL INSTALLATION Notice of Intent Number* _____

Type of Well

☒ Resource Protection

☐ Geotechnical Soil Boring

Property Owner Port of Bellingham

Site Address 201 Harris Ave.

Consulting Firm GeoEngineers-Bellingham

City Bellingham County 37-Whatcom

Unique Ecology Well ID

Tag No. _____

Location 1/4 SW 1/4 SW Sec 2 Town 37N R2E (EWM) or WWM

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

Lat/Long (s,t,r still Required) Lat Deg x Lat Min/Sec x

Long Deg x Long Min/Sec x

Tax Parcel No. 17744

☒ Driller ☐ Trainee Name (Print) Scott Krueger

Driller/Trainee Signature Scott Krueger

Driller/Trainee License No. 2073

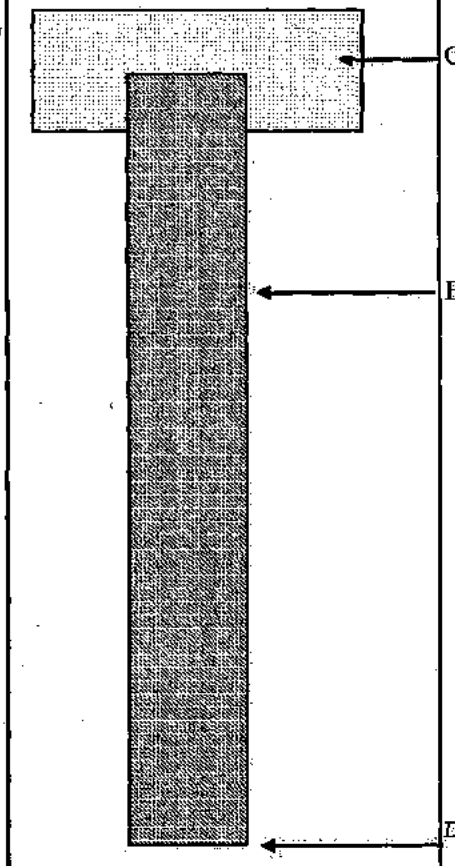
Cased or Uncased Diameter 8 Static Level 10

Work/Decommision Start Date 8-5-11

If trainee, licesned drillers' Signature and License No. _____

Work/Decommision Completed Date 8-5-11

Construction/Design — Well Data W11-471 — Formation Description



CONCRETE SURFACE SEAL 5 FT

BACKFILL 50 FT — Bent chips

DEPTH OF BORING 55 FT

Formation Description	
0 - 30 FT	brown Sands, gravel, some Cobbles
30 - 55 FT	gray Silty Sand, gravel, Till
0 - FT	

Scale 1" = _____ Page _____ of _____

ECY 050-12 (Rev. 2/01)

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WATER RESOURCES - NWRO

37-26-2N

RESOURCE PROTECTION WELL REPORT

(SUBMIT ONE WELL REPORT PER WELL INSTALLED)

CURRENT
Notice of Intent No. A.E 14195

Construction/Decommission

☐ Construction 428972

☒ Decommission *ORIGINAL INSTALLATION Notice of Intent Number* SE433402

Type of Well

☒ Resource Protection

☐ Geotechnical Soil Boring

Property Owner: Port of Bellingham

Site Address: 201 Harris Ave.

Consulting Firm: GeoEngineers-Bellingham

City: Bellingham County: 37-Whatcom

Unique Ecology Well ID

Tag No.

Location: 1/4 SW 1/4 SW Sec 2 Twn 37N R2E (EWM) or WWM

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

Lat/Long (s,t,r still Required): Lat Deg x Lat Min/Sec x; Long Deg x Long Min/Sec x

☒ Driller ☐ Trainee Name (Print): Scott Krueger

Driller/Trainee Signature:

Driller/Trainee License No. 2073

Tax Parcel No. 17744

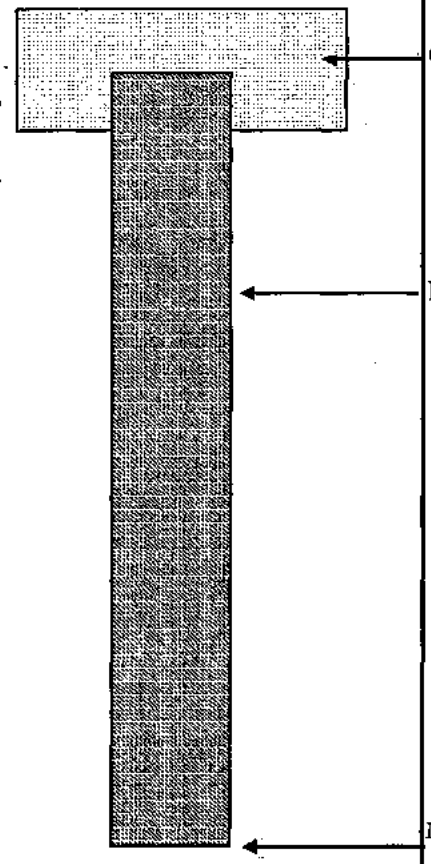
Cased or Uncased Diameter: 8 Static Level: 10

Work/Decommision Start Date: 8-5-11

If trainee, licesned drillers' Signature and License No.:

Work/Decommision Completed Date: 8-5-11

Construction/Design | Well Data W11-471 | Formation Description



CONCRETE SURFACE SEAL 5 FT

BACKFILL 50 FT

Rent chips

DEPTH OF BORING 55 FT

0 - 30 FT: brown Sands, gravel, some cobbles

30 - 55 FT: gray silty sand, gravel, till

0 - FT

Scale 1" =

Page of

ECY 050-12 (Rev. 2/01)

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WATER RESOURCES - NWRO

37-2B-2N

RESOURCE PROTECTION WELL REPORT

(SUBMIT ONE WELL REPORT PER WELL INSTALLED)

CURRENT
Notice of Intent No. AE14195

Construction/Decommission
03670750O
☐ Construction
☒ Decommission *ORIGINAL INSTALLATION Notice of Intent Number* SE43342

42997

Type of Well
☒ Resource Protection
☐ Geotechnical Soil Boring

Property Owner Port of Bellingham
Site Address 201 Harris Ave.
Consulting Firm GeoEngineers-Bellingham
City Bellingham County 37-Whatcom

Unique Ecology Well ID
Tag No.

Location 1/4 SW 1/4 SW Sec 2 Town 37N R2E (EWM or WWM)

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

Lat/Long (s,t,r still Required) Lat Deg x Lat Min/Sec x
Long Deg x Long Min/Sec x

☒ Driller ☐ Trainee Name (Print) Scott Krueger
Driller/Trainee Signature
Driller/Trainee License No. 2073

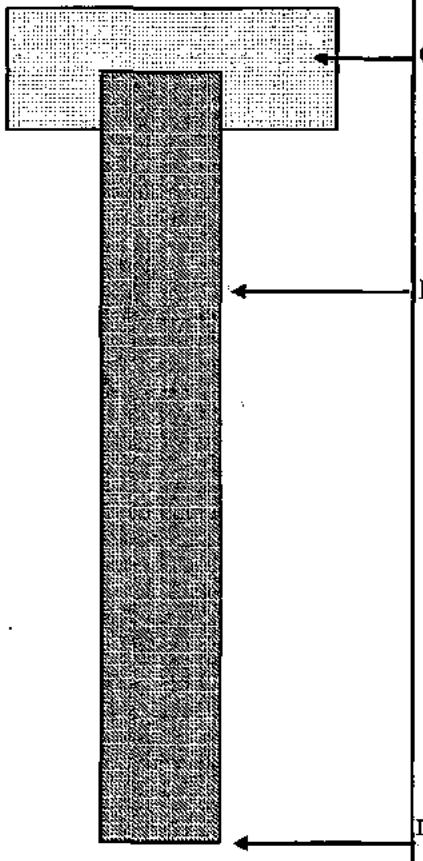
Tax Parcel No. 17744

Cased or Uncased Diameter 8¼ Static Level 8

If trainee, licensed drillers' Signature and License No.

Work/Decommission Start Date 8/4/2011
Work/Decommission Completed Date 8/5/2011

Construction/Design — Well Data W11-471 — Formation Description



CONCRETE SURFACE SEAL 0 - 14 FT
Dock to mudline

BACKFILL 66 FT
Bent grout

DEPTH OF BORING 80 FT

0 - 14 FT	Dock to mudline
014 - 52 FT	brown Sandy gravel, Some cobbles
052 - 80 FT	gray Silty Sand, gravel, Till

Scale 1" = _____ Page _____ of _____

ECY 050-12 (Rev. 2/01)

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WATER RESOURCES - NWRO

37-2E-2N

RESOURCE PROTECTION WELL REPORT

(SUBMIT ONE WELL REPORT PER WELL INSTALLED)

CURRENT
Notice of Intent No. SE43342

Construction/Decommission 03607500

☒ Construction

☐ Decommission *ORIGINAL INSTALLATION Notice of Intent Number* _____

428909

Type of Well

☒ Resource Protection

☐ Geotechnical Soil Boring

Property Owner: Port of Bellingham

Site Address: 201 Harris Ave.

Consulting Firm: GeoEngineers-Bellingham

City: Bellingham County: 37-Whatcom

Unique Ecology Well ID

Tag No.

Location: 1/4 SW 1/4 SW Sec 2 Town 37N R2E (EWM or WWM)

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

Lat/Long (s,t,r still Required): Lat Deg x Lat Min/Sec x Long Deg x Long Min/Sec x

Tax Parcel No: 17744

☒ Driller ☐ Trainee Name (Print): Scott Krueger

Driller/Trainee Signature

Driller/Trainee License No. 2073

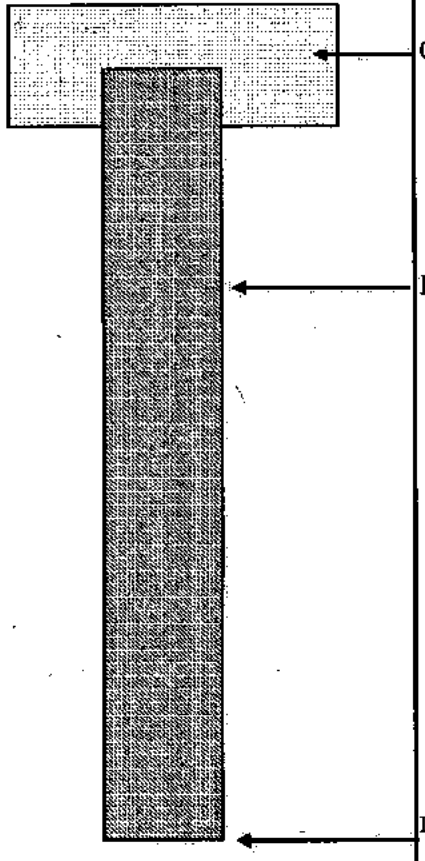
Cased or **Uncased** Diameter: 8¼ Static Level: 8

Work/Decommission Start Date: 8/4/2011

If trainee, licsned drillers' Signature and License No.

Work/Decommision Completed Date: 8/4/2011

Construction/Design | Well Data W11-471 | Formation Description



CONCRETE SURFACE SEAL 0 - 14 Dock to mudline FT

BACKFILL 66 FT Bent grout

DEPTH OF BORING 80 FT

0 - 14 FT Dock to mudline

014 - 52 FT brown Sandy gravel, Some cobbles

052 - 80 FT gray Silty Sand, gravel, till

Scale 1" = _____

Page _____ of _____

ECY 050-12 (Rev. 2/01)

RECEIVED SEP 02 2011 WATER RESOURCES - NWRO

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Soil Boring ID: FS-19

Drill Date: January 29, 2013
Logged By: Elena Ramirez
Drilled By: Eli Floyd/Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: Direct Push 2"x5' Core
Boring Diameter: 2 inches
Boring Depth (ft bgs): 30
Groundwater ATD (ft bgs): 5.4

Coordinate System: NAVD88
Ground Surface Elevation: 13.66
Latitude/Northing: 632240.06
Longitude/Easting: 1234608.37
Boring Location:

Client: Port of Bellingham
Project: POB-Harris
Task: 4030 Data Gaps Investigation
Address: Harris Avenue Shipyard
Bellingham, WA

Remarks: Collected groundwater screening sample from 21 to 26 ft bgs.

PID (ppm)	SAMPLE INTERVAL (ft bgs)	SAMPLE ID	DRIVE / RECOVERY	DEPTH (ft bgs)	USCS SYMBOL	LITHOLOGIC DESCRIPTION AND OBSERVATIONS (color, grading, Group Name [with MAJOR and minor constituents], moisture content, etc.)
0				0	SM	Dark yellowish brown, fine to medium SAND with silt and trace gravel, damp.
0				2	SP	Very dark grayish brown, fine to medium SAND with trace silt, moist to wet, odor and staining, medium sheen.
112	3.0-3.5	FS-19-3.0-3.5-012913		3		
				5		Becomes wet.
53	6.0-6.5	FS-19-6.0-6.5-012913		6		
140.2	7.0-7.5	FS-19-7.0-7.5-012913		7		Becomes gley colored.
89.5	8.0-8.5	FS-19-8.0-8.5-012913		9		
6.1				10		Odor, staining and sheen present. Continues to 12 feet bgs.
21.4	11.5-12.0	FS-19-11.5-12.0-012913		12		
9.3				15		Odor, staining and slight sheen present. Shell fragments present.
6.1				16		
5.0				17		
3.7				18		
6.4	19.0-19.5	FS-19-19.0-19.5-012913		19		

Notes:
ft bgs = feet below ground surface
ppm = parts per million

--- Gradational unit contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Soil Boring ID: FS-19

Drill Date: January 29, 2013
Logged By: Elena Ramirez
Drilled By: Eli Floyd/Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: Direct Push 2"x5' Core
Boring Diameter: 2 inches
Boring Depth (ft bgs): 30
Groundwater ATD (ft bgs): 5.4

Coordinate System: NAVD88
Ground Surface Elevation: 13.66
Latitude/Northing: 632240.06
Longitude/Easting: 1234608.37
Boring Location:

Client: Port of Bellingham
Project: POB-Harris
Task: 4030 Data Gaps Investigation
Address: Harris Avenue Shipyard
Bellingham, WA

Remarks: Collected groundwater screening sample from 21 to 26 ft bgs.

PID (ppm)	SAMPLE INTERVAL (ft bgs)	SAMPLE ID	DRIVE / RECOVERY	DEPTH (ft bgs)	USCS SYMBOL	LITHOLOGIC DESCRIPTION AND OBSERVATIONS (color, grading, Group Name [with MAJOR and minor constituents], moisture content, etc.)
7.1	19.5-20.0	FS-19-19.5-20.0-012913		20		
				21		
				22		
				23		
				24		
9.4				25		Becomes dark grayish brown.
				26		Silt content increases, trace gravel present and increases with depth.
75	27.0-27.5	FS-19-27.0-27.5 012913		27		
1.8				28		
2.2				29		Refusal at 30 feet bgs. Total depth = 30.0 feet bgs.
				30		

Notes:
ft bgs = feet below ground surface
ppm = parts per million
--- Gradational unit contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Soil Boring ID: FS-20

Drill Date: January 29, 2013
Logged By: Elena Ramirez
Drilled By: Eli Floyd/Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: Direct Push 2"x5' Core
Boring Diameter: 2 inches
Boring Depth (ft bgs): 40
Groundwater ATD (ft bgs): 5.25

Coordinate System: NAVD88
Ground Surface Elevation: 13.61
Latitude/Northing: 1234578.62
Longitude/Easting: 632221
Boring Location: Adjacent to MW-4

Client: Port of Bellingham
Project: POB-Harris
Task: 4030 Data Gaps Investigation
Address: Harris Avenue Shipyard
Bellingham, WA

Remarks: Weather overcast, rainy.

PID (ppm)	SAMPLE INTERVAL (ft bgs)	SAMPLE ID	DRIVE / RECOVERY	DEPTH (ft bgs)	USCS SYMBOL	LITHOLOGIC DESCRIPTION AND OBSERVATIONS (color, grading, Group Name [with MAJOR and minor constituents], moisture content, etc.)
4.1				0	SW	Very dark grayish brown, well graded, fine to coarse SAND with gravel and trace fines, damp.
3.0				2	SC	Dark greenish gray, poorly graded, fine CLAYEY SAND, moist to wet.
10.1	2.5-3.0	FS-20-2.5-3.0-012913				
1.2				3		
3.6				5		
50.1				6		Strong petroleum odor, staining, wood fragments.
93.8	10.5-11.0	FS-20-10.5-11.0-012913		10		Clay content decreases, visible sheen present, strong odor, stained.
83.5				12		
14.5	15.5-16.0	FS-20-15.5-16.0-012913		15		
16.4				16		
11.7				19		Becomes olive gray; contains fine to coarse gravel.
				20		

Notes:
ft bgs = feet below ground surface
ppm = parts per million
--- Gradational unit contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Soil Boring ID: FS-20

Drill Date: January 29, 2013
Logged By: Elena Ramirez
Drilled By: Eli Floyd/Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: Direct Push 2"x5' Core
Boring Diameter: 2 inches
Boring Depth (ft bgs): 40
Groundwater ATD (ft bgs): 5.25

Coordinate System: NAVD88
Ground Surface Elevation: 13.61
Latitude/Northing: 1234578.62
Longitude/Easting: 632221
Boring Location: Adjacent to MW-4

Client: Port of Bellingham
Project: POB-Harris
Task: 4030 Data Gaps Investigation
Address: Harris Avenue Shipyard
Bellingham, WA

Remarks: Weather overcast, rainy.

PID (ppm)	SAMPLE INTERVAL (ft bgs)	SAMPLE ID	DRIVE / RECOVERY	DEPTH (ft bgs)	USCS SYMBOL	LITHOLOGIC DESCRIPTION AND OBSERVATIONS (color, grading, Group Name [with MAJOR and minor constituents], moisture content, etc.)
7.1				20		
3.4				21		Becomes grayish brown.
				22		
				23		
				24		
0.6				25		Light hydrocarbon odor; becomes dark gray.
0.6				26		
4.3				27		4-inch lense of clean sand.
				28		
				29		
				30		
				31		
				32		
				33		
				34		
				35		
				36		
				37	SM	Dark greenish gray, poorly graded SILTY SAND.
				38		
				39		Total depth = 40.0 feet bgs.
				40		

Notes:
ft bgs = feet below ground surface
ppm = parts per million
--- Gradational unit contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Soil Boring ID: FS-21

Drill Date: January 30, 2013
Logged By: Elena Ramirez
Drilled By: Eli Floyd/Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: Direct Push 2"x5' Core
Boring Diameter: 2 inches
Boring Depth (ft bgs): 25
Groundwater ATD (ft bgs): 6.75

Coordinate System: NAVD88
Ground Surface Elevation: 16.46
Latitude/Northing: 632177.68
Longitude/Easting: 1234586.62
Boring Location: Southwest of MW-4

Client: Port of Bellingham
Project: POB-Harris
Task: 4030 Data Gaps Investigation
Address: Harris Avenue Shipyard
Bellingham, WA

Remarks: Weather overcast, gray. Collected groundwater screening sample from 20 to 25 ft bgs.
Revised December 12, 2014

PID (ppm)	SAMPLE INTERVAL (ft bgs)	SAMPLE ID	DRIVE / RECOVERY	DEPTH (ft bgs)	USCS SYMBOL	LITHOLOGIC DESCRIPTION AND OBSERVATIONS (color, grading, Group Name [with MAJOR and minor constituents], moisture content, etc.)
3.2	0-0.5	FS-21-0-0.5-013013		0	SM	Very dark grayish brown, moderately graded, fine to medium SILTY SAND with gravel, damp to wet, sandblast grit (in surface material), staining, strong chemical odor, wood fragments. At 2 feet bgs, becomes very dark greenish gray, staining, light sheen.
24.2				1		
8.3				2		
96.1	3.5-4.0	FS-21-3.5-4.0-013013		3		Possible "creosote" odor, darker staining, sheen on soil, wood fragments.
19.6				4		
62.1				5		
102.1				6		
87.0	8.0-9.0	FS-21-8.0-9.0-013013		7		6-inch lense of medium sand.
4.1				8		
13.8				9		
21.2				10		Some mottling rust-color with gley. Petroleum odor, sheen on saturated soils.
65.4				11		
63.8				12	SP	Dark greenish gray, poorly graded SAND with silt, wet, odor, staining, sheen.
113.6	13.5-14.0	FS-21-13.5-14.0-013013		13		Woody area with soil below, heavy sheen, strong odor.
61.6				14		
89.2				15	SM	Dark grayish brown, well graded SILTY SAND with gravel, wet, light sheen, light odor.
15.8				16		
5.3				17		
31.4				18		
6.3	22.0-22.5	FS-21-22.0-22.5-013013		19		
8.7				20		
4.8				21		
4.7				22		
				23		
				24		Total depth = 25.0 feet bgs.
				25		

Notes:
ft bgs = feet below ground surface
ppm = parts per million
--- Gradational unit contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Soil Boring ID: FS-22

Drill Date: January 30, 2013
Logged By: Elena Ramirez
Drilled By: Eli Floyd/Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: Direct Push 2"x5' Core
Boring Diameter: 2 inches
Boring Depth (ft bgs): 25
Groundwater ATD (ft bgs): 6.75

Coordinate System: NAVD88
Ground Surface Elevation: 15.37
Latitude/Northing: 632210.56
Longitude/Easting: 1234674.25
Boring Location: West of Arrowack Bldg

Client: Port of Bellingham
Project: POB-Harris
Task: 4030 Data Gaps Investigation
Address: Harris Avenue Shipyard
Bellingham, WA

Remarks: Weather overcast, gray. Collected groundwater screening sample from 20 to 25 ft bgs.

PID (ppm)	SAMPLE INTERVAL (ft bgs)	SAMPLE ID	DRIVE / RECOVERY	DEPTH (ft bgs)	USCS SYMBOL	LITHOLOGIC DESCRIPTION AND OBSERVATIONS (color, grading, Group Name [with MAJOR and minor constituents], moisture content, etc.)
2.5				0	SC	Asphalt surface.
1.7				1		Dark grayish brown, moderately graded CLAYEY SAND with trace gravel, moist to wet, gley mottling.
0.7	3.0-3.5	FS-22-3.0-3.5-013013		2		
0.5				3		4-inch sand lense.
1.5				4		
0.2	7.0-7.5	FS-22-7.0-7.5-013013		5		
3.0				6		
0.4	7.5-8.0	FS-22-7.5-8.0-013013		7		Becomes wet.
0.8				8		Becomes greenish gray.
	11.5-12.0	FS-22-11.5-12.0-013013		9		
0.3				10		
	12.0-12.5	FS-22-12.0-12.5-013013		11		
0.7	15.0-15.5	FS-22-15.0-15.5-013013		12		
				13		
				14		
				15		Contains shells.
				16		
				17		
				18		
				19		
				20		

Notes:
ft bgs = feet below ground surface
ppm = parts per million

--- Gradational unit contact
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Soil Boring ID: FS-22

Drill Date: January 30, 2013
Logged By: Elena Ramirez
Drilled By: Eli Floyd/Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: Direct Push 2"x5' Core
Boring Diameter: 2 inches
Boring Depth (ft bgs): 25
Groundwater ATD (ft bgs): 6.75

Coordinate System: NAVD88
Ground Surface Elevation: 15.37
Latitude/Northing: 632210.56
Longitude/Easting: 1234674.25
Boring Location: West of Arrowack Bldg

Client: Port of Bellingham
Project: POB-Harris
Task: 4030 Data Gaps Investigation
Address: Harris Avenue Shipyard
Bellingham, WA

Remarks: Weather overcast, gray. Collected groundwater screening sample from 20 to 25 ft bgs.

PID (ppm)	SAMPLE INTERVAL (ft bgs)	SAMPLE ID	DRIVE / RECOVERY	DEPTH (ft bgs)	USCS SYMBOL	LITHOLOGIC DESCRIPTION AND OBSERVATIONS (color, grading, Group Name [with MAJOR and minor constituents], moisture content, etc.)
0.3				20		
0.6				21	SP	Dark grayish brown, poorly graded, fine to medium SAND, wet.
0.4				22		
0.3				23		
				24		
0.7				25		Total depth = 25.0 feet bgs.

Notes:
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ppm = parts per million
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Soil Boring ID: FS-23

Drill Date: January 30, 2013
Logged By: Elena Ramirez
Drilled By: Eli Floyd/Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: Direct Push 2"x5' Core
Boring Diameter: 2 inches
Boring Depth (ft bgs): 25
Groundwater ATD (ft bgs): 7.25

Coordinate System: NAVD88
Ground Surface Elevation: 16.80
Latitude/Northing: 632136.9375
Longitude/Easting: 1234612.5
Boring Location: Adjacent to Restroom Bldg

Client: Port of Bellingham
Project: POB-Harris
Task: 4030 Data Gaps Investigation
Address: Harris Avenue Shipyard
Bellingham, WA

Remarks: Weather overcast, gray.

PID (ppm)	SAMPLE INTERVAL (ft bgs)	SAMPLE ID	DRIVE / RECOVERY	DEPTH (ft bgs)	USCS SYMBOL	LITHOLOGIC DESCRIPTION AND OBSERVATIONS (color, grading, Group Name [with MAJOR and minor constituents], moisture content, etc.)
0.3				0	SW	Very dark grayish brown, well graded, fine to coarse SAND with gravel and silt, damp to wet, light odor, light staining, wood fragments.
0.7				1		
25.0				2		Becomes gley-colored.
	3.0-3.5	FS-23-3.0-3.5-013013		3		6-inch fine sand lense mottled with rust color.
3.5				4		
18.2				5		Becomes moist.
1.9				6		Several large wood fragments present.
5.6	7.0-7.5	FS-23-7.0-7.5-013013		7		6-inch lense containing gravel and shells.
				8		
				9		
5.0				10		
9.0				11		
0.7				12		
0.6	13.0-13.5	FS-23-13.0-13.5-013013		13	SM	Dark greenish gray moderately graded, fine to medium SILTY SAND with trace gravel, wet, greenish gray mottling.
0.3				14		
1.1				15		6-inch sand layer containing shell and trace gravels, color becomes dark grayish brown.
11.8				16		
24.0				17		Becomes dark greenish gray; gravel content increases.
				18		
0.7				19		
0.2				20		

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Soil Boring ID: FS-23

Drill Date: January 30, 2013
Logged By: Elena Ramirez
Drilled By: Eli Floyd/Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: Direct Push 2"x5' Core
Boring Diameter: 2 inches
Boring Depth (ft bgs): 25
Groundwater ATD (ft bgs): 7.25

Coordinate System: NAVD88
Ground Surface Elevation: 16.80
Latitude/Northing: 632136.9375
Longitude/Easting: 1234612.5
Boring Location: Adjacent to Restroom Bldg

Client: Port of Bellingham
Project: POB-Harris
Task: 4030 Data Gaps Investigation
Address: Harris Avenue Shipyard
Bellingham, WA

Remarks: Weather overcast, gray.

PID (ppm)	SAMPLE INTERVAL (ft bgs)	SAMPLE ID	DRIVE / RECOVERY	DEPTH (ft bgs)	USCS SYMBOL	LITHOLOGIC DESCRIPTION AND OBSERVATIONS (color, grading, Group Name [with MAJOR and minor constituents], moisture content, etc.)
2.1				20		
0.7				21		
0.1				22		
				23		
0.2				24		Total depth = 25.0 feet bgs.
				25		

Notes:
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Monitoring Well ID: MW-10

Drill Date: January 29, 2013
Logged By: Lisa Meoli
Drilled By: David Gose/Cascade Drilling
Drill Type: CME-55 Hollow Stem Auger
Sample Method: 2"x18" D&M Sampler
Boring Diameter: 8-inch
Boring Depth (ft bgs): 26.5
Groundwater ATD (ft bgs): 11

Client: Port of Bellingham
Project: POB-Harris
Site Location: Harris Ave Shipyard
Bellingham, WA

Ground Surf Elev. & Datum: 14.89
Coord. System: NAVD88
Latitude/Northing: 632274.5
Longitude/Easting: 1234715.12
Casing Elevation: 14.31

Remarks: Weather overcast, rainy.
140 lb hammer used to drive split spoon sampler.

PID (ppm)	DRIVE / RECOVERY	SAMPLE INTERVAL	DEPTH (ft bgs)	USCS SYMBOL	SOIL DESCRIPTION: (color, grading, primary classification/description, (optional size fraction), secondary classification/description, moisture)	MONITORING WELL DETAIL
0.5		MW-10-2.0-3.0-012913	0	SW	Asphalt.	Flush-mounted Monument with Concrete to Ground Surface
			1		Light brown, well graded SAND with silt and trace gravel, dry to damp, contains brick fragments.	2-inch Dia. Sch. 40 PVC Casing
			2			Bentonite Chips
			3			
			4			
			5			
			6			
			7			
			8			
			9			
			10			
0.6		MW-10-11.0-11.5-012913	11	SP	Gray, poorly graded, fine to medium SAND, wet. At 11 feet bgs, silt content increases.	#2/12 Monterey Sand
0.2			12			2-inch Dia. 0.010-in Slotted PVC Screen
			13			
			14			
			15		Clay content increases.	
		MW-10-15.0-15.5-012913	16	SW	Gray, moderately to well graded SAND with gravel and silt, wet.	
			17			
			18			
			19			
			20			

Notes:
ft bgs = feet below ground surface
ppm = parts per million
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Monitoring Well ID: MW-10

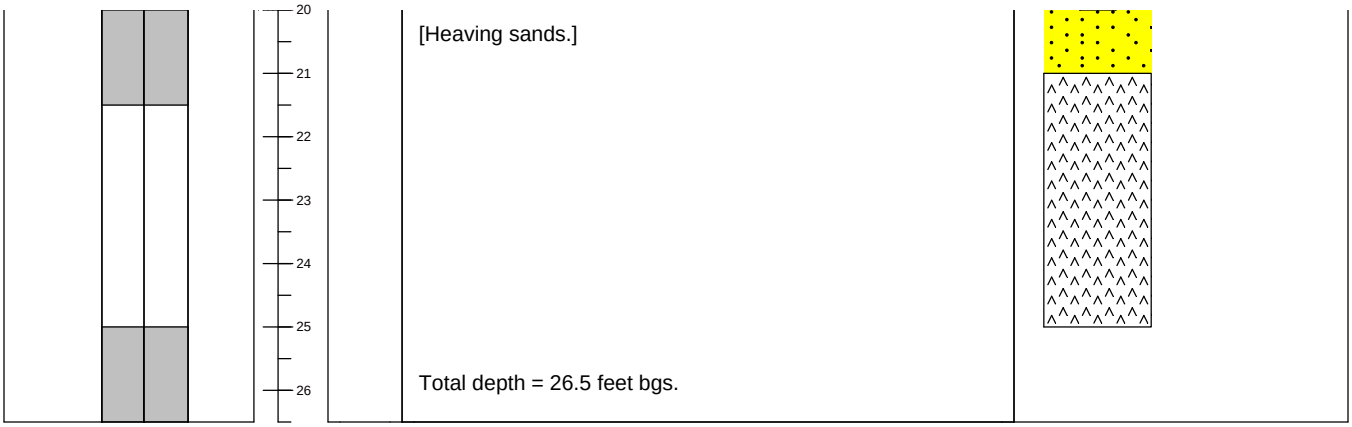
Drill Date: January 29, 2013
Logged By: Lisa Meoli
Drilled By: David Gose/Cascade Drilling
Drill Type: CME-55 Hollow Stem Auger
Sample Method: 2"x18" D&M Sampler
Boring Diameter: 8-inch
Boring Depth (ft bgs): 26.5
Groundwater ATD (ft bgs): 11

Ground Surf Elev. & Datum: 14.89
Coord. System: NAVD88
Latitude/Northing: 632274.5
Longitude/Easting: 1234715.12
Casing Elevation: 14.31

Client: Port of Bellingham
Project: POB-Harris
Site Location: Harris Ave Shipyard
Bellingham, WA

Remarks: Weather overcast, rainy.
140 lb hammer used to drive split spoon sampler.

PID (ppm)	DRIVE / RECOVERY	SAMPLE INTERVAL	DEPTH (ft bgs)	USCS SYMBOL	SOIL DESCRIPTION: (color, grading, primary classification/description, (optional size fraction), secondary classification/description, moisture)	MONITORING WELL DETAIL
			20		[Heaving sands.]	
			21			
			22			
			23			
			24			
			25			
			26		Total depth = 26.5 feet bgs.	



Notes:
ft bgs = feet below ground surface
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PROJECT: Harris Avenue Shipyard	**LOCATION:** 201 Harris Ave, Bellingham, WA	**BORING ID:** FS-24	
LOGGED BY: Lisa Meoli	**BORING LOCATION:**		
DRILLED BY: Frank Scott/Cascade Drilling, LP	**NORTHING:** 632113.8037	**EASTING:** 1234564.7271	
DRILLING EQUIPMENT: Geoprobe 8040DT	**SURFACE ELEVATION:** 16.47	**COORDINATE SYSTEM:** SPCS WA NAD83 N FT	
DRILLING METHOD: Direct-push	**TOTAL DEPTH (ft bgs):** 4	**DEPTH TO WATER (ft bgs):** N/A	
SAMPLING METHOD/SAMPLER LENGTH: Geoprobe 4-foot Plastic Liner	**BORING DIAMETER:** 2"	**DRILL DATE:** 2/9/2015	

Depth (feet)	USCS Symbol	Soil Description and Observations (color, texture, moisture, **MAJOR CONSTITUENT**, odor, staining, sheen, debris, etc.)	Drive/ Recovery	# of Blows	PID (ppm)	Sample ID
0	SW	Compacted gravel surface.				
		Brown, fine, silty **SAND** and angular gravel.			0.0	FS-24-0-1-020915
1		2-inch lens of sand blast grit.				
		Fine, silty **SAND** with angular gravel; moist.			0.0	FS-24-1-2-020915
2	SM	Reddish-brown, fine and medium, silty **SAND** with small rounded gravel; damp.			0.0	FS-24-2-3-020915
3					0.0	FS-24-3-4-020915
		Reddish-brown, very fine, silty **SAND** with rounded gravel; damp.				
4						
5						
6						
7						
8						
9						
10						
11						
12						

ABBREVIATIONS:
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NOTES:

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PROJECT: Harris Avenue Shipyard	**LOCATION:** 201 Harris Ave, Bellingham, WA	**BORING ID:** FS-25	
LOGGED BY: Lisa Meoli	**BORING LOCATION:**		
DRILLED BY: Frank Scott/Cascade Drilling, LP	**NORTHING:** 632132.5479	**EASTING:** 1234566.7916	
DRILLING EQUIPMENT: Geoprobe 8040DT	**SURFACE ELEVATION:** 16.92	**COORDINATE SYSTEM:** SPCS WA NAD83 N FT	
DRILLING METHOD: Direct-push	**TOTAL DEPTH (ft bgs):** 4	**DEPTH TO WATER (ft bgs):** N/A	
SAMPLING METHOD/SAMPLER LENGTH: Geoprobe 4-foot Plastic Liner	**BORING DIAMETER:** 2"	**DRILL DATE:** 2/9/2015	

Depth (feet)	USCS Symbol	Soil Description and Observations (color, texture, moisture, **MAJOR CONSTITUENT**, odor, staining, sheen, debris, etc.)	Drive/ Recovery	# of Blows	PID (ppm)	Sample ID
0	SW	Compacted gravel surface.				
1		Reddish brown, medium, silty **SAND** with small rounded gravel; well-graded; damp.			0.0	FS-25-0-1-020915
2	SM	Gray fine silty **SAND** with angular gravel, rock (>3" diameter); slight odor; damp.			3.7	FS-25-1-2-020915
3		Reddish-brown, fine-grained, silty **SAND** with small rounded gravel; slight odor; damp.			1.8	FS-25-2-3-020915 FS-25-2-3-020915DUP
4		Small wood fragment.			0.0	FS-25-3-4-020915
5						
6						
7						
8						
9						
10						
11						
12						

ABBREVIATIONS:
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PROJECT: Harris Avenue Shipyard	**LOCATION:** 201 Harris Ave, Bellingham, WA	**BORING ID:** FS-26	
LOGGED BY: Lisa Meoli	**BORING LOCATION:**		
DRILLED BY: Frank Scott/Cascade Drilling, LP	**NORTHING:** 632256.8446	**EASTING:** 1234584.9607	
DRILLING EQUIPMENT: Geoprobe 8040DT	**SURFACE ELEVATION:** 11.23	**COORDINATE SYSTEM:** SPCS WA NAD83 N FT	
DRILLING METHOD: Direct-push	**TOTAL DEPTH (ft bgs):** 4	**DEPTH TO WATER (ft bgs):** N/A	
SAMPLING METHOD/SAMPLER LENGTH: Geoprobe 4-foot Plastic Liner	**BORING DIAMETER:** 2"	**DRILL DATE:** 2/9/2015	

Depth (feet)	USCS Symbol	Soil Description and Observations (color, texture, moisture, **MAJOR CONSTITUENT**, odor, staining, sheen, debris, etc.)	Drive/ Recovery	# of Blows	PID (ppm)	Sample ID
0	SW	Compacted gravel surface.				
		Dark brown, sandy **GRAVEL**; well-graded; damp.			0.0	FS-26-0-1-020915
1		Medium to coarse **SAND** with gravel; damp.				
		1-inch lens of shell fragments and cobbles.			4.0	FS-26-1-2-020915
2	SM					
		Greenish-gray, silty **SAND** with gravel; wood fragments; damp.			105.6	FS-26-2-3-020915
3		Black silty **SAND** and sand blast grit with gravel and rock (>3" diameter); slight odor; damp.				
		Dark gray, fine, silty **SAND** with gravel; well-graded; slight odor; damp.			0.0	FS-26-3-4-020915
4						
5						
6						
7						
8						
9						
10						
11						
12						

ABBREVIATIONS:
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NOTES:

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PROJECT: Harris Avenue Shipyard	**LOCATION:** 201 Harris Ave, Bellingham, WA	**BORING ID:** FS-27	
LOGGED BY: Lisa Meoli	**BORING LOCATION:**		
DRILLED BY: Frank Scott/Cascade Drilling, LP	**NORTHING:** 632119.8249	**EASTING:** 1234593.9717	
DRILLING EQUIPMENT: Geoprobe 8040DT	**SURFACE ELEVATION:** 16.85	**COORDINATE SYSTEM:** SPCS WA NAD83 N FT	
DRILLING METHOD: Direct-push	**TOTAL DEPTH (ft bgs):** 4	**DEPTH TO WATER (ft bgs):** N/A	
SAMPLING METHOD/SAMPLER LENGTH: Geoprobe 4-foot Plastic Liner	**BORING DIAMETER:** 2"	**DRILL DATE:** 2/9/2015	

Depth (feet)	USCS Symbol	Soil Description and Observations (color, texture, moisture, **MAJOR CONSTITUENT**, odor, staining, sheen, debris, etc.)	Drive/ Recovery	# of Blows	PID (ppm)	Sample ID
0	SW	Compacted gravel surface.				
		Fine to coarse **SAND** and gravel; damp.			0.0	FS-27-0-1-020915
1						
		2-inch lens of black, fine **SAND** and sand blast grit; damp.			0.0	FS-27-1-2-020915
2	SM	Reddish-brown silty **SAND**, with small rounded to angular gravel; damp.			0.0	FS-27-2-3-020915
3						
		Dark brown, silty **SAND**, with small rounded to angular gravel; damp.			0.0	FS-27-3-4-020915
4						
5						
6						
7						
8						
9						
10						
11						
12						

ABBREVIATIONS:
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PROJECT: Harris Avenue Shipyard	**LOCATION:** 201 Harris Ave, Bellingham, WA	**BORING ID:** FS-28	
LOGGED BY: Lisa Meoli	**BORING LOCATION:**		
DRILLED BY: Frank Scott/Cascade Drilling, LP	**NORTHING:** 632148.1543	**EASTING:** 1234594.8297	
DRILLING EQUIPMENT: Geoprobe 8040DT	**SURFACE ELEVATION:** 16.83	**COORDINATE SYSTEM:** SPCS WA NAD83 N FT	
DRILLING METHOD: Direct-push	**TOTAL DEPTH (ft bgs):** 4	**DEPTH TO WATER (ft bgs):** N/A	
SAMPLING METHOD/SAMPLER LENGTH: Geoprobe 4-foot Plastic Liner	**BORING DIAMETER:** 2"	**DRILL DATE:** 2/9/2015	

Depth (feet)	USCS Symbol	Soil Description and Observations (color, texture, moisture, **MAJOR CONSTITUENT**, odor, staining, sheen, debris, etc.)	Drive/ Recovery	# of Blows	PID (ppm)	Sample ID
0	SW	Compacted gravel surface.				
		Brown, medium to coarse, gravelly **SAND**; damp.			2.5	FS-28-0-1-020915
1						
		1-inch lens of black sand blast grit; damp.			0.0	FS-28-1-2-020915
2	SM	Brown to dark brown, silty **SAND**; slight odor; damp.				
		Brown, gravelly **SAND** with concrete; damp.			0.0	FS-28-2-3-020915
3						
		Reddish-brown, silty **SAND** with small angular gravel; damp.			0.0	FS-28-3-4-020915
4						
5						
6						
7						
8						
9						
10						
11						
12						

ABBREVIATIONS:
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PROJECT: Harris Avenue Shipyard	**LOCATION:** 201 Harris Ave, Bellingham, WA	**BORING ID:** FS-29	
LOGGED BY: Lisa Meoli	**BORING LOCATION:**		
DRILLED BY: Frank Scott/Cascade Drilling, LP	**NORTHING:** 632250.461	**EASTING:** 1234601.6379	
DRILLING EQUIPMENT: Geoprobe 8040DT	**SURFACE ELEVATION:** 12.74	**COORDINATE SYSTEM:** SPCS WA NAD83 N FT	
DRILLING METHOD: Direct-push	**TOTAL DEPTH (ft bgs):** 4	**DEPTH TO WATER (ft bgs):** N/A	
SAMPLING METHOD/SAMPLER LENGTH: Geoprobe 4-foot Plastic Liner	**BORING DIAMETER:** 2"	**DRILL DATE:** 2/9/2015	

Depth (feet)	USCS Symbol	Soil Description and Observations (color, texture, moisture, **MAJOR CONSTITUENT**, odor, staining, sheen, debris, etc.)	Drive/ Recovery	# of Blows	PID (ppm)	Sample ID
0	SW	Compacted gravel surface.				
		Reddish-brown to rust, gravelly **SAND** with angular gravel; damp.			0.0	FS-29-0-1-020915
1		Fine to coarse **SAND**; well-graded; damp.			0.0	FS-29-1-2-020915
2	SM	Greenish-gray fine silty **SAND** and gravel; damp.			62.5	FS-29-2-3-020915
3		Black, 3-inch lens of "sticky oily" and silty **SAND** and gravel; shell fragments; strong odor; sheen test positive.			91.9	FS-29-3-4-020915
		Dark gray, fine to medium, silty **SAND** with shell fragments; slight odor; damp to moist.				
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ABBREVIATIONS:
ft bgs = feet below ground surface
USCS = Unified Soil Classification System
ppm = parts per million
▼ = denotes groundwater table

NOTES:

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PROJECT: Harris Avenue Shipyard	**LOCATION:** 201 Harris Ave, Bellingham, WA	**BORING ID:** FS-30	
LOGGED BY: Lisa Meoli	**BORING LOCATION:**		
DRILLED BY: Frank Scott/Cascade Drilling, LP	**NORTHING:** 632119.6763	**EASTING:** 1234616.5446	
DRILLING EQUIPMENT: Geoprobe 8040DT	**SURFACE ELEVATION:** 16.75	**COORDINATE SYSTEM:** SPCS WA NAD83 N FT	
DRILLING METHOD: Direct-push	**TOTAL DEPTH (ft bgs):** 4	**DEPTH TO WATER (ft bgs):** N/A	
SAMPLING METHOD/SAMPLER LENGTH: Geoprobe 4-foot Plastic Liner	**BORING DIAMETER:** 2"	**DRILL DATE:** 2/9/2015	

Depth (feet)	USCS Symbol	Soil Description and Observations (color, texture, moisture, **MAJOR CONSTITUENT**, odor, staining, sheen, debris, etc.)	Drive/ Recovery	# of Blows	PID (ppm)	Sample ID
0	SW	Compacted gravel surface.				
		Black and brown, gravelly **SAND** with wood pieces; damp.			0.0	FS-30-0-1-020915
1						
		Sand blast grit.			0.0	FS-30-1-2-020915
2	SM	Dark brown, silty **SAND** with gravel; damp.				
		Wire and a metal piece broken off the top of a padlock.			40.2	FS-30-2-3-020915
3		Large rock at 3 feet bgs.				
		Dark brown, silty **SAND** with gravel; damp.			17.2	FS-30-3-4-020915
4		6-inch lens black of sand blast grit grading to dark brown, fine, silty **SAND**; damp.				
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ABBREVIATIONS:
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NOTES:

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PROJECT: Harris Avenue Shipyard	**LOCATION:** 201 Harris Ave, Bellingham, WA	**BORING ID:** FS-31	
LOGGED BY: Lisa Meoli	**BORING LOCATION:**		
DRILLED BY: Frank Scott/Cascade Drilling, LP	**NORTHING:** 632153.3673	**EASTING:** 1234617.7537	
DRILLING EQUIPMENT: Geoprobe 8040DT	**SURFACE ELEVATION:** 16.54	**COORDINATE SYSTEM:** SPCS WA NAD83 N FT	
DRILLING METHOD: Direct-push	**TOTAL DEPTH (ft bgs):** 4	**DEPTH TO WATER (ft bgs):** N/A	
SAMPLING METHOD/SAMPLER LENGTH: Geoprobe 4-foot Plastic Liner	**BORING DIAMETER:** 2"	**DRILL DATE:** 2/9/2015	

Depth (feet)	USCS Symbol	Soil Description and Observations (color, texture, moisture, **MAJOR CONSTITUENT**, odor, staining, sheen, debris, etc.)	Drive/ Recovery	# of Blows	PID (ppm)	Sample ID
0	SW	Compacted gravel surface.				
		Reddish-brown, fine **SAND** with small rounded gravel; damp.			0.0	FS-31-0-1-020915
1					0.0	FS-31-1-2-020915
2	SM	Concrete, brown, silty **SAND** with gravel; damp.			8.4	FS-31-2-3-020915
3		Slight odor, moist.			49.7	FS-31-3-4-020915
		Grades to very fine, silty **SAND** with small rounded gravel; slight odor; moist.				FS-31-3-4-020915DUP
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ABBREVIATIONS:
ft bgs = feet below ground surface
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NOTES:

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PROJECT: Harris Avenue Shipyard	**LOCATION:** 201 Harris Ave, Bellingham, WA	**BORING ID:** FS-32	
LOGGED BY: Lisa Meoli	**BORING LOCATION:**		
DRILLED BY: Frank Scott/Cascade Drilling, LP	**NORTHING:** 632183.4372	**EASTING:** 1234618.5693	
DRILLING EQUIPMENT: Geoprobe 8040DT	**SURFACE ELEVATION:** 15.92	**COORDINATE SYSTEM:** SPCS WA NAD83 N FT	
DRILLING METHOD: Direct-push	**TOTAL DEPTH (ft bgs):** 4	**DEPTH TO WATER (ft bgs):** N/A	
SAMPLING METHOD/SAMPLER LENGTH: Geoprobe 4-foot Plastic Liner	**BORING DIAMETER:** 2"	**DRILL DATE:** 2/9/2015	

Depth (feet)	USCS Symbol	Soil Description and Observations (color, texture, moisture, **MAJOR CONSTITUENT**, odor, staining, sheen, debris, etc.)	Drive/ Recovery	# of Blows	PID (ppm)	Sample ID
0	SW	Compacted gravel surface.				
		Reddish-brown, silty **SAND**; slight odor; damp.			0.0	FS-32-0-1-020915
1		Large piece of wood with sweet smelling odor.				
		Reddish-brown, silty **SAND** with gravel and shell fragments.			0.0	FS-32-1-2-020915
2	SM					
					0.0	FS-32-2-3-020915
3		Dark gray, fine, silty **SAND** with gravel and shell fragments; damp.				
		Blueish-gray, fine, silty **SAND** with small gravel; damp.			0.0	FS-32-3-4-020915
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ABBREVIATIONS:
ft bgs = feet below ground surface
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NOTES:

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PROJECT: Harris Avenue Shipyard	**LOCATION:** 201 Harris Ave, Bellingham, WA	**BORING ID:** FS-33	
LOGGED BY: Lisa Meoli	**BORING LOCATION:**		
DRILLED BY: Frank Scott/Cascade Drilling, LP	**NORTHING:** 632213.1189	**EASTING:** 1234618.7133	
DRILLING EQUIPMENT: Geoprobe 8040DT	**SURFACE ELEVATION:** 15.07	**COORDINATE SYSTEM:** SPCS WA NAD83 N FT	
DRILLING METHOD: Direct-push	**TOTAL DEPTH (ft bgs):** 4	**DEPTH TO WATER (ft bgs):** N/A	
SAMPLING METHOD/SAMPLER LENGTH: Geoprobe 4-foot Plastic Liner	**BORING DIAMETER:** 2"	**DRILL DATE:** 2/9/2015	

Depth (feet)	USCS Symbol	Soil Description and Observations (color, texture, moisture, **MAJOR CONSTITUENT**, odor, staining, sheen, debris, etc.)	Drive/ Recovery	# of Blows	PID (ppm)	Sample ID
0	SW	Compacted gravel surface.				
		Brown,gravelly **SAND**; damp.			0.0	FS-33-0-1-020915
1		Sand blast grit.				
					0.0	FS-33-1-2-020915
2	SM	Dark brown, fine **SAND** and sand blast grit mixed throughout; damp.				
					0.0	FS-33-2-3-020915
3		2-inch lens of black sand blast grit.				
		Reddish-brown, silty **SAND** with a piece of white plastic; damp.			0.0	FS-33-3-4-020915
		Dark gray, fine, silty **SAND** with gravel; damp.				
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ABBREVIATIONS:
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PROJECT: Harris Avenue Shipyard	**LOCATION:** 201 Harris Ave, Bellingham, WA	**BORING ID:** FS-34	
LOGGED BY: Lisa Meoli	**BORING LOCATION:**		
DRILLED BY: Frank Scott/Cascade Drilling, LP	**NORTHING:** 632233.5521	**EASTING:** 1234619.257	
DRILLING EQUIPMENT: Geoprobe 8040DT	**SURFACE ELEVATION:** 14.25	**COORDINATE SYSTEM:** SPCS WA NAD83 N FT	
DRILLING METHOD: Direct-push	**TOTAL DEPTH (ft bgs):** 4	**DEPTH TO WATER (ft bgs):** N/A	
SAMPLING METHOD/SAMPLER LENGTH: Geoprobe 4-foot Plastic Liner	**BORING DIAMETER:** 2"	**DRILL DATE:** 2/9/2015	

Depth (feet)	USCS Symbol	Soil Description and Observations (color, texture, moisture, **MAJOR CONSTITUENT**, odor, staining, sheen, debris, etc.)	Drive/ Recovery	# of Blows	PID (ppm)	Sample ID
0	SW	Compacted gravel surface.				
		Brown, gravelly **SAND**; damp.			0.0	FS-34-0-1-020915
1					0.0	FS-34-1-2-020915
2	SM	Reddish-brown, silty **SAND** with gravel and shell fragments; damp.			0.0	FS-34-2-3-020915
		Black sand blast grit.				
3					5.0	FS-34-3-4-020915
		Reddish-brown and dark gray mottled, very fine, silty **SAND**, no gravel; slight odor.				
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ABBREVIATIONS:
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NOTES:

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PROJECT: Harris Avenue Shipyard	**LOCATION:** 201 Harris Ave, Bellingham, WA	**BORING ID:** FS-35	
LOGGED BY: Lisa Meoli	**BORING LOCATION:**		
DRILLED BY: Frank Scott/Cascade Drilling, LP	**NORTHING:** 632258.9036	**EASTING:** 1234619.9296	
DRILLING EQUIPMENT: Geoprobe 8040DT	**SURFACE ELEVATION:** 13.79	**COORDINATE SYSTEM:** SPCS WA NAD83 N FT	
DRILLING METHOD: Direct-push	**TOTAL DEPTH (ft bgs):** 4	**DEPTH TO WATER (ft bgs):** N/A	
SAMPLING METHOD/SAMPLER LENGTH: Geoprobe 4-foot Plastic Liner	**BORING DIAMETER:** 2"	**DRILL DATE:** 2/9/2015	

Depth (feet)	USCS Symbol	Soil Description and Observations (color, texture, moisture, **MAJOR CONSTITUENT**, odor, staining, sheen, debris, etc.)	Drive/ Recovery	# of Blows	PID (ppm)	Sample ID
0	SW	Compacted gravel surface.				
		Brown, gravelly **SAND**; damp.			0.0	FS-35-0-1-020915
1	SM	Reddish-brown, silty **SAND** with gravel; damp.			0.0	FS-35-1-2-020915
2		No recovery.				
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ABBREVIATIONS:
ft bgs = feet below ground surface
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NOTES:
Advanced boring 3x and could not get recovery from 2 to 4 feet bgs. Many utilities in the way, so abandoned location.

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PROJECT: Harris Avenue Shipyard	**LOCATION:** 201 Harris Ave, Bellingham, WA	**BORING ID:** FS-36	
LOGGED BY: Lisa Meoli	**BORING LOCATION:**		
DRILLED BY: Frank Scott/Cascade Drilling, LP	**NORTHING:** 632192.43	**EASTING:** 1234640.329	
DRILLING EQUIPMENT: Geoprobe 8040DT	**SURFACE ELEVATION:** 15.68	**COORDINATE SYSTEM:** SPCS WA NAD83 N FT	
DRILLING METHOD: Direct-push	**TOTAL DEPTH (ft bgs):** 4	**DEPTH TO WATER (ft bgs):** N/A	
SAMPLING METHOD/SAMPLER LENGTH: Geoprobe 4-foot Plastic Liner	**BORING DIAMETER:** 2"	**DRILL DATE:** 2/9/2015	

Depth (feet)	USCS Symbol	Soil Description and Observations (color, texture, moisture, **MAJOR CONSTITUENT**, odor, staining, sheen, debris, etc.)	Drive/ Recovery	# of Blows	PID (ppm)	Sample ID
0	SW	Compacted gravel surface.				
		Brown, gravelly **SAND**; dry.			0.0	FS-36-0-1-020915
1					0.0	FS-36-1-2-020915
2	SM	Light brown, silty **SAND** with rounded gravel; saturated at 4 feet bgs.			0.0	FS-36-2-3-020915 FS-36-2-3-020915DUP
3					0.0	FS-36-3-4-020915
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ABBREVIATIONS:
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NOTES:

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PROJECT: Harris Avenue Shipyard	**LOCATION:** 201 Harris Ave, Bellingham, WA	**BORING ID:** FS-37	
LOGGED BY: Lisa Meoli	**BORING LOCATION:**		
DRILLED BY: Frank Scott/Cascade Drilling, LP	**NORTHING:** 632212.4807	**EASTING:** 1234641.1178	
DRILLING EQUIPMENT: Geoprobe 8040DT	**SURFACE ELEVATION:** 15.32	**COORDINATE SYSTEM:** SPCS WA NAD83 N FT	
DRILLING METHOD: Direct-push	**TOTAL DEPTH (ft bgs):** 4	**DEPTH TO WATER (ft bgs):** 4	
SAMPLING METHOD/SAMPLER LENGTH: Geoprobe 4-foot Plastic Liner	**BORING DIAMETER:** 2"	**DRILL DATE:** 2/9/2015	

Depth (feet)	USCS Symbol	Soil Description and Observations (color, texture, moisture, **MAJOR CONSTITUENT**, odor, staining, sheen, debris, etc.)	Drive/ Recovery	# of Blows	PID (ppm)	Sample ID
0	SW	Compacted gravel surface.			0.0	FS-37-0-1-020915
1	SW	Brown, silty **SAND** with gravel; damp.			0.0	FS-37-1-2-020915
2	SW				0.0	FS-37-2-3-020915
3	SM	Light brown, silty **SAND** with rounded gravel; saturated at 3.5 feet bgs.			0.0	FS-37-3-4-020915
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NOTES:

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PROJECT: Harris Avenue Shipyard	**LOCATION:** 201 Harris Ave, Bellingham, WA	**BORING ID:** FS-38	
LOGGED BY: Lisa Meoli	**BORING LOCATION:**		
DRILLED BY: Frank Scott/Cascade Drilling, LP	**NORTHING:** 632256.9035	**EASTING:** 1234638.0195	
DRILLING EQUIPMENT: Geoprobe 8040DT	**SURFACE ELEVATION:** 14.29	**COORDINATE SYSTEM:** SPCS WA NAD83 N FT	
DRILLING METHOD: Direct-push	**TOTAL DEPTH (ft bgs):** 4	**DEPTH TO WATER (ft bgs):** N/A	
SAMPLING METHOD/SAMPLER LENGTH: Geoprobe 4-foot Plastic Liner	**BORING DIAMETER:** 2"	**DRILL DATE:** 2/9/2015	

Depth (feet)	USCS Symbol	Soil Description and Observations (color, texture, moisture, **MAJOR CONSTITUENT**, odor, staining, sheen, debris, etc.)	Drive/ Recovery	# of Blows	PID (ppm)	Sample ID
0	SW	Compacted gravel surface.				
		Brown, silty **SAND** with gravel; dry.			0.0	FS-38-0-1-020915
1		Sand blast grit grading to a silty **SAND**.			0.0	FS-38-1-2-020915
2	SM	Light grayish-brown silty **SAND** with rounded gravel; damp.			0.0	FS-38-2-3-020915
3		Brown, fine to medium, silty **SAND**; damp.			0.0	FS-38-3-4-020915
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NOTES:

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PROJECT: Harris Avenue Shipyard	**LOCATION:** 201 Harris Ave, Bellingham, WA	**BORING ID:** FS-39	
LOGGED BY: Lisa Meoli	**BORING LOCATION:**		
DRILLED BY: Frank Scott/Cascade Drilling, LP	**NORTHING:** 632170.0114	**EASTING:** 1234590.4772	
DRILLING EQUIPMENT: Geoprobe 8040DT	**SURFACE ELEVATION:** 16.79	**COORDINATE SYSTEM:** SPCS WA NAD83 N FT	
DRILLING METHOD: Direct-push	**TOTAL DEPTH (ft bgs):** 12	**DEPTH TO WATER (ft bgs):** 10	
SAMPLING METHOD/SAMPLER LENGTH: Geoprobe 4-foot Plastic Liner	**BORING DIAMETER:** 2"	**DRILL DATE:** 2/9/2015	

Depth (feet)	USCS Symbol	Soil Description and Observations (color, texture, moisture, **MAJOR CONSTITUENT**, odor, staining, sheen, debris, etc.)	Drive/ Recovery	# of Blows	PID (ppm)	Sample ID
0	SW	Compacted gravel surface.				
		Brown, silty **SAND** with gravel and rock at 2 feet bgs; damp.			0.0	
1						
2						
3					0.0	
		Reddish-brown (rust), silty **SAND** with gravel; grading to 1-inch lens of gray fine, silty **SAND**; damp.				
4						
		Brown, silty **SAND** with gravel; damp.				
5						
6	SM					
7					0.0	
		Rock, grading back to brown, silty **SAND** with rounded gravel; damp to wet.				
8					0.0	
9						FS-39-9-10-020915
10 ▼		Light brown, silty **SAND**; wet.				FS-39-10-10.5-020915
		Saturated.			0.0	FS-39-10.5-11-020915
11		Dark gray, medium to coarse, silty **SAND** with shell fragments and small rounded gravel; wet.				
		Reddish-gray, fine, silty **SAND**; no gravel; wet.				FS-39-11-12-020915
12						

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NOTES:

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PROJECT: Harris Avenue Shipyard	**LOCATION:** 201 Harris Ave, Bellingham, WA	**BORING ID:** FS-40	
LOGGED BY: Lisa Meoli	**BORING LOCATION:**		
DRILLED BY: Frank Scott/Cascade Drilling, LP	**NORTHING:** 632179.6579	**EASTING:** 1234596.2325	
DRILLING EQUIPMENT: Geoprobe 8040DT	**SURFACE ELEVATION:** 16.44	**COORDINATE SYSTEM:** SPCS WA NAD83 N FT	
DRILLING METHOD: Direct-push	**TOTAL DEPTH (ft bgs):** 12	**DEPTH TO WATER (ft bgs):** 10	
SAMPLING METHOD/SAMPLER LENGTH: Geoprobe 4-foot Plastic Liner	**BORING DIAMETER:** 2"	**DRILL DATE:** 2/9/2015	

Depth (feet)	USCS Symbol	Soil Description and Observations (color, texture, moisture, **MAJOR CONSTITUENT**, odor, staining, sheen, debris, etc.)	Drive/ Recovery	# of Blows	PID (ppm)	Sample ID
0	SW	Compacted gravel surface.				
		Brown, gravelly **SAND** with rock; well-graded; damp.			0.0	
2		Rock grading to brown, silty **SAND** with gravel; damp.				
5	SM				0.0	
9					0.0	FS-40-9-10-020915
10 ▼		Brown, very fine, silty **SAND**; no gravel; wet.			0.0	FS-40-10-10.5-020915
	ML	Brownish-gray, fine, sandy **SILT**; saturated.				FS-40-10.5-11-020915
11	SM	Gray, fine, sandy **SILT** grading to medium to coarse **SAND** with shell fragments; wet.			0.0	FS-40-11-12-020915
12						

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NOTES:

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PROJECT: Harris Avenue Shipyard	**LOCATION:** 201 Harris Ave, Bellingham, WA	**BORING ID:** FS-41	
LOGGED BY: Lisa Meoli	**BORING LOCATION:**		
DRILLED BY: Frank Scott/Cascade Drilling, LP	**NORTHING:** 632170.2427	**EASTING:** 1234605.3332	
DRILLING EQUIPMENT: Geoprobe 8040DT	**SURFACE ELEVATION:** 16.49	**COORDINATE SYSTEM:** SPCS WA NAD83 N FT	
DRILLING METHOD: Direct-push	**TOTAL DEPTH (ft bgs):** 12	**DEPTH TO WATER (ft bgs):** 10	
SAMPLING METHOD/SAMPLER LENGTH: Geoprobe 4-foot Plastic Liner	**BORING DIAMETER:** 2"	**DRILL DATE:** 2/9/2015	

Depth (feet)	USCS Symbol	Soil Description and Observations (color, texture, moisture, **MAJOR CONSTITUENT**, odor, staining, sheen, debris, etc.)	Drive/ Recovery	# of Blows	PID (ppm)	Sample ID
0	SW	Compacted gravel surface.				
		Brown, silty **SAND** with gravel; well-graded; damp.			0.0	
1						
2						
3						
4						
5						
6	SM				0.0	
7		Chunk of wood at 7 feet, then grades back to brown, silty **SAND** with gravel.				
8					0.0	
9		Dark brown, silty **SAND** with rounded gravel; damp.				FS-41-9-10-020915
10 ▼		Reddish-gray, silty **SAND** with small rounded gravel; wet.			0.0	FS-41-10-10.5-020915 FS-41-10.5-11-020915
11		Gray, fine, sandy **SILT**; saturated.			1.6	FS-41-11-12-020915
12		Wood fragments; slight odor.				

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PROJECT: Harris Avenue Shipyard	**LOCATION:** 201 Harris Ave, Bellingham, WA	**BORING ID:** FS-42	
LOGGED BY: Lisa Meoli	**BORING LOCATION:**		
DRILLED BY: Frank Scott/Cascade Drilling, LP	**NORTHING:** 632179.9338	**EASTING:** 1234606.1163	
DRILLING EQUIPMENT: Geoprobe 8040DT	**SURFACE ELEVATION:** 16.03	**COORDINATE SYSTEM:** SPCS WA NAD83 N FT	
DRILLING METHOD: Direct-push	**TOTAL DEPTH (ft bgs):** 12	**DEPTH TO WATER (ft bgs):** 10	
SAMPLING METHOD/SAMPLER LENGTH: Geoprobe 4-foot Plastic Liner	**BORING DIAMETER:** 2"	**DRILL DATE:** 2/9/2015	

Depth (feet)	USCS Symbol	Soil Description and Observations (color, texture, moisture, **MAJOR CONSTITUENT**, odor, staining, sheen, debris, etc.)	Drive/ Recovery	# of Blows	PID (ppm)	Sample ID
0	SW	Asphalt surface and gravel.				
		Brown, silty **SAND** with gravel; well-graded; damp.			0.0	
1						
2						
3						
4					65.0	
5		Gray, fine, silty **SAND** with gravel; well-graded; slight odor; damp.				
		Reddish-brown, fine to medium, silty **SAND** with gravel; moderate odor; wet at 10 feet bgs.				
6	SM					
7						
8						
9					0.7	FS-42-9-10-020915
10 ▼		Gray, silty **SAND** with gravel; well-graded; wood pieces; saturated.				FS-42-10-10.5-020915
11						FS-42-11-11.5-020915
		Gray, coarse, silty **SAND** with small rounded gravel, wood pieces and shell fragments; slight odor.			0.4	FS-42-11.5-12-020915
12						

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NOTES:

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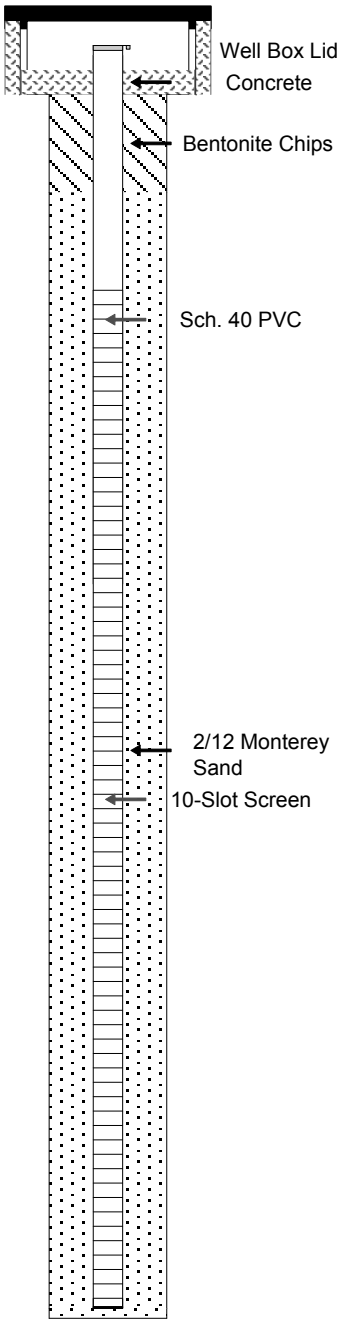
PROJECT: **Harris Avenue Shipyard**	LOCATION: **201 Harris Ave, Bellingham, WA**	WELL ID: **MW-11**
LOGGED BY: **Gabe Cisneros**	COORDINATE SYSTEM: **WA SPCS NAD83 N FT**	ECOLOGY WELL ID: **BJA-549**
DRILLED BY: **Aaron Ocheltree/Cascade Drilling, LP**	NORTHING: **632256.1657**	EASTING: **1234512.9216**
DRILLING EQUIPMENT: **CME 75 Limited Access Drill Rig**	GROUND SURFACE ELEV.: **9.68**	TOC ELEVATION: **9.33**
DRILLING METHOD: **Hollow-Stem Auger**	TOTAL DEPTH (ft bgs): **13.4**	DEPTH TO WATER (ft bgs): **6**
SAMPLING METHOD: **Split-Spoon**	BORING DIAMETER: **8.25**	DRILL DATE: **2/9/2015**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	# of Blows	PID (ppm)	Sample ID
0	SP	Railroad ties and fill material in the top 2 feet.			0	MW-11-0.0-1.0 -020915
1		Brown, loose, medium **SAND** with 15% rounded gravel, wood debris (lumber or railroad ties), and shells; no odor; no sheen; wet. Hand cleared to 2 feet bgs.			0	MW-11-1.0-2.0 -020915
2	ML	Thin **SILT** layer at 2 feet bgs.		15	3	MW-11-2.0-3.0 -020915
3	SP	Brown to gray, medium dense, medium to coarse **SAND** with 20% large gravel and wood; no odor; no sheen; moist.		16		
4		Gray, medium dense, medium to coarse **SAND** with 15% fine to large gravel; no odor; no sheen; moist.		16	2.9	MW-11-3.0-4.0 -020915
5				11		
6 ▼		Gray, medium dense, fine to medium **SAND** with 10% gravel; no odor; no sheen; wet.		26	0.9	
7	SW	Same as above with shells; saturated.		31		
8		Gray, medium dense, fine to coarse **SAND** with 20% fine gravel; no odor; no sheen; saturated.		11	0.4	MW-11-5.0-6.0 -020915
9	SP	Gray, medium dense, fine **SAND** with 5% silt; no odor; no sheen; saturated.		7		
10	SM	Gray, medium dense, silty, fine **SAND**; no odor; no sheen.		3	0.6	MW-11-6.0-7.0 -020915
11	ML	Gray to olive gray, stiff, sandy **SILT**; no odor; no sheen; saturated.		11		
12		Same as above; encountered wood debris at 11.5 to 12.5 feet.		17	0.8	MW-11-7.0-8.0 -020915
13		Same as above; shells at 12.5 feet.		16		
14				10	0.4	MW-11-8.0-9.0 -020915
				11		
				13	0.3	
				10		
				10	0.3	
				14		
				30		
				30		
				30		
				40		



ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
USCS = Unified Soil Classification System
▼ = denotes groundwater table

NOTES:

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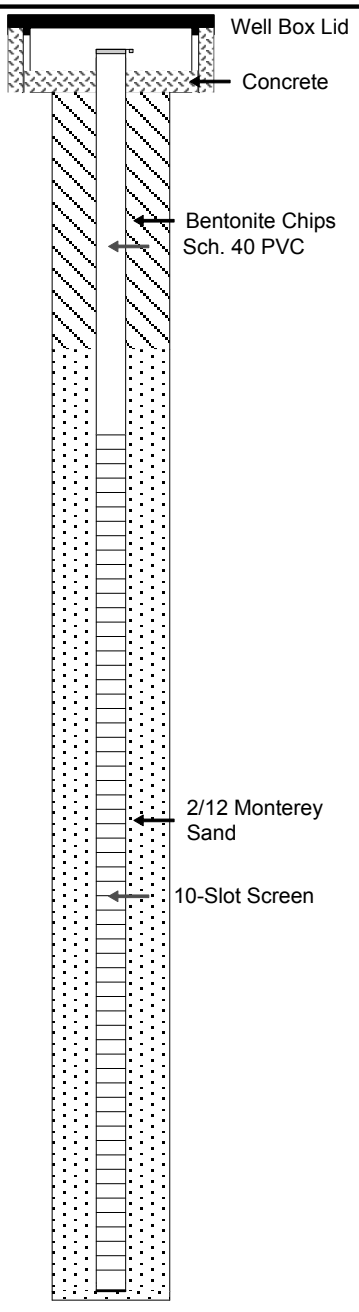
PROJECT: **Harris Avenue Shipyard**	LOCATION: **201 Harris Ave, Bellingham, WA**	WELL ID: **MW-12**
LOGGED BY: **Gabe Cisneros**	COORDINATE SYSTEM: **WA SPCS NAD83 N FT**	ECOLOGY WELL ID: **BJA-550**
DRILLED BY: **Aaron Ocheltree/Cascade Drilling, LP**	NORTHING: **632221.7187**	EASTING: **1234368.9675**
DRILLING EQUIPMENT: **CME 75 Limited Access Drill Rig**	GROUND SURFACE ELEV.: **14.71**	TOC ELEVATION: **14.5**
DRILLING METHOD: **Hollow-Stem Auger**	TOTAL DEPTH (ft bgs): **15.03**	DEPTH TO WATER (ft bgs): **9.25**
SAMPLING METHOD: **Split-Spoon**	BORING DIAMETER: **8.25**	DRILL DATE: **2/9/2015**

Depth (feet)	USCS Symbol	Description	Drive/ Recovery	# of Blows	PID (ppm)	Sample ID
0	SW	Brown, silty, sandy, crushed gravel Road Base Fill. Hand cleared down to 3 feet bgs.			7.1	MW-12-0.0-1.0 -020915
1		Metal pipe encountered at 1 foot bgs; moved boring location.			0.4	MW-12-1.0-2.0 -020915
2		Brown, medium dense, gravelly, fine to coarse **SAND** with 20% gravel up to 4 inches in diameter; no odor; no sheen; moist.			0.3	MW-12-2.0-3.0 -020915
3		Same as above; no odor; no sheen; moist.				
		Same as above; no odor; no sheen.		22	0.2	MW-12-3.0-4.0 -020915
4	SM	Brown with olive gray, medium dense to dense, silty, fine to medium **SAND** with 20% silt, 10% fine gravel, and wood debris at 4.25 feet bgs; no odor; no sheen.		48 80	91.5	MW-12-4.0-5.0 -020915
5		Dark gray, medium dense, silty, fine **SAND** with 30% silt and 15% fine to large gravel; slight hydrocarbon odor; no sheen; moist.		20 50	35.1	
6	ML	Olive gray, stiff, sandy **SILT** with low plasticity; slight odor; no sheen; moist.		12 14	1.7	
7				11	2.2	
8	SP	Brown, dense, medium to coarse **SAND** with 20% fine gravel; no odor; no sheen; moist.		50 50		MW-12-8.0-8.5 -020915
9		No recovery to 10.5 feet bgs		15 15 15		
10	SW	Brown, medium dense, gravelly, fine to coarse **SAND** with 25% fine to medium gravel; no odor; no sheen; saturated.		11	2	MW-12-10.5-1 1.0-020915
11				17 22	1.5	MW-12-11.0-1 2.0-020915
12		Same as above; no odor; no sheen; saturated.		6 6	1.6	
13	SM	Olive gray, medium dense, silty gravelly, fine to medium **SAND** with 15% silt and 15% gravel; no odor; no sheen.		8	0.2	
14	SW	Olive gray, medium dense, gravelly, fine to coarse **SAND** with 25% fine to medium, rounded gravel and 5% silt; no odor; no sheen.		3 4 6	0.3	
15						
16						



ABBREVIATIONS:
ft bgs = feet below ground surface
USCS = Unified Soil Classification System
ppm = parts per million
▼ = denotes groundwater table

NOTES:

2000 Sampling

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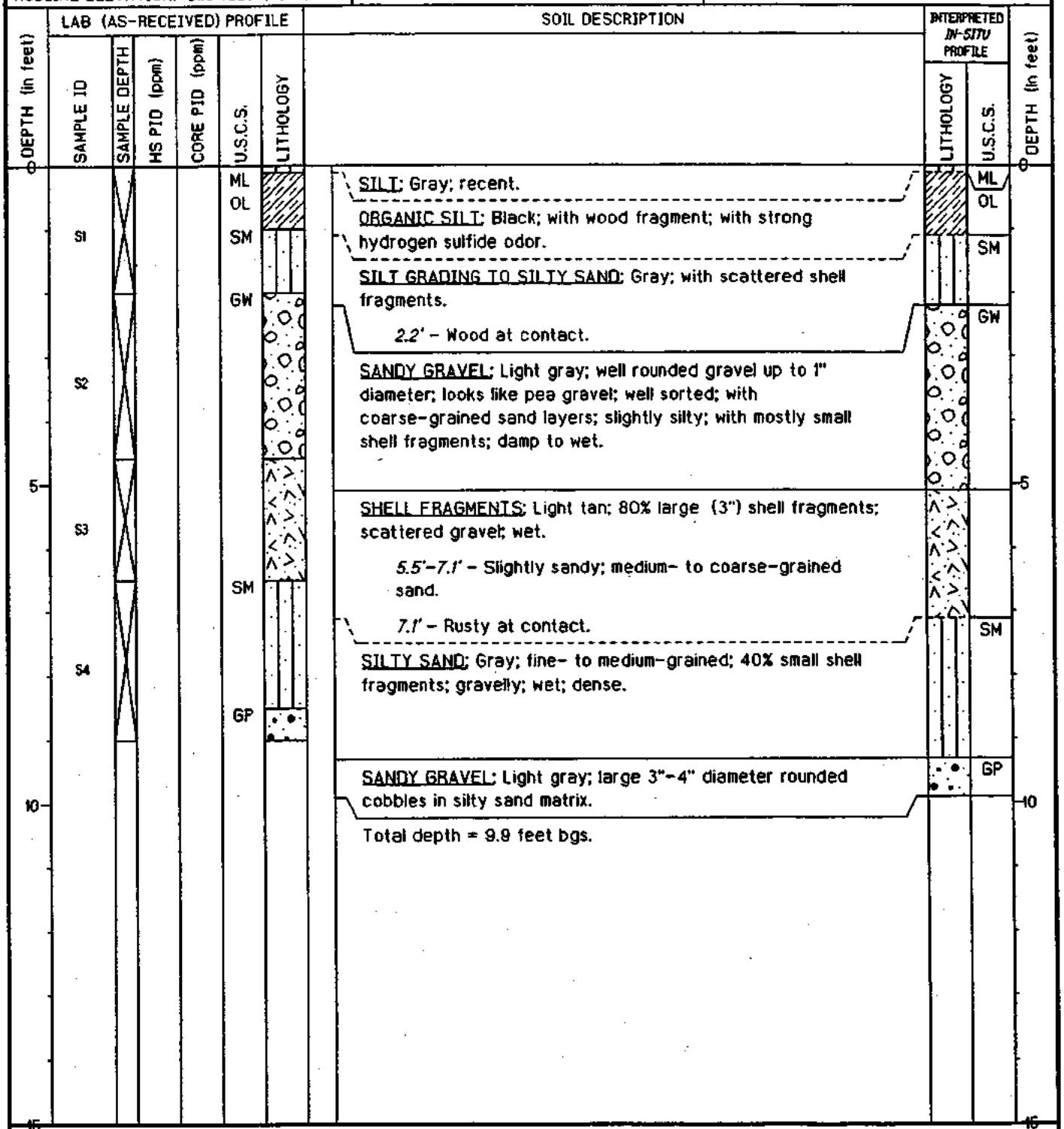
CORING LOG

HV-30 (Replicate D)

PROJECT NO.: PORTB-04140-210 Harris Avenue Shipyards RI/FS		CLIENT: Port of Bellingham
LOCATION: Bellingham, Washington; Harris Avenue Shipyard		RIG TYPE: MSS, Inc. Vessel
START DATE: 08/29/00 TIME: 18:14	RECOVERY LENGTH: 9.0 feet	METHOD: 4" Diameter Vibracore
LABORATORY DATE: 08/31/00 TIME: 17:00	DRIVE LENGTH: 9.9 feet	FIELD LOG BY: DCM
DEPTH TO MUD: 29.9 feet	CALCULATED RECOVERY: 91 %	LAB LOG BY: AGF/KLC/LM/SB
MUDLINE ELEVATION: 21.0 feet (MLLW)	LATITUDE: 48° 43' 19.05" N	LONGITUDE: 122° 30' 51.02" W



REMARKS: Suspect light tan layer is avenue of water transport between lower and upper SILT layers with rust at aquitard contact.
▣ – Sample Interval

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HV-31 (Replicate A)

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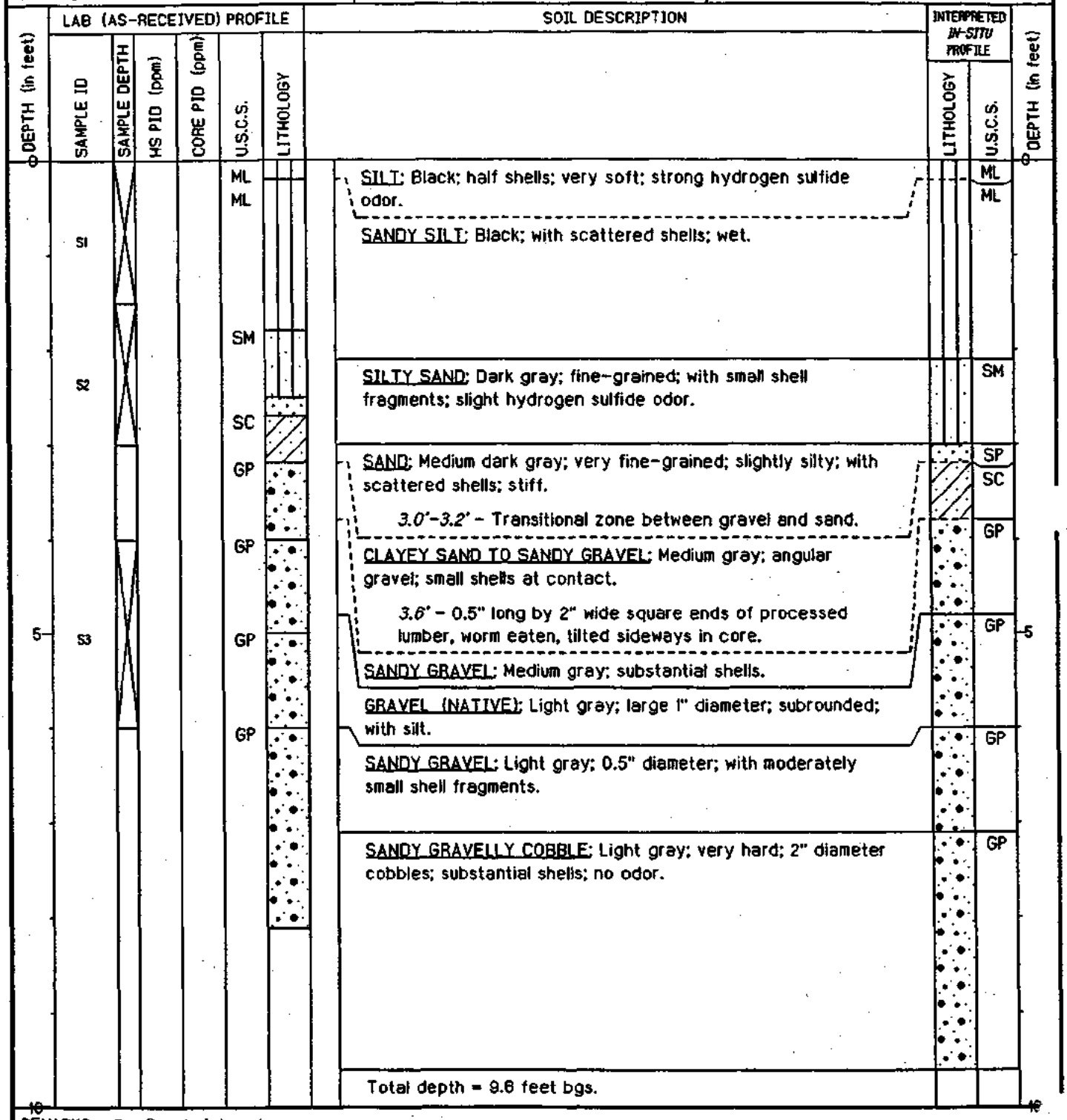
PROJECT NO.: *PORTB-04140-210 Harris Avenue Shipyards RI/FS*		CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington; Harris Avenue Shipyard*		RIG TYPE: *MSS, Inc. Vessel*
START DATE: *08/28/00* TIME: *15:58*	RECOVERY LENGTH: *8.1 feet*	METHOD: *4" Diameter Vibracore*
LABORATORY DATE: *08/30/00* TIME: *15:00*	DRIVE LENGTH: *9.6 feet*	FIELD LOG BY: *DCM*
DEPTH TO MUD: *16.3 feet*	CALCULATED RECOVERY: *84 %*	LAB LOG BY: *AGF/DCM*
MUDLINE ELEVATION: *1.0 feet (MLLW)*	LATITUDE: *48° 43' 17.39" N*	LONGITUDE: *122° 30' 51.22" W*



REMARKS: ▣ - Sample Interval

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HV-34 (Replicate A)

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PROJECT NO.: *PORTB-04140-210 Harris Avenue Shipyards RI/FS*		CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington; Harris Avenue Shipyard*		RIG TYPE: *MSS, Inc. Vessel*
START DATE: *08/28/00* TIME: *10:20*	RECOVERY LENGTH: *9.0 feet*	METHOD: *4" Diameter Vibracore*
LABORATORY DATE: *08/30/00* TIME: *16:30*	DRIVE LENGTH: *10.1 feet*	FIELD LOG BY: *DCM*
DEPTH TO MUD: *41.1 feet*	CALCULATED RECOVERY: *89 %*	LAB LOG BY: *AGF/DCM*
MUDLINE ELEVATION: *41.0 feet (MLLW)*	LATITUDE: *48° 43' 22.18" N*	LONGITUDE: *122° 30' 54.54" W*

DEPTH (in feet)	LAB (AS-RECEIVED) PROFILE: SAMPLE ID	SAMPLE DEPTH	HS PID (ppm)	CORE PID (ppm)	U.S.C.S.	LITHOLOGY	SOIL DESCRIPTION	INTERPRETED IN-SITU PROFILE: LITHOLOGY	U.S.C.S.	DEPTH (in feet)
0					ML		<u>SILT</u>: Dark gray; top 2" very soft, remainder medium stiff; very clayey; with large white flat worms (2) and worm holes; no shells; no odor.		ML	0
	S1				SM		<u>SILTY SAND</u>: Medium brown; very fine-grained; trace small shells; wet.		SM	
	S2				SP		<u>SAND</u>: Light gray; medium- to coarse-grained; with substantial shell fragments and half shells (60% white bivalves); stiff.		SP	
					SP		*3.4'-4.5'* – Transitional zone.		SP	
5	S3						<u>SAND</u>: Dark gray; medium-grained; slightly gravelly (up to 0.5" diameter); slightly silty; with scattered moderately small bivalves and fragmented shells (different disposition than above); stiff; trends with silty sand, nonsilty sand and gravelly sand layers.			5
	S4				GP		<u>SANDY GRAVEL</u>: Medium gray-brown; up to 0.5" diameter; subrounded; very coarse-grained sand; slightly silty; substnatial small and fractured shells (lighter gray but not classic); very hard; no layers.		GP	
10							Total depth = 10.1 feet bgs.			10
15										15

REMARKS: ▣ – Sample Interval

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HV-38 (Replicate A)

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PROJECT NO.: *PORTB-04140-210 Harris Avenue Shipyards RI/FS*		CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington; Harris Avenue Shipyard*		RIG TYPE: *MSS, Inc. Vessel*
START DATE: *08/28/00* TIME: *12:01*	RECOVERY LENGTH: *9.0 feet*	METHOD: *4" Diameter Vibracore*
LABORATORY DATE: *08/31/00* TIME: *12:30*	DRIVE LENGTH: *8.9 feet*	FIELD LOG BY: *DCM*
DEPTH TO MUD: *42.8 feet*	CALCULATED RECOVERY: *101%*	LAB LOG BY: *AGF/SB/KLC*
MUDLINE ELEVATION: *43.0 feet (MLLW)*	LATITUDE: *48° 43' 20.86" N*	LONGITUDE: *122° 30' 56.82" W*

DEPTH (in feet)	LAB (AS-RECEIVED) PROFILE: SAMPLE ID	SAMPLE DEPTH	HS PID (ppm)	CORE PID (ppm)	U.S.C.S.	LITHOLOGY	SOIL DESCRIPTION	INTERPRETED IN-SITU PROFILE: LITHOLOGY	INTERPRETED IN-SITU PROFILE: U.S.C.S.	DEPTH (in feet)
0					ML		SANDY SILT: Black; silt film; with lots of worms and worm holes; wet; no hydrogen sulfide odor.		ML	0
	S1				SM ML		CLAYEY SILT WITH SILTY SAND: Black in dark grayish-brown layers; transition zone (no obvious layers); lots of 6" long worm holes.		ML SM	
	S2				SM		SILTY SAND: Dark grayish-brown; fine- to medium-grained; with scattered small shells; no worm holes; less dry.		SM	
	S3				SM		SILTY SAND: Medium to light gray; fine- to medium-grained; with substantial large 3" diameter shell fragments; trace gravel (rounded, up to 2" diameter); wet; dense. *5.0'-8.3'* – Dark gray; slightly silty; with trace to moderate very small shell fragments (different type from layer above); trace 0.5" diameter gravel; dewatered; dense.		SM	
5	S4						*8.3'-8.9'* – Silty; with substantial large shell fragments.			5
							Total depth = 8.9 feet bgs.			
10										10

REMARKS: ▣ - Sample Interval

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HV-39 (Replicate A)

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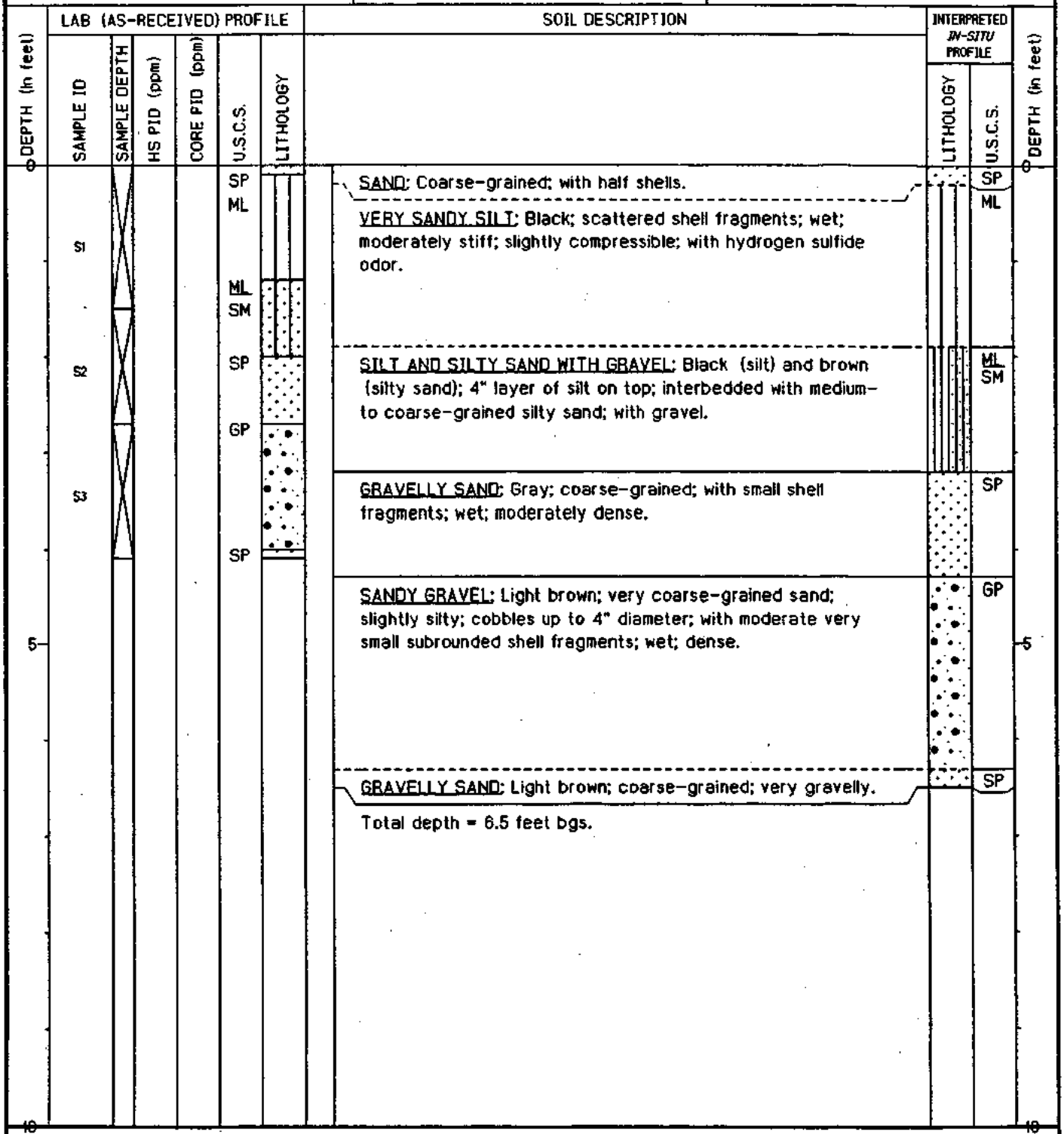
PROJECT NO.: *PORTB-04140-210 Harris Avenue Shipyards RI/FS*		CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington; Harris Avenue Shipyard*		RIG TYPE: *MSS, Inc. Vessel*
START DATE: *08/28/00* TIME: *12:43*	RECOVERY LENGTH: *4.1 feet*	METHOD: *4" Diameter Vibracore*
LABORATORY DATE: *08/31/00* TIME: *11:15*	DRIVE LENGTH: *6.5 feet*	FIELD LOG BY: *DCM*
DEPTH TO MUD: *33.0 feet*	CALCULATED RECOVERY: *63 %*	LAB LOG BY: *AGF/KLC*
MUDLINE ELEVATION: *33.0 feet (MLLW)*	LATITUDE: *48° 43' 18.37" N*	LONGITUDE: *122° 30' 56.77" W*



REMARKS: ■ - Sample Interval

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HV-41 (Replicate A)

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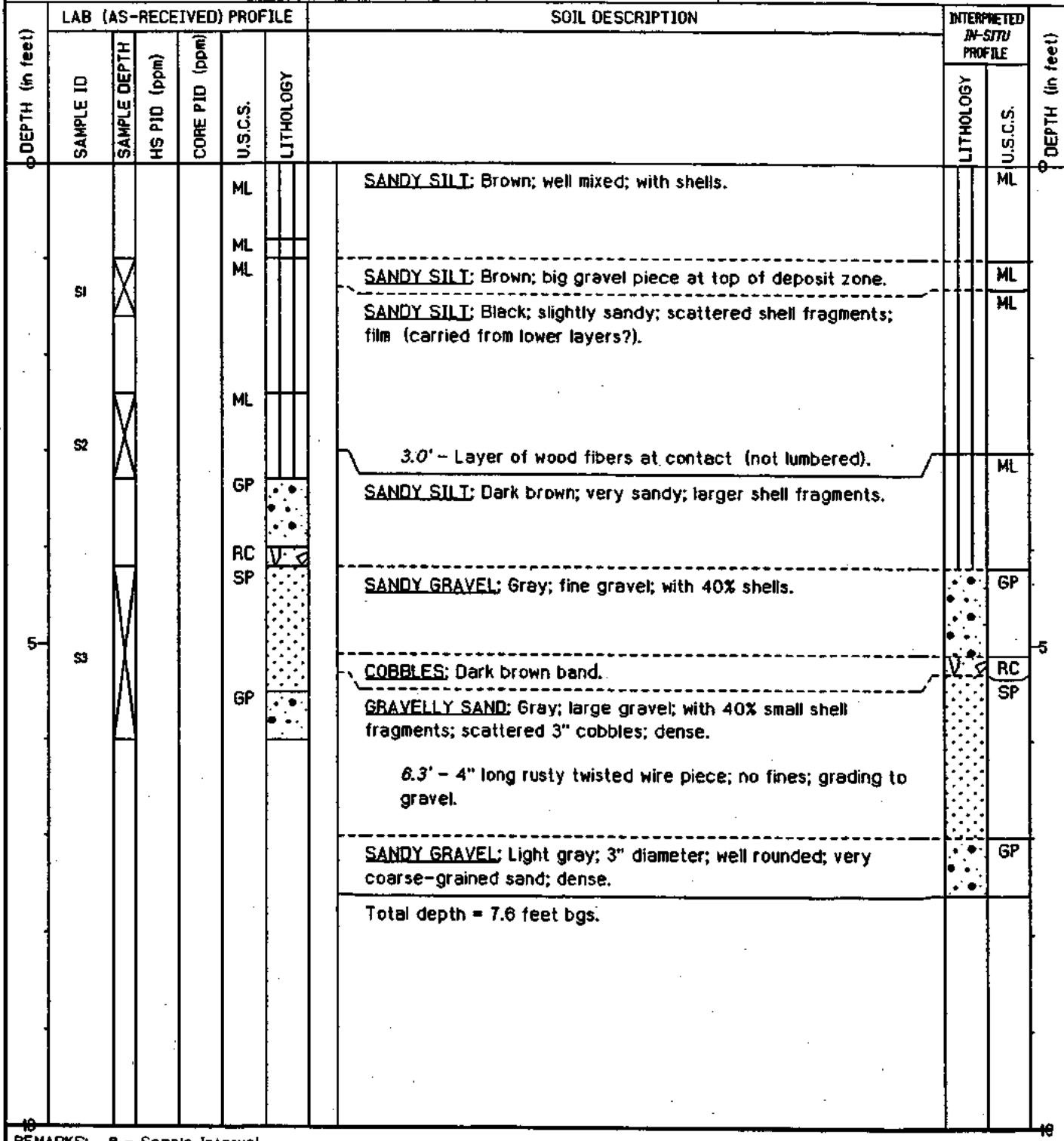
PROJECT NO.: *PORTB-04140-210 Harris Avenue Shipyards RI/FS*		CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington; Harris Avenue Shipyard*		RIG TYPE: *MSS, Inc. Vessel*
START DATE: *08/28/00* TIME: *14:35*	RECOVERY LENGTH: *6.0 feet*	METHOD: *4" Diameter Vibracore*
LABORATORY DATE: *08/31/00* TIME: *15:00*	DRIVE LENGTH: *7.6 feet*	FIELD LOG BY: *DCM*
DEPTH TO MUD: *16.8 feet*	CALCULATED RECOVERY: *79 %*	LAB LOG BY: *AGF/KLC/SB*
MUDLINE ELEVATION: *9.0 feet (MLLW)*	LATITUDE: *48° 43' 16.52" N*	LONGITUDE: *122° 30' 56.69" W*



REMARKS: ▮ – Sample Interval

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HV-50 (Replicate A)

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PROJECT NO.: *PORTB-04140-210 Harris Avenue Shipyards RI/FS*		CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington; Harris Avenue Shipyard*		RIG TYPE: *MSS, Inc. Vessel*
START DATE: *08/29/00* TIME: *11:49*	RECOVERY LENGTH: *6.0 feet*	METHOD: *4" Diameter Vibracore*
LABORATORY DATE: *08/31/00* TIME: *16:20*	DRIVE LENGTH: *7.4 feet*	FIELD LOG BY: *DCM*
DEPTH TO MUD: *25.7 feet*	CALCULATED RECOVERY: *81 %*	LAB LOG BY: *AGF/KLC/SB*
MUDLINE ELEVATION: *27.0 feet (MLLW)*	LATITUDE: *48° 43' 19.23" N*	LONGITUDE: *122° 30' 53.78" W*

DEPTH (in feet)	LAB (AS-RECEIVED) PROFILE: SAMPLE ID	SAMPLE DEPTH	HS PID (ppm)	CORE PID (ppm)	U.S.C.S.	LITHOLOGY	SOIL DESCRIPTION	INTERPRETED IN-SITU PROFILE: LITHOLOGY	U.S.C.S.	DEPTH (in feet)
0	S1				ML		SILTY SANDY SHELL LAYER: Dark brown; 70% fine shells; brown vibracore film.			0
							SILT GRADING TO SANDY CLAYEY SILT: ~10% clay in silt; 2.5" diameter gravel piece; wood fragments; no biota; strong hydrogen sulfide odor.		ML	
					GP					
					GP		GRAVEL: Mottled; disturbed; light gray sandy silt; large shells.		GP	
	S2						SILTY SANDY GRAVEL: Gray; <0.5" diameter; well rounded; coarse-grained sand; substantial white-ribbed shell fragments (40% up to 2" long); wet.		GP	
					GP					
5	S3						*5.3'* – Gravel at contact.		GP	5
							GRAVEL: Tan; with 40% small shell fragments; wet.			
							6.2' – Three 3" diameter gravel pieces in silty sand matrix.			
							7.2'–7.4' – Rusty.			
							Total depth = 7.4 feet bgs.			
10										10

REMARKS: ▯ – Sample Interval

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HV-51 (Replicate B)

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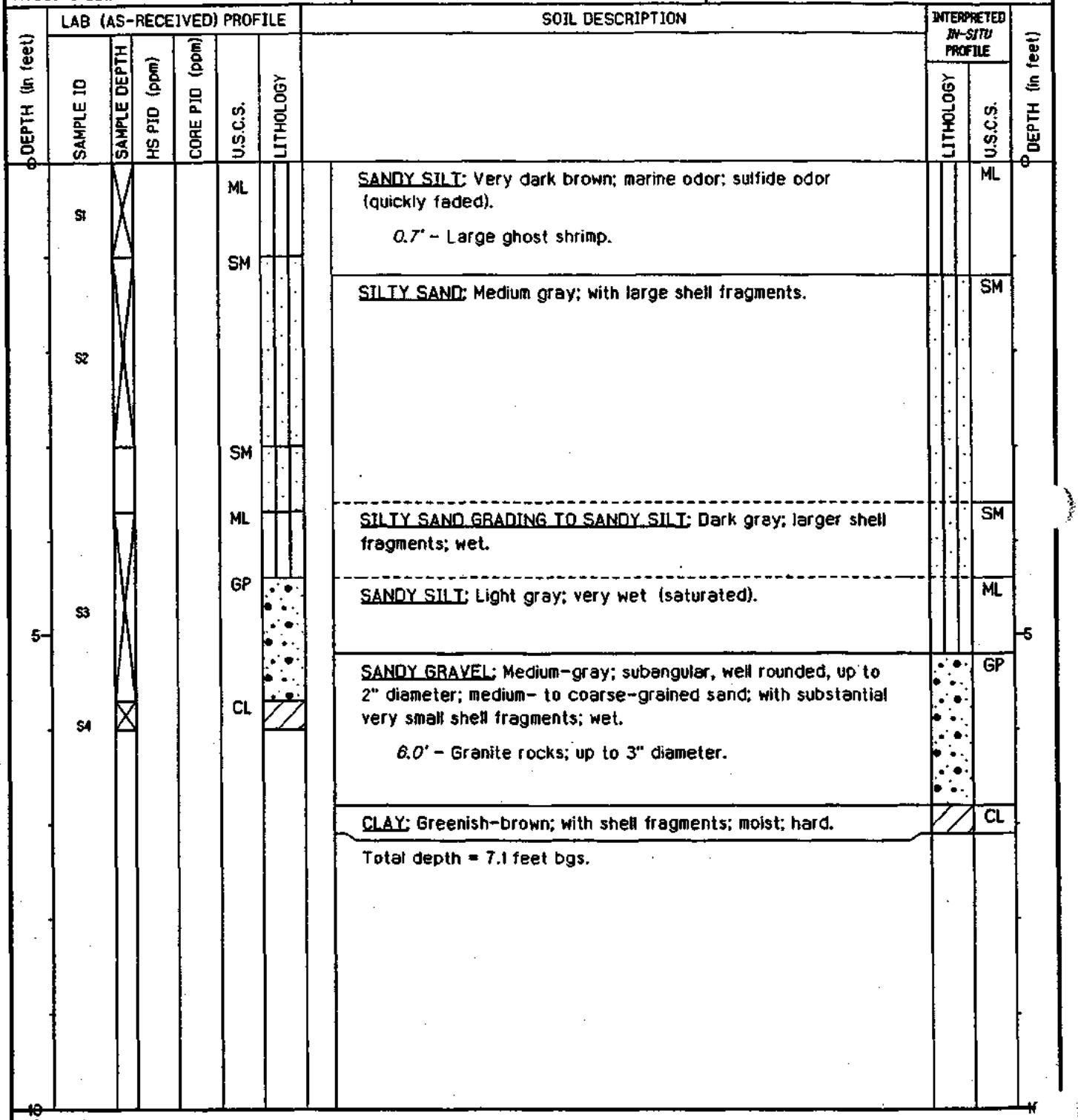
PROJECT NO.: *PORTB-04140-210 Harris Avenue Shipyards RI/FS*		CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington; Harris Avenue Shipyard*		RIG TYPE: *MSS, Inc. Vessel*
START DATE: *08/29/00* TIME: *12:49*	RECOVERY LENGTH: *6.0 feet*	METHOD: *4" Diameter Vibracore*
LABORATORY DATE: *08/31/00* TIME:	DRIVE LENGTH: *7.1 feet*	FIELD LOG BY: *DCM*
DEPTH TO MUD: *37.8 feet*	CALCULATED RECOVERY: *84 %*	LAB LOG BY: *AGF/KLC/LM*
MUDLINE ELEVATION: *38.0 feet (MLLW)*	LATITUDE: *48° 43' 20.24" N*	LONGITUDE: *122° 30' 54.90" W*



REMARKS: ■ – Sample Interval

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CORING LOG

HV-52 (Replicate B)

PROJECT NO.: *PORTB-04140-210 Harris Avenue Shipyards RI/FS*		CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington; Harris Avenue Shipyard*		RIG TYPE: *MSS, Inc. Vessel*
START DATE: *08/29/00* TIME: *10:21*	RECOVERY LENGTH: *5.0 feet*	METHOD: *4" Diameter Vibracore*
LABORATORY DATE: *09/01/00* TIME:	DRIVE LENGTH: *5.7 feet*	FIELD LOG BY: *DCM*
DEPTH TO MUD: *17.5 feet*	CALCULATED RECOVERY: *87 %*	LAB LOG BY: *AGF/KLC/LM*
MUDLINE ELEVATION: *17.0 feet (MLLW)*	LATITUDE: *48° 43' 18.20" N*	LONGITUDE: *122° 30' 54.11" W*

DEPTH (in feet)	LAB (AS-RECEIVED) PROFILE: SAMPLE ID	SAMPLE DEPTH	HS PID (ppm)	CORE PID (ppm)	U.S.C.S.	LITHOLOGY	SOIL DESCRIPTION	INTERPRETED IN-SITU PROFILE: LITHOLOGY	U.S.C.S.	DEPTH (in feet)
0	S1				SP		SAND: Medium gray; with ~10% crushed shells; wet; soft.		SP	0
					GP		SANDY GRAVEL: Light gray; with abundant shell fragments; some cobbles increasing gradually with depth.		GP	
	S2									
	S2 ARCHIVE				GP		*3.4'-4.0'* – Light gray; 50% fine shell fragments; some cobbles.			
	S3						GRAVEL: Tan; large, subrounded cobbles, ≤5" diameter.		GP	
5										5
							Total depth = 5.7 feet bgs.			
10										10

REMARKS: ■ – Sample Interval

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HV-53 (Replicate C)

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PROJECT NO.: *PORTB-04140-210 Harris Avenue Shipyards RI/FS*		CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington; Harris Avenue Shipyard*		RIG TYPE: *MSS, Inc. Vessel*
START DATE: *08/29/00* TIME: *17:23*	RECOVERY LENGTH: *7.0 feet*	METHOD: *4" Diameter Vibracore*
LABORATORY DATE: *09/01/00* TIME: *12:45*	DRIVE LENGTH: *9.2 feet*	FIELD LOG BY: *DCM*
DEPTH TO MUD: *8.8 feet*	CALCULATED RECOVERY: *76 %*	LAB LOG BY: *AGF/KLC/LM*
MUDLINE ELEVATION: *1.0 feet (MLLW)*	LATITUDE: *48° 43' 17.10" N*	LONGITUDE: *122° 30' 53.62" W*

DEPTH (in feet)	LAB (AS-RECEIVED) PROFILE: SAMPLE ID	SAMPLE DEPTH	HS PID (ppm)	CORE PID (ppm)	U.S.C.S.	LITHOLOGY	SOIL DESCRIPTION	INTERPRETED IN-SITU PROFILE: LITHOLOGY	U.S.C.S.	DEPTH (in feet)
0	S1				ML		SILT: Black; with fine-grained sand; with shell fragments increasing with depth to ~20%.		ML	0
	S2				SM		2.6' – Large rock; ~3" diameter.		SM	
	S2 ARCHIVE				SP		SILTY SAND: Medium gray; few small shell fragments.		SP	
					GP		SILTY GRAVELLY SAND: Grayish-brown; fine- to medium-grained; 1 large 5" diameter cobble; few shell fragments; 2" worm tubes.		GP	
5	S3						SANDY GRAVEL: Light gray; well rounded; slightly silty; with 4" diameter cobbles; saturated; very dense.			5
					GP		5.9' – Wood chip (~4" long); fibrous; untreated.			
	S4						VERY SANDY GRAVEL: Medium gray; most 0.125" diameter, subrounded, pea gravel; medium- to coarse-grained sand; 30% small shell fragments.		GP	
10							Total depth = 9.2 feet bgs.			10

REMARKS: ■ – Sample Interval

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HV-54 (Replicate A)

PROJECT NO.: *PORTB-04140-210 Harris Avenue Shipyards RI/FS*		CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington; Harris Avenue Shipyard*		RIG TYPE: *MSS, Inc. Vessel*
START DATE: *08/29/00* TIME: *09:13*	RECOVERY LENGTH: *5.5 feet*	METHOD: *4" Diameter Vibracore*
LABORATORY DATE: *09/01/00* TIME: *13:30*	DRIVE LENGTH: *7.0 feet*	FIELD LOG BY: *DCM*
DEPTH TO MUD: *8.1 feet*	CALCULATED RECOVERY: *78 %*	LAB LOG BY: *AGF/KLC*
MUDLINE ELEVATION: *7.0 feet (MLLW)*	LATITUDE: *48° 43' 16.70" N*	LONGITUDE: *122° 30' 55.15" W*

DEPTH (in feet)	LAB (AS-RECEIVED) PROFILE: SAMPLE ID	SAMPLE DEPTH	HS PID (ppm)	CORE PID (ppm)	U.S.C.S.	LITHOLOGY	SOIL DESCRIPTION	INTERPRETED IN-SITU PROFILE: LITHOLOGY	U.S.C.S.	DEPTH (in feet)
0	S1				SW		SAND: Dark gray; fine- to coarse-grained; well sorted; 30% shell fragments.		SW	0
					RC		ROCK (TRANSITIONAL ZONE): Angular; with shell fragments.		RC	
					SP		GRAVELLY SAND: Black; with shell fragments.		SP	
	S2				GP		SANDY GRAVEL: Medium gray; slightly silty; with substantial cobbles, cobbles are gradually larger with depth.		GP	
							4.5'-5.1' - With larger cobbles.			
5	S3				GP		GRAVEL: Medium gray; 0.5" diameter, pea gravel; with medium shells; saturated, water-bearing.		GP	5
					SC		CLAYEY SAND: Medium gray.		SC	
10							Total depth = 7.0 feet bgs.			10

REMARKS: ▮ - Sample Interval

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HCS-34 (Replicate A)

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PROJECT NO.: *PORTB-04140-210 Harris Avenue Shipyards RI/FS*		CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington; Harris Avenue Shipyard*		RIG TYPE: *MSS, Inc. Vessel*
START DATE: *08/28/00* TIME: *11:14*	RECOVERY LENGTH: *3.0 feet*	METHOD: *4" Diameter Vibracore*
LABORATORY DATE: *08/31/00* TIME: *12:15*	DRIVE LENGTH: *3.0 feet*	FIELD LOG BY: *DCM*
DEPTH TO MUD: *41.4 feet*	CALCULATED RECOVERY: *100 %*	LAB LOG BY: *AGF/SB/KLC*
MUDLINE ELEVATION: *41.0 feet (MLLW)*	LATITUDE: *48° 43' 22.14" N*	LONGITUDE: *122° 30' 54.48" W*

DEPTH (in feet)	LAB (AS-RECEIVED) PROFILE: SAMPLE ID	SAMPLE DEPTH	HS PID (ppm)	CORE PID (ppm)	U.S.C.S.	LITHOLOGY	SOIL DESCRIPTION	INTERPRETED IN-SITU PROFILE: LITHOLOGY	U.S.C.S.	DEPTH (in feet)
0	S1	■			ML		**SILT**: Black.		ML	0
	S2	■					*0.0'–0.1'* – Very soft.			
	S3	■			ML		*0.1'–0.3'* – Medium stiff.		ML	
	S4	■					**CLAYEY SILT**: Dark gray; medium stiff.			
	S5	■								
	S6	■								
	S7	■								
	S8	■								
	S9	■								
	S10	■								
	S11	■			SM		**SILTY SAND**: Dark brownish-gray; fine-grained; very silty.		SM	
	S12	■								
	S13	■								
	S14	■								
	S15	■								
	S16	■								
	S17	■								
	S18	■					*1.7'–2.4'* – With large 3" half shells.			
	S19	■								
	S20	■								
	S21	■								
	S22	■								
	S23	■								
	S24	■								
	S25	■					*2.4'–2.9'* – Dark gray; medium- to coarse-grained; large (3"–4" diameter) with small shells.			
	S26	■								
	S27	■								
	S28	■								
	S29	■								
	S30	■								
	S31	■					Total depth = 3.0 feet bgs.			
	S32									
	S33									
	S34									
	S35									
	S36									
	S37									
	S38									
	S39									
	S40									

REMARKS: Very good intact sample for dating scraped off outside film.
Samples sectioned into 2-cm intervals for radioisotope profiling.
Gray gravelly sand at core bottom (8.4').
■ – Sample Interval

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HCS-41 (Replicate A)

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PROJECT NO.: *PORTB-04140-210 Harris Avenue Shipyards RI/FS*		CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington; Harris Avenue Shipyard*		RIG TYPE: *MSS, Inc. Vessel*
START DATE: *08/28/00* TIME: *15:12*	RECOVERY LENGTH: *3.3 feet*	METHOD: *4" Diameter Vibracore*
LABORATORY DATE: *08/31/00* TIME: *15:00*	DRIVE LENGTH: *3.8 feet*	FIELD LOG BY: *DCM*
DEPTH TO MUD: *14.9 feet*	CALCULATED RECOVERY: *86 %*	LAB LOG BY: *AGF/SB*
MUDLINE ELEVATION: *10.0 feet (MLLW)*	LATITUDE: *48° 43' 16.49" N*	LONGITUDE: *122° 30' 56.85" W*

DEPTH (in feet)	LAB (AS-RECEIVED) PROFILE: SAMPLE ID	SAMPLE DEPTH	HS PID (ppm)	CORE PID (ppm)	U.S.C.S.	LITHOLOGY	SOIL DESCRIPTION	INTERPRETED IN-SITU PROFILE: LITHOLOGY	U.S.C.S.	DEPTH (in feet)
0	S1 S2 S3 S4 S5 S6 S7 S8 S9 S10 S11 S12 S13 S14 S15 S16 S17 S18 S19 S20 S21 S22 S23 S24 S25 S26 S27 S28 S29 S30 S31 S32 S33 S34 S35 S36 S37 S38 S39 S40 S41 S42 S43 S44 S45	▨			ML ML SM ML SM		**SANDY SILT:** Medium to light gray, slightly mottled; with scallop shells; wet; very soft. **SLIGHTLY SANDY SILT:** Black; with scattered gravel and shells; wet; soft. **SILTY SAND (TRANSITIONAL ZONE:** Dark brownish-gray; with moderate shells. *2.4'* - Layer of wood fragments. **SANDY SILT:** Medium brown to gray; very sandy; with shells. **SILTY SAND:** Dark brownish-gray; fine- to medium-grained; with 50% shells; large 3" diameter cobbles in shoe. Total depth = 3.8 feet bgs.		ML ML SM ML SM	0

REMARKS: The layer of vibra-film along edge of core was filled with gray shelly sand. Needed to remove fairly thick layer in order to see black silt core underneath. Samples sectioned into 2-cm intervals for radioisotope profiling. Gray, coarse-grained gravelly sand with substantial broken shells at core bottom (6.9').

▨ - Sample Interval

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CORING LOG

HCS-50 (Replicate A)

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PROJECT NO.: *PORTB-04140-210 Harris Avenue Shipyards RI/FS*		CLIENT: *Port of Bellingham*
LOCATION: *Bellingham, Washington; Harris Avenue Shipyard*		RIG TYPE: *MSS, Inc. Vessel*
START DATE: *08/29/00* TIME: *11:10*	RECOVERY LENGTH: *2.87 feet*	METHOD: *4" Diameter Vibracore*
LABORATORY DATE: *09/01/00* TIME:	DRIVE LENGTH: *3.2 feet*	FIELD LOG BY: *DCM*
DEPTH TO MUD: *25.7 feet*	CALCULATED RECOVERY: *84 %*	LAB LOG BY: *AGF/SB*
MUDLINE ELEVATION: *27.0 feet (MLLW)*	LATITUDE: *48° 43' 19.30" N*	LONGITUDE: *122° 30' 53.75" W*

DEPTH (in feet)	LAB (AS-RECEIVED) PROFILE: SAMPLE ID	SAMPLE DEPTH	HS PID (ppm)	CORE PID (ppm)	U.S.C.S.	LITHOLOGY	SOIL DESCRIPTION	INTERPRETED IN-SITU PROFILE: LITHOLOGY	U.S.C.S.	DEPTH (in feet)
0	S1				ML		SANDY SILT: Very soft.		ML	0
	S2				ML		CLAYEY SILT: Black; with 40% small shells; strong hydrogen sulfide odor.		ML	
	S3									
	S4									
	S5									
	S6									
	S7									
	S8						0.8'-1.3' - Dark gray.			
	S9									
	S10									
	S11									
	S12									
	S13									
	S14									
	S15						1.3'-2.1' - Grading to medium gray; wet to saturated with depth.			
	S16									
	S17									
	S18									
	S19									
	S20				SM					
	S21									
	S22						SILTY SAND: Dark gray; fine-grained; with substantial shells.		SM	
	S23				ML					
	S24									
	S25									
	S26									
	S27				GP		SANDY SILT: Light tan; very sandy; with scattered shells; with trace gravel up to 1" diameter.		ML	
	S28									
	S29									
	S30									
	S31						SANDY GRAVEL: Dark gray; smaller pea gravel; moderate shells.		GP	
	S32									
	S33									
	S34						Total depth = 3.2 feet bgs.			

REMARKS: Siphoned off standing water; clear, not many fines.
Samples sectioned into 2-cm intervals for radioisotope profiling.
Gray gravelly sand at core bottom (6.9').
■ - Sample Interval

2003 Sampling

Sediment Core Log

Sheet 1 of 1

Core: HC-8

Project: **Harris PSDDA**	Water Body Type: **Marine**	Tube Length: **10'**
Project #: **PORTB-04140-300**	SW Elevation (ft)/Tide:	Penetration Depth: **8.0**
Client: **Port of Bellingham**	Water Depth (ft): **41.1'**	Sample Quality: **Good**
Collection Date: **2/25/04**	Mudline Elevation (ft):	Recovery in ft (%): **7.5 (94)**
Contractor: **MSS**	N./LAT: **48 43.3465** E./LONG: **122 30.8406**	Process Date: **2/26/04**
Vessel: **R/V Nancy Anne**	Horiz. Datum: Vert. Datum:	Process Method: **Split**
Operator: **Bill Jaworski**	Method/Tube ID: **4" OD aluminium**	Logged By: **N. Bacher**

Depth (ft) Below Mudline	Recovered Interval	Sample #	Analysis	Headspace PID	Sediment Description Classification Scheme: USCS (Recalculated depth interval in feet)	Comments	Calc In situ Depths (ft) & Graphic Log	Mudline Elevation (ft)
0	S1		S2-, VOC		SM: (0-1.35') SM: wet, soft, grayish green SANDY SILT. Slight H2S odor.			0
1					SM: (1.35-3.75') SM: moist to wet, medium dense to dense, gray slightly silty SAND. Abundant shell fragments (40% at top of unit grading to 10 % at base). Moderate H2S odor.			-1
2								-2
3	S2		VOC					-3
4					SP: (3.75-5') SP: moist to wet, dense, gray SAND with minor silt. 5% shell fragments and scattered wood chunks (pretty fresh and 3/4"). Slight H2S odor.			-4
5								-5

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Remarks: Kept upper 5 feet only.

Calculated Recovery
Sample Length/Penetration Length:
7.5 / 8.0 = 94 %

Sediment Core Log

Core: HC-9

Sheet 1 of 1

Project: **Harris PSDDA**	Water Body Type: **Marine**	Tube Length: **10'**
Project #: **PORTB-04140-300**	SW Elevation (ft)/Tide:	Penetration Depth: **9.5**
Client: **Port of Bellingham**	Water Depth (ft): **40.7'**	Sample Quality: **Good**
Collection Date: **2/24/04**	Mudline Elevation (ft):	Recovery in ft (%): **7.8 (82)**
Contractor: **MSS**	N./LAT: **48 43.3455** E./LONG: **122 30.8820**	Process Date: **2/26/04**
Vessel: **R/V Nancy Anne**	Horiz. Datum: Vert. Datum:	Process Method: **Split**
Operator: **Bill Jaworski**	Method/Tube ID: **4" OD aluminium**	Logged By: **N. Bacher**

Depth (ft) Below Mudline	Recovered Interval	Sample #	Analysis	Headspace PID	Sediment Description Classification Scheme: USCS (Recalculated depth interval in feet)	Comments	Calc. In situ Depths (ft) & Graphic Log	Mudline Elevation (ft)
0	S1				MH: (0-0.4') MH: wet, soft, black slightly sandy SILT. 2" wood chunks. Moderate H2S odor.			0
1					MH: (0.4-1.2') MH: moist, medium dense, greenish gray slightly sandy SILT with trace clay. Trace reeds. Slight to moderate H2S odor.			-1
2					SM: (1.2-3') SM: moist, medium dense, gray slightly silty SAND. Abundance of shells (40% at top of unit grading to 25% at base). Slight to moderate H2S odor.			-2
3	S2				SP: (3-5') SP: moist, dense, gray SAND with minor silt. 5% shells (fragmented). Slight to moderate H2S odor.			-3
4								-4
5								-5

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Remarks: Kept upper 5 feet only.

Calculated Recovery
Sample Length/Penetration Length:
7.8 / 9.5 = 82 %

Sediment Core Log

Sheet 1 of 1

Core: HC-10

Project: **Harris PSDDA**	Water Body Type: **Marine**	Tube Length: **8'**
Project #: **PORTB-04140-300**	SW Elevation (ft)/Tide:	Penetration Depth: **8.0'**
Client: **Port of Bellingham**	Water Depth (ft): **47.6'**	Sample Quality: **Good**
Collection Date: **2/25/04**	Mudline Elevation (ft):	Recovery in ft (%): **7.7 (96)**
Contractor: **MSS**	N./LAT: **48 43.3463** E./LONG: **122 30.9043**	Process Date: **2/26/04**
Vessel: **R/V Nancy Anne**	Horiz. Datum: Vert. Datum:	Process Method: **Split**
Operator: **Bill Jaworski**	Method/Tube ID: **4" OD aluminium**	Logged By: **N. Bacher**

Depth (ft) Below Mudline	Recovered Interval	Sample #	Analysis	Headspace PID	Sediment Description Classification Scheme: USCS (Recalculated depth interval in feet)	Comments	Calc. In situ Depths (ft) & Graphic Log	Mudline Elevation (ft)
0	S1				MH: (0-0.65') MH: wet, soft, black SILT with trace sand. Slight H2S odor.			0
1					SM: (0.65-1.35') SM: wet, loose, blackish gray SILTY SAND. Trace shell fragments.			-1
2			S2-, VOC		SP: (1.35-2.25') SP: wet, medium dense, gray SAND with minor to trace silt. Trace shell fragments.			-2
3	S2		VOC		SP: (2.25-5') SP: wet to moist, medium dense to dense, gray SAND with minor to trace silt. Abundant shell fragments (30% at top of unit grading to 15% at base).			-3
4								-4
5								-5

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Remarks: Kept upper 5 feet only.

Calculated Recovery
Sample Length/Penetration Length:
7.7' / 8.0' = 96 %

Sediment Core Log

Sheet 1 of 1

Core: HC-11

Project: **Harris PSDDA**	Water Body Type: **Marine**	Tube Length: **8'**
Project #: **PORTB-04140-300**	SW Elevation (ft)/Tide:	Penetration Depth: **7.0**
Client: **Port of Bellingham**	Water Depth (ft): **44.2'**	Sample Quality: **Good**
Collection Date: **2/24/04**	Mudline Elevation (ft):	Recovery in ft (%): **5.3 (76)**
Contractor: **MSS**	N./LAT: **48 43.3461** E./LONG: **122 30.9182**	Process Date: **2/26/04**
Vessel: **R/V Nancy Anne**	Horiz. Datum: Vert. Datum:	Process Method: **Split**
Operator: **Bill Jaworski**	Method/Tube ID: **4" OD aluminium**	Logged By: **N. Bacher**

Depth (ft) Below Mudline	Recovered Interval	Sample #	Analysis	Headspace PID	**Sediment Description** Classification Scheme: USCS (Recalculated depth interval in feet)	Comments	Calc. In situ Depths (ft) & Graphic Log	Mudline Elevation (ft)
0	S1				MH: (0-0.9') MH: wet, soft, black to blackish gray slightly sandy SILT. Minor shell fragments. Slight H2S odor.			0
1					SP: (0.9-1.5') SP: moist, medium dense, gray SAND with trace to minor silt. Occasional shell fragment. Slight H2S odor.			-1
2					SP: (1.5-3.05') SP: moist, medium dense to dense, gray SAND with trace silt. Abundant shell fragments (25-30%) throughout. Slight H2S odor.			-2
3	S2				SM: (3.05-5.3') SM: moist, dense, dark gray slightly silty SAND. Minor shell fragments (5%) and occasional wood piece (twigs, chunks). Very slight H2S odor.			-3
4								-4
5								-5

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Remarks:

Calculated Recovery
Sample Length/Penetration Length:
5.3' / 7.0' = 76 %

Sediment Core Log

Core: HC-12

Sheet 1 of 1

Project: **Harris PSDDA**	Water Body Type: **Marine**	Tube Length: **8'**
Project #: **PORTB-04140-300**	SW Elevation (ft)/Tide:	Penetration Depth: **7.5**
Client: **Port of Bellingham**	Water Depth (ft): **35.8'**	Sample Quality: **Good**
Collection Date: **2/25/04**	Mudline Elevation (ft):	Recovery in ft (%): **5.6 (75)**
Contractor: **MSS**	N./LAT: **48 43.3244** E./LONG: **122 30.8554**	Process Date: **2/26/04**
Vessel: **R/V Nancy Anne**	Horiz. Datum: Vert. Datum:	Process Method: **Split**
Operator: **Bill Jaworski**	Method/Tube ID: **4" OD aluminium**	Logged By: **N. Bacher**

Depth (ft) Below Mudline	Recovered Interval	Sample #	Analysis	Headspace PID	Sediment Description Classification Scheme: USCS (Recalculated depth interval in feet)	Comments	Calc. In situ Depths (ft) & Graphic Log	Mudline Elevation (ft)
0	S1		S2-, VOC		SM: (0-0.9') SM: wet, medium dense, black slightly silty SAND. 10% paint chips and shell fragments. Slightly oily odor.			0
1					GW: (0.9-2.5') GW: wet, medium dense to dense, gray SANDY GRAVEL. 5-10% shell fragments. Gravel is rounded and up to 3/4". No odor.			-1
2	S2		VOC		SM: (2.5-3.4') SM: moist to wet, medium dense, tan brown SILTY SAND. Abundant shell fragments (30-40%).			-2
3					GW: (3.4-4.8') GW: wet, medium dense, gray slightly sandy GRAVEL. Gravel is subrounded to rounded and large (1.5-2.5").			-3
4					SP: (4.8-5.0') SP: moist, dense, gray coarse SAND with minor silt.			-4
5								-5

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Remarks: Kept upper 5 feet only.

Calculated Recovery
Sample Length/Penetration Length:
5.6 / 7.5 = 75 %

Sediment Core Log

Core: HC-13

Sheet 1 of 1

Project: **Harris PSDDA**	Water Body Type: **Marine**	Tube Length: **8'**
Project #: **PORTB-04140-300**	SW Elevation (ft)/Tide:	Penetration Depth: **6.5**
Client: **Port of Bellingham**	Water Depth (ft): **31.8'**	Sample Quality: **Good**
Collection Date: **2/24/04**	Mudline Elevation (ft):	Recovery in ft (%): **4.6 (71)**
Contractor: **MSS**	N./LAT: **48 43.3226** E./LONG: **122 30.8833**	Process Date: **2/26/04**
Vessel: **R/V Nancy Anne**	Horiz. Datum: Vert. Datum:	Process Method: **Split**
Operator: **Bill Jaworski**	Method/Tube ID: **4" OD aluminium**	Logged By: **N. Bacher**

Depth (ft) Below Mudline	Recovered Interval	Sample #	Analysis	Headspace PID	Sediment Description Classification Scheme: USCS (Recalculated depth interval in feet)	Comments	Calc. In situ Depths (ft) & Graphic Log	Mudline Elevation (ft)
0	S1				SM: (0-0.75') SM: wet, medium soft, black SANDY SILT. Trace paint chips and shells. Slight oily odor.			0
1					GW: (0.75-1.8') GW: wet, medium dense, gray SANDY GRAVEL. 5% shell fragments. Gravel is rounded and up to 3/4".			-1
2	S2				SP/ML: (1.8-3.2') SP/ML: moist, medium dense, tan brown slightly silty SAND. 35-40% shell fragments.			-2
3					GW: (3.2-4.6') GW: wet, medium dense, gray brown slightly sandy GRAVEL. Gravel is rounded and up to 3".			-3
4								-4

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Remarks: Difficult penetrating gravel layer.
Second attempt due to lower recovery.

Calculated Recovery
Sample Length/Penetration Length:
4.6 / 6.5 = 71 %

Sediment Core Log

Core: HC-14

Sheet 1 of 1

Project: **Harris PSDDA**	Water Body Type: **Marine**	Tube Length: **8'**
Project #: **PORTB-04140-300**	SW Elevation (ft)/Tide:	Penetration Depth: **7.0**
Client: **Port of Bellingham**	Water Depth (ft): **34.1'**	Sample Quality: **Good**
Collection Date: **2/25/04**	Mudline Elevation (ft):	Recovery in ft (%): **5.5' (78)**
Contractor: **MSS**	N./LAT: **48 43.3134** E./LONG: **122 30.9062**	Process Date: **02/27/04**
Vessel: **R/V Nancy Anne**	Horiz. Datum: Vert. Datum:	Process Method: **Split**
Operator: **Bill Jaworski**	Method/Tube ID: **4" OD aluminium**	Logged By: **N. Bacher**

Depth (ft) Below Mudline	Recovered Interval	Sample #	Analysis	Headspace PID	Sediment Description (Classification Scheme: USCS; Recalculated depth interval in feet)	Comments	Calc. In situ Depths (ft) & Graphic Log	Mudline Elevation (ft)
0	S1		S2-VOC		SM: (0-0.65') SM: wet, medium soft, black to blackish gray SILTY SAND. Trace rootlets, shell fragments and blast grit. Slight H2S odor.			0
1					SW: (0.65-2.45') SW: wet, medium dense to dense, gray GRAVELLY SAND with trace to minor silt. Trace shell fragments. Gravel is rounded and up to 1".			-1
2								-2
3	S2		VOC		GP: (2.45-3.7') GP: wet, dense, brownish gray GRAVEL with minor sand. Trace shell fragments. Gravel is rounded and large (3").			-3
4					GW: (3.7-5.0') GW: wet, dense, brown SANDY GRAVEL with trace silt. Trace shell fragments. Gravel is subangular to subrounded and up to 1".			-4
5								-5

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Remarks: **Kept upper 5' only.**

Calculated Recovery
Sample Length/Penetration Length:
5.5' / 7.0' = 78 %

Sediment Core Log

Sheet 1 of 1

Core: HC-15

Project: **Harris PSDDA**	Water Body Type: **Marine**	Tube Length: **8'**
Project #: **PORTB-04140-300**	SW Elevation (ft)/Tide:	Penetration Depth: **6.0'**
Client: **Port of Bellingham**	Water Depth (ft): **16.1'**	Sample Quality: **Good**
Collection Date: **2/25/04**	Mudline Elevation (ft):	Recovery in ft (%): **4.5' (75)**
Contractor: **MSS**	N./LAT: **48 43.2863** E./LONG: **122 30.9066**	Process Date: **02/27/04**
Vessel: **R/V Nancy Anne**	Horiz. Datum: Vert. Datum:	Process Method: **Split**
Operator: **Bill Jaworski**	Method/Tube ID: **4" OD aluminium**	Logged By: **N. Bacher**

Depth (ft) Below Mudline	Recovered Interval	Sample #	Analysis	Headspace PID	Sediment Description Classification Scheme: USCS (Recalculated depth interval in feet)	Comments	Calc. In situ Depths (ft) & Graphic Log	Mudline Elevation (ft)
0	S1				SP: (0-1.7') SP: moist, dense, blackish gray SAND w/ trace to minor silt. Trace blast grit and slight H2S odor.			0
1								-1
2					SP: (1.7-2.4') SP: moist, dense, black COARSE SAND w/ 20% blast grit.			-2
3	S2				SM: (2.4-3.75') SM: moist, medium dense, black SLIGHTY SILTY SAND. Trace shell fragments and oily odor.			-3
4					GW: (3.75-4.5') GW: moist to wet, medium dense, black SANDY GRAVEL. Gravel is up to 1" and rounded. Trace oily odor.			-4

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Remarks: Black sand @ surface w/ paint chips.
Black sand in shoe.
Third attempt due to low recovery.

Calculated Recovery
Sample Length/Penetration Length:
4.5' / 6.0' = 75 %

Sediment Core Log

Core: HC-16

Sheet 1 of 1

Project: **Harris PSDDA**	Water Body Type: **Marine**	Tube Length: **8'**
Project #: **PORTB-04140-300**	SW Elevation (ft)/Tide:	Penetration Depth: **9.5'**
Client: **Port of Bellingham**	Water Depth (ft): **45.9'**	Sample Quality: **Good**
Collection Date: **02/24/04**	Mudline Elevation (ft):	Recovery in ft (%): **7.7' (81)**
Contractor: **MSS**	N./LAT: **48 43.3425** E./LONG: **122 30.9430**	Process Date: **02/27/04**
Vessel: **R/V Nancy Anne**	Horiz. Datum: Vert. Datum:	Process Method: **Split**
Operator: **Bill Jaworski**	Method/Tube ID: **4" OD aluminium**	Logged By: **N. Bacher**

Depth (ft) Below Mudline	Recovered Interval	Sample #	Analysis	Headspace PID	Sediment Description (Classification Scheme: USCS; Recalculated depth interval in feet)	Comments	Calc. In situ Depths (ft) & Graphic Log	Mudline Elevation (ft)
0	S1	S1	S2-, VOC		MH: (0-0.35') MH: wet, soft, blackish gray SILT w/ minor sand. Trace shell fragments and slight H2S odor.			0
					MH: (0.35-1.40') MH: moist, medium soft, gray SILT w/ minor to trace sand. Occasional shell fragment and slight H2S odor.			
1								-1
					SP: (1.4-2.5') SP: moist, medium dense, gray SAND w/ minor to trace silt. Slight H2S odor.			
2								-2
	S2	S2	VOC		SP: (2.5-4.3') SP: moist, dense, gray SAND w/ trace silt. Abundant large shell fragments (35-40%) and slight H2S odor.			
3								-3
4								-4
					SP: (4.3-5.0') SP: SAA but minor shell fragments.			
5								-5

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1011 SW Klickitat Way, Suite 207
Seattle, WA 98134-1162
Phone: (206) 624-9349
Fax: (206) 624-2839

Remarks: **Shoe is empty.**

Kept upper 5 feet only. Lower 2.7 feet discarded.

Calculated Recovery
Sample Length/Penetration Length:
7.7' / 9.5' = 81 %

Sediment Core Log

Sheet 1 of 1

Core: HC-17

Project: **Harris PSDDA**	Water Body Type: **Marine**	Tube Length: **8'**
Project #: **PORTB-04140-300**	SW Elevation (ft)/Tide:	Penetration Depth: **4.5'**
Client: **Port of Bellingham**	Water Depth (ft): **39.8'**	Sample Quality: **Good**
Collection Date: **02/24/04**	Mudline Elevation (ft):	Recovery in ft (%): **2.7' (60)**
Contractor: **MSS**	N./LAT: **48 43.3131** E./LONG: **122 30.9435**	Process Date: **02/27/04**
Vessel: **R/V Nancy Anne**	Horiz. Datum: Vert. Datum:	Process Method: **Split**
Operator: **Bill Jaworski**	Method/Tube ID: **4" OD aluminium**	Logged By: **N. Bacher**

Depth (ft) Below Mudline	Recovered Interval	Sample #	Analysis	Headspace PID	Sediment Description Classification Scheme: USCS (Recalculated depth interval in feet)	Comments	Calc. In situ Depths (ft) & Graphic Log	Mudline Elevation (ft)
0	S1				SM: (0-0.4') SM: soupy wet, soft, brownish gray SANDY SILT. Slight H2S odor.			0
					SP: (0.4-0.95') SP: wet, medium dense, black SAND w/ minor silt and blast grit. Moderate H2S odor.			
1					SM: (0.95-1.55') SM: wet, loose, tan brown SILTY SAND. Trace shell fragments and slight H2S odor.			-1
					SP: (1.55-1.80') SW: wet, medium dense, blackish gray (multicolored) COARSE SAND to PEA GRAVEL.			
2	S2				GP: (1.8-2.7') GP: wet, medium dense, light brown GRAVEL w/ minor sand. Gravel is large (3") and rounded.			-2

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Seattle, WA 98134-1162
Phone: (206) 624-9349
Fax: (206) 624-2839

Remarks: Shoe bent/dented from refusal, rivets missing.
Shoe empty. Tube slightly bent at the top. Hard bottom.
Second attempt after low recovery from gravel.

Calculated Recovery
Sample Length/Penetration Length:
2.7' / 4.5' = 60 %

Sediment Core Log

Sheet 1 of 1

Core: HC-23

Project: **Harris PSDDA**	Water Body Type: **Marine**	Tube Length: **8'**
Project #: **PORTB-04140-300**	SW Elevation (ft)/Tide:	Penetration Depth: **8.0'**
Client: **Port of Bellingham**	Water Depth (ft): **47.6'**	Sample Quality: **Good**
Collection Date: **2/25/04**	Mudline Elevation (ft):	Recovery in ft (%): **7.1' (89)**
Contractor: **MSS**	N./LAT: **48 43.3322** E./LONG: **122 30.9650**	Process Date: **02/27/04**
Vessel: **R/V Nancy Anne**	Horiz. Datum: Vert. Datum:	Process Method: **Split**
Operator: **Bill Jaworski**	Method/Tube ID: **4" OD aluminium**	Logged By: **N. Bacher**

Depth (ft) Below Mudline	Recovered Interval	Sample #	Analysis	Headspace PID	Sediment Description Classification Scheme: USCS (Recalculated depth interval in feet)	Comments	Calc. In situ Depths (ft) & Graphic Log	Mudline Elevation (ft)
0	S1	S1	S2-, VOC		MH: (0-0.7') MH: soupy wet, soft, black SILT w/ minor sand. Trace plant and shell fragments. Slight to moderate H2S odor.			0
1					SM: (0.7-2.0') SM: moist to wet, medium soft, gray SLIGHTLY SANDY SILT. Homogeneous unit, trace roots at 0.9'. Slight H2S odor.			-1
2					SM: (2-2.3') SM: Transitions to unit below. 3 inch stick at 2.0'.			-2
3	S2	S2	VOC		SM: (2.3-3.1') SM: moist, medium dense to medium soft, gray SLIGHTLY SILTY SAND. Trace shell fragments.			-3
4					SP: (3.1-5.0') SP: moist, medium dense to dense gray SAND w/ trace silt. Abundant shells and shell fragments, 30% at top of unit grading to 15% at bottom. Very slight H2S odor.			-4
5								-5

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1011 SW Klickitat Way, Suite 207
Seattle, WA 98134-1162
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Fax: (206) 624-2839

Remarks: Core cutter rivets broke off during extraction. Fingers ok.
Kept upper 5 feet only. Lower 2.1 feet discarded.

Calculated Recovery
Sample Length/Penetration Length:
7.1' / 8.0' = 89 %

Sediment Core Log

Sheet 1 of 1

Core: HC-23A

Project: **Harris PSDDA**	Water Body Type: **Marine**	Tube Length: **8'**
Project #: **PORTB-04140-300**	SW Elevation (ft)/Tide:	Penetration Depth: **8.0'**
Client: **Port of Bellingham**	Water Depth (ft): **47.7'**	Sample Quality: **Good**
Collection Date: **2/25/04**	Mudline Elevation (ft):	Recovery in ft (%): **7.8' (97.5)**
Contractor: **MSS**	N./LAT: **48 23.3420** E./LONG: **122 30.9649**	Process Date: **02/27/04**
Vessel: **R/V Nancy Anne**	Horiz. Datum: Vert. Datum:	Process Method: **Split**
Operator: **Bill Jaworski**	Method/Tube ID: **4" OD aluminium**	Logged By: **N. Bacher**

Depth (ft) Below Mudline	Recovered Interval	Sample #	Analysis	Headspace PID	**Sediment Description** Classification Scheme: USCS (Recalculated depth interval in feet)	Comments	Calc. In situ Depths (ft) & Graphic Log	Mudline Elevation (ft)
0	S1				SM: (0-0.8') SM: soupy wet, soft, black SLIGHTLY SANDY SILT w/ minor clay at times. Trace rootlets and moderate H2S odor.			0
1					SM: (0.8-1.6') SM: moist to wet, gray SLIGHTLY SANDY SILT. Trace H2S odor.			-1
2					SP: (1.6-3.8') SP: moist, medium dense, gray SLIGHTLY SILTY SAND. Trace shell fragments and very slight H2S odor. Transition zone into the unit from above between 1.6' to 2'.			-2
3								-3
4	S2				SP: (3.8-5') SP: moist, dense, gray SAND w/ trace silt. Abundant shell fragments (30%).			-4
5								-5

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Seattle, WA 98134-1162
Phone: (206) 624-9349
Fax: (206) 624-2839

Remarks: **Shoe is half full with gray sand and shells**

Kept upper 5 feet only. Lower 2.8 feet discarded.

Calculated Recovery
Sample Length/Penetration Length:
7.8' / 8.0' = 97.5%

Drilled	Start	End	Total Depth (ft)	Logged By / Checked By	Driller	Drilling Method
	8/4/2011	8/4/2011	66.5	AF2 / AJH	Cascade Drilling	Hollow-stem Auger

Surface Elevation (ft) / Vertical Datum	1.0 MLLW	Hammer Data	140lb Autohammer
Drilling Equipment	CME 75 Truck-mounted Drill Rig		
Latitude / Longitude		System Datum	Geographic
Groundwater: Date Measured	Depth to Water (ft)	Elevation (ft)	

Notes: Drilled from deck: surface elevation is mudline

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name / Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
0	0	6	6		1			SM	Dark gray silty fine to coarse sand with numerous shell fragments (loose, wet) (beach deposits)			
	5	12	34		2a 2b			SP	Gray fine to medium sand with trace silt, occasional gravel and shell fragments (medium dense to dense, wet)			Blowcount likely overstated %F=4
	10	10	48		3a SA 3b			GP-GM	Light gray fine to coarse gravel with sand and silt (dense, wet)			%F=9
								ML/SM	Gray sandy silt to silty fine sand with occasional gravel (hard/dense, wet)			
	15	18	49		4a SA 4b			SP	Gray fine to coarse sand with gravel and trace silt (dense, wet)			%F=4
								ML/SM	Gray silty fine to coarse sand to fine to coarse sandy with with occasional gravel (hard, wet)			
								SM	Gray silty fine to coarse sand with occasional gravel (very dense, wet) (glacial till)			
	20	18	69		5 SA							%F=21
	25	18	69		6							
	30	12	30		7 SA				Becomes dense			%F=31
	35											

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-1

GeoEngineers

Project: Harris Avenue Shipyard Partial Replacement
Project Location: Bellingham, Washington
Project Number: 00307-075-00

Figure A-2
Sheet 1 of 2

Elevation (feet)	Depth (feet)	FIELD DATA: Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name / Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
-35	35		12	36		8							
-40	40		2	100/6"		9				Becomes very dense			
-45	45		9	50/4"		10							
-50	50		17	50/5"		11							
-55	55		6	50/5"		12				Sand grades finer			
-60	60		12	50/5"		13				Increased silt content			
-65	65		18	65		14							

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-1 (continued)

GeoEngineers

Project: Harris Avenue Shipyard Partial Replacement
Project Location: Bellingham, Washington
Project Number: 00307-075-00

Figure A-2
Sheet 2 of 2

Drilled	Start	End	Total Depth (ft)	Logged By	Checked By	Driller	Drilling Method
	8/5/2011	8/5/2011	55.5	AJH	AJH	Cascade Drilling	Hollow-stem Auger

Surface Elevation (ft) Vertical Datum	14.5 MLLW	Hammer Data	140lb Autohammer
Latitude Longitude		System Datum	Geographic

Drilling Equipment: CME 75 Truck-mounted Drill Rig

Groundwater — Date Measured | Depth to Water (ft) | Elevation (ft)

Notes:

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name / Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0								SP	Light-brown fine to coarse sand with gravel (medium dense to dense, moist) (fill)			
			12	83/8"		1					SS-MS		Blowcount overstated
10	5		12	27		2					MS		
5									SM	Gray silty fine to medium sand with occasional gravel (loose, wet) (beach deposits)			
	10		12	3		3					SS		
0													
	15		3	13		4 SA					SS		%F = 28
-5									SP	Gray fine to medium sand with gravel and shell fragments (dense, wet)			
	20		18	48		5					SS		
-10													
	25		18	48		6				Grades to fine to coarse sand with gravel and shell fragments	NS		
-15									SM	Light brown silty fine to coarse sand with gravel (very dense, wet) (glacial till)			
	30		6	100/7"		7					NS		Blowcount overstated
									SP-SM	Brown-gray fine to coarse sand with silt and gravel (very dense, wet)			
-20													
	35		12	73		8 SA					NS		%F = 11

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-2

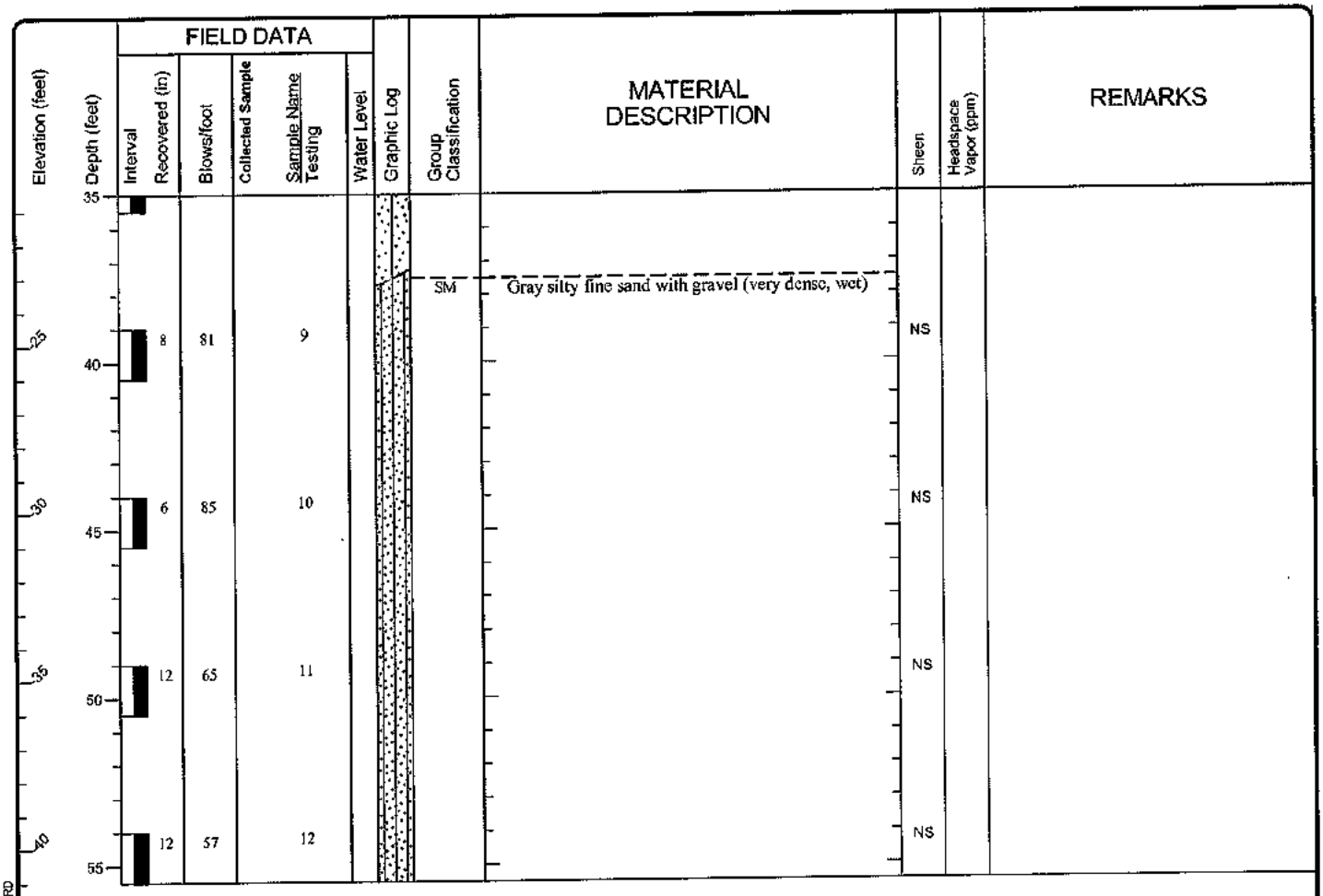
GeoEngineers

Project: Harris Avenue Shipyard Partial Replacement

Project Location: Bellingham, Washington

Project Number: 00307-075-00

Figure A-3
Sheet 1 of 2



Note: See Figure A-1 for explanation of symbols.

Log of Boring B-2 (continued)

GeoEngineers

Project: Harris Avenue Shipyard Partial Replacement
Project Location: Bellingham, Washington
Project Number: 00307-075-00

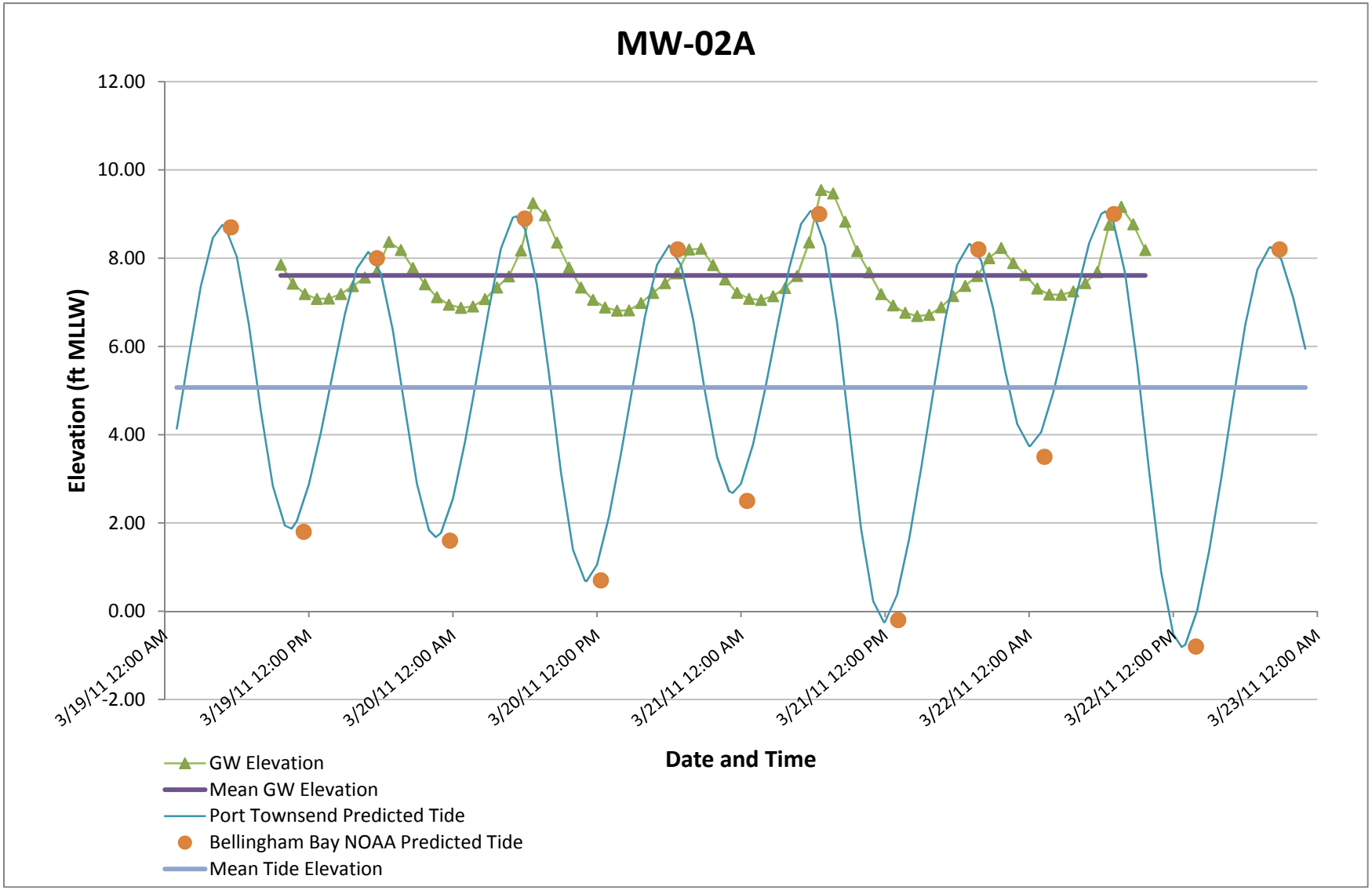
Figure A-3
Sheet 2 of 2

Harris Avenue Shipyard

Remedial Investigation/ Feasibility Study

Appendix F
Tidal Study Graphs

FINAL



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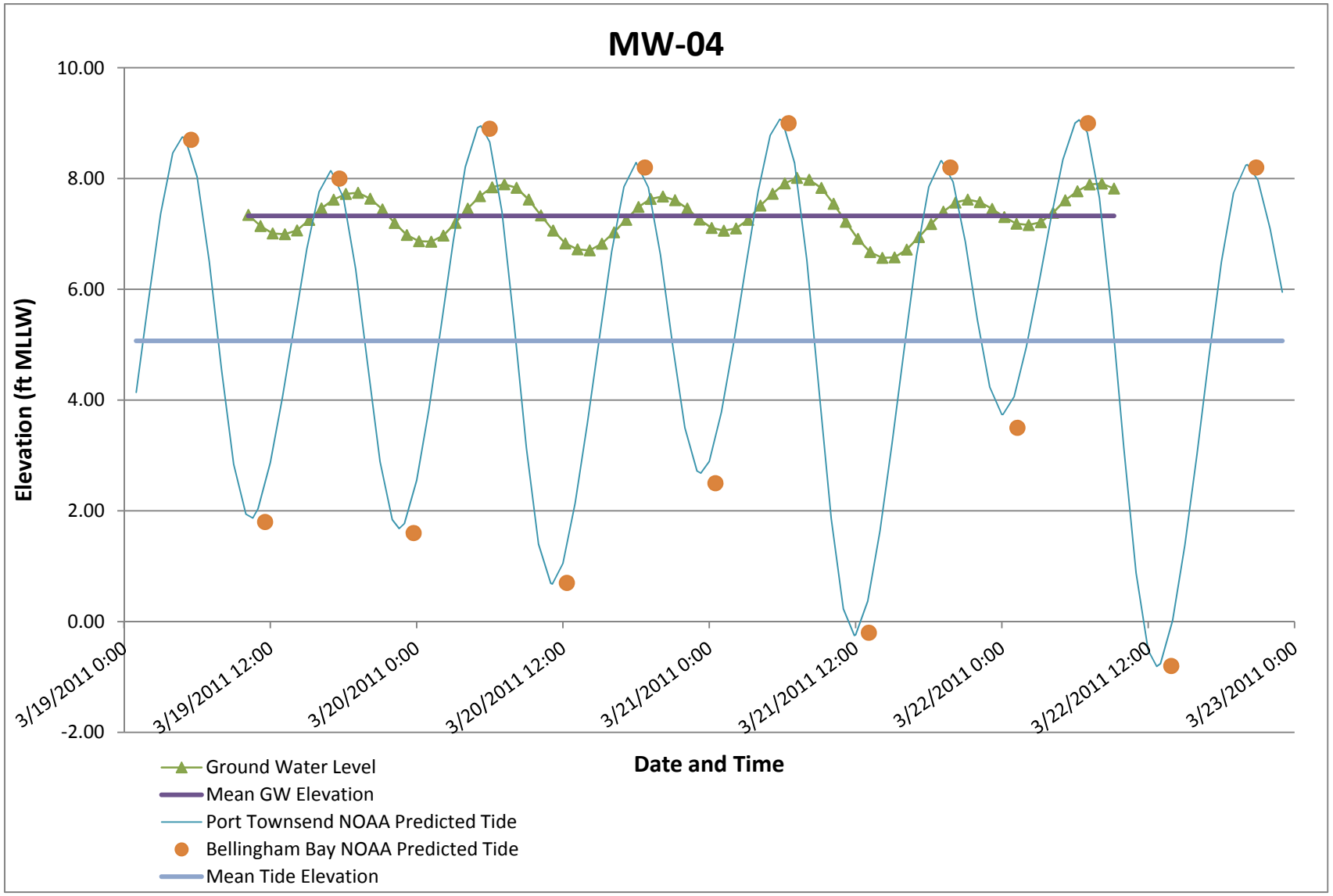
Remedial Investigation/Feasibility Study
Harris Avenue Shipyard
Bellingham, Washington

Appendix F: Tidal Study Graphs
Tidal Study Results for MW-02A



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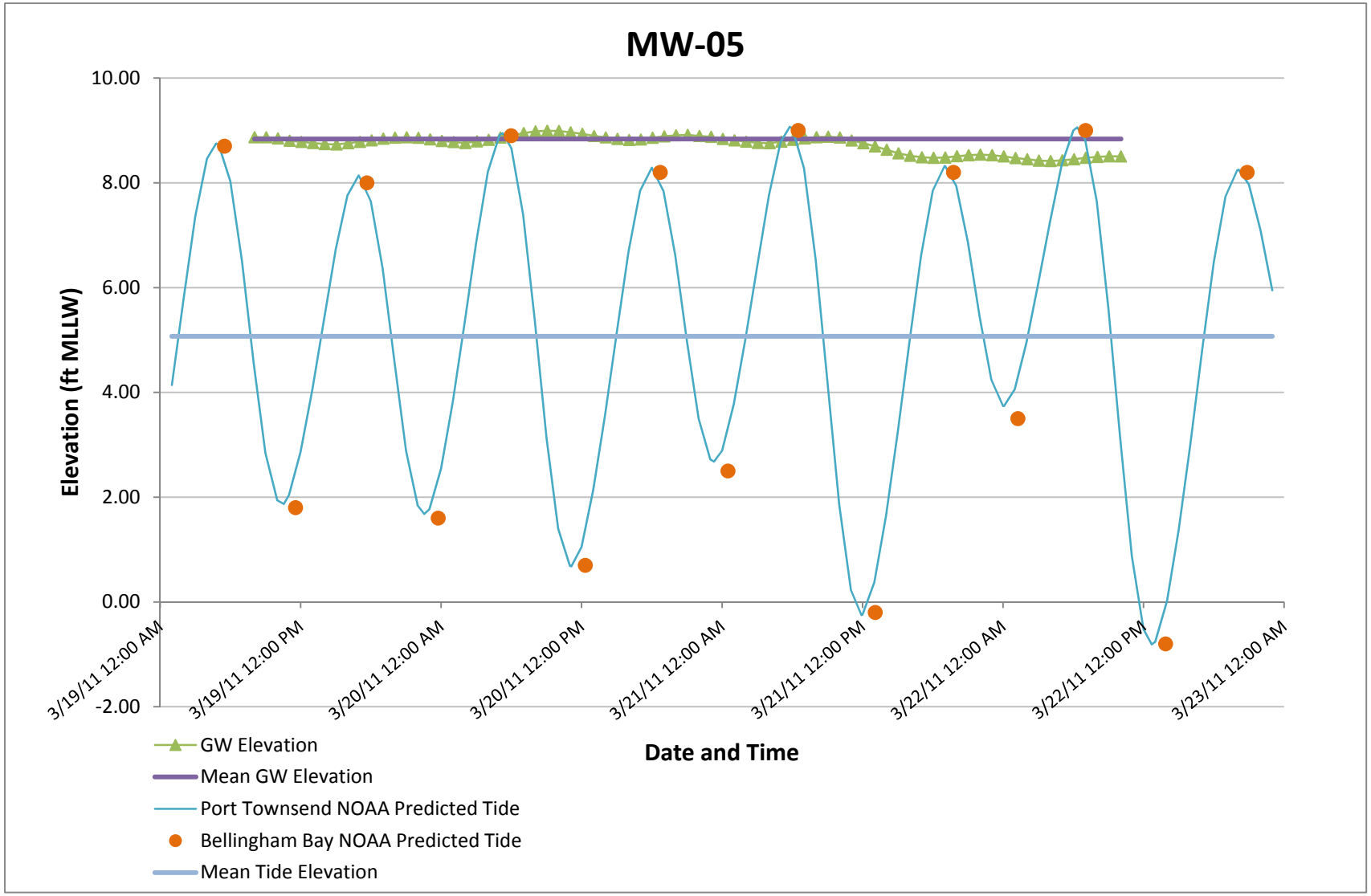
Remedial Investigation/Feasibility Study
Harris Avenue Shipyard
Bellingham, Washington

Appendix F: Tidal Study Graphs
Tidal Study Results for MW-04



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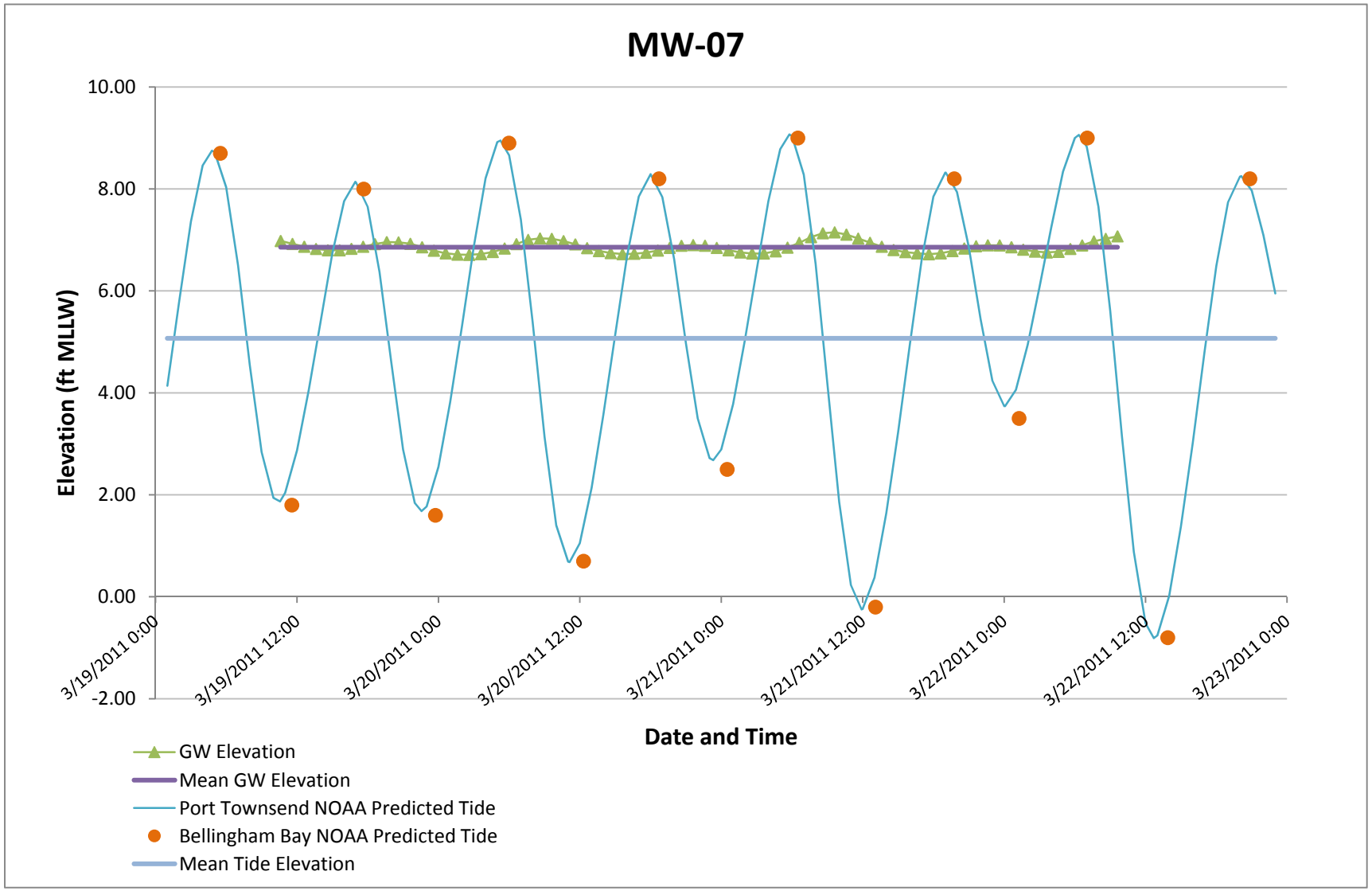
Harris Avenue Shipyard
Bellingham, Washington

Appendix F: Tidal Study Graphs
Tidal Study Results for MW-05



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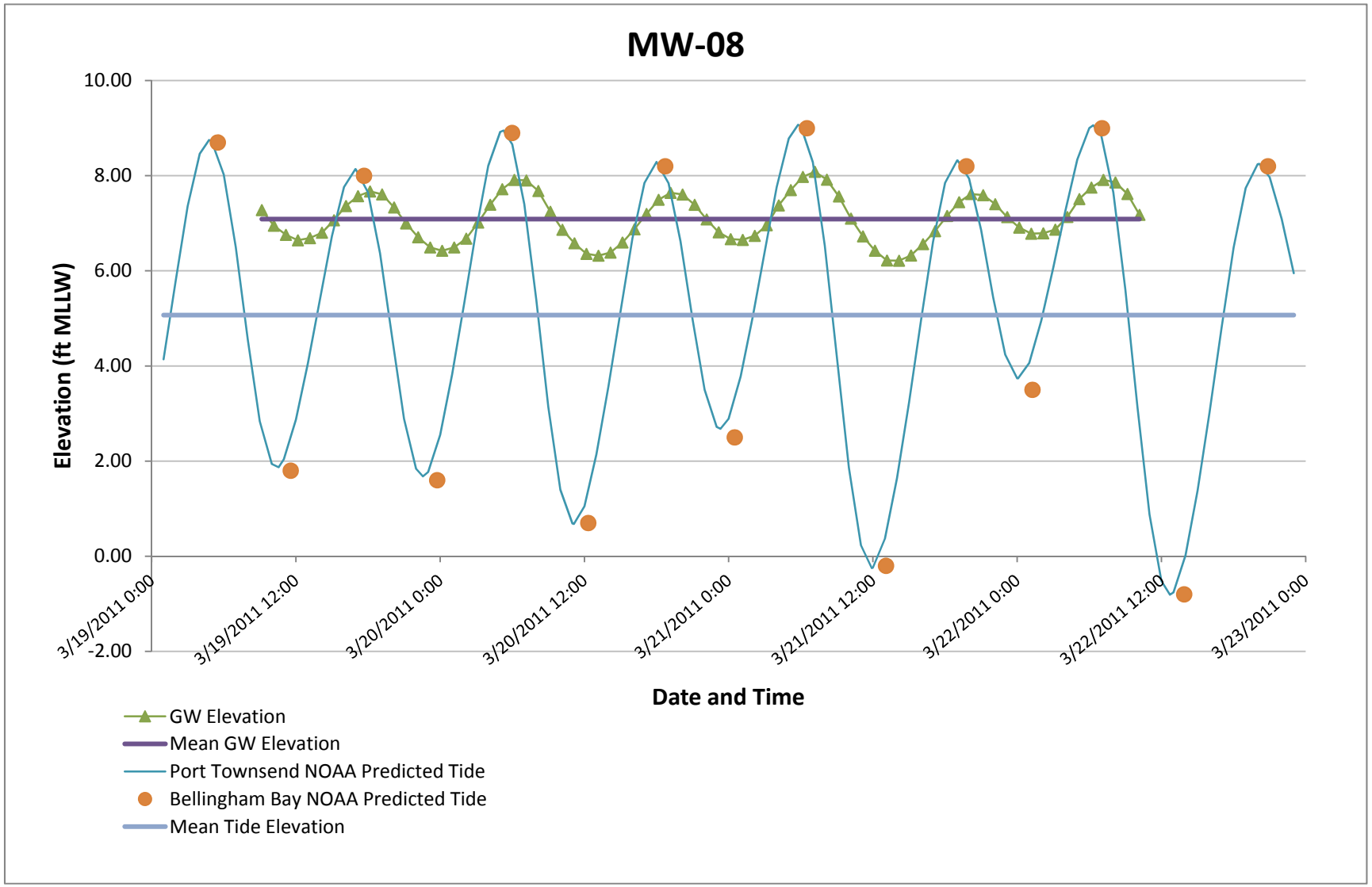
Harris Avenue Shipyard
Bellingham, Washington

Appendix F: Tidal Study Graphs
Tidal Study Results for MW-07



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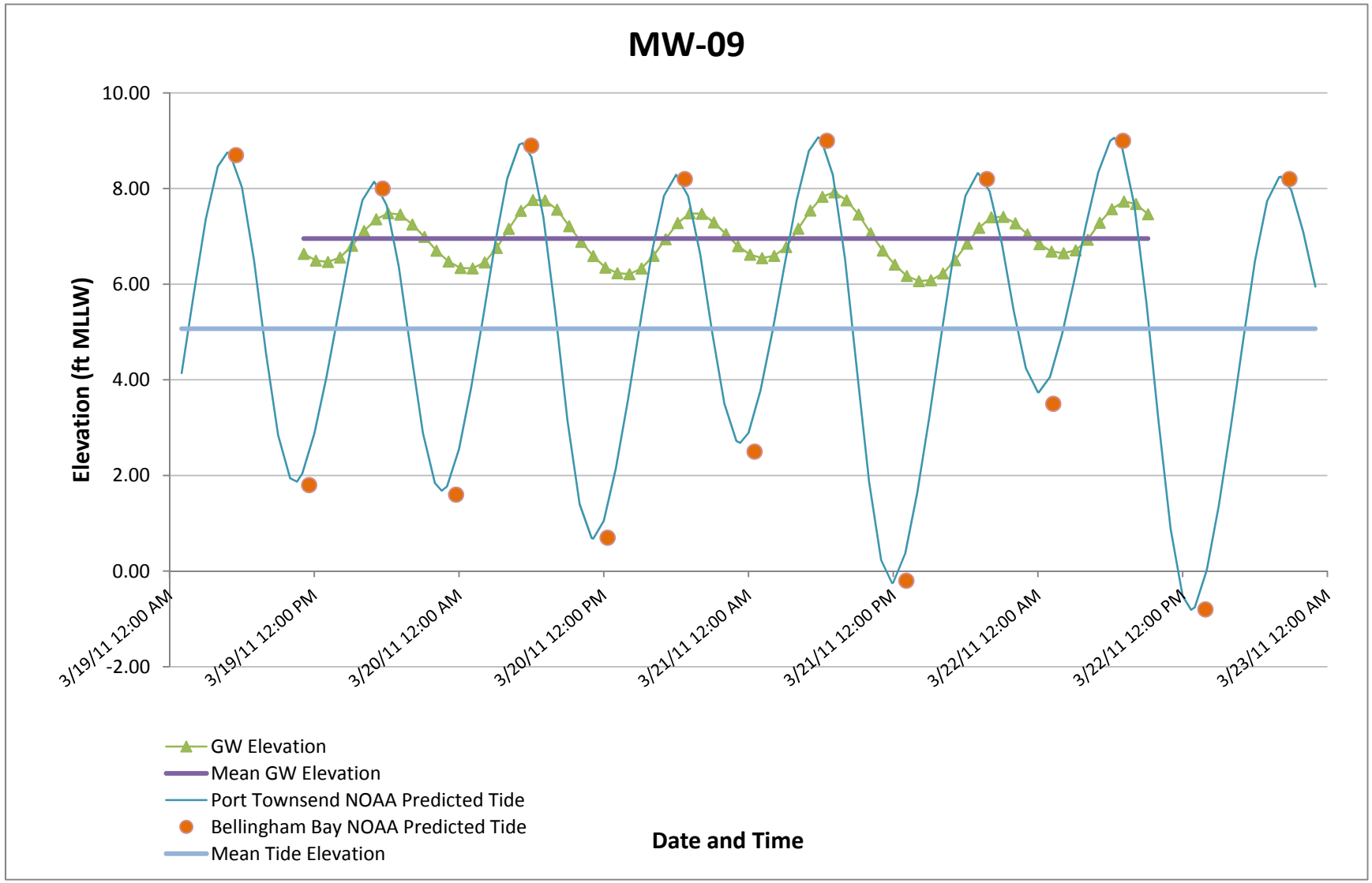
Harris Avenue Shipyard
Bellingham, Washington

Appendix F: Tidal Study Graphs
Tidal Study Results for MW-08



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Harris Avenue Shipyard
Bellingham, Washington

Appendix F: Tidal Study Graphs
Tidal Study Results for MW-09

Harris Avenue Shipyard

Remedial Investigation/ Feasibility Study

Appendix G
Screening Level Development

FINAL

Table of Contents

Harris Avenue Shipyard

Remedial Investigation/ Feasibility Study

Appendix G.1
Screening Level Development

Attachment G.1
Determination of Sediment Bioaccumulative Contaminants of Concern and Cleanup Screening Levels

FINAL

Table of Contents

Tables

Figures

List of Abbreviations/Acronyms

Acronym/ Abbreviation	Definition
ALM	Adult Lead Methodology
BAF	Bioaccumulation factor
Bold Report	OSV Bold Survey Report
BSAF	Biota-sediment accumulation factor
CDI	Chronic Daily Intake
COC	Contaminant of concern
COPC	Contaminant of potential concern
cPAH	Carcinogenic polycyclic aromatic hydrocarbon
CSL	Cleanup Screening Level
DMMP	Dredged Material Management Program
DNR	Washington State Department of Natural Resources
Ecology	Washington State Department of Ecology
EIM	Environmental Information Management
FOE	Frequency of exceedance
FS	Feasibility Study
g/day	Grams per day
HQ	Hazard Quotient
km^2	Square kilometers
µg/kg	Micrograms per kilogram
MDL	Method detection limit
mg/kg	Milligrams per kilogram
MTCA	Model Toxics Control Act

Acronym/ Abbreviation	Definition
ng/kg	Nanograms per kilogram
PAH	Polycyclic aromatic hydrocarbon
PCB	Polychlorinated biphenyl
ppm	Parts per million
PQL	Practical quantitation limit
PSAMP	Puget Sound Ambient Monitoring Program
RI	Remedial Investigation
RME	Reasonable maximum exposure
SCO	Sediment Cleanup Objective
Site	Harris Avenue Shipyard Site
SMS	Sediment Management Standards
TEQ	Toxic equivalent
TTL	Target tissue level
UCL	Upper confidence limit
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
UTL	Upper tolerance limit
WAC	Washington Administrative Code

1.0 Overview

The Sediment Management Standards (SMS) Rule (Washington Administrative Code [WAC] 173-204) includes a requirement to protect human health and higher trophic level species from risk posed by bioaccumulative chemicals, and provides a framework for the establishment of sediment cleanup levels (SCLs) to address these exposure pathways (WAC 173-204-560). This appendix documents the determination of bioaccumulative chemicals as contaminants of concern (COCs) in the sediments at the Harris Avenue Shipyard Site (Site), and the process used to determine SCLs for the bioaccumulative COCs. For the Site, the Washington State Department of Ecology (Ecology) directed that seven bioaccumulative chemicals or chemical classes be evaluated using this framework for their potential to pose a risk to human health and higher trophic level species at the Site. These bioaccumulatives include arsenic, cadmium, lead, mercury, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and dioxins/furans.

The process to develop SCLs as detailed in the SMS uses a two-tiered framework to establish Sediment Cleanup Objectives (SCOs) and Cleanup Screening Levels (CSLs). The SCO defines the lower bound of a SCL and the CSL defines the upper bound, with the final SCL defined on a site-by-site basis. Under the framework, the development of both human health and higher trophic level species risk-based levels is a component of the overall SCL development.[1] The risk-based levels are used in conjunction with background concentrations and practical quantitation limits (PQLs) to derive the SCOs and CSLs. The step-wise COC determination and SCL development process is summarized below and in Figure G.1.1, and is described in detail in Sections 2.0 through 4.0 of this appendix.

Step 1: Sediment Cleanup Objective Development. The bioaccumulative COC screening process initially requires the establishment of a screening level, the SCO, in accordance with WAC 173-204-560(2). The SCO is established as the highest of the following levels:

- **Risk-based concentration.** The risk-based concentration that is the lower of:
  - The concentration of the chemical based on protection of human health (at cancer risk of less than or equal to 1 in 1,000,000 or a non-cancer risk of less than or equal to a hazard quotient of 1, as specified in WAC 173-204-561(2), with lead considered separately).
  - The concentration of the chemical based on protection of higher trophic level species from bioaccumulative impacts as specified in WAC 173-204-564.
- **Natural Background;** or
- **PQL.**

Step 2: SCO screening assessment. Once the SCOs are developed, all study area data are screened against these levels. Consistent with the screening process for contaminants of potential concern (COPCs) described in Section 4.0 of the Remedial Investigation (RI) main text, chemicals are retained for further evaluation as COPCs if their SCOs are exceeded in greater than 5 percent of sediment samples collected within the study area.

Step 3: Identification of COCs based on Bellingham Bay seafood tissue data. The Sediment Cleanup Users Manual (SCUM II) allows for tissue data to be used in a weight-of-evidence approach along with sediment data to further screen COPCs. SCUM II states that: "Tissue

[1] Benthic risk is also considered within the two-tier framework, but is not further discussed in this appendix because this appendix focuses on protection of humans and higher trophic level species. Benthic risk is evaluated further in Section 4.0 of the main text.

concentrations provide an indication of whether bioaccumulative chemicals are entering the food chain at concentrations that present unacceptable risks to humans and higher trophic level species, and they are a more direct estimate of exposure than sediment data." Therefore, finfish and shellfish tissue data within Bellingham Bay were evaluated to identify which COPCs potentially pose unacceptable human or higher trophic level species health risks. The bioaccumulative COPCs that were shown to potentially pose a risk based on both tissue data and an exceedance of the SCO were identified as the final bioaccumulative COCs in sediments at the Site.

Step 4: Cleanup Screening Level Development. When the final bioaccumulative COCs have been determined, a CSL for each COC is developed. The CSL for each COC is established in accordance with WAC 173-204-560(3) as the highest of the following levels:

- **Risk-based concentration.** The risk-based concentration that is the lower of:
  - Human health risk. The concentration of the chemical based on protection of human health (at carcinogenic risk of less than or equal to 1 in 100,000 or a non-carcinogenic risk of less than or equal to a hazard quotient of 1, as specified in WAC 173-204-561(2)).
  - Higher trophic level species risk. The concentration of the chemical based on protection of higher trophic level species from bioaccumulative impacts as specified in WAC 173-204-564.
- **Regional Background** if available; or
- **PQL.**

Completion of Step 4 identifies the final bioaccumulative COCs at the Site, and their proposed CSLs. The final SCL is established in the FS, and will not exceed the CSL in accordance WAC 173-204-500.

2.0 Sediment Cleanup Objective Development

As described above, the development of SCOs is based initially on identification of risk-based levels protective of human health and higher trophic level species, natural background, and PQLs of the potential bioaccumulatives at the Site. The highest of these three values is then selected as the SCO for each bioaccumulative, pursuant to WAC 173-204-560(2). The process by which each of these three values is developed is presented in detail below.

2.1 CALCULATION OF RISK-BASED LEVELS

2.1.1 Risk-Based Levels Protective of Human Health

Protection of human health is evaluated by comparing measured concentrations in sediment to risk-based levels calculated using equations protective of the following exposure pathways:

- Ingestion of shellfish and finfish resources including clams and mussels, crab, and finfish present in the vicinity of the study area (shellfish) or the larger Bellingham Bay area (finfish).
- Direct contact (dermal absorption and incidental ingestion) with intertidal sediments by Shipyard workers and subtidal sediments by Tribal adults via net fishing.

These exposure pathways are described in detail in Section 4.0 of the main text. The risk calculation equations and their default parameters are described in the following sections. The risk-based level selected for protection of human health for each bioaccumulative is the lowest calculated level based on the relevant exposure pathways.

2.1.1.1 Risk-Based Levels Protective of Seafood Consumption

Bioaccumulative risk-based levels protective of seafood consumption by humans were calculated using the equations and input parameters provided in the SCUM II (Ecology 2017). These risk-based levels are the concentrations in sediment at and below which chemicals would not be expected to accumulate in tissues of seafood at levels greater than those acceptable for human consumption. The risk-based levels are based on both carcinogenic and non-carcinogenic health effects, which are evaluated separately because of the differences in their toxicological mechanisms of action. The process by which both carcinogenic and non-carcinogenic risk levels are derived is presented below, with two exceptions:

1. The risk-based level protective of seafood consumption for lead was derived separately using the Adult Lead Methodology (ALM; USEPA 2003). Derivation of the risk-based level for lead is further described in Section 2.1.1.3.
2. The risk-based level protective of seafood consumption for mercury was also derived separately based on empirical results presented in the *Whatcom Waterway Remedial Investigation/Feasibility Study* (Whatcom RI/FS; Anchor and Hart Crowser 2000). The approach used to derive the mercury risk-based level is described below.

Risk-Based Levels Based on Carcinogenic Effects

The two equations presented below are used to derive risk-based levels for those bioaccumulatives with carcinogenic effects, which include arsenic, PCBs, cPAHs, and dioxins/furans. Equation 1 is valid for non-polar organic hazardous substances, and is therefore used to calculate risk-based levels for PCBs, cPAHs, and dioxins/furans. Equation 2 is valid for

hazardous substances for which Equation 1 does not apply, and is, therefore, used to calculate a risk-based level for arsenic. The first portion of each equation is used to calculate a risk-based tissue concentration, consistent with Equation 9-5 in SCUM II. The second portion of each equation converts the risk-based tissue concentration to a risk-based sediment concentration.

Equation 1:

$$\mathrm{RBL}_{Cancer} = \left\{\left(\frac{(\mathrm{CR} \times \mathrm{BW} \times \mathrm{AT} \times \mathrm{UCF})}{(\mathrm{CPFo} \times \mathrm{FCR} \times \mathrm{FDF} \times \mathrm{EF} \times \mathrm{ED})}\right) \times \left(\frac{\mathrm{S_{foc}}}{\mathrm{SUF\ x\ SL\ x\ BSAF}}\right)\right\}$$

Equation 2:

$$\mathrm{RBL}_{Cancer} = \left\{\left(\frac{(\mathrm{CR} \times \mathrm{BW} \times \mathrm{AT} \times \mathrm{UCF})}{(\mathrm{CPFo} \times \mathrm{FCR} \times \mathrm{FDF} \times \mathrm{EF} \times \mathrm{ED})}\right) \times \left(\frac{1}{\mathrm{SUF\ x\ BAF}}\right)\right\}$$

Where:

RBL_{Cancer} = Risk-Based Level (milligrams per kilogram [mg/kg] dry weight)
CR = Cancer Risk (unitless)
BW = Body weight (kg)
AT = Averaging time (days)
UCF = Unit conversion factor (1,000 g/kg)
CPFo = Oral cancer potency factor (kg-day/mg)
FCR = Fish consumption rate (g/day)
FDF = Fish diet fraction (unitless)
EF = Exposure frequency (days/yr)
ED = Exposure duration (yrs)
SUF = Site Use Factor (unitless)
SL = Fish lipid fraction (gram/gram)
S_{foc} = Fraction of organic carbon in sediment (gram/gram)
BSAF = Biota-Sediment Accumulation Factor [gram tissue-lipid normalized (wet weight)/gram sediment –organic carbon normalized (dry weight)]
BAF = Bioaccumulation Factor [gram tissue (wet weight) / gram sediment (dry weight)]

The parameters employed for each potential exposure scenario are used to describe the frequency, duration, and magnitude of the potential exposures and characteristics of the receptor populations. Exposure parameters encompass current and future site use and are developed based on conservative reasonable maximum exposure (RME) estimates as determined by Ecology. Values for each of the listed parameters are presented in Tables G.1.1 and G.1.2 with the exception of the oral cancer potency factors, which are presented in Appendix G.3. Ecology default parameters were used and are not described here in detail, with the exception of those site-specific and chemical-specific parameters discussed further below. Calculated risk-based levels are presented in Table G.1.4.

Risk Levels Based on Non-Carcinogenic Effects

The two equations presented below are used to derive risk-based levels for those bioaccumulatives with non-carcinogenic effects, which include arsenic, cadmium, and dioxins/furans. Equation 1 is valid for non-polar organic hazardous substances, and is therefore used to calculate risk-based levels for dioxins/furans. Equation 2 is valid for hazardous substances for which Equation 1 does not apply, and is therefore used to calculate risk-based levels for arsenic and cadmium. The first portion of each equation is used to calculate a risk-based

tissue concentration, consistent with Equation 9-6 in SCUM II. The second portion of each equation converts the risk-based tissue concentration to a risk-based sediment concentration.

Equation 1:

$$RBL_{Noncancer} = \left\{\left(\frac{(HQ \times BW \times AT \times UCF \times RfDo)}{(FCR \times FDF \times EF \times ED)}\right) \times \left(\frac{S_{foc}}{SUF\ x\ SL\ x\ BSAF}\right)\right\}$$

Equation 2:

$$RBL_{Noncancer} = \left\{\left(\frac{(HQ \times BW \times AT \times UCF \times RfDo)}{(FCR \times FDF \times EF \times ED)}\right) \times \left(\frac{1}{SUF\ x\ BAF}\right)\right\}$$

Where:

$RBL_{Noncancer}$ = Risk-Based Level (mg/kg dry weight)
HQ = Hazard quotient (unitless)
BW = Body weight (kg)
AT = Averaging time (days)
UCF = Unit conversion factor (g/kg)
RfDo = Oral reference dose (mg/kg-day)
FCR = Fish consumption rate (g/day)
FDF = Fish diet fraction (unitless)
EF = Exposure frequency (days/yr)
ED = Exposure duration (yrs)
SUF = Site Use Factor (unitless)
SL = Fish lipid fraction (gram/gram)
S_{foc} = Fraction of organic carbon in sediment (gram/gram)
BSAF = Biota-Sediment Accumulation Factor [gram tissue-lipid normalized (wet weight) / gram sediment –organic carbon normalized (dry weight)]
BAF = Bioaccumulation Factor [gram tissue (wet weight) / gram sediment (dry weight)]

Values for each of the listed parameters are presented in Tables G.1.1 and G.1.2 with the exception of the oral reference doses, which are presented in Appendix G.3. Ecology default parameters were used and are not described here in detail, with the exception of those site-specific parameters and chemical-specific parameters discussed further below. Calculated risk-based levels are presented in Table G.1.4.

Site-Specific Parameters

Seafood Consumption Rate. The most comprehensive evaluation of seafood consumption rates by regional Tribal fishers is contained in Toy et al. (1996; the Toy Study) based on studies of the Tulalip and Squaxin Island Tribes. The Toy Study was used to estimate the amount of potentially contaminated seafood that might be consumed by Lummi Nation and Nooksack Tribal members, who have Tribal treaty rights within the Site. In Bellingham Bay, seafood consumption rates used in the *Whatcom Waterway Remedial Investigation/Feasibility Study* (Whatcom RI/FS; Anchor and Hart Crowser 2000) were based on the Toy Study and are also selected for use at the Site. Use of these rates provides both a conservative estimate of shellfish and finfish consumption as well as a risk-based level derivation approach that is consistent throughout Bellingham Bay.

For Whatcom Waterway, the conservative upper-bound (90th percentile) consumption for clams and mussels, crabs, and finfish of 70 grams per day (g/day) was used in the derivation of risk-based levels, assuming a body weight of 70 kg. Consumption rates by seafood type were 38.5 g/day for clams and mussels, 23.4 g/day for crabs, and 7.8 g/day for finfish. Since those

consumption rates were determined, the default body weight used in risk-based calculations has been adjusted upward to 80 kg (as presented in SCUM II). Therefore, the ingestion rates were adjusted upwards correspondingly, resulting in rates of 44.0 g/day for clams and mussels, 26.7 g/day for crabs, and 8.9 g/day for finfish. This is consistent with the adjustment approach taken for the I&J Waterway Site, also located within Bellingham Bay (Anchor QEA 2015).

Fraction of Organic Carbon in Sediment. This parameter is based on the average organic carbon fraction in sediment at the Site, resulting in a value of 0.018 grams organic carbon/grams soil.

Chemical-Specific Parameters

Cancer Slope Factors and Reference Doses. Toxicity values, including oral and dermal cancer slope factors and reference doses, are not specific to risk-based calculations for biaccumulative chemicals. These toxicity values are presented in Attachment G.3 (Table G.3.1) rather than being presented within this attachment. These toxicity values were obtained from the U.S. Environmental Protection Agency's (USEPA's) Integrated Risk Information System (IRIS) Database as required by WAC 173-204-561. Slope factors are an upper-bound estimate of a chemical's probability of causing cancer over a 70-year lifetime. The reference dose is an estimate of a chronic oral daily exposure to the human population, including sensitive subgroups such as children, which is not likely to cause harmful effects during the exposure. Oral toxicity factors are converted to dermal toxicity factors by either dividing the factor by the gastrointestinal absorption factor for slope factors or multiplying the factor by the gastrointestinal absorption factor for reference doses per WAC 173-340-745.

Biota-Sediment Accumulation Factors/Bioaccumulation Factors. The extent of chemical bioaccumulation from sediment is typically expressed using a biota-sediment accumulation factor (BSAF) or bioaccumulation factor (BAF). BSAF is the ratio between the concentration of a bioaccumulating nonpolar organic chemical in the total extractable lipids of an organism normalized on the lipid fraction, to the concentration in sediment normalized on the organic carbon content of sediment. BAF is derived for metals or other compounds where organic carbon normalization is not appropriate, and is the ratio of the chemical concentration in fish to chemical concentration in sediment.

The *Preliminary Sediment Cleanup Objectives for Port Angeles Harbor* document prepared for Ecology (NewFields 2013) includes a comprehensive summary of available BSAFs and BAFs. This document presents both BSAFs/BAFs derived from site-specific surface sediment data for Port Angeles and a literature review of BSAFs/BAFs to either confirm the site-specific values, or use in place of the site-specific values if there was insufficient data.

The literature review included a number of sources (refer to NewFields 2013 for the complete list), with the primary two sources being online databases maintained by the U.S. Army Corps of Engineers (USACE) and USEPA. The USACE Engineer Research and Development Center (ERDC) maintains a BSAF database that includes qualified datasets from a number of peer-reviewed and grey literature sources (USACE 2016). The Mid-Continent Division of the USEPA also maintains a database, which includes BSAF values generated for USEPA-related sites (USEPA 2009).

BSAFs/BAFs selected for use in the development of risk-based levels at the Site are presented in Table G.1.2; their selection was based on the following rationale:

- BSAFs/BAFs derived from empirical data were preferred over those derived from modeling.

- BSAFs/BAFs were only considered relevant if they were derived from species known to reside in Bellingham Bay.
- Where several values were available, the mean of the values was calculated and applied.
- Where multiple values for crustaceans were presented (i.e., various species of crab and shrimp), BSAFs/BAFs for Dungeness Crab were selected. These values were selected because the Tulalip/Squaxin Tribal crustacean consumption rate is based on Dungeness Crab consumption only.

Risk-Based Level Protective of Mercury Exposure

A risk-based level protective of seafood consumption for mercury can be derived using Equation 2 presented above, resulting in a value of 0.2 mg/kg. This value is literature-based and theoretical. It is accepted practice that where an empirically-based value is available, the literature-based value may be superseded. In the *Whatcom Waterway RI/FS* (Anchor and Hart Crowser 2000), a site-specific mercury screening level protective of both human and higher trophic level species was derived. A simple regression analysis was conducted between paired sediment and tissue data from throughout Bellingham Bay. The greatest bioaccumulation of mercury was found in Dungeness Crab. This tissue-sediment relationship was used to determine a screening level protective of human and higher trophic level species of 1.2 mg/kg. Because this relationship is based on data collected from Bellingham Bay, it is appropriate to apply as a human health and higher trophic level species risk-based level for mercury in this assessment (presented in Table G.1.4).

2.1.1.2 Risk-Based Levels Protective of Direct Contact

Bioaccumulative risk-based levels protective of direct sediment contact (ingestion or dermal contact) by Tribal adult net fishers and Shipyard Workers conducting activities in the shipyard intertidal sediment area were calculated using equations in the SCUM II (Equation 9-1 and Equation 9-2) and are presented below. Beach play by children was also considered on the shoreline adjacent to the Fairhaven Marine Park but determined not to be a complete exposure pathway. This area may be used by children, but is partially armored with riprap, and otherwise consists of large gravels and cobbles. There is little or no sediment defined as silt and sand and, therefore, sediment exposure to children cannot occur.

Risk Levels Based on Carcinogenic Effects

The equation presented below is used to derive risk levels based on sediment direct contact for chemicals with carcinogenic effects.

$$RBL_{Cancer} = \left\{ \frac{(CR \times BW \times AT)}{EF \times ED \times \left[\left(\frac{IR \times AB \times CPFo}{UCF} \right) + \left(\frac{SA \times AF \times ABS \times CPFd}{UCF} \right) \right]} \right\}$$

Where:

RBL_{Cancer} = Risk-Based Level (mg/kg dry weight)
CR = Cancer risk (unitless)
BW = Body weight (kg)
AT = Averaging time (days)
EF = Exposure frequency (days/yr)

ED = Exposure duration (yrs)
IR = Soil Ingestion Rate (mg/day)
AB = Gastrointestinal Absorption Fraction (unitless)
UCF = Unit conversion factor (1,000,000 mg/kg)
CPFo = Oral cancer potency factor (kg-day/mg)
SA = Dermal Exposed Surface Area (cm^2)
AF = Sediment to Skin Adherence Factor (mg/cm^2-day)
ABS = Dermal Absorption Fraction (unitless)
CPFd = Dermal cancer potency factor (kg-day/mg)

Values for each of the listed parameters are presented in Tables G.1.1, with the exception of the oral cancer potency factors, which are presented in Appendix G.3. Ecology default parameters for direct contact by Adult Tribal (subsistence) via net fishing were used. Exposure parameters for the Shipyard Workers scenario are similar to, but more conservative than, default parameters for MTCA Method C soil cleanup levels. Calculated risk-based levels are presented in Table G.1.4.

Risk Levels Based on Non-Carcinogenic Effects

The equation presented below is used to derive risk levels based on sediment direct contact for chemicals with non-carcinogenic effects.

$$RBL_{Noncancer} = \left\{ \frac{(HQ \times BW \times AT)}{EF \times ED \times \left[\left(\left(\frac{1}{RfDo} \right) \times \left(\frac{IR \times AB}{UCF} \right) \right) + \left(\left(\frac{1}{RfDd} \right) \times \left(\frac{SA \times AF \times ABS}{UCF} \right) \right) \right]} \right\}$$

Where:

$RBL_{Noncancer}$ = Risk-Based Level (mg/kg dry weight)
HQ = Hazard Quotient (unitless)
BW = Body weight (kg)
AT = Averaging time (days)
EF = Exposure frequency (days/yr)
ED = Exposure duration (yrs)
IR = Soil Ingestion Rate (mg/day)
AB = Gastrointestinal Absorption Fraction (unitless)
UCF = Unit conversion factor (mg/kg)
RfDo = Oral reference dose (mg/kg-day)
SA = Dermal Surface Area (cm^2)
AF = Sediment to Skin Adherence Factor (mg/cm^2-day)
ABS = Dermal Absorption Fraction (unitless)
RfDd = Dermal reference dose (mg/kg-day)

Values for each of the listed parameters are presented in Tables G.1.1. Ecology default parameters for shipyard workers and Adult Tribal (subsistence) netfishing were used. Calculated risk-based levels are presented in Table G.1.4.

2.1.1.3 Risk-Based Levels Protective of Lead Exposure in Sediment and Seafood Tissue

USEPA has no consensus toxicity factors for inorganic lead, so it is not possible to calculate risk-based levels as described above. USEPA considers lead to be a special case because of the difficulty in identifying the classic "threshold" needed to develop a reference dose (i.e., the intake level at which toxicity is expected to occur). Therefore, USEPA evaluates lead by using blood-lead modeling (USEPA 2003). The ALM was used here to derive a risk-based level protective of lead exposure at the Site. The ALM focuses on estimating fetal blood lead concentration in women exposed to lead-contaminated soils, the most sensitive subpopulation affected by adult lead exposure. Although the model was developed to assess soil exposures, it is applied here to evaluate exposure to lead in both sediments and in finfish and shellfish. Adjustments were made to account for seafood intake per USEPA guidance (USEPA 2007). A maximum allowable blood level of 10 micrograms per deciliter (µg/dL) was assumed in the developing fetus, and the risk-based level protective of this blood level (i.e., ensuring a blood level of less than 10 µg/dL) was calculated. Because the ALM guidelines (USEPA 2003) recommend using mean values for calculating the screening level, the adult tribal mean ingestion rate was used in the calculation (Anchor and Hart Crowser 2000).

The equation used to determine the risk-based level is presented below.

$$Lead\ RBL = \frac{\left(\frac{Pbf}{\left(R\ x\ (GSD^{1.645})\right)} - Pbo\right) x\ AT}{(\mathrm{BKSF}\ x\ \mathrm{IRs}\ x\ \mathrm{AFs}\ x\ \mathrm{EFs}) + (\mathrm{BKSF}\ x\ \mathrm{IRf}\ x\ \mathrm{AFf}\ x\ \mathrm{EFf})}$$

Where:

RBL = Risk-Based Level (mg/kg dry weight)
Pbf = 95th percentile Pb among fetuses of adult workers (µg/dL)
Pbo = Adult baseline (geometric mean) blood lead level (µg/dL)
R = Fetal/maternal lead ratio (unitless)
GSD = Geometric standard deviation (unitless)
AT = Averaging time (days)
BKSF = Biokinetic slope factor (µg/dL per µg/day)
IRs = Sediment ingestion rate (g/day)
AFs = Gastrointestinal absorption fraction for lead in sediment (unitless)
EFs = Exposure frequency for Tribal netfishing (days/yr)
IRf = Fish ingestion rate (g/day)
AFf = Gastrointestinal absorption fraction for lead in tissue (unitless)
EFf = Exposure frequency for Fish ingestion (days/yr)

Exposure parameters for each of these analyses and the resulting calculated risk-based level are presented in Table G.1.3.

2.1.2 Risk-Based Levels Protective of Higher Trophic Level Species

Bioaccumulative risk-based levels protective of seafood consumption by higher trophic level species were calculated using Equation 9-9 in the SCUM II, which back-calculates a risk-based sediment concentration from an acceptable tissue concentration using literature-derived Target Tissue Levels (TTLs) and BSAFs. TTLs are risk-based tissue concentrations below which chemicals would not be expected to pose adverse health effects to higher trophic level species (i.e., birds and mammals). TTLs are presented in guidance documents including the Sediment

Evaluation Framework (SEF) for the Pacific Northwest (RSET 2016), and the Oregon State Guidance for Assessing Bioaccumulative Chemicals of Concern in Sediment (ODEQ 2007).

Equation 1 presented below is valid for non-polar organic hazardous substances, and is therefore used to calculate risk-based levels for PAHs, PCBs, and dioxins/furans. For PAHs, the higher trophic level species evaluation focuses on the individual PAHs that SCUM II identifies as potentially posing a greater risk to higher trophic level species than to human health, pyrene and phenanthrene. Although phenanthrene does not have an associated TTL, pyrene is generally recognized as having greater toxic effects than phenanthrene (ATSDR 1995), and is a suitable surrogate to represent both chemicals. Therefore, phenanthrene is not included in further analysis or tables.

Equation 2 is valid for hazardous substances for which Equation 1 does not apply, and is therefore used to calculate risk-based levels for arsenic and cadmium. Calculations could not be completed to derive a higher trophic screening level for lead because an applicable BAF is not available, discussed further in Section 3.0. The development of the higher trophic level species risk-based level for mercury was previously described in Section 2.1.1.1.

Equation 1:

$$Higher\ Trophic\ Level\ Species\ RBL = \frac{\mathrm{TTL} \times \mathrm{Sfoc}}{\mathrm{SL} \times \mathrm{BSAF} \times \mathrm{SUF}}$$

Equation 2:

$$Higher\ Trophic\ Level\ Species\ RBL = \frac{\mathrm{TTL}}{\mathrm{BAF} \times \mathrm{SUF}}$$

Where:

RBL = Risk-Based Level (mg/kg dry weight)
TTL = Target tissue level
Sfoc = Fraction of organic carbon in sediment (gram/gram)
SL = Fish lipid fraction (gram/gram)
BSAF = Biota-Sediment Accumulation Factor (gram tissue-lipid normalized [wet weight]/gram sediment –organic carbon normalized [dry weight])
BAF = Bioaccumulation Factor (gram tissue [wet weight] / gram sediment [dry weight])
SUF = Site Use Factor (unitless)

Values for each of the listed parameters are presented in Tables G.1.1 and G.1.2.

2.2 DERIVATION OF NATURAL BACKGROUND

The Dredged Material Management Program (DMMP), which is composed of the USACE, USEPA, Ecology, and the Washington State Department of Natural Resources (DNR), collected surface sediment data throughout Puget Sound in the summer of 2008 and documented the results in a study called Puget Sound Sediment PCB and Dioxin 2008 Survey, OSV Bold Survey Report (Bold Report; DMMP 2009).

Data were collected from 70 deep off-shore sampling locations throughout Puget Sound, as well as from the area around the San Juan Islands and the Strait of Juan de Fuca. The sample

locations were intended to represent the natural sediment background of Puget Sound by targeting areas outside the influence of urban bays and known point sources.

Table 10-1 of the SCUM II provides recommended natural background values calculated from the 90/90 upper tolerance limit (UTL; i.e., the 90 percent upper confidence limit [UCL] on the 90th percentile) of the OSV Bold Report data. The natural background values are presented in Table G.1.4.

2.3 PRACTICAL QUANTITATION LIMITS

A PQL is defined by SMS as the "lowest concentration that can be reliably measured within specified limits of precision, accuracy, representativeness, completeness, and comparability during routine laboratory operating conditions, using department approved methods" (WAC 173-204-505(15)). SMS allows consideration of the PQL in establishing the SCO to address circumstances in which a concentration determined to be protective cannot be reliably detected using state-of-the-art analytical instruments and methods.

PQLs were selected based on the analytical method used in the Harris Avenue Shipyard Data Gaps Investigation and were similar to PQLs identified in Table 11-1 and Appendix D of the SCUM II. These PQLs are applicable to the Site, and have therefore been considered in the SCO selection process. The PQLs for the bioaccumulatives are presented in Table G.1.4.

2.4 PROPOSED SEDIMENT CLEANUP OBJECTIVE

The proposed SCO for each bioaccumulative is presented below, along with its basis. All of the potential SCOs are presented in Table G.1.4. As described above, the selection of SCO is based the highest value of: 1) lowest risk-based level; 2) natural background; and 3) PQL.

Bioaccumulative	Proposed Sediment Cleanup Objective (mg/kg)	Basis
Arsenic	11	Natural background
Cadmium	0.8	Natural background
Lead	16	Natural background (Bellingham Bay-specific; see Appendix G)
Mercury	1.2	Human health and higher trophic level species risk-based level
Pyrene	14	Higher trophic level species risk-based level
cPAH TEQ	0.021	Natural background
PCBs	0.0055	PQL
Dioxin/furan TEQ	0.000005	PQL

Abbreviation:
TEQ Toxic equivalent

2.5 SCO SCREENING ASSESSMENT

Bioaccumulatives were retained as COPCs if their frequency of exceedance (FOE) of the SCO presented above was greater than 5 percent. The FOE for each bioaccumulative is presented in Table G.1.4. If Site data are less than the SCO in greater than 95 percent of surface sediment samples, the determination can be made that the bioaccumulative does not pose a health risk and is not retained as a COPC.

All of the bioaccumulatives were retained as COPCs in this screening process with the exceptions of pyrene and mercury. For pyrene, no surface sediment samples had detected concentrations greater than its SCO. For mercury, only 1.6 percent of surface sediment samples had detected concentrations greater than its SCO. Therefore, both mercury and pyrene can be eliminated as bioaccumulative COCs at the Site. FOEs for the remaining bioaccumulatives ranged from 40 percent (cadmium) to 100 percent (dioxin/furan TEQ). Samples where bioaccumulatives were not detected but their reporting limit exceeded the SCO were included as SCO exceedances.

3.0 Identification of COCs based on Bellingham Bay Tissue Data

The SCUM II allows for the use of tissue data to be used in a weight-of-evidence approach along with sediment data to further screen COPCs. Seafood tissue data have not been collected as part of the site-wide RI/FS. However, numerous seafood tissue sampling studies have been performed in Bellingham Bay. These seafood tissue data indicate whether the bioaccumulative COPCs are actually accumulating in tissue and therefore pose a risk to the health of humans or higher trophic level species, or whether the basis for the risk is theoretical. It is accepted practice to eliminate a chemical from further evaluation if empirical tissue data indicates the chemical is not accumulating in seafood tissue, or if the concentration of accumulated chemicals indicates an acceptable health risk.

Therefore, finfish and shellfish tissue data within Bellingham Bay were evaluated to identify which COPCs potentially pose unacceptable human or higher trophic level species health risks. The bioaccumulative COPCs that were shown to potentially pose risk based on the risk evaluation described below were identified as the final bioaccumulative COCs in sediments at the Site.

3.1 AVAILABLE BELLINGHAM BAY SEAFOOD TISSUE DATA

The principal species of interest that could be collected and consumed by Tribal members from within the Site include hard-shell clams (e.g., little neck and butter clams, geoduck, and horse clams), crabs (Dungeness Crab), and resident finfish (e.g., English Sole, Starry Flounder). Existing data are available for each of these three groups as described below. For clams and crabs, only data collected in the vicinity (within 1 mile) of the study area are utilized in the evaluation because these data are considered most relevant to potential site exposures. Following accepted practice, anadromous fish species, such as salmon, are excluded from this evaluation because their residence time in Bellingham Bay is expected to be minimal and therefore bioaccumulative concentrations measured in their tissue cannot be attributed to Bellingham Bay exclusively.

All finfish and shellfish tissue data evaluated in this appendix are presented in Tables G.1.5a and G.1.5b, with locations and data presented in Figure G.1.2. Data were derived from the following studies:

- *Puget Sound Dredged Disposal Analysis. Baseline Survey of Phase II Disposal Sites* (PTI Environmental Services, 1989). This report includes tissue monitoring data for the bivalve *Compsomyax subdiaphana* (clam) collected from Bellingham Bay and other areas. Clams were collected at 16 stations in Bellingham Bay for bioaccumulation analysis, three of which were within 1 mile of the Site. Metals detected in all of the tissue samples included arsenic, cadmium, and lead at maximum concentrations of 1.5 milligrams per kilogram (mg/kg), 0.58 mg/kg, and 1.6 mg/kg wet weight, respectively. cPAHs were at levels less than method detection limits (44 micrograms per kilogram [µg/kg] wet weight) in tissue analyzed.
- *Toxic Contaminants in Marine and Anadromous Fishes from Puget Sound, Washington: Results of the Puget Sound Ambient Monitoring Program Fish Component, 1989–1999* (West et al. 2001). Data have been collected for muscle and liver tissue of English Sole and for liver tissue of Starry Flounder sampled from Bellingham Bay. Metals detected in all of the tissue samples included arsenic and lead (cadmium was not analyzed) at maximum concentrations in muscle tissue of 5.4 mg/kg and 0.03 mg/kg wet weight, respectively. Benzo(a)pyrene was analyzed in the majority of samples and never detected, at method detection limits as low as 3.6 µg/kg wet

weight. PCBs were detected in three of nine English Sole muscle tissue samples (all collected in 1993) at a maximum concentration of 2.9 µg/kg wet weight. PCB non-detects from prior years (1991 and 1992) may be explained by the much higher detection limits in those years (approximately 20 µg/kg wet weight).

- *Bioaccumulation of Contaminants in Crabs & Clams in Bellingham Bay* (Cubbage 1991). This study included muscle tissue data for Dungeness Crabs collected from areas of Bellingham Bay, including stations located immediately offshore of the Site. Metals detected in all of the tissue samples included arsenic, cadmium and lead at maximum concentrations of 5.1 mg/kg, 0.22 mg/kg and 0.29 mg/kg wet weight, respectively. PCBs were at levels less than method detection limits (19 to 20 µg/kg wet weight) in tissue analyzed.
- *Dioxin and furan concentrations in Puget Sound Crabs* (PTI Environmental Services 1991). USEPA conducted a survey evaluating dioxin/furan contamination in Puget Sound crabs by collecting from 12 locations in Puget Sound, including 1 station in Bellingham Bay. The dioxin/furan TEQ concentration at this location was 9.52 nanograms per kilogram (ng/kg) wet weight. USEPA concluded that "the results of a preliminary health assessment using data from one composite sample indicate that dioxin and furan levels in crabs from Bellingham Bay do not appear to be a health risk."
- *Puget Sound Ambient Monitoring Program: 1992 and* 1993 *Shellfish Chemical Contamination Data Report, Office* of *Toxic Substance, Department* of *Health* (Patrick 1996). The Washington State Department of Health has conducted sampling of littleneck clams at the Post Point sampling station on behalf of the Puget Sound Ambient Monitoring Program (PSAMP). Metals detected in all of the tissue samples included arsenic, cadmium and lead at maximum concentrations of 2.6 mg/kg, 0.27 mg/kg, and 0.094 mg/kg wet weight, respectively. cPAHs and PCBs were consistently at levels less than method detection limits (16 and 8 µg/kg wet weight, respectively) in tissue analyzed.
- *Dioxin/Furan Concentrations at the Non-dispersive Open-water Dredged Material Disposal Sites in Puget Sound* (SAIC 2008). Sediment and tissue collection was conducted in 2007 at several sites across Puget Sound. In total, 11 stations were sampled in Bellingham Bay. Dungeness Crab, English Sole, and Starry Flounder were collected by trawl in Bellingham Bay. Additionally, a number of clam samples (*Compsomyax* and *Macoma* species) were collected, with one sample collected within 1 mile of the Site. Tissue concentrations were generally low: dioxin/furan TEQ concentrations in English Sole and Starry Flounder tissue ranged from 0.120 and 0.184 ng/kg wet weight and the concentration in clam tissue was 0.139 ng/kg wet weight.
- *Washington State Department of Fish and Wildlife Ecosystem Monitoring Program Toxics in Biota Study -- Toxic Contaminants in Dungeness Crab and Spot Prawn from Puget Sound, Washington* (WDFW 2014). This report presents tissue monitoring data from Dungeness Crab and Spot Prawn collected throughout Puget Sound between 2011 and 2012. Crab were collected at one station in Bellingham Bay, with two samples analyzed for arsenic, cadmium, lead, and cPAHs. Arsenic and cadmium were detected in both samples, and lead was detected in one sample. Maximum concentrations were 7.4 mg/kg (arsenic), 0.098 mg/kg (cadmium), and 0.046 mg/kg (lead) wet weight. cPAHs were at levels less than method detection limits (0.3 to 0.55 micrograms per kilogram [µg/kg] wet weight) in tissue analyzed.

While the majority of the tissue data available is over 20 years old and the data generally do not reflect current conditions, the concentrations in tissue are expected to have been greater in the past as natural recovery continually approves the conditions of Bellingham Bay. Based on more recent data collected in 2011 (WDFW 2014), this appears to be the case with the exception of arsenic, which maintains elevated concentrations in tissue. Therefore, use of historical tissue data is a conservative approach in the evaluation of tissue risk.

3.2 RISK CHARACTERIZATION AND IDENTIFICATION OF BIOACCUMULATIVE CHEMICALS AS CONTAMINANTS OF CONCERN

3.2.1 Human Health and Higher Trophic Level Species Risk Evaluation

For all of the bioaccumulative COPCs that are detected in local seafood tissue, a risk evaluation is conducted to quantitatively determine whether exposure via seafood tissue consumption may cause an unacceptable health risk. This risk evaluation is conducted in a manner consistent with the toxic effects for each chemical (carcinogenic versus non-carcinogenic, with lead considered separately for human and higher trophic level species health risks). If the evaluation indicates that a chemical poses unacceptable human or higher trophic level species health risk due to seafood tissue concentrations, the bioaccumulative is then considered a bioaccumulative COC at the Site and a CSL is developed as described in Section 4.0.

This evaluation is conducted for arsenic, cadmium, lead, PCBs, and dioxins/furans that all have detectable concentrations in seafood tissue. cPAHs are not evaluated in this manner because they have not been detected in seafood tissue in Bellingham Bay. However, cPAH detection limits were much greater historically than they are now, and, therefore, cPAHs were conservatively retained as a bioaccumulative COC, with a CSL developed in Section 4.0.

For all bioaccumulatives except lead, quantification of potential oral exposure consists of an estimate of the chemical intake (chronic daily intake [CDI]) people might experience during consumption of shellfish and finfish. This was calculated from the available shellfish and finfish tissue concentration data, conservatively using maximum detected tissue concentrations for each analyte, as well as exposure parameters that encompass current and future site use. Intake estimates were developed based on RME estimates as determined by Ecology. The same exposure parameters used to derive SCOs in Section 2.0 were used to calculate potential CDI and potential risk.

The relationship between the intake of the chemical and the incidence of adverse health effects is then evaluated using either slope factors (carcinogenic effects) or reference doses (non-carcinogenic effects) previously described in Section 2.1.1. For carcinogenic chemicals (arsenic, PCBs, dioxins/furans), the magnitude of risk is calculated by multiplying the predicted exposure (CDI) by the slope factor, with the result compared to a risk threshold, an increased cancer risk of 1 in 1,000,000 (1×10^{-6}). For non-carcinogenic chemicals (arsenic, cadmium, and dioxins/furans), health risks are estimated by comparing the predicted exposure to the acceptable reference dose values. Risk calculations and results are described in detail below.

Human health risks from exposure to lead are not quantifiable following the approach used for the other bioaccumulatives. Health risks from lead exposure are evaluated based on blood lead concentration, which can be modeled. The results of blood lead modeling for adults using the ALM are presented below. Health risks to higher trophic level species posed by lead are also considered by comparing the finfish and shellfish tissue concentrations directly against target tissue levels presented in the Table G.1.2.

Because the shellfish tissue data used to calculate potential risk were not obtained from within the study area, there is some uncertainty about study area applicability. This uncertainty has been assessed, and a discussion of potential impacts on risk conclusions is presented below.

Human Health Risk Characterization

Calculation of Chronic Daily Intake

The potential exposure to chemicals in tissue during consumption is expressed as the CDI, the mass of a substance ingested per unit body weight per unit time, averaged over the exposure duration (Ecology 2007).The CDI for seafood ingestion (USEPA 1989; Ecology 2007) was calculated as:

$$CDI = [(Cfin \times IRfin) + (Cshell \times IRshell)] \times \left(\frac{EF \times ED \times FI \times CF}{AT + BW}\right)$$

Where:

CDI = Chronic daily intake from oral exposure route (mg/kg-day)
C =Bioaccumulative-specific maximum tissue concentration (mg/kg)
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
IR = Fish ingestion rate (g/day)
FI = Fractional intake of fish from the study area (unitless)
CF = Unit conversion factor (1×10^{-3} kg/g)
AT = Averaging time (days), equivalent to a 70-year lifetime for carcinogenic chemicals, and ED for non-carcinogenic chemicals multiplied by 365 days per year
BW = Body weight (kg)

CDIs were calculated for all four of the COPCs and are presented in Table G.1.6. As stated above, parameters used in Section 2.0 were used in the calculation of CDIs and are presented in Table G.1.1. Parameters assume an adult Tribal member consuming both shellfish and finfish at ingestion rates of 70.7 g/day and 8.9 g/day, respectively. These intakes were in turn used in the potential risk characterization.

Carcinogenic Risk Results

The potential lifetime excess risk of cancer (beyond "background" cancer risk) was calculated by multiplying the slope factor (presented in Attachment G.3.1 and described in Section 2.0) by the CDI (expressed in units of mg/kg-day) of the bioaccumulative, as described above. Potential risks were estimated separately for each chemical. As defined by SMS 173-204-561 (Ecology 2013a), the human health risk level for individual carcinogens may "not exceed one-in-a-million. If more than one type of hazardous substance is present, the total risk level at the site may not exceed 1 in 100,000 (1×10^{-5})."

Results are presented in Table G.1.6 and indicate that excess carcinogenic risk at levels greater than the risk threshold of 1×10^{-6} is a potential for arsenic, PCBs, and dioxins/furans. Potential excess cancer risks for each are $1 \times 10^{-2,}$ 2×10^{-2}, and 1×10^{-3}, respectively. Note that potential unacceptable human health risk is not indicated for PCBs when tissue results from the edible muscle of finfish (rather than the liver, which is not commonly consumed) are used in the risk analysis.

Non-Carcinogenic Risk Results

The potential for non-carcinogenic adverse health effects is expressed as an HQ, with a HQ of greater than 1 indicating a potential health risk. The HQ is calculated by the ratio of the CDI of the bioaccumulative to its route-specific reference dose. HQs should be summed for chemicals that exert adverse effects by the same toxicological mechanism.

For non-carcinogenic risk, arsenic and dioxins/furans are likely to pose unacceptable non-carcinogenic health effects based on their calculated hazard quotients of 24 and 12, as presented in Table G.1.6. Cadmium concentrations in seafood tissue (cadmium data are available in shellfish tissue only) are not likely to pose unacceptable adverse health effects, however, with an HQ of 0.5.

Lead Modeling

Human health risk posed by lead was not determined using the equations presented above. Instead, risks were estimated using the ALM (USEPA 2003).

As described in Section 2.1.3, the ALM is based on protecting the developing fetus of a pregnant woman and is applied here to evaluate exposure to lead in both sediments and in finfish and shellfish. Adjustments were made to account for fish intake per USEPA guidance (USEPA 2007). The ALM applied here estimates an average blood lead level in adults based on additional exposure (above a baseline level) to lead in sediments, seafood, and air. An estimated fetal blood lead level is then calculated from the estimated adult blood lead levels. The equation used to determine adult blood levels is presented below.

$$Pbadult = \frac{Pbo + BKSF\ x\ FI\ x\ ((Pbs\ x\ IRs\ x\ AFs\ x\ EFs) + (Pbf\ x\ IRf\ x\ AFf\ x\ EFf))}{AT}$$

Where:

Pbadult = Geometric mean blood lead level in exposed adults (µg/dL)
Pbo = Adult baseline (geometric mean) blood lead level (µg/dL)
BKSF = Biokinetic slope factor (µg/dL per µg/day)
FI = Fractional intake (unitless)
Pbs = Mean sediment lead concentration (mg/kg)
IRs = Sediment ingestion rate (g/day)
AFs = Gastrointestinal absorption fraction for lead in sediment (unitless)
EFs = Exposure frequency for Tribal netfishing (days/yr)
Pbf = Mean seafood lead concentration (mg/kg)
IRf = Mean seafood ingestion rate (g/day)
AFf = Gastrointestinal absorption fraction for lead in tissue (unitless)
EFf = Exposure frequency for seafood ingestion (days/yr)
AT = Averaging time (days)

Because the ALM guidelines (USEPA 2003) recommend using mean sediment and tissue values for calculating risks from lead exposure, mean values were calculated and applied in the ALM, including the adult tribal central tendency ingestion rates (refer to Table G.1.7 for exposure parameters and results).

Lead risks were assessed by estimating the probability of exceeding the threshold blood lead level of 10 µg/dL in the fetus through evaluation of exposure of a pregnant mother consuming

seafood and being exposed directly to site sediments. The 95th percentile of the predicted blood lead concentration for the developing fetus was 2.0 µg/dL for the scenario that included both seafood ingestion and direct contact with sediments. The probability of exceeding the 10 µg/dL blood lead threshold was equal to 0.00015 percent for this exposure scenario. Because the probability is so small, lead is not considered likely to pose unacceptable adverse human health effects.

Higher Trophic Level Species Health Risk Characterization

As described previously, lead is the only bioaccumulative at the Site that a risk-based level could not be developed for higher trophic level species. An alternative to the development of the sediment risk-based level is to compare Site-specific data to the TTL presented in Table G.1.2. The TTL for lead protective of higher trophic level species is 2 mg/kg. Shellfish and finfish data presented in Tables G.1.5a and G.1.5b indicate that there are no concentrations greater than 2 mg/kg, with the greatest concentration in clams at 1.6 mg/kg. The majority of concentrations are much less than 1.6 mg/kg. Lead is, therefore, not considered likely to pose unacceptable adverse higher trophic level species health effects.

Risk Uncertainty Due to the Use of Non-Site-Specific Shellfish Data

As described in Section 3.1, shellfish tissue data have not been collected as part of the Site-wide RI/FS, and therefore no tissue data are available that were collected from within the study area. The shellfish tissue data used in the calculation of human and higher trophic level species health risk, therefore, may not be representative of tissue concentration levels within the study area. To evaluate this uncertainty, cadmium and lead tissue concentrations, which indicate no unacceptable adverse health effects based in these tissue data, have been examined separately.

Cadmium Tissue Concentrations

Cadmium sediment data available from Ecology's Environmental Information Management (EIM) system in the vicinity of the shellfish samples is limited. Eight sediment samples have been collected historically within spatial (1 mile) and temporal proximity (between 1987 and 1989) to sample Location BBT11A, containing the maximum detected concentration of cadmium in clam tissue (refer to Figure G.1.1 for tissue sample location). If the sediment data in the vicinity of the shellfish were to indicate similar concentrations to the cadmium sediment data associated with the study area, this shellfish data could be considered representative of tissue concentrations within the study area. The 95 percent UCL for the available cadmium sediment concentrations in the vicinity of the shellfish samples is 0.50 parts per million (ppm). The cadmium sediment data collected within the study area result in a 95 percent UCL double that value, at 1.0 ppm. Because the cadmium sediment concentrations within the study area are greater than the sediment concentrations in the vicinity of the shellfish tissue, it cannot be assumed that the calculated cadmium risk values associated with the available tissue data are representative of Site exposure. Therefore, cadmium is carried forward as a bioaccumulative COC.

Lead Tissue Concentrations

Similar to cadmium, lead sediment data available from EIM in the vicinity of the shellfish samples is limited. Eight sediment samples have been collected historically within spatial (1 mile) and temporal proximity (between 1987 and 1989) to sample Location BBT11A, containing the maximum detected concentration of lead in clam tissue (refer to Figure G.1.1 for tissue sample location). The 95 percent UCL for the available lead sediment concentrations in the vicinity of the shellfish samples is 20 ppm. The lead data collected within the study area results in a 95 percent

UCL greater than that value, 81 ppm. Because the lead sediment concentrations within the study area are greater than the sediment concentrations in the vicinity of the shellfish tissue, it cannot be assumed that the calculated lead risk values associated with the available tissue data are representative of Site exposure. However, the probability of lead posing a human health risk (i.e., exceeding the target level of concern in blood, 10 µg/dL) is extremely low (0.00015 percent) as described above. USEPA's risk reduction goal for contaminated sites is no more than 5 percent of the population exposed to lead will have blood lead levels greater than 10 µg/dl (USEPA 2016). The ALM indicates that tissue containing lead concentrations over 20 times greater than the mean tissue concentrations measured adjacent to the study area could be consumed, and still show a less than 5 percent probability of exceeding target lead levels. Given this, lead is not carried forward as a bioaccumulative COC.

3.2.2 Identification of Contaminants of Concern

The following conclusions can be drawn based on the calculated risk-based levels for each of the bioaccumulative COPCs. cPAHs are also discussed below for completeness, although risk-based levels were not calculated for cPAHs.

- **Arsenic.** Potential unacceptable human and higher trophic level species health risk based on seafood tissue sample results is indicated for arsenic, therefore, arsenic is retained as a bioaccumulative COC, and a CSL protective of the human seafood consumption exposure pathway will be derived.
- **Cadmium.** Potential unacceptable human or higher trophic level species health risk is not indicated for cadmium, however, there is uncertainty in whether the shellfish tissue samples used in the risk analysis are truly representative of the study area. To be conservative, cadmium is retained as a bioaccumulative COC and a sediment cleanup level protective of the seafood consumption exposure pathway will be derived.
- **Lead.** Potential unacceptable human or higher trophic level species health risk is not indicated for lead in the evaluation of seafood tissue. Therefore lead is not retained as a bioaccumulative COC and no additional analysis is required.
- **cPAHs.** Risk analysis was not conducted for cPAHs because they were not detected in seafood tissue within Bellingham Bay. However, because uncertainty exists due to the elevated detection limits used for evaluation of cPAH in seafood tissue, cPAHs are retained as bioaccumulative COCs and a CSL protective of the seafood consumption exposure pathway will be derived.
- **PCBs.** Potential unacceptable human and higher trophic level species health risk is not indicated for PCBs when shellfish or finfish tissue results from the edible muscle of finfish (rather than the liver, which is not commonly consumed) are used in the risk analysis. However, because there exists uncertainty due to the elevated detection limits used for evaluation of PCBs in shellfish tissue, PCBs are retained as bioaccumulative COCs and a CSL protective of the seafood consumption exposure pathway will be derived.
- **Dioxins/Furans.** Potential unacceptable human and higher trophic level species health risk based on seafood tissue sample results is indicated for dioxins/furans, therefore, dioxins/furans are retained as bioaccumulative COCs and a CSL protective of the seafood consumption exposure pathway will be derived.

In summary, arsenic, cadmium, cPAHs, PCBs, and dioxins/furans are all retained as bioaccumulative COCs, and CSLs for each are derived in Section 4.0.

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4.0 Sediment Cleanup Screening Level Development

As described in Section 1.0, the development of CSLs is based on identification of risk-based sediment concentrations, regional background, and PQLs for the bioaccumulative COCs. The highest of these three values is then selected as the CSL for each bioaccumulative, pursuant to WAC 173-204-560(3). The process by which each of these three potential CSLs is developed is presented in detail below.

4.1 CALCULATION OF RISK-BASED LEVELS

The risk-based levels applied as potential CSLs are derived as described in Section 2.0. In the determination of sediment CSLs, only the most conservative human health risk-based levels have been considered, those derived for protection of human health via seafood consumption (rather than direct contact). For those risk-based levels that are protective of cancer risk (for arsenic, cPAHs, PCBs, and dioxins/furans), the acceptable lifetime excess cancer risk has been adjusted to 1 in 100,000 ($1x10^{-5}$) in accordance with WAC 173-204-561(3). Higher trophic level species risk-levels are not included as potential CSLs as all COCs have been determined to not pose unacceptable adverse health effects to higher trophic level species. Risk-based levels considered as potential CSLs are presented in Table G.1.8.

4.2 DERIVATION OF BELLINGHAM BAY REGIONAL BACKGROUND

4.2.1 Ecology-Derived Regional Background

In 2014, Ecology conducted a surface sediment characterization effort in Bellingham Bay to support implementation of the SMS Rule and establish regional background concentrations for a select group of bioaccumulative chemicals (Ecology 2015). Outcomes for this investigation included the following:

- Regional background concentrations were calculated by Ecology for cPAH TEQ and dioxin/furan TEQ. These values are presented in Table G.1.8.
- A regional background value for Total PCBs was not developed by Ecology; only a regional background for PCB TEQ was developed. However, a regional background value for Total PCBs was calculated by Floyd|Snider using the PCB congener data collected by Ecology.
- Other bioaccumulative chemicals including arsenic and cadmium were not sampled in this effort. In their report Ecology noted, “Arsenic and cadmium were not included because they did not appear elevated in the bay outside of clearly contaminated areas within sites.” Because Ecology neither collected arsenic and cadmium data in their investigation, nor developed regional background concentrations, Floyd|Snider developed site-specific regional background values consistent with WAC 173-204-560(5), described in Section 4.2.2.

4.2.2 Proposed Bellingham Bay Site-Specific Regional Background

The SMS Rule describes the process by which Ecology will define regional background (WAC 173-204-560(5)). The site-specific regional background development approach used to define regional background for arsenic and cadmium described below is designed to meet the intent of the SMS Rule. The site-specific regional background concentrations derived from these data sets are considered as potential CSLs and are presented in Table G.1.8.

In WAC 173-204-505, regional background is defined as “the concentration of a contaminant within the department-defined geographic area that is primarily attributable to diffuse sources, such as atmospheric deposition or storm water, not attributable to a specific source or release.” Regional background concentrations should be estimated based upon a defensible background data set of a reasonable size collected from a region proximal to the study area. For this site-specific regional background analysis, Inner Bellingham Bay was identified as the appropriate region proximal to the study area. Inner Bellingham Bay is delineated on Figure G.1.2. All studies located within Inner Bellingham Bay and available in EIM were identified for use in development of regional background for arsenic and cadmium. Table G.1.9 presents a list of all studies selected for use in the derivation of site-specific regional background.

The dataset excluded the following:

- All data that were associated with a source area or known cleanup site.
- All data within 1,000 feet of the shoreline.
- All data in the vicinity of three known source areas further offshore in the central bay: the Georgia Pacific Outfall, the Post Point Treatment Plant outfall, and the PSDDA disposal site.

After exclusion of samples as described above, a robust data set was still available for each analyte, with 116 individual results in both datasets. Figure G.1.3 displays the off-shore source areas locations, the shoreline buffer (which encompasses all additional source areas or known cleanup sites), and all sample locations selected for use in the site-specific regional background analysis.

The recommendation in SCUM II for derivation of a regional background concentration is to calculate the 90/90 UTL. The 90/90 UTL was therefore calculated for each data set. Measurements at levels less than the method detection limit (MDL) were assigned a value of one-half the MDL.

The resulting 90/90 UTL for arsenic was 13 mg/kg, therefore this concentration is designated the estimated regional background for arsenic. The 90/90 UTL for cadmium resulted in a concentration consistent with that of natural background, 0.8 mg/kg. Therefore, the cadmium regional background defaults to the natural background concentration of 0.8 mg/kg.

4.3 PRACTICAL QUANTITATION LIMITS

PQLs have previously been described in Section 2.3. As stated in Section 2.3, PQLs were selected based on the analytical method used in the Harris Avenue Shipyard Data Gaps Investigation and were generally similar to PQLs identified in Table 11-1 and Appendix D of the SCUM II. The PQLs for the bioaccumulative COCs are presented in Table G.1.8.

4.4 PROPOSED SEDIMENT CLEANUP SCREENING LEVELS

The proposed CSL for each bioaccumulative is presented below, along with its basis. All of the potential CSLs are presented in Table G.1.8. As described above, the selection of the CSL is based on the highest value of: 1) the lowest human health and higher trophic level species risk-based level; 2) regional background; and 3) PQL. A final SCL will be determined in the FS. The SCL will not exceed the CSL in accordance with WAC 173-204-500.

Bioaccumulative	Proposed Sediment Cleanup Screening Level (mg/kg)	Basis
Arsenic	13	Site-specific regional background
Cadmium	0.8	Natural background
cPAH TEQ	0.14	Risk-based concentration protective of seafood consumption
PCBs	0.033[1]	PQL (SCUM II, Appendix D)
Dioxin/furan TEQ	0.000015	Ecology regional background

Note:

1 The maximum PQL identified in SCUM II was selected as the PQL for Total PCBs. This is consistent with the PQLs reported for the historical sediment data that are used in conjunction with newer data to calculate surface-weight average concentrations (SWACs). PQLs for historical data collected by RETEC between 1998 and 2005 ranged from approximately 20 to 40 parts per billion (ppb). These data are presented in Appendix C of the RI/FS.

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Harris Avenue Shipyard

Remedial Investigation/ Feasibility Study

Appendix G.1
Screening Level Development

Attachment G.1
Determination of Sediment Bioaccumulative Contaminants of Concern and Cleanup Screening Levels

Tables

FINAL

Table G.1.1
Exposure Parameters for Calculation of Risk-Based Screening Levels

Parameter Name	Unit	Seafood Consumption Risk	Source	Tribal Adult Net Fishing Direct Contact Risk	Source	Shipyard Worker Direct Contact Risk	Source	Higher Trophic Level Risk	Source
Cancer Risk	unitless	1×10^{-6}	SCUM II	1×10^{-6}	SCUM II	1×10^{-6}	SCUM II	--	--
Hazard Quotient	unitless	1	SCUM II	1	SCUM II	1	SCUM II	--	--
Body Weight	kg	80	SCUM II	80	SCUM II	80	SCUM II	--	--
Averaging Time	days	27,375	SCUM II	27,375	SCUM II	27,375	SCUM II	--	--
Exposure Frequency	days/year	365	SCUM II	119	SCUM II	146 (assumes 50 weeks per year, 7 days per week, 10 hours per day)	Best professional judgment. Site-specific exposure frequency is more conservative than default MTCA Method C exposure frequency.	--	--
Exposure Duration	years	70	SCUM II	70	SCUM II	20	SCUM II	--	--
Fish/Shellfish Consumption Rate	grams/day	Clams and mussels: 44.0 Crab: 26.7 Bottomfish: 8.9	I & J Waterway RI/FS (Anchor QEA 2015) and Whatcom Waterway RI/FS (Anchor Environmental, LLC and Hart Crowser Inc. 2000)	--	--	--	--	--	--
Fish/Shellfish Diet Fraction	proportion	1	SCUM II	--	--	--	--	--	--
Fish/Shellfish Lipid Fraction	gram/gram	Fish: 0.029 Shellfish: 0.026	Haley memo (GeoEngineers 2014)	--	--	--	--	Fish: 0.029 Shellfish: 0.026	Haley memo (GeoEngineers 2014)
Fraction of Organic Carbon in Sediment	gram/gram	0.018	Site-specific data	--	--	--	--	0.018	Site-specific data
Sediment Ingestion Rate	mg/day	--	--	50	SCUM II	50	SCUM II	--	--
Gastrointestinal Absorption Fraction	unitless	--	--	0.6 for dioxins/furans; 1 for all other chemicals	SCUM II; WAC 173-340-745 (Equation 745-5)	0.6 for dioxins/furans; 1 for all other chemicals	SCUM II; WAC 173-340-745 (Equation 745-5)	--	--
Dermal Surface Area	cm^2	--	--	3,160 Based on the head, hands, and forearms of an adult male	SCUM II	3,160 Based on the head, hands, and forearms of an adult male	SCUM II	--	--
Sediment to Skin Adherence Factor	mg/cm^2-day	--	--	0.02 Based on geometric mean value of adult groundskeeper	SCUM II	0.02 Based on geometric mean value of adult groundskeeper	SCUM II	--	--
Dermal Absorption Fraction	unitless	--	--	• 0.01 for inorganic hazardous substances • 0.0005 for VOCs with vapor pressure ≥ benzene • 0.03 for VOCs with vapor pressure < benzene and for mixtures of dioxins/furans • 0.1 for other organic hazardous substances	SCUM II; WAC 173-340-745 (Equation 745-5)	• 0.01 for inorganic hazardous substances • 0.0005 for VOCs with vapor pressure ≥ benzene • 0.03 for VOCs with vapor pressure < benzene and for mixtures of dioxins/furans • 0.1 for other organic hazardous substances	SCUM II; WAC 173-340-745 (Equation 745-5)	--	--
Biota-Sediment Accumulation Factor	gram tissue-lipid normalized (wet weight) / gram sediment-organic carbon normalized (dry weight)	Chemical-specific, refer to Table G.1.2							
Bioaccumulation Factor	g tissue (wet weight) / g sediment (dry weight)	Chemical-specific, refer to Table G.1.2							
Target Fish Tissue Level	mg/kg wet weight	Chemical-specific, refer to Table G.1.2							

Note:
-- Means not applicable for that exposure pathway.

Abbreviations:

cm	Centimeters	SCUM	Sediment Cleanup Users Manual
kg	Kilograms	VOC	Volatile organic compound
mg	Milligrams	WAC	Washington Administrative Code

Table G.1.2
Chemical-Specific Parameters

Analyte	BSAF[1] [g tissue-lipid normalized (ww) / g sediment – OC normalized (dw)]	BAF[1] [kg tissue (ww) / kg sediment (dw)]	RSET Aquatic-dependent wildlife TTL (mg/kg wet weight)	ODEQ Aquatic-dependent wildlife TTL (mg/kg wet weight)	Selected TTL[2] (mg/kg wet weight)
Arsenic	--	Clam: 0.60 Crab: 4.6 Bottomfish: 0.19	2.7	7.6	2.7
Cadmium	--	Clam: 1.5 Crab: 2.7 Bottomfish: 0.03	--	5.6	5.6
Lead	Refer to Tables G.1.3		2	9.3	2
Mercury[3]	--	--	--	--	--
cPAH TEQ	Clam: 0.10 Crab: -- Bottomfish: --	--	--	--	--
Pyrene		--	3.8	9500	3.8
Total PCBs	Clam: 0.49 Crab: 4.8 Bottomfish: 1.2	--	0.04	0.88	0.04
Dioxin/Furan TEQ	Clam: 0.10 Crab: 0.31 Bottomfish: 0.17	--	5.00E-07	5.80E-07	5.00E-07

Note:

-- Not applicable.

1 Derived from *Preliminary Cleanup Objectives for Port Angeles Harbor* prepared for Ecology (NewFields 2013).

2 The lesser of the two available TTLs from RSET and ODEQ was selected for use.

3 In the Whatcom Waterway RI/FS (Anchor and Hart Crowser 2000), a site-specific mercury screening level protective of human and higher trophic level receptors was derived. A simple regression analysis was conducted between paired sediment and tissue data from throughout Bellingham Bay and the greater Puget Sound. This tissue-sediment relationship was used to determine a screening level protective of both human and higher trophic level receptors, 1.2 mg/kg. Because regression analysis was used to derive the mercury screening level, neither a BAF nor TTLs for mercury were required.

Abbreviations:

BAF Bioaccumulation Factor
BSAF Biota Sediment Accumulation Factor
cPAH Carcinogenic polycyclic aromatic hydrocarbon
dw Dry weight
g Gram
kg Kilogram
mg Milligram
OC Organic carbon
PCB Polychlorinated biphenyl
TEQ Toxic equivalent
TTL Target Tissue Level
ww Wet weight

Table G.1.3
Adult Lead Model Parameters and Resulting Screening Level

Variable	Description of Variable	Units	Values	Source
$Pb_{fetal, 0.95}$	95^{th} percentile Pb among fetuses of adult workers	µg/dL	10	ALM Default
$R_{fetal/maternal}$	Fetal/maternal Pb ratio	--	0.9	ALM Default
BKSF	Biokinetic Slope Factor	µg/dL per µg/day	0.4	ALM Default
GSD_i	Geometric standard deviation Pb	--	1.7	USEPA 2016
Pb_0	Adult baseline (geometric mean) blood lead level	µg/dL	0.7	USEPA 2016
IR_S	Sediment ingestion rate	g/day	0.050	SCUM II
AF_S	Sediment gastrointestinal absorption fraction	--	0.12	ALM Default
EF_s	Sediment exposure frequency (Tribal net fishing)	days/yr	119	SCUM II
AT	Averaging time	days/yr	365	SCUM II
IR_f	Mean seafood ingestion rate	g/day	15	Adult Tribal Central Tendency Ingestion Rate (Tulalip), Toy et al. (1996)
AF_f	Seafood gastrointestinal absorption fraction	--	0.12	USEPA 2007. Frequent Questions from Risk Assessors on the Adult Lead Methodology (ALM).
EF_f	Seafood exposure frequency	days/yr	365	SCUM II
Calculated Screening Levels		**mg/kg**	**5.5**	

Abbreviations:

g	Grams
µg/dL	Micrograms per deciliter
mg/kg	Milligrams per kilogram
NHANES	National Health and Nutrition Examination Survey
Pb	Lead
USEPA	U.S. Environmental Protection Agency
yr	Year

Table G.1.4
Proposed Sediment Cleanup Objectives and Frequency of Exceedance

Contaminant of Potential Concern	Units	Risk-Based Levels							Most Conservative Risk-Based Level	Natural Background From USS Bold Survey[2]	PQL[3]	Proposed SCO[4]	Frequency of Exceedance of Harris Avenue Shipyard Data[5]
		Carcinogenic			Non-Carcinogenic								
		Seafood Consumption	Tribal Adult Net Fishing Direct Contact	Shipyard Worker Direct Contact	Seafood Consumption	Tribal Adult Net Fishing Direct Contact	Shipyard Worker Direct Contact	Higher Trophic Level[1]					
Arsenic	mg/kg	0.00038	3.3	9.4	0.16	1,400	1,100	0.59	0.00038	11	0.5	11	54%
Cadmium	mg/kg	--	--	--	0.58	4,600	3,800	2.1	0.58	0.8	0.1	0.8	42%
Lead	mg/kg	--	--	--	5.5[6]	--	--	--[7]	5.5	16	2.0	16	90%
Mercury	mg/kg	--	--	--	1.2[8]	1,400	1,100	1.2[8]	1.2	0.2	0.02	1.2	1.6%
cPAH TEQ	mg/kg	0.014	4.2	12	--	--	--	--	0.014	0.021	0.009	0.021	89%
Pyrene	mg/kg	--	--	--	--[9]	120,000	96,000	14	14	--	0.05	14	0.0%
Total PCBs	mg/kg	0.00018	2.1	6.0	--	--	--	0.0050	0.00018	0.0035[10]	0.033	0.033	64%
Dioxin/Furan TEQ	mg/kg	3.2E-08	6.2E-05	1.8E-04	2.7E-06	5.3E-03	4.3E-03	1.0E-06	3.2E-08	4.0E-06	5.0E-06	5.0E-06	100%

Notes:

-- Not available.

1 The risk-based levels for organic substances were calculated using the higher seafood lipid fraction of 0.029 (for shellfish) to result in the most conservative higher trophic level risk-based level.

2 Natural background value based on the 90/90 upper tolerance limit of Bold Survey data (USEPA 2008) and other suitable background data sets as presented in the Sediment Cleanup Users Manual (SCUM II, Ecology 2017) except for lead. Natural background for lead was presented in the Bellingham Bay Regional Background Sediment Characterization Final Data Evaluation and Summary Report (Ecology 2015) and is specific to Bellingham Bay.

3 PQLs were selected based on the analytical method used in the Harris Avenue Shipyard Data Gaps Investigation and were generally consistent with PQLs identified in Table 11-1 and Appendix D of the Sediment Cleanup Users Manuals II (SCUM II, Ecology 2017).

4 Proposed SCO is the highest of: 1.) lowest of the human health and higher trophic level risk-based levels; 2.) natural background; and 3.) PQL.

5 Surface sediment data (0–12 cm) from within the Study Area was compared against the SCO. If a result was non-detect but the detection limit exceeded the criteria, this result was included as an exceedance. Where frequency of exceedance is greater than 5%, the bioaccumulative is retained for further consideration in the COC screening process.

6 The lead screening level addresses risk posed by sediment and tissue exposure simultaneously. Table G.1.3 presents the Adult Lead Model exposure parameters. See Section 2.1.1.3 in the text for more detail on the derivation of this risk-based level.

7 Calculations could not be completed to derive an higher trophic level risk-based level for lead because an applicable BAF is not readily available. Tissue concentrations discussed in Section 3 will instead be compared against the lead TTL of 2 mg/kg wet weight (protective of aquatic-dependent receptors).

8 In the Whatcom Waterway RI/FS (Anchor and Hart Crowser 2000), a site-specific mercury screening level protective of human and higher trophic levels was derived. A simple regression analysis was conducted between paired sediment and tissue data from throughout Bellingham Bay and the greater Puget Sound. The greatest bioaccumulation of mercury was found in Dungeness Crab. This tissue-sediment relationship was used to determine a screening level protective of both human and higher trophic level receptors, 1.2 mg/kg. Because this relationship is based on data collected from Bellingham Bay, it is appropriate to apply as a human health and higher trophic level risk-based level for mercury in this assessment.

9 Pyrene is known to be more toxic to higher trophic levels than to humans via seafood consumption; therefore human health risk-based levels protective of seafood consumption have not been developed.

10 A natural background for Total PCBs as Aroclors is not calculated due to their infrequent detection in the Bold Survey, nor is it developed for individual PAHs. The natural background presented here is calculated for Total PCB Congeners detected in the Bold Survey.

Abbreviations:

cm Centimeters
COC Contaminant of concern
cPAH Carcinogenic polycyclic aromatic hydrocarbon
Ecology Washington State Department of Ecology
mg/kg Milligrams per kilogram
PCB Polychlorinated biphenyl
PQL Practical Quantitation Limit
SCO Sediment Cleanup Objective
TEQ Toxic equivalent
TTL Target tissue level

Table G.1.5a
Existing Bellingham Bay Shellfish Tissue Data

	Location	DIOXCRABBB-1	BLGMACCM5	BLGMACCM3	BLGMACCM4	BLGMACCM7	BLGMACCM3B	PSDDA2BBB01	PSDDA2BBT11	PSDDA2BBT12	Post Point 1	Post Point 2	Post Point 3	DMMP-BBB01	Bellingham Bay_ DCRAB	Bellingham Bay_ DCRAB
	Sample ID	PSC-C-1	39-8080	39-8082	39-8083	39-8086	39-8215	BBB01A	BBT11A	BBT12A	9710728	9710729	9710730	BBB01_Macoma	12BH-DCHP01	12BH-DCM01
	Tissue Type	Crab	Crab	Crab	Crab	Crab	Crab	Clam	Clam	Clam	Clam	Clam	Clam	Clam	Crab	Crab
	Sample Date	3/11/1991	9/5/1990	8/21/1990	8/20/1990	9/5/1990	12/14/1990	4/20/1989	4/20/1989	4/19/1989	1992	1992	1992	7/20/2007	2011	2011
Analyte	**Units**															
Metals																
Arsenic	mg/kg	--	5.11	2.74	1.86	2.85	1.11	0.96 J	1.5	1.1	2.4	2.6	2.3	--	7.4	6.3
Cadmium	mg/kg	--	0.01 U	0.003	0.003	0.005	0.22	0.34	0.58	0.29	0.24	0.27	0.24	--	0.098	0.0024 J
Lead	mg/kg	--	0.05	0.16	0.11	0.29	0.02	0.02	1.6	0.58	0.087	0.094	0.089	--	0.046	0.004 U
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)																
Benz[a]anthracene	µg/kg	--	--	--	--		94 U	100 U	58 U	--	4.4 U	4.4 U	4.4 U	--	0.48 U	0.36 U
Benzo(a)pyrene	µg/kg	--	--	--	--		94 U	100 U	58 U	--	22 U	22 U	22 U	--	0.49 U	0.38 U
Benzo(b)fluoranthene	µg/kg	--	--	--	--		94 U	100 U	58 U	--	22 U	22 U	22 U	--	0.55 U	0.42 U
Benzo(k)fluoranthene	µg/kg	--	--	--	--		94 U	100 U	58 U	--	22 U	22 U	22 U	--	0.55 U	0.42 U
Chrysene	µg/kg	--	--	--	--		94 U	100 U	58 U	--	4.4 U	4.4 U	4.4 U	--	0.55 U	0.42 U
Dibenzo(a,h)anthracene	µg/kg	--	--	--	--		240 U	100 U	58 U	--	22 U	22 U	22 U	--	0.41 U	0.31 U
Indeno(1,2,3-cd)pyrene	µg/kg	--	--	--	--		94 U	100 U	58 U	--	22 U	22 U	22 U	--	0.49 U	0.37 U
Summed cPAH TEQ[1,2]	µg/kg	--	--	--	--		0 U	0 U	0 U	--	0 U	0 U	0 U	--	0 U	0 U
Summed cPAH TEQ with One-half of the Detection Limit[1,3]	µg/kg	--	--	--	--		78.3 U	75.5 U	43.8 U	--	15.6 U	15.6 U	15.6 U	--	0.4 U	0.3 U
Polychlorinated Biphenyls (PCBs)																
PCB Aroclor 1016	µg/kg	--	20 U	20 U	20 U	20 U	19 U	--	--	--	8 U	8 U	8 U	--	--	--
PCB Aroclor 1221	µg/kg	--	20 U	20 U	20 U	20 U	19 U	--	--	--	8 U	8 U	8 U	--	--	--
PCB Aroclor 1232	µg/kg	--	20 U	20 U	20 U	20 U	19 U	--	--	--	8 U	8 U	8 U	--	--	--
PCB Aroclor 1242	µg/kg	--	20 U	20 U	20 U	20 U	19 U	--	--	--	8 U	8 U	8 U	--	--	--
PCB Aroclor 1248	µg/kg	--	20 U	20 U	20 U	20 U	19 U	--	--	--	8 U	8 U	8 U	--	--	--
PCB Aroclor 1254	µg/kg	--	20 U	20 U	20 U	20 U	19 U	--	--	--	8 U	8 U	8 U	--	--	--
PCB Aroclor 1260	µg/kg	--	20 U	20 U	20 U	20 U	19 U	--	--	--	8 U	8 U	8 U	--	--	--
Total PCBs	µg/kg	--	20 U	20 U	20 U	20 U	19 U	--	--	--	8 U	8 U	8 U	--	--	--
Dioxins/Furans																
2,3,7,8-TCDD	ng/kg	1.8	--	--	--		--	--	--	--	--	--	--	0.0197 U	--	--
1,2,3,7,8-PeCDD	ng/kg	--	--	--	--		--	--	--	--	--	--	--	0.0508 U	--	--
1,2,3,4,7,8-HxCDD	ng/kg	3.2	--	--	--		--	--	--	--	--	--	--	0.0782 U	--	--
1,2,3,6,7,8-HxCDD	ng/kg	12	--	--	--		--	--	--	--	--	--	--	0.132 J	--	--
1,2,3,7,8,9-HxCDD	ng/kg	3.2	--	--	--		--	--	--	--	--	--	--	0.091 J	--	--
1,2,3,4,6,7,8-HpCDD	ng/kg	--	--	--	--		--	--	--	--	--	--	--	1.6	--	--
OCDD	ng/kg	38	--	--	--		--	--	--	--	--	--	--	10.4	--	--
2,3,7,8-TCDF	ng/kg	46	--	--	--		--	--	--	--	--	--	--	0.328	--	--
1,2,3,7,8-PeCDF	ng/kg	3.6	--	--	--		--	--	--	--	--	--	--	0.0375 U	--	--
2,3,4,7,8-PeCDF	ng/kg	3.1	--	--	--		--	--	--	--	--	--	--	0.05 J	--	--
1,2,3,4,7,8-HxCDF	ng/kg	0	--	--	--		--	--	--	--	--	--	--	0.0293 U	--	--
1,2,3,6,7,8-HxCDF	ng/kg	0.83	--	--	--		--	--	--	--	--	--	--	0.0336 U	--	--
1,2,3,7,8,9-HxCDF	ng/kg	0.8 U	--	--	--		--	--	--	--	--	--	--	0.0364 U	--	--
2,3,4,6,7,8-HxCDF	ng/kg	1	--	--	--		--	--	--	--	--	--	--	0.0301 U	--	--
1,2,3,4,6,7,8-HpCDF	ng/kg	--	--	--	--		--	--	--	--	--	--	--	0.3 J	--	--
1,2,3,4,7,8,9-HpCDF	ng/kg	1 U	--	--	--		--	--	--	--	--	--	--	0.0418 U	--	--
OCDF	ng/kg	6.4	--	--	--		--	--	--	--	--	--	--	1 J	--	--
Dioxin/Furan TEQ[4,5]	ng/kg	9.47	--	--	--		--	--	--	--	--	--	--	0.0925	--	--
Dioxin/Furan TEQ with One-half of the Detection Limit[4,6]	ng/kg	9.52	--	--	--		--	--	--	--	--	--	--	0.139	--	--

Notes:

-- Not available.

1 Calculation of cPAH TEQ concentrations was performed using the California Environmental Protection Agency 2005 Toxic Equivalency Factors as presented in Table 708-2 of WAC 173-340-900 (Ecology 2007).

2 Calculated using detected cPAH concentrations.

3 Calculated using detected cPAH concentrations plus one-half the reporting limit for cPAHs that were not detected.

4 World Health Organization 2005 Toxic Equivalency Factors used for calculation of dioxin/furan TEQ (Van den Berg et al. 2006).

5 Calculated using detected dioxin/furan concentrations.

6 Calculated using detected dioxin/furan concentrations plus one-half the detection limit for dioxins/furans that were not detected.

Abbreviations:

cPAH Carcinogenic polycyclic aromatic hydrocarbon
HpCDD Heptachlorodibenzo-p-dioxin
HpCDF Heptachlorodibenzofuran
HxCDD Hexachlorodibenzo-p-dioxin
µg/L Micrograms per liter
mg/kg Milligrams per kilogram
ng/kg Nanograms per kilogram
OCDD Octachlorodibenzodioxin
OCDF Octachlorodibenzofuran
PeCDD Pentachlorodibenzo-p-dioxin
PeCDF Pentachlorodibenzofuran
TCDD Tetrachlorodibenzo-p-dioxin
TCDF Tetrachlorodibenzofuran
TEQ Toxic equivalent
WAC Washington Administrative Code

Qualifiers:

J Estimated value.
U Not detected.

Table G.1.5b
Existing Bellingham Bay Finfish Tissue Data

	Location	DMMP-BBTIS	DMMP-BBTIS	DMMP-BBTIS	DMMP-BBTIS	BHMH-ESOLE	BHMH-ESOLE	BHMH-ESOLE	BHMH-ESOLE	BHMH-ESOLE	BHMH-ESOLE	BHMH-ESOLE	BHMH-ESOLE
	Sample ID	BB_EnglishSole_Rep1_Comp	BB_StarryFlounder_Rep1_Comp	BB_StarryFlounder_Rep2_Comp	BB_StarryFlounder_Rep3 _Comp	SOLE1	SOLE2	SOLE3	SL1_3	SM1	SM2	SM3	SL1
	Tissue Type	English Sole	Starry Flounder	Starry Flounder	Starry Flounder	Sole Muscle	Sole Muscle	Sole Muscle	Sole Liver	Sole Muscle	Sole Muscle	Sole Muscle	Sole Liver
	Sample Date	7/24/2007	7/24/2007	7/24/2007	7/24/2007	1989	1989	1989	1991	1991	1991	1991	1992
Analyte	**Units**												
Metal													
Arsenic	mg/kg	--	--	--	--	5.4	1.8	4.2	--	3.6	2.9	3.4	3
Cadmium	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--
Lea	mg/kg	--	--	--	--	0.04 U	0.04 U	0.04 U		0.03	0.03 U	0.03	0.7
Carcinogenic Polycyclic Aromatic													
Benzo(a)anthracene	µg/kg	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	µg/kg	--	--	--	--	17 U	22 U	14 U	--	3.6 U	4.2 U	4.2 U	--
Benzo(b)fluoranthene	µg/kg	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	µg/kg	--	--	--	--	--	--	--	--	--	--	--	--
Chrysene	µg/kg	--	--	--	--	--	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	µg/kg	--	--	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	µg/kg	--	--	--	--	--	--	--	--	--	--	--	--
Summed cPAH TEQ[1,2]	µg/kg	--	--	--	--	--	--	--	--	--	--	--	--
Summed cPAH TEQ with One-half of the Detection Limit[1,3]	µg/kg	--	--	--	--	--	--	--	--	--	--	--	--
Polychlorinated Biphenyls (PCBs)													
PCB Aroclor 1016	µg/kg	--	--	--	--	--	--	--	160 U	18 U	21 U	21 U	--
PCB Aroclor 1221	µg/kg	--	--	--	--	--	--	--	160 U	18 U	21 U	21 U	--
PCB Aroclor 1232	µg/kg	--	--	--	--	--	--	--	160 U	18 U	21 U	21 U	--
PCB Aroclor 1242	µg/kg	--	--	--	--	--	--	--	160 U	11 U	13 U	13 U	--
PCB Aroclor 1248	µg/kg	--	--	--	--	--	--	--	160 U	2.3 U	2.7 U	2.7 U	--
PCB Aroclor 1254	µg/kg	--	--	--	--	--	--	--	160 U	2.3 U	2.7 U	2.7 U	--
PCB Aroclor 1260	µg/kg	--	--	--	--	--	--	--	78	2.3 U	2.7 U	2.7 U	--
Total PCBs	µg/kg	--	--	--	--	--	--	--	78	18 U	21 U	21 U	--
Dioxins/Furans													
2,3,7,8-TCDD	ng/kg	0.0199 U	0.0198 U	0.0199 U	0.0199 U	--	--	--	--	--	--	--	--
1,2,3,7,8-PeCDD	ng/kg	0.13 J	0.0515 U	0.0517 U	0.0518 U	--	--	--	--	--	--	--	--
1,2,3,4,7,8-HxCDD	ng/kg	0.0795 U	0.0792 U	0.0795 U	0.0797 U	--	--	--	--	--	--	--	--
1,2,3,6,7,8-HxCDD	ng/kg	0.245 J	0.143 J	0.0493 U	0.129 J	--	--	--	--	--	--	--	--
1,2,3,7,8,9-HxCDD	ng/kg	0.055 J	0.0352 U	0.0354 U	0.0355 U	--	--	--	--	--	--	--	--
1,2,3,4,6,7,8-HpCDD	ng/kg	0.287 J	0.231 J	0.154 J	0.197 J	--	--	--	--	--	--	--	--
OCDD	ng/kg	1.15	0.946 J	0.822 J	0.823 J	--	--	--	--	--	--	--	--
2,3,7,8-TCDF	ng/kg	0.973	0.548	0.213	0.0199 U	--	--	--	--	--	--	--	--
1,2,3,7,8-PeCDF	ng/kg	0.04 J	0.038 U	0.0382 U	0.0383 U	--	--	--	--	--	--	--	--
2,3,4,7,8-PeCDF	ng/kg	0.0406 U	0.066 J	0.0405 U	0.0407 U	--	--	--	--	--	--	--	--
1,2,3,4,7,8-HxCDF	ng/kg	0.043 J	0.0297 U	0.0298 U	0.0299 U	--	--	--	--	--	--	--	--
1,2,3,6,7,8-HxCDF	ng/kg	0.0342 U	0.0341 U	0.0342 U	0.0343 U	--	--	--	--	--	--	--	--
1,2,3,7,8,9-HxCDF	ng/kg	0.037 U	0.0368 U	0.037 U	0.0371 U	--	--	--	--	--	--	--	--
2,3,4,6,7,8-HxCDF	ng/kg	0.0306 U	0.0305 U	0.0306 U	0.0307 U	--	--	--	--	--	--	--	--
1,2,3,4,6,7,8-HpCDF	ng/kg	0.0509 U	0.0507 U	0.0509 U	0.051 U	--	--	--	--	--	--	--	--
1,2,3,4,7,8,9-HpCDF	ng/kg	0.0425 U	0.0424 U	0.0425 U	0.0427 U	--	--	--	--	--	--	--	--
OCDF	ng/kg	0.127 J	0.12 J	0.0393 U	0.09 J	--	--	--	--	--	--	--	--
Dioxin/Furan TEQ[4,5]		0.0511	0.098	0.115	0.113	--	--	--	--	--	--	--	--
Dioxin/Furan TEQ with One-half of the Detection Limit[4,6]		0.184	0.144	0.127	0.120	--	--	--	--	--	--	--	--

Notes:

-- Not available.

1 Calculation of cPAH TEQ concentrations was performed using the California Environmental Protection Agency 2005 Toxic Equivalency Factors as presented in Table 708-2 of WAC 173-340-900 (Ecology 2007).

2 Calculated using detected cPAH concentrations.

3 Calculated using detected cPAH concentrations plus one-half the reporting limit for cPAHs that were not detected.

4 World Health Organization 2005 Toxic Equivalency Factors used for calculation of dioxin/furan TEQ (Van den Berg et al. 2006).

5 Calculated using detected dioxin/furan concentrations.

6 Calculated using detected dioxin/furan concentrations plus one-half the detection limit for dioxins/furans that were not detected.

Abbreviations:

cPAH Carcinogenic polycyclic aromatic hydrocarbon
HpCDD Heptachlorodibenzo-p-dioxin
HpCDF Heptachlorodibenzofuran
HxCDD Hexachlorodibenzo-p-dioxin
µg/L Micrograms per liter
mg/kg Milligrams per kilogram
ng/kg Nanograms per kilogram
OCDD Octachlorodibenzodioxin
OCDF Octachlorodibenzofuran
PeCDD Pentachlorodibenzo-p-dioxin
PeCDF Pentachlorodibenzofuran
TCDD Tetrachlorodibenzo-p-dioxin
TCDF Tetrachlorodibenzofuran
TEQ Toxic equivalent
WAC Washington Administrative Code

Qualifiers:

J Estimated value.
U Not detected.

Table G.1.5b
Existing Bellingham Bay Finfish Tissue Data

	Location	BHMH-ESOLE	BHMH-ESOLE	BHMH-ESOLE	BHMH-ESOLE	BHMH-ESOLE	BHMH-ESOLE	BHMH-ESOLE	BHMH-ESOLE	BHMH-ESOLE	BHMH-ESOLE	POST-ESOLE	POST-ESOLE	POST-STFL	POST-STFL	POST-STFL
	Sample ID	SL1_3	SL2	SL3	SM1A	SM2A	SM3A	SL1_3	SM1	SM2	SM3	SL1	SL2	SFL1	SFL2	SFL3
	Tissue Type	Sole Liver	Sole Liver	Sole Liver	Sole Muscle	Sole Muscle	Sole Muscle	Sole Liver	Sole Muscle	Sole Muscle	Sole Muscle	Sole Liver	Sole Liver	Flounder Liver	Flounder Liver	Flounder Liver
	Sample Date	1992	1992	1992	1992	1992	1992	1993	1993	1993	1993	1997	1997	1997	1997	1997
Analyte	**Units**															
Metal																
Arsenic	mg/kg	--	2	2	3.9	2.9	2.9	4.3	4.3	3.5	3.3	--	--	--	5.4	4.6
Cadmium	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lea	mg/kg	--	0.7	0.8	0.03 U	0.03 U	0.03 U	1.2	0.03 U	0.03 U	0.03 U	--	--	--	0.22	0.25
Carcinogenic Polycyclic Aromatic																
Benzo(a)anthracene	µg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	µg/kg	240 U	--	--	3.6 U	3.6 U	3.6 U	85 U	3.6 U	3.6 U	3.6 U	--	--	--	--	--
Benzo(b)fluoranthene	µg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	µg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chrysene	µg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	µg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	µg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Summed cPAH TEQ[1,2]	µg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Summed cPAH TEQ with One-half of the Detection Limit[1,3]	µg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Polychlorinated Biphenyls (PCBs)																
PCB Aroclor 1016	µg/kg	20 U	--	--	20 U	20 U	20 U	80 U	20 U	20 U	20 U	130 U	91 U	51 U	54 U	54 U
PCB Aroclor 1221	µg/kg	20 U	--	--	20 U	20 U	20 U	80 U	20 U	20 U	20 U	130 U	91 U	51 U	54 U	54 U
PCB Aroclor 1232	µg/kg	20 U	--	--	20 U	20 U	20 U	50 U	20 U	20 U	20 U	130 U	91 U	51 U	54 U	54 U
PCB Aroclor 1242	µg/kg	20 U	--	--	10 U	10 U	10 U	50 U	10 U	10 U	10 U	130 U	91 U	51 U	54 U	54 U
PCB Aroclor 1248	µg/kg	20 U	--	--	2 U	2 U	2 U	50 U	2 U	2 U	2 U	27 U	18 U	11 U	54 U	54 U
PCB Aroclor 1254	µg/kg	20 U	--	--	2 U	2 U	2 U	50 U	2 U	2 U	2 U	--	--	--	--	--
PCB Aroclor 1260	µg/kg	46	--	--	2 U	2 U	2 U	71	2	2	2.9	--	--	--	--	--
Total PCBs	µg/kg	46	--	--	20 U	20 U	20 U	71	2	2	2.9	130 U	91 U	51 U	54 U	54 U
Dioxins/Furans																
2,3,7,8-TCDD	ng/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8-PeCDD	ng/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8-HxCDD	ng/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,6,7,8-HxCDD	ng/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8,9-HxCDD	ng/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,6,7,8-HpCDD	ng/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
OCDD	ng/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,3,7,8-TCDF	ng/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8-PeCDF	ng/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,3,4,7,8-PeCDF	ng/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8-HxCDF	ng/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,6,7,8-HxCDF	ng/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8,9-HxCDF	ng/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,3,4,6,7,8-HxCDF	ng/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,6,7,8-HpCDF	ng/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8,9-HpCDF	ng/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
OCDF	ng/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dioxin/Furan TEQ[4,5]		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dioxin/Furan TEQ with One-half of the Detection Limit[4,6]		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:

-- Not available.

1 Calculation of cPAH TEQ concentrations was performed using the California Environmental Protection Agency 2005 Toxic Equivalency Factors as presented in Table 708-2 of WAC 173-340-900 (Ecology 2007).

2 Calculated using detected cPAH concentrations.

3 Calculated using detected cPAH concentrations plus one-half the reporting limit for cPAHs that were not detected.

4 World Health Organization 2005 Toxic Equivalency Factors used for calculation of dioxin/furan TEQ (Van den Berg et al. 2006).

5 Calculated using detected dioxin/furan concentrations.

6 Calculated using detected dioxin/furan concentrations plus one-half the detection limit for dioxins/furans that were not detected.

Abbreviations:

cPAH Carcinogenic polycyclic aromatic hydrocarbon
HpCDD Heptachlorodibenzo-p-dioxin
HpCDF Heptachlorodibenzofuran
HxCDD Hexachlorodibenzo-p-dioxin
µg/L Micrograms per liter
mg/kg Milligrams per kilogram
ng/kg Nanograms per kilogram
OCDD Octachlorodibenzodioxin
OCDF Octachlorodibenzofuran
PeCDD Pentachlorodibenzo-p-dioxin
PeCDF Pentachlorodibenzofuran
TCDD Tetrachlorodibenzo-p-dioxin
TCDF Tetrachlorodibenzofuran
TEQ Toxic equivalent
WAC Washington Administrative Code

Qualifiers:

J Estimated value.
U Not detected.

Table G.1.6
Human Health Risk Results

Contaminant of Potential Concern	Cancer Chronic Daily Intake (mg/kg-day)	Excess Cancer Risk	Non-Cancer Chronic Daily Intake (mg/kg-day)	Hazard Quotient
Arsenic	4.8E-03	**1.E-02**	5.1E-03	**24**
Cadmium	--	--	5.1E-04	0.5
Total PCBs	3.0E-07	**2.E-02**	--	--
Dioxin/Furan TEQ	7.9E-09	**1.E-03**	8.4E-09	**12**

Notes:

BOLD Signifies a lifetime carcinogenic risk greater than 10^{-6} or HI greater than 1.

-- Not applicable or data not available

Abbreviations:

mg/kg Milligrams per kilogram

PCB Polychlorinated biphenyl

TEQ Toxic equivalent

Table G.1.7
Adult Lead Model Risk Results

Variable	Description of Variable	Units	Value	Source
Pb_s	Mean Harris Avenue Shipyard sediment lead concentration	mg/kg	67.9	Mean calculated using all surface sediment (0- to 12-cm) lead site data
Pb_f	Mean seafood tissue lead concentration (non-detects = 1/2 detection limit).	mg/kg	0.25	Table G.1.5.1
FI	Fractional intake	--	1	ALM Default
$R_{fetal/maternal}$	Fetal/maternal Pb ratio	--	0.9	ALM Default
BKSF	Biokinetic Slope Factor	µg/dL per µg/day	0.4	ALM Default
GSD_i	Geometric standard deviation Pb	--	1.7	USEPA 2016
Pb_0	Adult baseline (geometric mean) blood lead level	µg/dL	0.7	USEPA 2016
IR_S	Sediment ingestion rate	g/day	0.05	SCUM II
Ir_f	Mean seafood ingestion rate	g/day	15.0	Adult Tribal Central Tendency Ingestion Rate (Tulalip), Toy et al. (1996)
AF_S	Sediment gastrointestinal absorption fraction	--	0.12	ALM Default
AF_f	Seafood gastrointestinal absorption fraction	--	0.12	USEPA 2007
EF_S	Sediment exposure frequency (Tribal net fishing)	days/yr	119	SCUM II
Ef_f	Seafood exposure frequency	days/yr	365	SCUM II
AT	Averaging time	days/yr	365	SCUM II
Pb_{adult}	**Geometric mean blood lead level in exposed adults**	**µg/dL**	**0.9**	
$Pb_{fetal, 0.95}$	95th percentile Pb among fetuses of adult workers	µg/dL	2.0	
Pb_t	Target Pb level of concern	µg/dL	10.0	
$P(Pb_{fetal} > Pb_t)$	**Probability that fetal Pb > Pb_t, assuming lognormal distribution**	**%**	**0.00015%**	

Abbreviations:

g	Grams
µg/dL	Micrograms per deciliter
mg/kg	Milligrams per kilogram
NHANES	National Health and Nutrition Examination Survey
Pb	Lead
USEPA	U.S. Environmental Protection Agency
yr	Year

Table G.1.8
Bioaccumulative Contaminants of Concern and Proposed Sediment Cleanup Screening Levels

Contaminant of Concern	Units	Proposed Bellingham Bay Site-Specific Regional Background	Ecology Regional Background	Risk-Based Levels			PQL[3]	Proposed Sediment Cleanup Screening Level[5]
				Seafood Consumption Carcinogenic (at 10-5 risk level)	Seafood Consumption Non-Carcinogenic	Lowest of the Human Health Risk-Based Levels		
Arsenic	mg/kg	13	--[1]	0.0038	0.16	0.0038	0.5	13
Cadmium	mg/kg	0.8	--[1]	--	0.58	0.58	0.1	0.8
cPAH TEQ	mg/kg	--	0.086	0.14	--	0.14	0.009	0.14
Total PCBs	mg/kg	--	0.011[2]	0.0018	--	0.0018	0.033[4]	0.033
Dioxin/Furan TEQ	mg/kg	--	1.50E-05	3.2E-07	2.7E-06	3.2E-07	5.0E-06	1.5E-05

Notes:

-- Not applicable

1 Regional background values for arsenic and cadmium were not developed by Ecology because "they did not appear elevated in the bay outside of clearly contaminated areas within sites" (Ecology 2015), therefore an estimated site-specific regional background was calculated. The resulting cadmium regional background was consistent with the natural background, however. Therefore cadmium regional background defaults to the natural background value of 0.8 mg/kg.

2 A regional background value for Total PCBs was not developed by Ecology; only a regional background for PCB TEQ was developed (Ecology 2015). However, a regional background value for Total PCBs was able to be calculated using the PCB congener data collected by Ecology.

3 PQLs were selected based on the analytical method used in the Harris Avenue Shipyard Data Gaps Investigation and were similar to PQLs identified in Table 11-1 and Appendix D of the Sediment Cleanup Users Manuals II (SCUM II, Ecology 2017).

4 The maximum PQL identified in SCUM II was selected as the PQL for Total PCBs. This is consistent with the PQLs reported for the historical sediment data that are used in conjunction with newer data to calculate SWACs. PQLs for historical data collected by RETEC between 1998 and 2005 ranged from approximately 20 ppb to 40 ppb. These data are presented in Appendix C of the RI/FS.

5 Proposed Sediment Cleanup Screening Level is the highest of: 1) lowest of the human health and higher trophic level risk-based levels; 2) regional background; and 3) PQL.

Abbreviations:

COC	Contaminant of concern
cPAH	Carcinogenic polycyclic aromatic hydrocarbon
Ecology	Washington State Department of Ecology
mg/kg	Milligrams per kilogram
PCB	Polychlorinated biphenyl
PQL	Practical Quantitation Limit
TEQ	Toxic equivalent

Table G.1.9
Sediment Studies used to Derive Site-Specific Regional Background Values

EIM Study Abbreviation	EIM ID	Year	Study Name (Linked to Further Information)	Study Purpose (from EIM)	Study QA Assessment Level
1985 Puget Sound Eight-Bay Survey.	EIGHTBAY	1983–1984	Puget Sound Eight-Bay Survey	Sediment toxicity assessment.	Level 5 - Data Verified and Assessed for Usability in a Peer-Reviewed Study Report
Columbia Cement Proposed Maint. Dredging.	COLUMBIA	1986	Columbia Cement Proposed Maintenance Dredging	Sediment toxicity assessment	Level 4 - Data Verified and Assessed for Usability in a Formal Study Report
NPDES Georgia Pacific - Bellingham.	GAPAC_C2	1988	NPDES Report Georgia Pacific - Bellingham	Monitoring for NPDES permit requirements	QA1 - For sediment investigations conducted under Sediment Management Standards and sediment dredging projects
Harris Avenue Shipyard Supplemental Historical Data, CS193, Bellingham, WA.	HARISHST	1988–1998	Harris Avenue Shipyard RI/FS Data Report: Historical Data	Supplement existing EIM historical data to provide a more complete record of investigation on site.	Level 1 - Data neither Verified nor Assessed for Usability
PSDDA Phase 2 Survey of Disposal Sites.	PSDDA2	1989	Puget Sound Dredged Disposal Analysis Baseline Survey of Phase II Disposal Sites	PSDDA Baseline Survey of Phase II Disposal Sites, PTI for Ecology June 1989. 445 samples were collected from disposal sites in north Puget Sound in Bellingham Bay and in the south sound between Anderson Island and Ketron Islands.	QA2 - More rigorous QA for sediment investigations used to develop sediment AET values and Sediment Management Standards numerical chemical criteria
The Puget Sound Assessment and Monitoring Program Long-Term Temporal Monitoring 1989–Present.	PSAMP	1989-Present	Puget Sound Assessment and Monitoring Program (PSAMP) Long-Term Temporal Monitoring	In 1986, the Puget Sound Water Quality Authority appointed the Monitoring Management Committee to develop a comprehensive monitoring program for Puget Sound. The result was the Puget Sound Ambient Monitoring Program (currently PSAMP).	Level 4 - Data Verified and Assessed for Usability in a Formal Study Report
Aq. Lands Sediment Qual. Reconnaissance 1991.	DNRREC91	1991	Washington Department of Natural Resources (DNR) Aquatic Lands Sediment Quality Reconnaissance	Sediment toxicity assessment.	Level 4 - Data Verified and Assessed for Usability in a Formal Study Report
Metals Results from Bellingham Bay.	BLGMMETL	1993	PSAMP Metals Results - 1993	Sediment toxicity assessment.	Level 5 - Data Verified and Assessed for Usability in a Peer-Reviewed Study Report
Georgia-Pacific Corp. Bellingham Class 2.	GPBLGMC2	1993	Georgia-Pacific Corporation (Bellingham) April 1993, Class II Inspection	Monitoring for NPDES permit requirements.	QA1 - For sediment investigations conducted under Sediment Management Standards and sediment dredging projects
GP Baseline Sed. Character., '93 NPDES.	GPBASE93	1993	Georgia Pacific Baseline Sediment Characterization Study 1993	Source control - identifying and managing sources of contamination	Level 5 - Data Verified and Assessed for Usability in a Peer-Reviewed Study Report
Whatcom Waterway 1996 RI Report.	WHATRI96	1996–1997	Whatcom Waterway Remedial Investigation Report 1996	Contaminated site investigation (characterization, includes RI/FS and remedial design)	Level 5 - Data Verified and Assessed for Usability in a Peer-Reviewed Study Report
A Cooperative Agreement with the Puget Sound Assessment and Monitoring Program and the National Oceanic and Atmospheric Administration(NOAA) National Status and Trends (NS&T) Program to jointly examine measures of sediment quality throughout Puget Sound.	PSAMPNOA	1997–1999	PSAMP-National Oceanic and Atmospheric Administration Cooperative Agreement	In 1997, Ecology entered into a Cooperative Agreement with the National Oceanic and Atmospheric Administration (NOAA) National Status and Trends (NS&T) Program, to jointly examine measures of sediment quality throughout Puget Sound. This 3-year monitoring effort consisted of focused studies, with 100 stations being sampled annually in north, central, and south Puget Sound using a stratified random sampling approach.	Level 5 - Data Verified and Assessed for Usability in a Peer-Reviewed Study Report
Starr Rock Surface Sed Investigation.	STARR98	1998	Supplementary Investigation of Surface Sediments, Boulevard Park/Starr Rock Area, Bellingham, Washington	Contaminated site investigation (characterization, includes RI/FS and remedial design).	Level 5 - Data Verified and Assessed for Usability in a Peer-Reviewed Study Report
Squalicum Outer Harbor.	SQUAL02	2002	Outer Squalicum Harbor Environmental Monitoring Study	Monitoring study.	Level 4 - Data Verified and Assessed for Usability in a Formal Study Report
Urban Waters Initiative, Sediment Quality in Bellingham Bay.	UWI2010	2010	Urban Waters Study 2010, Bellingham Bay, Washington	The purpose of the 2010 Urban Waters Initiative was to gauge the long-term effectiveness of collective toxics management efforts in Bellingham Bay, Washington. The objectives were to assess the current conditions in the Study Area, particularly the overall extent of sediment contamination, and to determine whether there had been changes in sediment quality over time.	Level 5 - Data Verified and Assessed for Usability in a Peer-Reviewed Study Report

Abbreviations:

AET	Apparent Effects Threshold	NPDES	National Pollutant Discharge Elimination System
As	Arsenic	PCB	Polychlorinated biphenyl
Cd	Cadmium	PSDDA	Puget Sound Dredged Disposal Analysis
cPAH	Carcinogenic polycyclic aromatic hydrocarbon	QA	Quality Assessment
Ecology	Washington State Department of Ecology	RI/FS	Remedial Investigation/Feasibility Study
EIM	Environmental Information Management	WAC	Washington Administrative Code

Harris Avenue Shipyard

Remedial Investigation/ Feasibility Study

Appendix G.1
Screening Level Development

Attachment G.1
Determination of Sediment Bioaccumulative Contaminants of Concern and Cleanup Screening Levels

Figures

FINAL

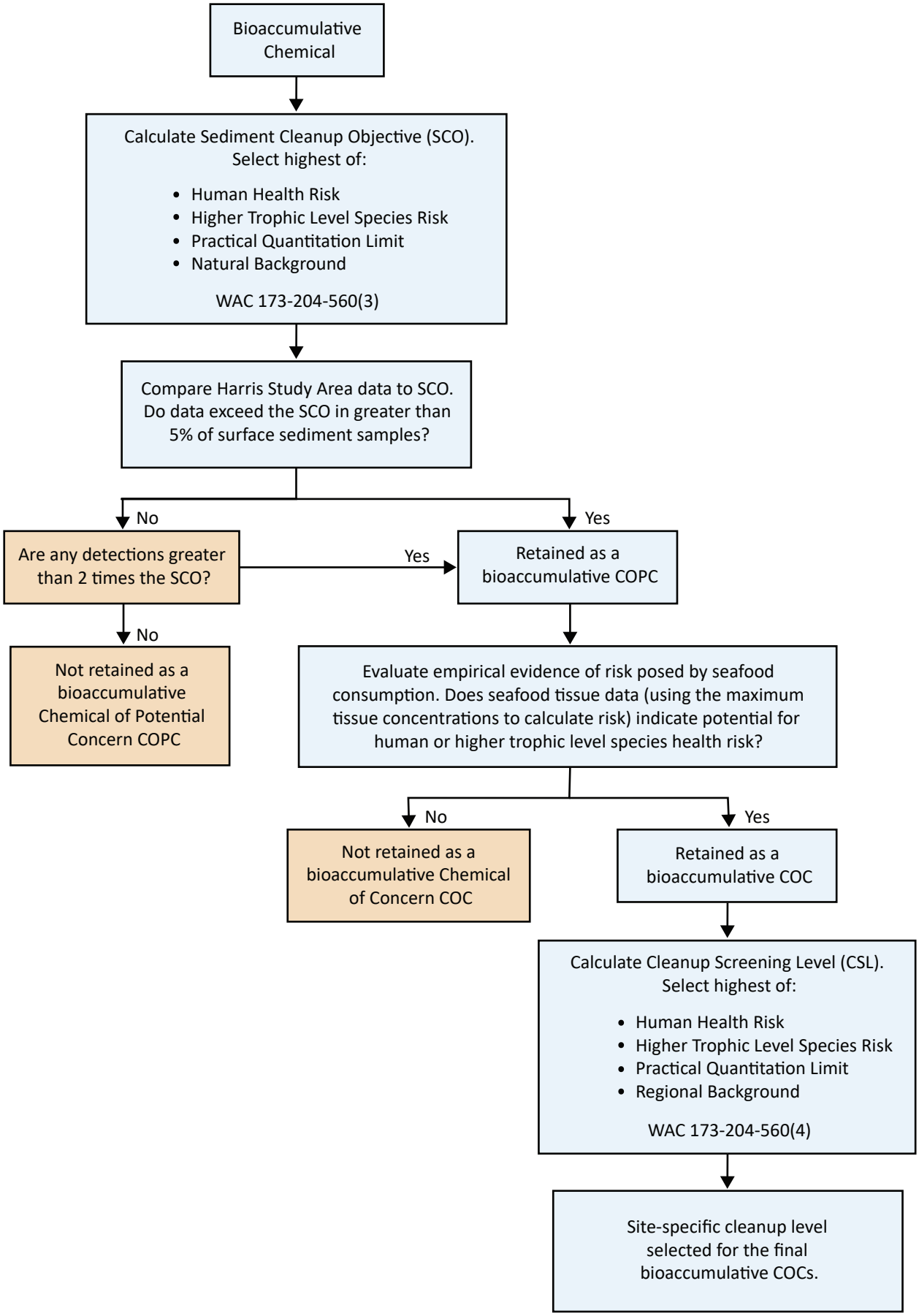

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Figure G.1.1
Bioaccumulative COC Screening Process Flowchart

12/12/2018

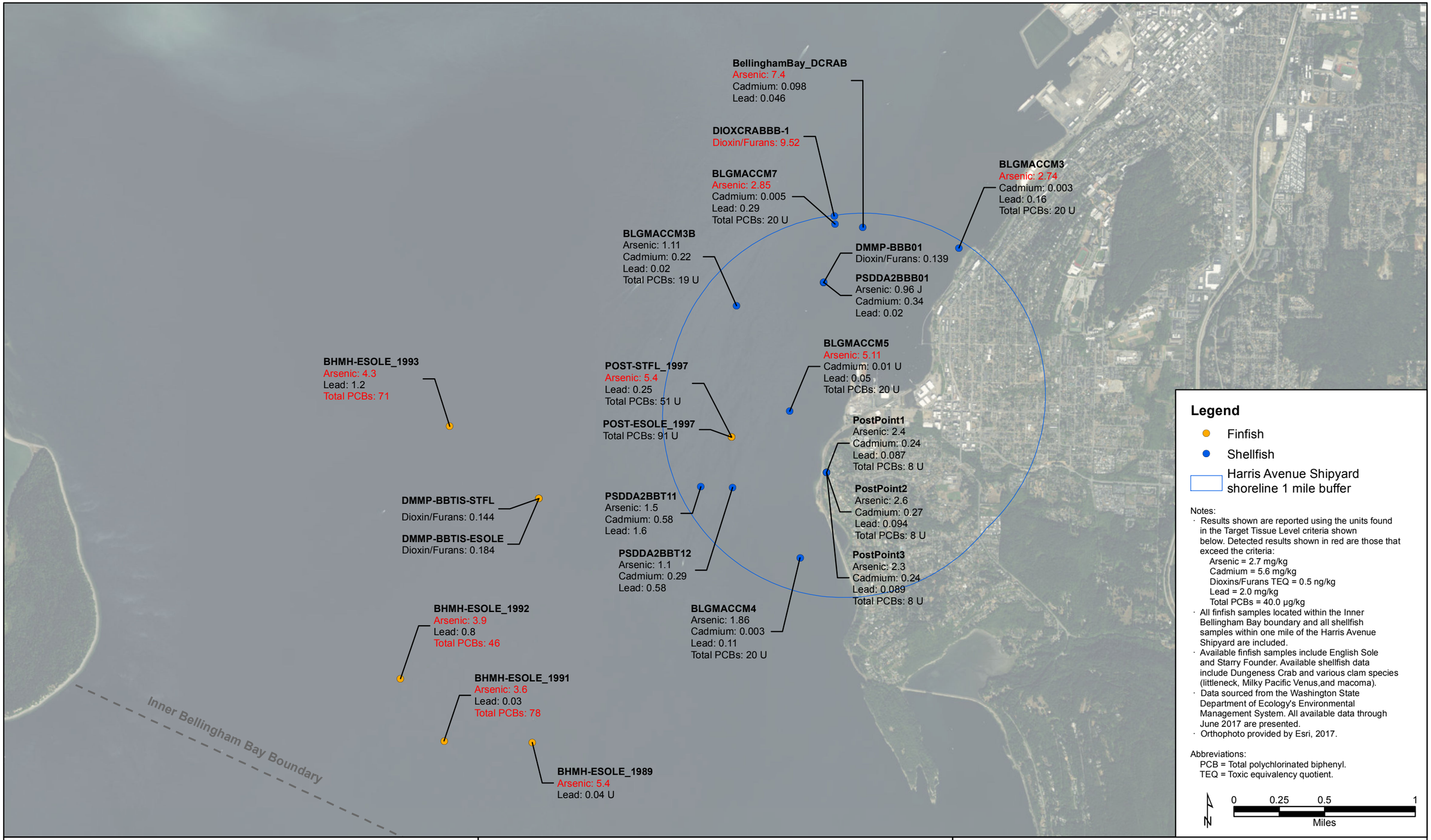

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Figure G.1.2
Seafood Tissue Data Available in Bellingham Bay

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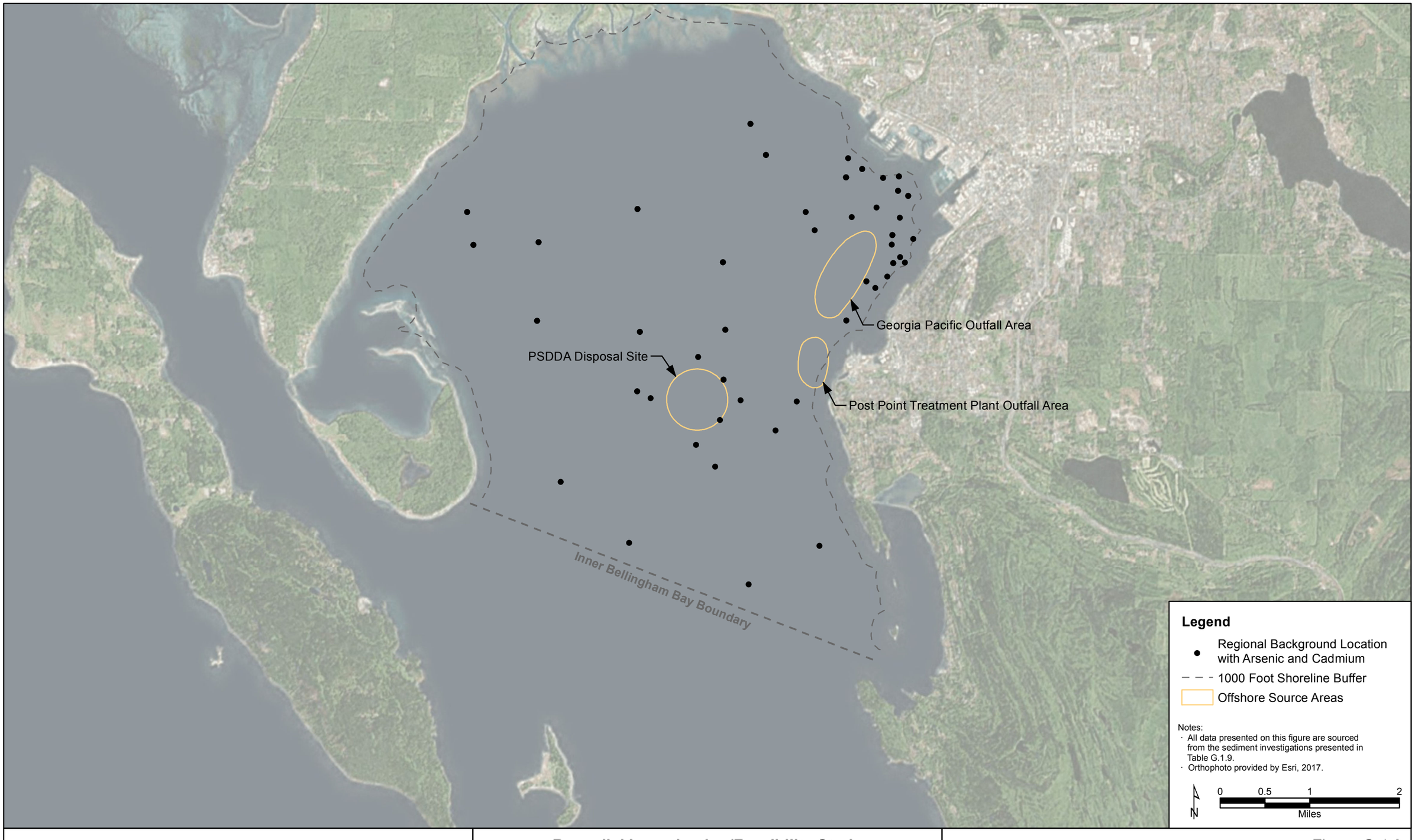

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Figure G.1.3
Arsenic and Cadmium Locations Used for Regional Background Analysis

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Harris Avenue Shipyard

Remedial Investigation/ Feasibility Study

Appendix G
Screening Level Development

Attachment G.2
TPH Screening Level Report

FINAL

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List of Abbreviations/Acronyms

Acronym/ Abbreviation	Definition
ADEQ	Alaska Department of Environmental Quality
AST	Aboveground storage tank
bgs	Below ground surface
COC	Contaminant of concern
cPAH	Carcinogenic polycyclic aromatic hydrocarbon
CUL	Cleanup level
Ecology	Washington State Department of Ecology
EPH	Extractable petroleum hydrocarbon
HPAH	High molecular weight polycyclic aromatic hydrocarbon
LPAH	Low molecular weight polycyclic aromatic hydrocarbon
mg/kg	Milligrams per kilogram
PAH	Polycyclic aromatic hydrocarbon
RI/FS	Remedial Investigation/Feasibility Study
Site	Harris Avenue Shipyard
SVOC	Semivolatile organic carbon
TPH	Total petroleum hydrocarbon
USEPA	U.S. Environmental Protection Agency
VOC	Volatile organic carbon
VPH	Volatile petroleum hydrocarbon

1.0 Identification of Product Types

1.1 AVAILABLE DATA

Petroleum hydrocarbons are a known contaminant at the Harris Avenue Shipyard (Site) in soil and groundwater. Soil and groundwater samples have been analyzed for the following constituents, contained in to petroleum:

- Gasoline-range hydrocarbons (TPH-GRO) using Method NWTPH-G.
- Diesel no. 2 and oil-range hydrocarbons (TPH-DRO and TPH-Oils, respectively) using Method NWTPH-Dx.
- Volatile aromatics (substituted benzenes or BTEX extended) using EPA Method 8260.
- Polycyclic aromatic hydrocarbons (PAHs) using EPA Method 8270, including low-level analysis of the carcinogen PAHs (cPAHs).
- Volatile-range petroleum hydrocarbons by Method NWTPH-VPH
- Semi-volatile range (extractable) petroleum hydrocarbons by Method NWTPH-EPH.

Washington State Department of Ecology's (Ecology) MTCA TPH Workbook was used to better quantify the different fractions and to develop site-specific cleanup levels (CULs). Volatile petroleum hydrocarbon (VPH)/extractable petroleum hydrocarbon (EPH) results are presented in Table G.2.1 for groundwater and Table G.2.2 for soils. Table G2-3 presents the Site-specific hydrogeological data used in Ecology's MTCA TPH Workbook for soil. For groundwater, the screening levels are based on protection of surface water and sediment quality without attenuation or dilution, but do not consider the drinking water pathway since the aquifer is non-potable at the site. For soil, protection of sediment and surface water quality without attenuation is considered, as is direct contact (incidental ingestion) with the soil.

Table G.2.4 presents the soil results by sample location and depth for the detected soil analytes. Table G.2.5 presents the groundwater results by well and event for the detected groundwater analytes.

The full results are available by sample in Appendix C of the RI/FS.

1.2 PRODUCT TYPES

Chromatograms were reviewed for all samples to confirm the actual type of petroleum product present. The majority of the samples show a mixture of weathered diesel and an oil in the general weight range of a motor oil. One sample, TP-15, contained a petroleum solvent similar to Stoddard solvent or kerosene; and one sample appeared to have creosote or coal tar (a review of the soil boring log and associated photograph indicated that the drill rig had encountered a subsurface creosote-treated piling.) Soil sample MW-11, collected between 6 and 7 feet, resembles a bunker-type fuel with a slight oil component on the heavier carbon end or very heavily weathered mixtures of diesel and oil. In addition, a shallow soil sample collected between 1 and 2 feet at MW-12 is consistent with a lube oil, heavy oil, or hydraulic oil and is lacking diesel range material; however, in contrast, the deeper samples in MW-12 at 4-5 feet and 10.5-11 feet contain lighter end material without the heavier oil.

Review of the chromatograms, indicates that the “gasoline-range” total petroleum hydrocarbon (TPH) reported in the NWTPH-G method is not gasoline, but the low boiling fraction of diesel No. 2 and/or kerosene; no gasoline was detected in either soil or groundwater at the Site.

Exhibit G.2.A at the end of this appendix includes select chromatograms for the samples collected from 2011 to 2015, along with chromatograms of the standards and of kerosene, mineral spirits, and a light oil for reference.

1.3 SOIL GAS DATA

A soil gas sample was collected from MW-09 prior to installation of the monitoring well to represent the volatile component of TPH that could potentially intrude into structures. This location was selected based on the presence of low boiling (and therefore more volatile) components in the TPH at this location. The results are presented in Table 4.5 in the RI/FS. Toluene was detected at concentrations approximately 4,000 times less than the soil gas screening levels; C5 to C8 aliphatics were detected at concentrations below the screening level; and C9 to C12 aliphatics were also detected but at concentrations of potential concern for vapor intrusion. This sample was collected on March 13, 2011 at 1:55 p.m. under conditions of a falling tide after 24 hours of very high tides. Therefore, it represents worst case conditions for soil gas due to the saturated nature of the subsurface because of both infiltrating rainwater and high tides. Despite these concentrations, there is a process for initially assessing the potential for petroleum vapor intrusion that can be applied at the Site.

USEPA’s 2015 technical guidance for addressing petroleum vapor intrusion states that the lateral inclusion zone and horizontal separation must be defined to determine if current buildings are threatened by potential vapor intrusion (USEPA 2015). Ecology has recently updated their vapor intrusion guidance to include lateral and vertical separation distances and lateral inclusion zones in their memorandum, “*Updated Process for Initially Assessing the Potential for Petroleum Vapor Intrusion*” (Ecology 2016a). The Ecology memo defines the lateral inclusion zone as the area surrounding a contaminant source through which vapor phase contamination might travel and intrude into buildings. If the degree and extent of contamination is well-defined and the dissolved phase plume is stable or receding, then a horizontal separation distance of 30 feet is appropriate for establishing a lateral inclusion zone.

The degree and extent is well defined and interim action activities will remediate soil at the Site. Any remaining petroleum impacts will be more than 30 feet away from any occupied below-grade foundation or slab-on-grade buildings. The only buildings that are present within the lateral inclusion zone is the Carpenter Building, which is scheduled to be demolished and not rebuilt, above-grade trailers, and storage sheds. All occupied slab-on-grade buildings with office and work spaces are more than 30 feet from any remaining petroleum impacts in soil and or groundwater. Therefore, using Ecology’s 2016 updated process for initially assessing vapor intrusion and the definition of lateral inclusion zone, there are no petroleum vapor risks to indoor air at the Site.

1.4 EPH/VPH DATA

Finally, select samples were submitted in 1998, and again in 2013, for analysis by NWTPH-VPH and -EPH to better quantify the different fractions and to develop site-specific cleanup levels (CULs). Results for the volatile petroleum hydrocarbon (VPH)/extractable petroleum hydrocarbon (EPH) results are presented in Table G.2.1 for groundwater and Table G.2.2 for soils.

All the results consistently point to the presence of medium to heavy oil mixed with diesel No. 2 and occasionally with kerosene (or a related product like stoddard solvents). The presence of these products on a historical shipyard side is unsurprising. In soils, the non-cPAHs are present at concentrations consistent with the diesel and oil. The cPAHs and several of the HPAHs are present in some soil samples and absent in many others and have been treated as a separate source rather than as part of the TPH release. They are highest in the soil boring where creosote-treated subsurface pilings were unintentionally encountered. The numerous detections of diesel and oil across the Site are treated as one source with a conceptual site model of numerous small surface releases throughout the years.

The oil fraction present in soil is very poorly soluble in groundwater. Groundwater contamination is dominated by the more soluble fractions of diesel No. 2, both the LPAHs that are target analytes in the SVOCs and the undifferentiated C8–C21 aromatics (which includes the LPAHs). Soil gas is dominated by the volatile (but insoluble) aliphatic C8–C12 fraction of diesel; however, there are no occupied slab-on-grade buildings or buildings with below-grade foundations within the lateral inclusion zone or within 30 feet of the soil gas concentrations detected in MW-09.

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2.0 Development of Screening and Cleanup Levels

The Washington State Department of Ecology's (Ecology's) Calculation Tool for TPH was used, along with site-specific observations and data, and professional judgment, to assess the potential for petroleum to contribute to risk at the site.

2.1 GROUNDWATER

Two groundwater samples, MW-01 and MW-09, were analyzed using VPH/EPH. These two wells were chosen because they consistently contain detectable TPH; the two new wells, MW-11 and MW-12, did not have detectable petroleum. MW-09 is downgradient of MW-01. VOCs and SVOCs were also analyzed for and are needed for use of Ecology's Calculation Tool.

TPH soil contamination also exists near MW-06, MW-02/MW-02A, and MW-12; however, the TPH in these areas is poorly soluble in groundwater, and the TPH concentrations in the wells were too low (too few detections) to develop CULs using the Calculation Tool for TPH.

Table G.2.1 contains the data used in the Calculation Tool for TPH for these two samples and Figure G.2.1 plots the data. The following observations are noted:

- The TPH patterns in both wells are similar, which makes sense if they are from the same source, with one well downgradient of the other.
- No aliphatic compounds are detected in either well. This is consistent with the poor solubility of aliphatic compounds with a higher boiling than C8; and the absence of aliphatic compounds with a lower boiling than C8 in the TPH products on-site.
- The highest concentrations of aromatic compounds in the well are those boiling between C8 and C21, consistent with the presence of diesel No. 2 and the solubility of the aromatic fraction.

Result sheets 1 and 2 (Exhibit G.2.B) present the Calculation Tool for TPH results for these two wells. The results indicate that <u>if</u> the water was used as a drinking water source at residential exposure levels, the groundwater quality would be unacceptable due to non-carcinogenic effects from the diesel-range aromatic compounds (both the known polycyclic aromatic hydrocarbons [PAHs] and the general aromatic fraction, which corresponds to the alkylated PAHs). If the groundwater were potable, an acceptable CUL would be 250 micrograms per liter (µg/L).

The groundwater; however, is not potable, and the highest beneficial use of groundwater is protection of surface water and sediment quality. There is no consensus standard at the national or state level for TPH concentrations in sediment or surface water. However, several of the individual PAHs have both surface water and sediment standards. Those that are the most useful are the LPAHs and their associated standards for the following reasons:

- They are present as major constituents of diesel-range and minor constituents of oil-range petroleum products.
- They are present in TPH-contaminated soil on-site.
- They are sufficiently soluble in groundwater to be detected on-site and are potentially mobile enough to reach surface water.
- There are readily available risk-based cleanup standards in sediments and surface water for both benthic species and for human health.

In Section 5.0 of the RI/FS, some PAHs are used as indicator hazardous substances, as allowed in Model Toxics Control Act (MTCA) regulations, for TPH to assess groundwater concentrations that would be protective of surface water and sediment quality.

2.2 SOIL

A total of eleven soil samples with known TPH contamination where selected from different areas of the Site and were analyzed for using NWTPH-VPH, NWTPH-EPH, VOCs, and SVOCs. Three of the samples were analyzed in 1998, three in 2013, and five in 2015. The results are summarized in Table G.2.2, in the order and format that is used in Ecology's Calculation Tool for TPH. Results for cPAHs are also shown; however, because the concentrations of cPAHs and TPH appear unrelated at the Site, cPAHs and TPH are treated as two separate and unrelated contaminants of concern (COCs). The soil sample FS-29 collected between 3 and 4 feet was not analyzed for VPH. However, the chromatogram from this sample indicate that the volatile or lighter compounds are not present in the sample; in addition, results from samples, collected across the entire Site, indicate that VPH compounds are not present. Therefore, zeros were used for the inputs to calculate the direct contact cleanup level for location FS-29.

Measured TPH concentrations in the eleven samples ranged from 44 to 14,000 milligrams per kilogram (mg/kg). Results are plotted using a bar chart format in Figure G.2.2. AL_EC8 to AL_EC21 refers to the aliphatic range of diesel; AL_EC21 to AL-EC34 refers to the aliphatic range of oil. Similarly, the letters AR refer to the aromatic ranges. These results are very consistent with the NWTPH-Dx results and chromatograms and the VOC and SVOC analyses.

A review of the TPH, VOC, and SVOC data for soils leads to the following observations (refer to Figure 5.16 in the RI/FS for location information):

- Results near MW-01, MW-09, MW-06, including FS-19, FS-20 and FS-29, are consistent with releases diesel contamination petroleum mixed with some oil contamination. In this area, soil contamination extends down to 10 to 11 feet below ground surface (bgs) because the groundwater in the area is tidally influenced. At low tide the groundwater table lowers and at high tide it rises, creating a larger smear zone of contamination than in areas without the tidal influence.
- Most other locations at the Site are dominated by oils and very weathered diesels, several of the oils are light enough to be quantified as diesel. Good examples are near MW-02 and MW-02A where the highest detections of TPH in soil occur (21,000 to 24,000 mg/kg at the water table[1]), but where groundwater contamination is quite low (160 to 340 µg/L) consistent with products containing little leachable hydrocarbons.
- Results at FS-21 (in 2013) and TP-15 (in 1998) may show the impact of weatherization of the material over time. The locations are less than 20 feet apart, but were collected and analyzed 15 years apart. The earlier sample at TP-15 shows the presence of a kerosene-range solvent (such as a Stoddard solvent); the later sample shows significantly lower concentrations in the solvent- and diesel-range. This may represent natural degradation and attenuation of the more mobile and degradable components.
- Results at TP-9 show a classic pattern for the downward transport of surface releases of diesel and oil (or a light oil) by infiltrating rainwater. Specifically, the lighter end components move further over time than the heavier ends and the concentrations decrease with depth as they are carried through the vadose zone.

[1] TPH concentrations in soil for MW-02 and MW-02A are expressed to two significant figures.

- The chromatogram from MW-11 resembles bunker fuel with an oil or a mixture of very heavily weathered diesel and oil. However, soil detections at 6 to 7 feet bgs are low with a total TPH concentration of 44 mg/kg. MW-11 is tidally influenced, and detections in soil may represent surface water sheen infiltrating into the subsurface as the tide drops and lowers the groundwater table. TPH detections in groundwater are non-detect, which is consistent with the rest of the site where TPH contamination is not very soluble.

- Results at MW-12 indicate surface contamination and deeper contamination at groundwater. The chromatogram representing the surface sample collected between 1 and 2 feet bgs indicates a lack of diesel range material, and is more consistent with a lube oil, heavy oil, or hydraulic oil. However, chromatograms from deeper soil samples collected at 4 feet and 10.5 feet show weathered diesel and oils. The highest detection occurs just above the groundwater table but where groundwater contamination is quite low or non-detect, which is consistent with products containing little leachable hydrocarbons.

In summary, all the samples are fundamentally mixtures of oil- and diesel-range TPH. Some of the oils are as heavy as a traditional motor oil, some are lighter and partially quantify as diesel. In some locations, diesel No. 2 is also present.

Result Sheet 3 through 9 (Exhibit G.2.B) present the inputs to, and outputs from, Ecology's Calculation Tool for TPH sites for these eleven soil samples. Whereas the groundwater Result Sheets are 1 page for monitoring wells MW-01 and MW-09 and only address the drinking water pathway, the Result Sheets for soil are 4 pages and address multiple pathways. The pathways will be discussed separately and are summarized on the bottom of Table G.2.2.

2.2.1 Direct Contact Pathway

The first pathway considered is the direct contact pathway for industrial workers. All eleven TPH-contaminated soil samples represent TPH at acceptable risk to industrial workers. The Calculation Tool for TPH also calculates the CUL protective for industrial workers for the TPH products in the sample. In the case of the TPH products at the Site, the calculated CULs for industrial workers range from 21,000 to 82,000 mg/kg. The sample with the lowest CUL, TP-15 collected in 1998, contains a kerosene or Stoddard solvent signature in addition to the oil. FS-21 was collected near TP-15 in 2013 (15 years later) and is dominated by the oil-range petroleum product. Because the samples are close to each other and at similar depths, the change is likely due to the weathering of the more mobile and volatile kerosene-range material. The sample with the highest total TPH of 14,000 mg/kg was FS-29 at a depth between 3 and 4 feet bgs. However, the calculated CUL for the FS-29 soil sample was 40,000 mg/kg and is at an acceptable risk to workers for direct contact.

2.2.2 Residual Saturation

Two tools were used to address the potential for residual saturation: field observation of soil and groundwater, and studies from the Alaska Department of Environmental Quality (ADEQ). In 2006, ADEQ published recommendations from a joint working group that included ADEQ, the U.S. Environmental Protection Agency (USEPA), and a number of federal stakeholders in Alaska regarding the formation of free product as a function of soil type and petroleum product. Their key findings are presented below.

2.3 ADEQ MAXIMUM ALLOWABLE CONCENTRATIONS ABOVE WHICH FREE PRODUCT MAY EXIST

Associated Soil Type	Gasoline (mg/kg)	Middle Distillates/Diesel (mg/kg)	Heavy Distillates & Oil Range (mg/kg)
Coarse gravel	950	2,200	4,800
Coarse Sand	2,800	6,500	15,000
Fine Sand/Silt	7,500	17,000	39,000

Abbreviation:
mg/kg Milligrams per kilogram

The Site is primarily sand and silty sand and the products are diesel- and oil-range petroleum products; therefore, free product would not be expected at concentrations less than 6,500 mg/kg for the coarsest sand and 17,000 mg/kg for the majority of the Site.

The second line of evidence is observation of soil and groundwater samples. No free product has been detected at the Site in soil or groundwater. The highest soil concentrations (21,000 to 24,000 mg/kg) have been a heavy oil found near MW-02 and MW-02A at the water table. This product shows staining and odor, but no free product, and is not soluble in groundwater. The same conditions as MW-02A exist for the area near MW-12. The highest soil concentration for MW-12 was found at the water table (11,300 mg/kg); however, no free product has been observed and TPH concentrations in groundwater samples for MW-12 have been less than 50 micrograms per liter for total TPH. The highest potential for free product is in the area around MW-01 and the historical aboveground storage tank (AST) where the most diesel is present. The highest soil concentration detected in this area is 5,600 mg/kg, and no free product was detected in the area.

2.3.1 Protection of Groundwater Quality

The existing TPH contamination on-site would not require cleanup based on protection of industrial workers and prevention of the formation of free product. However, the contamination has reached the shallow water table in many places, and the diesel-range aromatics are leaching into groundwater at measureable concentrations. Therefore, it is critical to consider a TPH soil concentration for the protection of groundwater quality. Groundwater quality at this site is defined based on the need to protect surface water and sediment quality. There are no sediment or surface water standards for TPH; however, there are well established standards for the specific aromatic components (the PAHs). This is the same class of chemicals that are present in diesel and are leaching into groundwater. Not every PAH in the class is measured; only a select group of target PAHs are analyzed using USEPA methods. However, these are the specific PAHs that regulatory groups have been using as surrogates for the more complex mixture of PAHs found in the environment; therefore, their existing CULs already incorporate the use as representatives of a complex mixture.

Screening levels were developed for all of the PAHs that are routinely analyzed. Groundwater screening levels are protective of direct contact pathways as well as cross-media pathways, including protection of the benthic and human health pathways for sediments and the aquatic organisms and seafood consumption pathways for surface water. Groundwater concentrations for the PAHs were then compared to the lowest of the screening levels. Based on this comparison, acenaphthene, fluorene, 1-methylnaphthalene, and 2-methylnaphthalene were detected in groundwater; however, only 1-methylnaphthalene was retained as a COC. Sediment data,

especially those in the intertidal area where groundwater discharges to the waterway, were reviewed to determine if groundwater was contaminating the sediments with PAHs. No sediment contamination was found, indicating that the TPH on-site is not impacting the sediments via a groundwater pathway.

Aside on the use of the Calculation Tool for TPH for this assessment. The Result Sheets for groundwater include those used to assess the potential for leaching. The Calculation Tool predicts that, except for TP-15, none of the TPH tested on-site poses a risk of leaching to groundwater, which is consistent with the groundwater data. TP-15 (a sample collected in 1998) would pose problems due to the presence of naphthalene and the methylnaphthalenes. The nearby sample, collected in 2013, does not pose a problem with leaching, and the naphthalenes were analyzed for in groundwater in all wells and were found to be in compliance. Therefore, the tool indicates that there is not a leaching risk.

2.3.2 Vapor Intrusion

As discussed above, the extent of contamination is well-defined and the dissolved phase plume is stable or receding, and all occupied slab-on-grade buildings with office and work spaces are more than 30 feet from any remaining petroleum impacts in soil and or groundwater. Therefore, using Ecology's 2016 updated process for initially assessing vapor intrusion and the definition of lateral inclusion zone, there are no current petroleum vapor risks to indoor air at the Site. However, VI should be considered a potential pathway if there is construction of a new slab-on-grade office or work space building within 30 feet of remaining residual petroleum contamination post excavation activities. The VI risk will be assessed by sampling soil gas in the vicinity of proposed building locations.

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3.0 Conclusions and Recommendations

The following conclusions were made during the evaluation:

- TPH concentrations at the Site are causing few, if any, impacts to the other pathways, and concentrations between 8,000 and 24,000 mg/kg are likely protective of groundwater quality, surface water quality, sediment quality, direct contact to industrial workers, and prevention of the formation of free product. This assessment is consistent with the Calculation Tool, the site data, and the ADEQ guidelines for free product formation.
- There are no buildings in the area that have diesel No. 2 contamination. There are above-grade trailers, but no buildings with on-grade or below-grade foundations within 30 feet of TPH contamination; therefore, there is no current opportunity for vapor intrusion into buildings

The majority of TPH found on the site consists of mixtures of heavily weathered diesel and oils. Testing of these samples for EPH, VPH, VOCs, and PAHs indicated that the mixtures have low toxicity and leaching potential. Of the 8 samples collected and tested since 2013, the lowest cleanup level was calculated to be 24,000 mg/kg. The Calculation Tool indicates that all concentrations were found to be protective of groundwater, which is confirmed by non-detections and very low TPH concentrations in groundwater samples. Therefore, the proposed cleanup level for TPH in soils is 24,000 mg/kg for the summed concentrations of TPH in the diesel and motor oil ranges. At interior well MW-01 and downgradient well MW-09, there is a light diesel component that does leach. When this TPH product present as seen in the chromatogram and in groundwater, a lower cleanup level of around 8,000 mg/kg may be necessary for the TPH-diesel range component in order to protect groundwater. In these locations, groundwater results are the best demonstration that soil concentrations are protective.

Ecology states that the most practicable approach to establish site-specific cleanup levels is to use data from multiple locations to calculate a median soil cleanup level that is representative of the site (Ecology 2016b). The median value of the eleven samples analyzed for site-specific cleanup level is 33,000 mg/kg. Therefore, as a final recommendation, we are proposing the use of a conservative TPH cleanup level in soil of 24,000 mg/kg for the purpose of the RI. Concentrations less than this value should be protective of all pathways except at interior well MW-01 and downgradient well MW-09, where groundwater results indicate TPH-diesel range components can potentially leach into the groundwater. At MW-01 and MW-09, a lower cleanup level of 8,000 mg/kg will be applied in order to prevent arsenic from reducing to a more soluble form that dissolves into groundwater. In addition, given the current Site use, there is not a vapor intrusion risk. However, vapor intrusion risk should be re-evaluated for future buildings constructed within 30 lateral feet of any remaining TPH impacts.

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4.0 References

U.S. Environmental Protection Agency (USEPA). 2015. *Technical Guidance for Addressing Petroleum Vapor Intrusion at Leaking Underground Storage Tank Sites*. Prepared by the Office of Underground Storage Tanks. EPA 510-R-15-001. June.

Washington State Department of Ecology (Ecology). 2016a. *Updated Process for Initially Assessing the Potential for Petroleum Vapor Intrusion: Implementation Memorandum No. 14*. Publication No. 16-09-046. 31 March.

_____. 2016b. *Guidance for Remediation of Petroleum Contaminated Sites*. Prepared by the Toxics Cleanup Program. Publication No. 10-09-057. June.

Harris Avenue Shipyard

Remedial Investigation/ Feasibility Study

Appendix G
Screening Level Development

Attachment G.2
TPH Screening Level Report

Tables

FINAL

Table G.2.1
Results Used for Groundwater in Calculation Tool for TPH

Location Description	Near AST Near Marine Rail		Downgradient of MW-01				Northwestern Portion of Site			
Location	MW-01		MW-09		MW-11		MW-12		MW-2A	
Date	February 14, 2013		February 15, 2013		February 25, 2015		February 25, 2015		February 25, 2015	
Analyte										
Petroleum Analytes										
AL_EC 5-6	50 U		50 U		50 U		50 U		50 U	
AL_EC 6-8	50 U		50 U		50 U		50 U		50 U	
AL_EC 8-10	50 U		50 U		40 U		40 U		40 U	
AL_EC 10-12	50 U		50 U		40 U		40 U		40 U	
AL_EC 12-16	50 U		50 U		40 U		40 U		40 U	
AL_EC 16-21	50 U		50 U		40 U		40 U		40 U	
AL_EC 21-34	50 U		50 U		40 U		40 U		40 U	
AR_EC 8-10		78		71		40 U		40 U		40 U
AR_EC 10-12		530		420		40 U		40 U		40 U
AR_EC 12-16		400		300		40 U		40 U		40 U
AR_EC 16-21		140		100		40 U		40 U		40 U
AR_EC 21-34		170		63		40 U		40 U		40 U
Benzene	2 U		2 U		5 U		5 U		5 U	
Toluene	2 U		2 U		5 U		5 U		5 U	
Ethylbenzene	2 U		2 U		5 U		5 U		5 U	
Total xylenes	2 U		2 U		10 U		10 U		10 U	
Naphthalene		4.6		0.64	5 U		5 U		5 U	
1-Methylnaphthalene		93		52	5 U		5 U		5 U	
2-Methylnaphthalene		67		4.3	0.1 U		0.1 U		0.1 U	
Hexane	2 U		2 U		5 U		5 U		5 U	
Summary Results										
Petroleum Type	soluble aromatics		soluble aromatics		Not Applicable		Not Applicable		Not Applicable	
Total TPH (µg/L)	1,482		1,011		Non Detect		Non Detect		Non Detect	
CUL for Drinking Water Use (µg/L)	217		276		500[1]		500[1]		500[1]	
Risk-Driver for CUL	HI based on AR_EC 10-12 and 2-methylnaphthalene									

Note:

1 A cleanup level for drinking water use could not be calculated because all concentrations were non-detect; therefore the default MTCA Method A CUL of 500 µg/L was used.

Abbreviations:

AST Aboveground storage tank
CUL Cleanup level
HI Hazard Index
µg/L Micrograms per liter
MTCA Model Toxics Control Act
TPH Total petroleum hydrocarbon

Qualifier:

U Not detected at the value shown.

Table G.2.2
Results Used for Soil in Calculation Tool for TPH

Location Description		Western Area		Near MW-01 and MW-09			Shoreline	Near Former ASTs	Variation in Time		Variation in Depth	
Location		MW-12		FS-19	FS-20	FS-29	MW-11	FS-42	FS-21	TP-15	TP-9	TP-9
Depth		4 to 5 ft bgs	10.5 to 11 ft bgs	7 to 7.5 ft bgs	10.5 to 11 ft bgs	3 to 4 ft bgs	6 to 7 ft bgs	10 to 10.5 ft bgs	8 to 9 ft bgs	6 ft bgs	1.8 ft bgs	6 ft bgs
Date		2/9/2015	2/9/2015	1/29/2013	1/31/2013	2/9/2015	2/9/2015	2/8/2015	1/30/2013	4/27/1998	4/30/1998	4/30/1998
Analyte												
Petroleum Analytes	**Primary range**											
AL_EC >5-6	solvent-range	8.5 UJ	9.7 UJ	5 U	5 U		10 UJ	6.5 U	5 U	2.9 U	2.7 U	2.9 U
AL_EC >6-8	solvent-range	8.5 UJ	9.7 UJ	9.3	5 U		10 UJ	6.5 U	5 U	2.9 U	2.7 U	2.9 U
AL_EC >8-10	diesel-range	38	2.3 U	30	36	61 J	2.2 U	2.2 U	5 U	2.9 U	4.5	6
AL_EC >10-12	diesel-range	740	9	230	220	600	2.2 U	12	5 U	2.9 U	360	140
AL_EC >12-16	diesel-range	5000	71	1200	930	3400	4.4	77	28	550	2000	530
AL_EC >16-21	diesel-range	2400	41	1100	750	4000	15	85	34	2.9 U	2.7 U	2.9 U
AL_EC >21-34	oil-range	1200	21	430	190	2100	18	20	32	2.9 U	2.7 U	2.9 U
AR_EC >8-10	diesel-range	28 J	2.3 U	56	31	2.7	2.2 U	2.2 U	10	11	30	19
AR_EC >10-12	diesel-range	120 J	16 J	18	43	43	2.2 U	2.2 U	330	70	12	4.9
AR_EC >12-16	diesel-range	700	21 J	200	320	560	2.2 U	10 U	640	150	110	56
AR_EC >16-21	diesel-range	900	14	780	710	2100	4.1	37 U	2300	370	650	190
AR_EC >21-34	oil-range	200	4	240	150	720	2.3	14 U	1000	120	200	34
Benzene		0.85 UJ	0.97 UJ	0.03 U	0.03 U		1 UJ	0.68 U	0.03 U	ND	ND	ND
Toluene		0.85 UJ	0.97 UJ	0.05 U	0.05 U		1 UJ	0.68 U	0.05 U	ND	ND	ND
Ethylbenzene		0.85 UJ	0.97 UJ	0.18	0.076		1 UJ	0.68 U	0.2 U	0.048	0	0.22
Total xylenes		1.7 UJ	1.9 UJ	0.28	0.2 U		2 UJ	1.4 U	0.2 U	0	0	0
Naphthalene		2.2	0.97 UJ	0.031	0.5 U	0.12	1 UJ	0.68 U	0.87	62	0	0.9
1-Methylnaphthalene		0.85 UJ	0.97 UJ	1.8	6.6	0.25	1 UJ	0.68 U	0.43	0	0	0
2-Methylnaphthalene		1.4	0.1	0.63	6.2	0.33	0.011	0.68 U	0.65	31	3.2	3.2
n-Hexane		0.85 UJ	0.97 UJ	0.2 U	0.2 U		1 UJ	0.68 U	0.2 U	ND	ND	ND
cPAHs do not correlate with TPH and have been handled as a separate COC group. They are not included in the TPH calculations.	*Benzo(a)anthracene*	*0.47*	*0.021*	*0.025*	*0.32*		*0.031*	*0.13*	*0.52*	*7.4*		
	Benzo(b)fluroanthene	*0.92* [2]	*0.048* [1]				*0.063* [1]	*0.15* [1]	*0.43*	*5.2*	*0.13*	
	Benzo(k)fluroanthene								*0.27*	*3.3*		
	Benzo(a)pyrene	*0.31*	*0.019*				*0.03*	*0.077*	*0.32*	*4.5*		
	Chrysene	*0.67*	*0.031*	*0.048*	*0.28*		*0.042*	*0.22*	*0.48*	*6.2*	*0.18*	
	Dibenzo(a,h)anthracene	*0.084*	*0.0046 JQ*				*0.006*	*0.013*	*0.12*	*0.3*		
	Indeno(1,2,3-cd)pyrene	*0.26*	*0.015*				*0.024*	*0.038*	*0.044*	*1.9*		
Summary Results												
Petroleum Type		diesel & oil	diesel & oil	diesel & oil	diesel & oil	diesel & oil	diesel & oil	diesel & oil	mostly oil	oil & kerosene	diesel & oil	diesel & oil
Total TPH (mg/kg)		11,300	197	4,300	3,400	14,000	44	194	4,400	1,400	3,400	980
Acceptable risk to workers (direct contact)		pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass
Cleanup Level for Direct Contact (mg/kg)		33,000	34,000	35,000	32,000	40,000[1]	82,000	46,000	24,000	21,000	22,000	23,000
Estimated Groundwater Concentration (µg/L)		64	213	114	125	31.4	4	0.172	213	naphthalenes	71	142
CUL for protection of GW at 250 µg/L (mg/L)		all conc.	all conc.	all conc.	all conc.	all conc.	all conc.	all conc	all conc	naphthalenes	all conc.	all conc.

Notes:

Red Pathway is problematic for reason shown.

1 VPH was not analyzed; however, the chromatograms from the sample indicate that the volatile or lighter end compounds are not present in the sample; in addition, results from samples collected across the entire Site indicate that VPH compounds are not present. Therefore, zeros were used for the inputs to calculate the direct contact cleanup level.

2 Concentration is for Total Benzofluoranthenes.

Qualifiers:

U Not detected at the value shown.

J Analyte was detected, concentration is considered an estimate

JQ Analyte was detected between the detection limit and reporting limit, concentration is considered an estimate.

Abbreviations:

bgs Below ground surface
COC Contaminant of concern
cPAH Carcinogenic polycyclic aromatic hydrocarbon
CUL Cleanup level
ft Feet
GW Groundwater
µg/L Micrograms per liter
mg/kg Milligrams per kilogram
mg/L Milligrams per liter
ND Non-detect
TPH Total petroleum hydrocarbon

Table G.2.3
Site-Specific Hydrogeological Data for Use in Ecology's MTCA TPH Workbook

Media	Modifier	Location Name	Field Sample ID	Sample Date	Analysis Method	Analyte	Use Result	Use Unit	Detect
Soil	Subsurface	FS-19	FS-19-19.5-20.0-012913	29-Jan-13	ASTM D7263	Dry Density[1]	110.1	PCF	TRUE
Soil	Subsurface	FS-19	FS-19-8.0-8.5-012913	29-Jan-13	ASTM D7263	Dry Density[1]	114.4	PCF	TRUE
Soil	Subsurface	FS-22	FS-22-12.0-12.5-013013	30-Jan-13	ASTM D7263	Dry Density[1]	121.9	PCF	TRUE
Calculated average of dry density to be used in TPH Workbook Calculations							**1.8**	**kg/L**	
Soil	Subsurface	FS-19	FS-19-19.5-20.0-012913	29-Jan-13	ASTM D2216	Moisture[2]	12.32	%	TRUE
Soil	Subsurface	FS-19	FS-19-8.0-8.5-012913	29-Jan-13	ASTM D2216	Moisture[2]	13.74	%	TRUE
Soil	Subsurface	FS-22	FS-22-12.0-12.5-013013	30-Jan-13	ASTM D2216	Moisture[2]	13.9	%	TRUE
Calculated average of moisture to be used in TPH Workbook Calculations							**0.13**	**Unitless**	
Soil	Subsurface	FS-19	FS-19-19.0-19.5-012913	29-Jan-13	ASTM D2974	Organic Content[3]	0.67	%	TRUE
Soil	Subsurface	FS-22	FS-22-11.5-12.0-013013	30-Jan-13	ASTM D2974	Organic Content[3]	0.6	%	TRUE
Soil	Subsurface	FS-22	FS-78-11.5-12.0-013013	30-Jan-13	ASTM D2974	Organic Content[3]	0.39	%	TRUE
Calculated average of organic content to be used in TPH Workbook Calculations							**0.006**	**Unitless**	
Soil	Subsurface	FS-19	FS-19-19.5-20.0-012913	29-Jan-13	USEPA 9100	Porosity[4]	0.35	Std Units	TRUE
Soil	Subsurface	FS-19	FS-19-8.0-8.5-012913	29-Jan-13	USEPA 9100	Porosity[4]	0.33	Std Units	TRUE
Soil	Subsurface	FS-22	FS-22-12.0-12.5-013013	30-Jan-13	USEPA 9100	Porosity[4]	0.29	Std Units	TRUE
Calculated average of porosity to be used in TPH Workbook Calculations							**0.32**	**Unitless**	

Notes:

1 "Dry density" refers to measured soil bulk density.
2 "Moisture" refers to volumetric water content.
3 "Organic Content" refers to fraction organic carbon.
4 "Porosity" refers to total soil porosity.

Abbreviations:

ID Identification.
Ecology Washington State Department of Ecology
kg/L Kilograms per liter
PCF Pound per cubic foot
Std Standard
TPH Total petroleum hydrocarbon

Table G.2.4
Soil Analytical Data

		Event	MCI Soil/Grit Samples (Ecology)						Measured Chemical Concenrations in Vadose Soils									
		Location	Soil 1-A/1-B	Soil 1-A/1-B	Soil 2-A/2-B	Soil 2-A/2-B	Soil 3-A/3-B	Soil 3-A/3-B	MW-04	TP-3	TP-4	TP-6	TP-8	TP-9	TP-9	TP-13	TP-15	TP-15
		Sample ID	1-A	1-B	2-A	2-B	3-A	3-B	MW-4 2.5'	TP-3 4'	TP-4 0.9'	TP-6 0.9'	TP-8 0.9'	TP-9 1.8'	TP-9 6'	TP-13 4'	TP-15 0.7'	TP-15 6'
		Sample Date	08/01/1993	08/01/1993	08/01/1993	08/01/1993	08/01/1993	08/01/1993	04/28/1998	04/27/1998	04/27/1998	04/27/1998	04/27/1998	04/30/1998	04/30/1998	04/30/1998	04/27/1998	04/27/1998
		Sample depth (ft bgs)	0 - 0.33	0.33 - 0.66	0 - 0.33	0.33 - 0.66	0 - 0.33	0.33 - 0.66	2.5	4	0.9	0.9	0.9	1.8	6	4	0.7	6
Detected TPH and Its Constituents	**CAS**	**Units**																
TPH by NWTPH Methods																		
Gasoline-Range Hydrocarbons		mg/kg							5.6 U	5.5 U				230	170		100	470
Diesel-Range Hydrocarbons		mg/kg							110	270	560	330	86	12000	2600	150	4300	4200
Oil-Range Hydrocarbons		mg/kg							350	1100	740	760	300	1700	24	460	1300	110
Mono-cyclic Aromatic or Substituted Benzenes (BTEX expanded list)																		
Toluene	108-88-3	mg/kg							0.0011 U									
Ethylbenzene	100-41-4	mg/kg							0.0011 U	0.0011 U					0.22			0.048
Xylenes (meta & para)	108-38-3/106-42-3	mg/kg							0.0022 U	0.0022 U					0.31			0.048
Xylene (ortho)	95-47-6	mg/kg							0.0011 U	0.0011 U					0.12			0.082
Xylenes (total)	1330-20-7	mg/kg																
1,2,4-Trimethylbenzene	95-63-6	mg/kg							0.0011 U	0.0011 U					1.6			0.41
1,3,5-Trimethylbenzene	108-67-8	mg/kg							0.0011 U	0.0011 U					0.34			0.31
Iso-Propylbenzene	98-82-8	mg/kg							0.0011 U	0.0011 U					0.18			0.036
n-Propylbenzene	103-65-1	mg/kg							0.0011 U	0.0011 U					0.38			0.056
n-Butylbenzene	104-51-8	mg/kg							0.0022 U	0.0022 U					0.56			0.2
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs) (Indicator Hazardous Substances for TPH)																		
1-Methylnaphthalene	90-12-0	mg/kg																
2-Methylnaphthalene	91-57-6	mg/kg	0.12 U	0.5	0.07	0.26	0.12 U	0.12 U		0.25 J				3.2	3.2			31
Naphthalene	91-20-3	mg/kg	0.12 U	1.3	0.17	0.14 U	0.12 U	0.12 U		0.25 J				0.11 U	0.9			62
Acenaphthene	83-32-9	mg/kg	0.12 U	0.52	0.12	0.18	0.12 U	0.12 U		0.11 UJ				0.89	0.46			35
Acenaphthylene	208-96-8	mg/kg	0.12 U	0.15	0.048	0.18	0.12 U	0.12 U						0.11 U	0.12 U			
Anthracene	120-12-7	mg/kg	0.048 J	0.096 J	0.27	0.5	0.072 J	0.12 U		0.74 J				0.19	0.12 U			10
Fluorene	86-73-7	mg/kg	0.12 U	0.19	0.15	0.21	0.12 U	0.12 U		0.3 J				3.8	1.3			28
Phenanthrene	85-01-8	mg/kg	0.31	1.2	1.5	3.1	0.46	0.12 U		2.9 J				4.5	2.3			84
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)																		
Total cPAHs TEQ		mg/kg	0.48	0.8	1.2	2.4 J	0.43 J	0.085 U		5.3 J				0.092	0.091 U			6.4
Benzo(a)pyrene	50-32-8	mg/kg	0.32	0.57	0.81	1.7 J	0.29 J	0.12 U		3.8 J				0.11 U	0.12 U			4.5
Benz(a)anthracene	56-55-3	mg/kg	0.35	0.61	0.93	1.8	0.26	0.12 U		3.4 J				0.11 U	0.12 U			7.4
Benzo(b)fluoranthene	205-99-2	mg/kg								4.2 J				0.13	0.12 U			5.2
Benzo(k)fluoranthene	207-08-9	mg/kg								3.7 J				0.11 U	0.12 U			3.3
Benzofluoranthenes (total)	56832-73-6	mg/kg	0.69	0.93	1.4	3.6 J	0.76 J	0.12 U										
Chrysene	218-01-9	mg/kg	0.5	0.83	1.1	2.7	0.56	0.12 U		5.2 J				0.18	0.12 U			6.2
Dibenzo(a,h)anthracene	53-70-3	mg/kg	0.14	0.18	0.27	0.33 J	0.077 J	0.12 U		0.65 J				0.11 U	0.12 U			0.3
Indeno(1,2,3-cd)pyrene	193-39-5	mg/kg	0.39	0.49	0.75	0.71 J	0.21 J	0.12 U		2.8 J				0.11 U	0.12 U			1.9
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAHs)																		
Benzo(g,h,i)perylene	191-24-2	mg/kg	0.37	0.43	0.69	0.51 J	0.18 J	0.12 U		2.8 J				0.11 U	0.12 U			1.9
Fluoranthene	206-44-0	mg/kg	0.69	1.8	2.8	5.3	1.2	0.05 J		5.9 J				0.44	0.17			37
Pyrene	129-00-0	mg/kg	0.47	1.2	1.4	3.9	0.57	0.06 J		8.5 J				0.5	0.15			44

Qualifiers:

- J The analyte was detected and the result should be considered an estimate.
- JM The analyte was detected and the result should be considered an estimate due to a poor chromatographic match to the Motor Oil and/or Diesel
- JQ The analyte was detected between the method detection limit and method reporting limit and the result should be considered an estimate.
- U The analyte was not detected at the given reporting limit.
- UJ The analyte was not detected at the given reporting limit, which is considered to be an estimate.
- UB The analyte was not detected, the reporting limit was raised due to blank contamination.

Table G.2.4
Soil Analytical Data

Event			Chemical Concenrations in Saturated Zone Soils					Shipyard Sediments RI/FS Intertidal Data									
Location			B-1	MW-01	MW-01	MW-02	MW-03	S-3	S-3	S-4	S-4	S-4	S-4	S-5	S-5	S-5	S-5
Sample ID			B-1 6.5'	MW-1 10'	MW-1 10' Dup	MW-2 8.5'	MW-3 7.5'	HAS-S3-0-2	HAS-S3-2-4	HAS-S4-0-2	HAS-S4-2-4	HAS-S4-4-6	HAS-S4-6-8	HAS-S5-0-2	HAS-S5-2-4	HAS-S5-4-6	HAS-S5-6-8
Sample Date			04/29/1998	04/28/1998	04/28/1998	04/28/1998	04/28/1998	08/19/2005	08/19/2005	08/19/2005	08/19/2005	08/19/2005	08/19/2005	08/19/2005	08/19/2005	08/19/2005	08/19/2005
Sample depth (ft bgs)			6.5	10	10	8.5	7.5	0 - 2	2 - 4	0 - 2	2 - 4	4 - 6	6 - 8	0 - 2	2 - 4	4 - 6	6 - 8
Detected TPH and Its Constituents	**CAS**	**Units**															
TPH by NWTPH Methods																	
Gasoline-Range Hydrocarbons		mg/kg	5.2 U	34		240	5.5 U	310	270	52	120	18	120	17	210	97	480
Diesel-Range Hydrocarbons		mg/kg	9.7	210	250	13000	6.3	2600	6300	810	1800	17	1400	84	3800	2800	5700
Oil-Range Hydrocarbons		mg/kg	16	11 U	12	8000	11 U	1100	1800	250	560	12 U	380	260	1400	540	440
Mono-cyclic Aromatic or Substituted Benzenes (BTEX expanded list)																	
Toluene	108-88-3	mg/kg						0.0012 U	0.0014 U	0.0011 U	0.0045 U			0.001 U	0.0011 U		
Ethylbenzene	100-41-4	mg/kg						0.0012 U	0.0014 U	0.0011 U	0.0045 U			0.001 U	0.0011 U		
Xylenes (meta & para)	108-38-3/106-42-3	mg/kg						0.0026 J	0.0019 J	0.0011 J	0.0045 U			0.001 U	0.01 J		
Xylene (ortho)	95-47-6	mg/kg						0.0022 J	0.0014 U	0.0011 U	0.0045 U			0.001 U	0.011 J		
Xylenes (total)	1330-20-7	mg/kg															
1,2,4-Trimethylbenzene	95-63-6	mg/kg	0.001 U	0.087		0.016 J	0.001 U	0.0019 U	0.0014 U	0.0011 U	0.0045 U			0.001 U	0.023 J		
1,3,5-Trimethylbenzene	108-67-8	mg/kg	0.001 U	0.022		0.0075 J	0.001 U	0.0012 U	0.0014 U	0.0011 U	0.0045 U			0.001 U	0.014 J		
Iso-Propylbenzene	98-82-8	mg/kg						0.0013 J	0.0014 U	0.0011 U	0.0045 U			0.001 U	0.0025 J		
n-Propylbenzene	103-65-1	mg/kg	0.001 U	0.01		0.0045 UJ	0.001 U	0.0012 U	0.0014 U	0.0011 U	0.0045 U			0.001 U	0.0011 U		
n-Butylbenzene	104-51-8	mg/kg	0.0021 U	0.027		0.0091 UJ	0.002 U	0.0012 U	0.0014 U	0.0011 U	0.0045 U			0.001 U	0.0066 U		
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs) (Indicator																	
1-Methylnaphthalene	90-12-0	mg/kg															
2-Methylnaphthalene	91-57-6	mg/kg						0.078 U	0.085 U	0.073 U	0.075 U	0.082 U	0.082 U	0.072 U	0.15	0.18	3.7
Naphthalene	91-20-3	mg/kg						0.0077 U	0.007 U	0.0054 U	0.038 U	0.082 U	0.082 U	0.0051 U	0.019 U	0.77	12
Acenaphthene	83-32-9	mg/kg						0.27	0.21	0.073 U	0.075 U	0.082 U	0.082 U	0.072 U	0.097	0.11	4.1
Acenaphthylene	208-96-8	mg/kg						0.078 U	0.085 U	0.073 U	0.075 U	0.082 U	0.082 U	0.072 U	0.089 J	0.072 U	0.073 U
Anthracene	120-12-7	mg/kg						0.46	0.65	0.073 U	0.075 U	0.082 U	0.082 U	0.072 U	0.097	0.072 U	1.2
Fluorene	86-73-7	mg/kg						0.18	0.095	0.073 U	0.075 U	0.082 U	0.082 U	0.072 U	0.24	0.46	4.1
Phenanthrene	85-01-8	mg/kg						0.88	1.1	0.073 U	0.075 U	0.082 U	0.082 U	0.34	0.73	1.1	8.4
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)																	
Total cPAHs TEQ		mg/kg						2.2	1.9	0.022 U	0.057	0.062 U	0.062 U	0.37	1.4	0.19	0.69
Benzo(a)pyrene	50-32-8	mg/kg						1.6	1.4	0.073 U	0.075 U	0.082 U	0.082 U	0.27	1	0.14	0.46
Benz(a)anthracene	56-55-3	mg/kg						1.3	1.2	0.073 U	0.075 U	0.082 U	0.082 U	0.21	0.88	0.12	0.89
Benzo(b)fluoranthene	205-99-2	mg/kg						1.8	1.4	0.073 U	0.075 U	0.082 U	0.082 U	0.33	1.5	0.16	0.62
Benzo(k)fluoranthene	207-08-9	mg/kg						1.7	1.4	0.073 U	0.075 U	0.082 U	0.082 U	0.32	1.6	0.17	0.56
Benzofluoranthenes (total)	56832-73-6	mg/kg						3.5	2.8	0.073 U	0.075 U	0.082 U	0.082 U	0.65	3.1	0.33	1.18
Chrysene	218-01-9	mg/kg						1.5	1.3	0.073 U	0.079	0.082 U	0.082 U	0.32	1.4	0.16	0.75
Dibenzo(a,h)anthracene	53-70-3	mg/kg						0.13	0.14	0.073 U	0.075 U	0.082 U	0.082 U	0.072 U	0.075 U	0.072 U	0.073 U
Indeno(1,2,3-cd)pyrene	193-39-5	mg/kg						0.45	0.42	0.073 U	0.075 U	0.082 U	0.082 U	0.1	0.31	0.072 U	0.074
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons																	
Benzo(g,h,i)perylene	191-24-2	mg/kg						0.41	0.38	0.073 U	0.075 U	0.082 U	0.082 U	0.095	0.28	0.072 U	0.073 U
Fluoranthene	206-44-0	mg/kg						3.1	3.7	0.11	0.17	0.082 U	0.12	0.6	1.8	0.44	6.1
Pyrene	129-00-0	mg/kg						2.9	3	0.12	0.21	0.082 U	0.12	0.44	2.7	0.44	3.8

Qualifiers:

- J The analyte was detected and the result should be considered an estimate.
- JM The analyte was detected and the result should be considered an estimate due to a poor chromatographic match to the Motor Oil and/or Diesel
- JQ The analyte was detected between the method detection limit and method reporting limit and the result should be considered an estimate.
- U The analyte was not detected at the given reporting limit.
- UJ The analyte was not detected at the given reporting limit, which is considered to be an estimate.
- UB The analyte was not detected, the reporting limit was raised due to blank contamination.

Table G.2.4
Soil Analytical Data

Event			RI/FS Sampling (Spring 2011)											
Location			FS-11	MW-06	MW-09	MW-09	FS-01	FS-01	FS-01	FS-01	FS-02	FS-03	FS-06	FS-07	FS-08
Sample ID			FS11-2-031411	MW06-10-031411	MW09-4-031411	MW09-6-031411	FS01-2.5-031411	FS01-14-031411	FS01-24-031411	FS01-24.8-031411	FS02-2.5-031611	FS03-1.5-031611	FS06-2.5-031611	FS07-12.5-031611	FS08-2-031511
Sample Date			03/14/2011	03/14/2011	03/14/2011	03/14/2011	03/14/2011	03/14/2011	03/14/2011	03/14/2011	03/16/2011	03/16/2011	03/16/2011	03/16/2011	03/15/2011
Sample depth (ft bgs)			1 - 2	10	4	6 - 6.5	2.5 - 3.5	14 - 15	24 - 24.8	24.8 - 25	2.5 - 3.5	1.5 - 2.5	2.5 - 3.5	12.5 - 13.5	2 - 3
Detected TPH and Its Constituents	**CAS**	**Units**													
TPH by NWTPH Methods															
Gasoline-Range Hydrocarbons		mg/kg	150 U	85 J	5.6	230 J	4.5 J	250 J	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Diesel-Range Hydrocarbons		mg/kg	5700	1700	34	2600	25 U	190	160	78	41	44	36	25 U	25 U
Oil-Range Hydrocarbons		mg/kg	1200	50 U	74	100 U	270	50 U	72	50 U	110	180	50 U	50 U	50 U
Mono-cyclic Aromatic or Substituted Benzenes (BTEX expanded list)															
Toluene	108-88-3	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Ethylbenzene	100-41-4	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Xylenes (meta & para)	108-38-3/106-42-3	mg/kg	0.02 U	0.02 U	0.02 U	0.02 U	0.02 UJ	0.02 U	0.02 U	0.02 UJ	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Xylene (ortho)	95-47-6	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Xylenes (total)	1330-20-7	mg/kg	0.02 U	0.02 U	0.02 U	0.02 U	0.02 UJ	0.02 U	0.02 U	0.02 UJ	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
1,2,4-Trimethylbenzene	95-63-6	mg/kg	2.8	0.01 U	0.01 U	0.01 U	0.01 UJ	0.011	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,3,5-Trimethylbenzene	108-67-8	mg/kg	0.01 U	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Iso-Propylbenzene	98-82-8	mg/kg	0.04	0.01 U	0.01 U	0.01 U	0.01 UJ	0.011	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
n-Propylbenzene	103-65-1	mg/kg	0.43	0.01 U	0.01 U	0.01 U	0.01 UJ	0.012	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
n-Butylbenzene	104-51-8	mg/kg	1.1	0.036	0.01 U	0.019	0.01 UJ	0.025	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs) (Indicator															
1-Methylnaphthalene	90-12-0	mg/kg	3.8 J	0.1 U	0.1 U	2.5	0.1 U	0.48	0.22	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2-Methylnaphthalene	91-57-6	mg/kg	0.2 U	0.1 U	0.1 U	0.67	0.1 U	0.63	0.2 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Naphthalene	91-20-3	mg/kg	1.3	0.042	0.01 U	0.01 U	0.01 UJ	0.01 U	0.91	0.081 J	0.01 U	0.01 U	0.01 U	0.01 U	0.011
Acenaphthene	83-32-9	mg/kg	0.98 J	0.22 J	0.1 U	0.52	0.1 U	0.15	3.8	0.1 U	0.1 U	0.1 U	0.1 U	0.41	0.1 U
Acenaphthylene	208-96-8	mg/kg	0.2 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Anthracene	120-12-7	mg/kg	0.36 J	0.1 J	0.1 U	0.15	0.1 U	0.1 U	11	0.1 U	0.1 U	0.1 U	0.15	0.1 U	0.1 U
Fluorene	86-73-7	mg/kg	1.5 J	0.58 J	0.1 U	1.6	0.1 U	0.2	14	0.1 U	0.1 U	0.1 U	0.1 U	0.22	0.1 U
Phenanthrene	85-01-8	mg/kg	3.5 J	2 J	0.14	0.91	0.27	0.48	5.1	0.11	0.26	0.1 U	1.1	0.1 U	0.1 U
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)															
Total cPAHs TEQ		mg/kg	0.52 J	0.076 U	0.14	0.076 U	0.32	0.076 U	7.2	0.076 U	0.24	0.076 U	0.82	0.076 U	0.076 U
Benzo(a)pyrene	50-32-8	mg/kg	0.39 J	0.1 U	0.11	0.1 U	0.24	0.1 U	5.1	0.1 U	0.18	0.1 U	0.62	0.1 U	0.1 U
Benz(a)anthracene	56-55-3	mg/kg	0.29 J	0.1 U	0.1 U	0.1 U	0.17	0.1 U	9	0.1 U	0.17	0.1 U	0.52	0.1 U	0.1 U
Benzo(b)fluoranthene	205-99-2	mg/kg	0.36 J	0.1 U	0.12	0.1 U	0.25	0.1 U	4.3	0.1 U	0.14	0.1 U	0.49	0.1 U	0.1 U
Benzo(k)fluoranthene	207-08-9	mg/kg	0.29 J	0.1 U	0.1 U	0.1 U	0.23	0.1 U	4.5	0.1 U	0.17	0.1 U	0.61	0.1 U	0.1 U
Benzofluoranthenes (total)	56832-73-6	mg/kg	0.65 J	0.1 U	0.12	0.1 U	0.48	0.1 U	8.8	0.1 U	0.31	0.1 U	1.1	0.1 U	0.1 U
Chrysene	218-01-9	mg/kg	0.37 J	0.1 U	0.12	0.1 U	0.24	0.1 U	14	0.1 U	0.18	0.1 U	0.67	0.1 U	0.1 U
Dibenzo(a,h)anthracene	53-70-3	mg/kg	0.2 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.57	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Indeno(1,2,3-cd)pyrene	193-39-5	mg/kg	0.24 J	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1	0.1 U	0.1 U	0.1 U	0.27	0.1 U	0.1 U
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons															
Benzo(g,h,i)perylene	191-24-2	mg/kg	0.24 J	0.1 U	0.11	0.1 U	0.12	0.1 U	1.1	0.1 U	0.1 U	0.1 U	0.27	0.1 U	0.1 U
Fluoranthene	206-44-0	mg/kg	0.72 J	0.1 U	0.19	0.22	0.38	0.1 U	48	0.15	0.41	0.1 U	1.3	0.1 U	0.1 U
Pyrene	129-00-0	mg/kg	0.99 J	0.1 J	0.23	0.21	0.43	0.1 U	36	0.15	0.42	0.1 U	1.4	0.1 U	0.1 U

Qualifiers:

- J The analyte was detected and the result should be considered an estimate.
- JM The analyte was detected and the result should be considered an estimate due to a poor chromatographic match to the Motor Oil and/or Diesel
- JQ The analyte was detected between the method detection limit and method reporting limit and the result should be considered an estimate.
- U The analyte was not detected at the given reporting limit.
- UJ The analyte was not detected at the given reporting limit, which is considered to be an estimate.
- UB The analyte was not detected, the reporting limit was raised due to blank contamination.

Table G.2.4
Soil Analytical Data

Event			RI/FS Sampling (Spring 2011) (cont.)											
Location			FS-09	FS-09A	FS-09A(2)	FS-09B	FS-09C	FS-09D	FS-12	FS-13	FS-14	FS-15	FS-17	FS-18	MW-02A
Sample ID			FS09-8-031511	FS09A-6-031711	FS09A(2)-14-031711	FS09B-15-031711	FS09C-8.5-031711	FS09D-5-031711	FS12-2-031411	FS13-4-031511	FS14-7-031511	FS15-13-031411	FS17-6.5-031611	FS18-14-031611	MW02A-7.5-031511
Sample Date			03/15/2011	03/17/2011	03/17/2011	03/17/2011	03/17/2011	03/17/2011	03/14/2011	03/15/2011	03/15/2011	03/14/2011	03/16/2011	03/16/2011	03/15/2011
Sample depth (ft bgs)			8 - 8.5	6 - 7	14 - 15	14 - 15	8.5 - 9.5	5 - 6	2 - 3	4 - 5	7 - 8	13 - 14	6.5 - 7.5	14 - 15	7.5
Detected TPH and Its Constituents	**CAS**	**Units**													
TPH by NWTPH Methods															
Gasoline-Range Hydrocarbons		mg/kg	28 U	3 UJ	3 UJ	3 U	180 UJ	37 UJ	3 U	3 U	19 U	55 U	1.5 U	3 U	280 J
Diesel-Range Hydrocarbons		mg/kg	5300	25 UJ	25 UJ	25 UJ	3700 J	1700 J	120	990	440	950	1200	25 U	18000
Oil-Range Hydrocarbons		mg/kg	520 J	50 UJ	50 UJ	50 UJ	100 UJ	50 UJ	210	160 J	50 U	50 U	5400	50 U	6300
Mono-cyclic Aromatic or Substituted Benzenes (BTEX expanded list)															
Toluene	108-88-3	mg/kg	0.01 UJ	0.033 J	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 UJ
Ethylbenzene	100-41-4	mg/kg	0.01 UJ	0.014 J	0.01 UJ	0.01 UJ	0.037 J	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 UJ
Xylenes (meta & para)	108-38-3/106-42-3	mg/kg	0.02 UJ	0.042 J	0.02 UJ	0.02 UJ	0.05 J	0.02 UJ	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 UJ
Xylene (ortho)	95-47-6	mg/kg	0.01 UJ	0.019 J	0.01 UJ	0.01 UJ	0.058 J	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 UJ
Xylenes (total)	1330-20-7	mg/kg	0.02 UJ	0.061 J	0.02 UJ	0.02 UJ	0.108 J	0.02 UJ	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 UJ
1,2,4-Trimethylbenzene	95-63-6	mg/kg	0.035 J	0.027 J	0.01 UJ	0.01 UJ	0.51 J	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 UJ
1,3,5-Trimethylbenzene	108-67-8	mg/kg	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 UJ
Iso-Propylbenzene	98-82-8	mg/kg	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.053 J	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 UJ
n-Propylbenzene	103-65-1	mg/kg	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.05 J	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.016 J
n-Butylbenzene	104-51-8	mg/kg	0.039 J	0.056 J	0.01 UJ	0.01 UJ	0.31 J	0.01 J	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.35
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs) (Indicator															
1-Methylnaphthalene	90-12-0	mg/kg	27	0.1 UJ	0.1 UJ	0.1 UJ	25 J	0.2 UJ	0.1 U	0.2 U	0.1 U	0.1 U	0.5 U	0.1 U	0.5 U
2-Methylnaphthalene	91-57-6	mg/kg	39	0.1 UJ	0.1 UJ	0.1 UJ	38 J	0.2 UJ	0.1 U	0.2 U	0.1 U	0.1 U	0.5 U	0.1 U	0.5 U
Naphthalene	91-20-3	mg/kg	160	6.9 J	0.01 UJ	0.01 UJ	40 J	0.011 J	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.3
Acenaphthene	83-32-9	mg/kg	70	0.14 J	0.3 J	0.13 J	29 J	0.2 UJ	0.1 U	0.2 U	0.1 U	1.1	0.5 U	0.1 U	1.2 J
Acenaphthylene	208-96-8	mg/kg	10 U	0.1 UJ	0.1 UJ	0.1 UJ	1 UJ	0.2 UJ	0.1 U	0.2 U	0.1 U	0.1 U	2	0.1 U	0.5 U
Anthracene	120-12-7	mg/kg	21	0.1 UJ	0.1 UJ	0.1 UJ	6.1 J	0.2 UJ	0.1 U	0.2 U	0.11 J	0.31	1	0.1 U	0.5 U
Fluorene	86-73-7	mg/kg	61	0.1 UJ	0.17 J	0.1 UJ	28 J	0.86 J	0.1 U	0.2 U	0.46 J	1.1	0.5 U	0.1 U	0.5 U
Phenanthrene	85-01-8	mg/kg	180	0.13 J	0.1 UJ	0.1 UJ	71 J	0.22 J	0.54	0.34	1.2 J	0.1 U	6.3	0.1 U	0.5 U
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)															
Total cPAHs TEQ		mg/kg	9.7	0.62 J	0.076 UJ	0.076 UJ	3.9 J	0.15 UJ	0.59	0.64	0.076 U	0.076 U	7.9	0.076 U	0.39 J
Benzo(a)pyrene	50-32-8	mg/kg	10 U	0.47 J	0.1 UJ	0.1 UJ	2.6 J	0.2 UJ	0.43	0.45	0.1 U	0.1 U	5.9	0.1 U	0.5 U
Benz(a)anthracene	56-55-3	mg/kg	20	0.23 J	0.1 UJ	0.1 UJ	6 J	0.2 UJ	0.3	0.24	0.1 U	0.1 U	3.6	0.1 U	0.63 U
Benzo(b)fluoranthene	205-99-2	mg/kg	11	0.57 J	0.1 UJ	0.1 UJ	2.6 J	0.2 UJ	0.53	0.78	0.1 U	0.1 U	5.1	0.1 U	0.5 U
Benzo(k)fluoranthene	207-08-9	mg/kg	10 U	0.28 J	0.1 UJ	0.1 UJ	2.8 J	0.2 UJ	0.42	0.53	0.1 U	0.1 U	4.7	0.1 U	0.5 U
Benzofluoranthenes (total)	56832-73-6	mg/kg	11	0.85 J	0.1 UJ	0.1 UJ	5.4 J	0.2 UJ	0.95	1.31	0.1 U	0.1 U	9.8	0.1 U	0.5 U
Chrysene	218-01-9	mg/kg	14	0.64 J	0.1 UJ	0.1 UJ	4.1 J	0.2 UJ	0.46	0.62	0.1 U	0.1 U	4.8	0.1 U	0.64 J
Dibenzo(a,h)anthracene	53-70-3	mg/kg	10 U	0.12 J	0.1 UJ	0.1 UJ	1 UJ	0.2 UJ	0.1 U	0.2 U	0.1 U	0.1 U	1.7	0.1 U	0.5 U
Indeno(1,2,3-cd)pyrene	193-39-5	mg/kg	10 U	0.26 J	0.1 UJ	0.1 UJ	1 UJ	0.2 UJ	0.22	0.22	0.1 U	0.1 U	4.3	0.1 U	0.5 U
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons															
Benzo(g,h,i)perylene	191-24-2	mg/kg	10 U	0.29 J	0.1 UJ	0.1 UJ	1 UJ	0.2 UJ	0.25	0.27	0.1 U	0.1 U	5.1	0.1 U	0.5 U
Fluoranthene	206-44-0	mg/kg	110	0.1 UJ	0.1 UJ	0.1 UJ	31 J	0.2 UJ	0.66	0.43	0.1 U	0.4	8.2	0.11	1.4 J
Pyrene	129-00-0	mg/kg	68	0.17 J	0.1 UJ	0.1 UJ	23 J	0.2 UJ	0.75	0.68	0.1 U	0.31	9.9	0.13	1.5 J

Qualifiers:

- J The analyte was detected and the result should be considered an estimate.
- JM The analyte was detected and the result should be considered an estimate due to a poor chromatographic match to the Motor Oil and/or Diesel
- JQ The analyte was detected between the method detection limit and method reporting limit and the result should be considered an estimate.
- U The analyte was not detected at the given reporting limit.
- UJ The analyte was not detected at the given reporting limit, which is considered to be an estimate.
- UB The analyte was not detected, the reporting limit was raised due to blank contamination.

Table G.2.4
Soil Analytical Data

Event			RI/FS Data Gaps Investigation Sampling											
Location			FS-19	FS-19	FS-19	FS-19	FS-20	FS-20	FS-21	FS-21	FS-21	FS-21	FS-23	FS-23	MW-10
Sample ID			FS-19-3.0-3.5-012913	FS-19-7.0-7.5-012913	FS-19-11.5-12.0-012913	FS-19-27.0-27.5-012913	FS-20-10.5-11.0-012913	FS-20-15.5-16.0-012913	FS-21-3.5-4.0-013013	FS-21-8.0-9.0-013013	FS-21-13.5-14.0-013013	FS-21-22.0-22.5-013013	FS-23-3.0-3.5-013013	FS-23-7.0-7.5-013013	MW-10-2.0-3.0-012913
Sample Date			01/29/2013	01/29/2013	01/29/2013	01/29/2013	01/29/2013	01/29/2013	01/29/2013	01/30/2013	01/30/2013	01/30/2013	01/30/2013	01/30/2013	01/29/2013
Sample depth (ft bgs)			3 - 3.5	7 - 7.5	11.5 - 12	27 - 27.5	10.5 - 11	15.5 - 16	3.5 - 4	8 - 9	13.5 - 14	22 - 22.5	3 - 3.5	7 - 7.5	2 - 3
Detected TPH and Its Constituents	**CAS**	**Units**													
TPH by NWTPH Methods															
Gasoline-Range Hydrocarbons		mg/kg		67 U	5.7 U	3 U	94 U	3 U		6.7 JM	72 JM	3 U		3 U	
Diesel-Range Hydrocarbons		mg/kg		2800 JM	25 U	25 U	2500 JM	25 U		4100 JM	5600 JM	25 U		25 U	
Oil-Range Hydrocarbons		mg/kg		160 JM	50 U	50 U	100 U	50 U		510 JM	670 U	50 U		50 U	
Mono-cyclic Aromatic or Substituted Benzenes (BTEX expanded list)															
Toluene	108-88-3	mg/kg		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U		0.05 U	0.1 U	0.05 U		0.05 U	
Ethylbenzene	100-41-4	mg/kg		0.18	0.05 U	0.05 U	0.076	0.05 U		0.05 U	0.18	0.05 U		0.05 U	
Xylenes (meta & para)	108-38-3/106-42-3	mg/kg													
Xylene (ortho)	95-47-6	mg/kg													
Xylenes (total)	1330-20-7	mg/kg		0.28	0.2 U	0.2 U	0.2 U	0.2 U		0.2 U	0.6	0.2 U		0.2 U	
1,2,4-Trimethylbenzene	95-63-6	mg/kg													
1,3,5-Trimethylbenzene	108-67-8	mg/kg													
Iso-Propylbenzene	98-82-8	mg/kg													
n-Propylbenzene	103-65-1	mg/kg													
n-Butylbenzene	104-51-8	mg/kg													
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs) (Indicator															
1-Methylnaphthalene	90-12-0	mg/kg	0.22	1.8	0.22	0.02 U	6.6	0.033	80	0.43	73	0.02 U	1.3	0.026	0.02 U
2-Methylnaphthalene	91-57-6	mg/kg	0.22	0.63	0.27	0.02 U	6.2	0.027	140	0.65	130	0.02 U	1.6	0.05	0.02 U
Naphthalene	91-20-3	mg/kg	0.23	0.031	0.02 U	0.02 U	0.5 U	0.022	300	0.87	320	0.024	1.2	0.12	0.02 U
Acenaphthene	83-32-9	mg/kg	0.19	0.28	0.089	0.041	1.6	0.14	150	0.91	120	0.036	3.5	0.017 U	0.017 U
Acenaphthylene	208-96-8	mg/kg	0.33	0.02 U	0.02 U	0.02 U	0.5 U	0.02 U	10 U	0.02 U	2 U	0.02 U	0.4 U	0.02 U	0.02 U
Anthracene	120-12-7	mg/kg	0.23	0.02 U	0.024	0.02 U	0.5 U	0.02 U	63	0.47	40	0.021	2	0.02 U	0.02 U
Fluorene	86-73-7	mg/kg	0.2 U	0.72	0.12	0.02 U	2.9	0.031	130	0.79	100	0.044	3	0.02 U	0.02 U
Phenanthrene	85-01-8	mg/kg	0.91	1.1	0.28	0.02 U	4.7	0.02 U	450	2.6	330	0.18	9.9	0.039	0.021
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)															
Total cPAHs TEQ		mg/kg	0.84	0.015	0.014	0.013 U	0.034	0.013 U	25	0.46	22	0.015	1.7	0.11	0.047
Benzo(a)pyrene	50-32-8	mg/kg	0.56	0.017 U	0.017 U	0.017 U	0.42 U	0.017 U	16	0.32	16	0.017 U	1.2	0.085	0.042
Benz(a)anthracene	56-55-3	mg/kg	0.44	0.025	0.015	0.0065 U	0.32	0.0065 U	38	0.52	24	0.021	1.4	0.063	0.014
Benzo(b)fluoranthene	205-99-2	mg/kg	1	0.02 U	0.02 U	0.02 U	0.5 U	0.02 U	20	0.43	16	0.02 U	1	0.058	0.02 U
Benzo(k)fluoranthene	207-08-9	mg/kg	0.74	0.02 U	0.02 U	0.02 U	0.5 U	0.02 U	23	0.27	12	0.02 U	0.76	0.052	0.02 U
Benzofluoranthenes (total)	56832-73-6	mg/kg													
Chrysene	218-01-9	mg/kg	0.87	0.048	0.015	0.0072 U	0.28	0.0072 U	38	0.48	24	0.018	1.7	0.074	0.019
Dibenzo(a,h)anthracene	53-70-3	mg/kg	0.44	0.018 U	0.018 U	0.018 U	0.45 U	0.018 U	9 U	0.12	4.7	0.018 U	0.81	0.065	0.018 U
Indeno(1,2,3-cd)pyrene	193-39-5	mg/kg	0.2 U	0.02 U	0.02 U	0.02 U	0.5 U	0.02 U	10 U	0.044	2.1	0.02 U	0.86	0.047	0.02 U
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons															
Benzo(g,h,i)perylene	191-24-2	mg/kg	0.73	0.02 U	0.02 U	0.02 U	0.5 U	0.02 U	10 U	0.2	8.1	0.02 U	0.54	0.071	0.02 U
Fluoranthene	206-44-0	mg/kg	1.2	0.054	0.068	0.02 U	1.4	0.02 U	200	2.1	130	0.12	5.6	0.11	0.029
Pyrene	129-00-0	mg/kg	2.6	0.02 U	0.073	0.02 U	1.3	0.02 U	190	2	120	0.098	6.5	0.13	0.038

Qualifiers:

J The analyte was detected and the result should be considered an estimate.
JM The analyte was detected and the result should be considered an estimate due to a poor chromatographic match to the Motor Oil and/or Diesel
JQ The analyte was detected between the method detection limit and method reporting limit and the result should be considered an estimate.
U The analyte was not detected at the given reporting limit.
UJ The analyte was not detected at the given reporting limit, which is considered to be an estimate.
UB The analyte was not detected, the reporting limit was raised due to blank contamination.

Table G.2.4
Soil Analytical Data

		Event	RI/FS Interim Action Sampling						
		Location	MW-11	MW-11	MW-12	MW-12	MW-12	MW-12	MW-12
		Sample ID	MW-11-1-2-020915	MW-11-6-7-020915	MW-12-1-2-020915	MW-12-4-5-020915	MW-12-10.5-11-020915	MW-12-11-12-020915	MW-12-13-14-020915
		Sample Date	02/09/2015	02/09/2015	02/09/2015	02/09/2015	02/09/2015	02/09/2015	02/09/2015
		Sample depth (ft bgs)	1 - 2	6 - 7	1 - 2	4 - 5	10.5 - 11	11 - 12	12 - 13
Detected TPH and Its Constituents	**CAS**	**Units**							
TPH by NWTPH Methods									
Gasoline-Range Hydrocarbons		mg/kg							
Diesel-Range Hydrocarbons		mg/kg	450	59	11	12,000	160	71	10
Oil-Range Hydrocarbons		mg/kg							
Mono-cyclic Aromatic or Substituted Benzenes (BTEX expanded list)									
Toluene	108-88-3	mg/kg		1 UJ		0.85 UJ	0.97 UJ		
Ethylbenzene	100-41-4	mg/kg		1 UJ		0.85 UJ	0.97 UJ		
Xylenes (meta & para)	108-38-3/106-42-3	mg/kg		2 UJ		1.7 UJ	1.9 UJ		
Xylene (ortho)	95-47-6	mg/kg		1 UJ		0.85 UJ	0.97 UJ		
Xylenes (total)	1330-20-7	mg/kg							
1,2,4-Trimethylbenzene	95-63-6	mg/kg							
1,3,5-Trimethylbenzene	108-67-8	mg/kg							
Iso-Propylbenzene	98-82-8	mg/kg							
n-Propylbenzene	103-65-1	mg/kg							
n-Butylbenzene	104-51-8	mg/kg							
Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAHs) (Indicator									
1-Methylnaphthalene	90-12-0	mg/kg	0.059	0.0086	0.0047 U	1.4	0.085		0.0026 JQ
2-Methylnaphthalene	91-57-6	mg/kg	0.069	0.011	0.0033 JQ	1.4	0.1		0.0044 JQ
Naphthalene	91-20-3	mg/kg	0.016	0.0086	0.0047 U	0.2	0.021		0.0043 JQ
Acenaphthene	83-32-9	mg/kg	0.081	0.011	0.0047 U	0.6	0.032		0.0032 JQ
Acenaphthylene	208-96-8	mg/kg	0.029	0.0047 JQ	0.0026 JQ	0.16	0.015		0.0025 JQ
Anthracene	120-12-7	mg/kg	0.11	0.01	0.004 JQ	1.1	0.032		0.0044 JQ
Fluorene	86-73-7	mg/kg	0.037	0.0061	0.0047 U	0.83	0.049		0.0048 U
Phenanthrene	85-01-8	mg/kg	1.4	0.063	0.0095	2.2	0.11		0.016
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)									
Total cPAHs TEQ		mg/kg	0.7	0.043	0.01	0.49	0.028 J		0.011 J
Benzo(a)pyrene	50-32-8	mg/kg	0.46	0.03	0.0067	0.31	0.019		0.0074
Benz(a)anthracene	56-55-3	mg/kg	0.7	0.031	0.006	0.47	0.021		0.0066
Benzo(b)fluoranthene	205-99-2	mg/kg							
Benzo(k)fluoranthene	207-08-9	mg/kg							
Benzofluoranthenes (total)	56832-73-6	mg/kg	1.2	0.063	0.016	0.92	0.048		0.018
Chrysene	218-01-9	mg/kg	0.85	0.042	0.0082	0.67	0.031		0.01
Dibenzo(a,h)anthracene	53-70-3	mg/kg	0.093	0.006	0.0047 U	0.084	0.0046 JQ		0.0025 JQ
Indeno(1,2,3-cd)pyrene	193-39-5	mg/kg	0.32	0.024	0.0078	0.26	0.015		0.0087
Non-Carcinogenic High Molecular Weight Polycyclic Aromatic Hydrocarbons									
Benzo(g,h,i)perylene	191-24-2	mg/kg	0.37	0.035	0.013	0.27	0.02		0.012
Fluoranthene	206-44-0	mg/kg	2.5	0.14	0.015	2	0.078		0.019
Pyrene	129-00-0	mg/kg	1.8	0.097	0.013	2	0.065		0.014

Qualifiers:

- J The analyte was detected and the result should be considered an estimate.
- JM The analyte was detected and the result should be considered an estimate due to a poor chromatographic match to the Motor Oil and/or Diesel
- JQ The analyte was detected between the method detection limit and method reporting limit and the result should be considered an estimate.
- U The analyte was not detected at the given reporting limit.
- UJ The analyte was not detected at the given reporting limit, which is considered to be an estimate.
- UB The analyte was not detected, the reporting limit was raised due to blank contamination.

Table G.2.5
Groundwater Analytical Data

		Location	MW-01 (Interior Well)						MW-02 (Shoreline	MW-02A (Shoreline Well)								
		Sample ID	MW-1-98	MW1-GW-032311	MW1-GW-072911	MW-01-GW-021513	MW-01-GW-082715	MW-01-GW-120315	MW-2-98	MW02A-GW-032311	MW02A-GW-032311-D	MW16B-GW-072911	MW2A-GW-072911	MW-02A-GW-021513	MW-02A-GW-022515	MW-02A-GW-052815	MW-02A-GW-082715	MW-02A-GW-120315
		Sample Date	05/14/1998	03/23/2011	07/29/2011	02/15/2013	08/27/2015	12/03/2015	05/14/1998	03/23/2011	03/23/2011	07/29/2011	07/29/2011	02/15/2013	02/25/2015	05/28/2015	08/27/2015	12/03/2015
Detected TPH and Its Constituents	**CAS**	**Units**																
TPH by NW-TPH Methods																		
Gasoline-Range Hydrocarbons		µg/L	580	730 J	770 J	680 JM			250 U	50 U	50 U	50 U	50 U	50 U				
Diesel-Range Hydrocarbons		µg/L	4,600	1,400	1,900	1,500 JM			400	130 U	130 U	160	130 U	340 JM				
Oil-Range Hydrocarbons		µg/L	500 U	250 U	250 U	250 U			500 U	250 U	250 U	250 U	250 U	250 U				
BTEX (expanded list)																		
Ethylbenzene	100-41-4	µg/L	1.4	1 U	1 U	2 U			1 U	1 U	1 U	1 U	1 U	2 U	5 U			
Xylenes (meta & para)	108-38-3/106-42-3	µg/L	6.6	2.1	2 U	4 U			1 U	2 U	2 U	2 U	2 U	4 U	10 U			
Xylene (ortho)	95-47-6	µg/L	2.5	1 U	1 U	2 U			1 U	1 U	1 U	1 U	1 U	2 U	5 U			
Xylenes (total)	1330-20-7	µg/L		2.1	2 U	3 U				2 U	2 U	2 U	2 U	3 U				
1,2,4-Trimethylbenzene	95-63-6	µg/L	15	1 U	1 U	2 U			1 U	1 U	1 U	1 U	1 U	2 U				
1,3,5-Trimethylbenzene	108-67-8	µg/L	6.4	1 U	1 U	2 U			1 U	1 U	1 U	1 U	1 U	2 U				
Iso-Propylbenzene	98-82-8	µg/L	3.4	3	2.7	3.1			1 U	1 U	1 U	1 U	1 U	2 U				
n-Propylbenzene	103-65-1	µg/L	2.9	2.7	2.4	2.5			1 U	1 U	1 U	1 U	1 U	2 U				
n-Butylbenzene	104-51-8	µg/L	1.5	1 U	8.6	2 U			1 U	1 U	1 U	1 U	1 U	2 U				
LPAHs																		
1-Methylnaphthalene	90-12-0	µg/L		78	54	93	25	28		2 U	2 U	2 U	2 U	0.026	0.0051 JQ	0.0053 JQ	0.0035 JQ	0.01 U
2-Methylnaphthalene	91-57-6	µg/L		63	30	67	9	22		2 U	2 U	2 U	2 U	0.027	0.01 U	0.0093 JQ	0.01 U	0.01 U
Naphthalene	91-20-3	µg/L	14	5.5	5.8	4.6	6.2	18	5 U	1 U	1.1	1 U	1 U	0.063	0.02	0.041	0.016	0.01 U
Acenaphthene	83-32-9	µg/L		21	20	25	32	35		2 U	2 U	2 U	2 U	0.02 U	0.01 U	0.004 JQ	0.01 U	0.01 U
Acenaphthylene	208-96-8	µg/L		2 U	2 U	0.02 U	0.41	0.31		2 U	2 U	2 U	2 U	0.02 U	0.01 U	0.0033 JQ	0.01 U	0.01 U
Anthracene	120-12-7	µg/L		2 U	2 U	0.42	0.3	0.44		2 U	2 U	2 U	2 U	0.037	0.011	0.0083 JQ	0.0035 JQ	0.012
Fluorene	86-73-7	µg/L		15	11	14	14	17		2 U	2 U	2 U	2 U	0.02 U	0.01 U	0.0078 JQ	0.01 U	0.01 U
Phenanthrene	85-01-8	µg/L		10	2.4	6.7	1.8 J	6.6		2 U	2 U	2 U	2 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U
CPAHs																		
Total cPAHs TEQ		µg/L		1.6 U	1.6 U	0.032 J	0.076 U	0.014 J		1.6 U	1.6 U	1.6 U	1.6 U	0.0073 UB	0.0076 U	0.0076 U	0.0076 U	0.0076 U
Benzo(a)pyrene	50-32-8	µg/L		2 U	2 U	0.028 J	0.1 U	0.0084 JQ		2 U	2 U	2 U	2 U	0.0099 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibenzo(a,h)anthracene	53-70-3	µg/L		2 U	2 U	0.012 J	0.1 U	0.01 U		2 U	2 U	2 U	2 U	0.0064 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	193-39-5	µg/L		2 U	2 U	0.0087 J	0.1 U	0.01 U		2 U	2 U	2 U	2 U	0.0051 U	0.01 U	0.01 U	0.01 U	0.01 U
Other HPAHs																		
Fluoranthene	206-44-0	µg/L		2 U	2 U	0.88	1.1	1.3		2 U	2 U	2 U	2 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U
Pyrene	129-00-0	µg/L		2 U	2 U	0.49	0.49	0.68		2 U	2 U	2 U	2 U	0.034 U	0.01 U	0.01 U	0.01 U	0.01 U

Notes:

-- Not analyzed.

RED Concentration exceeds the proposed cleanup level.

RED Concentration exceeds the groundwater screening level for this compound, but for a pathway where the data from the media to be protected (sediments) indicate that the pathway is protective and in compliance.

BOLD Reporting limit is greater than the proposed cleanup level.

1 Only groundwater samples from wells that were collected in the past 5 years were considered part of the data set.

2 Groundwater screening level is the lowest of the screening levels to protect surface water quality, sediment quality, and vapor intrusion, as modified by natural background for arsenic and PQLs for cPAHs.

3 TPH was calculated as either the addition of all detected EPH/VPH fractions or the highest reporting limit if all fractions were non-detect, or the addition of detected oil and diesel NWTPH-Dx results or the highest reporting limit if both were non-detect.

4 Total cPAHs TEQ is the sum of benzo(a)pyrene, benz(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, and indeno(1,2,3-cd)pyrene.

5 Calculation of cPAH TEQ concentrations was performed using the California Environmental Protection Agency 2005 TEFs as presented in Table 708-2 of WAC 173-340-900 (Ecology 2007).

6 Calculated using detected cPAH concentrations plus one-half the reporting limit for cPAHs that were not detected.

7 The first value is for protection of sediments and the second value is for protection of surface water; the two values discussed in the main text.

8 VPH and EPH were ran on these samples and were non detect.

Abbreviations:

CAS Chemical Abstract System
COC Contaminant of concern
COPC Contaminant of potential concern
EPH Extractable petroleum hydrocarbon
µg/L Micrograms per liter
PQL Practical Quantitation Limit
TEF Toxic equivalent factor
TEQ Toxic equivalent
VPH Volatile petroleum hydrocarbon
WAC Washington Administrative Code

Qualifiers:

J The analyte was detected and the result should be considered an estimate.
JM The analyte was detected and the result should be considered an estimate due to a poor chromatographic match to the Motor Oil and/or Diesel standards for the individual analyte results.
JQ The analyte was detected between the method detection limit and method reporting limit and the result should be considered an estimate.
U The analyte was not detected at the given reporting limit.
UB The analyte was not detected, the reporting limit was raised due to blank contamination.

Table G.2.5
Groundwater Analytical Data

		Location	MW-03 (Shoreline Well)		MW-04 (Interior Well)					MW-05 (Interior Well)			
		Sample ID	MW-3-98	MW-3-98 Dup	MW-4-98	HAS-MW-4	MW4-GW-032211	MW4-GW-072911	MW-04-GW-021413	MW-5-98	MW5-GW-032311	MW5-GW-072911	MW-05-GW-021413
		Sample Date	05/14/1998	05/14/1998	05/14/1998	08/17/2005	03/22/2011	07/29/2011	02/14/2013	05/14/1998	03/23/2011	07/29/2011	02/15/2013
Detected TPH and Its Constituents	**CAS**	**Units**											
TPH by NW-TPH Methods													
Gasoline-Range Hydrocarbons		µg/L	250 U	250 U	250 U	250 U	50 U	50 U	50 U	250 U	50 U	50 U	50 U
Diesel-Range Hydrocarbons		µg/L	250 U	250 U	730	250 U	130 U	130 U	130 U	250 U	130 U	130 U	130 U
Oil-Range Hydrocarbons		µg/L	500 U	500 U	500 U	500 U	250 U	250 U	250 U	500 U	250 U	250 U	250 U
BTEX (expanded list)													
Ethylbenzene	100-41-4	µg/L	1 U	1 U	1 U		2 U	1 U	2 U	1 U	1 U	1 U	2 U
Xylenes (meta & para)	108-38-3/106-42-3	µg/L	1 U	1 U	1 U		4 U	2 U	4 U	1 U	2 U	2 U	4 U
Xylene (ortho)	95-47-6	µg/L	1 U	1 U	1 U		2 U	1 U	2 U	1 U	1 U	1 U	2 U
Xylenes (total)	1330-20-7	µg/L					4 U	2 U	3 U		2 U	2 U	3 U
1,2,4-Trimethylbenzene	95-63-6	µg/L	1 U	1 U	1 U		2 U	1 U	2 U	1 U	1 U	1 U	2 U
1,3,5-Trimethylbenzene	108-67-8	µg/L	1 U	1 U	1 U		2 U	1 U	2 U	1 U	1 U	1 U	2 U
Iso-Propylbenzene	98-82-8	µg/L	1 U	1 U	1 U		2 U	1 U	2 U	1 U	1 U	1 U	2 U
n-Propylbenzene	103-65-1	µg/L	1 U	1 U	1 U		2 U	1 U	2 U	1 U	1 U	1 U	2 U
n-Butylbenzene	104-51-8	µg/L	1 U	1 U	1 U		2 U	1 U	2 U	1 U	1 U	1 U	2 U
LPAHs													
1-Methylnaphthalene	90-12-0	µg/L					2 U	2 U	0.02 U		2 U	2 U	0.02 U
2-Methylnaphthalene	91-57-6	µg/L				1 U	2 U	2 U	0.02 U		2 U	2 U	0.02 U
Naphthalene	91-20-3	µg/L	5 U	5 U	5 U	1 U	2 U	1 U	0.02 U	5 U	1 U	1 U	0.02 U
Acenaphthene	83-32-9	µg/L				1 U	2 U	2 U	0.02 U		2 U	2 U	0.02 U
Acenaphthylene	208-96-8	µg/L				1 U	2 U	2 U	0.02 U		2 U	2 U	0.02 U
Anthracene	120-12-7	µg/L				1 U	2 U	2 U	0.02 U		2 U	2 U	0.02 U
Fluorene	86-73-7	µg/L				1 U	2 U	2 U	0.02 U		2 U	2 U	0.02 U
Phenanthrene	85-01-8	µg/L				1 U	2 U	2 U	0.02 U		2 U	2 U	0.02 U
CPAHs													
Total cPAHs TEQ		µg/L				0.76 U	1.6 U	1.6 U	0.0071 U		1.6 U	1.6 U	0.0071 U
Benzo(a)pyrene	50-32-8	µg/L				1 U	2 U	2 U	0.0096 U		2 U	2 U	0.0096 U
Dibenzo(a,h)anthracene	53-70-3	µg/L				1 U	2 U	2 U	0.0062 U		2 U	2 U	0.0062 U
Indeno(1,2,3-cd)pyrene	193-39-5	µg/L				1 U	2 U	2 U	0.005 U		2 U	2 U	0.005 U
Other HPAHs													
Fluoranthene	206-44-0	µg/L				1 U	2 U	2 U	0.02 U		2 U	2 U	0.02 U
Pyrene	129-00-0	µg/L				1 U	2 U	2 U	0.033 U		2 U	2 U	0.094

Notes:

-- Not analyzed.

RED Concentration exceeds the proposed cleanup level.

RED Concentration exceeds the groundwater screening level for this compound, but for a pathway where the data from the media to be protected (sediments) indicate that the pathway is protective and in compliance.

BOLD Reporting limit is greater than the proposed cleanup level.

1 Only groundwater samples from wells that were collected in the past 5 years were considered part of the data set.

2 Groundwater screening level is the lowest of the screening levels to protect surface water quality, sediment quality, and vapor intrusion, as modified by natural background for arsenic and PQLs for cPAHs.

3 TPH was calculated as either the addition of all detected EPH/VPH fractions or the highest reporting limit if all fractions were non-detect, or the addition of detected oil and diesel NWTPH-Dx results or the highest reporting limit if both were non-detect.

4 Total cPAHs TEQ is the sum of benzo(a)pyrene, benz(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, and indeno(1,2,3-cd)pyrene.

5 Calculation of cPAH TEQ concentrations was performed using the California Environmental Protection Agency 2005 TEFs as presented in Table 708-2 of WAC 173-340-900 (Ecology 2007).

6 Calculated using detected cPAH concentrations plus one-half the reporting limit for cPAHs that were not detected.

7 The first value is for protection of sediments and the second value is for protection of surface water; the two values discussed in the main text.

8 VPH and EPH were ran on these samples and were non detect.

Abbreviations:

CAS Chemical Abstract System

COC Contaminant of concern

COPC Contaminant of potential concern

EPH Extractable petroleum hydrocarbon

µg/L Micrograms per liter

PQL Practical Quantitation Limit

TEF Toxic equivalent factor

TEQ Toxic equivalent

VPH Volatile petroleum hydrocarbon

WAC Washington Administrative Code

Qualifiers:

J The analyte was detected and the result should be considered an estimate.

JM The analyte was detected and the result should be considered an estimate due to a poor chromatographic match to the Motor Oil and/or Diesel standards for the individual analyte results.

JQ The analyte was detected between the method detection limit and method reporting limit and the result should be considered an estimate.

U The analyte was not detected at the given reporting limit.

UB The analyte was not detected, the reporting limit was raised due to blank contamination.

Table G.2.5
Groundwater Analytical Data

		Location	MW-06 (Shoreline Well)								MW-07 (Shoreline Well)						
		Sample ID	MW06-GW-032211	MW6-GW-072911	MW-06-GW-021413	MW-94-GW-021413	MW-06-GW-022515	MW-06-GW-052815	MW-06-GW-082715	MW-06-GW-120315	MW07-GW-032311	MW7-GW-072911	MW-07-GW-021413	MW-07-GW-022515	MW-07-GW-052815	MW-07-GW-082715	MW-07-GW-120315
		Sample Date	03/22/2011	07/29/2011	02/14/2013	02/14/2013	02/25/2015	05/28/2015	08/27/2015	12/03/2015	03/23/2011	07/29/2011	02/14/2013	02/25/2015	05/28/2015	08/27/2015	12/03/2015
Detected TPH and Its Constituents	**CAS**	**Units**															
TPH by NW-TPH Methods																	
Gasoline-Range Hydrocarbons		µg/L	1000	380	50 U	50 U					50 U	50	50 U				
Diesel-Range Hydrocarbons		µg/L	3500	1000	130 U	130 U					130 U	230	430 JM				
Oil-Range Hydrocarbons		µg/L	1200	310	250 U	250 U					250 U	250 U	250 U				
BTEX (expanded list)																	
Ethylbenzene	100-41-4	µg/L	2 U	1 U	2 U	2 U					1 U	1 U	2 U				
Xylenes (meta & para)	108-38-3/106-42-3	µg/L	4 U	2 U	4 U	4 U					2 U	2 U	4 U				
Xylene (ortho)	95-47-6	µg/L	2 U	1 U	2 U	2 U					1 U	1 U	2 U				
Xylenes (total)	1330-20-7	µg/L	4 U	2 U	3 U	3 U					2 U	2 U	3 U				
1,2,4-Trimethylbenzene	95-63-6	µg/L	2 U	1 U	2 U	2 U					1 U	1 U	2 U				
1,3,5-Trimethylbenzene	108-67-8	µg/L	2 U	1 U	2 U	2 U					1 U	1 U	2 U				
Iso-Propylbenzene	98-82-8	µg/L	2 U	1 U	2 U	2 U					1 U	1 U	2 U				
n-Propylbenzene	103-65-1	µg/L	2 U	1 U	2 U	2 U					1 U	1 U	2 U				
n-Butylbenzene	104-51-8	µg/L	2 U	1 U	2 U	2 U					1 U	1.3	2 U				
LPAHs																	
1-Methylnaphthalene	90-12-0	µg/L	4 U	2.9	0.02 U	0.02 U	0.026	0.0061 JQ	0.032	0.0043 JQ	2 U	2 U	0.02 U	0.0064 JQ	0.0035 JQ	0.008 JQ	0.01 U
2-Methylnaphthalene	91-57-6	µg/L	4 U	2 U	0.02 U	0.02 U	0.015	0.0085 JQ	0.02	0.01 U	2 U	2 U	0.02 U	0.0055 JQ	0.0047 JQ	0.0097 JQ	0.01 U
Naphthalene	91-20-3	µg/L	2 U	1 U	0.02 U	0.02 U	0.05	0.029	0.047	0.01 U	1 U	1 U	0.02 U	0.029	0.034	0.031	0.01 U
Acenaphthene	83-32-9	µg/L	4 U	2 U	0.031	0.039	0.01 U	0.0057 JQ	0.02	0.005 JQ	2 U	5	0.96	0.01 U	0.01 U	0.0073 JQ	0.01 U
Acenaphthylene	208-96-8	µg/L	4 U	2 U	0.02 U	0.02 U	0.01 U	0.01 U	0.0051 JQ	0.01 U	2 U	2 U	0.026	0.01 U	0.01 U	0.0051 JQ	0.01 U
Anthracene	120-12-7	µg/L	4 U	2 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	2 U	2 U	0.02 U	0.0063 JQ	0.0036 JQ	0.0048 JQ	0.01 U
Fluorene	86-73-7	µg/L	4 U	2 U	0.02 U	0.02 U	0.0071 JQ	0.0077 JQ	0.034	0.01 U	2 U	2 U	0.02 U	0.01 U	0.01 U	0.022	0.01 U
Phenanthrene	85-01-8	µg/L	4 U	2 U	0.02 U	0.02 U	0.01 U	0.01 U	0.0098 JQ	0.01 U	2 U	2 U	0.02 U	0.01 U	0.0034 JQ	0.011 J	0.01 U
CPAHs																	
Total cPAHs TEQ		µg/L	3.2 U	1.6 U	0.0071 U	0.0071 U	0.0076 U	0.0076 U	0.0076 U	0.0076 U	1.6 U	1.6 U	0.0071 U	0.0076 U	0.0076 U	0.0076 U	0.0076 U
Benzo(a)pyrene	50-32-8	µg/L	4 U	2 U	0.0096 U	0.0096 U	0.01 U	0.01 U	0.01 U	0.01 U	2 U	2 U	0.0096 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibenzo(a,h)anthracene	53-70-3	µg/L	4 U	2 U	0.0062 U	0.0062 U	0.01 U	0.01 U	0.01 U	0.01 U	2 U	2 U	0.0062 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	193-39-5	µg/L	4 U	2 U	0.005 U	0.005 U	0.01 U	0.01 U	0.01 U	0.01 U	2 U	2 U	0.005 U	0.01 U	0.01 U	0.01 U	0.01 U
Other HPAHs																	
Fluoranthene	206-44-0	µg/L	4 U	2 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	2 U	2 U	0.02 U	0.01 U	0.0038 JQ	0.0083 JQ	0.01 U
Pyrene	129-00-0	µg/L	4 U	2 U	0.033 U	0.033 U	0.01 U	0.01 U	0.01 U	0.01 U	2 U	2 U	0.033 U	0.0056 JQ	0.0048 JQ	0.0096 JQ	0.01 U

Notes:

-- Not analyzed.

RED Concentration exceeds the proposed cleanup level.

RED Concentration exceeds the groundwater screening level for this compound, but for a pathway where the data from the media to be protected (sediments) indicate that the pathway is protective and in compliance.

BOLD Reporting limit is greater than the proposed cleanup level.

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3 TPH was calculated as either the addition of all detected EPH/VPH fractions or the highest reporting limit if all fractions were non-detect, or the addition of detected oil and diesel NWTPH-Dx results or the highest reporting limit if both were non-detect.

4 Total cPAHs TEQ is the sum of benzo(a)pyrene, benz(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, and indeno(1,2,3-cd)pyrene.

5 Calculation of cPAH TEQ concentrations was performed using the California Environmental Protection Agency 2005 TEFs as presented in Table 708-2 of WAC 173-340-900 (Ecology 2007).

6 Calculated using detected cPAH concentrations plus one-half the reporting limit for cPAHs that were not detected.

7 The first value is for protection of sediments and the second value is for protection of surface water; the two values discussed in the main text.

8 VPH and EPH were ran on these samples and were non detect.

Abbreviations:

CAS Chemical Abstract System

COC Contaminant of concern

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EPH Extractable petroleum hydrocarbon

µg/L Micrograms per liter

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VPH Volatile petroleum hydrocarbon

WAC Washington Administrative Code

Qualifiers:

J The analyte was detected and the result should be considered an estimate.

JM The analyte was detected and the result should be considered an estimate due to a poor chromatographic match to the Motor Oil and/or Diesel standards for the individual analyte results.

JQ The analyte was detected between the method detection limit and method reporting limit and the result should be considered an estimate.

U The analyte was not detected at the given reporting limit.

UB The analyte was not detected, the reporting limit was raised due to blank contamination.

Table G.2.5
Groundwater Analytical Data

		Location	MW-08 (Shoreline Well)							MW-09 (Shoreline Well)							
		Sample ID	MW08-GW-032211	MW8-GW-072911	MW-08-GW-021413	MW-08-GW-022515	MW-08-GW-052815	MW-08-GW-082715	MW-08-120315	MW09-GW-032211	MW9-GW-072911	MW-09-GW-021513	MW-09-GW-022515	MW-25-GW-022515	MW-09-GW-052815	MW-25-GW-052815	MW-09-GW-082715
		Sample Date	03/22/2011	07/29/2011	02/14/2013	02/25/2015	05/28/2015	08/27/2015	12/03/2015	03/22/2011	07/29/2011	02/15/2013	02/25/2015	02/25/2015	05/28/2015	05/28/2015	08/27/2015
Detected TPH and Its Constituents	**CAS**	**Units**															
TPH by NW-TPH Methods																	
Gasoline-Range Hydrocarbons		µg/L	50 U	50 U	50 U					520 J	450 J	530 JM					
Diesel-Range Hydrocarbons		µg/L	130 U	130 U	130 U					620	1,300	1,200 JM					
Oil-Range Hydrocarbons		µg/L	250 U	250 U	250 U					250 U	250 U	250 U					
BTEX (expanded list)																	
Ethylbenzene	100-41-4	µg/L	2 U	1 U	2 U					2 U	1 U	2 U					
Xylenes (meta & para)	108-38-3/106-42-3	µg/L	4 U	2 U	4 U					4 U	2 U	4 U					
Xylene (ortho)	95-47-6	µg/L	2 U	1 U	2 U					2 U	1 U	2 U					
Xylenes (total)	1330-20-7	µg/L	4 U	2 U	3 U					4 U	2 U	3 U					
1,2,4-Trimethylbenzene	95-63-6	µg/L	2 U	1 U	2 U					2 U	1 U	2 U					
1,3,5-Trimethylbenzene	108-67-8	µg/L	2 U	1 U	2 U					2 U	1 U	2 U					
Iso-Propylbenzene	98-82-8	µg/L	2 U	1 U	2 U					2	1.5	2.6					
n-Propylbenzene	103-65-1	µg/L	2 U	1 U	2 U					2 U	1 U	2 U					
n-Butylbenzene	104-51-8	µg/L	2 U	1 U	2 U					2 U	2.4	2.8					
LPAHs																	
1-Methylnaphthalene	90-12-0	µg/L	2 U	2 U	0.02 U	0.0089 JQ	0.0043 JQ	0.0092 JQ	0.01 U	32	31	52	60	52	39	39	48
2-Methylnaphthalene	91-57-6	µg/L	2 U	2 U	0.02 U	0.01 U	0.01	0.016	0.01 U	4.1	4.2	4.3	12	10	8.6	8.1	8.3 J
Naphthalene	91-20-3	µg/L	2 U	1 U	0.02 U	0.0078 JQ	0.056	0.057	0.01 U	2 U	1.2	0.64	0.29	0.3	0.22	0.22	0.21
Acenaphthene	83-32-9	µg/L	2 U	2 U	0.02 U	0.01 U	0.01 U	0.0078 JQ	0.01 U	2.2	2 U	2	2.8	2.6	2.2	2.2	3.3
Acenaphthylene	208-96-8	µg/L	2 U	2 U	0.02 U	0.01 U	0.01 U	0.0037 JQ	0.01 U	2 U	2 U	0.02 U	0.01 U	0.01 U	0.075	0.11	0.076
Anthracene	120-12-7	µg/L	2 U	2 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	2 U	2 U	0.092	0.06	0.072	0.051	0.043	0.013
Fluorene	86-73-7	µg/L	2 U	2 U	0.02 U	0.01 U	0.01 U	0.018	0.01 U	3.2	2.6	3.9	3.9	3.6	2.7	2.5	3.6
Phenanthrene	85-01-8	µg/L	2 U	2 U	0.02 U	0.01 U	0.01 U	0.0084 JQ	0.0031 JQ	2 U	2 U	0.02 U	0.18	0.19	0.16	0.15	0.19 J
CPAHs																	
Total cPAHs TEQ		µg/L	1.6 U	1.6 U	0.0071 U	0.0076 U	0.0076 U	0.0076 U	0.0076 U	1.6 U	1.6 U	0.0071 U	0.0076 J	0.0076 U	0.0076 U	0.0076 U	0.005 J
Benzo(a)pyrene	50-32-8	µg/L	2 U	2 U	0.0096 U	0.01 U	0.01 U	0.01 U	0.01 U	2 U	2 U	0.0096 U	0.01 U	0.01 U	0.01 U	0.01 U	0.0025 JQ
Dibenzo(a,h)anthracene	53-70-3	µg/L	2 U	2 U	0.0062 U	0.01 U	0.01 U	0.01 U	0.01 U	2 U	2 U	0.0062 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	193-39-5	µg/L	2 U	2 U	0.005 U	0.01 U	0.01 U	0.01 U	0.01 U	2 U	2 U	0.005 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Other HPAHs																	
Fluoranthene	206-44-0	µg/L	2 U	2 U	0.02 U	0.01 U	0.01 U	0.0054 JQ	0.0036 JQ	2 U	2 U	0.02 U	0.016	0.018	0.014	0.011	0.017
Pyrene	129-00-0	µg/L	2 U	2 U	0.033 U	0.01 U	0.01 U	0.0052 JQ	0.01 U	2 U	2 U	0.033 U	0.024	0.018	0.019	0.02	0.022

Notes:

-- Not analyzed.

RED Concentration exceeds the proposed cleanup level.

RED Concentration exceeds the groundwater screening level for this compound, but for a pathway where the data from the media to be protected (sediments) indicate that the pathway is protective and in compliance.

BOLD Reporting limit is greater than the proposed cleanup level.

1 Only groundwater samples from wells that were collected in the past 5 years were considered part of the data set.

2 Groundwater screening level is the lowest of the screening levels to protect surface water quality, sediment quality, and vapor intrusion, as modified by natural background for arsenic and PQLs for cPAHs.

3 TPH was calculated as either the addition of all detected EPH/VPH fractions or the highest reporting limit if all fractions were non-detect, or the addition of detected oil and diesel NWTPH-Dx results or the highest reporting limit if both were non-detect.

4 Total cPAHs TEQ is the sum of benzo(a)pyrene, benz(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, and indeno(1,2,3-cd)pyrene.

5 Calculation of cPAH TEQ concentrations was performed using the California Environmental Protection Agency 2005 TEFs as presented in Table 708-2 of WAC 173-340-900 (Ecology 2007).

6 Calculated using detected cPAH concentrations plus one-half the reporting limit for cPAHs that were not detected.

7 The first value is for protection of sediments and the second value is for protection of surface water; the two values discussed in the main text.

8 VPH and EPH were ran on these samples and were non detect.

Abbreviations:

CAS Chemical Abstract System

COC Contaminant of concern

COPC Contaminant of potential concern

EPH Extractable petroleum hydrocarbon

µg/L Micrograms per liter

PQL Practical Quantitation Limit

TEF Toxic equivalent factor

TEQ Toxic equivalent

VPH Volatile petroleum hydrocarbon

WAC Washington Administrative Code

Qualifiers:

J The analyte was detected and the result should be considered an estimate.

JM The analyte was detected and the result should be considered an estimate due to a poor chromatographic match to the Motor Oil and/or Diesel standards for the individual analyte results.

JQ The analyte was detected between the method detection limit and method reporting limit and the result should be considered an estimate.

U The analyte was not detected at the given reporting limit.

UB The analyte was not detected, the reporting limit was raised due to blank contamination.

Table G.2.5
Groundwater Analytical Data

		Location	MW-09 (Shoreline Well) (cont.)			MW-10 (Shoreline	MW-11 (Shoreline Well)				MW-12 (Shoreline Well)			
		Sample ID	MW-25-GW-082715	MW-09-GW-120315	MW-25-GW-120315	MW-10-GW-021413	MW-11-GW-022515	MW-11-GW-052815	MW-GW-11-082715	MW-11-GW-120315	MW-12-GW-022515	MW-12-GW-052815	MW-GW-12-082715	MW-12-GW-120315
		Sample Date	08/27/2015	12/03/2015	12/03/2015	02/14/2013	02/25/2015	05/28/2015	08/27/2015	12/03/2015	02/25/2015	05/28/2015	08/27/2015	12/03/2015
Detected TPH and Its Constituents	**CAS**	**Units**												
TPH by NW-TPH Methods														
Gasoline-Range Hydrocarbons		µg/L				50 U	50 U[8]				50 U[8]			
Diesel-Range Hydrocarbons		µg/L				130 U	50 U[8]				50 U[8]			
Oil-Range Hydrocarbons		µg/L				250 U	50 U[8]				50 U[8]			
BTEX (expanded list)														
Ethylbenzene	100-41-4	µg/L				2 U	5 U				5 U			
Xylenes (meta & para)	108-38-3/106-42-3	µg/L				4 U	10 U				10 U			
Xylene (ortho)	95-47-6	µg/L				2 U	5 U				5 U			
Xylenes (total)	1330-20-7	µg/L				3 U								
1,2,4-Trimethylbenzene	95-63-6	µg/L				2 U								
1,3,5-Trimethylbenzene	108-67-8	µg/L				2 U								
Iso-Propylbenzene	98-82-8	µg/L				2 U								
n-Propylbenzene	103-65-1	µg/L				2 U								
n-Butylbenzene	104-51-8	µg/L				2 U								
LPAHs														
1-Methylnaphthalene	90-12-0	µg/L	47	35	35	0.02 U	0.22	1	0.73	0.14	0.1 U	0.0042 JQ	0.0062 JQ	0.01 U
2-Methylnaphthalene	91-57-6	µg/L	7.7 J	5.7	5.4	0.02 U	0.1 U	0.34	0.024	0.01	0.1 U	0.0076 JQ	0.01 JQ	0.01 U
Naphthalene	91-20-3	µg/L	0.2	0.16	0.15	0.02 U	0.82	5	1.1	0.2	0.1 U	0.03	0.036	0.01 U
Acenaphthene	83-32-9	µg/L	3	2.6	2.4	0.02 U	0.51	2.1	3	1.2	0.1 U	0.0032 JQ	0.0062 JQ	0.01 U
Acenaphthylene	208-96-8	µg/L	0.087	0.06	0.061	0.02 U	0.1 U	0.034	0.028	0.031	0.1 U	0.01 U	0.01 U	0.01 U
Anthracene	120-12-7	µg/L	0.014	0.039	0.039	0.02 U	0.1 U	0.037	0.027	0.048	0.05 JQ	0.0079 JQ	0.0045 JQ	0.0078 JQ
Fluorene	86-73-7	µg/L	3.7	1.9	1.8	0.02 U	0.11	0.54	0.59	0.46	0.1 U	0.0054 JQ	0.013	0.01 U
Phenanthrene	85-01-8	µg/L	0.2 J	0.1	0.09	0.02 U	0.1 U	0.21	0.069 JQ	0.026	0.1 U	0.01 U	0.0079 JQ	0.01 U
CPAHs														
Total cPAHs TEQ		µg/L	0.0053 J	0.0075 J	0.0076 J	0.0076 UB	0.071 U	0.0076 U	0.0076 U	0.016 J	0.071 U	0.0076 U	0.0076 U	0.0076 U
Benzo(a)pyrene	50-32-8	µg/L	0.0027 JQ	0.01 U	0.01 U	0.01 U	0.1 U	0.01 U	0.01 U	0.011	0.1 U	0.01 U	0.01 U	0.01 U
Dibenzo(a,h)anthracene	53-70-3	µg/L	0.01 U	0.01 U	0.01 U	0.0067 U	0.1 U	0.01 U	0.01 U	0.01 U	0.1 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	193-39-5	µg/L	0.01 U	0.01 U	0.01 U	0.0054 U	0.1 U	0.01 U	0.01 U	0.0035 JQ	0.1 U	0.01 U	0.01 U	0.01 U
Other HPAHs														
Fluoranthene	206-44-0	µg/L	0.017	0.018	0.016	0.02 U	0.1 U	0.031	0.03	0.11	0.1 U	0.01 U	0.0046 JQ	0.01 U
Pyrene	129-00-0	µg/L	0.017	0.02	0.019	0.036 U	0.1 U	0.023	0.02	0.083	0.1 U	0.01 U	0.01 U	0.01 U

Notes:

-- Not analyzed.

RED Concentration exceeds the proposed cleanup level.

RED Concentration exceeds the groundwater screening level for this compound, but for a pathway where the data from the media to be protected (sediments) indicate that the pathway is protective and in compliance.

BOLD Reporting limit is greater than the proposed cleanup level.

1 Only groundwater samples from wells that were collected in the past 5 years were considered part of the data set.

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3 TPH was calculated as either the addition of all detected EPH/VPH fractions or the highest reporting limit if all fractions were non-detect, or the addition of detected oil and diesel NWTPH-Dx results or the highest reporting limit if both were non-detect.

4 Total cPAHs TEQ is the sum of benzo(a)pyrene, benz(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, and indeno(1,2,3-cd)pyrene.

5 Calculation of cPAH TEQ concentrations was performed using the California Environmental Protection Agency 2005 TEFs as presented in Table 708-2 of WAC 173-340-900 (Ecology 2007).

6 Calculated using detected cPAH concentrations plus one-half the reporting limit for cPAHs that were not detected.

7 The first value is for protection of sediments and the second value is for protection of surface water; the two values discussed in the main text.

8 VPH and EPH were ran on these samples and were non detect.

Abbreviations:

CAS Chemical Abstract System
COC Contaminant of concern
COPC Contaminant of potential concern
EPH Extractable petroleum hydrocarbon
µg/L Micrograms per liter
PQL Practical Quantitation Limit
TEF Toxic equivalent factor
TEQ Toxic equivalent
VPH Volatile petroleum hydrocarbon
WAC Washington Administrative Code

Qualifiers:

J The analyte was detected and the result should be considered an estimate.
JM The analyte was detected and the result should be considered an estimate due to a poor chromatographic match to the Motor Oil and/or Diesel standards for the individual analyte results.
JQ The analyte was detected between the method detection limit and method reporting limit and the result should be considered an estimate.
U The analyte was not detected at the given reporting limit.
UB The analyte was not detected, the reporting limit was raised due to blank contamination.

Harris Avenue Shipyard

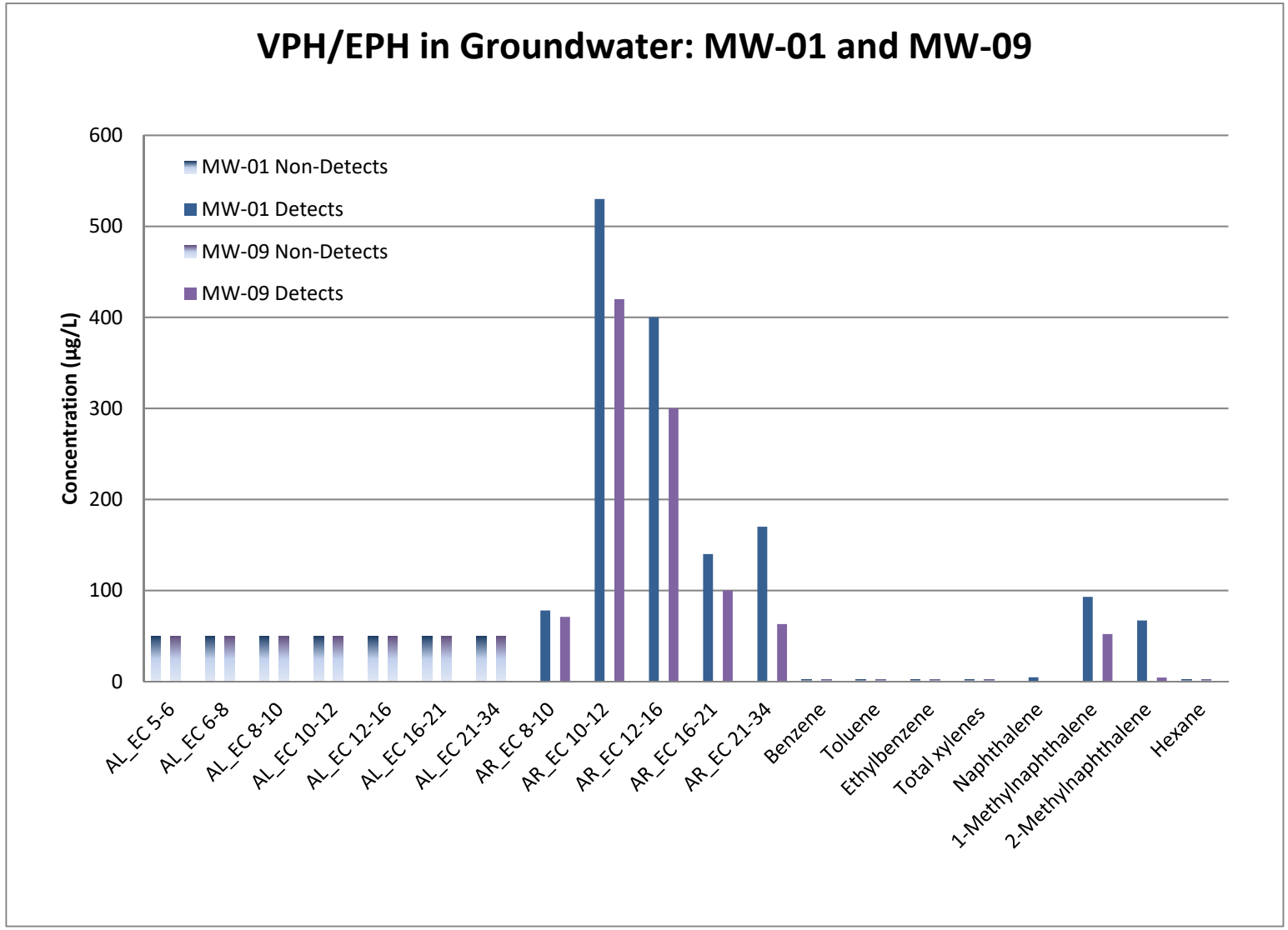
Remedial Investigation/ Feasibility Study

Appendix G
Screening Level Development

Attachment G.2
TPH Screening Level Report

Figures

FINAL



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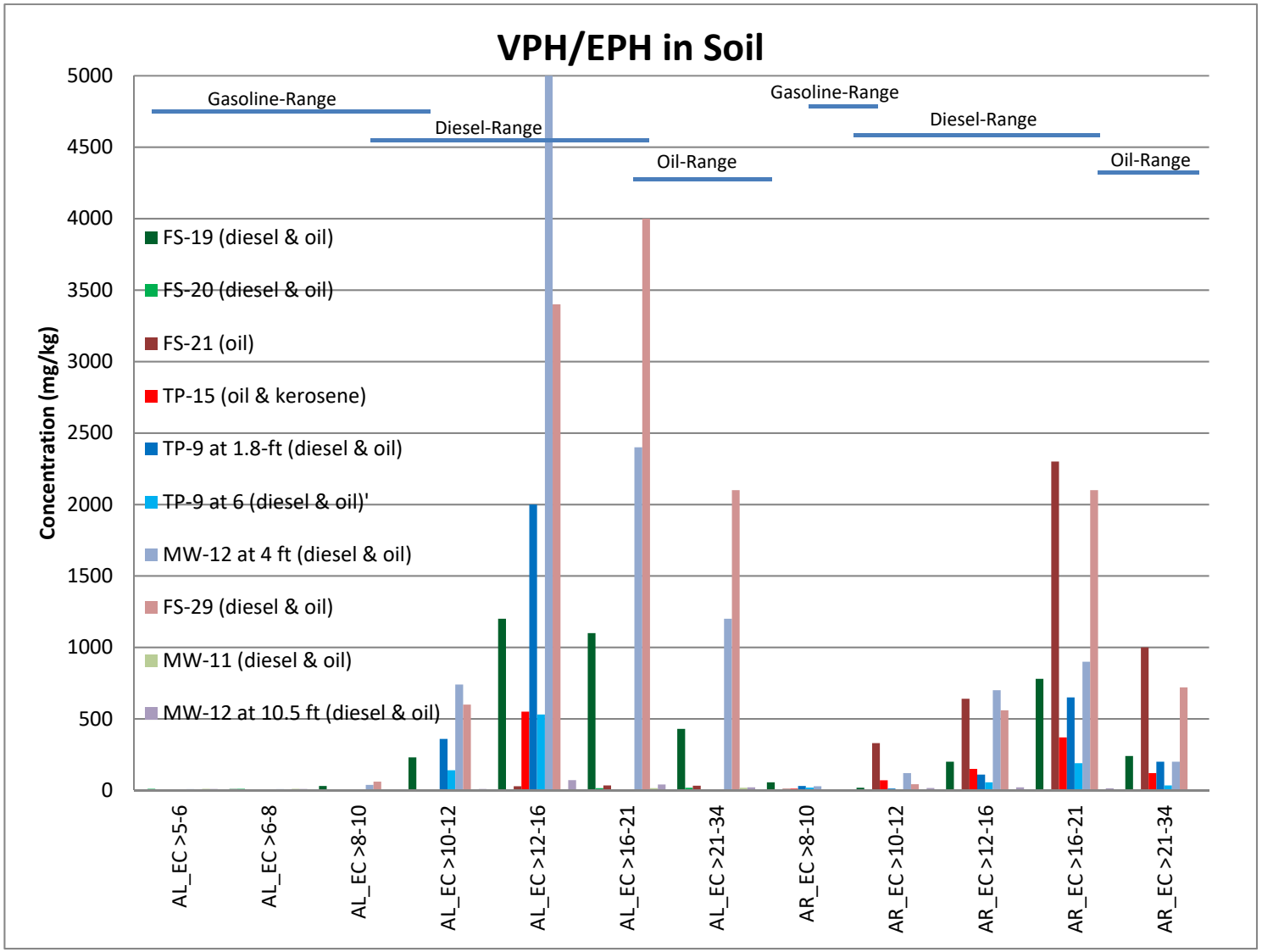
Remedial Investigation/Feasibility Study
Harris Avenue Shipyard
Bellingham, Washington

Figure G.2.1
VPH/EPH in Groundwater:
MW-01 and MW-09

6/13/2019



FLOYD | SNIDER
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Remedial Investigation/Feasibility Study
Harris Avenue Shipyard
Bellingham, Washington

Figure G.2.2
VPH/EPH in Soil

6/13/2019

Harris Avenue Shipyard

Remedial Investigation/ Feasibility Study

Appendix G
Screening Level Development

Attachment G.2
TPH Screening Level Report

Exhibit G.2.A
Chromatograms of TPH-contaminated Soils and Standards

FINAL

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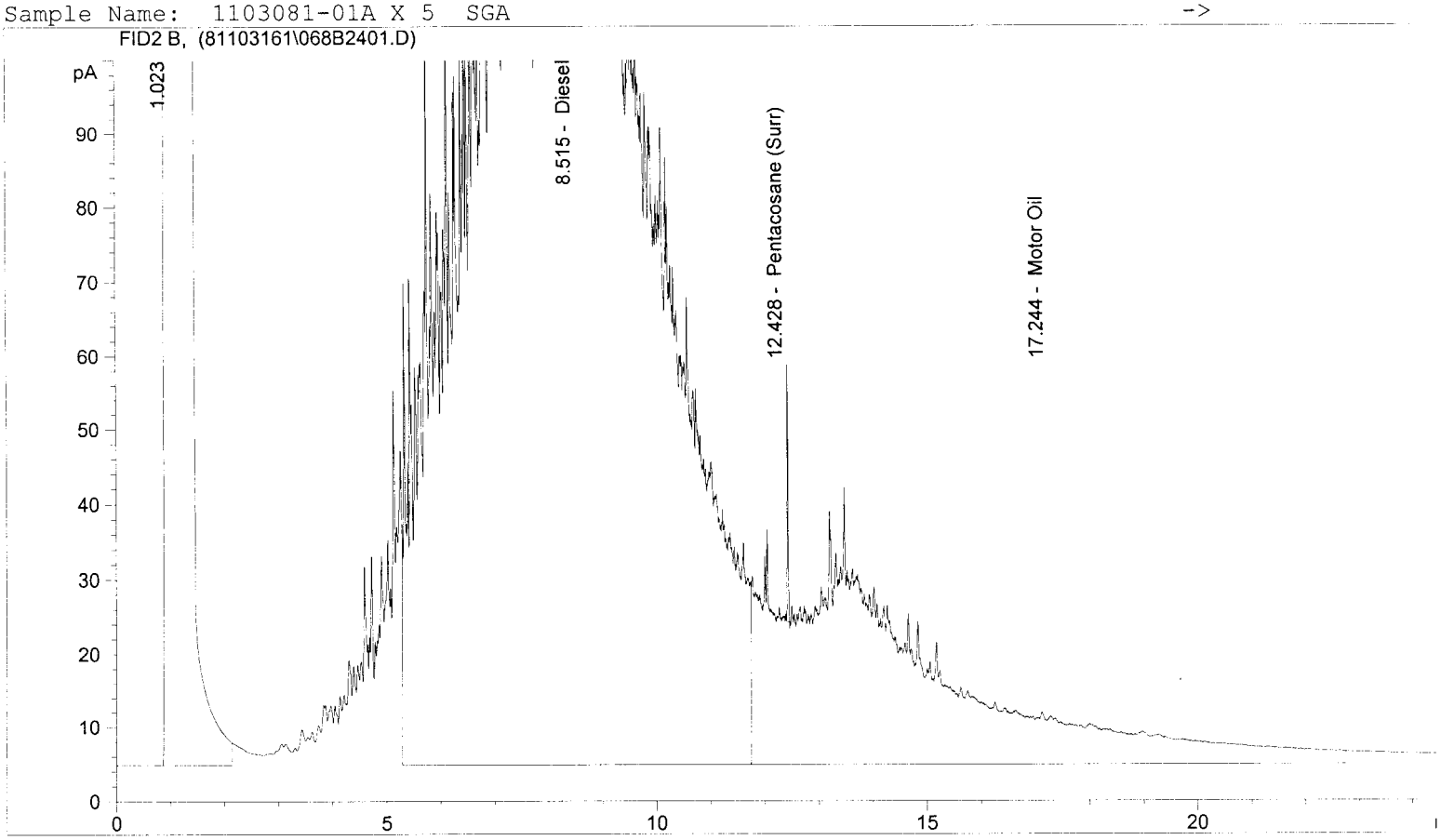
Report Creation: 3/17/2011 9:46:15 AM

NWTPH-Dx
FS11-2-031411
FS-11

Sample Name: 1103081-01A X 5 SGA ->



Ret. Time	Signal	Compound Name	Response	Amount ug/mL
8.515	FID2 B,	Diesel	32189.326	2435.956
12.428		Pentacosane (Surr)	42.982	2.091
17.244		Motor Oil	6272.334	489.627

x5 = 10.5 %

21.19g

0 = 2435.956 ug/mL x $\frac{10\ mL}{21.19g}$ x 5 = 5700 mg/kg Weathered Diesel Fuel

0 = 489.627 g/mL x $\frac{10\ mL}{21.19g}$ x 5 = 1200 mg/kg Lube Oil

REVIEWED BY & DATE RB 3/25/11

03.18.11 ES

NWTPH-Dx
FS01-14-031411
FS-01

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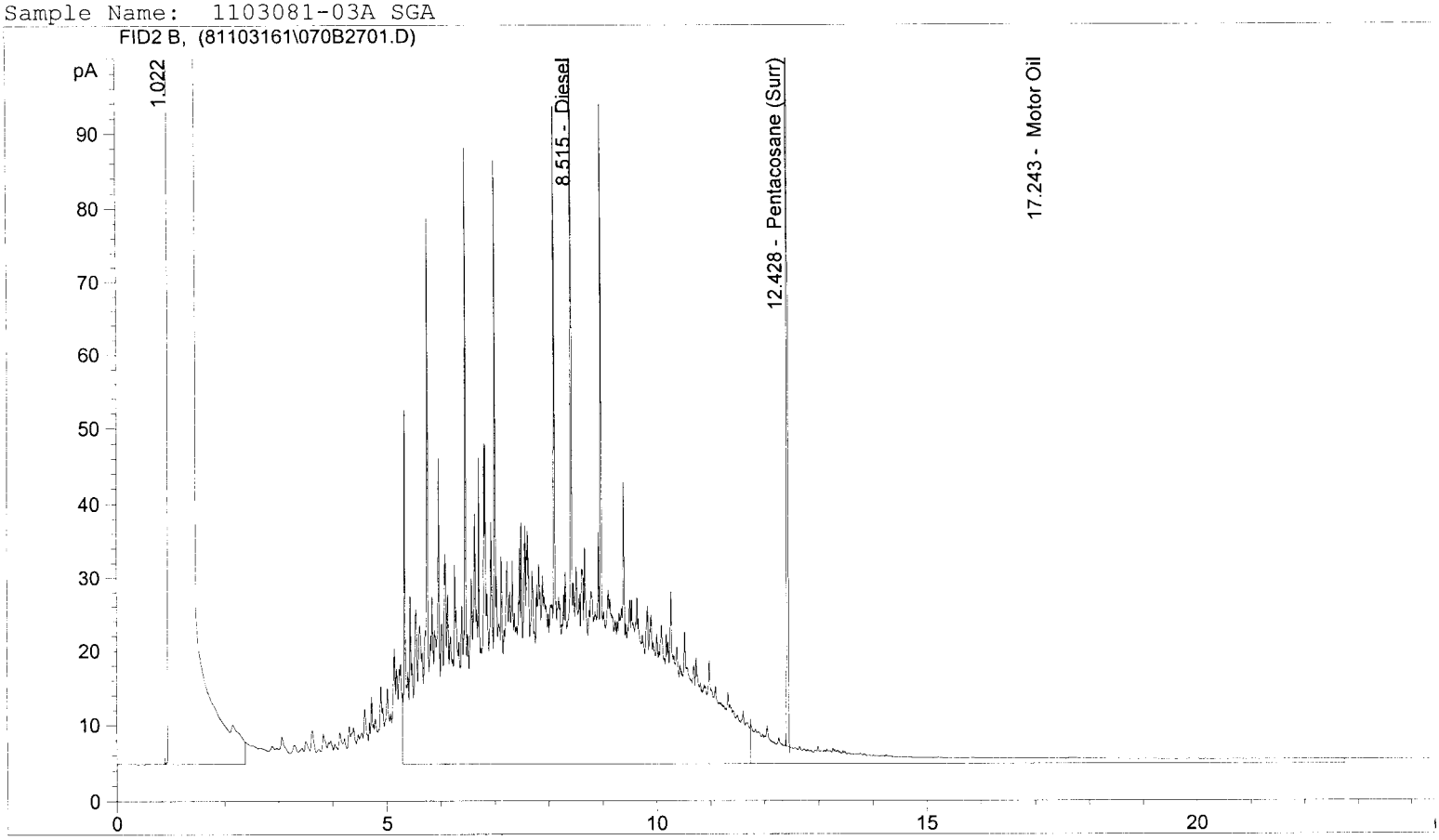
Report Creation: 3/17/2011 9:39:32 AM

Sample Name: 1103081-03A SGA



Ret. Time	Signal	Compound Name	Response	Amount ug/mL
8.515	FID2 B,	Diesel	7099.131	537.233
12.428		Pentacosane (Surr)	223.062	10.851
17.243		Motor Oil	618.014	48.243

109%

27.69g

D = 537.233 g/mL × 10mL / 27.69g = 190 mg/kg Weathered Diesel Fuel

< 50 mg/kg

REVIEWED BY & DATE 3/28/11

03.18.11 ES

NWTPH-Dx
FS01-24-031411
FS-01

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Operator: EBS
Method: C:\HPCHEM\1\METHODS\BDMO0311.M
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Report Creation: 3/17/2011 9:30:27 AM

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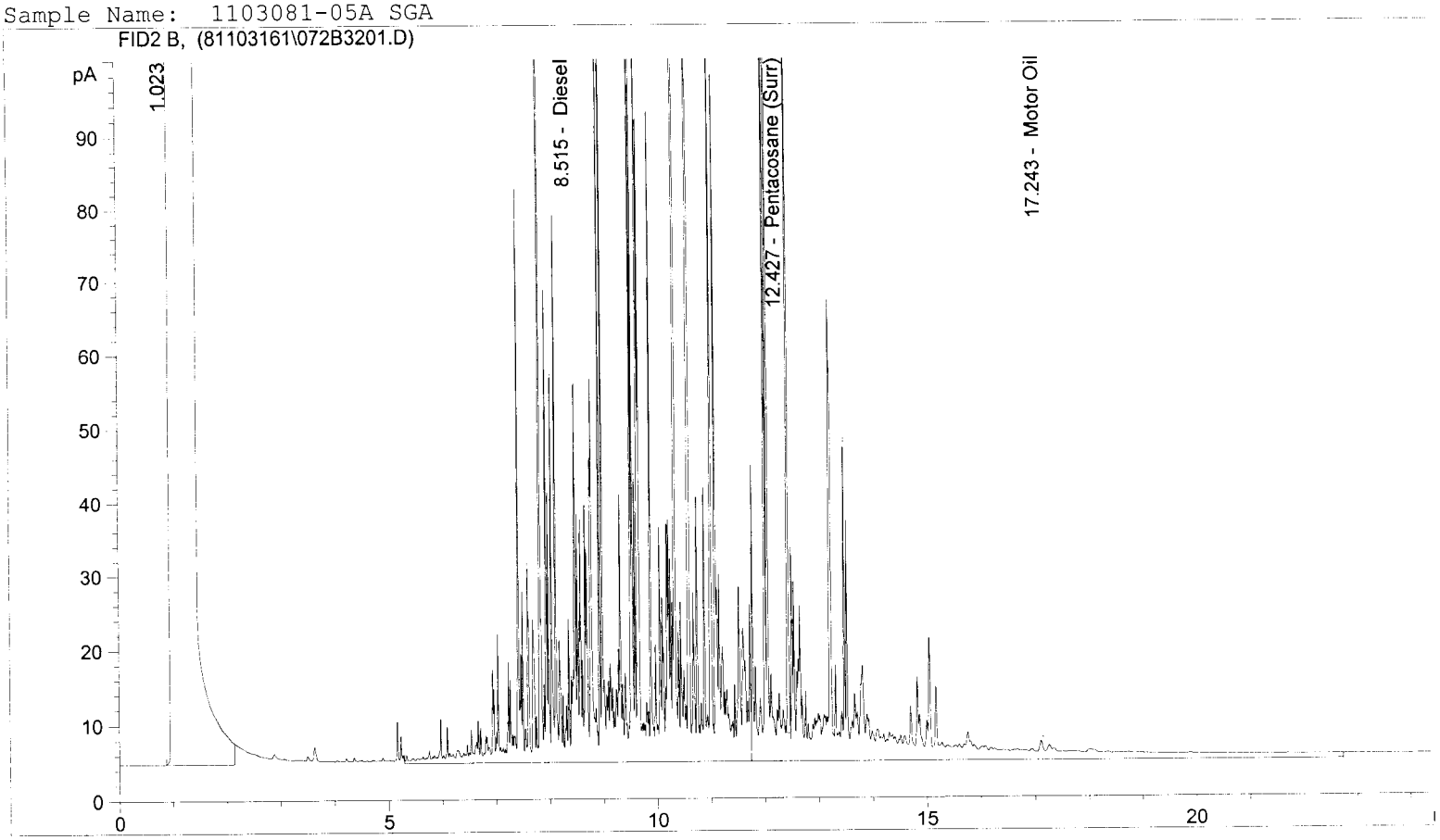

Ret. Time	Signal	Compound Name	Response	Amount ug/mL
8.515	FID2 B,	Diesel	5275.510	399.229
12.427		Pentacosane (Surr)	221.295	10.765 108%
17.243		Motor Oil	2254.034	175.953

24.59g

D = 399.229 g/mL x 10mL / 24.59g = 160 mg/kg Unidentified Diesel Range Product

O = 175.953 g/mL x 10mL / 24.59g = 72 mg/kg Unidentified Oil Range Product

REVIEWED BY & DATE RB 3/25/11

03.18.11 ES

NWTPH-Dx
FS01-24.8-031411
FS-01

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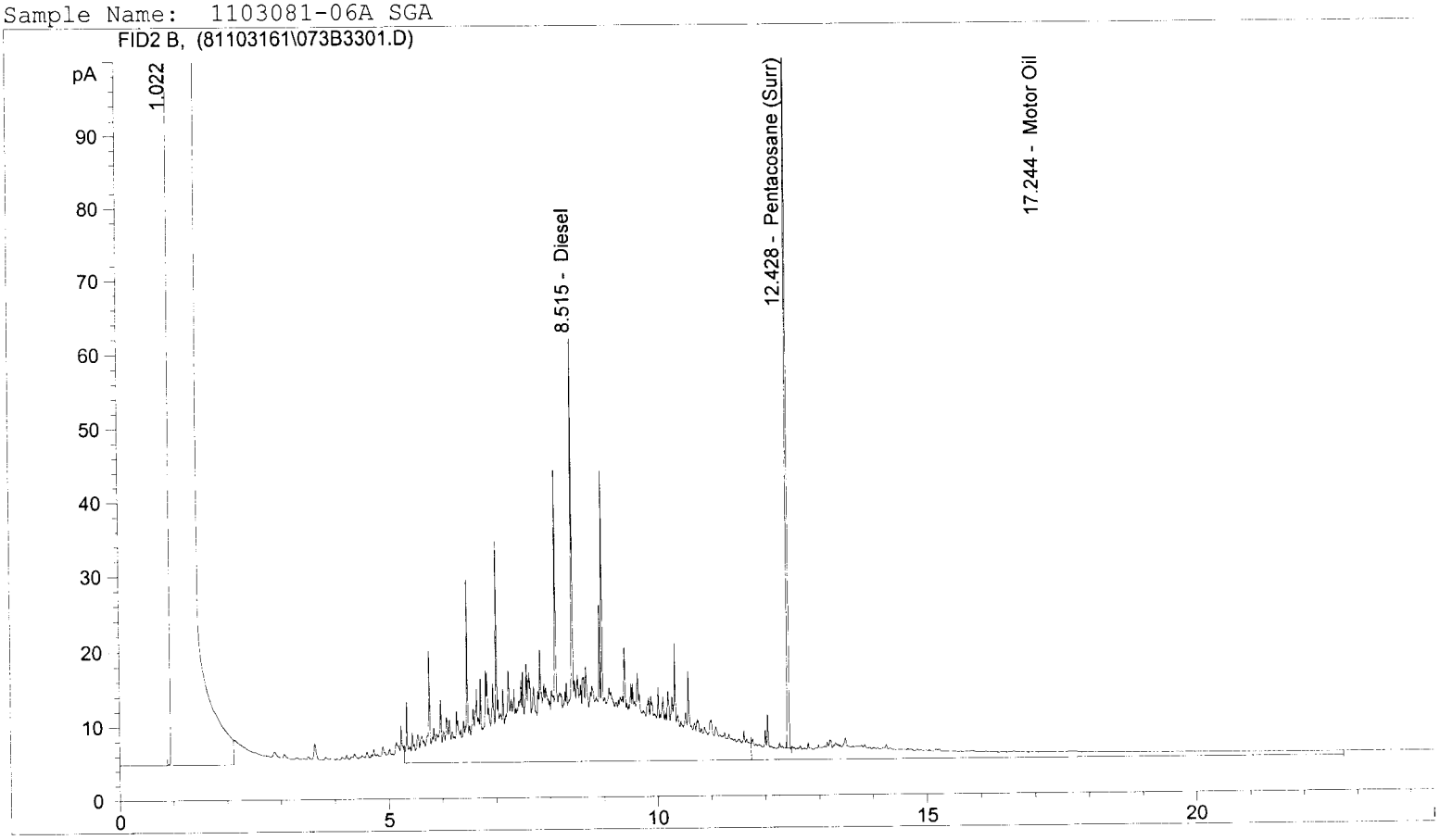

Ret. Time	Signal	Compound Name	Response	Amount ug/mL
8.515	FID2 B,	Diesel	2667.893	201.895
12.428		Pentacosane (Surr)	207.254	10.082 ~~102~~ 101% ES
17.244		Motor Oil	641.783	50.098

25.99g

D = 201.895 ug/ml x 10mL / 25.99g = 78 mg/kg Weathered Diesel Fuel

U < 50 mg/kg

REVIEWED BY & DATE 3/28/11

03.18.11 ES

NWTPH-Dx
FS12-2-031411
FS-12

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Instrument #98        Data File: C:\HPCHEM\1\DATA\81103161\074B3401.D
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Method:     C:\HPCHEM\1\METHODS\BDMO0311.M
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Report Creation:       3/17/2011            9:29:19 AM
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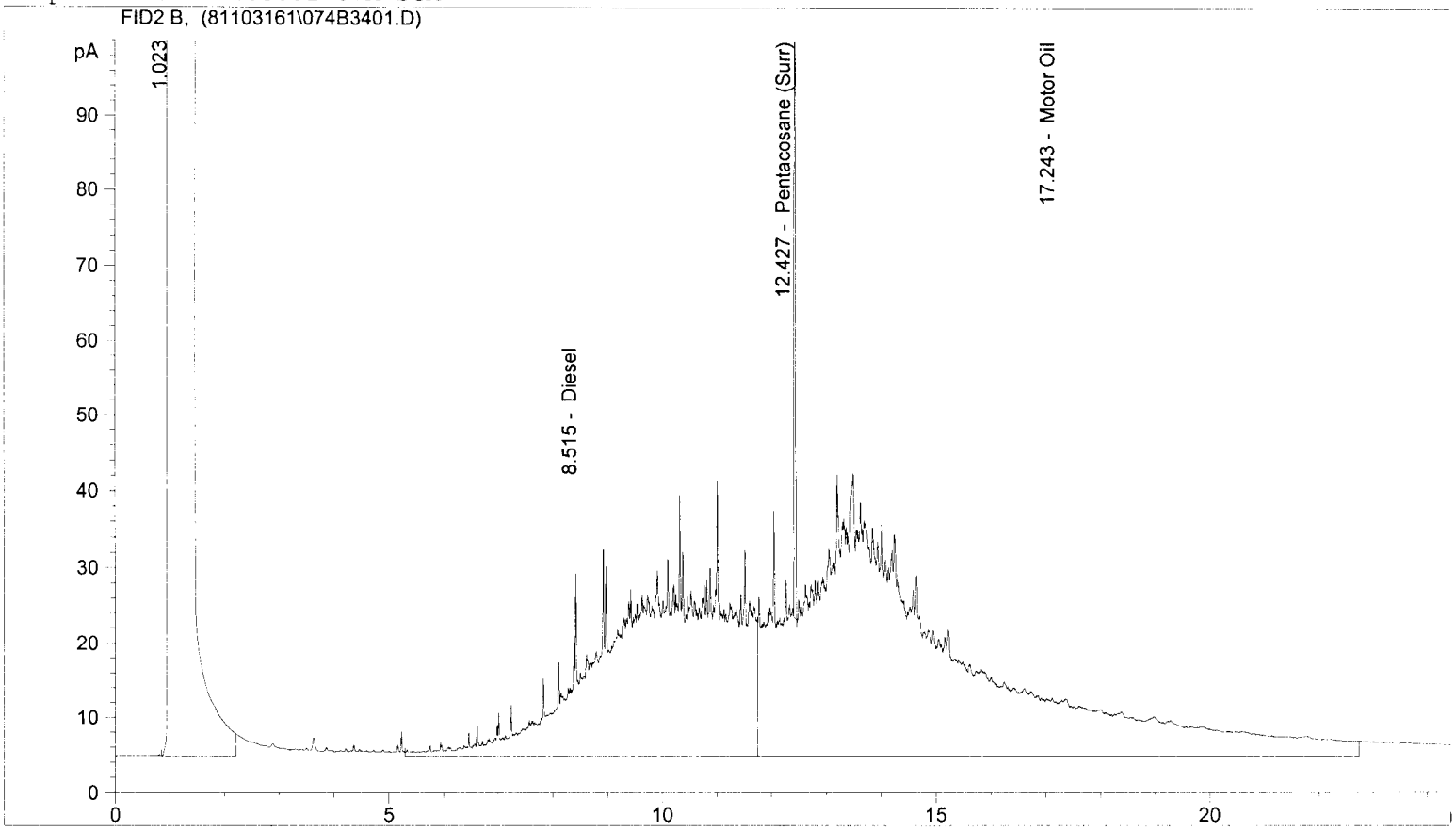

Ret. Time	Signal	Compound Name	Response	Amount ug/mL
8.515	FID2 B,	Diesel	4231.533	320.225
12.427		Pentacosane (Surr)	209.814	10.207
17.243		Motor Oil	7116.801	555.547

102%

26.15g

D = 320.225 µg/mL × 10mL / 26.15g = 120 mg/kg Weathered Diesel Fuel

O = 555.547 µg/mL × 10mL / 26.15g = 210 mg/kg Lube Oil

REVIEWED BY & DATE NB 3/28/11

03.18.11 EB

NWTPH-Dx
FS15-13-031411
FS-15

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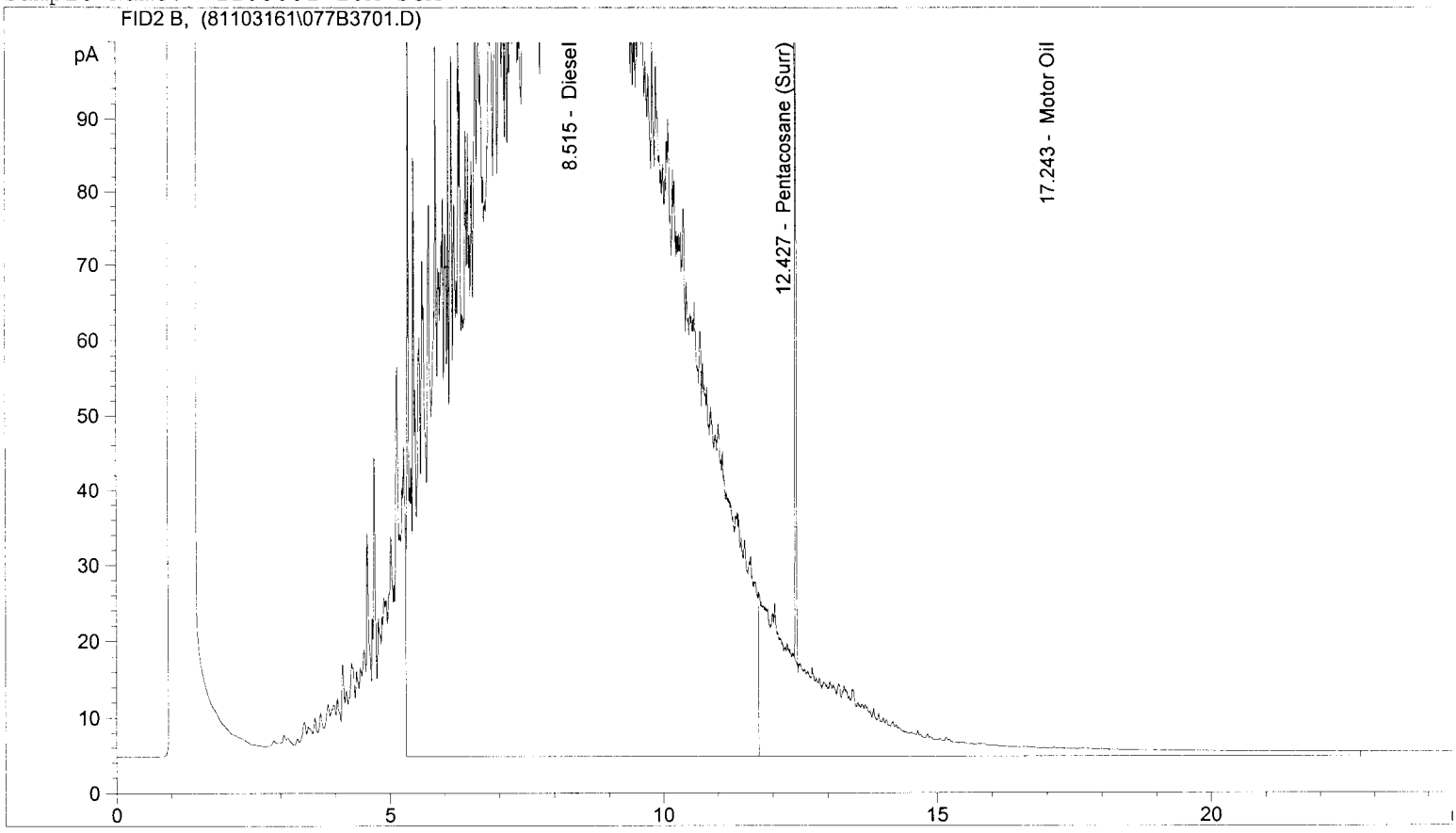

Ret. Time	Signal	Compound Name	Response	Amount ug/mL
8.515	FID2 B,	Diesel	30984.844	2344.805
12.427		Pentacosane (Surr)	225.658	10.977
17.243		Motor Oil	2118.257	165.354

110%

24.66g

D = 2344.805 g/mL x $\frac{10\,mL}{24.66\,g}$ = 950 mg/kg Weathered Diesel Fuel

0 < 50 mg/kg

REVIEWED BY & DATE 3/28/11

03.18.11ES

NWTPH-Dx
FS13-4-031511
FS-13

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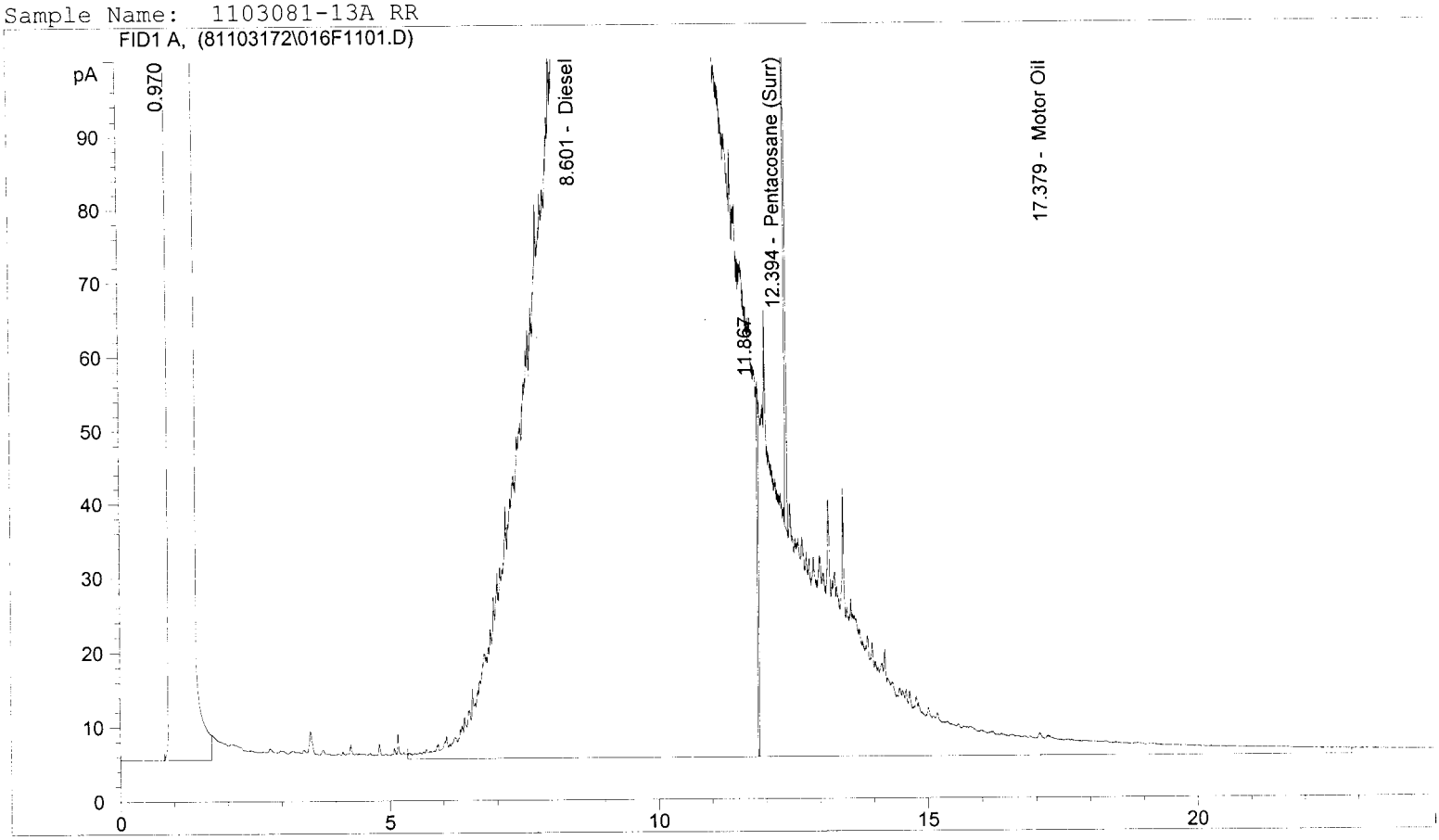
Injection Date & Time: 3/17/2011 3:23:01 PM 3/17/2011 3:23:01 PM
Report Creation: 3/17/2011 3:52:03 PM

Sample Name: 1103081-13A RR



Ret. Time	Signal	Compound Name	Response	Amount ug/mL
8.601	FID1 A,	Diesel	34150.340	2538.731
12.394		Pentacosane (Surr)	203.513	11.975
17.379		Motor Oil	4817.227	422.349

120%

25.71g

D = 2538.731 µg/mL × 10mL / 25.71g = 990 mg/kg Highly Weathered Diesel or similar product

O = 422.349 µg/mL × 10mL / 25.71g = 160 mg/kg Lube Oil (bias high due to Diesel Range Product overlap)

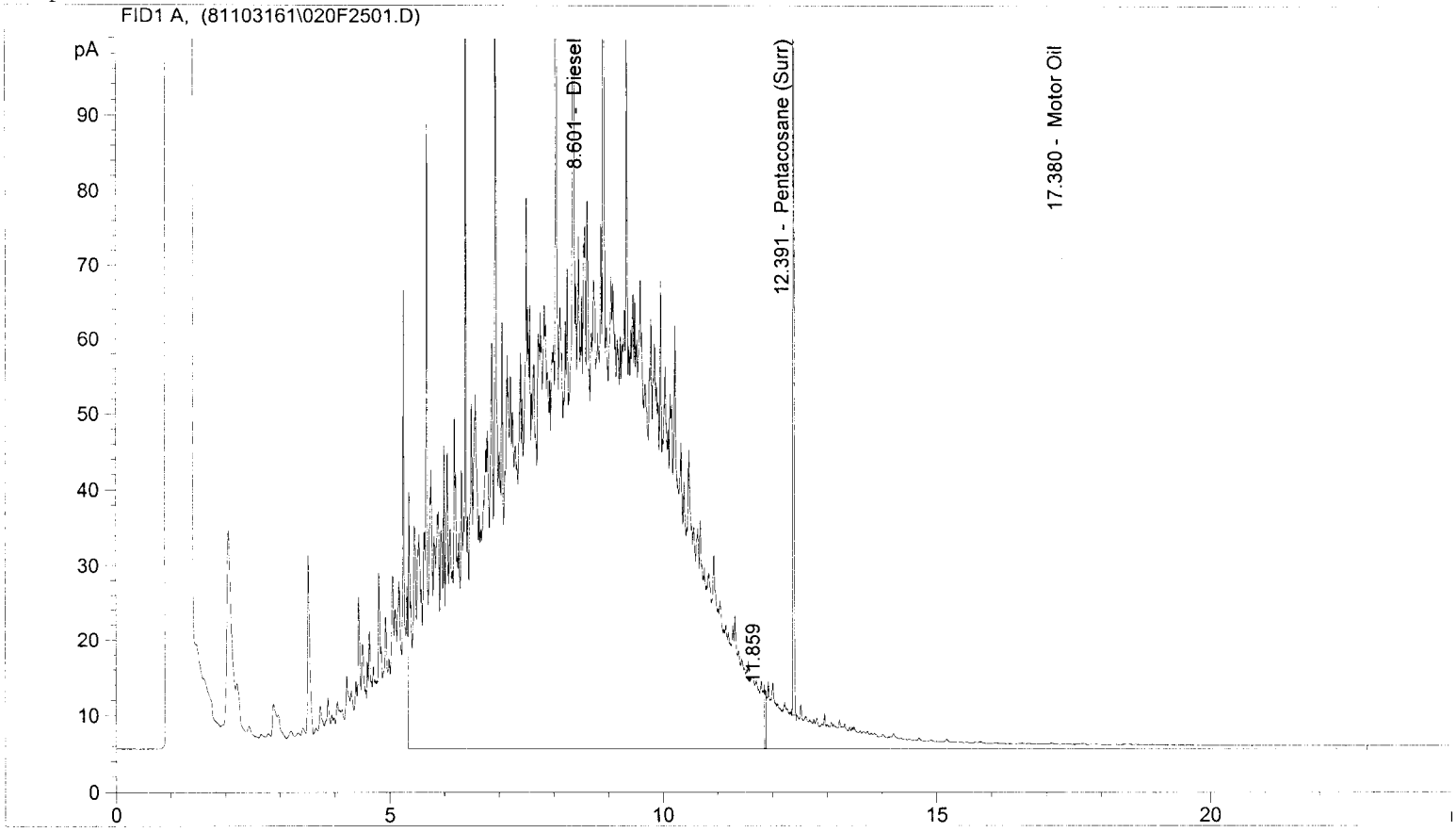
REVIEWED BY & DATE 3/28/11

03.18.11 ES

NWTPH-Dx
FS14-7-031511
FS-14

Instrument #98 Data File: C:\HPCHEM\1\DATA\81103161\020F2501.D
Operator: EBS
Method: C:\HPCHEM\1\METHODS\FDMO0311.M
Injection Date & Time: 3/16/2011 7:44:38 PM 3/16/2011 7:44:38 PM
Report Creation: 3/17/2011 2:46:21 PM

Sample Name: 1103081-15A SGA



Ret. Time	Signal	Compound Name	Response	Amount ug/mL
8.601	FID1 A,	Diesel	15555.071	1156.362
12.391		Pentacosane (Surr)	200.533	11.799
17.380		Motor Oil	806.465	70.707

118%

26.39g

D = 1156.362 g/mL x $\frac{10mL}{26.39g}$ = 440 mg/kg Weathered Diesel Fuel

0 < 50 mg/kg

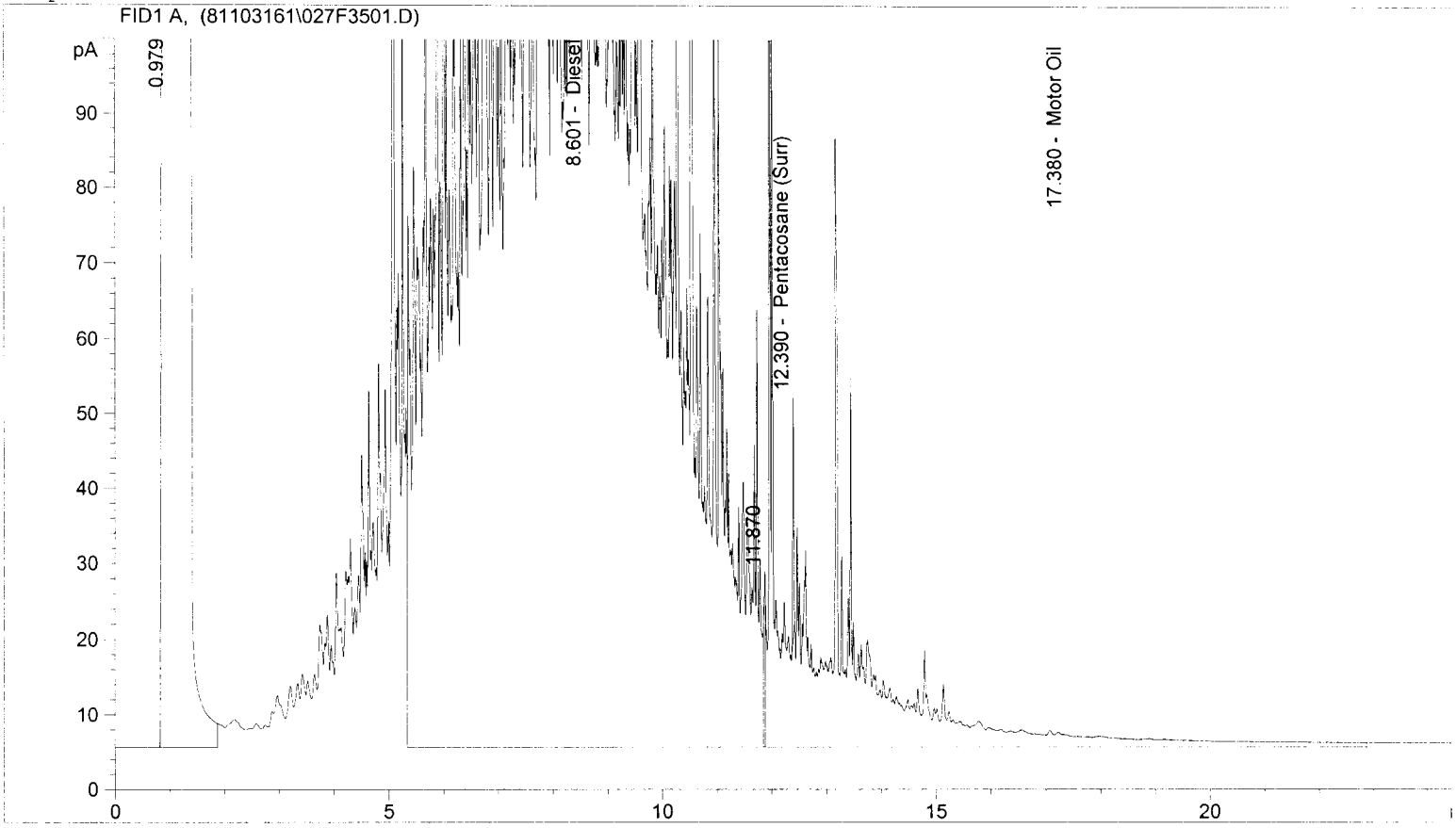
REVIEWED BY & DATE MB 3/25/11

03.18.11 EJ

NWTPH-Dx
FS09-8-031511
FS-09

Instrument #98 Data File: C:\HPCHEM\1\DATA\81103161\027F3501.D
Operator: EBS
Method: C:\HPCHEM\1\METHODS\FDMO0311.M
Injection Date & Time: 3/17/2011 12:44:38 AM 3/17/2011 12:44:38 AM
Report Creation: 3/17/2011 12:35:49 PM

Sample Name: 1103081-21A X 5 SGA ->



Ret. Time	Signal	Compound Name	Response	Amount ug/mL
8.601	FID1 A,	Diesel	38022.270	2826.570
12.390		Pentacosane (Surr)	42.384	2.494
17.380		Motor Oil	3166.221	277.598

x 5 = 125 %

26.86g

D = 2826.570 g/mL x $\frac{10mL}{26.86g}$ x 5 = 5300 mg/kg

O = 277.598 g/mL x $\frac{10mL}{26.86g}$ x 5 = 520 mg/kg Lube Oil or similar product
(bias high due to Diesel Range Product overlap)

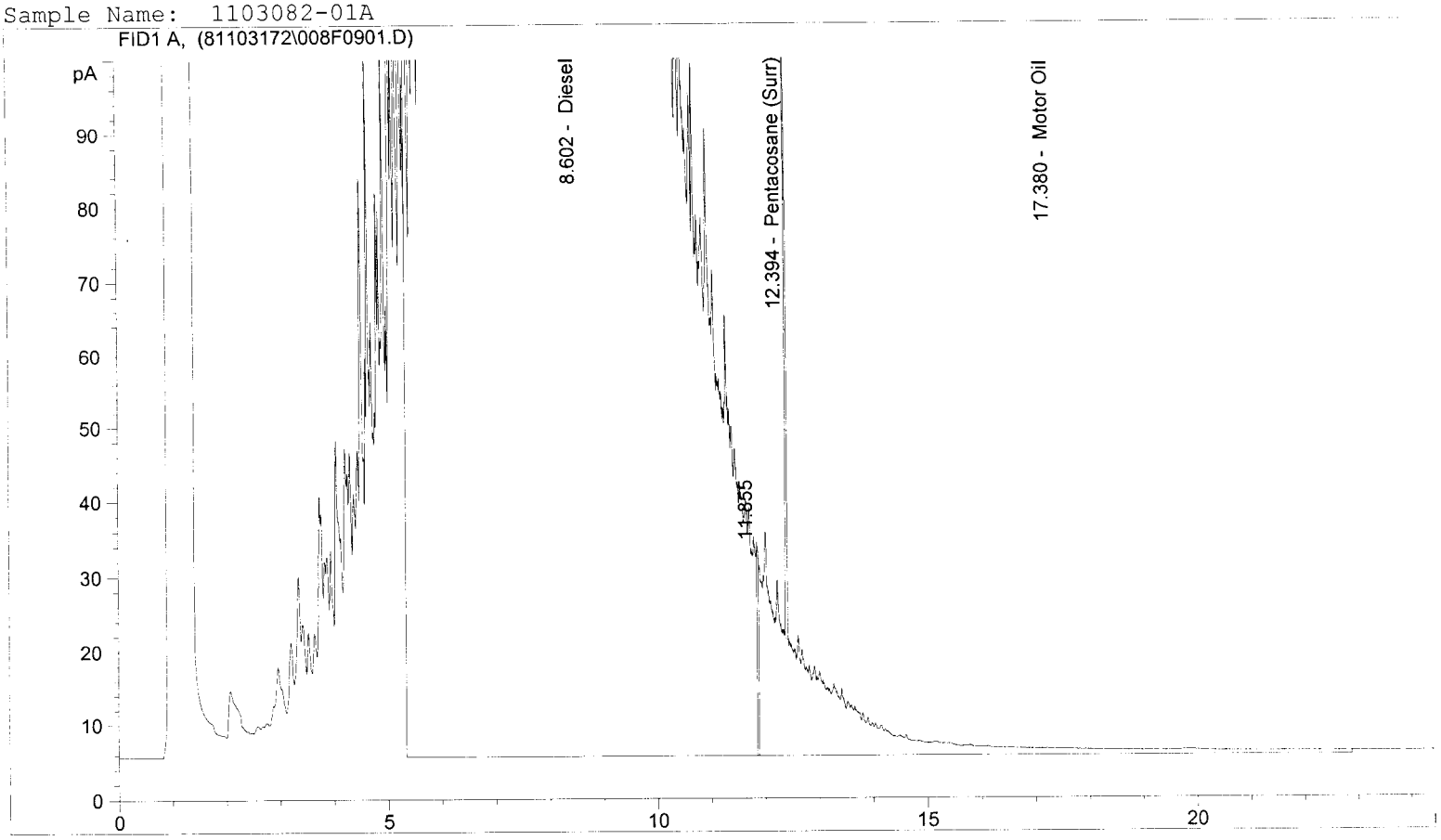
REVIEWED BY & DATE 3/28/11

03.18.11 EJ

Instrument #98 Data File: C:\HPCHEM\1\DATA\81103172\008F0901.D
Operator: EBS
Method: C:\HPCHEM\1\METHODS\FDMO0311.M
Injection Date & Time: 3/17/2011 2:22:29 PM 3/17/2011 2:22:29 PM
Report Creation: 3/21/2011 10:44:25 AM

NWTPH-Dx
MW06-10-031411
MW-06

Sample Name: 1103082-01A



Ret. Time	Signal	Compound Name	Response	Amount ug/mL
8.602	FID1 A,	Diesel	62421.043	4640.371
12.394		Pentacosane (Surr)	210.643	12.394
17.380		Motor Oil	2052.363	179.941

124%.

27.15g

D = 4640.371 mg/mL x $\frac{10mL}{27.15g}$ = 1700 mg/kg Weathered Diesel Fuel

0 < 50 mg/kg

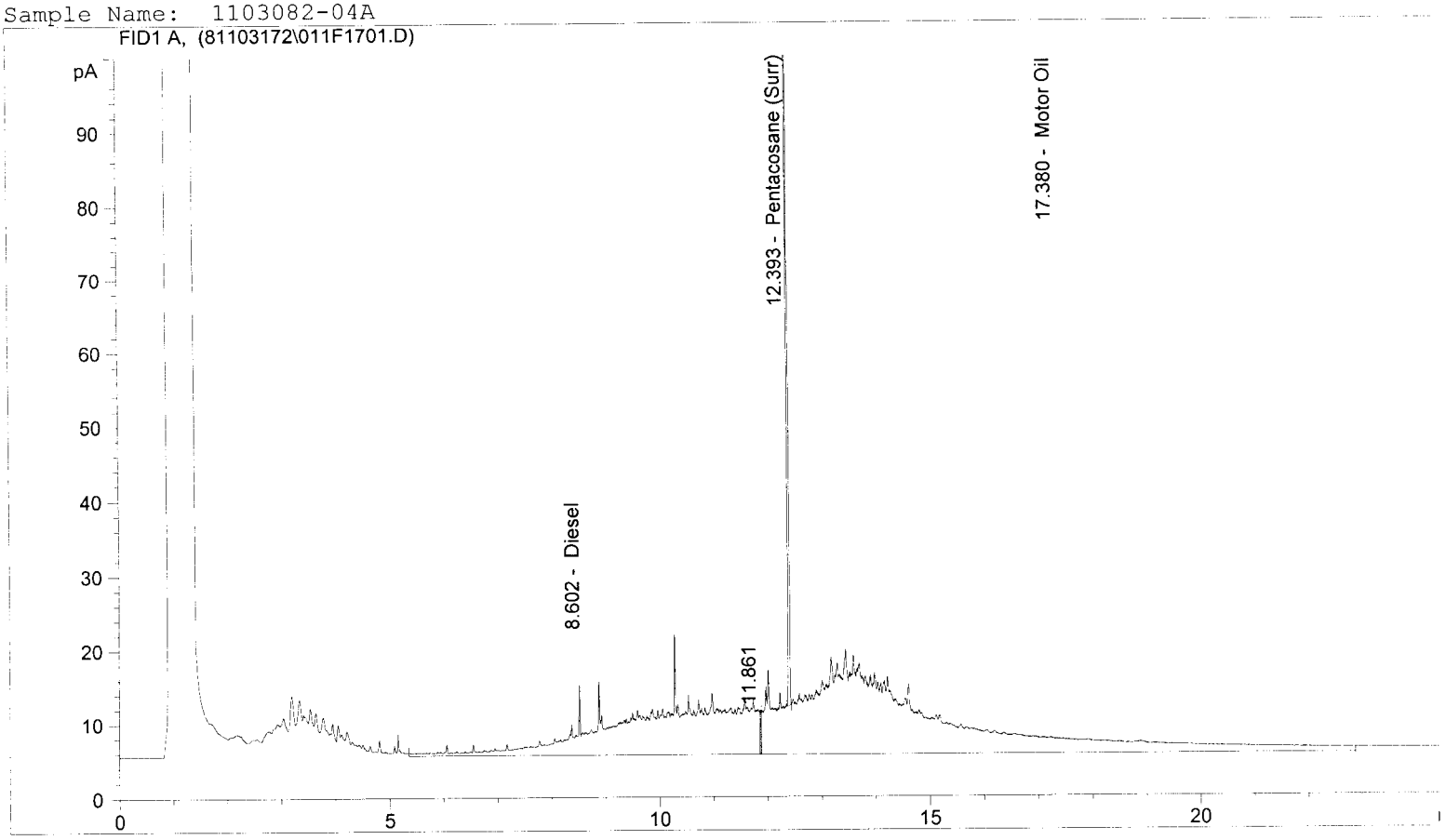
REVIEWED BY [illegible]
& DATE 3/29/11

03.21.11 ES

NWTPH-Dx
MW09-4-031411
MW-09

Instrument #98 Data File: C:\HPCHEM\1\DATA\81103172\011F1701.D
Operator: EBS
Method: C:\HPCHEM\1\METHODS\FDMO0311.M
Injection Date & Time: 3/17/2011 6:28:08 PM 3/17/2011 6:28:08 PM
Report Creation: 3/21/2011 10:38:39 AM

Sample Name: 1103082-04A



Ret. Time	Signal	Compound Name	Response	Amount ug/mL
8.602	FID1 A,	Diesel	1247.431	92.734
12.393		Pentacosane (Surr)	216.979	12.767
17.380		Motor Oil	2342.321	205.363

128%

27.63g

$D = 92.734\ g/mL \times \frac{10mL}{27.63g} = 34\ mg/kg$

$O = 205.363\ g/mL \times \frac{10mL}{27.63g} = 74\ mg/kg$ Light Oil and Lube Oil

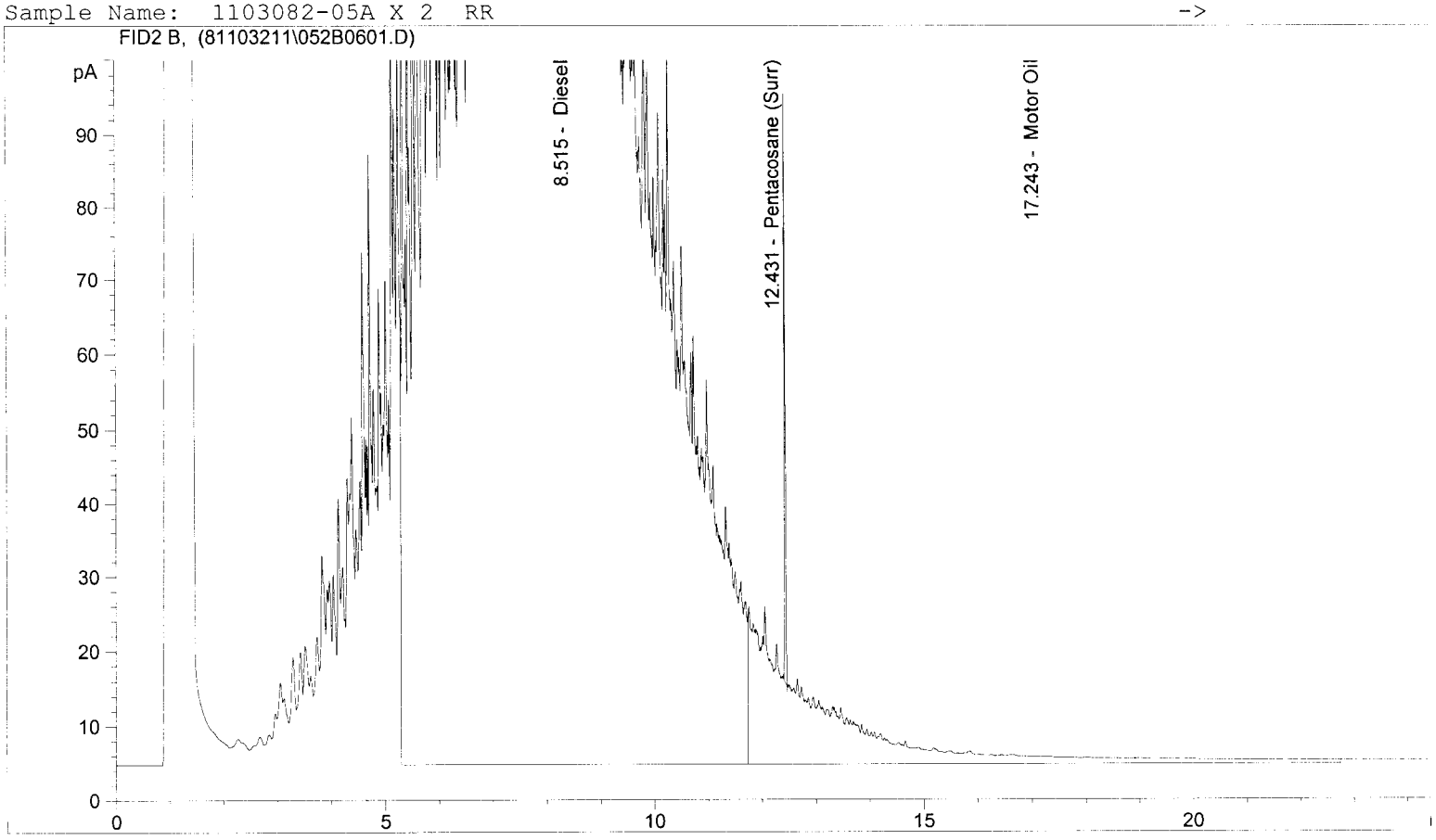
REVIEWED BY & DATE 3/29/11

03-21-11 EJ

NWTPH-Dx
MW09-6-031411
MW-09

Instrument #98 Data File: C:\HPCHEM\1\DATA\81103211\052B0601.D
Operator: EBS
Method: C:\HPCHEM\1\METHODS\BDMO0311.M
Injection Date & Time: 3/21/2011 11:27:01 AM 3/21/2011 11:27:01 AM
Report Creation: 3/21/2011 4:29:35 PM

Sample Name: 1103082-05A X 2 RR ->



Ret. Time	Signal	Compound Name	Response	Amount ug/mL
8.515	FID2 B,	Diesel	43105.297	3262.031
12.431		Pentacosane (Surr)	103.574	5.038
17.243		Motor Oil	1887.033	147.304

x2 = 101%.

25.51g

$D = 3262.031\ mg/mL \times \frac{10mL}{25.51g} \times 2 = 2600\ mg/kg$ Weathered Diesel Fuel

$0 < 100\ mg/kg$

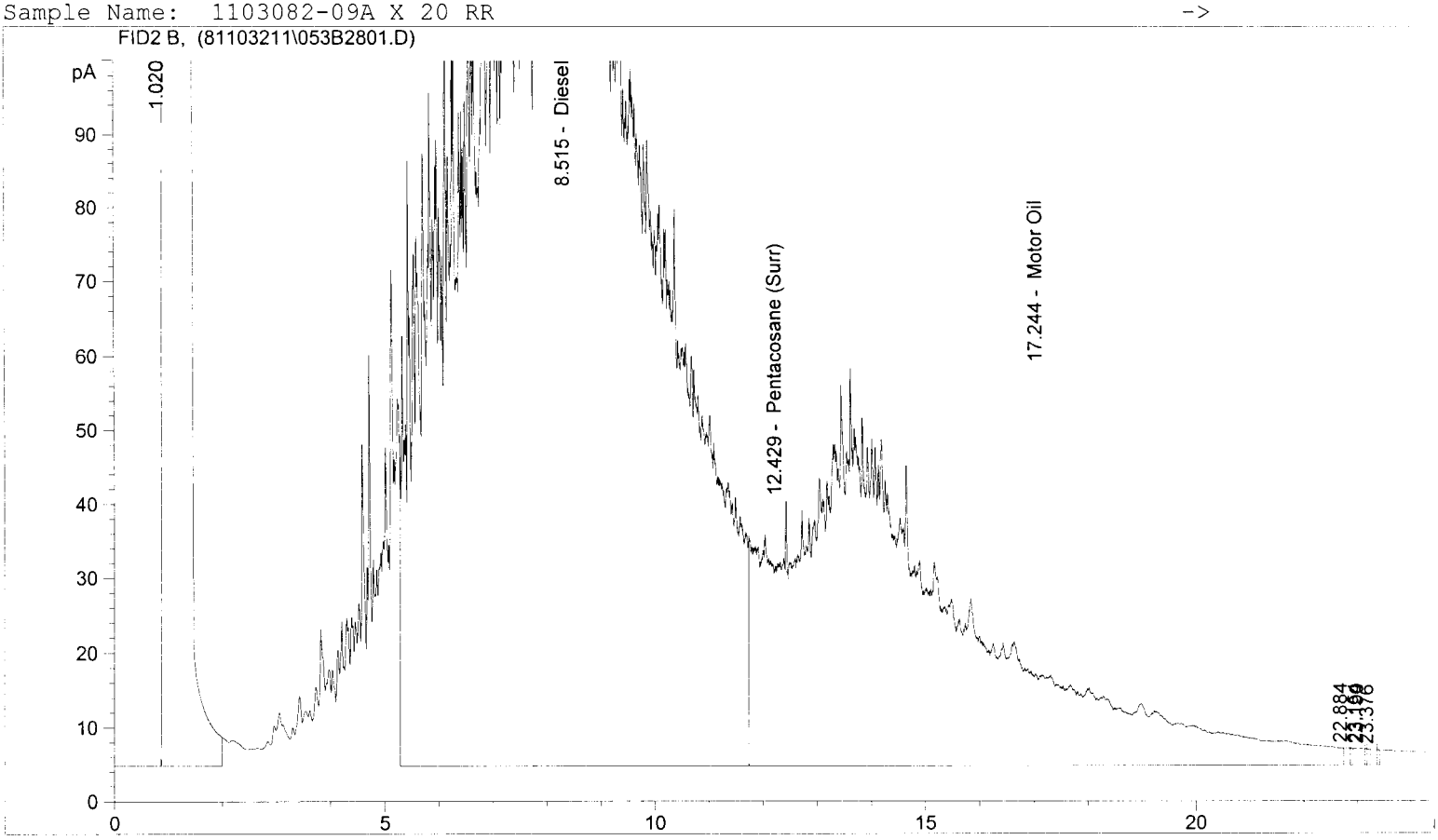
REVIEWED BY & DATE 3/29/11

03.21.11 EJ

NWTPH-Dx
MW02A-7.5-031511
MW-02A

Instrument #98 Data File: C:\HPCHEM\1\DATA\81103211\053B2801.D
Operator: EBS
Method: C:\HPCHEM\1\METHODS\BDMO0311.M
Injection Date & Time: 3/21/2011 11:20:15 PM 3/21/2011 11:20:15 PM
Report Creation: 3/22/2011 9:25:48 AM

Sample Name: 1103082-09A X 20 RR ->



Ret. Time	Signal	Compound Name	Response	Amount ug/mL	
8.515	FID2 B,	Diesel	30953.047	2342.399	
12.429		Pentacosane (Surr)	12.671	0.616	*
17.244		Motor Oil	10621.176	829.103	

* low surrogate recovery due to dilution 26.20g

D = 2342.399 g/mL x $\frac{10\,mL}{26.20g}$ x 20 = 18000 mg/kg Weathered Diesel Fuel

D = 829.103 g/mL x $\frac{10\,mL}{26.20g}$ x 20 = ~~26~~ 6300 mg/kg Lube Oil ES

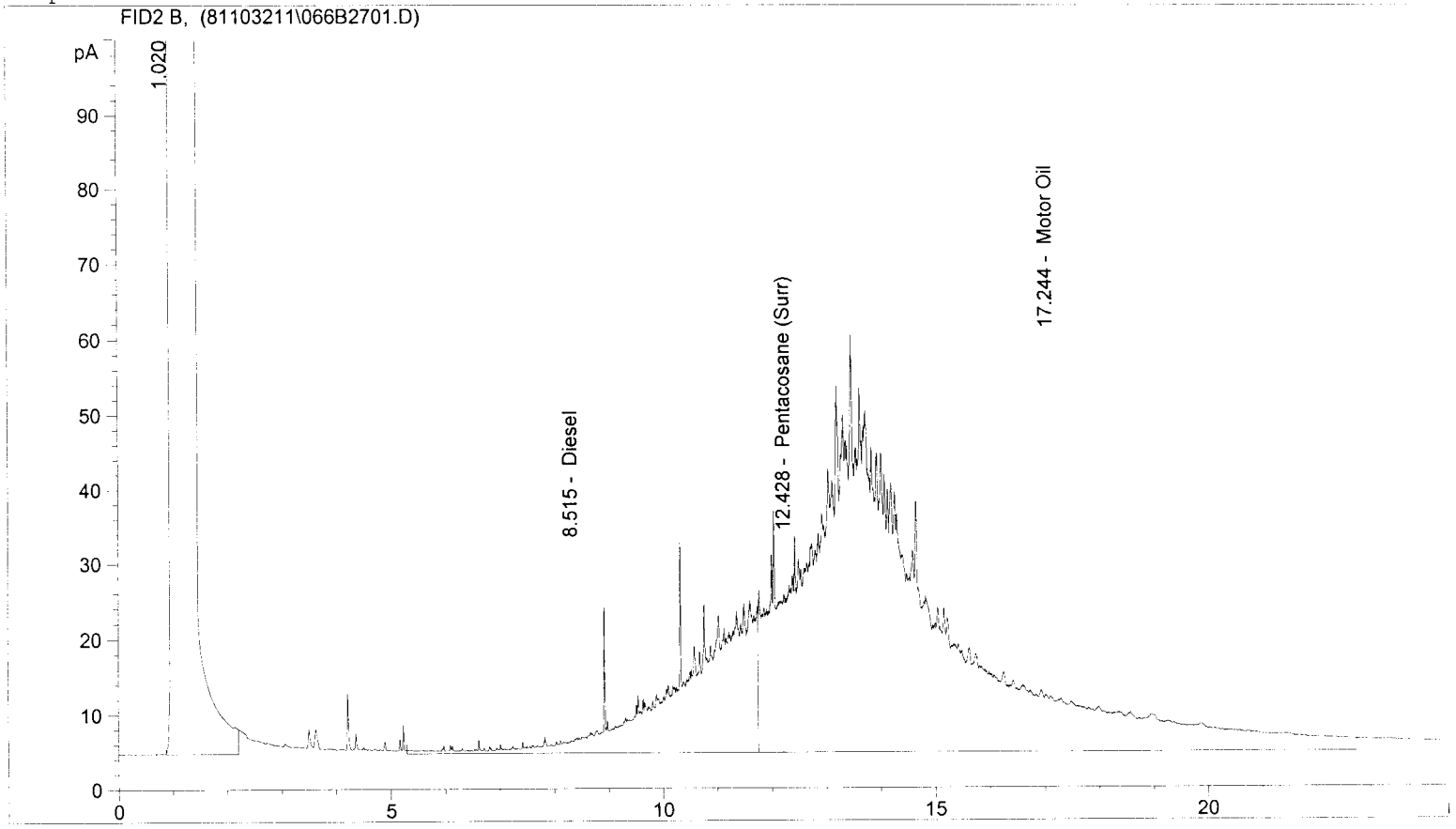
REVIEWED BY & DATE 3/29/11

03.22.11 ES

NWTPH-Dx
FS17-6.5-031611
FS-17

Instrument #98 Data File: C:\HPCHEM\1\DATA\81103211\066B2701.D
Operator: EBS
Method: C:\HPCHEM\1\METHODS\BDMO0311.M
Injection Date & Time: 3/21/2011 10:50:14 PM 3/21/2011 10:50:14 PM
Report Creation: 3/22/2011 5:10:29 PM

Sample Name: 1103098-04A X 20SGA ->



Ret. Time	Signal	Compound Name	Response	Amount ug/mL	
8.515	FID2 B,	Diesel	1921.401	145.404	
12.428		Pentacosane (Surr)	8.513	0.414	*
17.244		Motor Oil	8138.612	635.311	

* low surrogate recovery due to dilution

23.56g

D = 145.404 µg/mL × 10mL / 23.56g × 20 = 1200 mg/kg

O = 635.311 µg/mL × 10mL / 23.56g × 20 = 5400 mg/kg Light Oil and Lube Oil

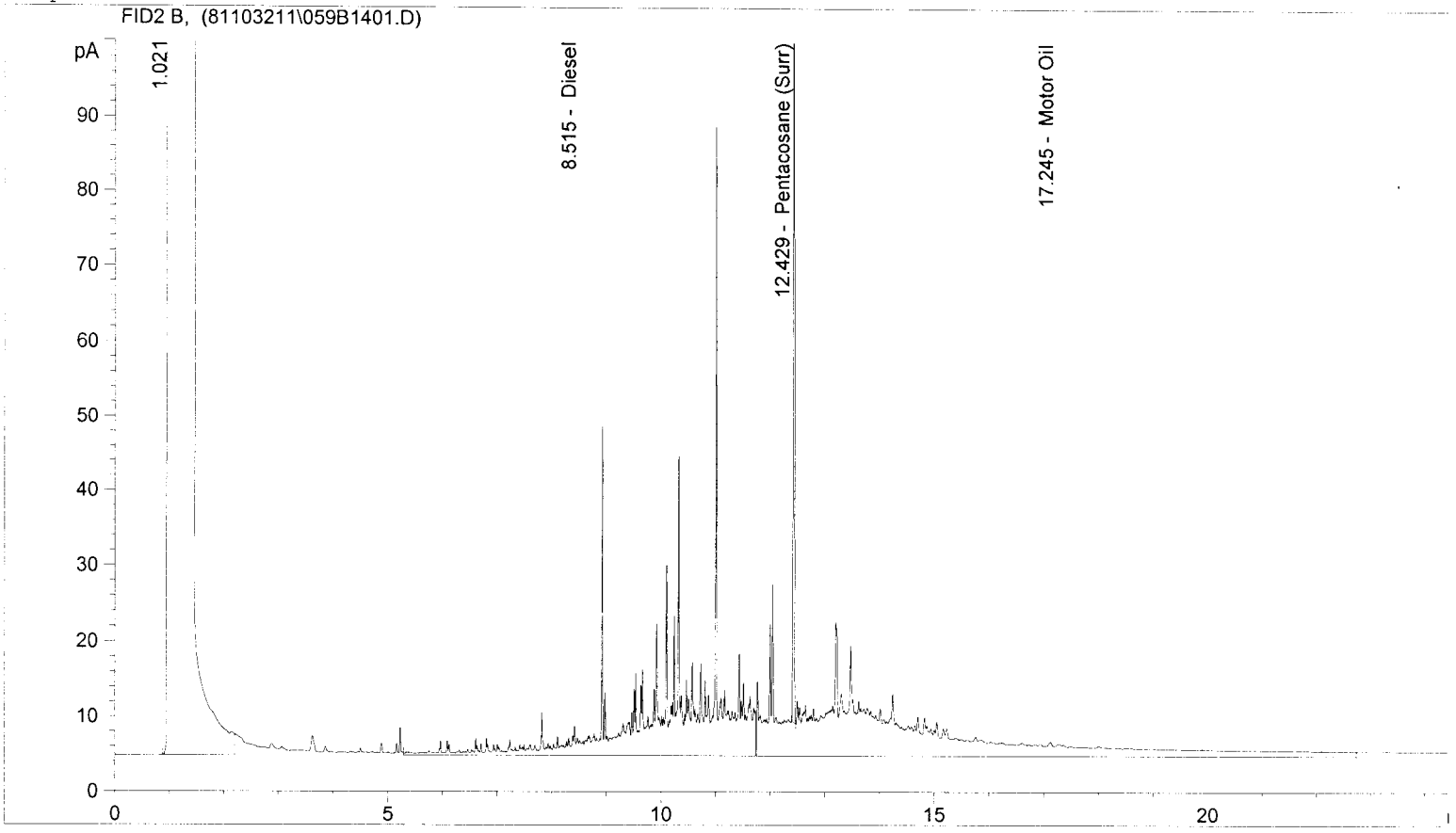
RS 3/30/11

03.22.11 EB

NWTPH-Dx
FS06-2.5-031611
FS-06

Instrument #98 Data File: C:\HPCHEM\1\DATA\81103211\059B1401.D
Operator: EBS
Method: C:\HPCHEM\1\METHODS\BDMO0311.M
Injection Date & Time: 3/21/2011 3:48:29 PM 3/21/2011 3:48:29 PM
Report Creation: 3/22/2011 5:49:19 PM

Sample Name: 1103098-12A SGA



Ret. Time	Signal	Compound Name	Response	Amount ug/mL
8.515	FID2 B,	Diesel	1301.446	98.488
12.429		Pentacosane (Surr)	192.840	9.381
17.245		Motor Oil	1622.642	126.666

94%

27.39g

D = 98.488 µg/mL x 10mL / 27.39g = 36 mg/kg Weathered Diesel Fuel or similar product

0 < 50 mg/kg

NS 3/30/11

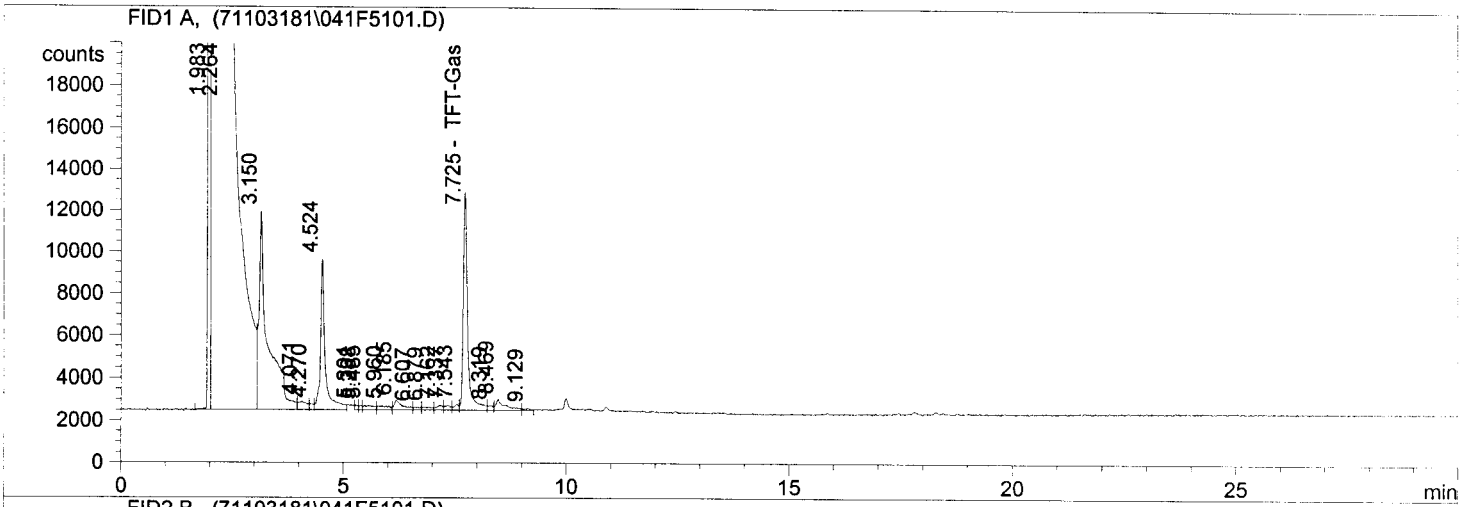
03.22.11 ES

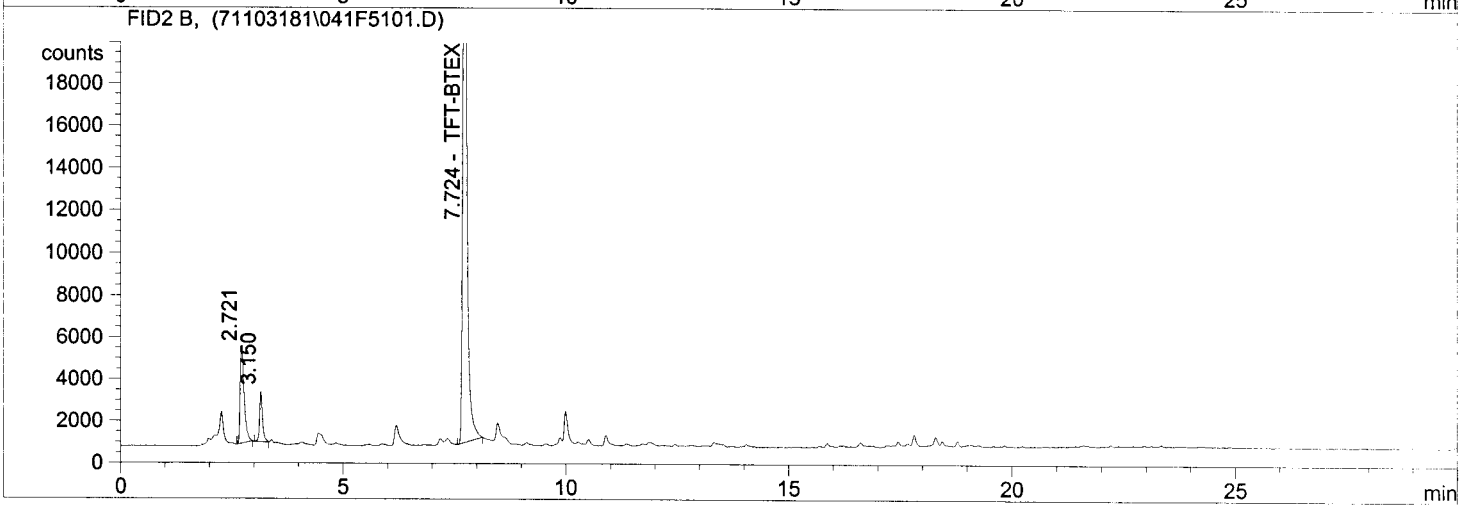
NWTPH-Dx
FS02-2.5-031611
FS-02

Gas/BTEX Instrument 70
Data File: C:\HPCHEM\1\DATA\71103181\041F5101.D
Injection Date & Time: 3/19/2011 12:57:59 PM
Report Created on: 3/21/2011 9:16:05 AM
Operator: DLC
Aquistion Method: 70GB0111.M
Analysis Method: C:\HPCHEM\1\METHODS\70GB0111.M

FID1 A equivalent to FID analysis.
FID2 B equivalent to PID analysis.

Sample Name:1103089-19A 100U 98 DC Dilution: X 0.0





Ret. Time	Compound Name	Area	Amount ug/L
7.725	TFT-Gas	70548.469	8.343
0.000	Gasoline Envelope	0.000	0.000

83%

Gas < 3.0 ~~50~~ mg/kg

Ret. Time	Compound Name	Area	Amount ug/L
0.000	MTBE	0.000	0.000
0.000	Benzene	0.000	0.000
7.724	TFT-BTEX	192342.359	7.875
0.000	Toluene	0.000	0.000
0.000	Ethylbenzene	0.000	0.000
0.000	M & P- Xylenes	0.000	0.000
0.000	O-Xylene	0.000	0.000

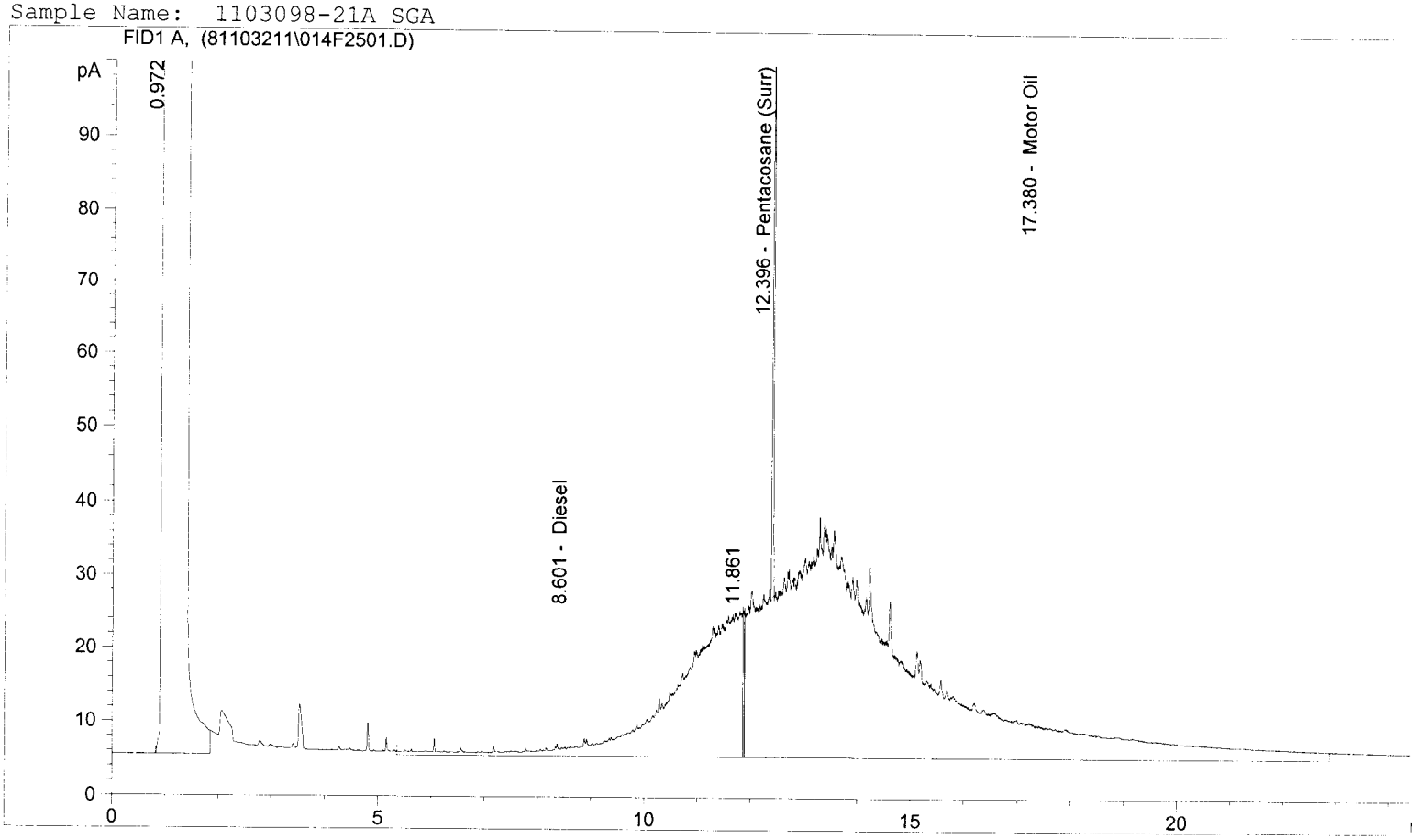
MB 3/30/11

3-22-11 DC

Instrument #98 Data File: C:\HPCHEM\1\DATA\81103211\014F2501.D
Operator: EBS
Method: C:\HPCHEM\1\METHODS\FDMO0311.M
Injection Date & Time: 3/21/2011 9:20:02 PM 3/21/2011 9:20:02 PM
Report Creation: 3/22/2011 10:26:30 AM

NWTPH-Dx
FS03-1.5-031611
FS-03

Sample Name: 1103098-21A SGA



Ret. Time	Signal	Compound Name	Response	Amount ug/mL
8.601	FID1 A,	Diesel	1686.120	125.346
12.396		Pentacosane (Surr)	183.182	10.778 108%
17.380		Motor Oil	5866.367	514.333

28.18g

$D = 125.346\ g/mL \times \frac{10mL}{28.18g} = 44\ mg/kg$

$O = 514.333\ g/mL \times \frac{10mL}{28.18g} = 180\ mg/kg$ Light Oil and Lube Oil

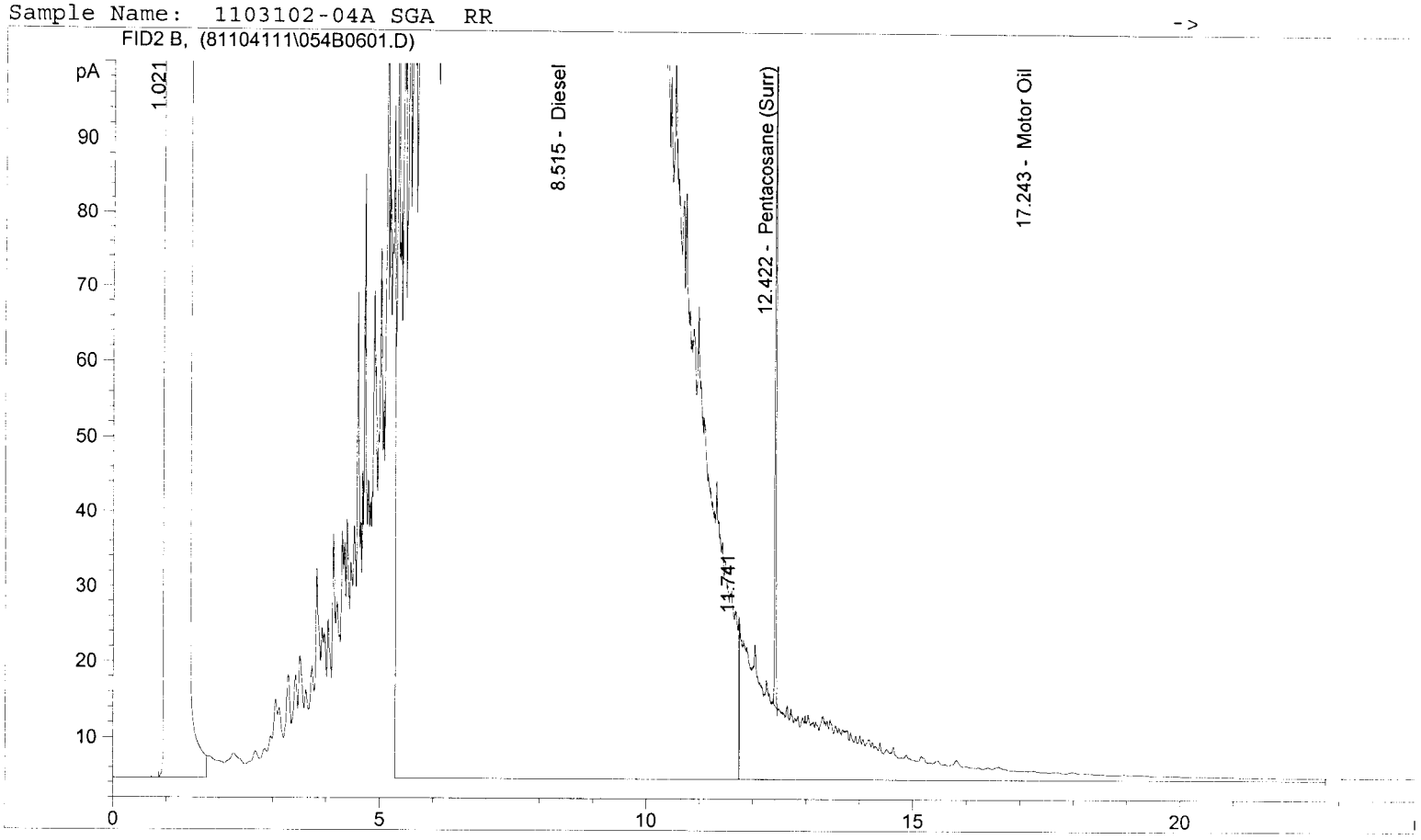
REVIEWED BY & DATE 3/30/11

03.22.11 ES

Instrument #98 Data File: C:\HPCHEM\1\DATA\81104111\054B0601.D
Operator:
Method: C:\HPCHEM\1\METHODS\BDMO0311.M
Injection Date & Time: 4/11/2011 11:54:45 AM 4/11/2011 11:54:45 AM
Report Creation: 4/11/2011 5:27:47 PM

NWTPH-Dx
FS09D-5-031711
FS-09D

Sample Name: 1103102-04A SGA RR



Ret. Time	Signal	Compound Name	Response	Amount ug/mL
8.515	FID2 B,	Diesel	57732.711	4368.974
12.422		Pentacosane (Surr)	192.364	9.358
17.243		Motor Oil	1976.219	154.266

94%

11.34g

D = 4368.974 mg/mL x $\frac{10mL}{11.34g}$ = 1702 mg/kg Weathered Diesel Fuel

0 < 50 mg/kg

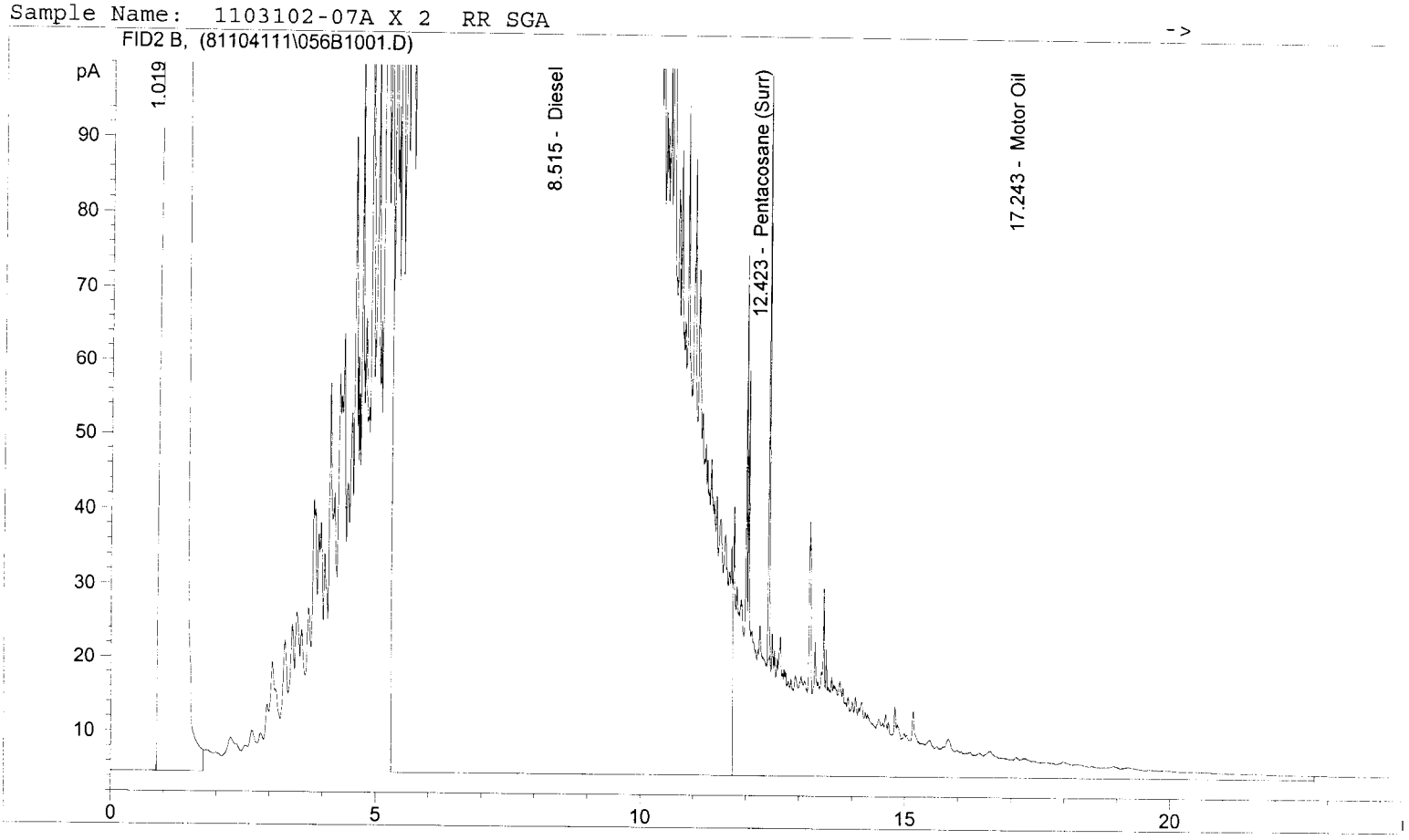
4/22/11

04.11.11

NWTPH-Dx
FS09C-8.5-031711
FS-09C

Instrument #98 Data File: C:\HPCHEM\1\DATA\81104111\056B1001.D
Operator:
Method: C:\HPCHEM\1\METHODS\BDMO0311.M
Injection Date & Time: 4/11/2011 1:55:23 PM 4/11/2011 1:55:23 PM
Report Creation: 4/11/2011 5:30:05 PM

Sample Name: 1103102-07A X 2 RR SGA



Ret. Time	Signal	Compound Name	Response	Amount ug/mL
8.515	FID2 B,	Diesel	60708.996	4594.207
12.423		Pentacosane (Surr)	101.101	4.918
17.243		Motor Oil	3478.052	271.501

x2 = 98%.

24.96g

D = 4594.207 g/mL × 10mL/24.96g × 2 = 3100 mg/kg Weathered Diesel Fuel

0 < 100 mg/kg

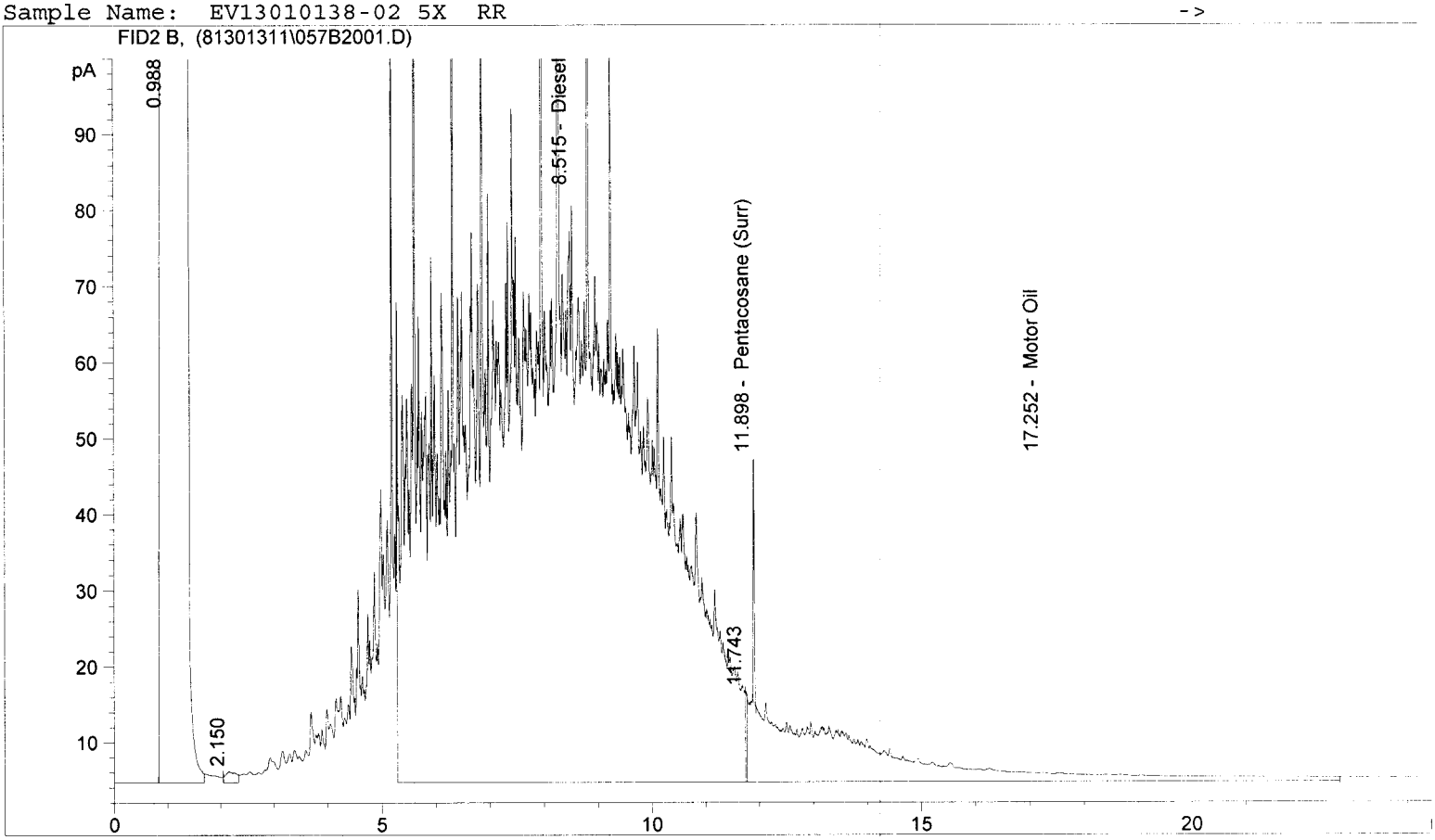
4/12/11

04.11.11 EE

NWTPH-Dx
FS-19-3.0-3.5-012913
FS-19

Instrument #98 Data File: C:\HPCHEM\1\DATA\81301311\057B2001.D
Operator: EBS
Method: C:\HPCHEM\1\METHODS\BDMO0812.M
Injection Date & Time: 1/31/2013 5:57:48 PM 1/31/2013 5:57:48 PM
Report Creation: 2/6/2013 9:19:17 AM

Sample Name: EV13010138-02 5X RR ->



Ret. Time	Signal	Compound Name	Response	Amount ug/mL
8.515	FID2 B,	Diesel	18280.902	1393.827
11.898		Pentacosane (Surr)	42.747	1.876
17.252		Motor Oil	1599.484	98.225

x5 = 941.

25.19g

D = 1393.827 mg/mL x $\frac{10\,mL}{25.19g}$ x5 = 2800 mg/kg Weathered Diesel Fuel

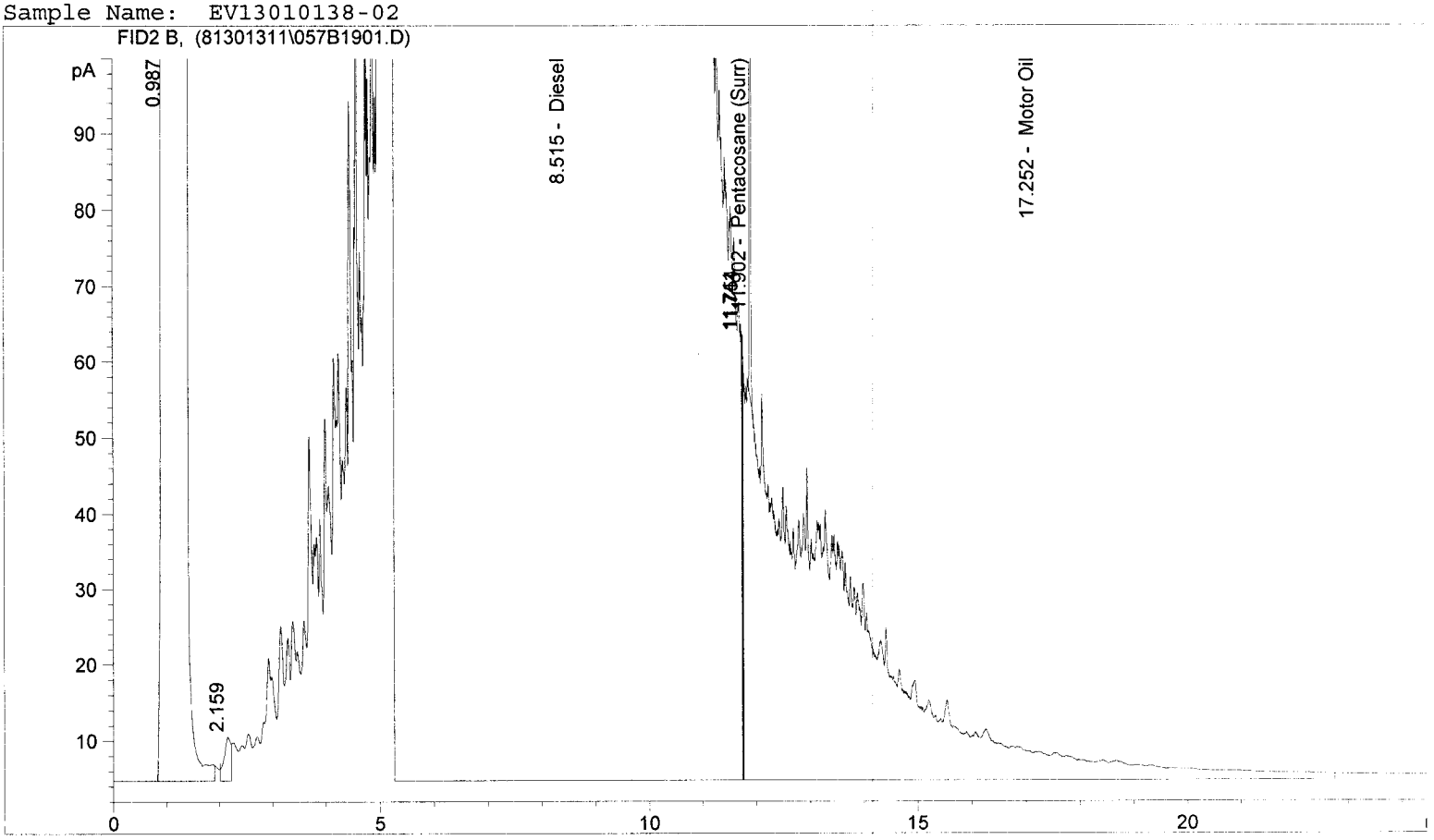
REVIEWED BY & DATE RS 2/11/13

02.06.13 D

Instrument #98 Data File: C:\HPCHEM\1\DATA\81301311\057B1901.D
Operator: EBS
Method: C:\HPCHEM\1\METHODS\BDMO0812.M
Injection Date & Time: 1/31/2013 5:27:44 PM 1/31/2013 5:27:44 PM
Report Creation: 2/6/2013 9:17:47 AM

NWTPH-Dx
FS-19-3.0-3.5-012913
FS-19

Sample Name: EV13010138-02



Ret. Time	Signal	Compound Name	Response	Amount ug/mL
8.515	FID2 B,	Diesel	91069.992	6943.630
11.902		Pentacosane (Surr)	197.785	8.682 87%
17.252		Motor Oil	6725.463	413.013
				25.19g

O = 413.013 ug/mL x 10mL / 25.19g = 160 mg/kg Lube Oil

(bias high due to Diesel Range Product overlap)

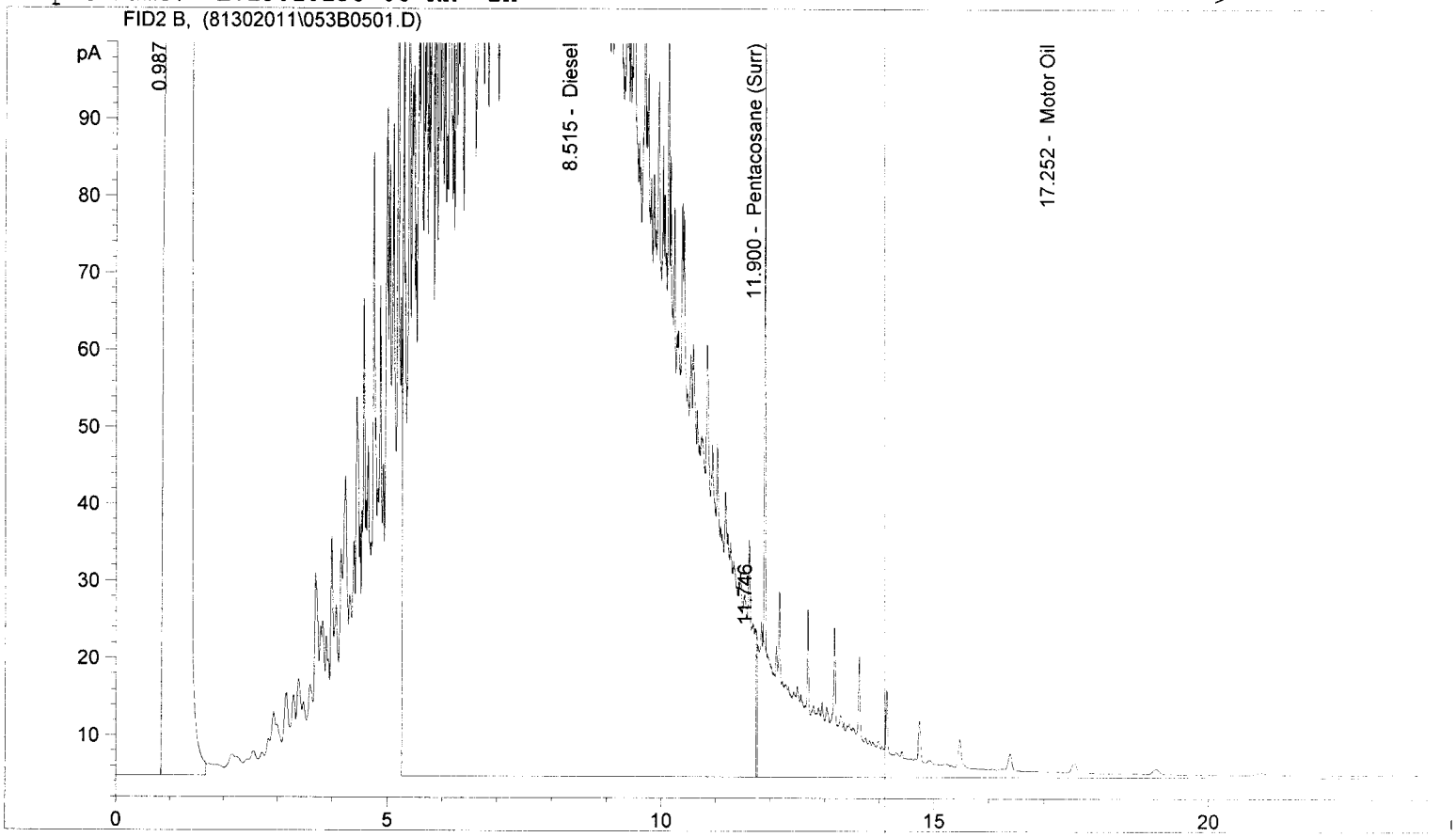
REVIEWED BY & DATE 2/11/13

02.06.13ES

NWTPH-Dx
FS-20-10.5-11.0-012913
FS-20

Instrument #98 Data File: C:\HPCHEM\1\DATA\81302011\053B0501.D
Operator: EBS
Method: C:\HPCHEM\1\METHODS\BDMO0812.M
Injection Date & Time: 2/1/2013 9:44:06 AM 2/1/2013 9:44:06 AM
Report Creation: 2/1/2013 12:48:35 PM

Sample Name: EV13010138-06 RR 2X



Ret. Time	Signal	Compound Name	Response	Amount ug/mL
8.515	FID2 B,	Diesel	38754.398	2954.828
11.900		Pentacosane (Surr)	107.471	4.718
17.252		Motor Oil	1826.834	112.186

x2 = 941

23618

D = 2954.828 ug/mL x $\frac{10\ mL}{23618\ g}$ x 2 = 2500 mg/kg Weathered Diesel Fuel

D < 100 mg/kg

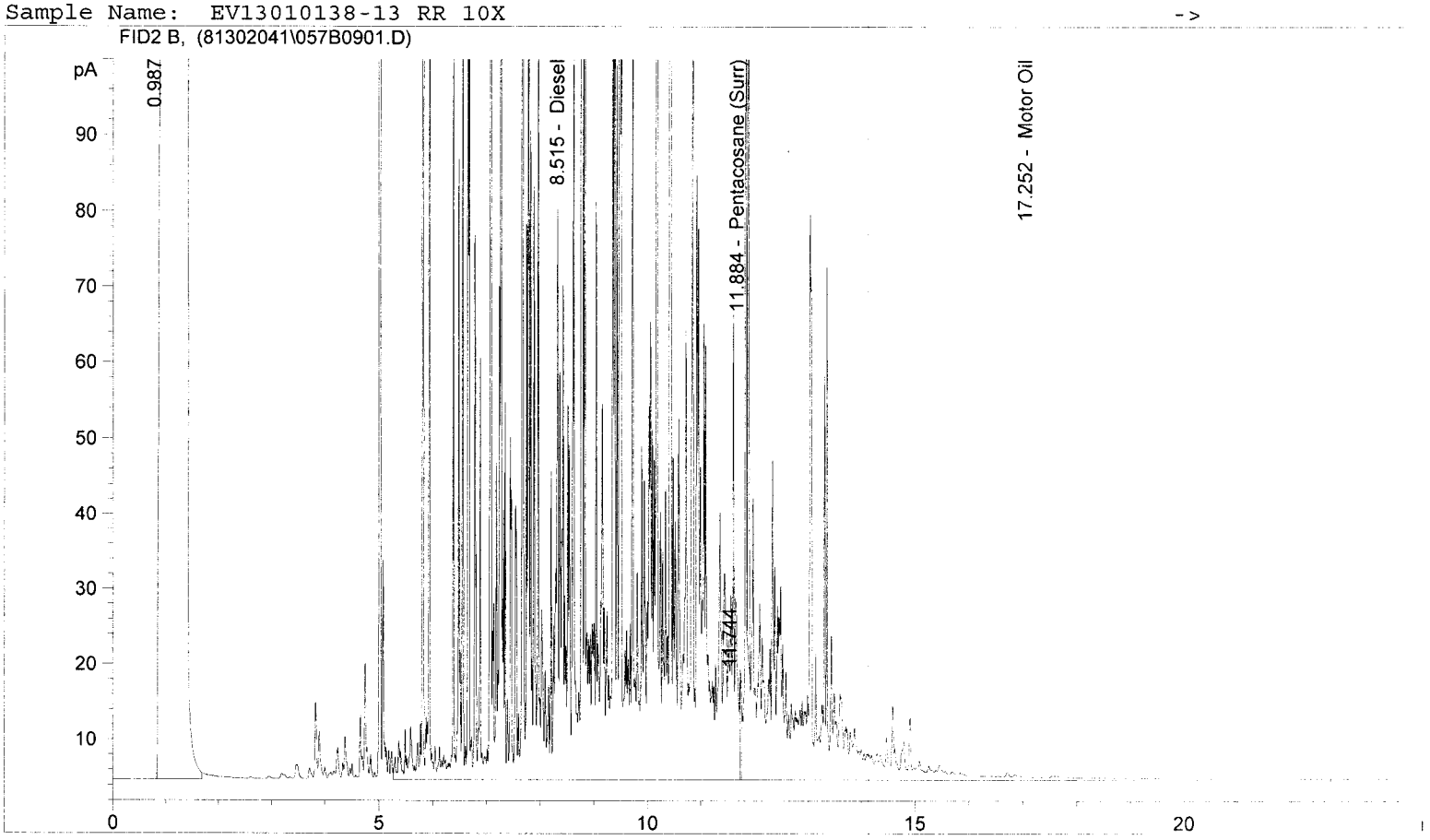
REVIEWED BY & DATE NB 2/11/13

02.05.13

Instrument #98 Data File: C:\HPCHEM\1\DATA\81302041\057B0901.D
Operator: EBS
Method: C:\HPCHEM\1\METHODS\BDMO0812.M
Injection Date & Time: 2/4/2013 1:47:39 PM 2/4/2013 1:47:39 PM
Report Creation: 2/4/2013 2:39:26 PM

NWTPH-Dx
FS-21-8.0-9.0-013013
FS-21

Sample Name: EV13010138-13 RR 10X ->



Ret. Time	Signal	Compound Name	Response	Amount ug/mL	
8.515	FID2 B,	Diesel	14139.627	1078.076	
11.884		Pentacosane (Surr)	191.326	8.398	*
17.252		Motor Oil	2199.389	135.065	

* Surrogate recovery outside QC limits due to co-eluting compounds 26.52g

D = 1078.076 ug/mL x $\frac{10\,mL}{26.52g}$ x 10 = 4100 mg/kg Unidentified Diesel Range Product

O = 135.065 ug/mL x $\frac{10\,mL}{26.52g}$ x 10 = 510 mg/kg Unidentified Oil Range Product

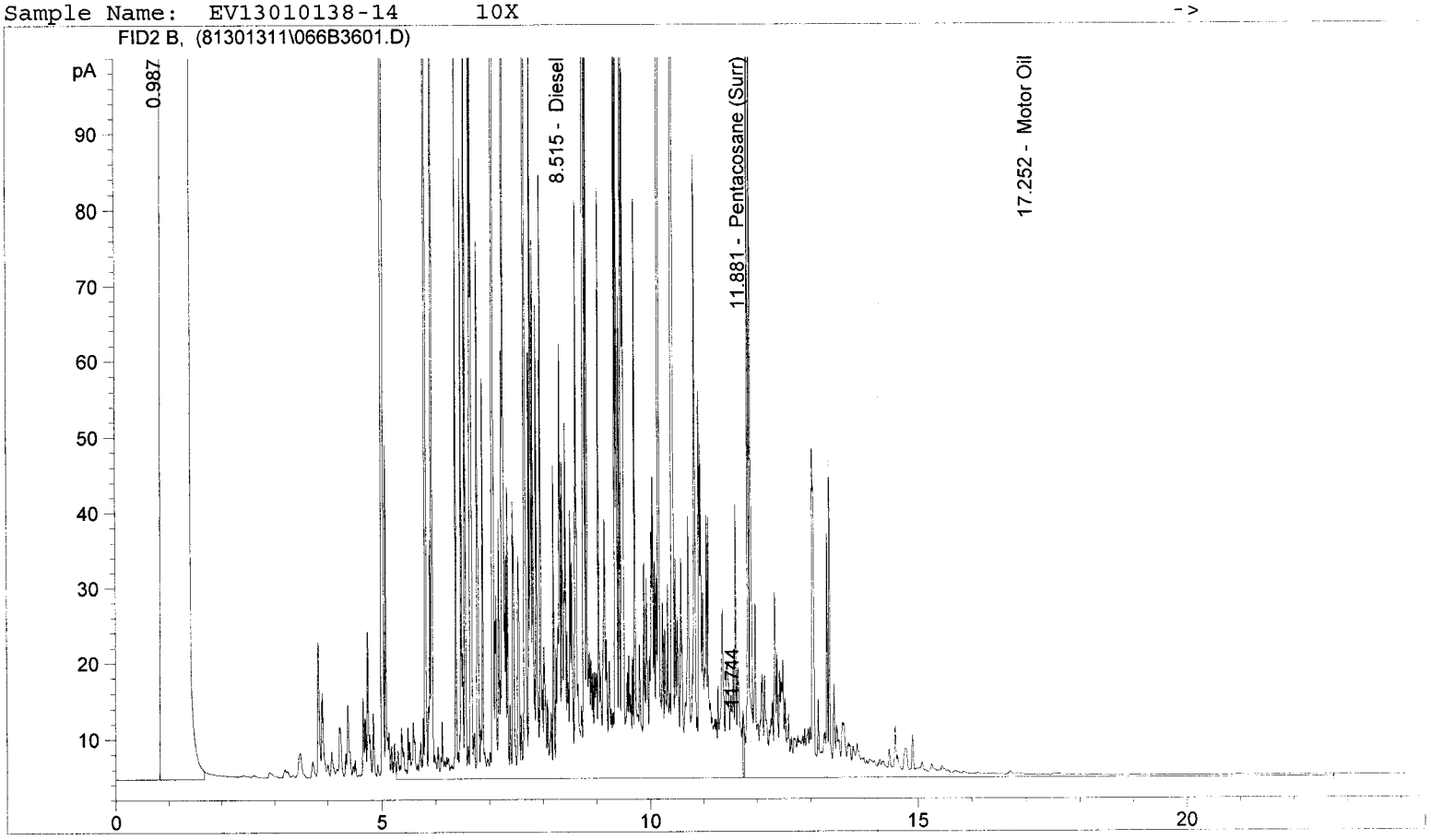
REVIEWED BY & DATE RB 2/11/13

02.04.13

Instrument #98 Data File: C:\HPCHEM\1\DATA\81301311\066B3601.D
Operator: EBS
Method: C:\HPCHEM\1\METHODS\BDMO0812.M
Injection Date & Time: 2/1/2013 1:56:33 AM 2/1/2013 1:56:33 AM
Report Creation: 2/6/2013 9:01:33 AM

NWTPH-Dx
FS-21-13.5-14.0-013013
FS-21

Sample Name: EV13010138-14 10X ->



Ret. Time	Signal	Compound Name	Response	Amount ug/mL	
8.515	FID2 B,	Diesel	10966.229	836.120	
11.881		Pentacosane (Surr)	125.104	5.492	*
17.252		Motor Oil	1404.288	86.238	
				15.01g	

* Surrogate recovery outside QC limits due to co-eluting compounds

$D = 836.120\ ug/mL \times \frac{10mL}{15.01g} \times 10 = 5600\ mg/kg$ Unidentified Diesel Range Product

$D < 100\ ug/mL \times \frac{10mL}{15.01g} \times 10 < 670\ mg/kg$ **

** reporting limit raised due to low % solids

REVIEWED BY & DATE RS 2/11/13

02.07.13

Data File: /chem3/fid4a.i/20150303.b/0303a038.d
Date : 04-MAR-2015 03:11
Client ID: FS-29-3-4-020915
Sample Info: ZX70B,100

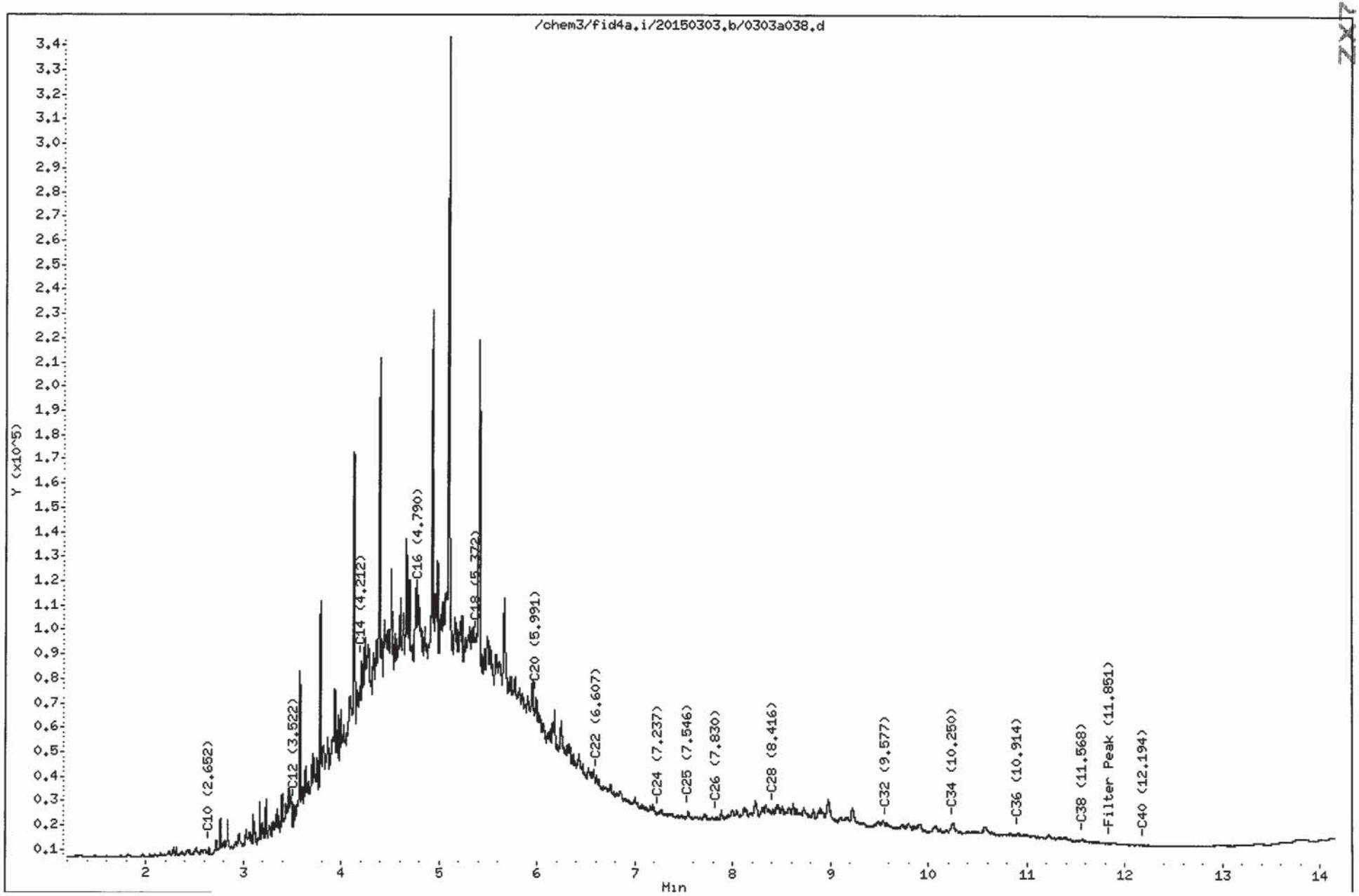
Column phase: RTX-1

Instrument: fid4a.i

Operator: JR/VTS/JW
Column diameter: 0.25

NWTPH-Dx
FS-29-3-4

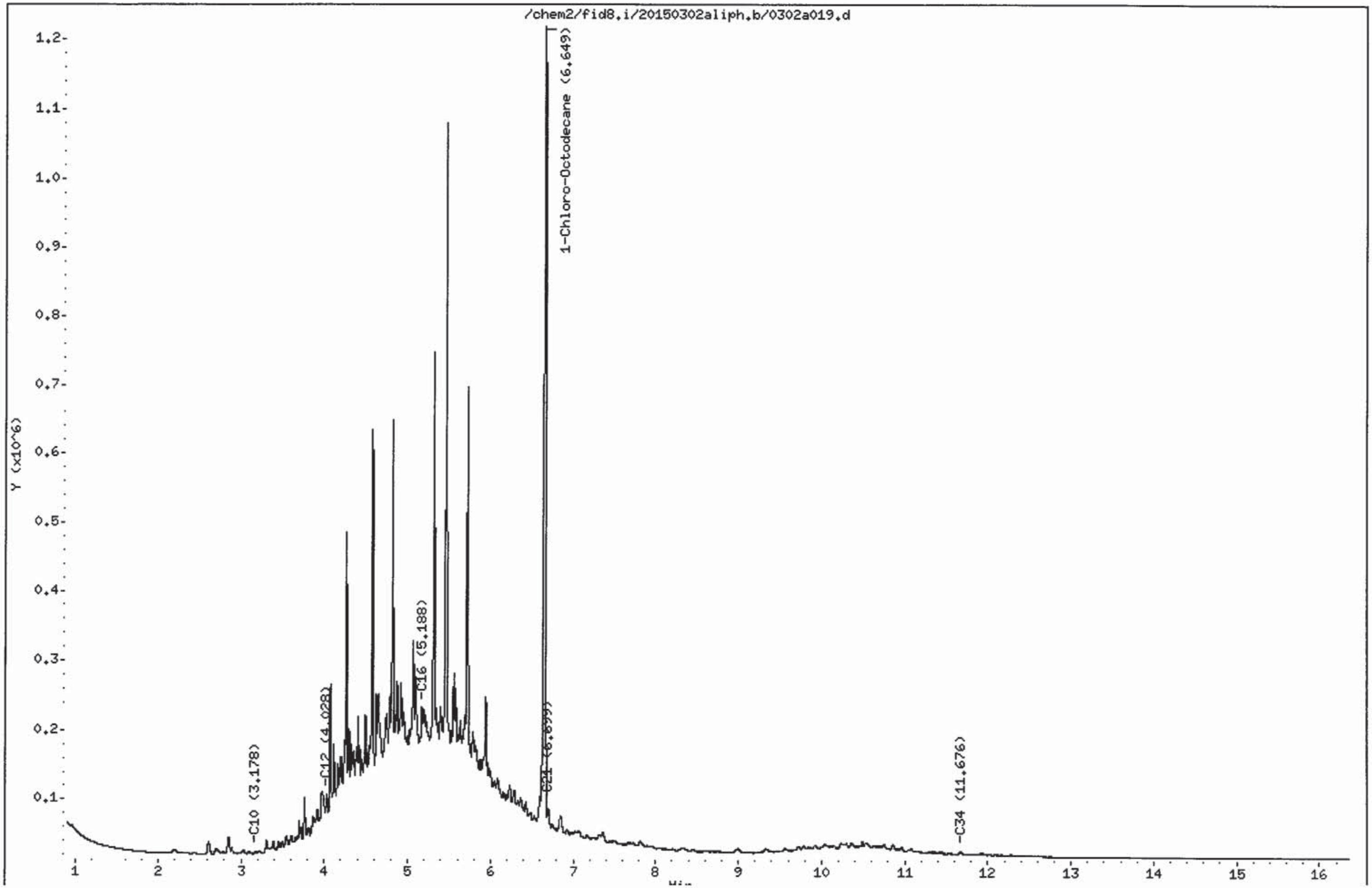
ZX70:00362



NWTPH-Dx
FS-42-10-10.5

Data File: /chem2/fid8.i/20150302aliph.b/0302a019.d

Date : 02-MAR-2015 16:53
Client ID: FS-42-10-10.5-02091
Instrument: fid8.i
Sample Info: ZX37C
Operator: JW
Column phase: ZB-5
Column diameter: 0.32

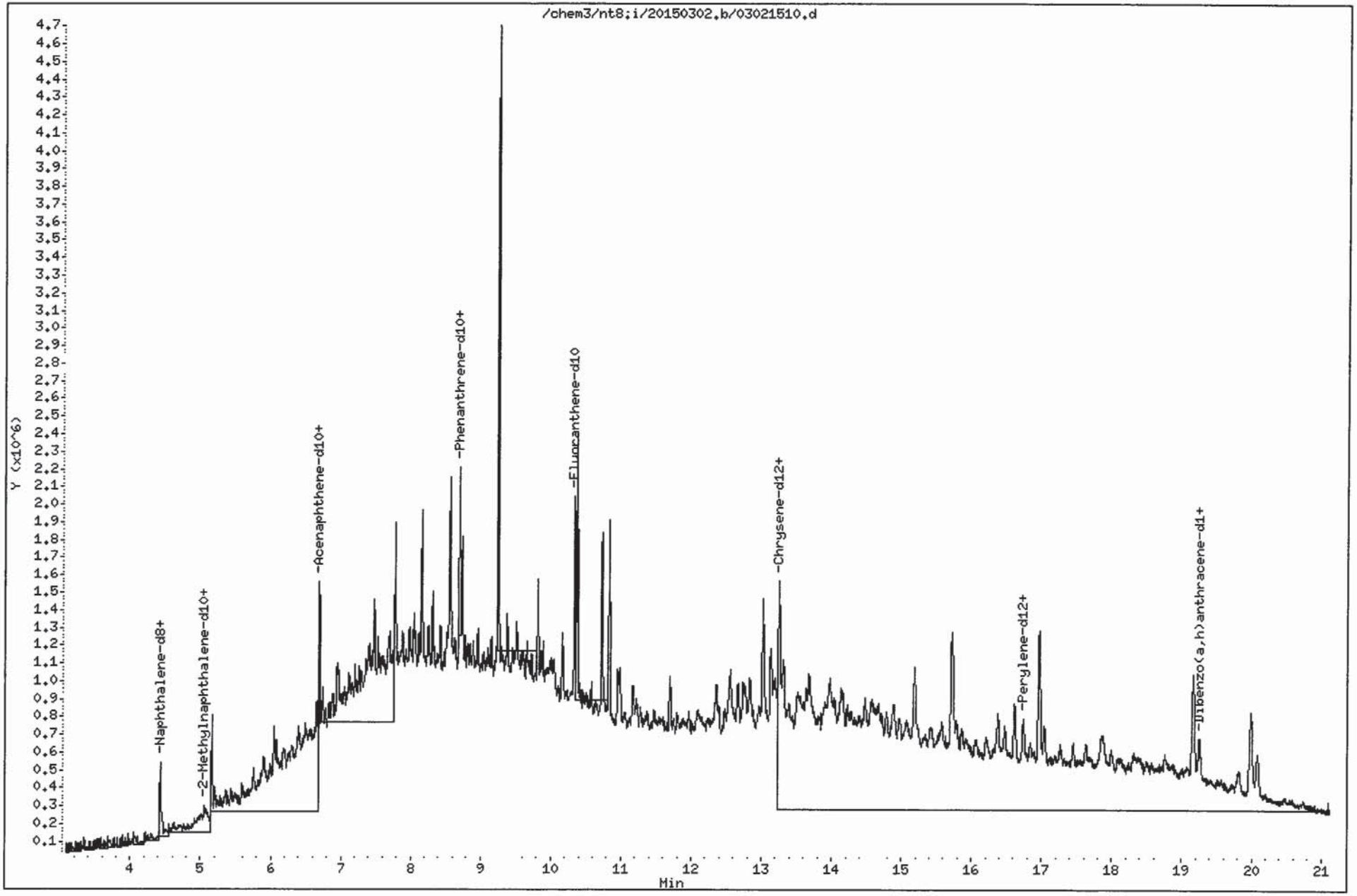


Data File: /chem3/nt8.i/20150302.b/03021510.d
Date : 02-MAR-2015 17:23
Client ID: MW-11-6.0-7.0-02091
Sample Info: ZW00F
Volume Injected (uL): 1.0
Column phase: ZB-35

Instrument: nt8.i
Operator: JZ
Column diameter: 0.25

NWTPH-Dx
MW-11-6-7

ZW00F:00532

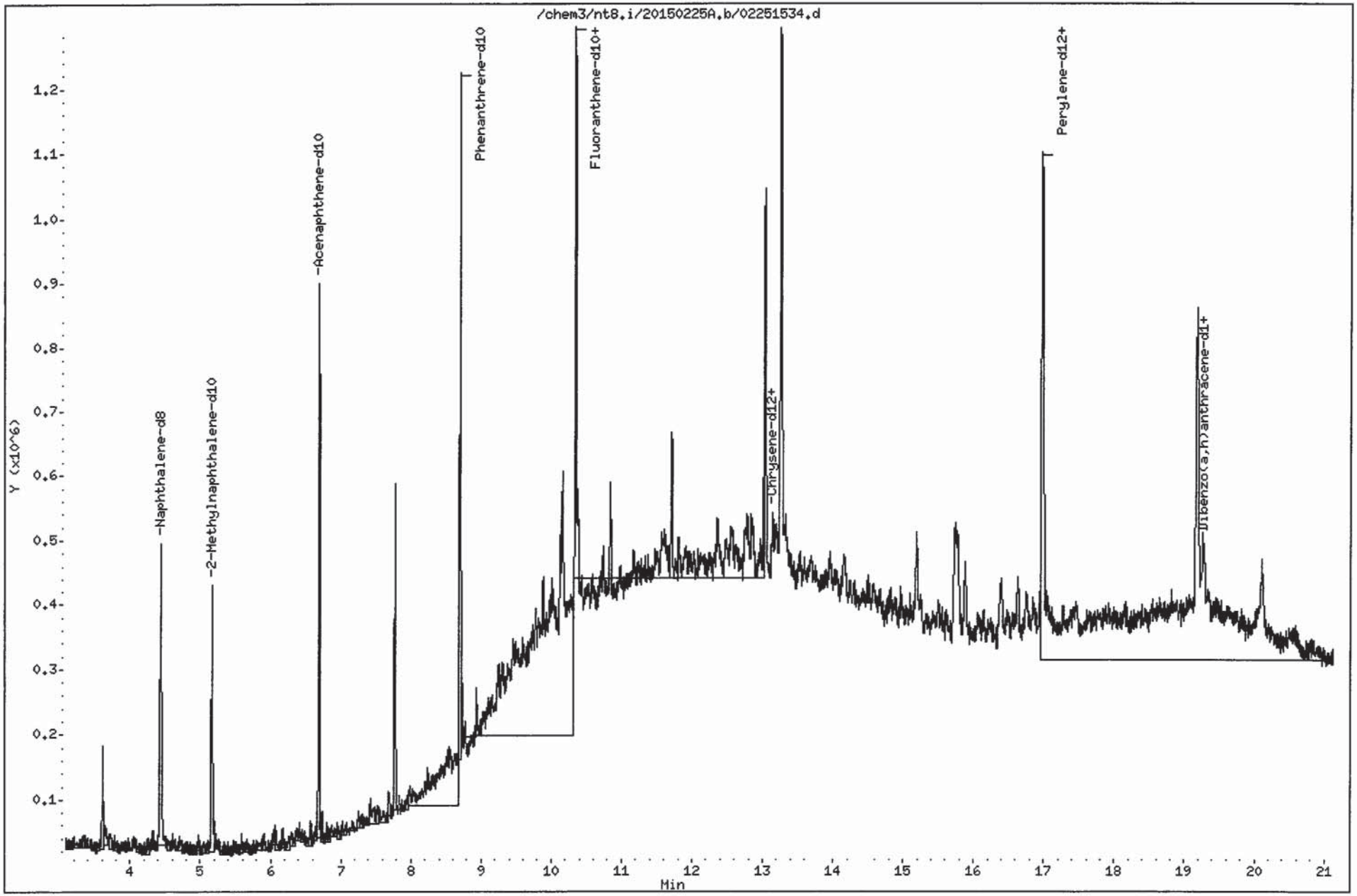


Data File: /chem3/nt8.i/20150225A.b/02251534.d
Date : 26-FEB-2015 03:29
Client ID: MW-12-1.0-2.0-02091
Sample Info: ZW00J
Volume Injected (uL): 1.0
Column phase: ZB-35

Instrument: nt8.i

Operator: JZ
Column diameter: 0.25

NWTPH-Dx
MW-12-1-2

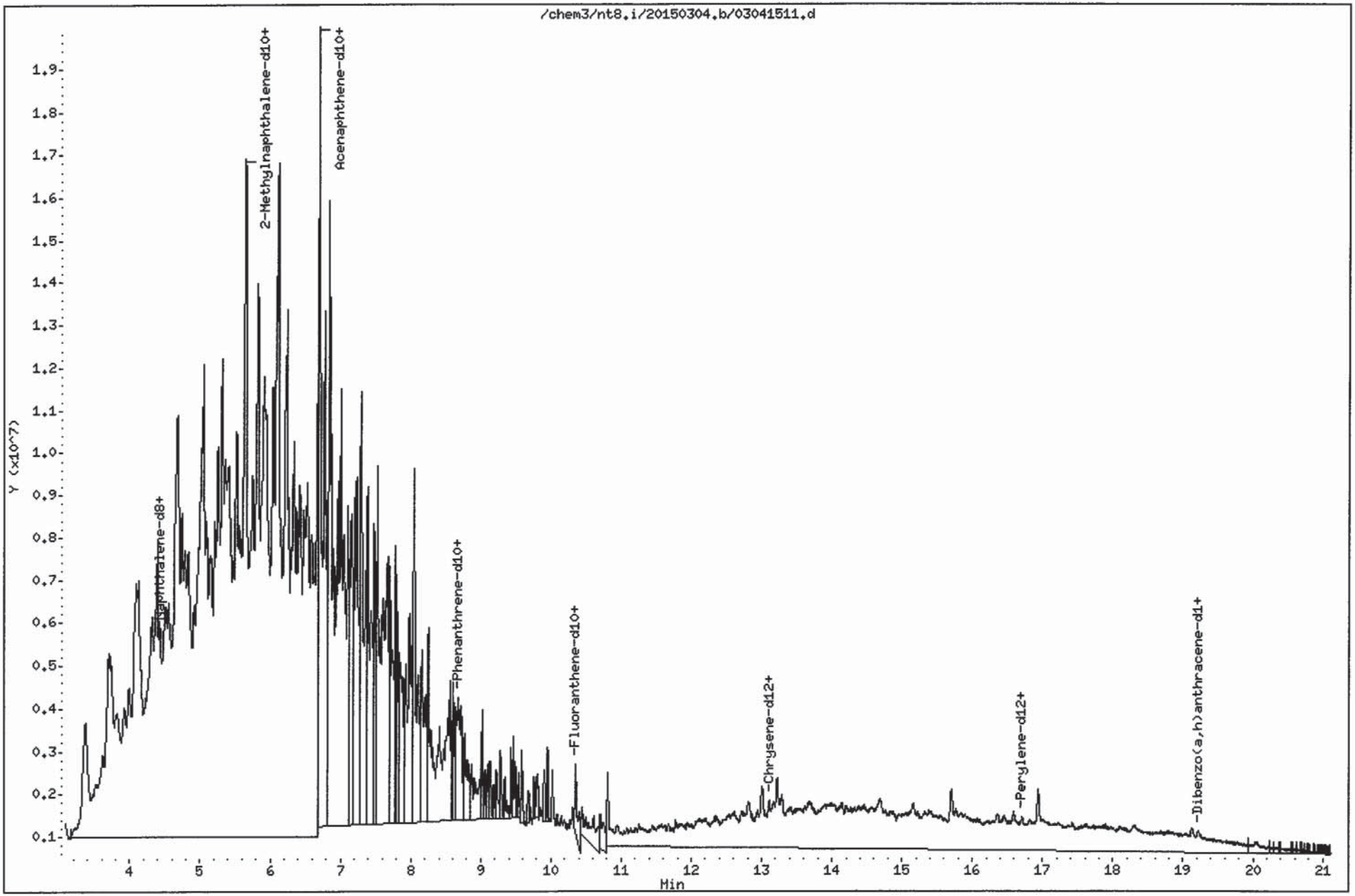


Data File: /chem3/nt8.i/20150304.b/03041511.d
Date : 04-MAR-2015 13:13
Client ID: MW-12-4.0-5.0-02091
Sample Info: ZX70A,3
Volume Injected (uL): 1.0
Column phase: ZB-35

Instrument: nt8.i
Operator: JZ
Column diameter: 0.25

NWTPH-Dx
MW-12-4-5

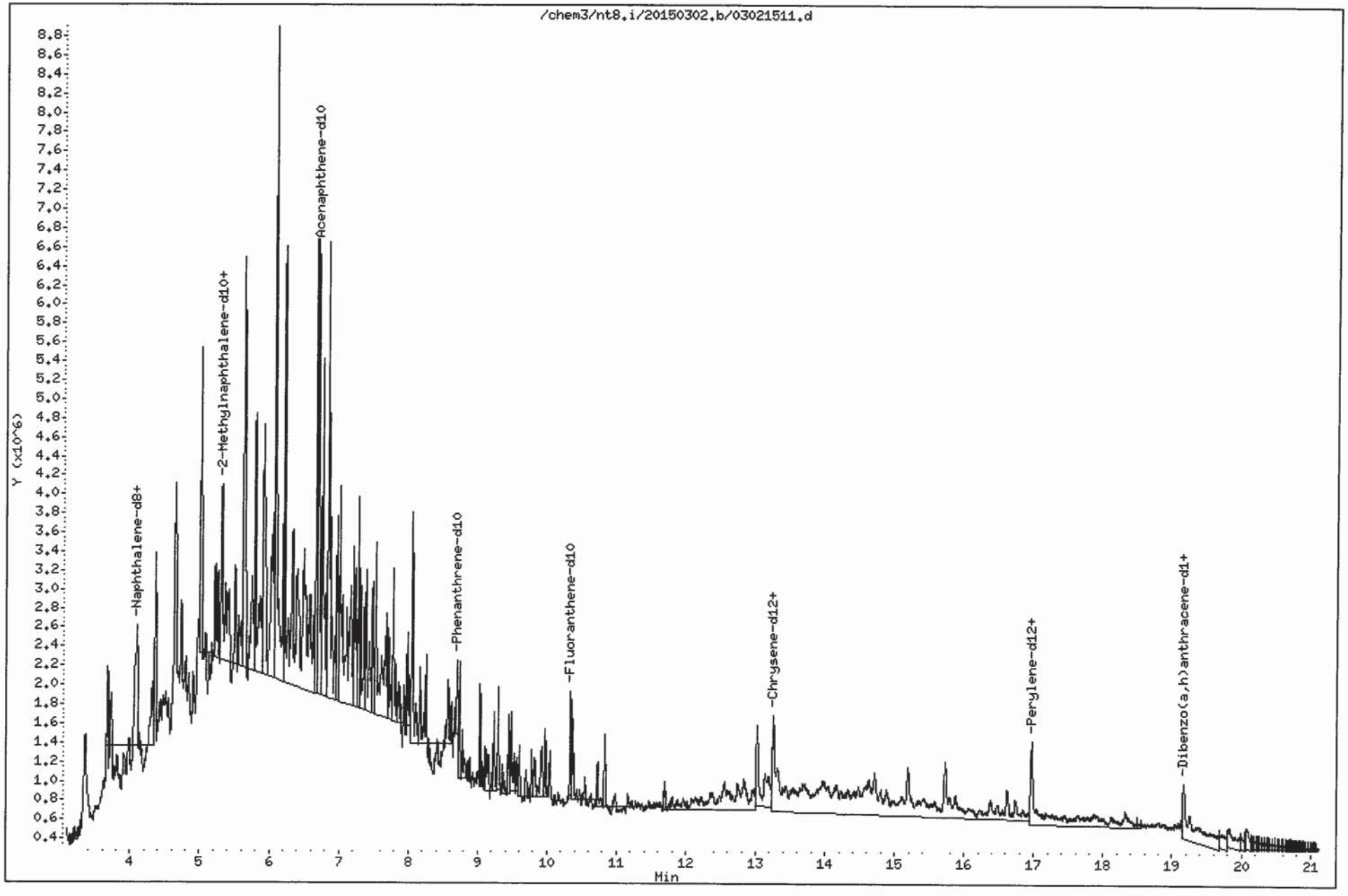
ZX70:00199



Data File: /chem3/nt8.i/20150302.b/03021511.d
Date : 02-MAR-2015 17:48
Client ID: MW-12-10.5-11.0-020
Sample Info: ZW000
Volume Injected (uL): 1.0
Column phase: ZB-35

Instrument: nt8.i
Operator: JZ
Column diameter: 0.25

NWTPH-Dx
MW-12-10.5-11



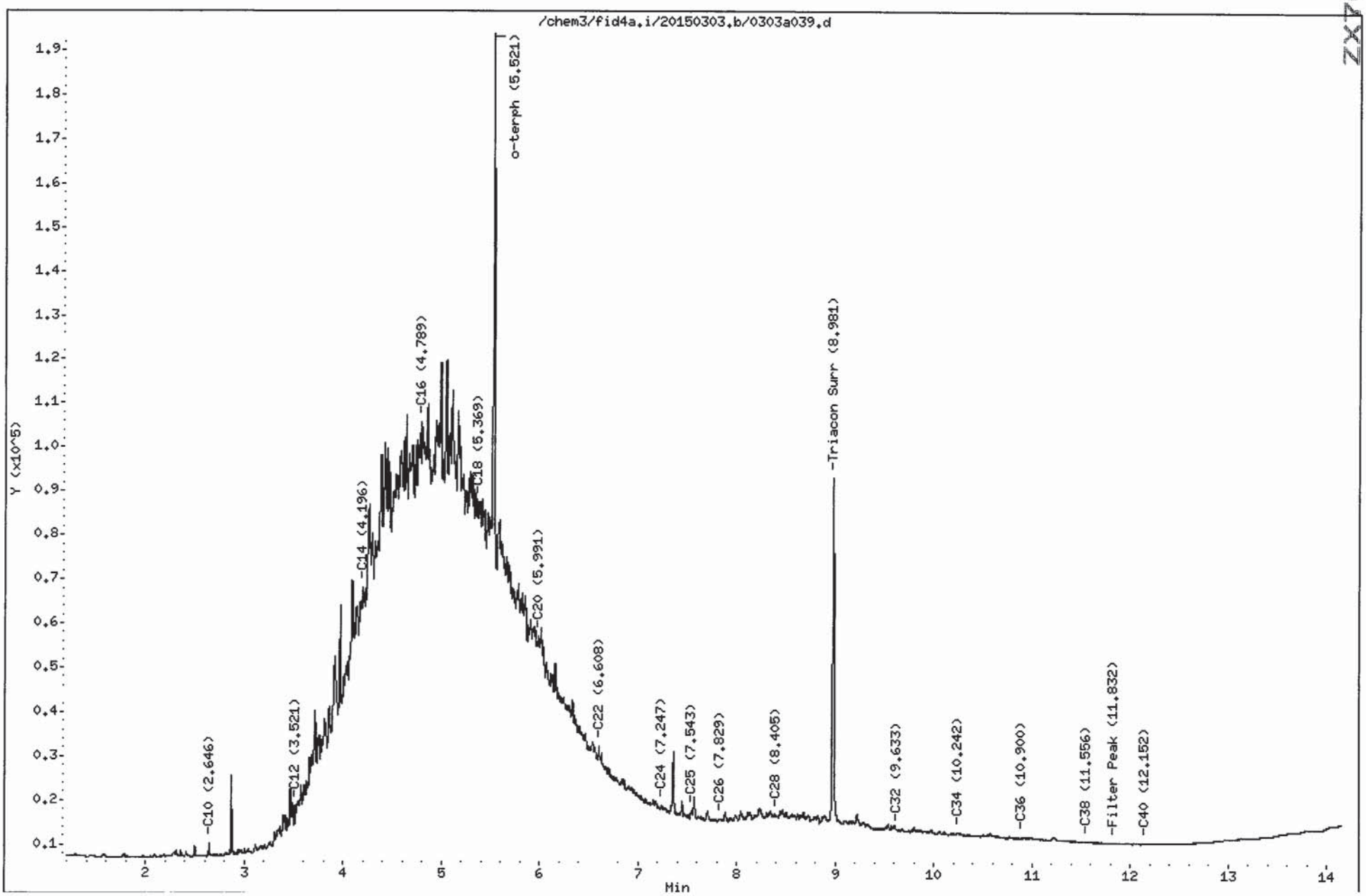
NWTPH-Dx
HA-14-1-2

Data File: /chem3/fid4a.i/20150303.b/0303a039.d
Date : 04-MAR-2015 03:34
Client ID: HA-14-1-2-021215
Sample Info: ZX70C,10

Column phase: RTX-1

Instrument: fid4a.i

Operator: JR/VTS/JW
Column diameter: 0.25



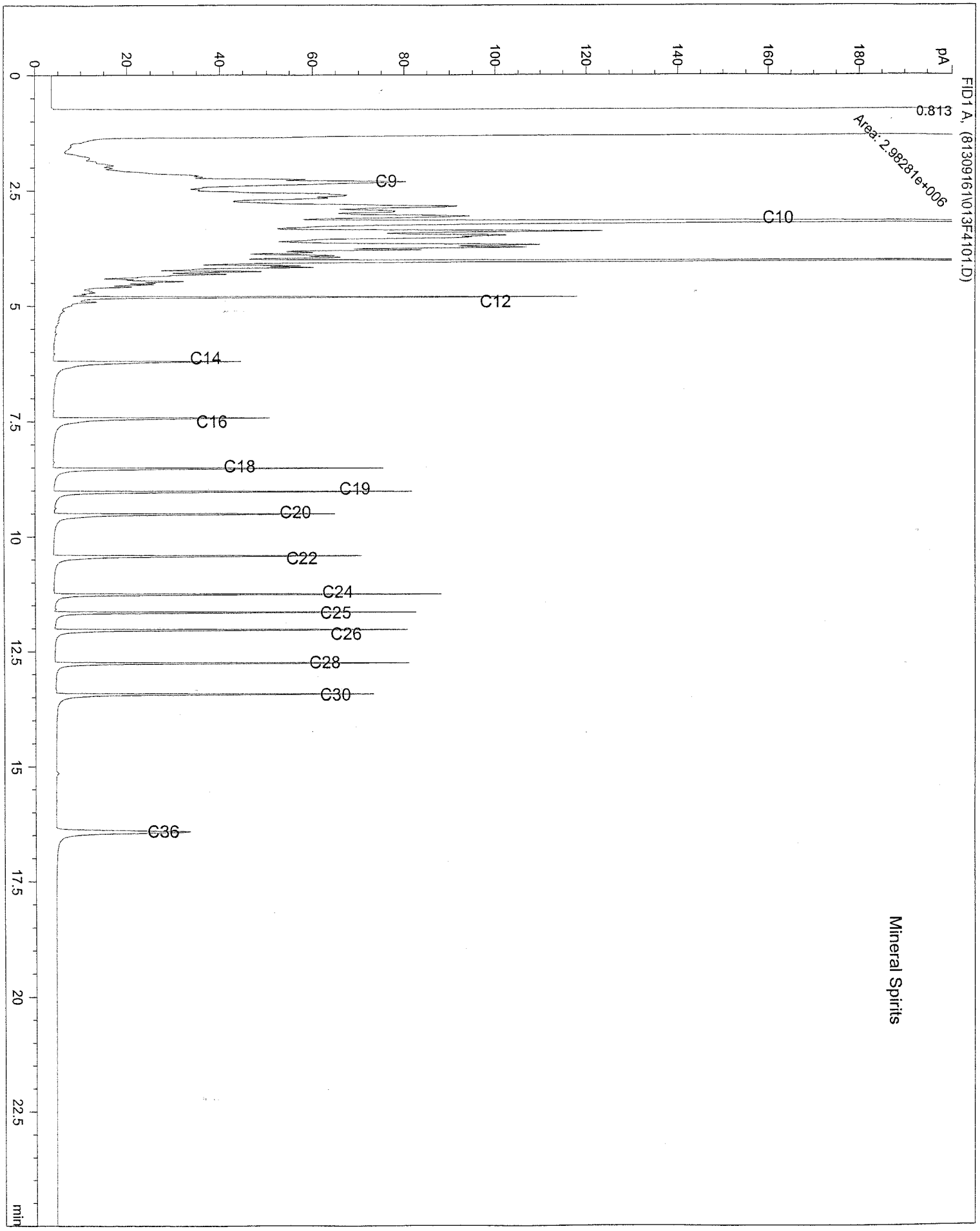
Environmental

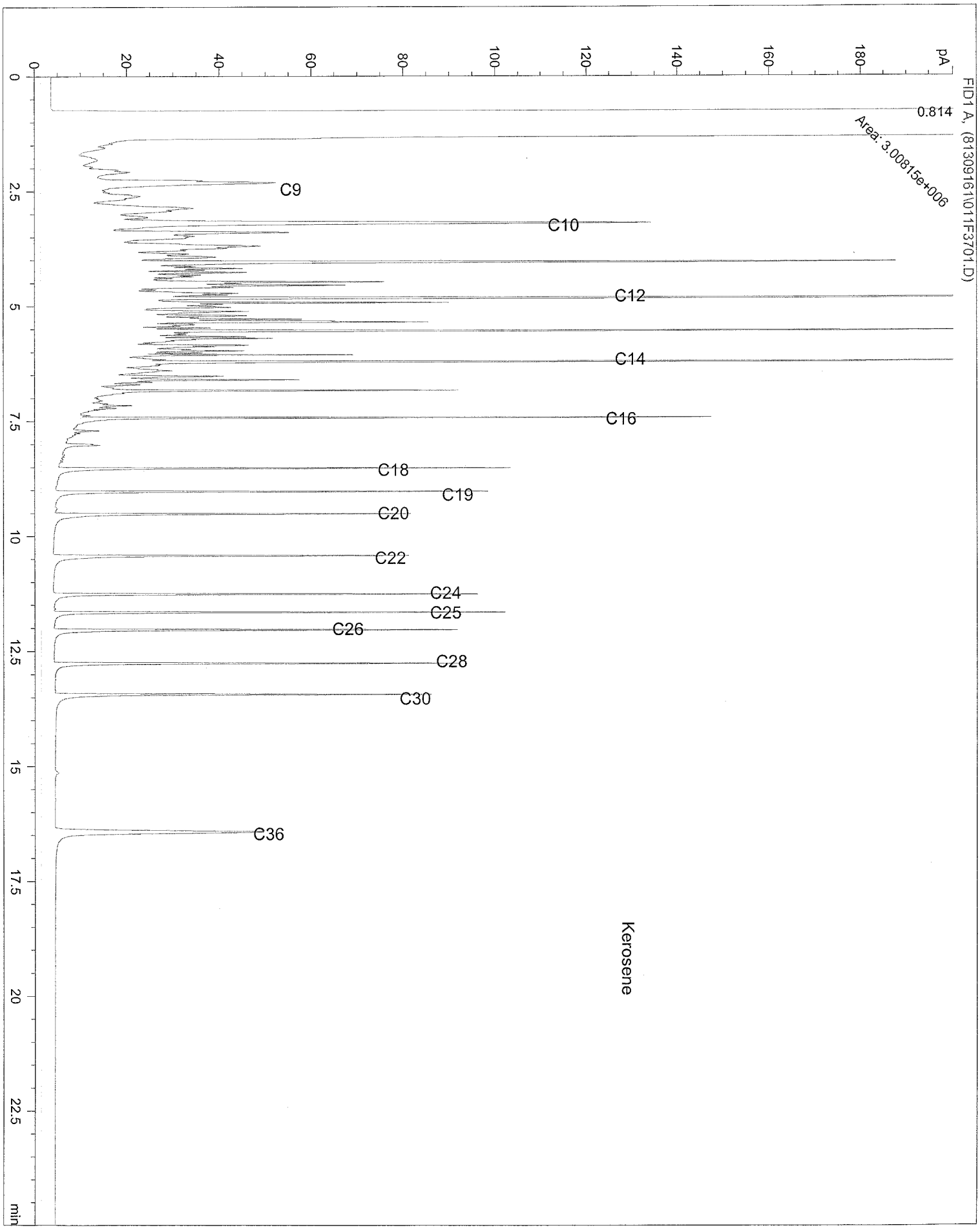
PETROLEUM PRODUCT CHROMATOGRAM LIBRARY

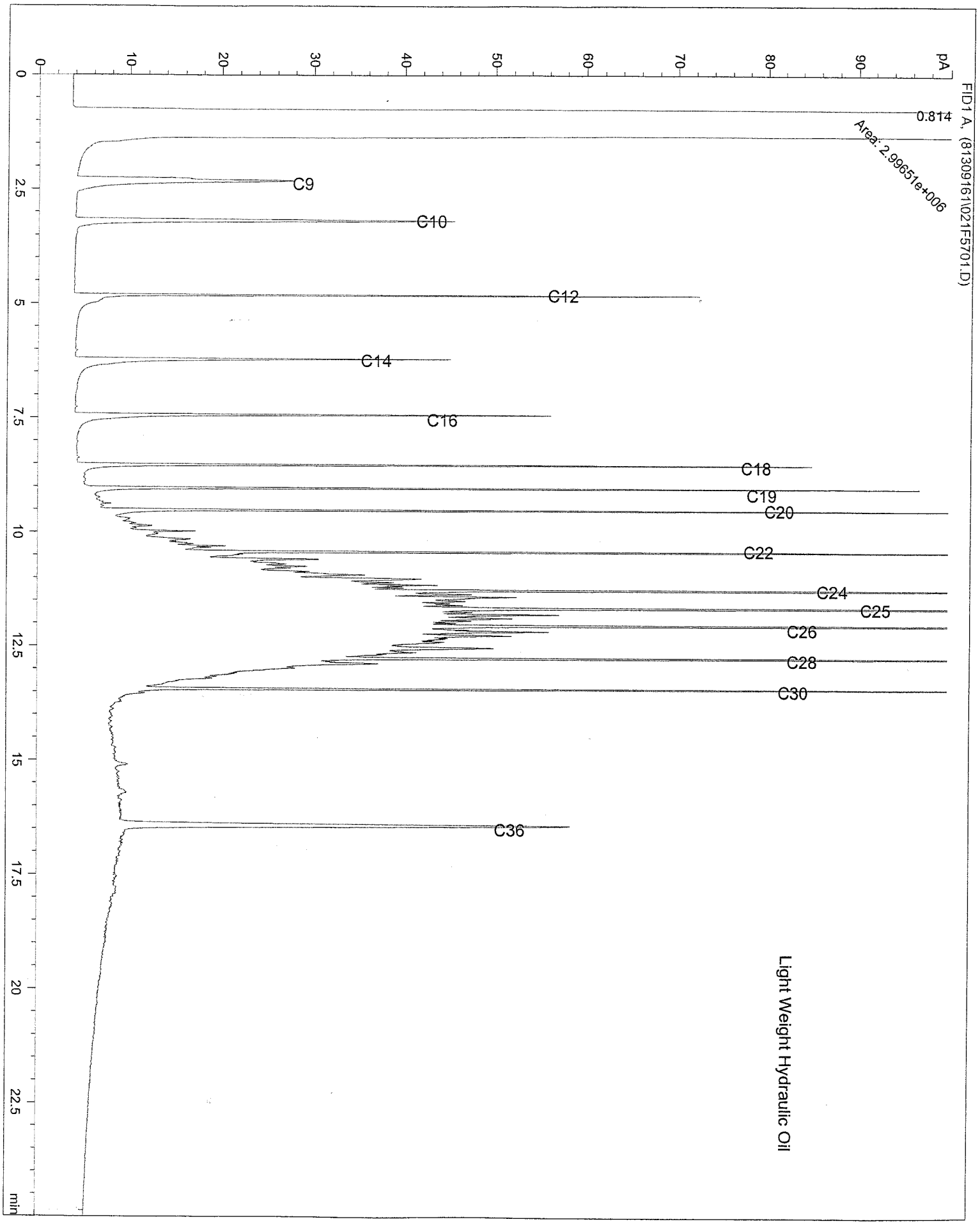
FOR EXTRACTABLE RANGE PRODUCTS RUN UNDER NWTPH-DX PROGRAM

REVISED 7/30/2012

ALS Environmental
Everett Facility
8620 Holly Drive, Suite 100
Everett, WA 98208
425-356-2600 (T)
425-356-2626 (F)
www.alsglobal.com


pA
0
20
40
60
80
100
120
140
160
180
FID1 A, (81309161\013F4101.D)
0.813
Area: 2.98281e+006
C9
C10
C12
C14
C16
C18
C19
C20
C22
C24
C25
C26
C28
C30
C36
Mineral Spirits
min
0
2.5
5
7.5
10
12.5
15
17.5
20
22.5

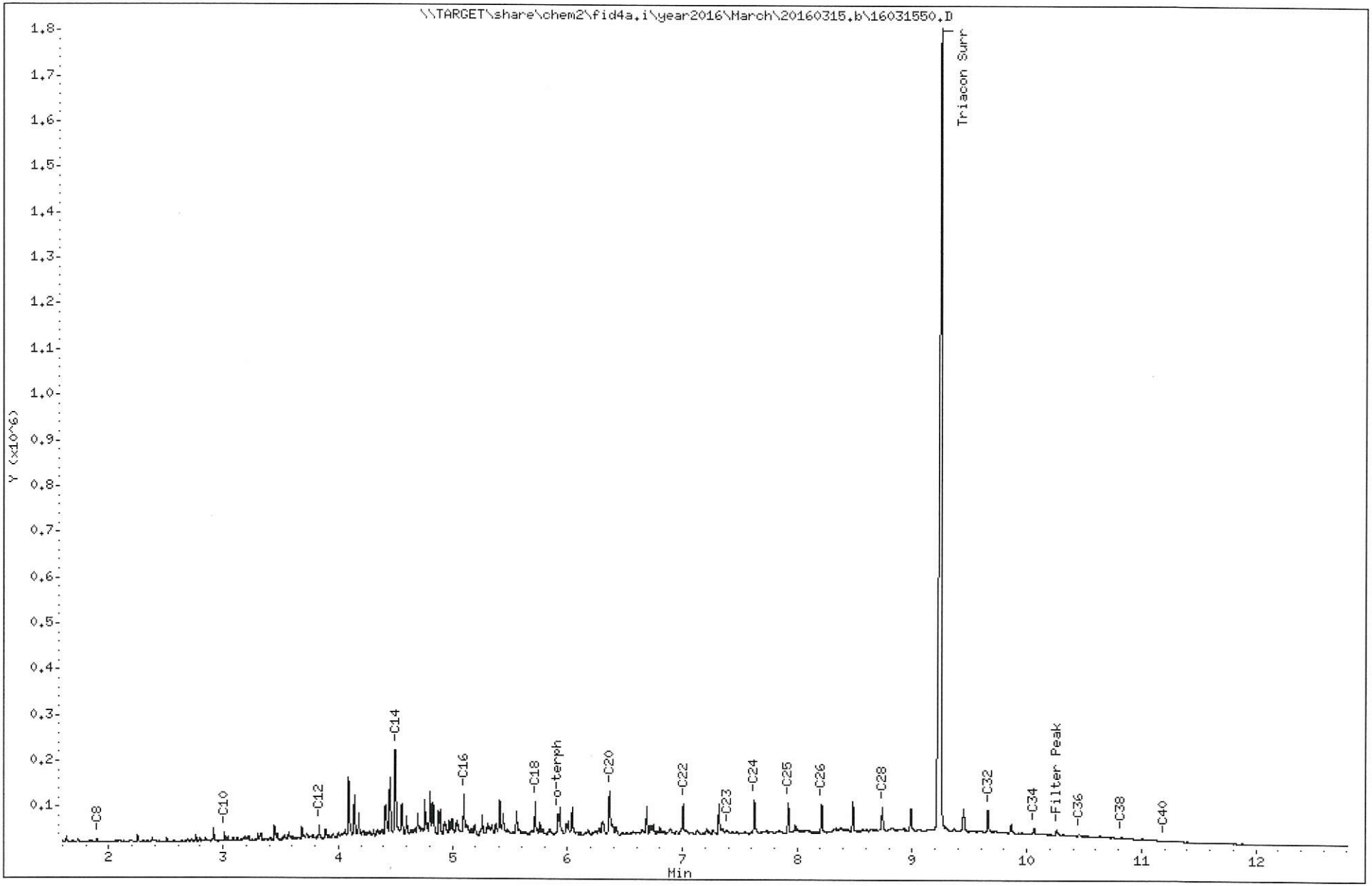

pA
FID1 A, (81309161\011F3701.D)
0.814
Area: 3.00815e+006
C9
C10
C12
C14
C16
C18
C19
C20
C22
C24
C25
C26
C28
C30
C36
Kerosene
min


pA
0
10
20
30
40
50
60
70
80
90
min
0
2.5
5
7.5
10
12.5
15
17.5
20
22.5
FID1 A, (81309161\021F5701.D)
0.814
Area: 2.99651e+006
C9
C10
C12
C14
C16
C18
C19
C20
C22
C24
C25
C26
C28
C30
C36
Light Weight Hydraulic Oil

Data File: \\TARGET\share\chem2\fid4a.i\year2016\March\20160315.b\16031550.D
Date : 16-MAR-2016 04:47
Client ID: Bunker C 2500 ug/ML, D003908
Sample Info: SEQ-CALA

Instrument: fid4a.i
Operator: ML
Column diameter: 0.25

Column phase: RTX-1



Data File: \\TARGET\share\chem2\fid4a.i\year2016\September\20160930.b\16093005.D

Date : 30-SEP-2016 16:23

Client ID:

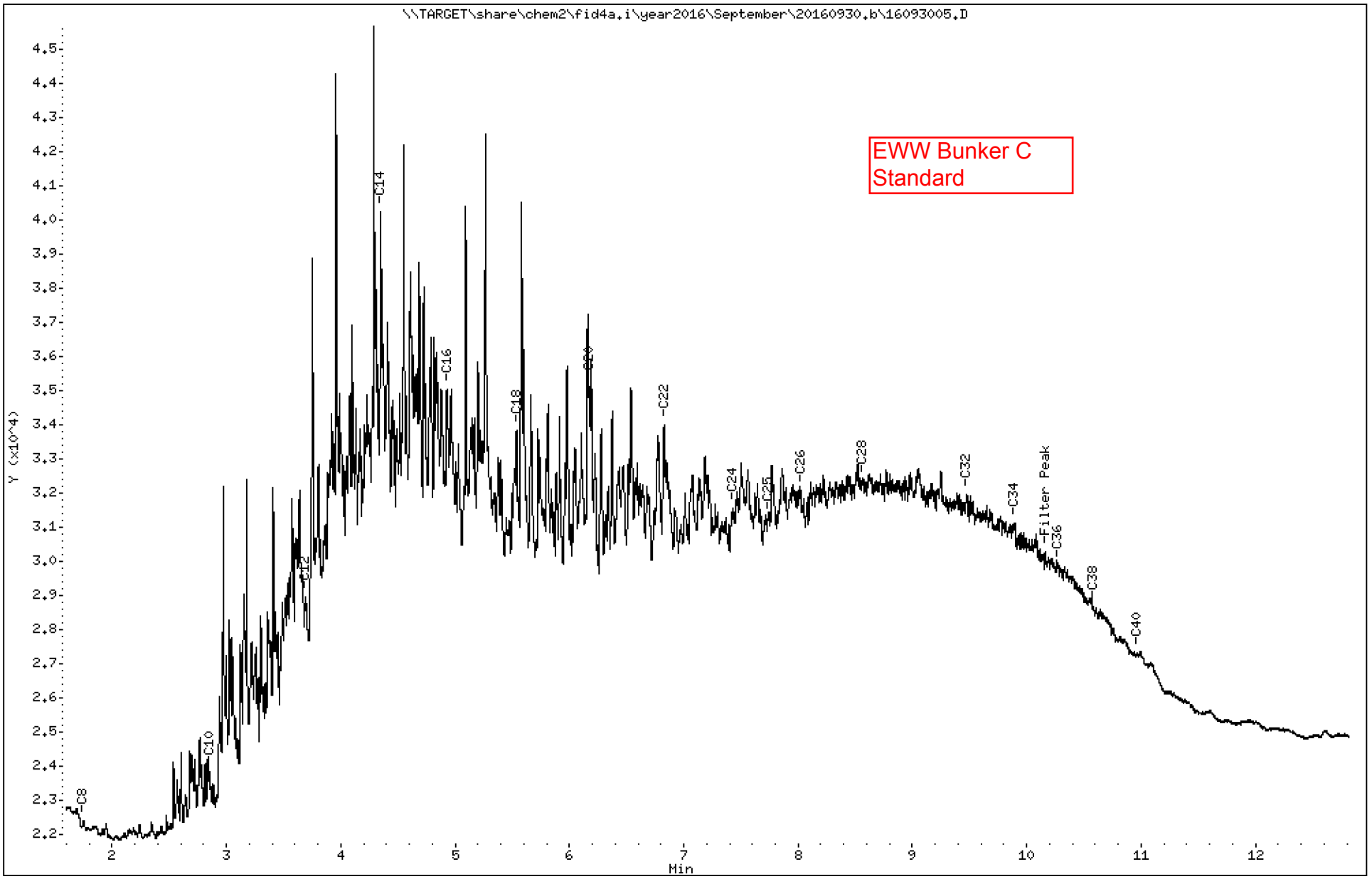
Instrument: fid4a.i

Sample Info: E005064

Operator: ML

Column phase: RTX-1

Column diameter: 0.25



Harris Avenue Shipyard

Remedial Investigation/ Feasibility Study

Appendix G
Screening Level Development

Attachment G.2
TPH Screening Level Report

Exhibit G.2.B
Input to and Calculated Outputs from Ecology's Cleanup Level Calculation Tool for TPH Sites

FINAL

B. Worksheet for Calculating Potable Ground Water Cleanup Levels
(Method B only) WAC 173-340-720

1. Enter Site Information

Date: 2/15/2013
Site Name: Harris
Sample info: MW-01

2. Enter Ground Water Concentration Measured

Notes for Data Entry

Chemical of Concern or EC Group	Measured GW Conc	GW Cleanup Level	Current Condition HQ	Current Condition RISK	Current Condition Pass or Fail?	Adjusted Condition GW Conc being tested	Adjusted Condition HQ	Adjusted Condition RISK	Adjusted Condition Pass or Fail?
	ug/L	ug/L	unitless	unitless		ug/L	unitless	unitless	
Petroleum EC Fraction									
AL_EC >5-6	0								
AL_EC >6-8	0								
AL_EC >8-10	0								
AL_EC >10-12	0								
AL_EC >12-16	0								
AL_EC >16-21	0								
AL_EC >21-34	0								
AR_EC >8-10	78		9.75E-02			5.26E+01	6.58E-02		
AR_EC >10-12	530		3.31E+00			3.57E+02	2.23E+00		
AR_EC >12-16	400		5.00E-01			2.70E+02	3.37E-01		
AR_EC >16-21	140		2.92E-01			9.44E+01	1.97E-01		
AR_EC >21-34	170		2.66E-01			1.15E+02	1.79E-01		
Benzene	0	5							
Toluene	0	1000							
Ethylbenzene	0	700							
Total Xylenes	0	1000							
Naphthalene	4.6	160	2.88E-02			3.10E+00	1.94E-02		
1-Methyl Naphthalene	93		2.33E-01			6.27E+01	1.57E-01		
2-Methyl Naphthalene	67		2.09E+00			4.52E+01	1.41E+00		
n-Hexane	0								
MTBE		20							
Ethylene Dibromide (EDB)		0.01							
1,2 Dichloroethane (EDC)		5							
Benzo(a)anthracene		for			*for*				*for*
Benzo(b)fluoranthene		all			*all*				*all*
Benzo(k)fluoranthene		cPAHs			*cPAHs*				*cPAHs*
Benzo(a)pyrene		Risk =							
Chrysene		1E-05							
Dibenz(a,h)anthracene					Σ Risk=				Σ Risk=
Indeno(1,2,3-cd)pyrene					0.00E+00				0.00E+00
Sum	**1482.6**		6.82E+00	0.00E+00	***Fail***	1.00E+03	4.60E+00	0.00E+00	***Fail***

TEST CURRENT CONDITION

Measured TPH GW Conc, ug/L = 1482.6
HI = 6.822E+00
RISK = 0.000E+00
Pass or Fail? ***Fail***

CALCULATE PROTECTIVE CONDITION

This tool allows the user to calculate a protective TPH ground water concentration based on various ground water quality criteria. The Workbook uses the same composition ratio as for the measured data.

Calculate Protective TPH GW Conc

Selected Criterion: HI = 1
Most Stringent? YES
Protective TPH GW Conc, ug/L = 217.32
HI = 1.00E+00
RISK = 0.00E+00

SUMMARY OF PROTECTIVE GW CONCENTRATIONS

Protective GW TPH Conc, ug/L	**217.32**
Most Stringent Criterion	**HI = 1**

Ground Water Criteria	Most Stringent?	GW TPH, ug/L	RISK @	HI @
HI = 1	YES	2.17E+02	0.00E+00	1.00E+00
Total Risk = 1E-5	NA	NA	NA	NA
Total Risk = 1E-6	NA	NA	NA	NA
Benzene MCL = 5 ug/L	NA	NA	NA	NA
MTBE = 20 ug/L	NA	NA	NA	NA
Risk of cPAHs = 1E-5	NA	NA	NA	NA
Toluene =1000 ug/L	NA	NA	NA	NA
Ethylbenzene = 700 ug/L	NA	NA	NA	NA
Total Xylenes = 1000 ug/L	NA	NA	NA	NA

TEST ADJUSTED CONDITION

This tool allows the user to test whether a particular TPH soil concentration is protective of human health. The Workbook uses the same composition ratio as for the measured data.

Test Adjusted TPH GW Conc

Tested TPH GW Conc, ug/L= 1000
HI= 4.60E+00
RISK= 0.00E+00
Pass or Fail? *Fail*

B. Worksheet for Calculating Potable Ground Water Cleanup Levels
(Method B only) WAC 173-340-720

1. Enter Site Information

Date: 2/15/2013
Site Name: Harris
Sample info: MW-09

2. Enter Ground Water Concentration Measured

Notes for Data Entry

Chemical of Concern or EC Group	Measured GW Conc	GW Cleanup Level	Current Condition HQ	Current Condition RISK	Current Condition Pass or Fail?	Adjusted Condition GW Conc being tested	Adjusted Condition HQ	Adjusted Condition RISK	Adjusted Condition Pass or Fail?
	ug/L	ug/L	unitless	unitless		ug/L	unitless	unitless	
Petroleum EC Fraction									
AL_EC >5-6	0								
AL_EC >6-8	0								
AL_EC >8-10	0								
AL_EC >10-12	0								
AL_EC >12-16	0								
AL_EC >16-21	0								
AL_EC >21-34	0								
AR_EC >8-10	71		8.88E-02			7.02E+01	8.78E-02		
AR_EC >10-12	420		2.63E+00			4.15E+02	2.60E+00		
AR_EC >12-16	300		3.75E-01			2.97E+02	3.71E-01		
AR_EC >16-21	100		2.08E-01			9.89E+01	2.06E-01		
AR_EC >21-34	63		9.84E-02			6.23E+01	9.74E-02		
Benzene	0	5							
Toluene	0	1000							
Ethylbenzene	0	700							
Total Xylenes	0	1000							
Naphthalene	0.64	160	4.00E-03			6.33E-01	3.96E-03		
1-Methyl Naphthalene	52		1.30E-01			5.14E+01	1.29E-01		
2-Methyl Naphthalene	4.3		1.34E-01			4.25E+00	1.33E-01		
n-Hexane									
MTBE		20							
Ethylene Dibromide (EDB)		0.01							
1,2 Dichloroethane (EDC)		5							
Benzo(a)anthracene		for			*for*				*for*
Benzo(b)fluoranthene		all			*all*				*all*
Benzo(k)fluoranthene		cPAHs			*cPAHs*				*cPAHs*
Benzo(a)pyrene		Risk =							
Chrysene		1E-05							
Dibenz(a,h)anthracene					Σ Risk=				Σ Risk=
Indeno(1,2,3-cd)pyrene					0.00E+00				0.00E+00
Sum	**1010.94**		3.66E+00	0.00E+00	***Fail***	1.00E+03	3.62E+00	0.00E+00	***Fail***

TEST CURRENT CONDITION

Measured TPH GW Conc, ug/L = 1010.94
HI = 3.664E+00
RISK = 0.000E+00
Pass or Fail? ***Fail***

CALCULATE PROTECTIVE CONDITION

This tool allows the user to calculate a protective TPH ground water concentration based on various ground water quality criteria. The Workbook uses the same composition ratio as for the measured data.

Calculate Protective TPH GW Conc

Selected Criterion: HI = 1
Most Stringent? YES

Protective TPH GW Conc, ug/L = 275.92
HI = 1.00E+00
RISK = 0.00E+00

SUMMARY OF PROTECTIVE GW CONCENTRATIONS

Protective GW TPH Conc, ug/L	**275.92**
Most Stringent Criterion	**HI = 1**

Ground Water Criteria	Most Stringent?	GW TPH, ug/L	RISK @	HI @
HI = 1	YES	2.76E+02	0.00E+00	1.00E+00
Total Risk = 1E-5	NA	NA	NA	NA
Total Risk = 1E-6	NA	NA	NA	NA
Benzene MCL = 5 ug/L	NA	NA	NA	NA
MTBE = 20 ug/L	NA	NA	NA	NA
Risk of cPAHs = 1E-5	NA	NA	NA	NA
Toluene =1000 ug/L	NA	NA	NA	NA
Ethylbenzene = 700 ug/L	NA	NA	NA	NA
Total Xylenes = 1000 ug/L	NA	NA	NA	NA

TEST ADJUSTED CONDITION

This tool allows the user to test whether a particular TPH soil concentration is protective of human health. The Workbook uses the same composition ratio as for the measured data.

Test Adjusted TPH GW Conc

Tested TPH GW Conc, ug/L= 1000
HI= 3.62E+00
RISK= 0.00E+00
Pass or Fail? *Fail*

A1 Soil Cleanup Levels: Worksheet for Soil Data Entry: Refer to WAC 173-340-720, 740,745, 747, 750

1. Enter Site Information

Date: 01/29/13
Site Name: Harris
Sample Name: FS-19

2. Enter Soil Concentration Measured

Chemical of Concern or Equivalent Carbon Group	Measured Soil Conc dry basis mg/kg	Composition Ratio %
Petroleum EC Fraction		
AL_EC >5-6		0.00%
AL_EC >6-8	9.3	0.22%
AL_EC >8-10	30	0.70%
AL_EC >10-12	230	5.35%
AL_EC >12-16	1200	27.93%
AL_EC >16-21	1100	25.60%
AL_EC >21-34	430	10.01%
AR_EC >8-10	56	1.30%
AR_EC >10-12	18	0.42%
AR_EC >12-16	200	4.66%
AR_EC >16-21	780	18.16%
AR_EC >21-34	240	5.59%
Benzene		0.00%
Toluene		0.00%
Ethylbenzene	0.18	0.00%
Total Xylenes	0.28	0.01%
Naphthalene	0.031	0.00%
1-Methyl Naphthalene	1.8	0.04%
2-Methyl Naphthalene	0.63	0.01%
n-Hexane		0.00%
MTBE		0.00%
Ethylene Dibromide (EDB)		0.00%
1,2 Dichloroethane (EDC)		0.00%
Benzo(a)anthracene		0.00%
Benzo(b)fluoranthene		0.00%
Benzo(k)fluoranthene		0.00%
Benzo(a)pyrene		0.00%
Chrysene		0.00%
Dibenz(a,h)anthracene		0.00%
Indeno(1,2,3-cd)pyrene		0.00%
Sum	4296.221	100.00%

Notes for Data Entry | Set Default Hydrogeology

Clear All Soil Concentration Data Entry Cells

Restore All Soil Concentration Data cleared previously

REMARK:
Non-detect values entered as blanks. When duplicate data values existed for a parameter, the higher detected result was used.

cPAH results intentionally omitted from this workbook, as cPAH is not well correlated with TPH at this site. cPAH results are evaluated as their own COC group in the RIFS.

For section 3, site-specific values for total soil porosity, volumetric water content, soil bulk density, and fraction of organic carbon were used.

For section 4, adjusted groundwater concentration of 1,000 ug/L used.

3. Enter Site-Specific Hydrogeological Data

Total soil porosity:	0.32	Unitless
Volumetric water content:	0.13	Unitless
Volumetric air content:	0.19	Unitless
Soil bulk density measured:	1.8	kg/L
Fraction Organic Carbon:	0.006	Unitless
Dilution Factor:	20	Unitless

4. Target TPH Ground Water Concentation (if adjusted)

If you adjusted the target TPH ground water concentration, enter adjusted value here:	1000	ug/L

A2. 1C Worksheet for Calculating Soil Cleanup Levels for Protection of Human Health: (Soil Direct Contact Pathway)
Method C: Industrial Land Use (WAC 173-340-745)

Date: 1/29/2013
Site Name: Harris
Sample Name: FS-19

Chemical of Concern or EC Group	Current Condition				Adjusted Condition			
	Measured Soil Conc @dry basis	HQ	RISK	Pass or Fail?	Soil Conc being tested	HQ	RISK	Pass or Fail?
	mg/kg	unitless	unitless		mg/kg	unitless	unitless	
Petroleum EC Fraction								
AL_EC >5-6	0				0.00E+00			
AL_EC >6-8	9.3	3.8E-06			7.61E+01	3.08E-05		
AL_EC >8-10	30	6.88E-04			2.45E+02	5.62E-03		
AL_EC >10-12	230	5.27E-03			1.88E+03	4.31E-02		
AL_EC >12-16	1200	6.00E-02			9.82E+03	4.91E-01		
AL_EC >16-21	1100	8.25E-04			9.00E+03	6.75E-03		
AL_EC >21-34	430	3.23E-04			3.52E+03	2.64E-03		
AR_EC >8-10	56	3.85E-04			4.58E+02	3.15E-03		
AR_EC >10-12	18	6.19E-04			1.47E+02	5.06E-03		
AR_EC >12-16	200	6.00E-03			1.64E+03	4.91E-02		
AR_EC >16-21	780	3.90E-02			6.38E+03	3.19E-01		
AR_EC >21-34	240	9.00E-03			1.96E+03	7.36E-02		
Benzene	0		0.00E+00		0.00E+00		0.00E+00	
Toluene	0				0.00E+00			
Ethylbenzene	0.18	1.19E-06			1.47E+00	9.76E-06		
Total Xylenes	0.28	9.33E-07			2.29E+00	7.64E-06		
Naphthalene	0.031	1.91E-06			2.54E-01	1.56E-05		
1-Methyl Naphthalene	1.8	2.03E-05			1.47E+01	1.66E-04		
2-Methyl Naphthalene	0.63	8.86E-05			5.15E+00	7.25E-04		
n-Hexane	0				0.00E+00	0.00E+00		
MTBE	0				0.00E+00			
Ethylene Dibromide (EDB)	0		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0		0.00E+00		0.00E+00		0.00E+00	
Benzo(b)fluoranthene	0		0.00E+00		0.00E+00		0.00E+00	
Benzo(k)fluoranthene	0		0.00E+00		0.00E+00		0.00E+00	
Benzo(a)pyrene	0		0.00E+00		0.00E+00		0.00E+00	
Chrysene	0		0.00E+00		0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00		0.00E+00		0.00E+00	
Indeno(1,2,3-cd)pyrene	0		0.00E+00		0.00E+00		0.00E+00	
Sum	**4296.221**	1.22E-01	0.00E+00		3.51E+04	1.00E+00	0.00E+00	

TEST CURRENT CONDITION

Measured TPH Soil Conc, mg/kg= 4296.221
HI= 1.222E-01
RISK= 0.000E+00
Pass or Fail? Pass
Check Residual Saturation (WAC340-747(10))

CALCULATE PROTECTIVE CONDITION

This tool allows the user to calculate protective TPH soil concentration based on various soil quality criteria. The Workbook uses the same composition ratio as for the measured data.

Calculate Protective TPH soil Conc

Selected Criterion: @HI=1
Most Stringent? YES

Protctive TPH Soil Conc, mg/kg = 35149.749
HI = 1.000E+00
RISK = 0.000E+00

Check Residual Saturation (WAC340-747(10))

TEST ADJUSTED CONDITION

This tool allows the user to test whether a particular TPH soil concentration is protective of human health. The Workbook uses the same composition ratio as for the measured data.

Test Adjusted TPH Soil Conc

Tested TPH Soil Conc, mg/kg=
HI=
RISK=
Pass or Fail?

Washington State Department of Ecology, Toxics Cleanup Program: Soil Cleanup Level for TPH Sites - Protection of Groundwater

A2.2 Worksheet for Calculating Soil Cleanup Level for the Protection of Ground Water Quality: (Leaching Pathway)

WAC 173-340-740 and 747

Date: 1/29/2013

Site Name: Harris

Sample Name: FS-19

Chemical of Concern or EC Group	Measured Soil Conc @dry basis	GW Cleanup Level	Adjusted Condition				
			Soil Conc being tested	Predicted Conc @Well	HQ @ Well	RISK @ Well	Pass or Fail?
	mg/kg	ug/L	mg/kg	ug/L	unitless	unitless	
Petroleum EC Fraction							
AL_EC >5-6	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >6-8	9.3		1.96E+02	1.25E+00	9.22E-05		
AL_EC >8-10	30		6.31E+02	2.48E-01	1.03E-03		
AL_EC >10-12	230		4.84E+03	1.22E-01	5.10E-04		
AL_EC >12-16	1200		2.52E+04	1.14E-02	2.38E-05		
AL_EC >16-21	1100		2.31E+04	1.33E-05	4.14E-10		
AL_EC >21-34	430		9.04E+03	4.04E-11	1.26E-15		
AR_EC >8-10	56		1.18E+03	7.51E+01	9.39E-02		
AR_EC >10-12	18		3.79E+02	8.61E+00	5.38E-02		
AR_EC >12-16	200		4.21E+03	1.93E+01	2.42E-02		
AR_EC >16-21	780		1.64E+04	5.24E+00	1.09E-02		
AR_EC >21-34	240		5.05E+03	1.65E-02	2.58E-05		
Benzene	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Toluene	0	1000	0.00E+00	0.00E+00	0.00E+00		
Ethylbenzene	0.18	700	3.79E+00	7.16E-01	8.94E-04		
Total Xylenes	0.28	1000	5.89E+00	1.13E+00	7.03E-04		
Naphthalene	0.031	160	6.52E-01	1.87E-02	1.17E-04		
1-Methyl Naphthalene	1.8		3.79E+01	7.87E-01	1.97E-03		
2-Methyl Naphthalene	0.63		1.33E+01	2.71E-01	8.47E-03		
n-Hexane	0		0.00E+00	0.00E+00	0.00E+00		
MTBE	0	20	0.00E+00	0.00E+00	0.00E+00		
Ethylene Dibromide (EDB)	0	0.01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0	for	0.00E+00	0.00E+00		0.00E+00	for
Benzo(b)fluoranthene	0	all	0.00E+00	0.00E+00		0.00E+00	all
Benzo(k)fluoranthene	0	cPAHs	0.00E+00	0.00E+00		0.00E+00	cPAHs
Benzo(a)pyrene	0	Risk=	0.00E+00	0.00E+00		0.00E+00	
Chrysene	0	1E-05	0.00E+00	0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0		0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	4296.221		9.04E+04	1.13E+02	1.97E-01	0.00E+00	Pass

Site-Specific Hydrogeological Properties previously entered:

Item	Symbol	Value	Units
Total soil porosity:	n	0.32	unitless
Volumetric water content:	Θ_w	0.13	unitless
Volumetric air content:	Θ_a	0.19	unitless
Soil bulk density measured:	ρ_b	1.8	kg/L
Fraction Organic Carbon:	f_{oc}	0.006	unitless
Dilution Factor:	DF	20	unitless

Target Ground Water TPH conc adjusted previously if any:

Target Ground Water TPH Conc, ug/L ⇒ 1000

CALCULATE PROTECTIVE CONDITION OR TEST ADJUSTED CONDITION

Calculate or Test

@ HI=1

Pass or Fail? YES

Tested TPH Soil Conc, mg/kg = **100% NAPL**

Predicted TPH GW Conc, ug/L = 1.13E+02

RISK @ Well = 0.00E+00

HI @Well = 1.97E-01

DEDAILED MODEL RESULTS TPH Range Test

Type of model used for computation:	4-Phase Model
Computation completed?	Yes!
Initial Weighted Average MW of NAPL, g/mol:	215.1
Equilibrated Weighted Average MW of NAPL, g/mol:	215.2
Initial Weighted Average Density of NAPL, kg/L:	0.856
Volumetric NAPL Content, Θ_{NAPL} :	1.9E-01
NAPL Saturation (%), Θ_{NAPL}/n :	59.33%
100% NAPL, mg/kg	90365.6

Mass Distribution Pattern @ 4-phase in soil pore system: Mass Balance Pattern

Total Mass distributed in Water Phase: 0.00% in Solid: 0.07%

Total Mass distributed in Air Phase: 0.00% in NAPL: 99.93%

Please Check Soil Residual Saturation TPH Levels: Refer to Table 747-5!

A2.2 Worksheet for Calculating Soil Cleanup Level for the Protection of Ground Water Quality: (Leaching Pathway)

WAC 173-340-740 and 747

Date: 1/29/2013
Site Name: Harris
Sample Name: FS-19

Chemical of Concern or EC Group	Measured Soil Conc @dry basis	GW Cleanup Level	Adjusted Condition: Soil Conc being tested	Predicted Conc @Well	HQ @ Well	RISK @ Well	Pass or Fail?
	mg/kg	ug/L	mg/kg	ug/L	unitless	unitless	
Petroleum EC Fraction							
AL_EC >5-6	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >6-8	9.3		1.96E+02	1.25E+00	9.22E-05		
AL_EC >8-10	30		6.31E+02	2.48E-01	1.03E-03		
AL_EC >10-12	230		4.84E+03	1.22E-01	5.10E-04		
AL_EC >12-16	1200		2.52E+04	1.14E-02	2.38E-05		
AL_EC >16-21	1100		2.31E+04	1.33E-05	4.14E-10		
AL_EC >21-34	430		9.04E+03	4.04E-11	1.26E-15		
AR_EC >8-10	56		1.18E+03	7.51E+01	9.39E-02		
AR_EC >10-12	18		3.79E+02	8.61E+00	5.38E-02		
AR_EC >12-16	200		4.21E+03	1.93E+01	2.42E-02		
AR_EC >16-21	780		1.64E+04	5.24E+00	1.09E-02		
AR_EC >21-34	240		5.05E+03	1.65E-02	2.58E-05		
Benzene	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Toluene	0	1000	0.00E+00	0.00E+00	0.00E+00		
Ethylbenzene	0.18	700	3.79E+00	7.16E-01	8.94E-04		
Total Xylenes	0.28	1000	5.89E+00	1.13E+00	7.03E-04		
Naphthalene	0.031	160	6.52E-01	1.87E-02	1.17E-04		
1-Methyl Naphthalene	1.8		3.79E+01	7.87E-01	1.97E-03		
2-Methyl Naphthalene	0.63		1.33E+01	2.71E-01	8.47E-03		
n-Hexane	0		0.00E+00	0.00E+00	0.00E+00		
MTBE	0	20	0.00E+00	0.00E+00	0.00E+00		
Ethylene Dibromide (EDB)	0	0.01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0	for	0.00E+00	0.00E+00		0.00E+00	for
Benzo(b)fluoranthene	0	all	0.00E+00	0.00E+00		0.00E+00	all
Benzo(k)fluoranthene	0	cPAHs	0.00E+00	0.00E+00		0.00E+00	cPAHs
Benzo(a)pyrene	0	Risk=	0.00E+00	0.00E+00		0.00E+00	
Chrysene	0	1E-05	0.00E+00	0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0		0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	4296.221		9.04E+04	1.13E+02	1.97E-01	0.00E+00	Pass

Site-Specific Hydrogeological Properties previously entered:

Item	Symbol	Value	Units
Total soil porosity:	n	0.32	unitless
Volumetric water content:	Θ_w	0.13	unitless
Volumetric air content:	Θ_a	0.19	unitless
Soil bulk density measured:	ρ_b	1.8	kg/L
Fraction Organic Carbon:	f_{oc}	0.006	unitless
Dilution Factor:	DF	20	unitless

Target Ground Water TPH conc adjusted previously if any:

Target Ground Water TPH Conc, ug/L ⇒ 1000

CALCULATE PROTECTIVE CONDITION OR TEST ADJUSTED CONDITION

Calculate or Test

@ Protection of Surface Water Quality

Pass or Fail? NA

Tested TPH Soil Conc, mg/kg = **100% NAPL**

Predicted TPH GW Conc, ug/L = 1.13E+02

RISK @ Well = NA

HI @Well = NA

DEDAILED MODEL RESULTS TPH Range Test

Type of model used for computation:	4-Phase Model
Computation completed?	Yes!
Initial Weighted Average MW of NAPL, g/mol:	215.1
Equilibrated Weighted Average MW of NAPL, g/mol:	215.2
Initial Weighted Average Density of NAPL, kg/L:	0.856
Volumetric NAPL Content, Θ_{NAPL} :	1.9E-01
NAPL Saturation (%), Θ_{NAPL}/n :	59.33%
100% NAPL, mg/kg	90365.6

Mass Distribution Pattern @ 4-phase in soil pore system: Mass Balance Pattern

Total Mass distributed in Water Phase: 0.00% in Solid: 0.07%

Total Mass distributed in Air Phase: 0.00% in NAPL: 99.93%

Please Check Soil Residual Saturation TPH Levels: Refer to Table 747-5!

A2.3 Worksheet for Calculating Soil Cleanup Levels for the Protection of Air Quality: (Vapor Pathway)
Method B: WAC 173-340-740 and 750

Date: 1/29/2013
Site Name: Harris
Sample Name: FS-19

Warning: This Worksheet is provided for informational purposes only! Background levels entered are not considered for the calculations.

Chemical of Concern or EC Group	Measured Soil Conc @dry basis	Enter Air Background Levels	Adjusted Condition: Soil Conc being tested	Adjusted Condition: Predicted Indoor Air Conc	Adjusted Condition: HQ @ Indoor Air	Adjusted Condition: RISK @ Indoor Air	Pass or Fail?
	mg/kg	ug/m^3	mg/kg	ug/m^3	unitless	unitless	
Petroleum EC Fraction							
AL_EC >5-6	0	40	0.00E+00	0.00E+00	0.00E+00		
AL_EC >6-8	9.3	40	9.31E+00	1.19E+03	4.37E-01		
AL_EC >8-10	30	40	3.00E+01	3.93E+02	2.89E+00		
AL_EC >10-12	230	40	2.30E+02	2.95E+02	2.17E+00		
AL_EC >12-16	1200	0	1.20E+03	1.20E+02	8.84E-01		
AL_EC >16-21	1100	0	1.10E+03	1.31E+00	0.00E+00		
AL_EC >21-34	430	0	4.30E+02	8.23E-05	0.00E+00		
AR_EC >8-10	56	40	5.60E+01	5.87E+02	3.22E+00		
AR_EC >10-12	18	40	1.80E+01	2.15E+01	1.56E+01		
AR_EC >12-16	200	0	2.00E+02	1.97E+01	2.47E-01		
AR_EC >16-21	780	0	7.81E+02	1.37E+00	0.00E+00		
AR_EC >21-34	240	0	2.40E+02	2.25E-04	0.00E+00		
Benzene	0	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Toluene	0	15	0.00E+00	0.00E+00	0.00E+00		
Ethylbenzene	0.18	5	1.80E-01	4.27E+00	9.33E-03		
Total Xylenes	0.28	36	2.80E-01	5.72E+00	1.23E-01		
Naphthalene	0.031	2.5	3.10E-02	6.96E-03	5.06E-03		
1-Methyl Naphthalene	1.8	5	1.80E+00	2.91E-01	3.64E-03		
2-Methyl Naphthalene	0.63	5	6.31E-01	1.02E-01	7.40E-02		
n-Hexane	0	1	0.00E+00	0.00E+00	0.00E+00		
MTBE	0	10	0.00E+00	0.00E+00	0.00E+00		
Ethylene Dibromide (EDB)	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0	0	0.00E+00	0.00E+00		0.00E+00	for
Benzo(b)fluoranthene	0	0	0.00E+00	0.00E+00		0.00E+00	all
Benzo(k)fluoranthene	0	0	0.00E+00	0.00E+00		0.00E+00	cPAHs
Benzo(a)pyrene	0	0	0.00E+00	0.00E+00		0.00E+00	
Chrysene	0	0	0.00E+00	0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0	0	0.00E+00	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0	0	0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	4296.221		4.30E+03	2.64E+03	2.57E+01	0.00E+00	***Fail***

Enter Vapor Attenuation Factor for all TPH components:	0.001

Site-Specific Hydrogeological Properties previously entered:

Item	Symbol	Value	Units
Total soil porosity: default is 0.43	n	0.32	unitless
Volumetric water content: default is 0.3	Θ_w	0.13	unitless
Initial volumetric air content: default is 0.13	Θ_a	0.19	unitless
Soil bulk density measured: default is 1.5	ρ_b	1.8	kg/L
Fraction Organic Carbon: default is 0.001	f_{oc}	0.006	unitless

TEST ADJUSTED CONDITION

This tool allows the user to test whether a particular TPH soil concentration is protective of indoor air quality. The Workbook uses the same composition ratio as for the measured data and the same hydrogeological data and vapor attenuation factor previously entered by the user.

Test Adjusted TPH Soil Conc

Pass or Fail? *Fail*

Tested TPH Soil Conc, mg/kg = 4300
Predicted TPH Indoor Air Conc, ug/m^3 = 2.64E+03
RISK @ Indoor Air = 0.00E+00
HI @ Indoor Air = 2.57E+01

Type of model used for computation: 4-Phase Model
Computation completed? Yes!

Note: Source of Default Air Background Level:
"Characterizing risk posed by Petroleum Contaminated Sites: Implementation of MADEP VPH/EPH Approach", *Petroleum Equivalent Carbon Fractions: State of Massachusetts, Department of Environmental Protection, 10/21/2002, Policy # WSC02-411

*Benzene and n-Hexane: Washington State Department of Ecology, 1997, "Memorandum: Washington State Air Toxic Monitoring Data Documentation"

A1 Soil Cleanup Levels: Worksheet for Soil Data Entry: Refer to WAC 173-340-720, 740,745, 747, 750

1. Enter Site Information

Date: 01/31/13
Site Name: Harris
Sample Name: FS-20

2. Enter Soil Concentration Measured

Chemical of Concern or Equivalent Carbon Group	Measured Soil Conc dry basis mg/kg	Composition Ratio %
Petroleum EC Fraction		
AL_EC >5-6		0.00%
AL_EC >6-8		0.00%
AL_EC >8-10	36	1.06%
AL_EC >10-12	220	6.48%
AL_EC >12-16	930	27.41%
AL_EC >16-21	750	22.11%
AL_EC >21-34	190	5.60%
AR_EC >8-10	31	0.91%
AR_EC >10-12	43	1.27%
AR_EC >12-16	320	9.43%
AR_EC >16-21	710	20.93%
AR_EC >21-34	150	4.42%
Benzene		0.00%
Toluene		0.00%
Ethylbenzene	0.076	0.00%
Total Xylenes		0.00%
Naphthalene		0.00%
1-Methyl Naphthalene	6.6	0.19%
2-Methyl Naphthalene	6.2	0.18%
n-Hexane		0.00%
MTBE		0.00%
Ethylene Dibromide (EDB)		0.00%
1,2 Dichloroethane (EDC)		0.00%
Benzo(a)anthracene		0.00%
Benzo(b)fluoranthene		0.00%
Benzo(k)fluoranthene		0.00%
Benzo(a)pyrene		0.00%
Chrysene		0.00%
Dibenz(a,h)anthracene		0.00%
Indeno(1,2,3-cd)pyrene		0.00%
Sum	3392.876	100.00%

Notes for Data Entry | Set Default Hydrogeology

Clear All Soil Concentration Data Entry Cells

Restore All Soil Concentration Data cleared previously

REMARK:
Non-detect values entered as blanks. When duplicate data values existed for a parameter, the higher detected result was used.

cPAH results intentionally omitted from this workbook, as cPAH is not well correlated with TPH at this site. cPAH results are evaluated as their own COC group in the RIFS.

For section 3, site-specific values for total soil porosity, volumetric water content, soil bulk density, and fraction of organic carbon were used.

For section 4, adjusted groundwater concentration of 1,000 ug/L used.

3. Enter Site-Specific Hydrogeological Data

Total soil porosity:	0.32	Unitless
Volumetric water content:	0.13	Unitless
Volumetric air content:	0.19	Unitless
Soil bulk density measured:	1.8	kg/L
Fraction Organic Carbon:	0.006	Unitless
Dilution Factor:	20	Unitless

4. Target TPH Ground Water Concentation (if adjusted)

If you adjusted the target TPH ground water concentration, enter adjusted value here:	1000	ug/L

A2. 1C Worksheet for Calculating Soil Cleanup Levels for Protection of Human Health: (Soil Direct Contact Pathway)
Method C: Industrial Land Use (WAC 173-340-745)

Date: 1/31/2013
Site Name: Harris
Sample Name: FS-20

Chemical of Concern or EC Group	Current Condition				Adjusted Condition			
	Measured Soil Conc @dry basis	HQ	RISK	Pass or Fail?	Soil Conc being tested	HQ	RISK	Pass or Fail?
	mg/kg	unitless	unitless		mg/kg	unitless	unitless	
Petroleum EC Fraction								
AL_EC >5-6	0				0.00E+00			
AL_EC >6-8	0				0.00E+00			
AL_EC >8-10	36	8.25E-04			3.38E+02	7.75E-03		
AL_EC >10-12	220	5.04E-03			2.07E+03	4.74E-02		
AL_EC >12-16	930	4.65E-02			8.74E+03	4.37E-01		
AL_EC >16-21	750	5.63E-04			7.05E+03	5.29E-03		
AL_EC >21-34	190	1.43E-04			1.79E+03	1.34E-03		
AR_EC >8-10	31	2.13E-04			2.91E+02	2.00E-03		
AR_EC >10-12	43	1.48E-03			4.04E+02	1.39E-02		
AR_EC >12-16	320	9.60E-03			3.01E+03	9.02E-02		
AR_EC >16-21	710	3.55E-02			6.67E+03	3.34E-01		
AR_EC >21-34	150	5.63E-03			1.41E+03	5.29E-02		
Benzene	0		0.00E+00		0.00E+00		0.00E+00	
Toluene	0				0.00E+00			
Ethylbenzene	0.076	5.04E-07			7.14E-01	4.74E-06		
Total Xylenes	0				0.00E+00			
Naphthalene	0				0.00E+00	0.00E+00		
1-Methyl Naphthalene	6.6	7.43E-05			6.20E+01	6.98E-04		
2-Methyl Naphthalene	6.2	8.72E-04			5.83E+01	8.19E-03		
n-Hexane	0				0.00E+00	0.00E+00		
MTBE	0				0.00E+00			
Ethylene Dibromide (EDB)	0		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0		0.00E+00		0.00E+00		0.00E+00	
Benzo(b)fluoranthene	0		0.00E+00		0.00E+00		0.00E+00	
Benzo(k)fluoranthene	0		0.00E+00		0.00E+00		0.00E+00	
Benzo(a)pyrene	0		0.00E+00		0.00E+00		0.00E+00	
Chrysene	0		0.00E+00		0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00		0.00E+00		0.00E+00	
Indeno(1,2,3-cd)pyrene	0		0.00E+00		0.00E+00		0.00E+00	
Sum	**3392.876**	1.06E-01	0.00E+00		3.19E+04	1.00E+00	0.00E+00	

TEST CURRENT CONDITION

Measured TPH Soil Conc, mg/kg= 3392.876
HI= 1.064E-01
RISK= 0.000E+00
Pass or Fail? Pass
Check Residual Saturation (WAC340-747(10))

CALCULATE PROTECTIVE CONDITION

This tool allows the user to calculate protective TPH soil concentration based on various soil quality criteria. The Workbook uses the same composition ratio as for the measured data.

Calculate Protective TPH soil Conc

Selected Criterion: @HI=1
Most Stringent? YES
Protctive TPH Soil Conc, mg/kg = 31883.220
HI = 1.000E+00
RISK = 0.000E+00
Check Residual Saturation (WAC340-747(10))

TEST ADJUSTED CONDITION

This tool allows the user to test whether a particular TPH soil concentration is protective of human health. The Workbook uses the same composition ratio as for the measured data.

Test Adjusted TPH Soil Conc

Tested TPH Soil Conc, mg/kg=
HI=
RISK=
Pass or Fail?

Washington State Department of Ecology, Toxics Cleanup Program: Soil Cleanup Level for TPH Sites - Protection of Groundwater

A2.2 Worksheet for Calculating Soil Cleanup Level for the Protection of Ground Water Quality: (Leaching Pathway)

WAC 173-340-740 and 747

Date: 1/31/2013
Site Name: Harris
Sample Name: FS-20

Chemical of Concern or EC Group	Measured Soil Conc @dry basis	GW Cleanup Level	Adjusted Condition: Soil Conc being tested	Predicted Conc @Well	HQ @ Well	RISK @ Well	Pass or Fail?
	mg/kg	ug/L	mg/kg	ug/L	unitless	unitless	
Petroleum EC Fraction							
AL_EC >5-6	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >6-8	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >8-10	36		9.75E+02	3.56E-01	1.48E-03		
AL_EC >10-12	220		5.96E+03	1.40E-01	5.83E-04		
AL_EC >12-16	930		2.52E+04	1.06E-02	2.20E-05		
AL_EC >16-21	750		2.03E+04	1.08E-05	3.38E-10		
AL_EC >21-34	190		5.15E+03	2.13E-11	6.66E-16		
AR_EC >8-10	31		8.40E+02	4.97E+01	6.21E-02		
AR_EC >10-12	43		1.16E+03	2.46E+01	1.54E-01		
AR_EC >12-16	320		8.67E+03	3.69E+01	4.62E-02		
AR_EC >16-21	710		1.92E+04	5.70E+00	1.19E-02		
AR_EC >21-34	150		4.06E+03	1.23E-02	1.93E-05		
Benzene	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Toluene	0	1000	0.00E+00	0.00E+00	0.00E+00		
Ethylbenzene	0.076	700	2.06E+00	3.61E-01	4.51E-04		
Total Xylenes	0	1000	0.00E+00	0.00E+00	0.00E+00		
Naphthalene	0	160	0.00E+00	0.00E+00	0.00E+00		
1-Methyl Naphthalene	6.6		1.79E+02	3.45E+00	8.62E-03		
2-Methyl Naphthalene	6.2		1.68E+02	3.19E+00	9.96E-02		
n-Hexane	0		0.00E+00	0.00E+00	0.00E+00		
MTBE	0	20	0.00E+00	0.00E+00	0.00E+00		
Ethylene Dibromide (EDB)	0	0.01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0	for	0.00E+00	0.00E+00		0.00E+00	for
Benzo(b)fluoranthene	0	all	0.00E+00	0.00E+00		0.00E+00	all
Benzo(k)fluoranthene	0	cPAHs	0.00E+00	0.00E+00		0.00E+00	cPAHs
Benzo(a)pyrene	0	Risk=	0.00E+00	0.00E+00		0.00E+00	
Chrysene	0	1E-05	0.00E+00	0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0		0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	3392.876		9.19E+04	1.24E+02	3.85E-01	0.00E+00	Pass

Site-Specific Hydrogeological Properties previously entered:

Item	Symbol	Value	Units
Total soil porosity:	n	0.32	unitless
Volumetric water content:	Θ_w	0.13	unitless
Volumetric air content:	Θ_a	0.19	unitless
Soil bulk density measured:	ρ_b	1.8	kg/L
Fraction Organic Carbon:	f_{oc}	0.006	unitless
Dilution Factor:	DF	20	unitless

Target Ground Water TPH conc adjusted previously if any:

Target Ground Water TPH Conc, ug/L ⇒ 1000

CALCULATE PROTECTIVE CONDITION OR TEST ADJUSTED CONDITION

Calculate or Test

@ HI=1

Pass or Fail? YES

Tested TPH Soil Conc, mg/kg = **100% NAPL**

Predicted TPH GW Conc, ug/L = 1.24E+02

RISK @ Well = 0.00E+00

HI @Well = 3.85E-01

DEDAILED MODEL RESULTS TPH Range Test

Type of model used for computation:	4-Phase Model
Computation completed?	Yes!
Initial Weighted Average MW of NAPL, g/mol:	202.8
Equilibrated Weighted Average MW of NAPL, g/mol:	202.9
Initial Weighted Average Density of NAPL, kg/L:	0.871
Volumetric NAPL Content, Θ_{NAPL} :	1.9E-01
NAPL Saturation (%), Θ_{NAPL}/n :	59.33%
100% NAPL, mg/kg	91921.0

Mass Distribution Pattern @ 4-phase in soil pore system: Mass Balance Pattern

Total Mass distributed in Water Phase: 0.00% in Solid: 0.08%

Total Mass distributed in Air Phase: 0.00% in NAPL: 99.92%

Please Check Soil Residual Saturation TPH Levels: Refer to Table 747-5!

A2.2 Worksheet for Calculating Soil Cleanup Level for the Protection of Ground Water Quality: (Leaching Pathway)

WAC 173-340-740 and 747

Date: 1/31/2013
Site Name: Harris
Sample Name: FS-20

Chemical of Concern or EC Group	Measured Soil Conc @dry basis	GW Cleanup Level	Adjusted Condition: Soil Conc being tested	Predicted Conc @Well	HQ @ Well	RISK @ Well	Pass or Fail?
	mg/kg	ug/L	mg/kg	ug/L	unitless	unitless	
Petroleum EC Fraction							
AL_EC >5-6	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >6-8	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >8-10	36		9.75E+02	3.56E-01	1.48E-03		
AL_EC >10-12	220		5.96E+03	1.40E-01	5.83E-04		
AL_EC >12-16	930		2.52E+04	1.06E-02	2.20E-05		
AL_EC >16-21	750		2.03E+04	1.08E-05	3.38E-10		
AL_EC >21-34	190		5.15E+03	2.13E-11	6.66E-16		
AR_EC >8-10	31		8.40E+02	4.97E+01	6.21E-02		
AR_EC >10-12	43		1.16E+03	2.46E+01	1.54E-01		
AR_EC >12-16	320		8.67E+03	3.69E+01	4.62E-02		
AR_EC >16-21	710		1.92E+04	5.70E+00	1.19E-02		
AR_EC >21-34	150		4.06E+03	1.23E-02	1.93E-05		
Benzene	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Toluene	0	1000	0.00E+00	0.00E+00	0.00E+00		
Ethylbenzene	0.076	700	2.06E+00	3.61E-01	4.51E-04		
Total Xylenes	0	1000	0.00E+00	0.00E+00	0.00E+00		
Naphthalene	0	160	0.00E+00	0.00E+00	0.00E+00		
1-Methyl Naphthalene	6.6		1.79E+02	3.45E+00	8.62E-03		
2-Methyl Naphthalene	6.2		1.68E+02	3.19E+00	9.96E-02		
n-Hexane	0		0.00E+00	0.00E+00	0.00E+00		
MTBE	0	20	0.00E+00	0.00E+00	0.00E+00		
Ethylene Dibromide (EDB)	0	0.01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0	for	0.00E+00	0.00E+00		0.00E+00	for
Benzo(b)fluoranthene	0	all	0.00E+00	0.00E+00		0.00E+00	all
Benzo(k)fluoranthene	0	cPAHs	0.00E+00	0.00E+00		0.00E+00	cPAHs
Benzo(a)pyrene	0	Risk=	0.00E+00	0.00E+00		0.00E+00	
Chrysene	0	1E-05	0.00E+00	0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0		0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	3392.876		9.19E+04	1.24E+02	3.85E-01	0.00E+00	Pass

Site-Specific Hydrogeological Properties previously entered:

Item	Symbol	Value	Units
Total soil porosity:	n	0.32	unitless
Volumetric water content:	Θ_w	0.13	unitless
Volumetric air content:	Θ_a	0.19	unitless
Soil bulk density measured:	ρ_b	1.8	kg/L
Fraction Organic Carbon:	f_{oc}	0.006	unitless
Dilution Factor:	DF	20	unitless

Target Ground Water TPH conc adjusted previously if any:

Target Ground Water TPH Conc, ug/L ⇒ 1000

CALCULATE PROTECTIVE CONDITION OR TEST ADJUSTED CONDITION

Calculate or Test

@ Protection of Surface Water Quality

Pass or Fail? NA

Tested TPH Soil Conc, mg/kg = **100% NAPL**

Predicted TPH GW Conc, ug/L = 1.24E+02

RISK @ Well = NA

HI @Well = NA

DEDAILED MODEL RESULTS TPH Range Test

Type of model used for computation:	4-Phase Model
Computation completed?	Yes!
Initial Weighted Average MW of NAPL, g/mol:	202.8
Equilibrated Weighted Average MW of NAPL, g/mol:	202.9
Initial Weighted Average Density of NAPL, kg/L:	0.871
Volumetric NAPL Content, Θ_{NAPL} :	1.9E-01
NAPL Saturation (%), Θ_{NAPL}/n :	59.33%
100% NAPL, mg/kg	91921.0

Mass Distribution Pattern @ 4-phase in soil pore system: Mass Balance Pattern

Total Mass distributed in Water Phase: 0.00% in Solid: 0.08%

Total Mass distributed in Air Phase: 0.00% in NAPL: 99.92%

Please Check Soil Residual Saturation TPH Levels: Refer to Table 747-5!

A2.3 Worksheet for Calculating Soil Cleanup Levels for the Protection of Air Quality: (Vapor Pathway)
Method B: WAC 173-340-740 and 750

Date: 1/31/2013
Site Name: Harris
Sample Name: FS-20

Warning: This Worksheet is provided for informational purposes only! Background levels entered are not considered for the calculations.

Chemical of Concern or EC Group	Measured Soil Conc @dry basis	Enter Air Background Levels	Adjusted Condition: Soil Conc being tested	Adjusted Condition: Predicted Indoor Air Conc	Adjusted Condition: HQ @ Indoor Air	Adjusted Condition: RISK @ Indoor Air	Pass or Fail?
	mg/kg	ug/m^3	mg/kg	ug/m^3	unitless	unitless	
Petroleum EC Fraction							
AL_EC >5-6	0	40	0.00E+00	0.00E+00	0.00E+00		
AL_EC >6-8	0	40	0.00E+00	0.00E+00	0.00E+00		
AL_EC >8-10	36	40	3.61E+01	5.63E+02	4.14E+00		
AL_EC >10-12	220	40	2.20E+02	3.38E+02	2.49E+00		
AL_EC >12-16	930	0	9.32E+02	1.12E+02	8.24E-01		
AL_EC >16-21	750	0	7.52E+02	1.07E+00	0.00E+00		
AL_EC >21-34	190	0	1.90E+02	4.37E-05	0.00E+00		
AR_EC >8-10	31	40	3.11E+01	3.75E+02	2.06E+00		
AR_EC >10-12	43	40	4.31E+01	6.03E+01	4.38E+01		
AR_EC >12-16	320	0	3.21E+02	3.76E+01	4.70E-01		
AR_EC >16-21	710	0	7.11E+02	1.50E+00	0.00E+00		
AR_EC >21-34	150	0	1.50E+02	1.69E-04	0.00E+00		
Benzene	0	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Toluene	0	15	0.00E+00	0.00E+00	0.00E+00		
Ethylbenzene	0.076	5	7.62E-02	2.13E+00	4.65E-03		
Total Xylenes	0	36	0.00E+00	0.00E+00	0.00E+00		
Naphthalene	0	2.5	0.00E+00	0.00E+00	0.00E+00		
1-Methyl Naphthalene	6.6	5	6.61E+00	1.25E+00	1.56E-02		
2-Methyl Naphthalene	6.2	5	6.21E+00	1.17E+00	8.53E-01		
n-Hexane	0	1	0.00E+00	0.00E+00	0.00E+00		
MTBE	0	10	0.00E+00	0.00E+00	0.00E+00		
Ethylene Dibromide (EDB)	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0	0	0.00E+00	0.00E+00		0.00E+00	for
Benzo(b)fluoranthene	0	0	0.00E+00	0.00E+00		0.00E+00	all
Benzo(k)fluoranthene	0	0	0.00E+00	0.00E+00		0.00E+00	cPAHs
Benzo(a)pyrene	0	0	0.00E+00	0.00E+00		0.00E+00	
Chrysene	0	0	0.00E+00	0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0	0	0.00E+00	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0	0	0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	3392.876		3.40E+03	1.49E+03	5.47E+01	0.00E+00	***Fail***

Enter Vapor Attenuation Factor for all TPH components:	0.001

Site-Specific Hydrogeological Properties previously entered:

Item	Symbol	Value	Units
Total soil porosity: default is 0.43	n	0.32	unitless
Volumetric water content: default is 0.3	Θ_w	0.13	unitless
Initial volumetric air content: default is 0.13	Θ_a	0.19	unitless
Soil bulk density measured: default is 1.5	ρ_b	1.8	kg/L
Fraction Organic Carbon: default is 0.001	f_{oc}	0.006	unitless

TEST ADJUSTED CONDITION

This tool allows the user to test whether a particular TPH soil concentration is protective of indoor air quality. The Workbook uses the same composition ratio as for the measured data and the same hydrogeological data and vapor attenuation factor previously entered by the user.

Test Adjusted TPH Soil Conc

Pass or Fail? *Fail*

Tested TPH Soil Conc, mg/kg = 3400
Predicted TPH Indoor Air Conc, ug/m^3 = 1.49E+03
RISK @ Indoor Air = 0.00E+00
HI @ Indoor Air = 5.47E+01

Type of model used for computation: 4-Phase Model
Computation completed? Yes!

Note: Source of Default Air Background Level:
"Characterizing risk posed by Petroleum Contaminated Sites: Implementation of MADEP VPH/EPH Approach", *Petroleum Equivalent Carbon Fractions: State of Massachusetts, Department of Environmental Protection, 10/21/2002, Policy # WSC02-411

*Benzene and n-Hexane: Washington State Department of Ecology, 1997, "Memorandum: Washington State Air Toxic Monitoring Data Documentation"

A1 Soil Cleanup Levels: Worksheet for Soil Data Entry: Refer to WAC 173-340-720, 740,745, 747, 750

1. Enter Site Information

Date: 01/30/13
Site Name: Harris
Sample Name: FS-21

2. Enter Soil Concentration Measured

Chemical of Concern or Equivalent Carbon Group	Measured Soil Conc dry basis mg/kg	Composition Ratio %
Petroleum EC Fraction		
AL_EC >5-6		0.00%
AL_EC >6-8		0.00%
AL_EC >8-10		0.00%
AL_EC >10-12		0.00%
AL_EC >12-16	28	0.64%
AL_EC >16-21	34	0.78%
AL_EC >21-34	32	0.73%
AR_EC >8-10	10	0.23%
AR_EC >10-12	330	7.54%
AR_EC >12-16	640	14.63%
AR_EC >16-21	2300	52.56%
AR_EC >21-34	1000	22.85%
Benzene		0.00%
Toluene		0.00%
Ethylbenzene		0.00%
Total Xylenes		0.00%
Naphthalene	0.87	0.02%
1-Methyl Naphthalene	0.43	0.01%
2-Methyl Naphthalene	0.65	0.01%
n-Hexane		0.00%
MTBE		0.00%
Ethylene Dibromide (EDB)		0.00%
1,2 Dichloroethane (EDC)		0.00%
Benzo(a)anthracene		0.00%
Benzo(b)fluoranthene		0.00%
Benzo(k)fluoranthene		0.00%
Benzo(a)pyrene		0.00%
Chrysene		0.00%
Dibenz(a,h)anthracene		0.00%
Indeno(1,2,3-cd)pyrene		0.00%
Sum	4375.95	100.00%

Notes for Data Entry | Set Default Hydrogeology

Clear All Soil Concentration Data Entry Cells

Restore All Soil Concentration Data cleared previously

REMARK:
Non-detect values entered as blanks. When duplicate data values existed for a parameter, the higher detected result was used.

cPAH results intentionally omitted from this workbook, as cPAH is not well correlated with TPH at this site. cPAH results are evaluated as their own COC group in the RIFS.

For section 3, site-specific values for total soil porosity, volumetric water content, soil bulk density, and fraction of organic carbon were used.

For section 4, adjusted groundwater concentration of 1,000 ug/L used.

3. Enter Site-Specific Hydrogeological Data

Total soil porosity:	0.32	Unitless
Volumetric water content:	0.13	Unitless
Volumetric air content:	0.19	Unitless
Soil bulk density measured:	1.8	kg/L
Fraction Organic Carbon:	0.006	Unitless
Dilution Factor:	20	Unitless

4. Target TPH Ground Water Concentation (if adjusted)

If you adjusted the target TPH ground water concentration, enter adjusted value here:	1000	ug/L

A2. 1C Worksheet for Calculating Soil Cleanup Levels for Protection of Human Health: (Soil Direct Contact Pathway)
Method C: Industrial Land Use (WAC 173-340-745)

Date: 1/30/2013
Site Name: Harris
Sample Name: FS-21

Chemical of Concern or EC Group	Current Condition				Adjusted Condition			
	Measured Soil Conc @dry basis	HQ	RISK	Pass or Fail?	Soil Conc being tested	HQ	RISK	Pass or Fail?
	mg/kg	unitless	unitless		mg/kg	unitless	unitless	
Petroleum EC Fraction								
AL_EC >5-6	0				0.00E+00			
AL_EC >6-8	0				0.00E+00			
AL_EC >8-10	0				0.00E+00			
AL_EC >10-12	0				0.00E+00			
AL_EC >12-16	28	1.40E-03			1.52E+02	7.58E-03		
AL_EC >16-21	34	2.55E-05			1.84E+02	1.38E-04		
AL_EC >21-34	32	2.40E-05			1.73E+02	1.30E-04		
AR_EC >8-10	10	6.88E-05			5.42E+01	3.72E-04		
AR_EC >10-12	330	1.13E-02			1.79E+03	6.14E-02		
AR_EC >12-16	640	1.92E-02			3.47E+03	1.04E-01		
AR_EC >16-21	2300	1.15E-01			1.25E+04	6.23E-01		
AR_EC >21-34	1000	3.75E-02			5.42E+03	2.03E-01		
Benzene	0		0.00E+00		0.00E+00		0.00E+00	
Toluene	0				0.00E+00			
Ethylbenzene	0				0.00E+00			
Total Xylenes	0				0.00E+00			
Naphthalene	0.87	5.35E-05			4.71E+00	2.90E-04		
1-Methyl Naphthalene	0.43	4.84E-06			2.33E+00	2.62E-05		
2-Methyl Naphthalene	0.65	9.14E-05			3.52E+00	4.95E-04		
n-Hexane	0				0.00E+00	0.00E+00		
MTBE	0				0.00E+00			
Ethylene Dibromide (EDB)	0		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0		0.00E+00		0.00E+00		0.00E+00	
Benzo(b)fluoranthene	0		0.00E+00		0.00E+00		0.00E+00	
Benzo(k)fluoranthene	0		0.00E+00		0.00E+00		0.00E+00	
Benzo(a)pyrene	0		0.00E+00		0.00E+00		0.00E+00	
Chrysene	0		0.00E+00		0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00		0.00E+00		0.00E+00	
Indeno(1,2,3-cd)pyrene	0		0.00E+00		0.00E+00		0.00E+00	
Sum	**4375.95**	1.85E-01	0.00E+00		2.37E+04	1.00E+00	0.00E+00	

TEST CURRENT CONDITION

Measured TPH Soil Conc, mg/kg= 4375.950
HI= 1.847E-01
RISK= 0.000E+00
Pass or Fail? Pass
Check Residual Saturation (WAC340-747(10))

CALCULATE PROTECTIVE CONDITION

This tool allows the user to calculate protective TPH soil concentration based on various soil quality criteria. The Workbook uses the same composition ratio as for the measured data.

Calculate Protective TPH soil Conc

Selected Criterion: @HI=1
Most Stringent? YES

Protctive TPH Soil Conc, mg/kg = 23702.519
HI = 1.000E+00
RISK = 0.000E+00

Check Residual Saturation (WAC340-747(10))

TEST ADJUSTED CONDITION

This tool allows the user to test whether a particular TPH soil concentration is protective of human health. The Workbook uses the same composition ratio as for the measured data.

Test Adjusted TPH Soil Conc

Tested TPH Soil Conc, mg/kg=
HI=
RISK=
Pass or Fail?

A2.2 Worksheet for Calculating Soil Cleanup Level for the Protection of Ground Water Quality: (Leaching Pathway)

WAC 173-340-740 and 747

Date: 1/30/2013
Site Name: Harris
Sample Name: FS-21

Chemical of Concern or EC Group	Measured Soil Conc @dry basis	GW Cleanup Level	Adjusted Condition: Soil Conc being tested	Predicted Conc @Well	HQ @ Well	RISK @ Well	Pass or Fail?
	mg/kg	ug/L	mg/kg	ug/L	unitless	unitless	
Petroleum EC Fraction							
AL_EC >5-6	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >6-8	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >8-10	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >10-12	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >12-16	28		7.59E+02	2.26E-04	4.72E-07		
AL_EC >16-21	34		9.22E+02	3.48E-07	1.09E-11		
AL_EC >21-34	32		8.68E+02	2.55E-12	7.98E-17		
AR_EC >8-10	10		2.71E+02	1.14E+01	1.43E-02		
AR_EC >10-12	330		8.95E+03	1.34E+02	8.40E-01		
AR_EC >12-16	640		1.74E+04	5.26E+01	6.57E-02		
AR_EC >16-21	2300		6.24E+04	1.31E+01	2.74E-02		
AR_EC >21-34	1000		2.71E+04	5.85E-02	9.14E-05		
Benzene	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Toluene	0	1000	0.00E+00	0.00E+00	0.00E+00		
Ethylbenzene	0	700	0.00E+00	0.00E+00	0.00E+00		
Total Xylenes	0	1000	0.00E+00	0.00E+00	0.00E+00		
Naphthalene	0.87	160	2.36E+01	4.47E-01	2.79E-03		
1-Methyl Naphthalene	0.43		1.17E+01	1.60E-01	4.00E-04		
2-Methyl Naphthalene	0.65		1.76E+01	2.38E-01	7.44E-03		
n-Hexane	0		0.00E+00	0.00E+00	0.00E+00		
MTBE	0	20	0.00E+00	0.00E+00	0.00E+00		
Ethylene Dibromide (EDB)	0	0.01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0	for	0.00E+00	0.00E+00		0.00E+00	for
Benzo(b)fluoranthene	0	all	0.00E+00	0.00E+00		0.00E+00	all
Benzo(k)fluoranthene	0	cPAHs	0.00E+00	0.00E+00		0.00E+00	cPAHs
Benzo(a)pyrene	0	Risk=	0.00E+00	0.00E+00		0.00E+00	
Chrysene	0	1E-05	0.00E+00	0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0		0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	4375.95		1.19E+05	2.12E+02	9.58E-01	0.00E+00	Pass

Site-Specific Hydrogeological Properties previously entered:

Item	Symbol	Value	Units
Total soil porosity:	n	0.32	unitless
Volumetric water content:	Θ_w	0.13	unitless
Volumetric air content:	Θ_a	0.19	unitless
Soil bulk density measured:	ρ_b	1.8	kg/L
Fraction Organic Carbon:	f_{oc}	0.006	unitless
Dilution Factor:	DF	20	unitless

Target Ground Water TPH conc adjusted previously if any:

Target Ground Water TPH Conc, ug/L ⇒ 1000

CALCULATE PROTECTIVE CONDITION OR TEST ADJUSTED CONDITION

Calculate or Test

@ HI=1

Pass or Fail? YES

Tested TPH Soil Conc, mg/kg = **100% NAPL**

Predicted TPH GW Conc, ug/L = 2.12E+02

RISK @ Well = 0.00E+00

HI @Well = 9.58E-01

DEDAILED MODEL RESULTS TPH Range Test

Type of model used for computation:	4-Phase Model
Computation completed?	Yes!
Initial Weighted Average MW of NAPL, g/mol:	186.0
Equilibrated Weighted Average MW of NAPL, g/mol:	186.1
Initial Weighted Average Density of NAPL, kg/L:	1.124
Volumetric NAPL Content, Θ_{NAPL} :	1.9E-01
NAPL Saturation (%), Θ_{NAPL}/n :	59.32%
100% NAPL, mg/kg	118667.2

Mass Distribution Pattern @ 4-phase in soil pore system: Mass Balance Pattern

Total Mass distributed in Water Phase: 0.00% in Solid: 0.08%

Total Mass distributed in Air Phase: 0.00% in NAPL: 99.91%

Please Check Soil Residual Saturation TPH Levels: Refer to Table 747-5!

A2.2 Worksheet for Calculating Soil Cleanup Level for the Protection of Ground Water Quality: (Leaching Pathway)

WAC 173-340-740 and 747

Date: 1/30/2013
Site Name: Harris
Sample Name: FS-21

Chemical of Concern or EC Group	Measured Soil Conc @dry basis	GW Cleanup Level	Adjusted Condition: Soil Conc being tested	Predicted Conc @Well	HQ @ Well	RISK @ Well	Pass or Fail?
	mg/kg	ug/L	mg/kg	ug/L	unitless	unitless	
Petroleum EC Fraction							
AL_EC >5-6	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >6-8	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >8-10	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >10-12	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >12-16	28		7.59E+02	2.26E-04	4.72E-07		
AL_EC >16-21	34		9.22E+02	3.48E-07	1.09E-11		
AL_EC >21-34	32		8.68E+02	2.55E-12	7.98E-17		
AR_EC >8-10	10		2.71E+02	1.14E+01	1.43E-02		
AR_EC >10-12	330		8.95E+03	1.34E+02	8.40E-01		
AR_EC >12-16	640		1.74E+04	5.26E+01	6.57E-02		
AR_EC >16-21	2300		6.24E+04	1.31E+01	2.74E-02		
AR_EC >21-34	1000		2.71E+04	5.85E-02	9.14E-05		
Benzene	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Toluene	0	1000	0.00E+00	0.00E+00	0.00E+00		
Ethylbenzene	0	700	0.00E+00	0.00E+00	0.00E+00		
Total Xylenes	0	1000	0.00E+00	0.00E+00	0.00E+00		
Naphthalene	0.87	160	2.36E+01	4.47E-01	2.79E-03		
1-Methyl Naphthalene	0.43		1.17E+01	1.60E-01	4.00E-04		
2-Methyl Naphthalene	0.65		1.76E+01	2.38E-01	7.44E-03		
n-Hexane	0		0.00E+00	0.00E+00	0.00E+00		
MTBE	0	20	0.00E+00	0.00E+00	0.00E+00		
Ethylene Dibromide (EDB)	0	0.01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0	for	0.00E+00	0.00E+00		0.00E+00	for
Benzo(b)fluoranthene	0	all	0.00E+00	0.00E+00		0.00E+00	all
Benzo(k)fluoranthene	0	cPAHs	0.00E+00	0.00E+00		0.00E+00	cPAHs
Benzo(a)pyrene	0	Risk=	0.00E+00	0.00E+00		0.00E+00	
Chrysene	0	1E-05	0.00E+00	0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0		0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	4375.95		1.19E+05	2.12E+02	9.58E-01	0.00E+00	Pass

Site-Specific Hydrogeological Properties previously entered:

Item	Symbol	Value	Units
Total soil porosity:	n	0.32	unitless
Volumetric water content:	Θ_w	0.13	unitless
Volumetric air content:	Θ_a	0.19	unitless
Soil bulk density measured:	ρ_b	1.8	kg/L
Fraction Organic Carbon:	f_{oc}	0.006	unitless
Dilution Factor:	DF	20	unitless

Target Ground Water TPH conc adjusted previously if any:

Target Ground Water TPH Conc, ug/L ⇒ 1000

CALCULATE PROTECTIVE CONDITION OR TEST ADJUSTED CONDITION

Calculate or Test

@ Protection of Surface Water Quality

Pass or Fail? NA

Tested TPH Soil Conc, mg/kg = **100% NAPL**

Predicted TPH GW Conc, ug/L = 2.12E+02

RISK @ Well = NA

HI @Well = NA

DEDAILED MODEL RESULTS TPH Range Test

Type of model used for computation:	4-Phase Model
Computation completed?	Yes!
Initial Weighted Average MW of NAPL, g/mol:	186.0
Equilibrated Weighted Average MW of NAPL, g/mol:	186.1
Initial Weighted Average Density of NAPL, kg/L:	1.124
Volumetric NAPL Content, Θ_{NAPL} :	1.9E-01
NAPL Saturation (%), Θ_{NAPL}/n :	59.32%
100% NAPL, mg/kg	118667.2

Mass Distribution Pattern @ 4-phase in soil pore system: Mass Balance Pattern

Total Mass distributed in Water Phase: 0.00% in Solid: 0.08%

Total Mass distributed in Air Phase: 0.00% in NAPL: 99.91%

Please Check Soil Residual Saturation TPH Levels: Refer to Table 747-5!

A2.3 Worksheet for Calculating Soil Cleanup Levels for the Protection of Air Quality: (Vapor Pathway)
Method B: WAC 173-340-740 and 750

Date: 1/30/2013
Site Name: Harris
Sample Name: FS-21

Warning: This Worksheet is provided for informational purposes only! Background levels entered are not considered for the calculations.

Chemical of Concern or EC Group	Measured Soil Conc @dry basis	Enter Air Background Levels	Adjusted Condition: Soil Conc being tested	Adjusted Condition: Predicted Indoor Air Conc	Adjusted Condition: HQ @ Indoor Air	Adjusted Condition: RISK @ Indoor Air	Pass or Fail?
	mg/kg	ug/m^3	mg/kg	ug/m^3	unitless	unitless	
Petroleum EC Fraction							
AL_EC >5-6	0	40	0.00E+00	0.00E+00	0.00E+00		
AL_EC >6-8	0	40	0.00E+00	0.00E+00	0.00E+00		
AL_EC >8-10	0	40	0.00E+00	0.00E+00	0.00E+00		
AL_EC >10-12	0	40	0.00E+00	0.00E+00	0.00E+00		
AL_EC >12-16	28	0	2.82E+01	2.41E+00	1.77E-02		
AL_EC >16-21	34	0	3.42E+01	3.47E-02	0.00E+00		
AL_EC >21-34	32	0	3.22E+01	5.25E-06	0.00E+00		
AR_EC >8-10	10	40	1.01E+01	9.27E+01	5.08E-01		
AR_EC >10-12	330	40	3.32E+02	3.45E+02	2.51E+02		
AR_EC >12-16	640	0	6.44E+02	5.46E+01	6.82E-01		
AR_EC >16-21	2300	0	2.31E+03	3.47E+00	0.00E+00		
AR_EC >21-34	1000	0	1.01E+03	8.05E-04	0.00E+00		
Benzene	0	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Toluene	0	15	0.00E+00	0.00E+00	0.00E+00		
Ethylbenzene	0	5	0.00E+00	0.00E+00	0.00E+00		
Total Xylenes	0	36	0.00E+00	0.00E+00	0.00E+00		
Naphthalene	0.87	2.5	8.75E-01	1.69E-01	1.23E-01		
1-Methyl Naphthalene	0.43	5	4.32E-01	6.09E-02	7.61E-04		
2-Methyl Naphthalene	0.65	5	6.54E-01	9.18E-02	6.67E-02		
n-Hexane	0	1	0.00E+00	0.00E+00	0.00E+00		
MTBE	0	10	0.00E+00	0.00E+00	0.00E+00		
Ethylene Dibromide (EDB)	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0	0	0.00E+00	0.00E+00		0.00E+00	for
Benzo(b)fluoranthene	0	0	0.00E+00	0.00E+00		0.00E+00	all
Benzo(k)fluoranthene	0	0	0.00E+00	0.00E+00		0.00E+00	cPAHs
Benzo(a)pyrene	0	0	0.00E+00	0.00E+00		0.00E+00	
Chrysene	0	0	0.00E+00	0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0	0	0.00E+00	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0	0	0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	4375.95		4.40E+03	4.98E+02	2.52E+02	0.00E+00	***Fail***

Enter Vapor Attenuation Factor for all TPH components:	0.001

Site-Specific Hydrogeological Properties previously entered:

Item	Symbol	Value	Units
Total soil porosity: default is 0.43	n	0.32	unitless
Volumetric water content: default is 0.3	Θ_w	0.13	unitless
Initial volumetric air content: default is 0.13	Θ_a	0.19	unitless
Soil bulk density measured: default is 1.5	ρ_b	1.8	kg/L
Fraction Organic Carbon: default is 0.001	f_{oc}	0.006	unitless

TEST ADJUSTED CONDITION

This tool allows the user to test whether a particular TPH soil concentration is protective of indoor air quality. The Workbook uses the same composition ratio as for the measured data and the same hydrogeological data and vapor attenuation factor previously entered by the user.

Test Adjusted TPH Soil Conc

Pass or Fail? *Fail*

Tested TPH Soil Conc, mg/kg = 4400

Predicted TPH Indoor Air Conc, ug/m^3 = 4.98E+02

RISK @ Indoor Air = 0.00E+00

HI @ Indoor Air = 2.52E+02

Type of model used for computation: 4-Phase Model

Computation completed? Yes!

Note: Source of Default Air Background Level:
"Characterizing risk posed by Petroleum Contaminated Sites: Implementation of MADEP VPH/EPH Approach", *Petroleum Equivalent Carbon Fractions: State of Massachusetts, Department of Environmental Protection, 10/21/2002, Policy # WSC02-411

*Benzene and n-Hexane: Washington State Department of Ecology, 1997, "Memorandum: Washington State Air Toxic Monitoring Data Documentation"

A1 Soil Cleanup Levels: Worksheet for Soil Data Entry: Refer to WAC 173-340-720, 740,745, 747, 750

1. Enter Site Information

Date: 01/29/13
Site Name: Harris
Sample Name: FS-19

2. Enter Soil Concentration Measured

Chemical of Concern or Equivalent Carbon Group	Measured Soil Conc dry basis mg/kg	Composition Ratio %
Petroleum EC Fraction		
AL_EC >5-6	0	0.00%
AL_EC >6-8	4.2	0.05%
AL_EC >8-10	34.4	0.43%
AL_EC >10-12	427.5	5.34%
AL_EC >12-16	2357.1	29.46%
AL_EC >16-21	847.8	10.59%
AL_EC >21-34	293.4	3.67%
AR_EC >8-10	70.7	0.88%
AR_EC >10-12	215.1	2.69%
AR_EC >12-16	664.2	8.30%
AR_EC >16-21	2250.0	28.12%
AR_EC >21-34	784.8	9.81%
Benzene	0.0	0.00%
Toluene	0.0	0.00%
Ethylbenzene	0.2	0.00%
Total Xylenes	0.1	0.00%
Naphthalene	28.7	0.36%
1-Methyl Naphthalene	4.0	0.05%
2-Methyl Naphthalene	20.2	0.25%
n-Hexane	0.0	0.00%
MTBE		0.00%
Ethylene Dibromide (EDB)		0.00%
1,2 Dichloroethane (EDC)		0.00%
Benzo(a)anthracene		0.00%
Benzo(b)fluoranthene		0.00%
Benzo(k)fluoranthene		0.00%
Benzo(a)pyrene		0.00%
Chrysene		0.00%
Dibenz(a,h)anthracene		0.00%
Indeno(1,2,3-cd)pyrene		0.00%
Sum	8002.35675	100.00%

Notes for Data Entry | Set Default Hydrogeology

Clear All Soil Concentration Data Entry Cells

Restore All Soil Concentration Data cleared previously

REMARK:
Non-detect values entered as blanks. When duplicate data values existed for a parameter, the higher detected result was used.

cPAH results intentionally omitted from this workbook, as cPAH is not well correlated with TPH at this site. cPAH results are evaluated as their own COC group in the RIFS.

For section 3, site-specific values for total soil porosity, volumetric water content, soil bulk density, and fraction of organic carbon were used.

For section 4, adjusted groundwater concentration of 1,000 ug/L used.

3. Enter Site-Specific Hydrogeological Data

Total soil porosity:	0.32	Unitless
Volumetric water content:	0.13	Unitless
Volumetric air content:	0.19	Unitless
Soil bulk density measured:	1.8	kg/L
Fraction Organic Carbon:	0.006	Unitless
Dilution Factor:	20	Unitless

4. Target TPH Ground Water Concentation (if adjusted)

If you adjusted the target TPH ground water concentration, enter adjusted value here:	1000	ug/L

A2. 1C Worksheet for Calculating Soil Cleanup Levels for Protection of Human Health: (Soil Direct Contact Pathway)
Method C: Industrial Land Use (WAC 173-340-745)

Date: 1/29/2013
Site Name: Harris
Sample Name: FS-19

Chemical of Concern or EC Group	Current Condition				Adjusted Condition			
	Measured Soil Conc @dry basis	HQ	RISK	Pass or Fail?	Soil Conc being tested	HQ	RISK	Pass or Fail?
	mg/kg	unitless	unitless		mg/kg	unitless	unitless	
Petroleum EC Fraction								
AL_EC >5-6	0				0.00E+00			
AL_EC >6-8	4.185	1.7E-06			1.84E+01	7.43E-06		
AL_EC >8-10	34.425	7.89E-04			1.51E+02	3.47E-03		
AL_EC >10-12	427.5	9.80E-03			1.88E+03	4.30E-02		
AL_EC >12-16	2357.1	1.18E-01			1.04E+04	5.18E-01		
AL_EC >16-21	847.8	6.36E-04			3.72E+03	2.79E-03		
AL_EC >21-34	293.4	2.20E-04			1.29E+03	9.67E-04		
AR_EC >8-10	70.65	4.86E-04			3.10E+02	2.13E-03		
AR_EC >10-12	215.055	7.39E-03			9.45E+02	3.25E-02		
AR_EC >12-16	664.2	1.99E-02			2.92E+03	8.75E-02		
AR_EC >16-21	2250	1.13E-01			9.88E+03	4.94E-01		
AR_EC >21-34	784.8	2.94E-02			3.45E+03	1.29E-01		
Benzene	0		0.00E+00		0.00E+00		0.00E+00	
Toluene	0				0.00E+00			
Ethylbenzene	0.2358	1.56E-06			1.04E+00	6.87E-06		
Total Xylenes	0.126	4.20E-07			5.53E-01	1.84E-06		
Naphthalene	28.71045	1.77E-03			1.26E+02	7.76E-03		
1-Methyl Naphthalene	3.9735	4.47E-05			1.75E+01	1.96E-04		
2-Methyl Naphthalene	20.196	2.84E-03			8.87E+01	1.25E-02		
n-Hexane	0				0.00E+00	0.00E+00		
MTBE	0				0.00E+00			
Ethylene Dibromide (EDB)	0		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0		0.00E+00		0.00E+00		0.00E+00	
Benzo(b)fluoranthene	0		0.00E+00		0.00E+00		0.00E+00	
Benzo(k)fluoranthene	0		0.00E+00		0.00E+00		0.00E+00	
Benzo(a)pyrene	0		0.00E+00		0.00E+00		0.00E+00	
Chrysene	0		0.00E+00		0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00		0.00E+00		0.00E+00	
Indeno(1,2,3-cd)pyrene	0		0.00E+00		0.00E+00		0.00E+00	
Sum	**8002.35675**	3.04E-01	0.00E+00		3.51E+04	1.33E+00	0.00E+00	Fail

TEST CURRENT CONDITION

Measured TPH Soil Conc, mg/kg= 8002.357
HI= 3.037E-01
RISK= 0.000E+00
Pass or Fail? Pass
Check Residual Saturation (WAC340-747(10))

CALCULATE PROTECTIVE CONDITION

This tool allows the user to calculate protective TPH soil concentration based on various soil quality criteria. The Workbook uses the same composition ratio as for the measured data.

Calculate Protective TPH soil Conc

Selected Criterion:
Most Stringent?

Protctive TPH Soil Conc, mg/kg =
HI =
RISK =

TEST ADJUSTED CONDITION

This tool allows the user to test whether a particular TPH soil concentration is protective of human health. The Workbook uses the same composition ratio as for the measured data.

Test Adjusted TPH Soil Conc

Tested TPH Soil Conc, mg/kg=
HI=
RISK=
Pass or Fail?

A2.2 Worksheet for Calculating Soil Cleanup Level for the Protection of Ground Water Quality: (Leaching Pathway)

WAC 173-340-740 and 747

Date: 1/29/2013
Site Name: Harris
Sample Name: FS-19

Chemical of Concern or EC Group	Measured Soil Conc @dry basis	GW Cleanup Level	Adjusted Condition: Soil Conc being tested	Predicted Conc @Well	HQ @ Well	RISK @ Well	Pass or Fail?
	mg/kg	ug/L	mg/kg	ug/L	unitless	unitless	
Petroleum EC Fraction							
AL_EC >5-6	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >6-8	4.185		5.07E+01	2.76E-01	2.03E-05		
AL_EC >8-10	34.425		4.17E+02	1.40E-01	5.81E-04		
AL_EC >10-12	427.5		5.17E+03	1.11E-01	4.64E-04		
AL_EC >12-16	2357.1		2.85E+04	1.10E-02	2.29E-05		
AL_EC >16-21	847.8		1.03E+04	5.01E-06	1.56E-10		
AL_EC >21-34	293.4		3.55E+03	1.35E-11	4.22E-16		
AR_EC >8-10	70.65		8.55E+02	4.65E+01	5.81E-02		
AR_EC >10-12	215.055		2.60E+03	5.04E+01	3.15E-01		
AR_EC >12-16	664.2		8.04E+03	3.14E+01	3.93E-02		
AR_EC >16-21	2250		2.72E+04	7.41E+00	1.54E-02		
AR_EC >21-34	784.8		9.50E+03	2.65E-02	4.14E-05		
Benzene	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Toluene	0	1000	0.00E+00	0.00E+00	0.00E+00		
Ethylbenzene	0.2358	700	2.85E+00	4.59E-01	5.74E-04		
Total Xylenes	0.126	1000	1.53E+00	2.48E-01	1.55E-04		
Naphthalene	28.71045	160	3.48E+02	8.50E+00	5.31E-02		
1-Methyl Naphthalene	3.9735		4.81E+01	8.52E-01	2.13E-03		
2-Methyl Naphthalene	20.196		2.44E+02	4.26E+00	1.33E-01		
n-Hexane	0		0.00E+00	0.00E+00	0.00E+00		
MTBE	0	20	0.00E+00	0.00E+00	0.00E+00		
Ethylene Dibromide (EDB)	0	0.01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0	for	0.00E+00	0.00E+00		0.00E+00	for
Benzo(b)fluoranthene	0	all	0.00E+00	0.00E+00		0.00E+00	all
Benzo(k)fluoranthene	0	cPAHs	0.00E+00	0.00E+00		0.00E+00	cPAHs
Benzo(a)pyrene	0	Risk=	0.00E+00	0.00E+00		0.00E+00	
Chrysene	0	1E-05	0.00E+00	0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0		0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	8002.35675		9.69E+04	1.51E+02	6.18E-01	0.00E+00	Pass

Site-Specific Hydrogeological Properties previously entered:

Item	Symbol	Value	Units
Total soil porosity:	n	0.32	unitless
Volumetric water content:	Θ_w	0.13	unitless
Volumetric air content:	Θ_a	0.19	unitless
Soil bulk density measured:	ρ_b	1.8	kg/L
Fraction Organic Carbon:	f_{oc}	0.006	unitless
Dilution Factor:	DF	20	unitless

Target Ground Water TPH conc adjusted previously if any:

Target Ground Water TPH Conc, ug/L ⇒ 1000

CALCULATE PROTECTIVE CONDITION OR TEST ADJUSTED CONDITION

Calculate or Test

@ HI=1

Pass or Fail? YES

Tested TPH Soil Conc, mg/kg = **100% NAPL**

Predicted TPH GW Conc, ug/L = 1.51E+02

RISK @ Well = 0.00E+00

HI @Well = 6.18E-01

DEDAILED MODEL RESULTS TPH Range Test

Type of model used for computation:	4-Phase Model
Computation completed?	Yes!
Initial Weighted Average MW of NAPL, g/mol:	196.0
Equilibrated Weighted Average MW of NAPL, g/mol:	196.2
Initial Weighted Average Density of NAPL, kg/L:	0.918
Volumetric NAPL Content, Θ_{NAPL} :	1.9E-01
NAPL Saturation (%), Θ_{NAPL}/n :	59.33%
100% NAPL, mg/kg	96867.5

Mass Distribution Pattern @ 4-phase in soil pore system: Mass Balance Pattern

Total Mass distributed in Water Phase: 0.00% in Solid: 0.08%

Total Mass distributed in Air Phase: 0.00% in NAPL: 99.92%

Please Check Soil Residual Saturation TPH Levels: Refer to Table 747-5!

Washington State Department of Ecology, Toxics Cleanup Program: Soil Cleanup Level for TPH Sites - Protection of Groundwater

A2.2 Worksheet for Calculating Soil Cleanup Level for the Protection of Ground Water Quality: (Leaching Pathway)

WAC 173-340-740 and 747

Date: 1/29/2013
Site Name: Harris
Sample Name: FS-19

Chemical of Concern or EC Group	Measured Soil Conc @dry basis	GW Cleanup Level	Adjusted Condition: Soil Conc being tested	Predicted Conc @Well	HQ @ Well	RISK @ Well	Pass or Fail?
	mg/kg	ug/L	mg/kg	ug/L	unitless	unitless	
Petroleum EC Fraction							
AL_EC >5-6	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >6-8	4.185		5.07E+01	2.76E-01	2.03E-05		
AL_EC >8-10	34.425		4.17E+02	1.40E-01	5.81E-04		
AL_EC >10-12	427.5		5.17E+03	1.11E-01	4.64E-04		
AL_EC >12-16	2357.1		2.85E+04	1.10E-02	2.29E-05		
AL_EC >16-21	847.8		1.03E+04	5.01E-06	1.56E-10		
AL_EC >21-34	293.4		3.55E+03	1.35E-11	4.22E-16		
AR_EC >8-10	70.65		8.55E+02	4.65E+01	5.81E-02		
AR_EC >10-12	215.055		2.60E+03	5.04E+01	3.15E-01		
AR_EC >12-16	664.2		8.04E+03	3.14E+01	3.93E-02		
AR_EC >16-21	2250		2.72E+04	7.41E+00	1.54E-02		
AR_EC >21-34	784.8		9.50E+03	2.65E-02	4.14E-05		
Benzene	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Toluene	0	1000	0.00E+00	0.00E+00	0.00E+00		
Ethylbenzene	0.2358	700	2.85E+00	4.59E-01	5.74E-04		
Total Xylenes	0.126	1000	1.53E+00	2.48E-01	1.55E-04		
Naphthalene	28.71045	160	3.48E+02	8.50E+00	5.31E-02		
1-Methyl Naphthalene	3.9735		4.81E+01	8.52E-01	2.13E-03		
2-Methyl Naphthalene	20.196		2.44E+02	4.26E+00	1.33E-01		
n-Hexane	0		0.00E+00	0.00E+00	0.00E+00		
MTBE	0	20	0.00E+00	0.00E+00	0.00E+00		
Ethylene Dibromide (EDB)	0	0.01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0	for	0.00E+00	0.00E+00		0.00E+00	for
Benzo(b)fluoranthene	0	all	0.00E+00	0.00E+00		0.00E+00	all
Benzo(k)fluoranthene	0	cPAHs	0.00E+00	0.00E+00		0.00E+00	cPAHs
Benzo(a)pyrene	0	Risk=	0.00E+00	0.00E+00		0.00E+00	
Chrysene	0	1E-05	0.00E+00	0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0		0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	8002.35675		9.69E+04	1.51E+02	6.18E-01	0.00E+00	Pass

Site-Specific Hydrogeological Properties previously entered:

Item	Symbol	Value	Units
Total soil porosity:	n	0.32	unitless
Volumetric water content:	Θ_w	0.13	unitless
Volumetric air content:	Θ_a	0.19	unitless
Soil bulk density measured:	ρ_b	1.8	kg/L
Fraction Organic Carbon:	f_{oc}	0.006	unitless
Dilution Factor:	DF	20	unitless

Target Ground Water TPH conc adjusted previously if any:

Target Ground Water TPH Conc, ug/L ⇒ 1000

CALCULATE PROTECTIVE CONDITION OR TEST ADJUSTED CONDITION

Calculate or Test

@ Protection of Surface Water Quality

Pass or Fail? NA

Tested TPH Soil Conc, mg/kg = **100% NAPL**

Predicted TPH GW Conc, ug/L = 1.51E+02

RISK @ Well = NA

HI @Well = NA

DEDAILED MODEL RESULTS TPH Range Test

Type of model used for computation:	4-Phase Model
Computation completed?	Yes!
Initial Weighted Average MW of NAPL, g/mol:	196.0
Equilibrated Weighted Average MW of NAPL, g/mol:	196.2
Initial Weighted Average Density of NAPL, kg/L:	0.918
Volumetric NAPL Content, Θ_{NAPL} :	1.9E-01
NAPL Saturation (%), Θ_{NAPL}/n :	59.33%
100% NAPL, mg/kg	96867.5

Mass Distribution Pattern @ 4-phase in soil pore system: Mass Balance Pattern

Total Mass distributed in Water Phase: 0.00% in Solid: 0.08%

Total Mass distributed in Air Phase: 0.00% in NAPL: 99.92%

Please Check Soil Residual Saturation TPH Levels: Refer to Table 747-5!

A2.3 Worksheet for Calculating Soil Cleanup Levels for the Protection of Air Quality: (Vapor Pathway)
Method B: WAC 173-340-740 and 750

Date: 1/29/2013
Site Name: Harris
Sample Name: FS-19

Warning: This Worksheet is provided for informational purposes only! Background levels entered are not considered for the calculations.

Chemical of Concern or EC Group	Measured Soil Conc @dry basis	Enter Air Background Levels	Adjusted Condition: Soil Conc being tested	Adjusted Condition: Predicted Indoor Air Conc	Adjusted Condition: HQ @ Indoor Air	Adjusted Condition: RISK @ Indoor Air	Pass or Fail?
	mg/kg	ug/m^3	mg/kg	ug/m^3	unitless	unitless	
Petroleum EC Fraction							
AL_EC >5-6	0	40	0.00E+00	0.00E+00	0.00E+00		
AL_EC >6-8	4.185	40	4.18E+00	2.70E+02	9.93E-02		
AL_EC >8-10	34.425	40	3.44E+01	2.22E+02	1.64E+00		
AL_EC >10-12	427.5	40	4.27E+02	2.68E+02	1.97E+00		
AL_EC >12-16	2357.1	0	2.36E+03	1.15E+02	8.46E-01		
AL_EC >16-21	847.8	0	8.48E+02	4.93E-01	0.00E+00		
AL_EC >21-34	293.4	0	2.93E+02	2.73E-05	0.00E+00		
AR_EC >8-10	70.65	40	7.06E+01	4.03E+02	2.21E+00		
AR_EC >10-12	215.055	40	2.15E+02	1.34E+02	9.73E+01		
AR_EC >12-16	664.2	0	6.64E+02	3.28E+01	4.10E-01		
AR_EC >16-21	2250	0	2.25E+03	1.93E+00	0.00E+00		
AR_EC >21-34	784.8	0	7.85E+02	3.58E-04	0.00E+00		
Benzene	0	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Toluene	0	15	0.00E+00	0.00E+00	0.00E+00		
Ethylbenzene	0.2358	5	2.36E-01	2.86E+00	6.25E-03		
Total Xylenes	0.126	36	1.26E-01	1.33E+00	2.86E-02		
Naphthalene	28.71045	2.5	2.87E+01	3.27E+00	2.38E+00		
1-Methyl Naphthalene	3.9735	5	3.97E+00	3.37E-01	4.21E-03		
2-Methyl Naphthalene	20.196	5	2.02E+01	1.71E+00	1.24E+00		
n-Hexane	0	1	0.00E+00	0.00E+00	0.00E+00		
MTBE	0	10	0.00E+00	0.00E+00	0.00E+00		
Ethylene Dibromide (EDB)	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0	0	0.00E+00	0.00E+00		0.00E+00	for
Benzo(b)fluoranthene	0	0	0.00E+00	0.00E+00		0.00E+00	all
Benzo(k)fluoranthene	0	0	0.00E+00	0.00E+00		0.00E+00	cPAHs
Benzo(a)pyrene	0	0	0.00E+00	0.00E+00		0.00E+00	
Chrysene	0	0	0.00E+00	0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0	0	0.00E+00	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0	0	0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	8002.35675		8.00E+03	1.46E+03	1.08E+02	0.00E+00	***Fail***

Enter Vapor Attenuation Factor for all TPH components:	0.001

Site-Specific Hydrogeological Properties previously entered:

Item	Symbol	Value	Units
Total soil porosity: default is 0.43	n	0.32	unitless
Volumetric water content: default is 0.3	Θ_w	0.13	unitless
Initial volumetric air content: default is 0.13	Θ_a	0.19	unitless
Soil bulk density measured: default is 1.5	ρ_b	1.8	kg/L
Fraction Organic Carbon: default is 0.001	f_{oc}	0.006	unitless

TEST ADJUSTED CONDITION

This tool allows the user to test whether a particular TPH soil concentration is protective of indoor air quality. The Workbook uses the same composition ratio as for the measured data and the same hydrogeological data and vapor attenuation factor previously entered by the user.

Test Adjusted TPH Soil Conc

Pass or Fail? *Fail*

Tested TPH Soil Conc, mg/kg = 8000
Predicted TPH Indoor Air Conc, ug/m^3 = 1.46E+03
RISK @ Indoor Air = 0.00E+00
HI @ Indoor Air = 1.08E+02

Type of model used for computation: 4-Phase Model
Computation completed? Yes!

Note: Source of Default Air Background Level:
"Characterizing risk posed by Petroleum Contaminated Sites: Implementation of MADEP VPH/EPH Approach", *Petroleum Equivalent Carbon Fractions: State of Massachusetts, Department of Environmental Protection, 10/21/2002, Policy # WSC02-411

*Benzene and n-Hexane: Washington State Department of Ecology, 1997, "Memorandum: Washington State Air Toxic Monitoring Data Documentation"

A1 Soil Cleanup Levels: Worksheet for Soil Data Entry: Refer to WAC 173-340-720, 740,745, 747, 750

1. Enter Site Information

Date: 04/27/98
Site Name: Harris
Sample Name: TP-15

2. Enter Soil Concentration Measured

Chemical of Concern or Equivalent Carbon Group	Measured Soil Conc dry basis mg/kg	Composition Ratio %
Petroleum EC Fraction		
AL_EC >5-6		0.00%
AL_EC >6-8		0.00%
AL_EC >8-10		0.00%
AL_EC >10-12		0.00%
AL_EC >12-16	550	40.32%
AL_EC >16-21		0.00%
AL_EC >21-34		0.00%
AR_EC >8-10	11	0.81%
AR_EC >10-12	70	5.13%
AR_EC >12-16	150	11.00%
AR_EC >16-21	370	27.13%
AR_EC >21-34	120	8.80%
Benzene		0.00%
Toluene		0.00%
Ethylbenzene	0.048	0.00%
Total Xylenes		0.00%
Naphthalene	62	4.55%
1-Methyl Naphthalene		0.00%
2-Methyl Naphthalene	31	2.27%
n-Hexane		0.00%
MTBE		0.00%
Ethylene Dibromide (EDB)		0.00%
1,2 Dichloroethane (EDC)		0.00%
Benzo(a)anthracene		0.00%
Benzo(b)fluoranthene		0.00%
Benzo(k)fluoranthene		0.00%
Benzo(a)pyrene		0.00%
Chrysene		0.00%
Dibenz(a,h)anthracene		0.00%
Indeno(1,2,3-cd)pyrene		0.00%
Sum	1364.048	100.00%

Notes for Data Entry | Set Default Hydrogeology

Clear All Soil Concentration Data Entry Cells

Restore All Soil Concentration Data cleared previously

REMARK:
Non-detect values entered as blanks. When duplicate data values existed for a parameter, the higher detected result was used.

cPAH results intentionally omitted from this workbook, as cPAH is not well correlated with TPH at this site. cPAH results are evaluated as their own COC group in the RIFS.

For section 3, site-specific values for total soil porosity, volumetric water content, soil bulk density, and fraction of organic carbon were used.

For section 4, adjusted groundwater concentration of 1,000 ug/L used.

3. Enter Site-Specific Hydrogeological Data

Total soil porosity:	0.32	Unitless
Volumetric water content:	0.13	Unitless
Volumetric air content:	0.19	Unitless
Soil bulk density measured:	1.8	kg/L
Fraction Organic Carbon:	0.006	Unitless
Dilution Factor:	20	Unitless

4. Target TPH Ground Water Concentation (if adjusted)

If you adjusted the target TPH ground water concentration, enter adjusted value here:	1000	ug/L

A2. 1C Worksheet for Calculating Soil Cleanup Levels for Protection of Human Health: (Soil Direct Contact Pathway)
Method C: Industrial Land Use (WAC 173-340-745)

Date: 4/27/1998
Site Name: Harris
Sample Name: TP-15

Chemical of Concern or EC Group	Current Condition				Adjusted Condition			
	Measured Soil Conc @dry basis	HQ	RISK	Pass or Fail?	Soil Conc being tested	HQ	RISK	Pass or Fail?
	mg/kg	unitless	unitless		mg/kg	unitless	unitless	
Petroleum EC Fraction								
AL_EC >5-6	0				0.00E+00			
AL_EC >6-8	0				0.00E+00			
AL_EC >8-10	0				0.00E+00			
AL_EC >10-12	0				0.00E+00			
AL_EC >12-16	550	2.75E-02			8.38E+03	4.19E-01		
AL_EC >16-21	0				0.00E+00			
AL_EC >21-34	0				0.00E+00			
AR_EC >8-10	11	7.56E-05			1.68E+02	1.15E-03		
AR_EC >10-12	70	2.41E-03			1.07E+03	3.66E-02		
AR_EC >12-16	150	4.50E-03			2.28E+03	6.85E-02		
AR_EC >16-21	370	1.85E-02			5.64E+03	2.82E-01		
AR_EC >21-34	120	4.50E-03			1.83E+03	6.85E-02		
Benzene	0		0.00E+00		0.00E+00		0.00E+00	
Toluene	0				0.00E+00			
Ethylbenzene	0.048	3.18E-07			7.31E-01	4.85E-06		
Total Xylenes	0				0.00E+00			
Naphthalene	62	3.81E-03			9.44E+02	5.81E-02		
1-Methyl Naphthalene	0				0.00E+00	0.00E+00		
2-Methyl Naphthalene	31	4.36E-03			4.72E+02	6.64E-02		
n-Hexane	0				0.00E+00	0.00E+00		
MTBE	0				0.00E+00			
Ethylene Dibromide (EDB)	0		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0		0.00E+00		0.00E+00		0.00E+00	
Benzo(b)fluoranthene	0		0.00E+00		0.00E+00		0.00E+00	
Benzo(k)fluoranthene	0		0.00E+00		0.00E+00		0.00E+00	
Benzo(a)pyrene	0		0.00E+00		0.00E+00		0.00E+00	
Chrysene	0		0.00E+00		0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00		0.00E+00		0.00E+00	
Indeno(1,2,3-cd)pyrene	0		0.00E+00		0.00E+00		0.00E+00	
Sum	**1364.048**	6.57E-02	0.00E+00		2.08E+04	1.00E+00	0.00E+00	

TEST CURRENT CONDITION

Measured TPH Soil Conc, mg/kg= 1364.048
HI= 6.566E-02
RISK= 0.000E+00
Pass or Fail? Pass
Check Residual Saturation (WAC340-747(10))

CALCULATE PROTECTIVE CONDITION

This tool allows the user to calculate protective TPH soil concentration based on various soil quality criteria. The Workbook uses the same composition ratio as for the measured data.

Calculate Protective TPH soil Conc

Selected Criterion: @HI=1
Most Stringent? YES

Protctive TPH Soil Conc, mg/kg = 20775.802
HI = 1.000E+00
RISK = 0.000E+00

Check Residual Saturation (WAC340-747(10))

TEST ADJUSTED CONDITION

This tool allows the user to test whether a particular TPH soil concentration is protective of human health. The Workbook uses the same composition ratio as for the measured data.

Test Adjusted TPH Soil Conc

Tested TPH Soil Conc, mg/kg=
HI=
RISK=
Pass or Fail?

A2.2 Worksheet for Calculating Soil Cleanup Level for the Protection of Ground Water Quality: (Leaching Pathway)

WAC 173-340-740 and 747

Date: 4/27/1998
Site Name: Harris
Sample Name: TP-15

Chemical of Concern or EC Group	Measured Soil Conc @dry basis	GW Cleanup Level	Adjusted Condition: Soil Conc being tested	Predicted Conc @Well	HQ @ Well	RISK @ Well	Pass or Fail?
	mg/kg	ug/L	mg/kg	ug/L	unitless	unitless	
Petroleum EC Fraction							
AL_EC >5-6	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >6-8	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >8-10	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >10-12	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >12-16	550		1.10E+02	1.73E-02	3.61E-05		
AL_EC >16-21	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >21-34	0		0.00E+00	0.00E+00	0.00E+00		
AR_EC >8-10	11		2.19E+00	9.46E+00	1.18E-02		
AR_EC >10-12	70		1.40E+01	3.36E+01	2.10E-01		
AR_EC >12-16	150		2.99E+01	2.57E+01	3.22E-02		
AR_EC >16-21	370		7.38E+01	7.41E+00	1.54E-02		
AR_EC >21-34	120		2.39E+01	2.99E-02	4.67E-05		
Benzene	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Toluene	0	1000	0.00E+00	0.00E+00	0.00E+00		
Ethylbenzene	0.048	700	9.57E-03	2.38E-01	2.98E-04		
Total Xylenes	0	1000	0.00E+00	0.00E+00	0.00E+00		
Naphthalene	62	160	1.24E+01	5.29E+01	3.31E-01		
1-Methyl Naphthalene	0		0.00E+00	0.00E+00	0.00E+00		
2-Methyl Naphthalene	31		6.18E+00	1.28E+01	3.99E-01		
n-Hexane	0		0.00E+00	0.00E+00	0.00E+00		
MTBE	0	20	0.00E+00	0.00E+00	0.00E+00		
Ethylene Dibromide (EDB)	0	0.01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0	for	0.00E+00	0.00E+00		0.00E+00	for
Benzo(b)fluoranthene	0	all	0.00E+00	0.00E+00		0.00E+00	all
Benzo(k)fluoranthene	0	cPAHs	0.00E+00	0.00E+00		0.00E+00	cPAHs
Benzo(a)pyrene	0	Risk=	0.00E+00	0.00E+00		0.00E+00	
Chrysene	0	1E-05	0.00E+00	0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0		0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	1364.048		2.72E+02	1.42E+02	1.00E+00	0.00E+00	Pass

Site-Specific Hydrogeological Properties previously entered:

Item	Symbol	Value	Units
Total soil porosity:	n	0.32	unitless
Volumetric water content:	Θ_w	0.13	unitless
Volumetric air content:	Θ_a	0.19	unitless
Soil bulk density measured:	ρ_b	1.8	kg/L
Fraction Organic Carbon:	f_{oc}	0.006	unitless
Dilution Factor:	DF	20	unitless

Target Ground Water TPH conc adjusted previously if any:

Target Ground Water TPH Conc, ug/L ⇒ 1000

CALCULATE PROTECTIVE CONDITION OR TEST ADJUSTED CONDITION

Calculate or Test

Selected Criterion: @ HI=1
Most Stringent? YES

Protective TPH Soil Conc, mg/kg = **272.00**
Protective TPH GW Conc, ug/L = 1.42E+02
RISK @ Well = 0.00E+00
HI @Well = 1.00E+00

DEDAILED MODEL RESULTS TPH Range Test

Type of model used for computation:	4-Phase Model
Computation completed?	Yes!
Initial Weighted Average MW of NAPL, g/mol:	181.1
Equilibrated Weighted Average MW of NAPL, g/mol:	191.1
Initial Weighted Average Density of NAPL, kg/L:	0.940
Volumetric NAPL Content, Θ_{NAPL} :	4.0E-04
NAPL Saturation (%), Θ_{NAPL}/n :	0.13%
100% NAPL, mg/kg	99196.1

Mass Distribution Pattern @ 4-phase in soil pore system: Mass Balance Pattern

Total Mass distributed in Water Phase: 0.08% in Solid: 23.97%
Total Mass distributed in Air Phase: 0.02% in NAPL: 75.94%

Please Check Soil Residual Saturation TPH Levels: Refer to Table 747-5!

A2.2 Worksheet for Calculating Soil Cleanup Level for the Protection of Ground Water Quality: (Leaching Pathway)

WAC 173-340-740 and 747

Date: 4/27/1998
Site Name: Harris
Sample Name: TP-15

Chemical of Concern or EC Group	Measured Soil Conc @dry basis	GW Cleanup Level	Adjusted Condition: Soil Conc being tested	Predicted Conc @Well	HQ @ Well	RISK @ Well	Pass or Fail?
	mg/kg	ug/L	mg/kg	ug/L	unitless	unitless	
Petroleum EC Fraction							
AL_EC >5-6	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >6-8	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >8-10	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >10-12	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >12-16	550		4.00E+04	1.39E-02	2.90E-05		
AL_EC >16-21	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >21-34	0		0.00E+00	0.00E+00	0.00E+00		
AR_EC >8-10	11		8.00E+02	3.93E+01	4.91E-02		
AR_EC >10-12	70		5.09E+03	8.91E+01	5.57E-01		
AR_EC >12-16	150		1.09E+04	3.85E+01	4.81E-02		
AR_EC >16-21	370		2.69E+04	6.61E+00	1.38E-02		
AR_EC >21-34	120		8.73E+03	2.20E-02	3.43E-05		
Benzene	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Toluene	0	1000	0.00E+00	0.00E+00	0.00E+00		
Ethylbenzene	0.048	700	3.49E+00	5.07E-01	6.34E-04		
Total Xylenes	0	1000	0.00E+00	0.00E+00	0.00E+00		
Naphthalene	62	160	4.51E+03	9.96E+01	6.22E-01		
1-Methyl Naphthalene	0		0.00E+00	0.00E+00	0.00E+00		
2-Methyl Naphthalene	31		2.25E+03	3.55E+01	1.11E+00		
n-Hexane	0		0.00E+00	0.00E+00	0.00E+00		
MTBE	0	20	0.00E+00	0.00E+00	0.00E+00		
Ethylene Dibromide (EDB)	0	0.01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0	for	0.00E+00	0.00E+00		0.00E+00	for
Benzo(b)fluoranthene	0	all	0.00E+00	0.00E+00		0.00E+00	all
Benzo(k)fluoranthene	0	cPAHs	0.00E+00	0.00E+00		0.00E+00	cPAHs
Benzo(a)pyrene	0	Risk=	0.00E+00	0.00E+00		0.00E+00	
Chrysene	0	1E-05	0.00E+00	0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0		0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	1364.048		9.92E+04	3.09E+02	2.40E+00	0.00E+00	***Fail***

Site-Specific Hydrogeological Properties previously entered:

Item	Symbol	Value	Units
Total soil porosity:	n	0.32	unitless
Volumetric water content:	Θ_w	0.13	unitless
Volumetric air content:	Θ_a	0.19	unitless
Soil bulk density measured:	ρ_b	1.8	kg/L
Fraction Organic Carbon:	f_{oc}	0.006	unitless
Dilution Factor:	DF	20	unitless

Target Ground Water TPH conc adjusted previously if any:

Target Ground Water TPH Conc, ug/L ⇒ 1000

CALCULATE PROTECTIVE CONDITION OR TEST ADJUSTED CONDITION

Calculate or Test

Selected Criterion: @ Protection of Surface Water Quality

Most Stringent? NA

Protective TPH Soil Conc, mg/kg = **100% NAPL**

Protective TPH GW Conc, ug/L = 3.09E+02

RISK @ Well = NA

HI @Well = NA

DEDAILED MODEL RESULTS TPH Range Test

Type of model used for computation:	4-Phase Model
Computation completed?	Yes!
Initial Weighted Average MW of NAPL, g/mol:	181.1
Equilibrated Weighted Average MW of NAPL, g/mol:	181.3
Initial Weighted Average Density of NAPL, kg/L:	0.940
Volumetric NAPL Content, Θ_{NAPL} :	1.9E-01
NAPL Saturation (%), Θ_{NAPL}/n :	59.31%
100% NAPL, mg/kg	99196.1

Mass Distribution Pattern @ 4-phase in soil pore system: Mass Balance Pattern

Total Mass distributed in Water Phase: 0.00% in Solid: 0.11%

Total Mass distributed in Air Phase: 0.00% in NAPL: 99.89%

Please Check Soil Residual Saturation TPH Levels: Refer to Table 747-5!

A2.3 Worksheet for Calculating Soil Cleanup Levels for the Protection of Air Quality: (Vapor Pathway)
Method B: WAC 173-340-740 and 750

Date: 4/27/1998
Site Name: Harris
Sample Name: TP-15

Warning: This Worksheet is provided for informational purposes only! Background levels entered are not considered for the calculations.

Chemical of Concern or EC Group	Measured Soil Conc @dry basis	Enter Air Background Levels	Adjusted Condition: Soil Conc being tested	Adjusted Condition: Predicted Indoor Air Conc	Adjusted Condition: HQ @ Indoor Air	Adjusted Condition: RISK @ Indoor Air	Pass or Fail?
	mg/kg	ug/m^3	mg/kg	ug/m^3	unitless	unitless	
Petroleum EC Fraction							
AL_EC >5-6	0	40	0.00E+00	0.00E+00	0.00E+00		
AL_EC >6-8	0	40	0.00E+00	0.00E+00	0.00E+00		
AL_EC >8-10	0	40	0.00E+00	0.00E+00	0.00E+00		
AL_EC >10-12	0	40	0.00E+00	0.00E+00	0.00E+00		
AL_EC >12-16	550	0	5.64E+02	1.54E+02	1.14E+00		
AL_EC >16-21	0	0	0.00E+00	0.00E+00	0.00E+00		
AL_EC >21-34	0	0	0.00E+00	0.00E+00	0.00E+00		
AR_EC >8-10	11	40	1.13E+01	2.39E+02	1.31E+00		
AR_EC >10-12	70	40	7.18E+01	1.93E+02	1.40E+02		
AR_EC >12-16	150	0	1.54E+02	3.82E+01	4.77E-01		
AR_EC >16-21	370	0	3.80E+02	1.80E+00	0.00E+00		
AR_EC >21-34	120	0	1.23E+02	3.19E-04	0.00E+00		
Benzene	0	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Toluene	0	15	0.00E+00	0.00E+00	0.00E+00		
Ethylbenzene	0.048	5	4.93E-02	2.75E+00	6.01E-03		
Total Xylenes	0	36	0.00E+00	0.00E+00	0.00E+00		
Naphthalene	62	2.5	6.36E+01	3.45E+01	2.51E+01		
1-Methyl Naphthalene	0	5	0.00E+00	0.00E+00	0.00E+00		
2-Methyl Naphthalene	31	5	3.18E+01	1.14E+01	8.31E+00		
n-Hexane	0	1	0.00E+00	0.00E+00	0.00E+00		
MTBE	0	10	0.00E+00	0.00E+00	0.00E+00		
Ethylene Dibromide (EDB)	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0	0	0.00E+00	0.00E+00		0.00E+00	for
Benzo(b)fluoranthene	0	0	0.00E+00	0.00E+00		0.00E+00	all
Benzo(k)fluoranthene	0	0	0.00E+00	0.00E+00		0.00E+00	cPAHs
Benzo(a)pyrene	0	0	0.00E+00	0.00E+00		0.00E+00	
Chrysene	0	0	0.00E+00	0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0	0	0.00E+00	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0	0	0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	1364.048		1.40E+03	6.75E+02	1.77E+02	0.00E+00	***Fail***

Enter Vapor Attenuation Factor for all TPH components:	0.001

Site-Specific Hydrogeological Properties previously entered:

Item	Symbol	Value	Units
Total soil porosity: default is 0.43	n	0.32	unitless
Volumetric water content: default is 0.3	Θ_w	0.13	unitless
Initial volumetric air content: default is 0.13	Θ_a	0.19	unitless
Soil bulk density measured: default is 1.5	ρ_b	1.8	kg/L
Fraction Organic Carbon: default is 0.001	f_{oc}	0.006	unitless

TEST ADJUSTED CONDITION

This tool allows the user to test whether a particular TPH soil concentration is protective of indoor air quality. The Workbook uses the same composition ratio as for the measured data and the same hydrogeological data and vapor attenuation factor previously entered by the user.

Test Adjusted TPH Soil Conc

Pass or Fail? *Fail*

Tested TPH Soil Conc, mg/kg = 1400

Predicted TPH Indoor Air Conc, ug/m^3 = 6.75E+02

RISK @ Indoor Air = 0.00E+00

HI @ Indoor Air = 1.77E+02

Type of model used for computation: 4-Phase Model

Computation completed? Yes!

Note: Source of Default Air Background Level:
"Characterizing risk posed by Petroleum Contaminated Sites: Implementation of MADEP VPH/EPH Approach", *Petroleum Equivalent Carbon Fractions: State of Massachusetts, Department of Environmental Protection, 10/21/2002, Policy # WSC02-411

*Benzene and n-Hexane: Washington State Department of Ecology, 1997, "Memorandum: Washington State Air Toxic Monitoring Data Documentation"

A1 Soil Cleanup Levels: Worksheet for Soil Data Entry: Refer to WAC 173-340-720, 740,745, 747, 750

1. Enter Site Information

Date: 04/30/98
Site Name: Harris
Sample Name: TP-9 1.8'

2. Enter Soil Concentration Measured

Chemical of Concern or Equivalent Carbon Group	Measured Soil Conc dry basis mg/kg	Composition Ratio %
Petroleum EC Fraction		
AL_EC >5-6		0.00%
AL_EC >6-8		0.00%
AL_EC >8-10	4.5	0.13%
AL_EC >10-12	360	10.68%
AL_EC >12-16	2000	59.35%
AL_EC >16-21		0.00%
AL_EC >21-34		0.00%
AR_EC >8-10	30	0.89%
AR_EC >10-12	12	0.36%
AR_EC >12-16	110	3.26%
AR_EC >16-21	650	19.29%
AR_EC >21-34	200	5.94%
Benzene		0.00%
Toluene		0.00%
Ethylbenzene		0.00%
Total Xylenes		0.00%
Naphthalene		0.00%
1-Methyl Naphthalene		0.00%
2-Methyl Naphthalene	3.2	0.09%
n-Hexane		0.00%
MTBE		0.00%
Ethylene Dibromide (EDB)		0.00%
1,2 Dichloroethane (EDC)		0.00%
Benzo(a)anthracene		0.00%
Benzo(b)fluoranthene		0.00%
Benzo(k)fluoranthene		0.00%
Benzo(a)pyrene		0.00%
Chrysene		0.00%
Dibenz(a,h)anthracene		0.00%
Indeno(1,2,3-cd)pyrene		0.00%
Sum	3369.7	100.00%

Notes for Data Entry | Set Default Hydrogeology

Clear All Soil Concentration Data Entry Cells

Restore All Soil Concentration Data cleared previously

REMARK:
Non-detect values entered as blanks. When duplicate data values existed for a parameter, the higher detected result was used.

cPAH results intentionally omitted from this workbook, as cPAH is not well correlated with TPH at this site. cPAH results are evaluated as their own COC group in the RIFS.

For section 3, site-specific values for total soil porosity, volumetric water content, soil bulk density, and fraction of organic carbon were used.

For section 4, adjusted groundwater concentration of 1,000 ug/L used.

3. Enter Site-Specific Hydrogeological Data

Total soil porosity:	0.32	Unitless
Volumetric water content:	0.13	Unitless
Volumetric air content:	0.19	Unitless
Soil bulk density measured:	1.8	kg/L
Fraction Organic Carbon:	0.006	Unitless
Dilution Factor:	20	Unitless

4. Target TPH Ground Water Concentation (if adjusted)

If you adjusted the target TPH ground water concentration, enter adjusted value here:	1000	ug/L

A2. 1C Worksheet for Calculating Soil Cleanup Levels for Protection of Human Health: (Soil Direct Contact Pathway)
Method C: Industrial Land Use (WAC 173-340-745)

Date: 4/30/1998
Site Name: Harris
Sample Name: TP-9 1.8'

Chemical of Concern or EC Group	Current Condition				Adjusted Condition			
	Measured Soil Conc @dry basis	HQ	RISK	Pass or Fail?	Soil Conc being tested	HQ	RISK	Pass or Fail?
	mg/kg	unitless	unitless		mg/kg	unitless	unitless	
Petroleum EC Fraction								
AL_EC >5-6	0				0.00E+00			
AL_EC >6-8	0				0.00E+00			
AL_EC >8-10	4.5	1.03E-04			2.95E+01	6.75E-04		
AL_EC >10-12	360	8.25E-03			2.36E+03	5.40E-02		
AL_EC >12-16	2000	1.00E-01			1.31E+04	6.55E-01		
AL_EC >16-21	0				0.00E+00			
AL_EC >21-34	0				0.00E+00			
AR_EC >8-10	30	2.06E-04			1.96E+02	1.35E-03		
AR_EC >10-12	12	4.13E-04			7.86E+01	2.70E-03		
AR_EC >12-16	110	3.30E-03			7.20E+02	2.16E-02		
AR_EC >16-21	650	3.25E-02			4.26E+03	2.13E-01		
AR_EC >21-34	200	7.50E-03			1.31E+03	4.91E-02		
Benzene	0		0.00E+00		0.00E+00		0.00E+00	
Toluene	0				0.00E+00			
Ethylbenzene	0				0.00E+00			
Total Xylenes	0				0.00E+00			
Naphthalene	0				0.00E+00	0.00E+00		
1-Methyl Naphthalene	0				0.00E+00	0.00E+00		
2-Methyl Naphthalene	3.2	4.50E-04			2.10E+01	2.95E-03		
n-Hexane	0				0.00E+00	0.00E+00		
MTBE	0				0.00E+00			
Ethylene Dibromide (EDB)	0		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0		0.00E+00		0.00E+00		0.00E+00	
Benzo(b)fluoranthene	0		0.00E+00		0.00E+00		0.00E+00	
Benzo(k)fluoranthene	0		0.00E+00		0.00E+00		0.00E+00	
Benzo(a)pyrene	0		0.00E+00		0.00E+00		0.00E+00	
Chrysene	0		0.00E+00		0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00		0.00E+00		0.00E+00	
Indeno(1,2,3-cd)pyrene	0		0.00E+00		0.00E+00		0.00E+00	
Sum	**3369.7**	1.53E-01	0.00E+00		2.21E+04	1.00E+00	0.00E+00	

TEST CURRENT CONDITION

Measured TPH Soil Conc, mg/kg= 3369.700
HI= 1.527E-01
RISK= 0.000E+00
Pass or Fail? Pass
Check Residual Saturation (WAC340-747(10))

CALCULATE PROTECTIVE CONDITION

This tool allows the user to calculate protective TPH soil concentration based on various soil quality criteria. The Workbook uses the same composition ratio as for the measured data.

Calculate Protective TPH soil Conc

Selected Criterion:
Most Stringent?
Protctive TPH Soil Conc, mg/kg =
HI =
RISK =

TEST ADJUSTED CONDITION

This tool allows the user to test whether a particular TPH soil concentration is protective of human health. The Workbook uses the same composition ratio as for the measured data.

Test Adjusted TPH Soil Conc

Tested TPH Soil Conc, mg/kg=
HI=
RISK=
Pass or Fail?

A2.2 Worksheet for Calculating Soil Cleanup Level for the Protection of Ground Water Quality: (Leaching Pathway)

WAC 173-340-740 and 747

Date: 4/30/1998
Site Name: Harris
Sample Name: TP-9 1.8'

Chemical of Concern or EC Group	Measured Soil Conc @dry basis	GW Cleanup Level	Adjusted Condition: Soil Conc being tested	Predicted Conc @Well	HQ @ Well	RISK @ Well	Pass or Fail?
	mg/kg	ug/L	mg/kg	ug/L	unitless	unitless	
Petroleum EC Fraction							
AL_EC >5-6	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >6-8	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >8-10	4.5		1.20E+02	4.22E-02	1.76E-04		
AL_EC >10-12	360		9.60E+03	2.17E-01	9.04E-04		
AL_EC >12-16	2000		5.33E+04	2.16E-02	4.49E-05		
AL_EC >16-21	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >21-34	0		0.00E+00	0.00E+00	0.00E+00		
AR_EC >8-10	30		8.00E+02	4.56E+01	5.70E-02		
AR_EC >10-12	12		3.20E+02	6.51E+00	4.07E-02		
AR_EC >12-16	110		2.93E+03	1.20E+01	1.51E-02		
AR_EC >16-21	650		1.73E+04	4.95E+00	1.03E-02		
AR_EC >21-34	200		5.33E+03	1.56E-02	2.44E-05		
Benzene	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Toluene	0	1000	0.00E+00	0.00E+00	0.00E+00		
Ethylbenzene	0	700	0.00E+00	0.00E+00	0.00E+00		
Total Xylenes	0	1000	0.00E+00	0.00E+00	0.00E+00		
Naphthalene	0	160	0.00E+00	0.00E+00	0.00E+00		
1-Methyl Naphthalene	0		0.00E+00	0.00E+00	0.00E+00		
2-Methyl Naphthalene	3.2		8.53E+01	1.56E+00	4.88E-02		
n-Hexane	0		0.00E+00	0.00E+00	0.00E+00		
MTBE	0	20	0.00E+00	0.00E+00	0.00E+00		
Ethylene Dibromide (EDB)	0	0.01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0	for	0.00E+00	0.00E+00		0.00E+00	for
Benzo(b)fluoranthene	0	all	0.00E+00	0.00E+00		0.00E+00	all
Benzo(k)fluoranthene	0	cPAHs	0.00E+00	0.00E+00		0.00E+00	cPAHs
Benzo(a)pyrene	0	Risk=	0.00E+00	0.00E+00		0.00E+00	
Chrysene	0	1E-05	0.00E+00	0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0		0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	3369.7		8.98E+04	7.10E+01	1.73E-01	0.00E+00	Pass

Site-Specific Hydrogeological Properties previously entered:

Item	Symbol	Value	Units
Total soil porosity:	n	0.32	unitless
Volumetric water content:	Θ_w	0.13	unitless
Volumetric air content:	Θ_a	0.19	unitless
Soil bulk density measured:	ρ_b	1.8	kg/L
Fraction Organic Carbon:	f_{oc}	0.006	unitless
Dilution Factor:	DF	20	unitless

Target Ground Water TPH conc adjusted previously if any:

Target Ground Water TPH Conc, ug/L ⇒ 1000

CALCULATE PROTECTIVE CONDITION OR TEST ADJUSTED CONDITION

Calculate or Test

@ HI=1

Pass or Fail? YES

Tested TPH Soil Conc, mg/kg = **100% NAPL**

Predicted TPH GW Conc, ug/L = 7.10E+01

RISK @ Well = 0.00E+00

HI @Well = 1.73E-01

DEDAILED MODEL RESULTS TPH Range Test

Type of model used for computation:	4-Phase Model
Computation completed?	Yes!
Initial Weighted Average MW of NAPL, g/mol:	191.1
Equilibrated Weighted Average MW of NAPL, g/mol:	191.2
Initial Weighted Average Density of NAPL, kg/L:	0.851
Volumetric NAPL Content, Θ_{NAPL} :	1.9E-01
NAPL Saturation (%), Θ_{NAPL}/n :	59.34%
100% NAPL, mg/kg	89847.9

Mass Distribution Pattern @ 4-phase in soil pore system: Mass Balance Pattern

Total Mass distributed in Water Phase: 0.00% in Solid: 0.05%

Total Mass distributed in Air Phase: 0.00% in NAPL: 99.95%

Please Check Soil Residual Saturation TPH Levels: Refer to Table 747-5!

A2.2 Worksheet for Calculating Soil Cleanup Level for the Protection of Ground Water Quality: (Leaching Pathway)
WAC 173-340-740 and 747

Date: 4/30/1998
Site Name: Harris
Sample Name: TP-9 1.8'

Chemical of Concern or EC Group	Measured Soil Conc @dry basis	GW Cleanup Level	Adjusted Condition: Soil Conc being tested	Predicted Conc @Well	HQ @ Well	RISK @ Well	Pass or Fail?
	mg/kg	ug/L	mg/kg	ug/L	unitless	unitless	
Petroleum EC Fraction							
AL_EC >5-6	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >6-8	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >8-10	4.5		1.20E+02	4.22E-02	1.76E-04		
AL_EC >10-12	360		9.60E+03	2.17E-01	9.04E-04		
AL_EC >12-16	2000		5.33E+04	2.16E-02	4.49E-05		
AL_EC >16-21	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >21-34	0		0.00E+00	0.00E+00	0.00E+00		
AR_EC >8-10	30		8.00E+02	4.56E+01	5.70E-02		
AR_EC >10-12	12		3.20E+02	6.51E+00	4.07E-02		
AR_EC >12-16	110		2.93E+03	1.20E+01	1.51E-02		
AR_EC >16-21	650		1.73E+04	4.95E+00	1.03E-02		
AR_EC >21-34	200		5.33E+03	1.56E-02	2.44E-05		
Benzene	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Toluene	0	1000	0.00E+00	0.00E+00	0.00E+00		
Ethylbenzene	0	700	0.00E+00	0.00E+00	0.00E+00		
Total Xylenes	0	1000	0.00E+00	0.00E+00	0.00E+00		
Naphthalene	0	160	0.00E+00	0.00E+00	0.00E+00		
1-Methyl Naphthalene	0		0.00E+00	0.00E+00	0.00E+00		
2-Methyl Naphthalene	3.2		8.53E+01	1.56E+00	4.88E-02		
n-Hexane	0		0.00E+00	0.00E+00	0.00E+00		
MTBE	0	20	0.00E+00	0.00E+00	0.00E+00		
Ethylene Dibromide (EDB)	0	0.01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0	for	0.00E+00	0.00E+00		0.00E+00	for
Benzo(b)fluoranthene	0	all	0.00E+00	0.00E+00		0.00E+00	all
Benzo(k)fluoranthene	0	cPAHs	0.00E+00	0.00E+00		0.00E+00	cPAHs
Benzo(a)pyrene	0	Risk=	0.00E+00	0.00E+00		0.00E+00	
Chrysene	0	1E-05	0.00E+00	0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0		0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	3369.7		8.98E+04	7.10E+01	1.73E-01	0.00E+00	Pass

Site-Specific Hydrogeological Properties previously entered:

Item	Symbol	Value	Units
Total soil porosity:	n	0.32	unitless
Volumetric water content:	Θ_w	0.13	unitless
Volumetric air content:	Θ_a	0.19	unitless
Soil bulk density measured:	ρ_b	1.8	kg/L
Fraction Organic Carbon:	f_{oc}	0.006	unitless
Dilution Factor:	DF	20	unitless

Target Ground Water TPH conc adjusted previously if any:

Target Ground Water TPH Conc, ug/L ⇒ 1000

CALCULATE PROTECTIVE CONDITION OR TEST ADJUSTED CONDITION

Calculate or Test

@ Protection of Surface Water Quality

Pass or Fail? NA

Tested TPH Soil Conc, mg/kg = **100% NAPL**

Predicted TPH GW Conc, ug/L = 7.10E+01

RISK @ Well = NA

HI @Well = NA

DEDAILED MODEL RESULTS TPH Range Test

Type of model used for computation:	4-Phase Model
Computation completed?	Yes!
Initial Weighted Average MW of NAPL, g/mol:	191.1
Equilibrated Weighted Average MW of NAPL, g/mol:	191.2
Initial Weighted Average Density of NAPL, kg/L:	0.851
Volumetric NAPL Content, Θ_{NAPL} :	1.9E-01
NAPL Saturation (%), Θ_{NAPL}/n :	59.34%
100% NAPL, mg/kg	89847.9

Mass Distribution Pattern @ 4-phase in soil pore system: Mass Balance Pattern

Total Mass distributed in Water Phase: 0.00% in Solid: 0.05%

Total Mass distributed in Air Phase: 0.00% in NAPL: 99.95%

Please Check Soil Residual Saturation TPH Levels: Refer to Table 747-5!

A2.3 Worksheet for Calculating Soil Cleanup Levels for the Protection of Air Quality: (Vapor Pathway)
Method B: WAC 173-340-740 and 750

Date: 4/30/1998
Site Name: Harris
Sample Name: TP-9 1.8'

Warning: This Worksheet is provided for informational purposes only! Background levels entered are not considered for the calculations.

Chemical of Concern or EC Group	Measured Soil Conc @dry basis	Enter Air Background Levels	Adjusted Condition: Soil Conc being tested	Adjusted Condition: Predicted Indoor Air Conc	Adjusted Condition: HQ @ Indoor Air	Adjusted Condition: RISK @ Indoor Air	Pass or Fail?
	mg/kg	ug/m^3	mg/kg	ug/m^3	unitless	unitless	
Petroleum EC Fraction							
AL_EC >5-6	0	40	0.00E+00	0.00E+00	0.00E+00		
AL_EC >6-8	0	40	0.00E+00	0.00E+00	0.00E+00		
AL_EC >8-10	4.5	40	4.54E+00	6.62E+01	4.87E-01		
AL_EC >10-12	360	40	3.63E+02	5.20E+02	3.82E+00		
AL_EC >12-16	2000	0	2.02E+03	2.26E+02	1.66E+00		
AL_EC >16-21	0	0	0.00E+00	0.00E+00	0.00E+00		
AL_EC >21-34	0	0	0.00E+00	0.00E+00	0.00E+00		
AR_EC >8-10	30	40	3.03E+01	3.46E+02	1.90E+00		
AR_EC >10-12	12	40	1.21E+01	1.60E+01	1.16E+01		
AR_EC >12-16	110	0	1.11E+02	1.22E+01	1.52E-01		
AR_EC >16-21	650	0	6.56E+02	1.29E+00	0.00E+00		
AR_EC >21-34	200	0	2.02E+02	2.12E-04	0.00E+00		
Benzene	0	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Toluene	0	15	0.00E+00	0.00E+00	0.00E+00		
Ethylbenzene	0	5	0.00E+00	0.00E+00	0.00E+00		
Total Xylenes	0	36	0.00E+00	0.00E+00	0.00E+00		
Naphthalene	0	2.5	0.00E+00	0.00E+00	0.00E+00		
1-Methyl Naphthalene	0	5	0.00E+00	0.00E+00	0.00E+00		
2-Methyl Naphthalene	3.2	5	3.23E+00	5.74E-01	4.17E-01		
n-Hexane	0	1	0.00E+00	0.00E+00	0.00E+00		
MTBE	0	10	0.00E+00	0.00E+00	0.00E+00		
Ethylene Dibromide (EDB)	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0	0	0.00E+00	0.00E+00		0.00E+00	for
Benzo(b)fluoranthene	0	0	0.00E+00	0.00E+00		0.00E+00	all
Benzo(k)fluoranthene	0	0	0.00E+00	0.00E+00		0.00E+00	cPAHs
Benzo(a)pyrene	0	0	0.00E+00	0.00E+00		0.00E+00	
Chrysene	0	0	0.00E+00	0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0	0	0.00E+00	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0	0	0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	3369.7		3.40E+03	1.19E+03	2.00E+01	0.00E+00	***Fail***

Enter Vapor Attenuation Factor for all TPH components:	0.001

Site-Specific Hydrogeological Properties previously entered:

Item	Symbol	Value	Units
Total soil porosity: default is 0.43	n	0.32	unitless
Volumetric water content: default is 0.3	Θ_w	0.13	unitless
Initial volumetric air content: default is 0.13	Θ_a	0.19	unitless
Soil bulk density measured: default is 1.5	ρ_b	1.8	kg/L
Fraction Organic Carbon: default is 0.001	f_{oc}	0.006	unitless

TEST ADJUSTED CONDITION

This tool allows the user to test whether a particular TPH soil concentration is protective of indoor air quality. The Workbook uses the same composition ratio as for the measured data and the same hydrogeological data and vapor attenuation factor previously entered by the user.

Test Adjusted TPH Soil Conc

Pass or Fail? *Fail*

Tested TPH Soil Conc, mg/kg = 3400

Predicted TPH Indoor Air Conc, ug/m^3 = 1.19E+03

RISK @ Indoor Air = 0.00E+00

HI @ Indoor Air = 2.00E+01

Type of model used for computation: 4-Phase Model

Computation completed? Yes!

Note: Source of Default Air Background Level:
"Characterizing risk posed by Petroleum Contaminated Sites: Implementation of MADEP VPH/EPH Approach", *Petroleum Equivalent Carbon Fractions: State of Massachusetts, Department of Environmental Protection, 10/21/2002, Policy # WSC02-411

*Benzene and n-Hexane: Washington State Department of Ecology, 1997, "Memorandum: Washington State Air Toxic Monitoring Data Documentation"

A1 Soil Cleanup Levels: Worksheet for Soil Data Entry: Refer to WAC 173-340-720, 740,745, 747, 750

1. Enter Site Information

Date: 04/30/98
Site Name: Harris
Sample Name: TP-9 6'

2. Enter Soil Concentration Measured

Chemical of Concern or Equivalent Carbon Group	Measured Soil Conc dry basis	Composition Ratio
	mg/kg	%
Petroleum EC Fraction		
AL_EC >5-6		0.00%
AL_EC >6-8		0.00%
AL_EC >8-10	6	0.61%
AL_EC >10-12	140	14.22%
AL_EC >12-16	530	53.85%
AL_EC >16-21		0.00%
AL_EC >21-34		0.00%
AR_EC >8-10	19	1.93%
AR_EC >10-12	4.9	0.50%
AR_EC >12-16	56	5.69%
AR_EC >16-21	190	19.30%
AR_EC >21-34	34	3.45%
Benzene		0.00%
Toluene		0.00%
Ethylbenzene	0.22	0.02%
Total Xylenes		0.00%
Naphthalene	0.9	0.09%
1-Methyl Naphthalene		0.00%
2-Methyl Naphthalene	3.2	0.33%
n-Hexane		0.00%
MTBE		0.00%
Ethylene Dibromide (EDB)		0.00%
1,2 Dichloroethane (EDC)		0.00%
Benzo(a)anthracene		0.00%
Benzo(b)fluoranthene		0.00%
Benzo(k)fluoranthene		0.00%
Benzo(a)pyrene		0.00%
Chrysene		0.00%
Dibenz(a,h)anthracene		0.00%
Indeno(1,2,3-cd)pyrene		0.00%
Sum	984.22	100.00%

Notes for Data Entry | Set Default Hydrogeology

Clear All Soil Concentration Data Entry Cells

Restore All Soil Concentration Data cleared previously

REMARK:
Non-detect values entered as blanks. When duplicate data values existed for a parameter, the higher detected result was used.

cPAH results intentionally omitted from this workbook, as cPAH is not well correlated with TPH at this site. cPAH results are evaluated as their own COC group in the RIFS.

For section 3, site-specific values for total soil porosity, volumetric water content, soil bulk density, and fraction of organic carbon were used.

For section 4, adjusted groundwater concentration of 1,000 ug/L used.

3. Enter Site-Specific Hydrogeological Data

Total soil porosity:	0.32	Unitless
Volumetric water content:	0.13	Unitless
Volumetric air content:	0.19	Unitless
Soil bulk density measured:	1.8	kg/L
Fraction Organic Carbon:	0.006	Unitless
Dilution Factor:	20	Unitless

4. Target TPH Ground Water Concentation (if adjusted)

If you adjusted the target TPH ground water concentration, enter adjusted value here:	1000	ug/L

A2. 1C Worksheet for Calculating Soil Cleanup Levels for Protection of Human Health: (Soil Direct Contact Pathway)
Method C: Industrial Land Use (WAC 173-340-745)

Date: 4/30/1998
Site Name: Harris
Sample Name: TP-9 6'

Chemical of Concern or EC Group	Current Condition				Adjusted Condition			
	Measured Soil Conc @dry basis	HQ	RISK	Pass or Fail?	Soil Conc being tested	HQ	RISK	Pass or Fail?
	mg/kg	unitless	unitless		mg/kg	unitless	unitless	
Petroleum EC Fraction								
AL_EC >5-6	0				0.00E+00			
AL_EC >6-8	0				0.00E+00			
AL_EC >8-10	6	1.38E-04			1.39E+02	3.19E-03		
AL_EC >10-12	140	3.21E-03			3.25E+03	7.44E-02		
AL_EC >12-16	530	2.65E-02			1.23E+04	6.15E-01		
AL_EC >16-21	0				0.00E+00			
AL_EC >21-34	0				0.00E+00			
AR_EC >8-10	19	1.31E-04			4.41E+02	3.03E-03		
AR_EC >10-12	4.9	1.68E-04			1.14E+02	3.91E-03		
AR_EC >12-16	56	1.68E-03			1.30E+03	3.90E-02		
AR_EC >16-21	190	9.50E-03			4.41E+03	2.20E-01		
AR_EC >21-34	34	1.28E-03			7.89E+02	2.96E-02		
Benzene	0		0.00E+00		0.00E+00		0.00E+00	
Toluene	0				0.00E+00			
Ethylbenzene	0.22	1.46E-06			5.10E+00	3.38E-05		
Total Xylenes	0				0.00E+00			
Naphthalene	0.9	5.54E-05			2.09E+01	1.28E-03		
1-Methyl Naphthalene	0				0.00E+00	0.00E+00		
2-Methyl Naphthalene	3.2	4.50E-04			7.42E+01	1.04E-02		
n-Hexane	0				0.00E+00	0.00E+00		
MTBE	0				0.00E+00			
Ethylene Dibromide (EDB)	0		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0		0.00E+00		0.00E+00		0.00E+00	
Benzo(b)fluoranthene	0		0.00E+00		0.00E+00		0.00E+00	
Benzo(k)fluoranthene	0		0.00E+00		0.00E+00		0.00E+00	
Benzo(a)pyrene	0		0.00E+00		0.00E+00		0.00E+00	
Chrysene	0		0.00E+00		0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00		0.00E+00		0.00E+00	
Indeno(1,2,3-cd)pyrene	0		0.00E+00		0.00E+00		0.00E+00	
Sum	**984.22**	4.31E-02	0.00E+00		2.28E+04	1.00E+00	0.00E+00	

TEST CURRENT CONDITION

Measured TPH Soil Conc, mg/kg= 984.220
HI= 4.311E-02
RISK= 0.000E+00
Pass or Fail? Pass

CALCULATE PROTECTIVE CONDITION

This tool allows the user to calculate protective TPH soil concentration based on various soil quality criteria. The Workbook uses the same composition ratio as for the measured data.

Calculate Protective TPH soil Conc

Selected Criterion: @HI=1
Most Stringent? YES

Protctive TPH Soil Conc, mg/kg = 22832.171
HI = 1.000E+00
RISK = 0.000E+00

Check Residual Saturation (WAC340-747(10))

TEST ADJUSTED CONDITION

This tool allows the user to test whether a particular TPH soil concentration is protective of human health. The Workbook uses the same composition ratio as for the measured data.

Test Adjusted TPH Soil Conc

Tested TPH Soil Conc, mg/kg=
HI=
RISK=
Pass or Fail?

A2.2 Worksheet for Calculating Soil Cleanup Level for the Protection of Ground Water Quality: (Leaching Pathway)

WAC 173-340-740 and 747

Date: 4/30/1998
Site Name: Harris
Sample Name: TP-9 6'

Chemical of Concern or EC Group	Measured Soil Conc @dry basis	GW Cleanup Level	Adjusted Condition				
			Soil Conc being tested	Predicted Conc @Well	HQ @ Well	RISK @ Well	Pass or Fail?
	mg/kg	ug/L	mg/kg	ug/L	unitless	unitless	
Petroleum EC Fraction							
AL_EC >5-6	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >6-8	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >8-10	6		5.46E+02	1.87E-01	7.78E-04		
AL_EC >10-12	140		1.27E+04	2.80E-01	1.17E-03		
AL_EC >12-16	530		4.82E+04	1.90E-02	3.95E-05		
AL_EC >16-21	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >21-34	0		0.00E+00	0.00E+00	0.00E+00		
AR_EC >8-10	19		1.73E+03	9.60E+01	1.20E-01		
AR_EC >10-12	4.9		4.46E+02	8.83E+00	5.52E-02		
AR_EC >12-16	56		5.09E+03	2.04E+01	2.54E-02		
AR_EC >16-21	190		1.73E+04	4.80E+00	1.00E-02		
AR_EC >21-34	34		3.09E+03	8.81E-03	1.38E-05		
Benzene	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Toluene	0	1000	0.00E+00	0.00E+00	0.00E+00		
Ethylbenzene	0.22	700	2.00E+01	3.29E+00	4.11E-03		
Total Xylenes	0	1000	0.00E+00	0.00E+00	0.00E+00		
Naphthalene	0.9	160	8.18E+01	2.05E+00	1.28E-02		
1-Methyl Naphthalene	0		0.00E+00	0.00E+00	0.00E+00		
2-Methyl Naphthalene	3.2		2.91E+02	5.18E+00	1.62E-01		
n-Hexane	0		0.00E+00	0.00E+00	0.00E+00		
MTBE	0	20	0.00E+00	0.00E+00	0.00E+00		
Ethylene Dibromide (EDB)	0	0.01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0	for	0.00E+00	0.00E+00		0.00E+00	for
Benzo(b)fluoranthene	0	all	0.00E+00	0.00E+00		0.00E+00	all
Benzo(k)fluoranthene	0	cPAHs	0.00E+00	0.00E+00		0.00E+00	cPAHs
Benzo(a)pyrene	0	Risk=	0.00E+00	0.00E+00		0.00E+00	
Chrysene	0	1E-05	0.00E+00	0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0		0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	984.22		8.95E+04	1.41E+02	3.91E-01	0.00E+00	Pass

Site-Specific Hydrogeological Properties previously entered:

Item	Symbol	Value	Units
Total soil porosity:	n	0.32	unitless
Volumetric water content:	Θ_w	0.13	unitless
Volumetric air content:	Θ_a	0.19	unitless
Soil bulk density measured:	ρ_b	1.8	kg/L
Fraction Organic Carbon:	f_{oc}	0.006	unitless
Dilution Factor:	DF	20	unitless

Target Ground Water TPH conc adjusted previously if any:

Target Ground Water TPH Conc, ug/L ⇒ 1000

CALCULATE PROTECTIVE CONDITION OR TEST ADJUSTED CONDITION

Calculate or Test

@ HI=1

Pass or Fail? YES

Tested TPH Soil Conc, mg/kg = **100% NAPL**

Predicted TPH GW Conc, ug/L = 1.41E+02

RISK @ Well = 0.00E+00

HI @Well = 3.91E-01

DEDAILED MODEL RESULTS TPH Range Test

Type of model used for computation:	4-Phase Model
Computation completed?	Yes!
Initial Weighted Average MW of NAPL, g/mol:	185.2
Equilibrated Weighted Average MW of NAPL, g/mol:	185.4
Initial Weighted Average Density of NAPL, kg/L:	0.848
Volumetric NAPL Content, Θ_{NAPL} :	1.9E-01
NAPL Saturation (%), Θ_{NAPL}/n :	59.33%
100% NAPL, mg/kg	89506.2

Mass Distribution Pattern @ 4-phase in soil pore system: Mass Balance Pattern

Total Mass distributed in Water Phase: 0.00% in Solid: 0.07%

Total Mass distributed in Air Phase: 0.00% in NAPL: 99.93%

Please Check Soil Residual Saturation TPH Levels: Refer to Table 747-5!

A2.2 Worksheet for Calculating Soil Cleanup Level for the Protection of Ground Water Quality: (Leaching Pathway)

WAC 173-340-740 and 747

Date: 4/30/1998
Site Name: Harris
Sample Name: TP-9 6'

Chemical of Concern or EC Group	Measured Soil Conc @dry basis	GW Cleanup Level	Adjusted Condition				
			Soil Conc being tested	Predicted Conc @Well	HQ @ Well	RISK @ Well	Pass or Fail?
	mg/kg	ug/L	mg/kg	ug/L	unitless	unitless	
Petroleum EC Fraction							
AL_EC >5-6	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >6-8	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >8-10	6		5.46E+02	1.87E-01	7.78E-04		
AL_EC >10-12	140		1.27E+04	2.80E-01	1.17E-03		
AL_EC >12-16	530		4.82E+04	1.90E-02	3.95E-05		
AL_EC >16-21	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >21-34	0		0.00E+00	0.00E+00	0.00E+00		
AR_EC >8-10	19		1.73E+03	9.60E+01	1.20E-01		
AR_EC >10-12	4.9		4.46E+02	8.83E+00	5.52E-02		
AR_EC >12-16	56		5.09E+03	2.04E+01	2.54E-02		
AR_EC >16-21	190		1.73E+04	4.80E+00	1.00E-02		
AR_EC >21-34	34		3.09E+03	8.81E-03	1.38E-05		
Benzene	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Toluene	0	1000	0.00E+00	0.00E+00	0.00E+00		
Ethylbenzene	0.22	700	2.00E+01	3.29E+00	4.11E-03		
Total Xylenes	0	1000	0.00E+00	0.00E+00	0.00E+00		
Naphthalene	0.9	160	8.18E+01	2.05E+00	1.28E-02		
1-Methyl Naphthalene	0		0.00E+00	0.00E+00	0.00E+00		
2-Methyl Naphthalene	3.2		2.91E+02	5.18E+00	1.62E-01		
n-Hexane	0		0.00E+00	0.00E+00	0.00E+00		
MTBE	0	20	0.00E+00	0.00E+00	0.00E+00		
Ethylene Dibromide (EDB)	0	0.01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0	for	0.00E+00	0.00E+00		0.00E+00	for
Benzo(b)fluoranthene	0	all	0.00E+00	0.00E+00		0.00E+00	all
Benzo(k)fluoranthene	0	cPAHs	0.00E+00	0.00E+00		0.00E+00	cPAHs
Benzo(a)pyrene	0	Risk=	0.00E+00	0.00E+00		0.00E+00	
Chrysene	0	1E-05	0.00E+00	0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0		0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	984.22		8.95E+04	1.41E+02	3.91E-01	0.00E+00	Pass

Site-Specific Hydrogeological Properties previously entered:

Item	Symbol	Value	Units
Total soil porosity:	n	0.32	unitless
Volumetric water content:	Θ_w	0.13	unitless
Volumetric air content:	Θ_a	0.19	unitless
Soil bulk density measured:	ρ_b	1.8	kg/L
Fraction Organic Carbon:	f_{oc}	0.006	unitless
Dilution Factor:	DF	20	unitless

Target Ground Water TPH conc adjusted previously if any:

Target Ground Water TPH Conc, ug/L ⇒ 1000

CALCULATE PROTECTIVE CONDITION OR TEST ADJUSTED CONDITION

Calculate or Test

@ Protection of Surface Water Quality

Pass or Fail? NA

Tested TPH Soil Conc, mg/kg = **100% NAPL**

Predicted TPH GW Conc, ug/L = 1.41E+02

RISK @ Well = NA

HI @Well = NA

DEDAILED MODEL RESULTS TPH Range Test

Type of model used for computation:	4-Phase Model
Computation completed?	Yes!
Initial Weighted Average MW of NAPL, g/mol:	185.2
Equilibrated Weighted Average MW of NAPL, g/mol:	185.4
Initial Weighted Average Density of NAPL, kg/L:	0.848
Volumetric NAPL Content, Θ_{NAPL} :	1.9E-01
NAPL Saturation (%), Θ_{NAPL}/n :	59.33%
100% NAPL, mg/kg	89506.2

Mass Distribution Pattern @ 4-phase in soil pore system: Mass Balance Pattern

Total Mass distributed in Water Phase: 0.00% in Solid: 0.07%

Total Mass distributed in Air Phase: 0.00% in NAPL: 99.93%

Please Check Soil Residual Saturation TPH Levels: Refer to Table 747-5!

A2.3 Worksheet for Calculating Soil Cleanup Levels for the Protection of Air Quality: (Vapor Pathway)
Method B: WAC 173-340-740 and 750

Date: 4/30/1998
Site Name: Harris
Sample Name: TP-9 6'

Warning: This Worksheet is provided for informational purposes only! Background levels entered are not considered for the calculations.

Chemical of Concern or EC Group	Measured Soil Conc @dry basis	Enter Air Background Levels	Adjusted Condition: Soil Conc being tested	Adjusted Condition: Predicted Indoor Air Conc	Adjusted Condition: HQ @ Indoor Air	Adjusted Condition: RISK @ Indoor Air	Pass or Fail?
	mg/kg	ug/m^3	mg/kg	ug/m^3	unitless	unitless	
Petroleum EC Fraction							
AL_EC >5-6	0	40	0.00E+00	0.00E+00	0.00E+00		
AL_EC >6-8	0	40	0.00E+00	0.00E+00	0.00E+00		
AL_EC >8-10	6	40	5.97E+00	2.84E+02	2.09E+00		
AL_EC >10-12	140	40	1.39E+02	6.77E+02	4.98E+00		
AL_EC >12-16	530	0	5.28E+02	2.06E+02	1.51E+00		
AL_EC >16-21	0	0	0.00E+00	0.00E+00	0.00E+00		
AL_EC >21-34	0	0	0.00E+00	0.00E+00	0.00E+00		
AR_EC >8-10	19	40	1.89E+01	4.85E+02	2.66E+00		
AR_EC >10-12	4.9	40	4.88E+00	1.67E+01	1.21E+01		
AR_EC >12-16	56	0	5.58E+01	1.87E+01	2.34E-01		
AR_EC >16-21	190	0	1.89E+02	1.27E+00	0.00E+00		
AR_EC >21-34	34	0	3.39E+01	1.26E-04	0.00E+00		
Benzene	0	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Toluene	0	15	0.00E+00	0.00E+00	0.00E+00		
Ethylbenzene	0.22	5	2.19E-01	1.60E+01	3.49E-02		
Total Xylenes	0	36	0.00E+00	0.00E+00	0.00E+00		
Naphthalene	0.9	2.5	8.96E-01	6.42E-01	4.66E-01		
1-Methyl Naphthalene	0	5	0.00E+00	0.00E+00	0.00E+00		
2-Methyl Naphthalene	3.2	5	3.19E+00	1.45E+00	1.06E+00		
n-Hexane	0	1	0.00E+00	0.00E+00	0.00E+00		
MTBE	0	10	0.00E+00	0.00E+00	0.00E+00		
Ethylene Dibromide (EDB)	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0	0	0.00E+00	0.00E+00		0.00E+00	for
Benzo(b)fluoranthene	0	0	0.00E+00	0.00E+00		0.00E+00	all
Benzo(k)fluoranthene	0	0	0.00E+00	0.00E+00		0.00E+00	cPAHs
Benzo(a)pyrene	0	0	0.00E+00	0.00E+00		0.00E+00	
Chrysene	0	0	0.00E+00	0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0	0	0.00E+00	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0	0	0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	984.22		9.80E+02	1.71E+03	2.52E+01	0.00E+00	***Fail***

Enter Vapor Attenuation Factor for all TPH components:	0.001

Site-Specific Hydrogeological Properties previously entered:

Item	Symbol	Value	Units
Total soil porosity: default is 0.43	n	0.32	unitless
Volumetric water content: default is 0.3	Θ_w	0.13	unitless
Initial volumetric air content: default is 0.13	Θ_a	0.19	unitless
Soil bulk density measured: default is 1.5	ρ_b	1.8	kg/L
Fraction Organic Carbon: default is 0.001	f_{oc}	0.006	unitless

TEST ADJUSTED CONDITION

This tool allows the user to test whether a particular TPH soil concentration is protective of indoor air quality. The Workbook uses the same composition ratio as for the measured data and the same hydrogeological data and vapor attenuation factor previously entered by the user.

Test Adjusted TPH Soil Conc

Pass or Fail? *Fail*

Tested TPH Soil Conc, mg/kg = 980

Predicted TPH Indoor Air Conc, ug/m^3 = 1.71E+03

RISK @ Indoor Air = 0.00E+00

HI @ Indoor Air = 2.52E+01

Type of model used for computation: 4-Phase Model

Computation completed? Yes!

Note: Source of Default Air Background Level:
"Characterizing risk posed by Petroleum Contaminated Sites: Implementation of MADEP VPH/EPH Approach", *Petroleum Equivalent Carbon Fractions: State of Massachusetts, Department of Environmental Protection, 10/21/2002, Policy # WSC02-411

*Benzene and n-Hexane: Washington State Department of Ecology, 1997, "Memorandum: Washington State Air Toxic Monitoring Data Documentation"

A1 Soil Cleanup Levels: Worksheet for Soil Data Entry: Refer to WAC 173-340-720, 740,745, 747, 750

1. Enter Site Information

Date: 02/09/15
Site Name: POB-Harris
Sample Name: FS-29-3-4

2. Enter Soil Concentration Measured

Chemical of Concern or Equivalent Carbon Group	Measured Soil Conc dry basis mg/kg	Composition Ratio %
Petroleum EC Fraction		
AL_EC >5-6		0.00%
AL_EC >6-8		0.00%
AL_EC >8-10	61	0.45%
AL_EC >10-12	600	4.42%
AL_EC >12-16	3400	25.02%
AL_EC >16-21	4000	29.44%
AL_EC >21-34	2100	15.46%
AR_EC >8-10	2.7	0.02%
AR_EC >10-12	42.88	0.32%
AR_EC >12-16	559.42	4.12%
AR_EC >16-21	2100	15.46%
AR_EC >21-34	720	5.30%
Benzene		0.00%
Toluene		0.00%
Ethylbenzene		0.00%
Total Xylenes		0.00%
Naphthalene	0.12	0.00%
1-Methyl Naphthalene	0.25	0.00%
2-Methyl Naphthalene	0.33	0.00%
n-Hexane		0.00%
MTBE		0.00%
Ethylene Dibromide (EDB)		0.00%
1,2 Dichloroethane (EDC)		0.00%
Benzo(a)anthracene		0.00%
Benzo(b)fluoranthene		0.00%
Benzo(k)fluoranthene		0.00%
Benzo(a)pyrene		0.00%
Chrysene		0.00%
Dibenz(a,h)anthracene		0.00%
Indeno(1,2,3-cd)pyrene		0.00%
Sum	13586.7	100.00%

Notes for Data Entry | Set Default Hydrogeology

Clear All Soil Concentration Data Entry Cells

Restore All Soil Concentration Data cleared previously

REMARK:
Non-detect values entered a blanks. When data values existed for a parameter, the higher detected result was used.

VPH was not analyzed; however, results from samples analyzed indicate that VPH compounds are not present at the Site. Therefore, zeros were used for the inputs.

Double counting was avoided.

cPAH results intentionally omitted from this workbook, as cPAH is not well correlated with TPH at this site. cPAH results are evaluated as their own COC group in the RI/FS

For Section 3, site-specific values for total soil porosity, volumetric water content, soil bulk density, and fraction of organic carbon were used.

For Section 4, adjusted groundwater concentration of 1,000 ug/L used.

3. Enter Site-Specific Hydrogeological Data

Total soil porosity:	0.32	Unitless
Volumetric water content:	0.13	Unitless
Volumetric air content:	0.19	Unitless
Soil bulk density measured:	1.8	kg/L
Fraction Organic Carbon:	0.006	Unitless
Dilution Factor:	20	Unitless

4. Target TPH Ground Water Concentation (if adjusted)

If you adjusted the target TPH ground water concentration, enter adjusted value here: 1000 ug/L

A2. 1C Worksheet for Calculating Soil Cleanup Levels for Protection of Human Health: (Soil Direct Contact Pathway)
Method C: Industrial Land Use (WAC 173-340-745)

Date: 2/9/2015
Site Name: POB-Harris
Sample Name: FS-29-3-4

Chemical of Concern or EC Group	Current Condition				Adjusted Condition			
	Measured Soil Conc @dry basis	HQ	RISK	Pass or Fail?	Soil Conc being tested	HQ	RISK	Pass or Fail?
	mg/kg	unitless	unitless		mg/kg	unitless	unitless	
Petroleum EC Fraction								
AL_EC >5-6	0				0.00E+00			
AL_EC >6-8	0				0.00E+00			
AL_EC >8-10	61	1.40E-03			1.79E+02	4.11E-03		
AL_EC >10-12	600	1.38E-02			1.76E+03	4.04E-02		
AL_EC >12-16	3400	1.70E-01			1.00E+04	5.00E-01		
AL_EC >16-21	4000	3.00E-03			1.18E+04	8.82E-03		
AL_EC >21-34	2100	1.58E-03			6.18E+03	4.63E-03		
AR_EC >8-10	2.7	1.86E-05			7.94E+00	5.46E-05		
AR_EC >10-12	42.88	1.47E-03			1.26E+02	4.33E-03		
AR_EC >12-16	559.42	1.68E-02			1.65E+03	4.94E-02		
AR_EC >16-21	2100	1.05E-01			6.18E+03	3.09E-01		
AR_EC >21-34	720	2.70E-02			2.12E+03	7.94E-02		
Benzene	0		0.00E+00		0.00E+00		0.00E+00	
Toluene	0				0.00E+00			
Ethylbenzene	0				0.00E+00			
Total Xylenes	0				0.00E+00			
Naphthalene	0.12	7.38E-06			3.53E-01	2.17E-05		
1-Methyl Naphthalene	0.25	2.81E-06			7.35E-01	8.27E-06		
2-Methyl Naphthalene	0.33	4.64E-05			9.70E-01	1.36E-04		
n-Hexane	0				0.00E+00	0.00E+00		
MTBE	0				0.00E+00			
Ethylene Dibromide (EDB)	0		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0		0.00E+00		0.00E+00		0.00E+00	
Benzo(b)fluoranthene	0		0.00E+00		0.00E+00		0.00E+00	
Benzo(k)fluoranthene	0		0.00E+00		0.00E+00		0.00E+00	
Benzo(a)pyrene	0		0.00E+00		0.00E+00		0.00E+00	
Chrysene	0		0.00E+00		0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00		0.00E+00		0.00E+00	
Indeno(1,2,3-cd)pyrene	0		0.00E+00		0.00E+00		0.00E+00	
Sum	**13586.7**	3.40E-01	0.00E+00		4.00E+04	1.00E+00	0.00E+00	

TEST CURRENT CONDITION

Measured TPH Soil Conc, mg/kg= 13586.700
HI= 3.401E-01
RISK= 0.000E+00
Pass or Fail? Pass
Check Residual Saturation (WAC340-747(10))

CALCULATE PROTECTIVE CONDITION

This tool allows the user to calculate protective TPH soil concentration based on various soil quality criteria. The Workbook uses the same composition ratio as for the measured data.

Calculate Protective TPH soil Conc

Selected Criterion: @HI=1
Most Stringent? YES

Protctive TPH Soil Conc, mg/kg = 39954.457
HI = 1.000E+00
RISK = 0.000E+00

Check Residual Saturation (WAC340-747(10))

TEST ADJUSTED CONDITION

This tool allows the user to test whether a particular TPH soil concentration is protective of human health. The Workbook uses the same composition ratio as for the measured data.

Test Adjusted TPH Soil Conc

Tested TPH Soil Conc, mg/kg=
HI=
RISK=
Pass or Fail?

A2. 2 Worksheet for Calculating Soil Cleanup Level for the Protection of Ground Water Quality (Leaching Pathway)
Washington State Department of Ecology, Toxics Cleanup Program Soil Cleanup Level for TPH Mixtures - Migration to Potable Ground Water

WAC 173-340-740 and 747

Date: 2/9/2015

Site Name: POB-Harris

Sample Name: FS-29-3-4

Chemical of Concern or EC Group	Measured Soil Conc @dry basis	GW Cleanup Level	Adjusted Condition: Soil Conc being tested	Predicted Conc @Well	HQ @ Well	RISK @ Well	Pass or Fail?
	mg/kg	ug/L	mg/kg	ug/L	unitless	unitless	
Petroleum EC Fraction							
AL_EC >5-6	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >6-8	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >8-10	61		4.01E+02	1.70E-01	7.07E-04		
AL_EC >10-12	600		3.94E+03	1.07E-01	4.47E-04		
AL_EC >12-16	3400		2.23E+04	1.09E-02	2.27E-05		
AL_EC >16-21	4000		2.63E+04	1.62E-05	5.06E-10		
AL_EC >21-34	2100		1.38E+04	6.63E-11	2.07E-15		
AR_EC >8-10	2.7		1.77E+01	1.22E+00	1.52E-03		
AR_EC >10-12	42.88		2.82E+02	6.89E+00	4.31E-02		
AR_EC >12-16	559.42		3.68E+03	1.82E+01	2.27E-02		
AR_EC >16-21	2100		1.38E+04	4.74E+00	9.88E-03		
AR_EC >21-34	720		4.73E+03	1.67E-02	2.61E-05		
Benzene	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Toluene	0	1000	0.00E+00	0.00E+00	0.00E+00		
Ethylbenzene	0	700	0.00E+00	0.00E+00	0.00E+00		
Total Xylenes	0	1000	0.00E+00	0.00E+00	0.00E+00		
Naphthalene	0.12	160	7.89E-01	2.44E-02	1.52E-04		
1-Methyl Naphthalene	0.25		1.64E+00	3.67E-02	9.18E-05		
2-Methyl Naphthalene	0.33		2.17E+00	4.77E-02	1.49E-03		
n-Hexane	0		0.00E+00	0.00E+00	0.00E+00		
MTBE	0	20	0.00E+00	0.00E+00	0.00E+00		
Ethylene Dibromide (EDB)	0	0.01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0	for	0.00E+00	0.00E+00		0.00E+00	for
Benzo(b)fluoranthene	0	all	0.00E+00	0.00E+00		0.00E+00	all
Benzo(k)fluoranthene	0	cPAHs	0.00E+00	0.00E+00		0.00E+00	cPAHs
Benzo(a)pyrene	0	Risk=	0.00E+00	0.00E+00		0.00E+00	
Chrysene	0	1E-05	0.00E+00	0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0		0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	13586.7		8.93E+04	3.14E+01	8.01E-02	0.00E+00	Pass

Site-Specific Hydrogeological Properties previously entered:

Item	Symbol	Value	Units
Total soil porosity:	n	0.32	unitless
Volumetric water content:	Θ_w	0.13	unitless
Volumetric air content:	Θ_a	0.19	unitless
Soil bulk density measured:	ρ_b	1.8	kg/L
Fraction Organic Carbon:	f_{oc}	0.006	unitless
Dilution Factor:	DF	20	unitless

Target Ground Water TPH conc adjusted previously if any:

Target Ground Water TPH Conc, ug/L ⇒ 1000

CALCULATE PROTECTIVE CONDITION OR TEST ADJUSTED CONDITION

Calculate or Test

@ HI=1

Pass or Fail? YES

Tested TPH Soil Conc, mg/kg = **100% NAPL**

Predicted TPH GW Conc, ug/L = 3.14E+01

RISK @ Well = 0.00E+00

HI @Well = 8.01E-02

DEDAILED MODEL RESULTS

Type of model used for computation:	4-Phase Model
Computation completed?	Yes!
Initial Weighted Average MW of NAPL, g/mol:	228.6
Equilibrated Weighted Average MW of NAPL, g/mol:	228.7
Initial Weighted Average Density of NAPL, kg/L:	0.846
Volumetric NAPL Content, Θ_{NAPL} :	1.9E-01
NAPL Saturation (%), Θ_{NAPL}/n :	59.34%
100% NAPL, mg/kg	89296.2

Mass Distribution Pattern @ 4-phase in soil pore system:

Total Mass distributed in Water Phase: 0.00% in Solid: 0.06%

Total Mass distributed in Air Phase: 0.00% in NAPL: 99.94%

Please Check Soil Residual Saturation TPH Levels: Refer to Table 747-5!

A2. 2 Worksheet for Calculating Soil Cleanup Level for the Protection of Ground Water Quality: (Leaching Pathway)

WAC 173-340-740 and 747

Date: 2/9/2015

Site Name: POB-Harris

Sample Name: FS-29-3-4

Chemical of Concern or EC Group	Measured Soil Conc @dry basis	GW Cleanup Level	Adjusted Condition				
			Soil Conc being tested	Predicted Conc @Well	HQ @ Well	RISK @ Well	Pass or Fail?
	mg/kg	ug/L	mg/kg	ug/L	unitless	unitless	
Petroleum EC Fraction							
AL_EC >5-6	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >6-8	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >8-10	61		4.01E+02	1.70E-01	7.07E-04		
AL_EC >10-12	600		3.94E+03	1.07E-01	4.47E-04		
AL_EC >12-16	3400		2.23E+04	1.09E-02	2.27E-05		
AL_EC >16-21	4000		2.63E+04	1.62E-05	5.06E-10		
AL_EC >21-34	2100		1.38E+04	6.63E-11	2.07E-15		
AR_EC >8-10	2.7		1.77E+01	1.22E+00	1.52E-03		
AR_EC >10-12	42.88		2.82E+02	6.89E+00	4.31E-02		
AR_EC >12-16	559.42		3.68E+03	1.82E+01	2.27E-02		
AR_EC >16-21	2100		1.38E+04	4.74E+00	9.88E-03		
AR_EC >21-34	720		4.73E+03	1.67E-02	2.61E-05		
Benzene	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Toluene	0	1000	0.00E+00	0.00E+00	0.00E+00		
Ethylbenzene	0	700	0.00E+00	0.00E+00	0.00E+00		
Total Xylenes	0	1000	0.00E+00	0.00E+00	0.00E+00		
Naphthalene	0.12	160	7.89E-01	2.44E-02	1.52E-04		
1-Methyl Naphthalene	0.25		1.64E+00	3.67E-02	9.18E-05		
2-Methyl Naphthalene	0.33		2.17E+00	4.77E-02	1.49E-03		
n-Hexane	0		0.00E+00	0.00E+00	0.00E+00		
MTBE	0	20	0.00E+00	0.00E+00	0.00E+00		
Ethylene Dibromide (EDB)	0	0.01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0	for	0.00E+00	0.00E+00		0.00E+00	for
Benzo(b)fluoranthene	0	all	0.00E+00	0.00E+00		0.00E+00	all
Benzo(k)fluoranthene	0	cPAHs	0.00E+00	0.00E+00		0.00E+00	cPAHs
Benzo(a)pyrene	0	Risk=	0.00E+00	0.00E+00		0.00E+00	
Chrysene	0	1E-05	0.00E+00	0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0		0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	13586.7		8.93E+04	3.14E+01	8.01E-02	0.00E+00	Pass

Site-Specific Hydrogeological Properties previously entered:

Item	Symbol	Value	Units
Total soil porosity:	n	0.32	unitless
Volumetric water content:	Θ_w	0.13	unitless
Volumetric air content:	Θ_a	0.19	unitless
Soil bulk density measured:	ρ_b	1.8	kg/L
Fraction Organic Carbon:	f_{oc}	0.006	unitless
Dilution Factor:	DF	20	unitless

Target Ground Water TPH conc adjusted previously if any:

Target Ground Water TPH Conc, ug/L ⇒ 1000

CALCULATE PROTECTIVE CONDITION OR TEST ADJUSTED CONDITION

Calculate or Test

@ Protection of Surface Water Quality

Pass or Fail? NA

Tested TPH Soil Conc, mg/kg = **100% NAPL**

Predicted TPH GW Conc, ug/L = 3.14E+01

RISK @ Well = NA

HI @Well = NA

DEDAILED MODEL RESULTS

Type of model used for computation:	4-Phase Model
Computation completed?	Yes!
Initial Weighted Average MW of NAPL, g/mol:	228.6
Equilibrated Weighted Average MW of NAPL, g/mol:	228.7
Initial Weighted Average Density of NAPL, kg/L:	0.846
Volumetric NAPL Content, Θ_{NAPL} :	1.9E-01
NAPL Saturation (%), Θ_{NAPL}/n :	59.34%
100% NAPL, mg/kg	89296.2

Mass Distribution Pattern @ 4-phase in soil pore system:

Total Mass distributed in Water Phase: 0.00% in Solid: 0.06%

Total Mass distributed in Air Phase: 0.00% in NAPL: 99.94%

Please Check Soil Residual Saturation TPH Levels: Refer to Table 747-5!

A2.3 Worksheet for Calculating Soil Cleanup Levels for the Protection of Air Quality: (Vapor Pathway)
Method B: WAC 173-340-740 and 750

Date: 2/9/2015
Site Name: POB-Harris
Sample Name: FS-29-3-4

Warning: This Worksheet is provided for informational purposes only! Background levels entered are not considered for the calculations.

Chemical of Concern or EC Group	Measured Soil Conc @dry basis	Enter Air Background Levels	Adjusted Condition: Soil Conc being tested	Adjusted Condition: Predicted Indoor Air Conc	Adjusted Condition: HQ @ Indoor Air	Adjusted Condition: RISK @ Indoor Air	Pass or Fail?
	mg/kg	ug/m^3	mg/kg	ug/m^3	unitless	unitless	
Petroleum EC Fraction							
AL_EC >5-6	0	40	0.00E+00	0.00E+00	0.00E+00		
AL_EC >6-8	0	40	0.00E+00	0.00E+00	0.00E+00		
AL_EC >8-10	61	40	6.06E+01	2.70E+02	1.99E+00		
AL_EC >10-12	600	40	5.96E+02	2.57E+02	1.89E+00		
AL_EC >12-16	3400	0	3.38E+03	1.13E+02	8.33E-01		
AL_EC >16-21	4000	0	3.97E+03	1.59E+00	0.00E+00		
AL_EC >21-34	2100	0	2.09E+03	1.33E-04	0.00E+00		
AR_EC >8-10	2.7	40	2.68E+00	1.09E+01	5.98E-02		
AR_EC >10-12	42.88	40	4.26E+01	1.86E+01	1.35E+01		
AR_EC >12-16	559.42	0	5.56E+02	1.90E+01	2.38E-01		
AR_EC >16-21	2100	0	2.09E+03	1.23E+00	0.00E+00		
AR_EC >21-34	720	0	7.15E+02	2.24E-04	0.00E+00		
Benzene	0	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Toluene	0	15	0.00E+00	0.00E+00	0.00E+00		
Ethylbenzene	0	5	0.00E+00	0.00E+00	0.00E+00		
Total Xylenes	0	36	0.00E+00	0.00E+00	0.00E+00		
Naphthalene	0.12	2.5	1.19E-01	9.45E-03	6.87E-03		
1-Methyl Naphthalene	0.25	5	2.48E-01	1.48E-02	1.85E-04		
2-Methyl Naphthalene	0.33	5	3.28E-01	1.94E-02	1.41E-02		
n-Hexane	0	1	0.00E+00	0.00E+00	0.00E+00		
MTBE	0	10	0.00E+00	0.00E+00	0.00E+00		
Ethylene Dibromide (EDB)	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0	0	0.00E+00	0.00E+00		0.00E+00	for
Benzo(b)fluoranthene	0	0	0.00E+00	0.00E+00		0.00E+00	all
Benzo(k)fluoranthene	0	0	0.00E+00	0.00E+00		0.00E+00	cPAHs
Benzo(a)pyrene	0	0	0.00E+00	0.00E+00		0.00E+00	
Chrysene	0	0	0.00E+00	0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0	0	0.00E+00	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0	0	0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	13586.7		1.35E+04	6.92E+02	1.85E+01	0.00E+00	***Fail***

Enter Vapor Attenuation Factor for all TPH components:	0.001

Site-Specific Hydrogeological Properties previously entered:

Item	Symbol	Value	Units
Total soil porosity: default is 0.43	n	0.32	unitless
Volumetric water content: default is 0.3	Θ_w	0.13	unitless
Initial volumetric air content: default is 0.13	Θ_a	0.19	unitless
Soil bulk density measured: default is 1.5	ρ_b	1.8	kg/L
Fraction Organic Carbon: default is 0.001	f_{oc}	0.006	unitless

TEST ADJUSTED CONDITION

This tool allows the user to test whether a particular TPH soil concentration is protective of indoor air quality. The Workbook uses the same composition ratio as for the measured data and the same hydrogeological data and vapor attenuation factor previously entered by the user.

Test Adjusted TPH Soil Conc

Pass or Fail? *Fail*

Tested TPH Soil Conc, mg/kg = 13500

Predicted TPH Indoor Air Conc, ug/m^3 = 6.92E+02

RISK @ Indoor Air = 0.00E+00

HI @ Indoor Air = 1.85E+01

Type of model used for computation: 4-Phase Model

Computation completed? Yes!

Note: Source of Default Air Background Level:
"Characterizing risk posed by Petroleum Contaminated Sites: Implementation of MADEP VPH/EPH Approach", *Petroleum Equivalent Carbon Fractions: State of Massachusetts, Department of Environmental Protection, 10/21/2002, Policy # WSC02-411

*Benzene and n-Hexane: Washington State Department of Ecology, 1997, "Memorandum: Washington State Air Toxic Monitoring Data Documentation"

A1 Soil Cleanup Levels: Worksheet for Soil Data Entry: Refer to WAC 173-340-720, 740,745, 747, 750

1. Enter Site Information

Date: 02/08/15
Site Name: POB-Harris
Sample Name: FS-42-10-10.5

2. Enter Soil Concentration Measured

Chemical of Concern or Equivalent Carbon Group	Measured Soil Conc dry basis	Composition Ratio
	mg/kg	%
Petroleum EC Fraction		
AL_EC >5-6		0.00%
AL_EC >6-8		0.00%
AL_EC >8-10		0.00%
AL_EC >10-12	12	6.19%
AL_EC >12-16	77	39.69%
AL_EC >16-21	85	43.81%
AL_EC >21-34	20	10.31%
AR_EC >8-10		0.00%
AR_EC >10-12		0.00%
AR_EC >12-16		0.00%
AR_EC >16-21		0.00%
AR_EC >21-34		0.00%
Benzene		0.00%
Toluene		0.00%
Ethylbenzene		0.00%
Total Xylenes		0.00%
Naphthalene		0.00%
1-Methyl Naphthalene		0.00%
2-Methyl Naphthalene		0.00%
n-Hexane		0.00%
MTBE		0.00%
Ethylene Dibromide (EDB)		0.00%
1,2 Dichloroethane (EDC)		0.00%
Benzo(a)anthracene		0.00%
Benzo(b)fluoranthene		0.00%
Benzo(k)fluoranthene		0.00%
Benzo(a)pyrene		0.00%
Chrysene		0.00%
Dibenz(a,h)anthracene		0.00%
Indeno(1,2,3-cd)pyrene		0.00%
Sum	194	100.00%

Notes for Data Entry | Set Default Hydrogeology

Clear All Soil Concentration Data Entry Cells

Restore All Soil Concentration Data cleared previously

REMARK:
Non-detect values entered a blanks. When data values existed for a parameter, the higher detected result was used.

cPAH results intentionally omitted from this workbook, as cPAH is not well correlated with TPH at this site. cPAH results are evaluated as their own COC group in the RI/FS

For Section 3, site-specific values for total soil porosity, volumetric water content, soil bulk density, and fraction of organic carbon were used.

For Section 4, adjusted groundwater concentration of 1,000 ug/L used.

3. Enter Site-Specific Hydrogeological Data

Total soil porosity:	0.32	Unitless
Volumetric water content:	0.13	Unitless
Volumetric air content:	0.19	Unitless
Soil bulk density measured:	1.8	kg/L
Fraction Organic Carbon:	0.006	Unitless
Dilution Factor:	20	Unitless

4. Target TPH Ground Water Concentation (if adjusted)

If you adjusted the target TPH ground water concentration, enter adjusted value here:	1000	ug/L

A2. 1C Worksheet for Calculating Soil Cleanup Levels for Protection of Human Health: (Soil Direct Contact Pathway)
Method C: Industrial Land Use (WAC 173-340-745)

Date: 2/8/2015
Site Name: POB-Harris
Sample Name: FS-42-10-10.5

Chemical of Concern or EC Group	Current Condition				Adjusted Condition			
	Measured Soil Conc @dry basis	HQ	RISK	Pass or Fail?	Soil Conc being tested	HQ	RISK	Pass or Fail?
	mg/kg	unitless	unitless		mg/kg	unitless	unitless	
Petroleum EC Fraction								
AL_EC >5-6	0				0.00E+00			
AL_EC >6-8	0				0.00E+00			
AL_EC >8-10	0				0.00E+00			
AL_EC >10-12	12	2.75E-04			2.85E+03	6.54E-02		
AL_EC >12-16	77	3.85E-03			1.83E+04	9.16E-01		
AL_EC >16-21	85	6.38E-05			2.02E+04	1.52E-02		
AL_EC >21-34	20	1.50E-05			4.76E+03	3.57E-03		
AR_EC >8-10	0				0.00E+00			
AR_EC >10-12	0				0.00E+00			
AR_EC >12-16	0				0.00E+00			
AR_EC >16-21	0				0.00E+00			
AR_EC >21-34	0				0.00E+00			
Benzene	0		0.00E+00		0.00E+00		0.00E+00	
Toluene	0				0.00E+00			
Ethylbenzene	0				0.00E+00			
Total Xylenes	0				0.00E+00			
Naphthalene	0				0.00E+00	0.00E+00		
1-Methyl Naphthalene	0				0.00E+00	0.00E+00		
2-Methyl Naphthalene	0				0.00E+00	0.00E+00		
n-Hexane	0				0.00E+00	0.00E+00		
MTBE	0				0.00E+00			
Ethylene Dibromide (EDB)	0		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0		0.00E+00		0.00E+00		0.00E+00	
Benzo(b)fluoranthene	0		0.00E+00		0.00E+00		0.00E+00	
Benzo(k)fluoranthene	0		0.00E+00		0.00E+00		0.00E+00	
Benzo(a)pyrene	0		0.00E+00		0.00E+00		0.00E+00	
Chrysene	0		0.00E+00		0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00		0.00E+00		0.00E+00	
Indeno(1,2,3-cd)pyrene	0		0.00E+00		0.00E+00		0.00E+00	
Sum	**194**	4.20E-03	0.00E+00		4.61E+04	1.00E+00	0.00E+00	

TEST CURRENT CONDITION

Measured TPH Soil Conc, mg/kg= 194.000
HI= 4.204E-03
RISK= 0.000E+00
Pass or Fail? Pass

CALCULATE PROTECTIVE CONDITION

This tool allows the user to calculate protective TPH soil concentration based on various soil quality criteria. The Workbook uses the same composition ratio as for the measured data.

Calculate Protective TPH soil Conc

Selected Criterion: @HI=1
Most Stringent? YES

Protctive TPH Soil Conc, mg/kg = 46149.271
HI = 1.000E+00
RISK = 0.000E+00

Check Residual Saturation (WAC340-747(10))

TEST ADJUSTED CONDITION

This tool allows the user to test whether a particular TPH soil concentration is protective of human health. The Workbook uses the same composition ratio as for the measured data.

Test Adjusted TPH Soil Conc

Tested TPH Soil Conc, mg/kg=
HI=
RISK=
Pass or Fail?

A2. 2 Worksheet for Calculating Soil Cleanup Level for the Protection of Ground Water Quality (Leaching Pathway)
Washington State Department of Ecology, Toxics Cleanup Program Soil Cleanup Level for TPH Mixtures - Migration to Potable Ground Water

WAC 173-340-740 and 747

Date: 2/8/2015

Site Name: POB-Harris

Sample Name: FS-42-10-10.5

Chemical of Concern or EC Group	Measured Soil Conc @dry basis	GW Cleanup Level	Adjusted Condition: Soil Conc being tested	Predicted Conc @Well	HQ @ Well	RISK @ Well	Pass or Fail?
	mg/kg	ug/L	mg/kg	ug/L	unitless	unitless	
Petroleum EC Fraction							
AL_EC >5-6	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >6-8	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >8-10	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >10-12	12		5.06E+03	1.55E-01	6.44E-04		
AL_EC >12-16	77		3.25E+04	1.77E-02	3.70E-05		
AL_EC >16-21	85		3.58E+04	2.48E-05	7.75E-10		
AL_EC >21-34	20		8.43E+03	4.55E-11	1.42E-15		
AR_EC >8-10	0		0.00E+00	0.00E+00	0.00E+00		
AR_EC >10-12	0		0.00E+00	0.00E+00	0.00E+00		
AR_EC >12-16	0		0.00E+00	0.00E+00	0.00E+00		
AR_EC >16-21	0		0.00E+00	0.00E+00	0.00E+00		
AR_EC >21-34	0		0.00E+00	0.00E+00	0.00E+00		
Benzene	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Toluene	0	1000	0.00E+00	0.00E+00	0.00E+00		
Ethylbenzene	0	700	0.00E+00	0.00E+00	0.00E+00		
Total Xylenes	0	1000	0.00E+00	0.00E+00	0.00E+00		
Naphthalene	0	160	0.00E+00	0.00E+00	0.00E+00		
1-Methyl Naphthalene	0		0.00E+00	0.00E+00	0.00E+00		
2-Methyl Naphthalene	0		0.00E+00	0.00E+00	0.00E+00		
n-Hexane	0		0.00E+00	0.00E+00	0.00E+00		
MTBE	0	20	0.00E+00	0.00E+00	0.00E+00		
Ethylene Dibromide (EDB)	0	0.01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0	for	0.00E+00	0.00E+00		0.00E+00	for
Benzo(b)fluoranthene	0	all	0.00E+00	0.00E+00		0.00E+00	all
Benzo(k)fluoranthene	0	cPAHs	0.00E+00	0.00E+00		0.00E+00	cPAHs
Benzo(a)pyrene	0	Risk=	0.00E+00	0.00E+00		0.00E+00	
Chrysene	0	1E-05	0.00E+00	0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0		0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	194		8.18E+04	1.72E-01	6.81E-04	0.00E+00	Pass

Site-Specific Hydrogeological Properties previously entered:

Item	Symbol	Value	Units
Total soil porosity:	n	0.32	unitless
Volumetric water content:	Θ_w	0.13	unitless
Volumetric air content:	Θ_a	0.19	unitless
Soil bulk density measured:	ρ_b	1.8	kg/L
Fraction Organic Carbon:	f_{oc}	0.006	unitless
Dilution Factor:	DF	20	unitless

Target Ground Water TPH conc adjusted previously if any:

Target Ground Water TPH Conc, ug/L ⇒ 1000

CALCULATE PROTECTIVE CONDITION OR TEST ADJUSTED CONDITION

Calculate or Test

@ HI=1

Pass or Fail? YES

Tested TPH Soil Conc, mg/kg = **100% NAPL**

Predicted TPH GW Conc, ug/L = 1.72E-01

RISK @ Well = 0.00E+00

HI @Well = 6.81E-04

DEDAILED MODEL RESULTS

Type of model used for computation:	4-Phase Model	
Computation completed?	Yes!	
Initial Weighted Average MW of NAPL, g/mol:		235.2
Equilibrated Weighted Average MW of NAPL, g/mol:		235.2
Initial Weighted Average Density of NAPL, kg/L:		0.775
Volumetric NAPL Content, Θ_{NAPL} :		1.9E-01
NAPL Saturation (%), Θ_{NAPL}/n :		59.34%
100% NAPL, mg/kg		81815.9
Mass Distribution Pattern @ 4-phase in soil pore system:		
Total Mass distributed in Water Phase: 0.00%		in Solid: 0.05%
Total Mass distributed in Air Phase: 0.00%		in NAPL: 99.95%

Please Check Soil Residual Saturation TPH Levels: Refer to Table 747-5!

A2. 2 Worksheet for Calculating Soil Cleanup Level for the Protection of Ground Water Quality: (Leaching Pathway)

WAC 173-340-740 and 747

Date: 2/8/2015
Site Name: POB-Harris
Sample Name: FS-42-10-10.5

Chemical of Concern or EC Group	Measured Soil Conc @dry basis	GW Cleanup Level	Adjusted Condition				
			Soil Conc being tested	Predicted Conc @Well	HQ @ Well	RISK @ Well	Pass or Fail?
	mg/kg	ug/L	mg/kg	ug/L	unitless	unitless	
Petroleum EC Fraction							
AL_EC >5-6	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >6-8	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >8-10	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >10-12	12		5.06E+03	1.55E-01	6.44E-04		
AL_EC >12-16	77		3.25E+04	1.77E-02	3.70E-05		
AL_EC >16-21	85		3.58E+04	2.48E-05	7.75E-10		
AL_EC >21-34	20		8.43E+03	4.55E-11	1.42E-15		
AR_EC >8-10	0		0.00E+00	0.00E+00	0.00E+00		
AR_EC >10-12	0		0.00E+00	0.00E+00	0.00E+00		
AR_EC >12-16	0		0.00E+00	0.00E+00	0.00E+00		
AR_EC >16-21	0		0.00E+00	0.00E+00	0.00E+00		
AR_EC >21-34	0		0.00E+00	0.00E+00	0.00E+00		
Benzene	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Toluene	0	1000	0.00E+00	0.00E+00	0.00E+00		
Ethylbenzene	0	700	0.00E+00	0.00E+00	0.00E+00		
Total Xylenes	0	1000	0.00E+00	0.00E+00	0.00E+00		
Naphthalene	0	160	0.00E+00	0.00E+00	0.00E+00		
1-Methyl Naphthalene	0		0.00E+00	0.00E+00	0.00E+00		
2-Methyl Naphthalene	0		0.00E+00	0.00E+00	0.00E+00		
n-Hexane	0		0.00E+00	0.00E+00	0.00E+00		
MTBE	0	20	0.00E+00	0.00E+00	0.00E+00		
Ethylene Dibromide (EDB)	0	0.01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0	for	0.00E+00	0.00E+00		0.00E+00	for
Benzo(b)fluoranthene	0	all	0.00E+00	0.00E+00		0.00E+00	all
Benzo(k)fluoranthene	0	cPAHs	0.00E+00	0.00E+00		0.00E+00	cPAHs
Benzo(a)pyrene	0	Risk=	0.00E+00	0.00E+00		0.00E+00	
Chrysene	0	1E-05	0.00E+00	0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0		0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	194		8.18E+04	1.72E-01	6.81E-04	0.00E+00	Pass

Site-Specific Hydrogeological Properties previously entered:

Item	Symbol	Value	Units
Total soil porosity:	n	0.32	unitless
Volumetric water content:	Θ_w	0.13	unitless
Volumetric air content:	Θ_a	0.19	unitless
Soil bulk density measured:	ρ_b	1.8	kg/L
Fraction Organic Carbon:	f_{oc}	0.006	unitless
Dilution Factor:	DF	20	unitless

Target Ground Water TPH conc adjusted previously if any:

Target Ground Water TPH Conc, ug/L ⇒ 1000

CALCULATE PROTECTIVE CONDITION OR TEST ADJUSTED CONDITION

Calculate or Test

@ Protection of Surface Water Quality

Pass or Fail? NA

Tested TPH Soil Conc, mg/kg = **100% NAPL**

Predicted TPH GW Conc, ug/L = 1.72E-01

RISK @ Well = NA

HI @Well = NA

DEDAILED MODEL RESULTS

Type of model used for computation:	4-Phase Model	
Computation completed?	Yes!	
Initial Weighted Average MW of NAPL, g/mol:		235.2
Equilibrated Weighted Average MW of NAPL, g/mol:		235.2
Initial Weighted Average Density of NAPL, kg/L:		0.775
Volumetric NAPL Content, Θ_{NAPL} :		1.9E-01
NAPL Saturation (%), Θ_{NAPL}/n :		59.34%
100% NAPL, mg/kg		81815.9
Mass Distribution Pattern @ 4-phase in soil pore system:		
Total Mass distributed in Water Phase: 0.00%		in Solid: 0.05%
Total Mass distributed in Air Phase: 0.00%		in NAPL: 99.95%

Please Check Soil Residual Saturation TPH Levels: Refer to Table 747-5!

A2.3 Worksheet for Calculating Soil Cleanup Levels for the Protection of Air Quality: (Vapor Pathway)
Method B: WAC 173-340-740 and 750

Date: 2/8/2015
Site Name: POB-Harris
Sample Name: FS-42-10-10.5

Warning: This Worksheet is provided for informational purposes only! Background levels entered are not considered for the calculations.

Chemical of Concern or EC Group	Measured Soil Conc @dry basis	Enter Air Background Levels	Adjusted Condition: Soil Conc being tested	Adjusted Condition: Predicted Indoor Air Conc	Adjusted Condition: HQ @ Indoor Air	Adjusted Condition: RISK @ Indoor Air	Pass or Fail?
	mg/kg	ug/m^3	mg/kg	ug/m^3	unitless	unitless	
Petroleum EC Fraction							
AL_EC >5-6	0	40	0.00E+00	0.00E+00	0.00E+00		
AL_EC >6-8	0	40	0.00E+00	0.00E+00	0.00E+00		
AL_EC >8-10	0	40	0.00E+00	0.00E+00	0.00E+00		
AL_EC >10-12	12	40	1.20E+01	3.23E+02	2.38E+00		
AL_EC >12-16	77	0	7.70E+01	1.98E+02	1.46E+00		
AL_EC >16-21	85	0	8.50E+01	2.18E+00	0.00E+00		
AL_EC >21-34	20	0	2.00E+01	1.16E-04	0.00E+00		
AR_EC >8-10	0	40	0.00E+00	0.00E+00	0.00E+00		
AR_EC >10-12	0	40	0.00E+00	0.00E+00	0.00E+00		
AR_EC >12-16	0	0	0.00E+00	0.00E+00	0.00E+00		
AR_EC >16-21	0	0	0.00E+00	0.00E+00	0.00E+00		
AR_EC >21-34	0	0	0.00E+00	0.00E+00	0.00E+00		
Benzene	0	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Toluene	0	15	0.00E+00	0.00E+00	0.00E+00		
Ethylbenzene	0	5	0.00E+00	0.00E+00	0.00E+00		
Total Xylenes	0	36	0.00E+00	0.00E+00	0.00E+00		
Naphthalene	0	2.5	0.00E+00	0.00E+00	0.00E+00		
1-Methyl Naphthalene	0	5	0.00E+00	0.00E+00	0.00E+00		
2-Methyl Naphthalene	0	5	0.00E+00	0.00E+00	0.00E+00		
n-Hexane	0	1	0.00E+00	0.00E+00	0.00E+00		
MTBE	0	10	0.00E+00	0.00E+00	0.00E+00		
Ethylene Dibromide (EDB)	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0	0	0.00E+00	0.00E+00		0.00E+00	for
Benzo(b)fluoranthene	0	0	0.00E+00	0.00E+00		0.00E+00	all
Benzo(k)fluoranthene	0	0	0.00E+00	0.00E+00		0.00E+00	cPAHs
Benzo(a)pyrene	0	0	0.00E+00	0.00E+00		0.00E+00	
Chrysene	0	0	0.00E+00	0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0	0	0.00E+00	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0	0	0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	194		1.94E+02	5.24E+02	3.84E+00	0.00E+00	***Fail***

Enter Vapor Attenuation Factor for all TPH components:	0.001

Site-Specific Hydrogeological Properties previously entered:

Item	Symbol	Value	Units
Total soil porosity: default is 0.43	n	0.32	unitless
Volumetric water content: default is 0.3	Θ_w	0.13	unitless
Initial volumetric air content: default is 0.13	Θ_a	0.19	unitless
Soil bulk density measured: default is 1.5	ρ_b	1.8	kg/L
Fraction Organic Carbon: default is 0.001	f_{oc}	0.006	unitless

TEST ADJUSTED CONDITION

This tool allows the user to test whether a particular TPH soil concentration is protective of indoor air quality. The Workbook uses the same composition ratio as for the measured data and the same hydrogeological data and vapor attenuation factor previously entered by the user.

Test Adjusted TPH Soil Conc

Pass or Fail?	*Fail*
Tested TPH Soil Conc, mg/kg =	194
Predicted TPH Indoor Air Conc, ug/m^3 =	5.24E+02
RISK @ Indoor Air =	0.00E+00
HI @ Indoor Air =	3.84E+00
Type of model used for computation:	4-Phase Model
Computation completed?	Yes!

Note: Source of Default Air Background Level:
"Characterizing risk posed by Petroleum Contaminated Sites: Implementation of MADEP VPH/EPH Approach", *Petroleum Equivalent Carbon Fractions: State of Massachusetts, Department of Environmental Protection, 10/21/2002, Policy # WSC02-411

*Benzene and n-Hexane: Washington State Department of Ecology, 1997, "Memorandum: Washington State Air Toxic Monitoring Data Documentation"

A1 Soil Cleanup Levels: Worksheet for Soil Data Entry: Refer to WAC 173-340-720, 740,745, 747, 750

1. Enter Site Information

Date: 02/09/15
Site Name: POB-Harris
Sample Name: MW-11-6-7

2. Enter Soil Concentration Measured

Chemical of Concern or Equivalent Carbon Group	Measured Soil Conc dry basis	Composition Ratio
	mg/kg	%
Petroleum EC Fraction		
AL_EC >5-6		0.00%
AL_EC >6-8		0.00%
AL_EC >8-10		0.00%
AL_EC >10-12		0.00%
AL_EC >12-16	4.4	10.05%
AL_EC >16-21	15	34.25%
AL_EC >21-34	18	41.10%
AR_EC >8-10		0.00%
AR_EC >10-12		0.00%
AR_EC >12-16		0.00%
AR_EC >16-21	4.1	9.36%
AR_EC >21-34	2.3	5.25%
Benzene		0.00%
Toluene		0.00%
Ethylbenzene		0.00%
Total Xylenes		0.00%
Naphthalene		0.00%
1-Methyl Naphthalene		0.00%
2-Methyl Naphthalene		0.00%
n-Hexane		0.00%
MTBE		0.00%
Ethylene Dibromide (EDB)		0.00%
1,2 Dichloroethane (EDC)		0.00%
Benzo(a)anthracene		0.00%
Benzo(b)fluoranthene		0.00%
Benzo(k)fluoranthene		0.00%
Benzo(a)pyrene		0.00%
Chrysene		0.00%
Dibenz(a,h)anthracene		0.00%
Indeno(1,2,3-cd)pyrene		0.00%
Sum	43.8	100.00%

Notes for Data Entry | Set Default Hydrogeology

Clear All Soil Concentration Data Entry Cells

Restore All Soil Concentration Data cleared previously

REMARK:
Non-detect values entered a blanks. When data values existed for a parameter, the higher detected result was used.

cPAH results intentionally omitted from this workbook, as cPAH is not well correlated with TPH at this site. cPAH results are evaluated as their own COC group in the RI/FS

For Section 3, site-specific values for total soil porosity, volumetric water content, soil bulk density, and fraction of organic carbon were used.

For Section 4, adjusted groundwater concentration of 1,000 ug/L used.

3. Enter Site-Specific Hydrogeological Data

Total soil porosity:	0.32	Unitless
Volumetric water content:	0.13	Unitless
Volumetric air content:	0.19	Unitless
Soil bulk density measured:	1.8	kg/L
Fraction Organic Carbon:	0.006	Unitless
Dilution Factor:	20	Unitless

4. Target TPH Ground Water Concentation (if adjusted)

If you adjusted the target TPH ground water concentration, enter adjusted value here: 1000 ug/L

A2. 1C Worksheet for Calculating Soil Cleanup Levels for Protection of Human Health: (Soil Direct Contact Pathway)
Method C: Industrial Land Use (WAC 173-340-745)

Date: 2/9/2015
Site Name: POB-Harris
Sample Name: MW-11-6-7

Chemical of Concern or EC Group	Current Condition				Adjusted Condition			
	Measured Soil Conc @dry basis	HQ	RISK	Pass or Fail?	Soil Conc being tested	HQ	RISK	Pass or Fail?
	mg/kg	unitless	unitless		mg/kg	unitless	unitless	
Petroleum EC Fraction								
AL_EC >5-6	0				0.00E+00			
AL_EC >6-8	0				0.00E+00			
AL_EC >8-10	0				0.00E+00			
AL_EC >10-12	0				0.00E+00			
AL_EC >12-16	4.4	2.20E-04			8.21E+03	4.10E-01		
AL_EC >16-21	15	1.13E-05			2.80E+04	2.10E-02		
AL_EC >21-34	18	1.35E-05			3.36E+04	2.52E-02		
AR_EC >8-10	0				0.00E+00			
AR_EC >10-12	0				0.00E+00			
AR_EC >12-16	0				0.00E+00			
AR_EC >16-21	4.1	2.05E-04			7.65E+03	3.82E-01		
AR_EC >21-34	2.3	8.63E-05			4.29E+03	1.61E-01		
Benzene	0		0.00E+00		0.00E+00		0.00E+00	
Toluene	0				0.00E+00			
Ethylbenzene	0				0.00E+00			
Total Xylenes	0				0.00E+00			
Naphthalene	0				0.00E+00	0.00E+00		
1-Methyl Naphthalene	0				0.00E+00	0.00E+00		
2-Methyl Naphthalene	0				0.00E+00	0.00E+00		
n-Hexane	0				0.00E+00	0.00E+00		
MTBE	0				0.00E+00			
Ethylene Dibromide (EDB)	0		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0		0.00E+00		0.00E+00		0.00E+00	
Benzo(b)fluoranthene	0		0.00E+00		0.00E+00		0.00E+00	
Benzo(k)fluoranthene	0		0.00E+00		0.00E+00		0.00E+00	
Benzo(a)pyrene	0		0.00E+00		0.00E+00		0.00E+00	
Chrysene	0		0.00E+00		0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00		0.00E+00		0.00E+00	
Indeno(1,2,3-cd)pyrene	0		0.00E+00		0.00E+00		0.00E+00	
Sum	**43.8**	5.36E-04	0.00E+00		8.17E+04	1.00E+00	0.00E+00	

TEST CURRENT CONDITION

Measured TPH Soil Conc, mg/kg= 43.800
HI= 5.360E-04
RISK= 0.000E+00
Pass or Fail? Pass

CALCULATE PROTECTIVE CONDITION

This tool allows the user to calculate protective TPH soil concentration based on various soil quality criteria. The Workbook uses the same composition ratio as for the measured data.

Calculate Protective TPH soil Conc

Selected Criterion: @HI=1
Most Stringent? YES

Protctive TPH Soil Conc, mg/kg = 81716.418
HI = 1.000E+00
RISK = 0.000E+00

Check Residual Saturation (WAC340-747(10))

TEST ADJUSTED CONDITION

This tool allows the user to test whether a particular TPH soil concentration is protective of human health. The Workbook uses the same composition ratio as for the measured data.

Test Adjusted TPH Soil Conc

Tested TPH Soil Conc, mg/kg=
HI=
RISK=
Pass or Fail?

A2. 2 Worksheet for Calculating Soil Cleanup Level for the Protection of Ground Water Quality: (Leaching Pathway)

WAC 173-340-740 and 747

Date: 2/9/2015
Site Name: POB-Harris
Sample Name: MW-11-6-7

Chemical of Concern or EC Group	Measured Soil Conc @dry basis	GW Cleanup Level	Adjusted Condition				
			Soil Conc being tested	Predicted Conc @Well	HQ @ Well	RISK @ Well	Pass or Fail?
	mg/kg	ug/L	mg/kg	ug/L	unitless	unitless	
Petroleum EC Fraction							
AL_EC >5-6	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >6-8	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >8-10	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >10-12	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >12-16	4.4		8.76E+03	5.44E-03	1.13E-05		
AL_EC >16-21	15		2.99E+04	2.35E-05	7.34E-10		
AL_EC >21-34	18		3.58E+04	2.20E-10	6.86E-15		
AR_EC >8-10	0		0.00E+00	0.00E+00	0.00E+00		
AR_EC >10-12	0		0.00E+00	0.00E+00	0.00E+00		
AR_EC >12-16	0		0.00E+00	0.00E+00	0.00E+00		
AR_EC >16-21	4.1		8.16E+03	3.58E+00	7.46E-03		
AR_EC >21-34	2.3		4.58E+03	2.06E-02	3.22E-05		
Benzene	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Toluene	0	1000	0.00E+00	0.00E+00	0.00E+00		
Ethylbenzene	0	700	0.00E+00	0.00E+00	0.00E+00		
Total Xylenes	0	1000	0.00E+00	0.00E+00	0.00E+00		
Naphthalene	0	160	0.00E+00	0.00E+00	0.00E+00		
1-Methyl Naphthalene	0		0.00E+00	0.00E+00	0.00E+00		
2-Methyl Naphthalene	0		0.00E+00	0.00E+00	0.00E+00		
n-Hexane	0		0.00E+00	0.00E+00	0.00E+00		
MTBE	0	20	0.00E+00	0.00E+00	0.00E+00		
Ethylene Dibromide (EDB)	0	0.01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0	for	0.00E+00	0.00E+00		0.00E+00	for
Benzo(b)fluoranthene	0	all	0.00E+00	0.00E+00		0.00E+00	all
Benzo(k)fluoranthene	0	cPAHs	0.00E+00	0.00E+00		0.00E+00	cPAHs
Benzo(a)pyrene	0	Risk=	0.00E+00	0.00E+00		0.00E+00	
Chrysene	0	1E-05	0.00E+00	0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0		0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	43.8		8.72E+04	3.60E+00	7.50E-03	0.00E+00	Pass

Site-Specific Hydrogeological Properties previously entered:

Item	Symbol	Value	Units
Total soil porosity:	n	0.32	unitless
Volumetric water content:	Θ_w	0.13	unitless
Volumetric air content:	Θ_a	0.19	unitless
Soil bulk density measured:	ρ_b	1.8	kg/L
Fraction Organic Carbon:	f_{oc}	0.006	unitless
Dilution Factor:	DF	20	unitless

Target Ground Water TPH conc adjusted previously if any:

Target Ground Water TPH Conc, ug/L ⇒ 1000

CALCULATE PROTECTIVE CONDITION OR TEST ADJUSTED CONDITION

Calculate or Test

@ HI=1
Pass or Fail? YES
Tested TPH Soil Conc, mg/kg = **100% NAPL**
Predicted TPH GW Conc, ug/L = 3.60E+00
RISK @ Well = 0.00E+00
HI @Well = 7.50E-03

DEDAILED MODEL RESULTS TPH Range Test

Type of model used for computation:	4-Phase Model	
Computation completed?	Yes!	
Initial Weighted Average MW of NAPL, g/mol:		284.9
Equilibrated Weighted Average MW of NAPL, g/mol:		285.0
Initial Weighted Average Density of NAPL, kg/L:		0.826
Volumetric NAPL Content, Θ_{NAPL} :		1.9E-01
NAPL Saturation (%), Θ_{NAPL}/n :		59.35%
100% NAPL, mg/kg		87177.5
Mass Distribution Pattern @ 4-phase in soil pore system:		Mass Balance Pattern
Total Mass distributed in Water Phase: 0.00%		in Solid: 0.04%
Total Mass distributed in Air Phase: 0.00%		in NAPL: 99.96%

Please Check Soil Residual Saturation TPH Levels: Refer to Table 747-5!

A2. 2 Worksheet for Calculating Soil Cleanup Level for the Protection of Ground Water Quality (Leaching Pathway)
WAC 173-340-740 and 747

Date: 2/9/2015
Site Name: POB-Harris
Sample Name: MW-11-6-7

Chemical of Concern or EC Group	Measured Soil Conc @dry basis	GW Cleanup Level	Adjusted Condition: Soil Conc being tested	Predicted Conc @Well	HQ @ Well	RISK @ Well	Pass or Fail?
	mg/kg	ug/L	mg/kg	ug/L	unitless	unitless	
Petroleum EC Fraction							
AL_EC >5-6	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >6-8	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >8-10	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >10-12	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >12-16	4.4		8.76E+03	5.44E-03	1.13E-05		
AL_EC >16-21	15		2.99E+04	2.35E-05	7.34E-10		
AL_EC >21-34	18		3.58E+04	2.20E-10	6.86E-15		
AR_EC >8-10	0		0.00E+00	0.00E+00	0.00E+00		
AR_EC >10-12	0		0.00E+00	0.00E+00	0.00E+00		
AR_EC >12-16	0		0.00E+00	0.00E+00	0.00E+00		
AR_EC >16-21	4.1		8.16E+03	3.58E+00	7.46E-03		
AR_EC >21-34	2.3		4.58E+03	2.06E-02	3.22E-05		
Benzene	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Toluene	0	1000	0.00E+00	0.00E+00	0.00E+00		
Ethylbenzene	0	700	0.00E+00	0.00E+00	0.00E+00		
Total Xylenes	0	1000	0.00E+00	0.00E+00	0.00E+00		
Naphthalene	0	160	0.00E+00	0.00E+00	0.00E+00		
1-Methyl Naphthalene	0		0.00E+00	0.00E+00	0.00E+00		
2-Methyl Naphthalene	0		0.00E+00	0.00E+00	0.00E+00		
n-Hexane	0		0.00E+00	0.00E+00	0.00E+00		
MTBE	0	20	0.00E+00	0.00E+00	0.00E+00		
Ethylene Dibromide (EDB)	0	0.01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0	for	0.00E+00	0.00E+00		0.00E+00	for
Benzo(b)fluoranthene	0	all	0.00E+00	0.00E+00		0.00E+00	all
Benzo(k)fluoranthene	0	cPAHs	0.00E+00	0.00E+00		0.00E+00	cPAHs
Benzo(a)pyrene	0	Risk=	0.00E+00	0.00E+00		0.00E+00	
Chrysene	0	1E-05	0.00E+00	0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0		0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	43.8		8.72E+04	3.60E+00	7.50E-03	0.00E+00	Pass

Site-Specific Hydrogeological Properties previously entered:

Item	Symbol	Value	Units
Total soil porosity:	n	0.32	unitless
Volumetric water content:	Θ_w	0.13	unitless
Volumetric air content:	Θ_a	0.19	unitless
Soil bulk density measured:	ρ_b	1.8	kg/L
Fraction Organic Carbon:	f_{oc}	0.006	unitless
Dilution Factor:	DF	20	unitless

Target Ground Water TPH conc adjusted previously if any:

Target Ground Water TPH Conc, ug/L ⇒ 1000

CALCULATE PROTECTIVE CONDITION OR TEST ADJUSTED CONDITION

Calculate or Test

@ Protection of Surface Water Quality

Pass or Fail? NA

Tested TPH Soil Conc, mg/kg = **100% NAPL**

Predicted TPH GW Conc, ug/L = 3.60E+00

RISK @ Well = NA

HI @Well = NA

DEDAILED MODEL RESULTS TPH Range Test

Type of model used for computation:	4-Phase Model
Computation completed?	Yes!
Initial Weighted Average MW of NAPL, g/mol:	284.9
Equilibrated Weighted Average MW of NAPL, g/mol:	285.0
Initial Weighted Average Density of NAPL, kg/L:	0.826
Volumetric NAPL Content, Θ_{NAPL} :	1.9E-01
NAPL Saturation (%), Θ_{NAPL}/n :	59.35%
100% NAPL, mg/kg	87177.5

Mass Distribution Pattern @ 4-phase in soil pore system: Mass Balance Pattern

Total Mass distributed in Water Phase: 0.00% in Solid: 0.04%

Total Mass distributed in Air Phase: 0.00% in NAPL: 99.96%

Please Check Soil Residual Saturation TPH Levels: Refer to Table 747-5!

A2.3 Worksheet for Calculating Soil Cleanup Levels for the Protection of Air Quality: (Vapor Pathway)
Method B: WAC 173-340-740 and 750

Date: 2/9/2015
Site Name: POB-Harris
Sample Name: MW-11-6-7

Warning: This Worksheet is provided for informational purposes only! Background levels entered are not considered for the calculations.

Chemical of Concern or EC Group	Measured Soil Conc @dry basis	Enter Air Background Levels	Adjusted Condition: Soil Conc being tested	Adjusted Condition: Predicted Indoor Air Conc	Adjusted Condition: HQ @ Indoor Air	Adjusted Condition: RISK @ Indoor Air	Pass or Fail?
	mg/kg	ug/m^3	mg/kg	ug/m^3	unitless	unitless	
Petroleum EC Fraction							
AL_EC >5-6	0	40	0.00E+00	0.00E+00	0.00E+00		
AL_EC >6-8	0	40	0.00E+00	0.00E+00	0.00E+00		
AL_EC >8-10	0	40	0.00E+00	0.00E+00	0.00E+00		
AL_EC >10-12	0	40	0.00E+00	0.00E+00	0.00E+00		
AL_EC >12-16	4.4	0	4.42E+00	4.33E+01	3.19E-01		
AL_EC >16-21	15	0	1.51E+01	1.00E+00	0.00E+00		
AL_EC >21-34	18	0	1.81E+01	8.59E-04	0.00E+00		
AR_EC >8-10	0	40	0.00E+00	0.00E+00	0.00E+00		
AR_EC >10-12	0	40	0.00E+00	0.00E+00	0.00E+00		
AR_EC >12-16	0	0	0.00E+00	0.00E+00	0.00E+00		
AR_EC >16-21	4.1	0	4.12E+00	4.31E-01	0.00E+00		
AR_EC >21-34	2.3	0	2.31E+00	4.27E-04	0.00E+00		
Benzene	0	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Toluene	0	15	0.00E+00	0.00E+00	0.00E+00		
Ethylbenzene	0	5	0.00E+00	0.00E+00	0.00E+00		
Total Xylenes	0	36	0.00E+00	0.00E+00	0.00E+00		
Naphthalene	0	2.5	0.00E+00	0.00E+00	0.00E+00		
1-Methyl Naphthalene	0	5	0.00E+00	0.00E+00	0.00E+00		
2-Methyl Naphthalene	0	5	0.00E+00	0.00E+00	0.00E+00		
n-Hexane	0	1	0.00E+00	0.00E+00	0.00E+00		
MTBE	0	10	0.00E+00	0.00E+00	0.00E+00		
Ethylene Dibromide (EDB)	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0	0	0.00E+00	0.00E+00		0.00E+00	for
Benzo(b)fluoranthene	0	0	0.00E+00	0.00E+00		0.00E+00	all
Benzo(k)fluoranthene	0	0	0.00E+00	0.00E+00		0.00E+00	cPAHs
Benzo(a)pyrene	0	0	0.00E+00	0.00E+00		0.00E+00	
Chrysene	0	0	0.00E+00	0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0	0	0.00E+00	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0	0	0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	43.8		4.40E+01	4.48E+01	3.19E-01	0.00E+00	

Enter Vapor Attenuation Factor for all TPH components:	0.001

Site-Specific Hydrogeological Properties previously entered:

Item	Symbol	Value	Units
Total soil porosity: default is 0.43	n	0.32	unitless
Volumetric water content: default is 0.3	Θ_w	0.13	unitless
Initial volumetric air content: default is 0.13	Θ_a	0.19	unitless
Soil bulk density measured: default is 1.5	ρ_b	1.8	kg/L
Fraction Organic Carbon: default is 0.001	f_{oc}	0.006	unitless

TEST ADJUSTED CONDITION

This tool allows the user to test whether a particular TPH soil concentration is protective of indoor air quality. The Workbook uses the same composition ratio as for the measured data and the same hydrogeological data and vapor attenuation factor previously entered by the user.

Test Adjusted TPH Soil Conc

Pass or Fail?	Pass
Tested TPH Soil Conc, mg/kg =	44
Predicted TPH Indoor Air Conc, ug/m^3 =	4.48E+01
RISK @ Indoor Air =	0.00E+00
HI @ Indoor Air =	3.19E-01
Type of model used for computation:	4-Phase Model
Computation completed?	Yes!

Note: Source of Default Air Background Level:
"Characterizing risk posed by Petroleum Contaminated Sites: Implementation of MADEP VPH/EPH Approach", *Petroleum Equivalent Carbon Fractions: State of Massachusetts, Department of Environmental Protection, 10/21/2002, Policy # WSC02-411

*Benzene and n-Hexane: Washington State Department of Ecology, 1997, "Memorandum: Washington State Air Toxic Monitoring Data Documentation"

A1 Soil Cleanup Levels: Worksheet for Soil Data Entry: Refer to WAC 173-340-720, 740,745, 747, 750

1. Enter Site Information

Date: 02/09/15
Site Name: POB-Harris
Sample Name: MW-12-4-5

2. Enter Soil Concentration Measured

Chemical of Concern or Equivalent Carbon Group	Measured Soil Conc dry basis mg/kg	Composition Ratio %
Petroleum EC Fraction		
AL_EC >5-6		0.00%
AL_EC >6-8		0.00%
AL_EC >8-10	38	0.34%
AL_EC >10-12	740	6.53%
AL_EC >12-16	5000	44.15%
AL_EC >16-21	2400	21.19%
AL_EC >21-34	1200	10.60%
AR_EC >8-10	28	0.25%
AR_EC >10-12	117.8	1.04%
AR_EC >12-16	700	6.18%
AR_EC >16-21	900	7.95%
AR_EC >21-34	200	1.77%
Benzene		0.00%
Toluene		0.00%
Ethylbenzene		0.00%
Total Xylenes		0.00%
Naphthalene	2.2	0.02%
1-Methyl Naphthalene		0.00%
2-Methyl Naphthalene		0.00%
n-Hexane		0.00%
MTBE		0.00%
Ethylene Dibromide (EDB)		0.00%
1,2 Dichloroethane (EDC)		0.00%
Benzo(a)anthracene		0.00%
Benzo(b)fluoranthene		0.00%
Benzo(k)fluoranthene		0.00%
Benzo(a)pyrene		0.00%
Chrysene		0.00%
Dibenz(a,h)anthracene		0.00%
Indeno(1,2,3-cd)pyrene		0.00%
Sum	11326	100.00%

Notes for Data Entry | Set Default Hydrogeology

Clear All Soil Concentration Data Entry Cells

Restore All Soil Concentration Data cleared previously

REMARK:
Non-detect values entered a blanks. When data values existed for a parameter, the higher detected result was used.

cPAH results intentionally omitted from this workbook, as cPAH is not well correlated with TPH at this site. cPAH results are evaluated as their own COC group in the RI/FS

For Section 3, site-specific values for total soil porosity, volumetric water content, soil bulk density, and fraction of organic carbon were used.

For Section 4, adjusted groundwater concentration of 1,000 ug/L used.

Double-counting was avoided.

3. Enter Site-Specific Hydrogeological Data

Total soil porosity:	0.32	Unitless
Volumetric water content:	0.13	Unitless
Volumetric air content:	0.19	Unitless
Soil bulk density measured:	1.8	kg/L
Fraction Organic Carbon:	0.006	Unitless
Dilution Factor:	20	Unitless

4. Target TPH Ground Water Concentation (if adjusted)

If you adjusted the target TPH ground water concentration, enter adjusted value here: 1000 ug/L

A2. 1C Worksheet for Calculating Soil Cleanup Levels for Protection of Human Health: (Soil Direct Contact Pathway)
Method C: Industrial Land Use (WAC 173-340-745)

Date: 2/9/2015
Site Name: POB-Harris
Sample Name: MW-12-4-5

Chemical of Concern or EC Group	Current Condition				Adjusted Condition			
	Measured Soil Conc @dry basis	HQ	RISK	Pass or Fail?	Soil Conc being tested	HQ	RISK	Pass or Fail?
	mg/kg	unitless	unitless		mg/kg	unitless	unitless	
Petroleum EC Fraction								
AL_EC >5-6	0				0.00E+00			
AL_EC >6-8	0				0.00E+00			
AL_EC >8-10	38	8.71E-04			1.09E+02	2.50E-03		
AL_EC >10-12	740	1.70E-02			2.12E+03	4.87E-02		
AL_EC >12-16	5000	2.50E-01			1.44E+04	7.18E-01		
AL_EC >16-21	2400	1.80E-03			6.89E+03	5.17E-03		
AL_EC >21-34	1200	9.00E-04			3.44E+03	2.58E-03		
AR_EC >8-10	28	1.93E-04			8.04E+01	5.53E-04		
AR_EC >10-12	117.8	4.05E-03			3.38E+02	1.16E-02		
AR_EC >12-16	700	2.10E-02			2.01E+03	6.03E-02		
AR_EC >16-21	900	4.50E-02			2.58E+03	1.29E-01		
AR_EC >21-34	200	7.50E-03			5.74E+02	2.15E-02		
Benzene	0		0.00E+00		0.00E+00		0.00E+00	
Toluene	0				0.00E+00			
Ethylbenzene	0				0.00E+00			
Total Xylenes	0				0.00E+00			
Naphthalene	2.2	1.35E-04			6.31E+00	3.88E-04		
1-Methyl Naphthalene	0				0.00E+00	0.00E+00		
2-Methyl Naphthalene	0				0.00E+00	0.00E+00		
n-Hexane	0				0.00E+00	0.00E+00		
MTBE	0				0.00E+00			
Ethylene Dibromide (EDB)	0		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0		0.00E+00		0.00E+00		0.00E+00	
Benzo(b)fluoranthene	0		0.00E+00		0.00E+00		0.00E+00	
Benzo(k)fluoranthene	0		0.00E+00		0.00E+00		0.00E+00	
Benzo(a)pyrene	0		0.00E+00		0.00E+00		0.00E+00	
Chrysene	0		0.00E+00		0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00		0.00E+00		0.00E+00	
Indeno(1,2,3-cd)pyrene	0		0.00E+00		0.00E+00		0.00E+00	
Sum	**11326**	3.48E-01	0.00E+00		3.25E+04	1.00E+00	0.00E+00	

TEST CURRENT CONDITION

Measured TPH Soil Conc, mg/kg= 11326.000
HI= 3.484E-01
RISK= 0.000E+00
Pass or Fail? Pass
Check Residual Saturation (WAC340-747(10))

CALCULATE PROTECTIVE CONDITION

This tool allows the user to calculate protective TPH soil concentration based on various soil quality criteria. The Workbook uses the same composition ratio as for the measured data.

Calculate Protective TPH soil Conc

Selected Criterion: @HI=1
Most Stringent? YES

Protctive TPH Soil Conc, mg/kg = 32508.016
HI = 1.000E+00
RISK = 0.000E+00

Check Residual Saturation (WAC340-747(10))

TEST ADJUSTED CONDITION

This tool allows the user to test whether a particular TPH soil concentration is protective of human health. The Workbook uses the same composition ratio as for the measured data.

Test Adjusted TPH Soil Conc

Tested TPH Soil Conc, mg/kg=
HI=
RISK=
Pass or Fail?

A2. 2 Worksheet for Calculating Soil Cleanup Level for the Protection of Ground Water Quality (Leaching Pathway)
Washington State Department of Ecology, Toxics Cleanup Program Soil Cleanup Level for TPH Mixtures - Migration to Potable Ground Water

WAC 173-340-740 and 747

Date: 2/9/2015

Site Name: POB-Harris

Sample Name: MW-12-4-5

Chemical of Concern or EC Group	Measured Soil Conc @dry basis	GW Cleanup Level	Adjusted Condition: Soil Conc being tested	Predicted Conc @Well	HQ @ Well	RISK @ Well	Pass or Fail?
	mg/kg	ug/L	mg/kg	ug/L	unitless	unitless	
Petroleum EC Fraction							
AL_EC >5-6	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >6-8	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >8-10	38		2.88E+02	1.18E-01	4.92E-04		
AL_EC >10-12	740		5.61E+03	1.48E-01	6.16E-04		
AL_EC >12-16	5000		3.79E+04	1.79E-02	3.72E-05		
AL_EC >16-21	2400		1.82E+04	1.09E-05	3.39E-10		
AL_EC >21-34	1200		9.10E+03	4.23E-11	1.32E-15		
AR_EC >8-10	28		2.12E+02	1.41E+01	1.76E-02		
AR_EC >10-12	117.8		8.93E+02	2.12E+01	1.32E-01		
AR_EC >12-16	700		5.31E+03	2.54E+01	3.17E-02		
AR_EC >16-21	900		6.82E+03	2.27E+00	4.73E-03		
AR_EC >21-34	200		1.52E+03	5.17E-03	8.08E-06		
Benzene	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Toluene	0	1000	0.00E+00	0.00E+00	0.00E+00		
Ethylbenzene	0	700	0.00E+00	0.00E+00	0.00E+00		
Total Xylenes	0	1000	0.00E+00	0.00E+00	0.00E+00		
Naphthalene	2.2	160	1.67E+01	4.99E-01	3.12E-03		
1-Methyl Naphthalene	0		0.00E+00	0.00E+00	0.00E+00		
2-Methyl Naphthalene	0		0.00E+00	0.00E+00	0.00E+00		
n-Hexane	0		0.00E+00	0.00E+00	0.00E+00		
MTBE	0	20	0.00E+00	0.00E+00	0.00E+00		
Ethylene Dibromide (EDB)	0	0.01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0	for	0.00E+00	0.00E+00		0.00E+00	for
Benzo(b)fluoranthene	0	all	0.00E+00	0.00E+00		0.00E+00	all
Benzo(k)fluoranthene	0	cPAHs	0.00E+00	0.00E+00		0.00E+00	cPAHs
Benzo(a)pyrene	0	Risk=	0.00E+00	0.00E+00		0.00E+00	
Chrysene	0	1E-05	0.00E+00	0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0		0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	11326		8.59E+04	6.37E+01	1.91E-01	0.00E+00	Pass

Site-Specific Hydrogeological Properties previously entered:

Item	Symbol	Value	Units
Total soil porosity:	n	0.32	unitless
Volumetric water content:	Θ_w	0.13	unitless
Volumetric air content:	Θ_a	0.19	unitless
Soil bulk density measured:	ρ_b	1.8	kg/L
Fraction Organic Carbon:	f_{oc}	0.006	unitless
Dilution Factor:	DF	20	unitless

Target Ground Water TPH conc adjusted previously if any:

Target Ground Water TPH Conc, ug/L ⇒ 1000

CALCULATE PROTECTIVE CONDITION OR TEST ADJUSTED CONDITION

Calculate or Test

@ HI=1

Pass or Fail? YES

Tested TPH Soil Conc, mg/kg = **100% NAPL**

Predicted TPH GW Conc, ug/L = 6.37E+01

RISK @ Well = 0.00E+00

HI @Well = 1.91E-01

DEDAILED MODEL RESULTS

Type of model used for computation:	4-Phase Model
Computation completed?	Yes!
Initial Weighted Average MW of NAPL, g/mol:	212.9
Equilibrated Weighted Average MW of NAPL, g/mol:	213.0
Initial Weighted Average Density of NAPL, kg/L:	0.813
Volumetric NAPL Content, Θ_{NAPL} :	1.9E-01
NAPL Saturation (%), Θ_{NAPL}/n :	59.34%
100% NAPL, mg/kg	85867.7

Mass Distribution Pattern @ 4-phase in soil pore system:

Total Mass distributed in Water Phase: 0.00% in Solid: 0.07%

Total Mass distributed in Air Phase: 0.00% in NAPL: 99.93%

Please Check Soil Residual Saturation TPH Levels: Refer to Table 747-5!

A2. 2 Worksheet for Calculating Soil Cleanup Level for the Protection of Ground Water Quality: (Leaching Pathway)

WAC 173-340-740 and 747

Date: 2/9/2015
Site Name: POB-Harris
Sample Name: MW-12-4-5

Chemical of Concern or EC Group	Measured Soil Conc @dry basis	GW Cleanup Level	Adjusted Condition				
			Soil Conc being tested	Predicted Conc @Well	HQ @ Well	RISK @ Well	Pass or Fail?
	mg/kg	ug/L	mg/kg	ug/L	unitless	unitless	
Petroleum EC Fraction							
AL_EC >5-6	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >6-8	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >8-10	38		2.88E+02	1.18E-01	4.92E-04		
AL_EC >10-12	740		5.61E+03	1.48E-01	6.16E-04		
AL_EC >12-16	5000		3.79E+04	1.79E-02	3.72E-05		
AL_EC >16-21	2400		1.82E+04	1.09E-05	3.39E-10		
AL_EC >21-34	1200		9.10E+03	4.23E-11	1.32E-15		
AR_EC >8-10	28		2.12E+02	1.41E+01	1.76E-02		
AR_EC >10-12	117.8		8.93E+02	2.12E+01	1.32E-01		
AR_EC >12-16	700		5.31E+03	2.54E+01	3.17E-02		
AR_EC >16-21	900		6.82E+03	2.27E+00	4.73E-03		
AR_EC >21-34	200		1.52E+03	5.17E-03	8.08E-06		
Benzene	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Toluene	0	1000	0.00E+00	0.00E+00	0.00E+00		
Ethylbenzene	0	700	0.00E+00	0.00E+00	0.00E+00		
Total Xylenes	0	1000	0.00E+00	0.00E+00	0.00E+00		
Naphthalene	2.2	160	1.67E+01	4.99E-01	3.12E-03		
1-Methyl Naphthalene	0		0.00E+00	0.00E+00	0.00E+00		
2-Methyl Naphthalene	0		0.00E+00	0.00E+00	0.00E+00		
n-Hexane	0		0.00E+00	0.00E+00	0.00E+00		
MTBE	0	20	0.00E+00	0.00E+00	0.00E+00		
Ethylene Dibromide (EDB)	0	0.01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0	for	0.00E+00	0.00E+00		0.00E+00	for
Benzo(b)fluoranthene	0	all	0.00E+00	0.00E+00		0.00E+00	all
Benzo(k)fluoranthene	0	cPAHs	0.00E+00	0.00E+00		0.00E+00	cPAHs
Benzo(a)pyrene	0	Risk=	0.00E+00	0.00E+00		0.00E+00	
Chrysene	0	1E-05	0.00E+00	0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0		0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	11326		8.59E+04	6.37E+01	1.91E-01	0.00E+00	Pass

Site-Specific Hydrogeological Properties previously entered:

Item	Symbol	Value	Units
Total soil porosity:	n	0.32	unitless
Volumetric water content:	Θ_w	0.13	unitless
Volumetric air content:	Θ_a	0.19	unitless
Soil bulk density measured:	ρ_b	1.8	kg/L
Fraction Organic Carbon:	f_{oc}	0.006	unitless
Dilution Factor:	DF	20	unitless

Target Ground Water TPH conc adjusted previously if any:

Target Ground Water TPH Conc, ug/L ⇒ 1000

CALCULATE PROTECTIVE CONDITION OR TEST ADJUSTED CONDITION

Calculate or Test

@ Protection of Surface Water Quality

Pass or Fail? NA

Tested TPH Soil Conc, mg/kg = **100% NAPL**

Predicted TPH GW Conc, ug/L = 6.37E+01

RISK @ Well = NA

HI @Well = NA

DEDAILED MODEL RESULTS

Type of model used for computation:	4-Phase Model
Computation completed?	Yes!
Initial Weighted Average MW of NAPL, g/mol:	212.9
Equilibrated Weighted Average MW of NAPL, g/mol:	213.0
Initial Weighted Average Density of NAPL, kg/L:	0.813
Volumetric NAPL Content, Θ_{NAPL} :	1.9E-01
NAPL Saturation (%), Θ_{NAPL}/n :	59.34%
100% NAPL, mg/kg	85867.7

Mass Distribution Pattern @ 4-phase in soil pore system:

Total Mass distributed in Water Phase: 0.00% in Solid: 0.07%

Total Mass distributed in Air Phase: 0.00% in NAPL: 99.93%

Please Check Soil Residual Saturation TPH Levels: Refer to Table 747-5!

A1 Soil Cleanup Levels: Worksheet for Soil Data Entry: Refer to WAC 173-340-720, 740,745, 747, 750

1. Enter Site Information

Date: 02/09/15
Site Name: POB-Harris
Sample Name: MW-12-10.5-11

2. Enter Soil Concentration Measured

Chemical of Concern or Equivalent Carbon Group	Measured Soil Conc dry basis mg/kg	Composition Ratio %
Petroleum EC Fraction		
AL_EC >5-6		0.00%
AL_EC >6-8		0.00%
AL_EC >8-10		0.00%
AL_EC >10-12	9	4.57%
AL_EC >12-16	71	36.04%
AL_EC >16-21	41	20.81%
AL_EC >21-34	21	10.66%
AR_EC >8-10		0.00%
AR_EC >10-12	16	8.12%
AR_EC >12-16	19.6	9.95%
AR_EC >16-21	14	7.11%
AR_EC >21-34	4	2.03%
Benzene		0.00%
Toluene		0.00%
Ethylbenzene		0.00%
Total Xylenes		0.00%
Naphthalene		0.00%
1-Methyl Naphthalene	1.4	0.71%
2-Methyl Naphthalene		0.00%
n-Hexane		0.00%
MTBE		0.00%
Ethylene Dibromide (EDB)		0.00%
1,2 Dichloroethane (EDC)		0.00%
Benzo(a)anthracene		0.00%
Benzo(b)fluoranthene		0.00%
Benzo(k)fluoranthene		0.00%
Benzo(a)pyrene		0.00%
Chrysene		0.00%
Dibenz(a,h)anthracene		0.00%
Indeno(1,2,3-cd)pyrene		0.00%
Sum	197	100.00%

Notes for Data Entry | Set Default Hydrogeology

Clear All Soil Concentration Data Entry Cells

Restore All Soil Concentration Data cleared previously

REMARK:
Non-detect values entered a blanks. When data values existed for a parameter, the higher detected result was used.

cPAH results intentionally omitted from this workbook, as cPAH is not well correlated with TPH at this site. cPAH results are evaluated as their own COC group in the RI/FS

For Section 3, site-specific values for total soil porosity, volumetric water content, soil bulk density, and fraction of organic carbon were used.

For Section 4, adjusted groundwater concentration of 1,000 ug/L used.

Double-counting was avoided.

3. Enter Site-Specific Hydrogeological Data

Total soil porosity:	0.32	Unitless
Volumetric water content:	0.13	Unitless
Volumetric air content:	0.19	Unitless
Soil bulk density measured:	1.8	kg/L
Fraction Organic Carbon:	0.006	Unitless
Dilution Factor:	20	Unitless

4. Target TPH Ground Water Concentation (if adjusted)

If you adjusted the target TPH ground water concentration, enter adjusted value here:	1000	ug/L

A2. 1C Worksheet for Calculating Soil Cleanup Levels for Protection of Human Health: (Soil Direct Contact Pathway)
Method C: Industrial Land Use (WAC 173-340-745)

Date: 2/9/2015
Site Name: POB-Harris
Sample Name: MW-12-10.5-11

Chemical of Concern or EC Group	Current Condition				Adjusted Condition			
	Measured Soil Conc @dry basis	HQ	RISK	Pass or Fail?	Soil Conc being tested	HQ	RISK	Pass or Fail?
	mg/kg	unitless	unitless		mg/kg	unitless	unitless	
Petroleum EC Fraction								
AL_EC >5-6	0				0.00E+00			
AL_EC >6-8	0				0.00E+00			
AL_EC >8-10	0				0.00E+00			
AL_EC >10-12	9	2.06E-04			1.55E+03	3.55E-02		
AL_EC >12-16	71	3.55E-03			1.22E+04	6.11E-01		
AL_EC >16-21	41	3.08E-05			7.06E+03	5.30E-03		
AL_EC >21-34	21	1.58E-05			3.62E+03	2.71E-03		
AR_EC >8-10	0				0.00E+00			
AR_EC >10-12	16	5.50E-04			2.76E+03	9.47E-02		
AR_EC >12-16	19.6	5.88E-04			3.38E+03	1.01E-01		
AR_EC >16-21	14	7.00E-04			2.41E+03	1.21E-01		
AR_EC >21-34	4	1.50E-04			6.89E+02	2.58E-02		
Benzene	0		0.00E+00		0.00E+00		0.00E+00	
Toluene	0				0.00E+00			
Ethylbenzene	0				0.00E+00			
Total Xylenes	0				0.00E+00			
Naphthalene	0				0.00E+00	0.00E+00		
1-Methyl Naphthalene	1.4	1.58E-05			2.41E+02	2.71E-03		
2-Methyl Naphthalene	0				0.00E+00	0.00E+00		
n-Hexane	0				0.00E+00	0.00E+00		
MTBE	0				0.00E+00			
Ethylene Dibromide (EDB)	0		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0		0.00E+00		0.00E+00		0.00E+00	
Benzo(b)fluoranthene	0		0.00E+00		0.00E+00		0.00E+00	
Benzo(k)fluoranthene	0		0.00E+00		0.00E+00		0.00E+00	
Benzo(a)pyrene	0		0.00E+00		0.00E+00		0.00E+00	
Chrysene	0		0.00E+00		0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00		0.00E+00		0.00E+00	
Indeno(1,2,3-cd)pyrene	0		0.00E+00		0.00E+00		0.00E+00	
Sum	**197**	5.81E-03	0.00E+00		3.39E+04	1.00E+00	0.00E+00	

TEST CURRENT CONDITION

Measured TPH Soil Conc, mg/kg= 197.000
HI= 5.807E-03
RISK= 0.000E+00
Pass or Fail? Pass

CALCULATE PROTECTIVE CONDITION

This tool allows the user to calculate protective TPH soil concentration based on various soil quality criteria. The Workbook uses the same composition ratio as for the measured data.

Calculate Protective TPH soil Conc

Selected Criterion: @HI=1
Most Stringent? YES

Protctive TPH Soil Conc, mg/kg = 33927.495
HI = 1.000E+00
RISK = 0.000E+00

Check Residual Saturation (WAC340-747(10))

TEST ADJUSTED CONDITION

This tool allows the user to test whether a particular TPH soil concentration is protective of human health. The Workbook uses the same composition ratio as for the measured data.

Test Adjusted TPH Soil Conc

Tested TPH Soil Conc, mg/kg=
HI=
RISK=
Pass or Fail?

A2. 2 Worksheet for Calculating Soil Cleanup Level for the Protection of Ground Water Quality (Leaching Pathway)
Washington State Department of Ecology, Toxics Cleanup Program Soil Cleanup Level for TPH Mixtures - Migration to Potable Ground Water

WAC 173-340-740 and 747

Date: 2/9/2015

Site Name: POB-Harris

Sample Name: MW-12-10.5-11

Chemical of Concern or EC Group	Measured Soil Conc @dry basis	GW Cleanup Level	Adjusted Condition: Soil Conc being tested	Predicted Conc @Well	HQ @ Well	RISK @ Well	Pass or Fail?
	mg/kg	ug/L	mg/kg	ug/L	unitless	unitless	
Petroleum EC Fraction							
AL_EC >5-6	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >6-8	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >8-10	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >10-12	9		2.64E+02	9.98E-02	4.16E-04		
AL_EC >12-16	71		2.08E+03	1.42E-02	2.95E-05		
AL_EC >16-21	41		1.20E+03	1.03E-05	3.22E-10		
AL_EC >21-34	21		6.16E+02	4.16E-11	1.30E-15		
AR_EC >8-10	0		0.00E+00	0.00E+00	0.00E+00		
AR_EC >10-12	16		4.69E+02	1.47E+02	9.18E-01		
AR_EC >12-16	19.6		5.75E+02	3.84E+01	4.80E-02		
AR_EC >16-21	14		4.11E+02	1.96E+00	4.09E-03		
AR_EC >21-34	4		1.17E+02	5.80E-03	9.06E-06		
Benzene	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Toluene	0	1000	0.00E+00	0.00E+00	0.00E+00		
Ethylbenzene	0	700	0.00E+00	0.00E+00	0.00E+00		
Total Xylenes	0	1000	0.00E+00	0.00E+00	0.00E+00		
Naphthalene	0	160	0.00E+00	0.00E+00	0.00E+00		
1-Methyl Naphthalene	1.4		4.11E+01	1.16E+01	2.91E-02		
2-Methyl Naphthalene	0		0.00E+00	0.00E+00	0.00E+00		
n-Hexane	0		0.00E+00	0.00E+00	0.00E+00		
MTBE	0	20	0.00E+00	0.00E+00	0.00E+00		
Ethylene Dibromide (EDB)	0	0.01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0	for	0.00E+00	0.00E+00		0.00E+00	for
Benzo(b)fluoranthene	0	all	0.00E+00	0.00E+00		0.00E+00	all
Benzo(k)fluoranthene	0	cPAHs	0.00E+00	0.00E+00		0.00E+00	cPAHs
Benzo(a)pyrene	0	Risk=	0.00E+00	0.00E+00		0.00E+00	
Chrysene	0	1E-05	0.00E+00	0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0		0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	197		5.78E+03	1.99E+02	1.00E+00	0.00E+00	Pass

Site-Specific Hydrogeological Properties previously entered:

Item	Symbol	Value	Units
Total soil porosity:	n	0.32	unitless
Volumetric water content:	Θ_w	0.13	unitless
Volumetric air content:	Θ_a	0.19	unitless
Soil bulk density measured:	ρ_b	1.8	kg/L
Fraction Organic Carbon:	f_{oc}	0.006	unitless
Dilution Factor:	DF	20	unitless

Target Ground Water TPH conc adjusted previously if any:

Target Ground Water TPH Conc, ug/L ⇒ 1000

CALCULATE PROTECTIVE CONDITION OR TEST ADJUSTED CONDITION

Calculate or Test

Selected Criterion: @ HI=1

Most Stringent? YES

Protective TPH Soil Conc, mg/kg = **5776.36**

Protective TPH GW Conc, ug/L = 1.99E+02

RISK @ Well = 0.00E+00

HI @Well = 1.00E+00

DEDAILED MODEL RESULTS

Type of model used for computation:	4-Phase Model	
Computation completed?	Yes!	
Initial Weighted Average MW of NAPL, g/mol:		203.2
Equilibrated Weighted Average MW of NAPL, g/mol:		204.3
Initial Weighted Average Density of NAPL, kg/L:		0.830
Volumetric NAPL Content, Θ_{NAPL} :		1.2E-02
NAPL Saturation (%), Θ_{NAPL}/n :		3.85%
100% NAPL, mg/kg		87650.1
Mass Distribution Pattern @ 4-phase in soil pore system:		
Total Mass distributed in Water Phase: 0.00%		in Solid: 1.72%
Total Mass distributed in Air Phase: 0.00%		in NAPL: 98.28%

Please Check Soil Residual Saturation TPH Levels: Refer to Table 747-5!

A2. 2 Worksheet for Calculating Soil Cleanup Level for the Protection of Ground Water Quality: (Leaching Pathway)

WAC 173-340-740 and 747

Date: 2/9/2015
Site Name: POB-Harris
Sample Name: MW-12-10.5-11

Chemical of Concern or EC Group	Measured Soil Conc @dry basis	GW Cleanup Level	Adjusted Condition: Soil Conc being tested	Predicted Conc @Well	HQ @ Well	RISK @ Well	Pass or Fail?
	mg/kg	ug/L	mg/kg	ug/L	unitless	unitless	
Petroleum EC Fraction							
AL_EC >5-6	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >6-8	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >8-10	0		0.00E+00	0.00E+00	0.00E+00		
AL_EC >10-12	9		4.00E+03	9.87E-02	4.11E-04		
AL_EC >12-16	71		3.16E+04	1.39E-02	2.90E-05		
AL_EC >16-21	41		1.82E+04	1.02E-05	3.18E-10		
AL_EC >21-34	21		9.34E+03	4.07E-11	1.27E-15		
AR_EC >8-10	0		0.00E+00	0.00E+00	0.00E+00		
AR_EC >10-12	16		7.12E+03	1.58E+02	9.87E-01		
AR_EC >12-16	19.6		8.72E+03	3.90E+01	4.88E-02		
AR_EC >16-21	14		6.23E+03	1.94E+00	4.04E-03		
AR_EC >21-34	4		1.78E+03	5.68E-03	8.88E-06		
Benzene	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Toluene	0	1000	0.00E+00	0.00E+00	0.00E+00		
Ethylbenzene	0	700	0.00E+00	0.00E+00	0.00E+00		
Total Xylenes	0	1000	0.00E+00	0.00E+00	0.00E+00		
Naphthalene	0	160	0.00E+00	0.00E+00	0.00E+00		
1-Methyl Naphthalene	1.4		6.23E+02	1.26E+01	3.16E-02		
2-Methyl Naphthalene	0		0.00E+00	0.00E+00	0.00E+00		
n-Hexane	0		0.00E+00	0.00E+00	0.00E+00		
MTBE	0	20	0.00E+00	0.00E+00	0.00E+00		
Ethylene Dibromide (EDB)	0	0.01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0	for	0.00E+00	0.00E+00		0.00E+00	for
Benzo(b)fluoranthene	0	all	0.00E+00	0.00E+00		0.00E+00	all
Benzo(k)fluoranthene	0	cPAHs	0.00E+00	0.00E+00		0.00E+00	cPAHs
Benzo(a)pyrene	0	Risk=	0.00E+00	0.00E+00		0.00E+00	
Chrysene	0	1E-05	0.00E+00	0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0		0.00E+00	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0		0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	197		8.77E+04	2.12E+02	1.07E+00	0.00E+00	***Fail***

Site-Specific Hydrogeological Properties previously entered:

Item	Symbol	Value	Units
Total soil porosity:	n	0.32	unitless
Volumetric water content:	Θ_w	0.13	unitless
Volumetric air content:	Θ_a	0.19	unitless
Soil bulk density measured:	ρ_b	1.8	kg/L
Fraction Organic Carbon:	f_{oc}	0.006	unitless
Dilution Factor:	DF	20	unitless

Target Ground Water TPH conc adjusted previously if any:

Target Ground Water TPH Conc, ug/L ⇒ 1000

CALCULATE PROTECTIVE CONDITION OR TEST ADJUSTED CONDITION

Calculate or Test

Selected Criterion: @ Protection of Surface Water Quality
Most Stringent? NA
Protective TPH Soil Conc, mg/kg = **100% NAPL**
Protective TPH GW Conc, ug/L = 2.12E+02
RISK @ Well = NA
HI @Well = NA

DEDAILED MODEL RESULTS

Type of model used for computation:	4-Phase Model	
Computation completed?	Yes!	
Initial Weighted Average MW of NAPL, g/mol:		203.2
Equilibrated Weighted Average MW of NAPL, g/mol:		203.3
Initial Weighted Average Density of NAPL, kg/L:		0.830
Volumetric NAPL Content, Θ_{NAPL} :		1.9E-01
NAPL Saturation (%), Θ_{NAPL}/n :		59.31%
100% NAPL, mg/kg		87650.1
Mass Distribution Pattern @ 4-phase in soil pore system:		
Total Mass distributed in Water Phase: 0.00%		in Solid: 0.12%
Total Mass distributed in Air Phase: 0.00%		in NAPL: 99.88%

Please Check Soil Residual Saturation TPH Levels: Refer to Table 747-5!

A2.3 Worksheet for Calculating Soil Cleanup Levels for the Protection of Air Quality: (Vapor Pathway)
Method B: WAC 173-340-740 and 750

Date: 2/9/2015
Site Name: POB-Harris
Sample Name: MW-12-10.5-11

Warning: This Worksheet is provided for informational purposes only! Background levels entered are not considered for the calculations.

Chemical of Concern or EC Group	Measured Soil Conc @dry basis	Enter Air Background Levels	Adjusted Condition: Soil Conc being tested	Adjusted Condition: Predicted Indoor Air Conc	Adjusted Condition: HQ @ Indoor Air	Adjusted Condition: RISK @ Indoor Air	Pass or Fail?
	mg/kg	ug/m^3	mg/kg	ug/m^3	unitless	unitless	
Petroleum EC Fraction							
AL_EC >5-6	0	40	0.00E+00	0.00E+00	0.00E+00		
AL_EC >6-8	0	40	0.00E+00	0.00E+00	0.00E+00		
AL_EC >8-10	0	40	0.00E+00	0.00E+00	0.00E+00		
AL_EC >10-12	9	40	9.00E+00	2.46E+02	1.81E+00		
AL_EC >12-16	71	0	7.10E+01	1.86E+02	1.37E+00		
AL_EC >16-21	41	0	4.10E+01	1.07E+00	0.00E+00		
AL_EC >21-34	21	0	2.10E+01	1.25E-04	0.00E+00		
AR_EC >8-10	0	40	0.00E+00	0.00E+00	0.00E+00		
AR_EC >10-12	16	40	1.60E+01	1.22E+02	8.83E+01		
AR_EC >12-16	19.6	0	1.96E+01	2.24E+01	2.79E-01		
AR_EC >16-21	14	0	1.40E+01	5.51E-01	0.00E+00		
AR_EC >21-34	4	0	4.00E+00	1.13E-04	0.00E+00		
Benzene	0	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Toluene	0	15	0.00E+00	0.00E+00	0.00E+00		
Ethylbenzene	0	5	0.00E+00	0.00E+00	0.00E+00		
Total Xylenes	0	36	0.00E+00	0.00E+00	0.00E+00		
Naphthalene	0	2.5	0.00E+00	0.00E+00	0.00E+00		
1-Methyl Naphthalene	1.4	5	1.40E+00	1.34E+00	1.68E-02		
2-Methyl Naphthalene	0	5	0.00E+00	0.00E+00	0.00E+00		
n-Hexane	0	1	0.00E+00	0.00E+00	0.00E+00		
MTBE	0	10	0.00E+00	0.00E+00	0.00E+00		
Ethylene Dibromide (EDB)	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0	0	0.00E+00	0.00E+00		0.00E+00	for
Benzo(b)fluoranthene	0	0	0.00E+00	0.00E+00		0.00E+00	all
Benzo(k)fluoranthene	0	0	0.00E+00	0.00E+00		0.00E+00	cPAHs
Benzo(a)pyrene	0	0	0.00E+00	0.00E+00		0.00E+00	
Chrysene	0	0	0.00E+00	0.00E+00		0.00E+00	
Dibenz(a,h)anthracene	0	0	0.00E+00	0.00E+00		0.00E+00	Σ Risk=
Indeno(1,2,3-cd)pyrene	0	0	0.00E+00	0.00E+00		0.00E+00	0.00E+00
Sum	197		1.97E+02	5.79E+02	9.18E+01	0.00E+00	***Fail***

Enter Vapor Attenuation Factor for all TPH components:	0.001

Site-Specific Hydrogeological Properties previously entered:

Item	Symbol	Value	Units
Total soil porosity: default is 0.43	n	0.32	unitless
Volumetric water content: default is 0.3	Θ_w	0.13	unitless
Initial volumetric air content: default is 0.13	Θ_a	0.19	unitless
Soil bulk density measured: default is 1.5	ρ_b	1.8	kg/L
Fraction Organic Carbon: default is 0.001	f_{oc}	0.006	unitless

TEST ADJUSTED CONDITION

This tool allows the user to test whether a particular TPH soil concentration is protective of indoor air quality. The Workbook uses the same composition ratio as for the measured data and the same hydrogeological data and vapor attenuation factor previously entered by the user.

Test Adjusted TPH Soil Conc

Pass or Fail? *Fail*

Tested TPH Soil Conc, mg/kg = 197
Predicted TPH Indoor Air Conc, ug/m^3 = 5.79E+02
RISK @ Indoor Air = 0.00E+00
HI @ Indoor Air = 9.18E+01

Type of model used for computation: 4-Phase Model
Computation completed? Yes!

Note: Source of Default Air Background Level:
"Characterizing risk posed by Petroleum Contaminated Sites: Implementation of MADEP VPH/EPH Approach", *Petroleum Equivalent Carbon Fractions: State of Massachusetts, Department of Environmental Protection, 10/21/2002, Policy # WSC02-411

*Benzene and n-Hexane: Washington State Department of Ecology, 1997, "Memorandum: Washington State Air Toxic Monitoring Data Documentation"

Harris Avenue Shipyard

Remedial Investigation/ Feasibility Study

Appendix G
Screening Level Development

Attachment G.3
Screening Level Support Parameters

FINAL

Table G.3.1
Backup Parameters

Analyte	CAS Number	Constants and Coefficients[1,2]			Toxicity Factors[1,2]			
		K_{oc} (Soil Organic Carbon-Water Partitioning Coefficient) (L/kg)	K_d (Distribution Coefficient for Metals) (L/kg)	Henry's Law Constant (Hcc; unitless)	Oral Cancer Slope Factor (SF_o) (kg-day/mg)	Dermal Cancer Slope Factor (SF_d)[3] (kg-day/mg)	Oral Reference Dose (RfD_o) (mg/kg-day)	Dermal Reference Dose (RfD_d)[4] (mg/kg-day)
Total Petroleum Hydrocarbons (TPH)								
Gasoline-range Hydrocarbons	86290-81-5							
Diesel-range Hydrocarbons	68334-30-5							
Oil-range Hydrocarbons	TPH-Oil							
Metals								
Antimony	7440-36-0		45				0.0004	0.00008
Arsenic	7440-38-2		29		1.5	7.5	0.0003	0.00006
Beryllium	7440-41-7		790				0.002	0.0004
Cadmium	7440-43-9a		6.7				0.001	0.0002
Chromium	7440-47-3							
Chromium III	16065-83-1		1,000				1.5	0.3
Copper	7440-50-8		22				0.04	0.008
Lead	7439-92-1		10,000					
Mercury (inorganic)	7439-97-6		52	0.47				
Nickel	7440-02-0		65				0.02	0.004
Selenium	7782-49-2		5				0.005	0.001
Silver	7440-22-4		8.3				0.005	0.001
Thallium	7440-28-0		71				0.00001	0.000002
Zinc	7440-66-6		62				0.3	0.06
Organometallics								
Tributyltin	688-73-3						0.0003	0.00006
Polychlorinated Biphenyls (PCBs)								
Aroclor 1016	12674-11-2	110,000			0.07	0.14	0.00007	0.000035
Aroclor 1221	11104-28-2							
Aroclor 1232	11141-16-5							
Aroclor 1242	53469-21-9							
Aroclor 1248	12672-29-6							
Aroclor 1254[5]	11097-69-1	820,000			2		0.00002	
Aroclor 1260	11096-82-5	820,000			2	4		
Aroclor 1268	11100-14-4							
Total PCBs	Total PCBs	310,000			2	4		
Dioxins/Furans								
Dioxin/Furan TEQ[6]	2,3,7,8-TCDD	1,000,000		0.0042	130,000		7.00E-10	5.60E-10
Semivolatile Organic Compounds (SVOCs)								
Polycyclic Aromatic Hydrocarbons (PAHs)								
Total cPAHs TEQ[7,8,9]	Total cPAHs TEF	970,000			1.0	2.0	0.0003	0.00015
Acenaphthene	83-32-9	4,900		0.0064			0.06	0.03
Acenaphthylene	208-96-8							
Anthracene	120-12-7	23,000		0.0027			0.3	0.15
Benzo(g,h,i)perylene	191-24-2							
Fluoranthene	206-44-0	49,000		0.00066			0.04	0.02
Fluorene	86-73-7	7,700		0.0026			0.04	0.02
Phenanthrene	85-01-8							
Pyrene	129-00-0	68,000		0.00045			0.03	0.015
1-Methylnaphthalene	90-12-0				0.029	0.058	0.07	0.035
2-Methylnaphthalene	91-57-6						0.004	0.002
Naphthalene	91-20-3	1,200		0.02			0.02	0.01
Benz(a)anthracene[8]	56-55-3	360,000		0.00014	0.1	0.2		
Benzo(a)pyrene[8,9]	50-32-8	970,000		0.000046	1	2	0.0003	0.00015
Benzo(b)fluoranthene[8]	205-99-2	1,200,000		0.0046	0.1	0.2		
Benzo(k)fluoranthene[9]	207-08-9	1,200,000		0.000034	0.01	0.02		
Benzofluoranthenes (total)								
Chrysene[8]	218-01-9	400,000		0.0039	0.001			
Dibenzo(a,h)anthracene[8]	53-70-3	1,800,000		0.0000006	1	2		
Indeno(1,2,3-cd)pyrene[8]	193-39-5	3,500,000		0.000066	0.1	0.2		
Other SVOCs								
1,2,4-Trichlorobenzene	120-82-1	1,700		0.058	0.029	0.058	0.01	0.008
1,2-Dichlorobenzene	95-50-1	380		0.078			0.09	0.072
1,4-Dichlorobenzene	106-46-7	620		0.1	0.0054	0.0108	0.07	0.035
2,3,4,6-Tetrachlorophenol	58-90-2	280					0.03	0.015
2,4,5-Trichlorophenol	95-95-4	1,600		0.00018			0.1	0.05
2,4,6-Trichlorophenol	88-06-2	380		0.00032	0.011	0.022	0.001	0.05
2,4-Dichlorophenol	120-83-2	150		0.00013			0.003	0.0015
2,4-Dimethylphenol	105-67-9	210		0.000082			0.02	0.01
2,4-Dinitrophenol	51-28-5	0.01		0.000018			0.002	0.001
2-Chloronaphthalene	91-58-7						0.08	0.04
2-Chlorophenol	95-57-8	390		0.016			0.005	0.0025
2-Methylphenol	95-48-7	91		0.000049			0.05	0.025
2-Nitroaniline	88-74-4						0.01	0.005
3,3'-Dichlorobenzidine	91-94-1	720		0.00000016	0.45	0.9		
4-Chloro-3-methylphenol	59-50-7							

Table G.3.1
Backup Parameters

Analyte	CAS Number	Constants and Coefficients[1,2]			Toxicity Factors[1,2]			
		K_{oc} (Soil Organic Carbon-Water Partitioning Coefficient) (L/kg)	K_d (Distribution Coefficient for Metals) (L/kg)	Henry's Law Constant (Hcc; unitless)	Oral Cancer Slope Factor (SF_o) (kg-day/mg)	Dermal Cancer Slope Factor (SF_d)[3] (kg-day/mg)	Oral Reference Dose (RfD_o) (mg/kg-day)	Dermal Reference Dose (RfD_d)[4] (mg/kg-day)
SVOCs (cont.)								
Other SVOCs (continued)								
4-Chloroaniline	106-47-8	66		0.000014	0.2	0.4	0.004	0.002
4-Methylphenol	106-44-5						0.1	0.05
Aniline	62-53-3				0.0057	0.0114	0.007	0.0035
Azobenzene	103-33-3				0.11	0.22		
Benzoic acid	65-85-0	0.6		0.000063			4	2
Benzyl alcohol	100-51-6						0.1	0.05
Butyl benzyl phthalate	85-68-7	14,000		0.000052	0.0019	0.0038	0.2	0.1
Bis(2-chloroethyl) ether	111-44-4	76		0.00074	1.1	2.2		
Bis(2-ethylhexyl) phthalate	117-81-7	110,000		0.0000042	0.014	0.028	0.02	0.01
Dibenzofuran	132-64-9						0.001	0.0005
Diethylphthalate	84-66-2	82		0.000019			0.8	0.4
Dimethyl phthalate	131-11-3							
Di-n-butyl phthalate	84-74-2	1,600		0.000000039			0.1	0.05
Di-n-octyl phthalate	117-84-0	83,000,000		0.0027			0.01	0.005
Hexachlorobenzene	118-74-1	80,000		0.054	1.6	3.2	0.0008	0.0004
Hexachlorobutadiene	87-68-3	54,000		0.33	0.078	0.156	0.001	0.0008
Hexachlorocyclopentadiene	77-47-4	200,000		1.1			0.006	0.003
Hexachloroethane	67-72-1	1,800		0.16	0.04	0.08	0.0007	0.00035
Isophorone	78-59-1	47		0.00027	0.00095	0.0019	0.2	0.1
m,p-Cresol (2:1 ratio)	15831-10-4							
Nitrobenzene	98-95-3	120		0.00098			0.002	0.001
N-Nitroso-di-n-propylamine	621-64-7	24		0.000092	7	14		
N-Nitrosodimethylamine	62-75-9				51	102	0.000008	0.000004
N-Nitrosodiphenylamine	86-30-6	1,300		0.00021	0.0049	0.0098		
Pentachlorophenol	87-86-5	590		0.000001	0.4	0.8	0.005	0.0025
Phenol	108-95-2	29		0.000016			0.3	0.15
2,4-Dinitrotoluene	121-14-2	96		0.0000038	0.31	0.62	0.002	0.001
2,6-Dinitrotoluene	606-20-2	69		0.000031	1.5	3	0.0003	0.00015
Volatile Organic Compounds (VOCs)								
1,1,1,2-Tetrachloroethane	630-20-6				0.026	0.0325	0.03	0.024
1,1,1-Trichloroethane	71-55-6	140		0.71			2	1.6
1,1,2 - Trichlorotrifluoroethane	76-13-1						30	24
1,1,2,2-Tetrachloroethane	79-34-5	79		0.014	0.2	0.25	0.02	0.016
1,1,2-Trichloroethane	79-00-5	75		0.037	0.057	0.07125	0.004	0.0032
1,1-Dichloroethane	75-34-3	53		0.23	0.0057	0.007125	0.2	0.16
1,1-Dichloroethene	75-35-4	65		1.1			0.05	0.04
1,2,3-Trichloropropane	96-18-4				30	37.5	0.004	0.0024
1,2-Dibromo-3-chloropropane	96-12-8				0.8	1	0.0002	0.00016
1,2-Dibromoethane (EDB)	106-93-4	66			2	2.5	0.009	0.0072
1,2-Dichloroethane (EDC)	107-06-2	38		0.04	0.091	0.11375	0.006	0.0048
1,2-Dichloropropane	78-87-5	47		0.12	0.036	0.045	0.09	0.072
1,3,5-Trimethylbenzene	108-67-8						0.01	0.008
Methyl ethyl ketone	78-93-3						0.6	0.48
2-Chlorotoluene	95-49-8						0.02	0.016
2-Hexanone	591-78-6							
Methyl iso butyl ketone	108-10-1						0.08	0.064
Acetone	67-64-1	0.58		0.0016			0.9	0.72
Acrolein	107-02-8						0.0005	0.0004
Acrylonitrile	107-13-1				0.54	0.675	0.04	0.032
Benzene	71-43-2	62		0.23	0.055	0.06875	0.004	0.0032
Bromodichloromethane	75-27-4	55		0.066	0.062	0.0775	0.02	0.016
Bromoform	75-25-2	130		0.022	0.0079	0.009875	0.02	0.016
Bromomethane	74-83-9	9		0.26			0.0014	0.00112
Carbon disulfide	75-15-0	46		1.2			0.1	0.08
Carbon tetrachloride	56-23-5	150		1.3	0.07	0.0875	0.004	0.0032
Chlorobenzene	108-90-7	220		0.15			0.02	0.016
Chloroform	67-66-3	53		0.15	0.031		0.01	0.008
Chloromethane	74-87-3	6						
cis-1,2-Dichloroethene	156-59-2	36		0.17			0.002	0.0016
cis-1,3-Dichloropropene	10061-01-5							
Dibromochloromethane	124-48-1	63		0.032	0.084	0.105	0.02	0.016
Dibromomethane	74-95-3						0.01	0.008
Dichlorodifluoromethane	75-71-8						0.2	0.16
Ethylbenzene	100-41-4	200		0.32			0.1	0.08
Iso-Propylbenzene	98-82-8						0.1	0.08
Xylene (meta & para)	179601-23-1							
Methylene chloride	75-09-2	10		0.09	0.002	0.0025	0.006	0.0048
Methyl-Tert-Butyl Ether	1634-04-4	11		0.018	0.0018	0.00225		
n-Propylbenzene	103-65-1						0.1	0.08

Table G.3.1
Backup Parameters

Analyte	CAS Number	Constants and Coefficients[1,2]			Toxicity Factors[1,2]			
		K_{oc} (Soil Organic Carbon-Water Partitioning Coefficient) (L/kg)	K_d (Distribution Coefficient for Metals) (L/kg)	Henry's Law Constant (Hcc; unitless)	Oral Cancer Slope Factor (SF_o) (kg-day/mg)	Dermal Cancer Slope Factor (SF_d)[3] (kg-day/mg)	Oral Reference Dose (RfD_o) (mg/kg-day)	Dermal Reference Dose (RfD_d)[4] (mg/kg-day)
VOCs (cont.)								
Xylene (ortho)	95-47-6	240		0.21			0.2	0.16
Pyridine	110-86-1						0.001	0.0008
Styrene	100-42-5	910		0.11			0.2	0.16
Tetrachloroethene[10]	127-18-4	270		0.75	0.0021	0.0026	0.006	0.0048
Toluene	108-88-3	140		0.27			0.08	0.064
trans-1,2-Dichloroethene	156-60-5	38		0.39			0.02	0.016
Trichloroethene[10]	79-01-6	94		0.42	0.046	0.058	0.0005	0.0004
Trichlorofluoromethane	75-69-4						0.3	0.24
Vinyl acetate	108-05-4	5.3		0.021			1	0.8
Vinyl chloride[11]	75-01-4	19		1.1	0.75 or 1.5	0.94 or 1.9	0.003	0.0024
Xylene (total)	1330-20-7	230		0.28			0.2	0.16

Notes:

Blank cells are intentional; no values available

1 Values taken from Ecology's CLARC Database pulled on April 21, 2017, except as noted.

2 All values have been rounded to two significant digits.

3 The dermal cancer slop factor is calculated by dividing the oral cancer slope factor for each analyte by the gastrointestinal absorption conversion factor, which is determined by analyte class. Factors for each analyte class are as follows: 0.2 for metals; 0.5 for SVOCs, including PCBs and cPAHs; 0.8 for VOCs and dioxin.

4 The dermal cancer reference dose is calculated by multiplying the oral reference dose for each analyte by the gastrointestinal absorption conversion factor, which is determined by analyte class. Factors for each analyte class are as follows: 0.2 for metals; 0.5 for SVOCs, including PCBs and cPAHs; 0.8 for VOCs and dioxin.

5 Koc value not available but assumed to be the same as the Koc for Aroclor 1260 due to the similarity in mixture.

6 Hcc value and cancer slope factors for 2,3,7,8-TCDD TEQ are not provided in CLARC, therefore the values used are those published for 2,3,7,8-TCDD from ATSDR's Toxicological Profile for Chlorinated Dibenzo-p-Dioxins (1998). The Koc value was from the USEPA 2003, Exposure and Human Health Reassessment of 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (TCDD) and Related Compounds National Academy Sciences (NAS) Review Draft, Part I: Estimating Exposure to Dioxin-Like Compounds, vol 3: Site-Specific Assessment Procedures.

7 Koc and slope factors values for Total cPAHs TEQ are not provided in CLARC, therefore the values provided in CLARC for benzo(a)pyrene were used, consistent with WAC 173-340-708.

8 Cancer slope factors for benzo(a)pyrene and chemicals with associated relative potency factors were updated based on an updated IRIS Profile dated January 2017, consistent with WAC 173-340-708(7)(d).

9 Reference dose for benzo(a)pyrene was updated based on an updated IRIS Profile dated January 2017, consistent with WAC 173-340-708(7)(d).

10 Slope factors and reference dose for PCE and TCE are established in guidance published by Ecology (https://fortress.wa.gov/ecy/clarc/FocusSheets/CLARC%20guidance%20TCE%20PCE.pdf).

11 The relevant slope factor value depends on exposure scenario; industrial exposures are calculated using a slope factor value of 0.75, while netfishing and other non-industrial exposures are calculated using a slope factor of 1.5. This is established in Ecology guidance on vinyl chloride (https://fortress.wa.gov/ecy/clarc/FocusSheets/VinylChloride.pdf).

Abbreviations:

ATSDR	Agency for Toxic Substances and Disease Registry
CAS	Chemical Abstracts Service
CLARC	Cleanup Levels and Risk Calculation
cPAH	Carcinogenic polycyclic aromatic hydrocarbon
Ecology	Washington State Department of Ecology
kg	Kilograms
L	Liters
mg	Milligrams
TCDD	Tetrachlordibenzo-p-dioxin
TEF	Toxic equivalent factor
TEQ	Toxic equivalent

Harris Avenue Shipyard

Remedial Investigation/ Feasibility Study

Appendix H
Cost Estimates for Remedial Alternatives

FINAL

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Table H.1

Upland Alternative Cost Estimate Summary[1,2]

	Alternative 1	Alternative 2[3]	Alternative 3
Alternative Implementation			
Pre-Remedial Sampling and Remedial Design	$ 274,000	$ 378,000	$ 767,000
Implement Remedial Action	$ 992,000	$ 2,742,600	$ 7,504,600
Compliance Groundwater Monitoring	$ 620,000	$ 200,000	$ 200,000
Subtotal	**$ 1,886,000**	**$ 3,320,600**	**$ 8,471,600**
Contingency (30%)	$ 565,800	$ 996,200	$ 2,541,500
Interim Action Cost (Same for All Alternatives)[2]	$ 1,625,783	$ 1,625,783	$ 1,625,783
Total	**$ 4,077,583**	**$ 5,942,500**	**$ 12,638,900**

Notes:

1 Tax (8.7%) has been added on construction activities.

2 Interim Action includes construction cost and fees for design and oversight.

3 Alternative 2 is the average of the two options for addressing AOC 2A.

Table H.2

Alternative 1—Surface Soil Excavation and Placement of a Gravel Cap[1]

Task	Item	Qty.	Unit	Unit Cost	Cost
Task 1.0 - Pre-Remedial Sampling and Remedial Design					
1.01	Prepare Pre-Remedial Design SAP	1	LS	$ 25,000	$ 25,000
1.02	Implement Pre-Remedial Design SAP	1	LS	$ 50,000	$ 50,000
1.03	Prepare Engineering Design Report	1	LS	$ 50,000	$ 50,000
1.04	Prepare Construction Plans and Specifications	1	LS	$ 75,000	$ 75,000
1.05	Institutional Controls Development and Implementation	1	LS	$ 20,000	$ 20,000
1.06	Permitting	1	LS	$ 20,000	$ 20,000
1.07	Agency Oversight and Coordination	1	LS	$ 34,000	$ 34,000
Task 1.0 Total					**$ 274,000**
Task 2.0 - Implement Remedial Action[2]					
2.01	Mobilization/Demobilization[3]	1	LS	$ 25,000	$ 25,000
2.02	Project Management/Health and Safety[3]	1	LS	$ 25,000	$ 25,000
2.03	Field Engineering	1	LS	$ 15,000	$ 15,000
2.04	Temporary Erosion and Sediment Control	1	LS	$ 15,000	$ 15,000
2.05	Site Prep: Stockpile Prep, Utility Work, Relocate portable buildings and staged equipment	1	LS	$ 40,000	$ 40,000
2.06	AOC 2A and 2B - Excavate 6-Inches Contaminated Soil	2,070	CY	$ 12.00	$ 25,000
2.07	Contaminated Soil Transport and Disposal[4]	3,110	TON	$ 82.00	$ 255,000
2.08	Placement of Geotextile Layer	12,360	SY	$ 2.45	$ 30,000
2.09	Gravel Backfill and Compaction (capping)[4]	3,110	TON	$ 37.00	$ 115,000
2.10	Confirmation Sampling, Oversight, Construction Reporting, Operations and Maintenance Plan	1	LS	$ 350,000	$ 350,000
2.11	Archaeological Monitoring and Reporting	1	LS	$ 50,000	$ 50,000
Task 2.0 Subtotal					**$ 945,000**
Tax on Construction Activities (8.7%)[5]					$ 47,400
Task 2.0 Total					**$ 992,000**
Task 3.0 - Long-Term Monitoring and Maintenance					
3.01	Quarterly Groundwater Monitoring and Reporting (2 Years)	8	Per Event	$ 10,000	$ 80,000
3.02	Annual Groundwater Monitoring and Reporting (18 Years)	18	Per Event	$ 20,000	$ 360,000
3.03	Annual Cap Inspection and Maintenance	1	LS	$ 180,000	$ 180,000
Task 3.0 Total					**$ 620,000**
Totals					
Subtotal (Tasks 1.0 through 3.0)					**$ 1,886,000**
Contingency, 30%					$ 565,800
Interim Action Cost (Same for All Alternatives)[6]					**$ 1,625,783**
Total					**$ 4,077,583**

Notes:

1 All costs based on 2018 dollars.

2 Costs based on Interim Action bids, Engineer's Estimate, RS Means, vendor quotes and professional experience.

3 Costs based on previous construction costs and bids, approximately 5% of construction cost.

4 Assumes 1.5 tons per cubic yard.

5 Tax is on construction activities only and does not include consultants.

6 Interim Action includes consultant fees for design and oversight and construction.

Table H.3
Alternative 2a (AOC 2A: Excavation to CULs)[1]

Task	Item	Qty.	Unit	Unit Cost	Cost
Task 1.0 - Pre-Remedial Sampling and Remedial Design					
1.01	Prepare Pre-Remedial Design SAP	1	LS	$ 40,000	$ 40,000
1.02	Implement Pre-Remedial Design SAP	1	LS	$ 125,000	$ 125,000
1.03	Prepare Engineering Design Report	1	LS	$ 50,000	$ 50,000
1.04	Prepare Construction Plans and Specifications	1	LS	$ 75,000	$ 75,000
1.05	Institutional Controls Development and Implementation	1	LS	$ 20,000	$ 20,000
1.06	Permitting	1	LS	$ 20,000	$ 20,000
1.07	Agency Oversight and Coordination	1	LS	$ 48,000	$ 48,000
Task 1.0 Total					**$ 378,000**
Task 2.0 - Implement Remedial Action[2]					
2.01	Mobilization/Demobilization[3]	1	LS	$ 87,345	$ 87,300
2.02	Project Management/Health and Safety[3]	1	LS	$ 87,345	$ 87,300
2.03	Field Engineering	1	LS	$ 20,000	$ 20,000
2.04	Temporary Erosion and Sediment Control	1	LS	$ 25,000	$ 25,000
2.05	Site Prep: Stockpile Prep, Relocate portable buildings and staged equipment	1	LS	$ 40,000	$ 40,000
2.06	AOC 2A - Excavate two feet	7,930	CY	$ 12.00	$ 95,200
2.07	AOC 2B - Excavation two feet	320	CY	$ 12.00	$ 3,800
2.08	AOC 2B - Deeper Excavation Based on Pre-Remedial Investigation[4]	480	CY	$ 50.00	$ 24,000
2.09	Placement of Geotextile Layer	12,370	SY	$ 2.45	$ 30,300
2.10	Contaminated Soil Transport and Disposal[5]	13,100	TON	$ 82	$ 1,074,200
2.11	Soil Backfill and Compaction[5]	9,990	TON	$ 27	$ 269,700
2.12	Gravel Backfill and Compaction (Upper 6-inches)[5]	3,100	TON	$ 37	$ 114,700
2.13	Utility Work (as necessary)	1	LS	$ 50,000	$ 50,000
2.14	Confirmation Sampling, Oversight and Construction Reporting	1	LS	$ 550,000	$ 550,000
2.15	Archaeological Monitoring and Reporting	1	LS	$ 175,000	$ 175,000
Task 2.0 Subtotal					**$ 2,646,500**
	Tax on Construction Activities (8.7%)[6]				$ 167,200
Task 2.0 Total					**$ 2,813,700**
Task 3.0 - Long-Term Monitoring and Maintenance					
3.01	Quarterly Groundwater Monitoring and Reporting (2 Years)	8	Per Event	$ 10,000	$ 80,000
3.02	Annual Groundwater Monitoring and Reporting (6 Years)	6	Per Event	$ 20,000	$ 120,000
3.03	Annual Cap Inspection and Maintenance	1	LS	$ 120,000	$ 120,000
Task 3.0 Total					**$ 200,000**
Totals					
Subtotal (Tasks 1.0 through 3.0)					**$ 3,391,700**
Contingency, 30%					$ 1,017,510
Interim Action Cost (Same for All Alternatives)[7]					**$ 1,625,783**
Total					**$ 6,034,993**

Contingency Measures					
AOC 3 Contingency - Bioremediation[8]		**Quantity**	**Unit**	**Unit Cost**	**Cost**
5.01	Mobilization/Demobilization	3	Event	$ 5,000	$ 15,000
5.02	Site Prep	1	LS	$ 10,000	$ 10,000
5.03	Bioremediation Amendment Product (55 lbs per location)	1,650	Pound	$ 8.75	$ 14,400
5.04	Performance Monitoring during Bioremediation Application	3	Event	$ 5,000	$ 15,000
5.05	Geoprobe Injection of Amendment (3 events, 10 injections per event)	30	Each	$ 1,150	$ 34,500
AOC 3 Contingency Total					**$ 88,900**

Notes:

1 All costs based on 2018 dollars.
2 Costs based on Interim Action bids, Engineer's Estimate, RS Means, vendor quotes and professional experience.
3 Costs based on previous construction costs and bids, approximately 5% of construction cost.
4 Potential deeper excavation in AOC 2B based upon the results of the pre-remedial investigation.
5 Assumes 1.5 tons per cubic yard.
6 Tax is on construction activities only and does not include consultants.
7 Interim Action includes consultant fees for design and oversight and construction.
8 Assumes 3 injection events of ORC of 55 lbs. per location at 10 geoprobe locations per event.

Table H.4

Alternative 2 (AOC 2A: Excavation to Support Paving)[1]

Task	Item	Qty.	Unit	Unit Cost	Cost
Task 1.0 - Pre-Remedial Sampling and Remedial Design					
1.01	Prepare Pre-Remedial Design SAP	1	LS	$ 40,000	$ 40,000
1.02	Implement Pre-Remedial Design SAP	1	LS	$ 125,000	$ 125,000
1.03	Prepare Engineering Design Report	1	LS	$ 50,000	$ 50,000
1.04	Prepare Construction Plans and Specifications	1	LS	$ 75,000	$ 75,000
1.05	Institutional Controls Development and Implementation	1	LS	$ 20,000	$ 20,000
1.06	Permitting	1	LS	$ 20,000	$ 20,000
1.07	Agency Oversight and Coordination	1	LS	$ 48,000	$ 48,000
Task 1.0 Total					**$ 378,000**
Task 2.0 - Implement Remedial Action[2]					
2.01	Mobilization/Demobilization[3]	1	LS	$ 81,390	$ 81,400
2.02	Project Management/Health and Safety[3]	1	LS	$ 81,390	$ 81,400
2.03	Field Engineering	1	LS	$ 20,000	$ 20,000
2.04	Temporary Erosion and Sediment Control	1	LS	$ 20,000	$ 20,000
2.05	Site Prep: Stockpile Prep, Relocate Portable Buildings and Staged Equipment	1	LS	$ 40,000	$ 40,000
2.06	AOC 2A - 1-Foot Excavation to Support Asphalt Placement	3,970	CY	$ 12.00	$ 47,600
2.07	AOC 2B - 1-Foot Excavation to Support Asphalt Placement	160	CY	$ 12.00	$ 1,900
2.08	AOC 2B - Deeper Excavation Based on Pre-Remedial Investigation[7]	560	CY	$ 50.00	$ 28,000
2.09	AOC 2B - Backfill and Compaction of Deeper Excavation[4]	560	TON	$ 27	$ 15,100
2.10	Contaminated Soil Transport and Disposal[4]	7,040	TON	$ 82.00	$ 577,300
2.11	Install stormwater conveyance system	1,100	LF	$ 135	$ 148,800
2.12	Gravel Backfill in SW conveyance trenches[4]	740	TON	$ 37.00	$ 27,400
2.13	Gravel Backfill and Compaction (8" for base course)[4]	4,080	TON	$ 37.00	$ 151,000
2.14	Paving (two 2" lifts)	111,260	SF	$ 4.5	$ 500,700
2.15	Utility Work (as necessary)	1	LS	$ 50,000	$ 50,000
2.16	Confirmation Sampling, Oversight and Construction Reporting	1	LS	$ 550,000	$ 550,000
2.17	Archaeological Monitoring and Reporting	1	LS	$ 175,000	$ 175,000
Task 2.0 Subtotal					**$ 2,515,600**
	Tax on Construction Activities (8.7%)[5]				$ 155,800
Task 2.0 Total					**$ 2,671,400**
Task 3.0 - Long-Term Monitoring and Maintenance					
3.01	Quarterly Groundwater Monitoring and Reporting (2 Years)	8	Per Event	$ 10,000	$ 80,000
3.02	Annual Groundwater Monitoring and Reporting (6 Years)	6	Per Event	$ 20,000	$ 120,000
3.03	Annual Cap Inspection and Maintenance	1	LS	$ 120,000	$ 120,000
Task 3.0 Total					**$ 200,000**
Totals					
Subtotal (Tasks 1.0 through 3.0)					**$ 3,249,400**
Contingency, 30%					$ 974,820
Interim Action Cost (Same for All Alternatives)[6]					**$ 1,625,783**
Total					**$ 5,850,003**

Contingency Measures					
AOC 2B Contingency - Soil Solidification[7]	**Quantity**	**Unit**	**Unit Cost**	**Cost**	
4.01	Mobilization/Demobilization	1	LS	$ 5,000	$ 5,000
4.02	Labor and Equipment	1	LS	$ 6,800	$ 6,800
4.03	Soil Stabilization Product (cost per ton of soil treated)	1,990	Ton	$ 24.00	$ 47,800
4.04	Soil Stabilization Treatment Process (cost per ton of soil treated)	1,990	Ton	$ 28.00	$ 55,700
AOC 2B Contingency Total					**$ 115,300**
AOC 3 Contingency - Bioremediation[8]	**Quantity**	**Unit**	**Unit Cost**	**Cost**	
4.01	Mobilization/Demobilization	3	Event	$ 5,000	$ 15,000
4.02	Site Prep: Utility Work (as necessary)	1	LS	$ 10,000	$ 10,000
4.03	Bioremediation Amendment Product (55 lbs per location)	1,650	Pound	$ 8.75	$ 14,400
4.04	Performance Monitoring during Bioremediation Application	3	LS	$ 5,000	$ 15,000
4.05	Geoprobe Injection of Amendment (3 events, 10 injections per event)	30	Each	$ 1,150	$ 34,500
AOC 3 Contingency Total					**$ 88,900**

Notes:

1 All costs based on 2018 dollars.
2 Costs based on Interim Action bids, Engineer's Estimate, RS Means, vendor quotes and professional experience.
3 Costs based on previous construction costs and bids, approximately 5% of construction cost.
4 Assumes 1.5 tons per cubic yard.
5 Tax is on construction activities only and does not include consultants.
6 Interim Action includes consultant fees for design and oversight and construction.
7 Potential deeper excavation in AOC 2B based upon the results of the pre-remedial investigation.
8 Assumes 3 injection events at 30 Geoprobe locations of ORC of 55 lbs. per location.

Table H.5

Alternative 3—Full Removal[1]

Task	Item	Qty.	Unit	Unit Cost	Cost
Task 1.0 - Pre-Remedial Sampling and Remedial Design					
1.01	Prepare Pre-Remedial Design SAP	1	LS	$ 50,000	$ 50,000
1.02	Implement Pre-Remedial Design SAP	1	LS	$ 200,000	$ 200,000
1.03	Prepare Engineering Design Report	1	LS	$ 75,000	$ 75,000
1.04	Prepare Construction Plans and Specifications	1	LS	$ 250,000	$ 250,000
1.05	Institutional Controls Development and Implementation	1	LS	$ 20,000	$ 20,000
1.06	Permitting	1	LS	$ 75,000	$ 75,000
1.07	Agency Oversight and Coordination	1	LS	$ 97,000	$ 97,000
Task 1.0 Total					**$ 767,000**
Task 2.0 - Implement Remedial Action[2]					
2.01	Mobilization/Demobilization[3]	1	LS	$ 272,000	$ 272,000
2.02	Project Management/Health and Safety[3]	1	LS	$ 272,000	$ 272,000
2.03	Field Engineering	1	LS	$ 30,000	$ 30,000
2.04	Temporary Erosion and Sediment Control	1	LS	$ 70,000	$ 70,000
2.05	Site Prep: Stockpile Prep, temporarily move water treatment system	1	LS	$ 75,000	$ 75,000
2.06	Demolition and Removal of existing buildings	19,480	SF	$ 35.00	$ 681,800
2.07	Demolition and Removal of existing pavement and marine railway	1	LS	$ 63,200	$ 63,200
2.08	Shoring and Dewatering in AOC 2B	1	LS	$ 350,000	$ 350,000
2.09	AOC 2A - Contaminated Soil Excavation (2-foot average)	10,270	CY	$ 12.00	$ 123,200
2.10	AOC 2B - Contaminated Soil Excavation (8-foot average)	1,330	CY	$ 12.00	$ 16,000
2.11	AOC 3 - Contaminated Soil Excavation (3-foot average)	240	CY	$ 12.00	$ 2,900
2.12	Contaminated Soil Transport and Disposal[4]	15,770	Ton	$ 82.00	$ 1,293,100
2.13	Install stormwater conveyance system	1,050	LF	$ 135.30	$ 142,100
2.14	Soil Backfill and Compaction[4]	9,700	Ton	$ 27.00	$ 261,900
2.15	Gravel Backfill and Compaction (top 1-foot)[4]	8,100	Ton	$ 37.00	$ 299,700
2.16	Replace Asphalt Paving (two 2-inch lifts)	22,000	SF	$ 4.50	$ 99,000
2.17	Rebuild Misc. Small buildings, marine railway, and side tracks	1	LS	$ 1,857,100	$ 1,857,100
2.18	Utility Work (as necessary)	1	LS	$ 75,000	$ 75,000
2.19	Confirmation Sampling, Oversight and Construction Reporting	1	LS	$ 700,000	$ 700,000
2.20	Archaeological Monitoring and Reporting	1	LS	$ 300,000	$ 300,000
Task 2.0 Subtotal					**$ 6,984,000**
Tax on Construction Activities (8.7%)[5]					$ 520,600
Task 2.0 Total					**$ 7,504,600**
Task 3.0 - Long-Term Monitoring					
3.01	Quarterly Groundwater Monitoring and Reporting (2 Years)	8	Per Event	$ 10,000	$ 80,000
3.02	Annual Groundwater Monitoring and Reporting (6 Years)	6	Per Event	$ 20,000	$ 120,000
Task 3.0 Total					**$ 200,000**
Totals					
Subtotal (Tasks 1.0 through 3.0)					**$ 8,471,600**
Contingency, 30%					$ 2,541,480
Interim Action Cost (Same for All Alternatives)[6]					**$ 1,625,783**
Total					**$ 12,638,863**

Notes:

1 All costs based on 2018 dollars.

2 Costs based on Interim Action bids, Engineer's Estimate, RS Means, vendor quotes and professional experience.

3 Costs based on previous construction costs and bids, approximately 5% of construction cost.

4 Assumes 1.5 tons per cubic yard.

5 Tax is on construction activities only and does not include consultants.

6 Interim Action includes consultant fees for design and oversight and construction.

Table H.6

Sediment Alternative Cost Estimate Summary[1,2,3]

	Alternative 1–Capping	Alternative 2–Dredging and Capping	Alternative 3–Full Removal
Alternative Implementation			
Pre-Remedial Sampling and Remedial Design	$ 502,000	$ 697,000	$ 1,427,000
Implement Remedial Action			
Mobilization/Demobilization	$ 240,000	$ 380,000	$ 1,130,000
Project Administration/Health and Safety	$ 240,000	$ 380,000	$ 1,130,000
Field Engineering	$ 157,700	$ 315,300	$ 315,300
SMU 1	$ 70,200	$ 70,200	$ 70,200
SMU 2 and 4	$ -	$ -	$ 541,200
SMU 5	$ 40,300	$ 40,300	$ 867,000
SMU 6	$ 96,700	$ 276,200	$ 275,700
SMU 7	$ 28,100	$ 28,100	$ 3,166,200
SMU 8	$ 50,100	$ 52,800	$ 1,656,300
SMU 9	$ 1,085,000	$ 2,595,000	$ 2,594,300
SMU 10	$ 313,200	$ 313,200	$ 313,900
SMU 11	$ 9,600	$ 9,600	$ 1,000,000
All SMUs - ENR as needed	$ 2,900	$ 13,700	$ 15,960
Conf. Sampling, Oversight and Reporting	$ 250,000	$ 550,000	$ 700,000
Archaeological Monitoring and Reporting	$ 30,000	$ 30,000	$ 30,000
Tax on Construction Activities, 8.7%[4]	$ 248,500	$ 399,600	$ 1,183,000
Long-Term Cap Maintenance	$ 480,000	$ 260,000	$ -
Subtotal	**$ 4,366,500**	**$ 6,933,200**	**$ 16,938,300**
Contingency (30%)	$ 1,310,000	$ 2,080,000	$ 5,081,500
Interim Action Cost (Same for All Alternatives)[5]	$ 13,366,803	$ 13,366,803	$ 13,366,803
Total	**$ 19,043,303**	**$ 22,380,003**	**$ 35,386,600**

Notes:

1 Costs based on previous construction costs and bids, approximately 5% of construction cost.

2 Costs based on Interim Action bids, Engineer's Estimate, RS Means, vendor quotes and professional experience.

3 All costs based on 2018 dollars.

4 Tax is on construction activities only and does not include consultants.

5 Interim Action includes consultant fees for design and oversight and construction.

Table H.7

Alternative 1—Capping Alternative[1]

Task	Item	Qty.	Unit	Unit Cost	Cost[2]
Task 1.0 - Pre-Remedial Sampling and Remedial Design					
1.01	Prepare Pre-Remedial Design SAP	1	LS	$ 50,000	$ 50,000
1.02	Implement Pre-Remedial Design SAP	1	LS	$ 100,000	$ 100,000
1.03	Prepare Engineering Design Report	1	LS	$ 100,000	$ 100,000
1.04	Prepare Construction Plans and Specifications	1	LS	$ 100,000	$ 100,000
1.05	Institutional Controls Development and Implementation	1	LS	$ 20,000	$ 20,000
1.06	Permitting	1	LS	$ 75,000	$ 75,000
1.07	Agency Oversight and Coordination	1	LS	$ 57,000	$ 57,000
Task 1.0 Total					**$ 502,000**
Task 2.0 - Implement Remedial Action					
2.01	Mobilization/Demobilization[3]	1	LS	$ 240,000	$ 240,000
2.02	Project Administration/Health and Safety[3]	1	LS	$ 240,000	$ 240,000
2.03	Field Engineering	1	LS	$ 157,700	$ 157,700
2.04	SMU 1 - Open Water Dredge (3-foot dredge plus 6-inch overdredge)	420	CY	$ 43	$ 18,200
2.05	SMU 1 - Contaminated Sediment Transport and Disposal	420	CY	$ 124	$ 52,000
2.06	SMU 5 - Under Pier Granular Cap (2-feet thick)	630	CY	$ 64	$ 40,300
2.07	SMU 6 - Open Water Granular Cap (3-feet thick)	1,410	CY	$ 69	$ 96,700
2.08	SMU 7 - Open Water Granular Cap (2-feet thick)	410	CY	$ 69	$ 28,100
2.09	SMU 8 - 1-Foot Excavation within Marine Railway	160	CY	$ 111	$ 17,800
2.10	SMU 8 - Contaminated Sediment Transport and Disposal	160	CY	$ 124	$ 19,800
2.11	SMU 8 - 1-Foot Granular Rock Cap to Restore Elevation	160	CY	$ 78	$ 12,500
2.12	SMU 9 - Mobilization/Demobilization of Dry Dock	1	LS	$ 118,200	$ 118,200
2.13	SMU 9 - Open Water Granular Cap (3-feet thick)	15,500	CY	$ 70	$ 1,085,000
2.14	SMU 10 - Intertidal Sediment Excavation (3-foot plus 6-inch overdredge)	890	CY	$ 56	$ 49,400
2.15	SMU 10 - Infrastructure Repair Allowance: Outfall and Bulkhead	1	LS	$ 50,000	$ 50,000
2.16	SMU 10 - Armored Cap w/Habitat Mix	6,890	SF	$ 15	$ 103,400
2.17	SMU 10 - Contaminated Sediment Transport and Disposal	890	CY	$ 124	$ 110,400
2.18	SMU 11 - Under Pier Granular Cap 1-foot Thickness	150	CY	$ 64	$ 9,600
2.19	West Marine Walkway Pier Removal and Replacement	1	LS	$ 334,000	$ 334,000
2.20	Repair and Armor Western Shoreline	350	LF	$ 200	$ 70,000
2.21	All SMUs as necessary - ENR (6-inches of Sand)	50	CY	$ 57	$ 2,900
2.22	Confirmation Sampling, Oversight, Construction Reporting, Operations and Maintenance Plan	1	LS	$ 250,000	$ 250,000
2.23	Archaeological Monitoring and Reporting	1	LS	$ 30,000	$ 30,000
Task 2.0 Subtotal					**$ 3,136,000**
	Tax on Construction Activities (8.7%)[4]				$ 248,500
Task 2.0 Total					**$ 3,384,500**
Task 3.0 - Long-Term Monitoring and Maintenance					
3.01	Cap Inspection and Maintenance	1	LS	$ 480,000	$ 480,000
Task 3.0 Total					**$ 480,000**
Totals					
Subtotal (Tasks 1.0 through 2.0)					**$ 4,366,500**
Contingency, 30%					$ 1,310,000
Interim Action Cost (Same for All Alternatives)[5]					**$ 13,366,803**
Total					**$ 19,043,303**

Notes:

1 Costs based on Interim Action bids, Engineer's Estimate, RS Means, vendor quotes and professional experience.

2 All costs based on 2018 dollars.

3 Costs based on previous construction costs and bids, approximately 5% of construction cost.

4 Tax is on construction activities only and does not include consultants.

5 Interim Action includes consultant fees for design and construction oversight.

Table H.8

Alternative 2—Dredging and Capping Alternative[1]

Task	Item	Qty.	Unit	Unit Cost	Cost[2]
Task 1.0 - Pre-Remedial Sampling and Remedial Design					
1.01	Prepare Pre-Remedial Design SAP	1	LS	$ 50,000	$ 50,000
1.02	Implement Pre-Remedial Design SAP	1	LS	$ 225,000	$ 225,000
1.03	Prepare Engineering Design Report	1	LS	$ 100,000	$ 100,000
1.04	Remedial Action Design	1	LS	$ 150,000	$ 150,000
1.05	Institutional Controls Development and Implementation	1	LS	$ 20,000	$ 20,000
1.06	Permitting	1	LS	$ 75,000	$ 75,000
1.07	Agency Oversight and Coordination	1	LS	$ 77,000	$ 77,000
Task 1.0 Total					**$ 697,000**
Task 2.0 - Implement Remedial Action					
2.01	Mobilization/Demobilization[3]	1	LS	$ 380,000	$ 380,000
2.02	Project Administration/Health and Safety[3]	1	LS	$ 380,000	$ 380,000
2.03	Field Engineering	1	LS	$ 315,300	$ 315,300
2.04	SMU 1 - Open Water Dredge (3-foot dredge plus 6-inch overdredge)	420	CY	$ 43	$ 18,200
2.05	SMU 1 - Contaminated Sediment Transport and Disposal	420	CY	$ 124	$ 52,000
2.04	SMU 5 - Under Pier Granular Cap (2-feet thick)	630	CY	$ 64	$ 40,300
2.05	SMU 6 - Open Water Dredge (3-foot dredge plus 6-inch overdredge)	1,650	CY	$ 43	$ 71,600
2.06	SMU 6 - Contaminated Sediment Transport and Disposal	1,650	CY	$ 124	$ 204,600
2.07	SMU 7 - Open Water Granular Cap (2-feet thick)	410	CY	$ 68	$ 28,100
2.08	SMU 8 - 1-Foot Excavation within Marine Railway	160	CY	$ 111	$ 17,800
2.09	SMU 8 - Contaminated Sediment Transport and Disposal	160	CY	$ 124	$ 19,800
2.10	SMU 8 - 1-Foot Granular Rock Cap to Restore Elevation	160	CY	$ 95	$ 15,200
2.11	SMU 9 - Mobilization/Demobilization of Dry Dock	1	LS	$ 118,200	$ 118,200
2.12	SMU 9 - Open Water Dredge (3-foot dredge plus 6-inch overdredge)	15,500	CY	$ 43	$ 673,000
2.13	SMU 9 - Contaminated Sediment Transport and Disposal	15,500	CY	$ 124	$ 1,922,000
2.14	SMU 10 - Intertidal Sediment Excavation (3-foot plus 6-inch overdredge)	890	CY	$ 56	$ 49,400
2.15	SMU 10 - Infrastructure Repair Allowance: Outfall and Bulkhead	1	LS	$ 50,000	$ 50,000
2.16	SMU 10 - Backfill to Existing Elevations	6,890	SF	$ 15	$ 103,400
2.17	SMU 10 -Contaminated Sediment Transport and Disposal	890	CY	$ 124	$ 110,400
2.18	SMU 11 - Under Pier Granular Cap 1-foot Thickness	150	CY	$ 64	$ 9,600
2.19	All SMUs as necessary - ENR (6-inches of Sand)	240	CY	$ 57	$ 13,700
2.17	West Marine Walkway Pier Removal and Replacement	1	LS	$ 334,000	$ 334,000
2.20	Repair and Armor Western Shoreline	350	LF	$ 200	$ 70,000
2.21	Confirmation Sampling, Oversight, Construction Reporting, Operations and Maintenance Plan	1	LS	$ 550,000	$ 550,000
2.22	Archaeological Monitoring and Reporting	1	LS	$ 30,000	$ 30,000
Task 2.0 Subtotal					**$ 5,576,600**
Tax on Construction Activities (8.7%)[4]					$ 399,600
Task 2.0 Total					**$ 5,976,200**
Task 3.0 - Long-Term Monitoring and Maintenance					
3.01	Cap Inspection and Maintenance	1	LS	$ 260,000	$ 260,000
Task 3.0 Total					**$ 260,000**
Totals					
Subtotal (Tasks 1.0 through 2.0)					**$ 6,933,200**
Contingency, 30%					$ 2,080,000
Interim Action Cost (Same for All Alternatives)[5]					**$ 13,366,803**
Total					**$ 22,380,003**

Notes:

1 Costs based on Interim Action bids, Engineer's Estimate, RS Means, vendor quotes and professional experience.
2 All costs based on 2018 dollars.
3 Costs based on previous construction costs and bids, approximately 5% of construction cost.
4 Tax is on construction activities only and does not include consultants.
5 Interim Action includes consultant fees for design and oversight and construction.

Table H.9

Alternative 3—Full Removal Alternative[1]

Task	Item	Qty.	Unit	Unit Cost	Cost[2]
Task 1.0 - Pre-Remedial Sampling and Remedial Design					
1.01	Prepare Pre-Remedial Design SAP	1	LS	$ 50,000	$ 50,000
1.02	Implement Pre-Remedial Design SAP	1	LS	$ 225,000	$ 225,000
1.03	Prepare Engineering Design Report	1	LS	$ 100,000	$ 100,000
1.04	Remedial Action Design	1	LS	$ 800,000	$ 800,000
1.05	Institutional Controls Development and Implementation	1	LS	$ 20,000	$ 20,000
1.06	Permitting	1	LS	$ 75,000	$ 75,000
1.07	Agency Oversight and Coordination	1	LS	$ 157,000	$ 157,000
Task 1.0 Total					**$ 1,427,000**
Task 2.0 - Implement Remedial Action					
2.01	Mobilization/Demobilization[3]	1	LS	$ 1,130,000	$ 1,130,000
2.02	Project Administration/Health and Safety[3]	1	LS	$ 1,130,000	$ 1,130,000
2.03	Field Engineering	1	LS	$ 315,300	$ 315,300
2.04	SMU 1 - Open Water Dredge (3-foot dredge plus 6-inch overdredge)	420	CY	$ 43	$ 18,200
2.05	SMU 1 - Contaminated Sediment Transport and Disposal	420	CY	$ 124	$ 52,000
2.06	SMUs 2 and 4 - Remove Cap Placed During Interim Action	1,803	CY	$ 67	$ 120,100
2.07	SMUs 2 and 4 - Intertidal Sediment Excavation (average of 3-feet)	1,803	CY	$ 56	$ 100,100
2.08	SMUs 2 and 4 - Contaminated Sediment Transport and Disposal	1,803	CY	$ 124	$ 223,600
2.09	SMUs 2 and 4 - Backfilll to Original Elevation	16,225	SF	$ 6	$ 97,400
2.10	SMU 5 - Demo and Replace Pier	2,260	SF	$ 320	$ 724,000
2.11	SMU 5 - Open Water Dredge (3-foot dredge plus 6-inch overdredge)	854	CY	$ 43	$ 37,100
2.12	SMU 5 - Contaminated Sediment Transport and Disposal	854	CY	$ 124	$ 105,900
2.13	SMU 6 - Open Water Dredge (3-foot dredge plus 6-inch overdredge)	1,647	CY	$ 43	$ 71,500
2.14	SMU 6 - Contaminated Sediment Transport and Disposal	1,647	CY	$ 124	$ 204,200
2.15	SMU 7 - Open Water Dredge (3-foot dredge plus 6-inch overdredge)	720	CY	$ 43	$ 31,300
2.16	SMU 7 - Contaminated Sediment Transport and Disposal	720	CY	$ 124	$ 89,300
2.17	SMU 7 - Demolish and Rebuild Marine Railway	1	LS	$ 3,045,600	$ 3,045,600
2.18	SMU 8 - Demolish and Rebuild Marine Railway	1	LS	$ 1,561,500	$ 1,561,500
2.19	SMU 8 - Intertidal Sediment Excavation (3-foot dredge plus 6 inch overdredge)	528	CY	$ 56	$ 29,300
2.20	SMU 8 - Contaminated Sediment Transport and Disposal	528	CY	$ 124	$ 65,500
2.21	SMU 9 - Mobilization/Demobilization of Dry Dock	1	LS	$ 118,200	$ 118,200
2.22	SMU 9 - Open Water Dredge (3-foot dredge plus 6-inch overdredge)	15,496	CY	$ 43	$ 672,800
2.23	SMU 9 - Contaminated Sediment Transport and Disposal	15,496	CY	$ 124	$ 1,921,500
2.24	SMU 10 -Intertidal Sediment Excavation (3-foot dredge plus 6 inch overdredge)	894	CY	$ 56	$ 49,600
2.25	SMU 10 - Infrastructure Repair Allowance: Outfall and Bulkhead	1	LS	$ 50,000	$ 50,000
2.26	SMU 10 - Backfill to Existing Elevations	6,892	SF	$ 15	$ 103,400
2.27	SMU 10 -Contaminated Sediment Transport and Disposal	894	CY	$ 124	$ 110,900
2.28	SMU 11 -Demolish and Rebuild Existing Pier	2,838	SF	$ 320	$ 909,200
2.29	SMU 11 - Open Water Dredge (3-foot dredge plus 6-inch overdredge)	528	CY	$ 43	$ 22,900
2.30	SMU 11 - Contaminated Sediment Transport and Disposal	528	CY	$ 124	$ 65,500
2.31	SMU 11 - Backfill to Existing Elevations in Intertidal Area	161	CY	$ 15	$ 2,400
2.32	West Marine Walkway Pier Removal and Replacement	1	LS	$ 334,000	$ 334,000
2.33	Repair and Armor Western Shoreline	350	LF	$ 200	$ 70,000
2.34	All SMUs as necessary - ENR (6-inches of Granular)	280	CY	$ 57	$ 15,960
2.35	Confirmation Sampling, Oversight, Construction Reporting, Operations and Maintenance Plan	1	LS	$ 700,000	$ 700,000
2.36	Archaeological Monitoring and Reporting	1	LS	$ 30,000	$ 30,000
Task 2.0 Subtotal					**$ 14,328,260**
	Tax on Construction Activities (8.7%)[4]				$ 1,183,000
Task 2.0 Total					**$ 15,511,260**
Totals					
Subtotal (Tasks 1.0 through 2.0)					**$ 16,938,300**
Contingency, 30%					$ 5,081,500
Interim Action Cost (Same for All Alternatives)[5]					**$ 13,366,803**
Total					**$ 35,386,603**

Notes:

1 Costs based on Interim Action bids, Engineer's Estimate, RS Means, vendor quotes and professional experience.

2 All costs based on 2018 dollars.

3 Costs based on previous construction costs and bids, approximately 5% of construction cost.

4 Tax is on construction activities only and does not include consultants.

5 Interim Action includes consultant fees for design and oversight and construction.

Table H.10
Interim Action Costs

Name and Description of Work	TOTAL PRICE	% Upland	% Sediment	Upland	Sediment
Floyd|Snider - Environmental Consulting: Investigation, Design and Const. Services	$ 660,300	30%	70%	$ 198,100	$ 462,200
Subcontractors to Floyd|Snider					
Historical Research Associates Inc. - Archeological Consulting and Monitoring	$ 66,800	70%	30%	$ 46,800	$ 20,000
Marine Sampling Systems - Confirmation Sampling Vessel and Crew	$ 4,200	0%	100%	$ -	$ 4,200
OnSite Environmental Inc. - Analytical Services	$ 41,300	30%	70%	$ 12,400	$ 28,900
Research Support Services (RSS) - Confirmation Sampling Vessel and Crew	$ 22,200	0%	100%	$ -	$ 22,200
Berger ABAM - Civil and Structural Engineering Design and Construction Services	$ 1,164,700	20%	80%	$ 232,940	$ 931,760
Subcontractors to Berger ABAM					
Greg Morin - Construction Management	$ 175,000	20%	80%	$ 35,000	$ 140,000
Anchor QEA - Permitting	$ 170,000	0%	100%	$ -	$ 170,000
MED Tox - Hazardous Material Assessment	$ 15,800	100%	0%	$ 15,800	$ -
Geoengineers - Geotechnical engineering services	$ 45,500	100%	0%	$ 45,500	$ -
BCE - Electrical engineering Services	$ 270,000	50%	50%	$ 135,000	$ 135,000
Tinnea - Corrosion	$ 8,300	0%	100%	$ -	$ 8,300
ICF - Historical Consultants	$ 50,845	50%	50%	$ 25,423	$ 25,423
Elcon - Electrical Engineering Services	$ 32,000	50%	50%	$ 16,000	$ 16,000
PS&E - Survey	$ 64,040	50%	50%	$ 32,020	$ 32,020
MTC - Material Testing	$ 30,400	100%	0%	$ 30,400	$ -
IMCO - Prime Contractor for Construction					
IMCO (Prime Contractor) Total[1,2]	$ 11,197,000	7%	93%	$ 736,300	$ 10,460,700
IMCO (Prime Contractor) Sales Tax (8.7%)[1,2]	$ 974,200	7%	93%	$ 64,100	$ 910,100
IMCO (Prime Contractor) Total[1,2]	$ 12,171,200	7%	93%	$ 800,400	$ 11,370,800
Interim Action Total Costs				**$ 1,625,783**	**$ 13,366,803**

Notes:

1 Construction costs were divided into upland and sediment portions on a per bid item basis. Only the overall percentage is shown here.

2 Construction costs are for the contractor, IMCO, and their subcontractors.

Harris Avenue Shipyard

Remedial Investigation/ Feasibility Study

Appendix I
Evaluation of Sediment Deposition

FINAL

Evaluation of Sediment Deposition

In the Sediments Remedial Investigation and Feasibility Study completed by The RETEC Group, Inc. (RETEC; RETEC 2004), an evaluation of sedimentation rates and sediment mixing was completed by utilization of a geochronological radioisotope age dating profiling technique that relies on analysis of cesium-137 (Cs-137) concentrations in sediment. This technique enables determination of the net sedimentation rate, which is an important indicator of natural recovery potential, and facilitates estimation of the depth of potentially contaminated sediments.

Cs-137 is a chemical produced during nuclear fission due to nuclear testing or by releases from nuclear reactors; it has no natural sources (Ritchie and McHenry 1990). Cs-137 first appeared in the environment as a result of nuclear tests that were initiated at a small scale in 1945; in 1952, the initiation of high-yield nuclear testing caused widespread global dispersion of Cs-137 (Ritchie and McHenry 1990). Once present in the atmosphere, Cs-137 settles onto soil and sediment, where it is strongly sorbed. The scientific community generally agrees that measurable amounts of Cs-137 began to appear in soil and sediment in 1954 (Ritchie and McHenry 1990). The rate of Cs-137 accumulation or loss in sediment is indicative of the net rate of deposition or erosion, and can be determined by comparing the vertical distribution of Cs-137 in sediments with knowledge of global and local Cs-137 releases to the atmosphere (Ritchie and McHenry 1990). For example, large-scale nuclear testing resulted in Cs-137 concentration peaks in 1958 and 1963; while a testing moratorium from 1958 to 1961 and the Test Ban Treaty of 1963 have resulted in periods of decreasing concentrations of Cs-137 (Ritchie and McHenry 1990). Globally, the greatest concentrations of Cs-137 in sediments are associated with the peak in nuclear testing in 1963 (WDNR 1995).

Thus, sediment profiles will exhibit a peak Cs-137 concentration in 1963 and shallower sample depths will indicate contamination patterns post-1963. Sediment profiles that decline dramatically, exhibiting only minor increases in concentration after 1963 (which may be correlated to small-scale testing in the early 1970s) are indicative of situations in which only deposition of surface sediment has taken place. Extensive resuspension of sediment is evidenced by shallow sediment concentrations that display significant local maxima after 1963.

In 2000, three locations from within the sediments at active areas of the Harris Avenue Shipyard (Site) were sampled and analyzed for Cs-137 to determine the net sedimentation rate (RETEC 2004). After initial collection of the cores (HCS-34, HCS-41, and HCS-50), the cores were divided into 2-centimeter (cm) sections, homogenized, and shipped overnight in laboratory-provided jars to Battelle Northwest Laboratories (Battelle) for analysis. From the data provided by Battelle (Attachment 1), RETEC created a figure showing the typical Cs-137 profile observed in all of the cores collected from the Site (Attachment 2).

At the time of sample collection, the 1963 Cs-137 peak was present at a depth of 24 centimeters (cm) in two of the cores (HCS-34 and HCS-41) and at a depth of 30 cm in the remaining core (HCS-50) after a correction for compaction was made. The resulting sedimentation rate over a 37-year period (from 1963 to 2000, when samples were collected) was calculated to be 0.65 cm per year at HCS-34 and HCS-41, and 0.81 cm per year at HCS-50. These rates may be extrapolated to estimate sedimentation at the shipyard since it began operations in 1915,[1] assuming that sedimentation rates during this 37-year period are representative of depositional patterns at the shipyard throughout the entire 103-year operational timeframe. When this

[1] It is assumed that the sediment surface was clean or native prior to the start of shipyard operations in 1915.

calculation is completed, the total sedimentation is estimated to vary between 67.0 and 83.4 cm (2.20 to 2.74 feet). Thus, with the exception of localized disturbances caused by site filling, dredging, or other developmental activities, it is expected that contamination in sediment as a result of shipyard activities is confined to the upper 3 feet of the sediments.

The sedimentation rates reported by RETEC are less than half of the sedimentation rate estimated for the Inner Bellingham Bay (Hart Crowser 1997), indicating that natural attenuation will be slower for the Site than for other sites in the same geographic area. Based on the sedimentation rates calculated from the data collected in 2000, it is unlikely that natural recovery alone will be sufficient to bring the Site into compliance with Sediment Management Standards (SMS) within a 10-year restoration timeframe; however, a dredge depth between 2 and 3 feet would be sufficient to reach a native surface. However, a recent study by Landau Associates stated that “sediment accumulation at other locations in Bellingham Bay support the conclusion that natural recovery is occurring throughout Bellingham Bay” (Landau Associates 2013), indicating that natural recovery is likely occurring at the Site and in the areas outside the active remediation area.

REFERENCES

Hart Crowser. 1997. *Remedial Investigation Report for the Whatcom Waterway Site.* Prepared for Georgia Pacific West Corporation.

The RETEC Group, Inc. (RETEC). 2004. *Sediments Remedial Investigation and Feasibility Study, Harris Avenue Shipyard, Bellingham, Washington*. Prepared for the Port of Bellingham. 27 May.

Ritchie, Jerry C. and J. Roger McHenry. 1990. “Application of Radioactive Fallout Cesium-137 for Measuring Soil Erosion and Sediment Accumulation Rates and Patterns: A Review.” *Journal of Environmental Qualify*. 19: 215–233.

Wisconsin Department of Natural Resources (WDNR). 1995. *A Deterministic PCB Transport Model for the Lower Fox River Between Lake Winnebago and De Pere, Wisconsin*. PUBL WR 389-95. May.

Landau Associates. 2013. *FINAL Remedial Investigation/Feasibility Study, Cornwall Avenue Landfill, Bellingham, Washington*. Prepared for the Port of Bellingham. 17 December.

Harris Avenue Shipyard

Remedial Investigation/ Feasibility Study

Appendix I
Evaluation of Sediment Deposition

Attachment I.1
Battelle Cs-137 Data Report

FINAL

March 20, 2001

Battelle
Pacific Northwest Division

Marine Sciences Laboratory
1529 West Sequim Bay Road
Sequim, Washington 98382-9099
Telephone (206) 683-4151
Facsimile (206) 681-3699

Mr. Damon Morris
ThermoRetec Corp.
1011 SW Klickitat Way, Suite 207
Seattle, WA 98134-1162

Dear Mr. Morris:

Enclosed, please find final results for Cs-137 and percent dry weight analyses performed on sediment samples sent by ThermoRetec and received by Battelle Marine Sciences Laboratory on September 9, 2000. The samples were checked against the accompanying custody forms (copies enclosed) and given MSL ID numbers. All samples were present, unless otherwise noted on the custody forms. Samples were analyzed for Cs-137 using gamma emission spectrometry.

Results indicate a cesium peak near 24 to 26 cm depth in each core. The Cs peak in core 41 may be a result of grain size affects as the percent dry weight changes abruptly with a corresponding change in Cs levels below 26 cm depth. The change in percent dry weight suggests a sand layer which would typically contain low levels of Cs-137. The Cs peak in cores 50 and 34 indicate an approximate date of 1960 near 26 cm depth. A more accurate estimate of date could be determined with Pb-210 analyses of these samples. Three replicates of our Cs-137 standard reference material, IAEA-135 were within our default criteria of ±20% relative percent difference. Duplicate results were not calculable as the sample duplicated had Cs results less than the detection limit.

We apologize for the lengthy delay in obtaining these results for you. We had some instrument problems caused by an interference in our electrical power here as a result of a storm. We had to have our detector repaired at an off-site facility. We have since procured a UPS (uninterrupted power source) and should not have this problem in the future. It was a pleasure working with you. Data have been flagged with a "U" for those values less than the instrument detection limit.

Table 1 describes the cost breakdown for these analyses. If you have any problems with the data or have discrepancies with the cost breakdown, please contact me at 360-681-3627. We will return these samples to you on April 4th, 2001, unless otherwise advised by you.

Sincerely,

Linda S. Bingler
Research Scientist

enc.

9434

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME	SAMPLERS:	RECEIVING LABORATORY:
04140-220	Harris Ave. Shipyard	DM/TH/BH	Battelle

SEND RESULTS TO: Mark Larsen

Page 1 of 3
Cores 1 of 2

LAB I.D. NO.	DATE	TIME	SAMPLE NO.	NO. OF CONTAINERS	Cesium 137	Archive -18°C	REMARKS
1569-1	9/1/00	10:10	HCS 50 - S1	1	X		0-2 cm
2		1012	HCS 50 - S2	1	X		2-4 cm
3		1014	HCS-50 - S3	1	X		4-6 cm
4		1016	HCS 50 - S4	1	X		6-8 cm
5		1018	HCS 50 - S5	1	X		8-10 cm
6		1020	HCS 50 S6	1	X		10-12 cm
7		1022	HCS 50 S7	1	X		12-14 cm
8		1024	HCS 50 S8	1	X		14-16 cm
9		1026	HCS 50 S9	1	X		16-18 cm
10		1028	HCS 50 S10	1	X		18-20 cm
61		1030	HCS 50 S11	1		X	20-22 cm
62		1032	HCS 50 S12	1		X	22-24 cm
11		1034	HCS 50 S13	1	X		24-26 cm
63		1036	HCS 50 S14	1		X	26-28 cm
64		1038	HCS 50 S15	1		X	28-30 cm
12		1040	HCS 50 S16	1	X		30-32 cm
65	↓	1042	HCS 50 S17	1		X	32-34 cm

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Dawn Morin	9/5/00 1615	9-6-00 3:45			

Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time

Shipper Information

REMEDIATION TECHNOLOGIES INC
REMEDIATION TECHNOLOGIES
1011 S.W. Klickitat Way
Suite 207
Seattle, WA 98134
(206) 624-9349

9435

CHAIN OF CUSTODY RECORD

PROJ. NO. PORTB 04140220 | PROJECT NAME: Harris Ave Shipyard

SAMPLERS: DM/TH/BH

RECEIVING LABORATORY: Battelle

SEND RESULTS TO: Mark Larsen

Page 2 of 3

Order 1 of 2

LAB I.D. NO.	DATE	TIME	SAMPLE NO.	NO. OF CONTAINERS	Cesium 137	Archive -18°C	REMARKS
1569-66	9/1/00	1044	HCS 50 S18	1		X	34-36 cm
-13		1046	HCS 50 S19	1	X		36-38 cm
67		1048	HCS 50 S20	1		X	38-40 cm
68		1050	HCS 50 S21	1		X	40-42 cm
-14		1052	HCS 50 S22	1	X		42-44 cm
69		1054	HCS 50 S23	1		X	44-46 cm
70		1056	HCS 50 S24	1		X	46-48 cm
-15		1058	HCS 50 S25	1	X		48-50 cm
71		1100	HCS 50 S26	1		X	50-52 cm
72		1102	HCS 50 S27	1		X	52-54 cm
-16		1104	HCS 50 S28	1	X		54-56 cm
73		1106	HCS 50 S29	1		X	56-58 cm
74		1108	HCS 50 S30	1		X	58-60 cm
75		1110	HCS 50 S31	1		X	60-62 cm
76		1112	HCS 50 S32	1		X	62-64 cm
77		1114	HCS 50 S33	1		X	64-66 cm
-77		1116	HCS 50 S34	1	X		66-68 cm

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Damon Morris	9/5/00 1615	3:45 9-6-00			
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time		

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Suite 207
Seattle, WA 98134
(206) 624-9349

9420

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME Harris Ave Shipyard Portb 04140-220
SAMPLERS: SD	
RECEIVING LABORATORY: Battelle	

SEND RESULTS TO: Mark Larson

#1 of 6
Cooler 2 of 2

LAB I.D. NO.	DATE	TIME	SAMPLE NO.	NO. OF CONTAINERS	Cesium-137	Archive -18°C	REMARKS
1869-19	8/31/00	1215	HCS-34-S1	1	X		0-2 cm
-20		1217	HCS-34-S2	1	X		2-4 cm
-21		1219	HCS-34-S3	1	X		4-6 cm
-22		1221	HCS-34-S4	1	X		6-8 cm
-23		1223	HCS-34-S5	1	X		8-10 cm
-24		1225	HCS-34-S6	1	X		10-12 cm
-25		1227	HCS-34-S7	1	X		12-14 cm
-26		1229	HCS-34-S8	1	X		14-16 cm
-27		1231	HCS-34-S9	1	X		16-18 cm
-28		1233	HCS-34-S10	1	X		18-20 cm
-29		1235	HCS-34-S11	1		X	20-22 cm
84		1237	HCS-34-S12	1		X	22-24 cm
-30		1238	HCS-34-S13	1	X		24-26 cm
85		1240	HCS-34-S14	1		X	26-28 cm
86		1241	HCS-34-S15	1		X	28-30 cm
-31		1243	HCS-34-S16	1	X		30-32 cm
87		1245	HCS-34-S17	1		X	32-34 cm

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	8/31/00 1900	[signature]	[signature]	9/1/00 1615	
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time		
		[signature]	9-6-00 1345		

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1011 S.W. Klickitat Way
Suite 207
Seattle, WA 98134
(206) 624-9349

9421

CHAIN OF CUSTODY RECORD

PROJ. NO. | PROJECT NAME: Harris Ave Shipyard Portb-04140-220

SAMPLERS: SD, AuF

RECEIVING LABORATORY: Battelle

SEND RESULTS TO: Mark Larsen

Pax 2 of 6

Cooler 2 of 2

LAB I.D. NO.	DATE	TIME	SAMPLE NO.	NO. OF CONTAINERS	Cesium-137	Archive -18°C	REMARKS
88	8/31/00	1247	HCS-34-S18	1		X	34-36 cm
1569-32		1249	HCS-34-S19	1	X		36-38 cm
89		1251	HCS-34-S20	1		X	38-40 cm
90		1253	HCS-34-S21	1		X	40-42 cm
-33		1255	HCS-34-S22	1	X		42-44 cm
91		1257	HCS-34-S23	1		X	44-46 cm
92		1259	HCS-34-S24	1		X	46-48 cm
-34		1310	HCS-34-S25	1	X		48-50 cm
93		1328	HCS-34-S26	1		X	50-52 cm
94		1330	HCS-34-S27	1		X	52-54 cm
-35		1332	HCS-34-S28	1	X		54-56 cm
95		1334	HCS-34-S29	1		X	56-58 cm
96		1336	HCS-34-S30	1		X	58-60 cm
97		1338	HCS-34-S31	1		X	60-62 cm
98		1340	HCS-34-S32	1		X	62-64 cm
99		1342	HCS-34-S33	1		X	64-66 cm
-36	↓	1344	HCS-34-S34	1	X		66-68 cm

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
	8/31/00 1900			9/5/11 1615	
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time		
			9-6-00 8:45		

Shipper Information

REMEDIATION TECHNOLOGIES INC
REMEDIATION TECHNOLOGIES
1011 S.W. Klickitat Way
Suite 207
Seattle, WA 98134
(206) 624-9349

9422

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME Harris Ave Shipyard Portb-04140-220
SAMPLERS: SD, AGF	
RECEIVING LABORATORY: Battelle	

SEND RESULTS TO: Mark Larsen

Page 3 of 6

Coolers 2 of 2

LAB I.D. NO.	DATE	TIME	SAMPLE NO.	NO. OF CONTAINERS	Cesium-137	Archive -18°C	REMARKS
1569-100	8/31/00	1346	HCS-34-S35	1		X	68-70 cm
-101		1348	HCS-34-S36	1		X	70-72 cm
-102		1352	HCS-34-S37	1		X	72-74 cm
-103		1354	HCS-34-S38	1		X	74-76 cm
1563-37		1356	HCS-34-S39	1	X		76-78 cm
-130	↓	1400	HCS-34-S40	1		X	78-80 cm

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
	8/31/00 1900			9/5/00 1615	
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time		
			9-6-00 3:45		

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REMEDIATION TECHNOLOGIES INC
REMEDIATION TECHNOLOGIES
1011 S.W. Klickitat Way
Suite 207
Seattle, WA 98134
(206) 624-9349

5438

CHAIN OF CUSTODY RECORD

PROJ. NO. PORTB 04140-220 | PROJECT NAME: Harris Ave. Shipyard

SAMPLERS: SD, AcF

RECEIVING LABORATORY: Battelle

SEND RESULTS TO: Mark Larsen

Page 4 of 6

Cooler 2 of 2

LAB I.D. NO.	DATE	TIME	SAMPLE NO.	NO. OF CONTAINERS	Cesium 137	Archive -18°C						REMARKS
1569-38	8/31/00	1430	HCS-41-S1	1	X							0-2 cm
39		1432	HCS-41-S2	1	X							2-4 cm
40		1434	HCS-41-S3	1	X							4-6 cm
41		1436	HCS-41-S4	1	X							6-8 cm
42		1438	HCS-41-S5	1	X							8-10 cm
43		1440	HCS-41-S6	1	X							10-12 cm
44		1442	HCS-41-S7	1	X							12-14 cm
45		1444	HCS-41-S8	1	X							14-16 cm
46		1446	HCS-41-S9	1	X							16-18 cm
47		1448	HCS-41-S10	1	X							18-20 cm
-104		1450	HCS-41-S11	1		X						20-22 cm
-105		1452	HCS-41-S12	1		X						22-24 cm
-48		1454	HCS-41-S13	1	X							24-26 cm
-106		~~1456~~ 1456	HCS-41-S14	1		X						26-28 cm
-107		~~1458~~ 1458	HCS-41-S15	1		X						28-30 cm
-49		1502	HCS-41-S16	1	X							30-32 cm
-108		1504	HCS-41-S17	1		X						32-34 cm

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Anne Kilpatrick	8/31/00 1900	Damon Morris	Damon Morris	9/1/00 1615	
Relinquished by: (Signature) Anne Kilpatrick	Date / Time	Received for Laboratory by: (Signature) 9-6-00 3:45	Date / Time		

Shipper Information

REMEDIATION TECHNOLOGIES INC

REMEDIATION TECHNOLOGIES
1011 S.W. Klickitat Way
Suite 207
Seattle, WA 98134
(206) 624-9349

9441

CHAIN OF CUSTODY RECORD

PROJ. NO. PORTB 04140-220	PROJECT NAME Harris Ave Shipyard			NO. OF CONTAINERS	Cesium 137	Archive -18°C							SEND RESULTS TO: Mark Larsen Page 5 of 6 Cooler 2 of 2
SAMPLERS: SD, AGF													
RECEIVING LABORATORY: Battelle													
LAB I.D. NO.	DATE	TIME	SAMPLE NO.										REMARKS
-109	8/31/00	1506	HCS-41 - S18	1		X							34-36 cm
1569-50		1508	HCS-41 S19	1	X								36-38 cm
-110		1510	HCS-41 S20	1		X							38-40 cm
-111		1512	HCS-41 S21	1		X							40-42 cm
-51		1514	HCS-41 S22	1	X								42-44 cm
-112		1516	HCS-41 S23	1		X							44-46 cm
-113		1518	HCS-41 S24	1		X							46-48 cm
-52		1520	HCS-41 S25	1	X								48-50 cm
-114		1522	HCS-41 S26	1		X							50-52cm
-115		1524	HCS-41 S27	1		X							52-54 cm
-53		1526	HCS-41 S28	1	X								54-56 cm
-116		1528	HCS-41 S29	1		X							56-58cm
-117		1530	HCS-41 S30	1		X							58-60cm
-118		1532	HCS-41 S31	1		X							60-62 cm
-119		1534	HCS-41 S32	1		X							62-64 cm
-120		1536	HCS-41 S33	1		X							64-66 cm
-54	✓	1538	HCS-41 S34	1	X								66-68 cm

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
	8/31/00 1900			9/1/00 1615	
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)		Date / Time	
			9-6-00	3:45pm	

Shipper Information

REMEDIATION TECHNOLOGIES INC
REMEDIATION TECHNOLOGIES
1011 S.W. Klickitat Way
Suite 207
Seattle, WA 98134
(206) 624-9349

9442

CHAIN OF CUSTODY RECORD

PROJ. NO. PORTS 04190220 | PROJECT NAME: Harris Arp Shipyard

SAMPLERS: SD, ACF

RECEIVING LABORATORY: Battelle

SEND RESULTS TO: Mark Larsen

Page 6 of 6

Cooler 2 of 2

LAB I.D. NO.	DATE	TIME	SAMPLE NO.	NO. OF CONTAINERS	Cesium 137	Archive -18°C	REMARKS
1569-121	8/31/00	1540	HCS 41 - S35	1		X	68 - 70cm
-122		1542	HCS 41 - S36	1		X	70 - 72 cm
-123		1544	HCS 41 - S37	1		X	72 - 74cm
-124		1546	HCS 41 - S38	1		X	74 - 76 cm
-55		1548	HCS 41 - S39	1	X	X 9m	76 - 78 cm
-125		1550	HCS 41 - S40	1		X	78 - 80 cm
-126		1552	HCS 41 - S41	1		X	80 - 82cm
-127		1554	HCS 41 S42	1		X	82 - 84 cm
-128		1556	HCS 41 S43	1		X	84 - 86 cm
-56 ~~-130~~	8/	1558	HCS 41 S44	1	X	X 9m	86 - 88 cm
-129	↓	1600	HCS-41 S45	1		X	88 - 90 cm

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
	8/31/00 1900	8/31/00 1900		9/1/00 1615	
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time		
			9-6-00 3:45		

Shipper Information

REMEDIATION TECHNOLOGIES INC

REMEDIATION TECHNOLOGIES
1011 S.W. Klickitat Way
Suite 207
Seattle, WA 98134
(206) 624-9349

Percent Dry Weight

3/5/01

Project: Bellingham Bay
Matrix: Sediments
Analyst L. Bingler
CF#: 1596
Addendum: 4151
Balance #: 11

Sample Number	Tare Weight (g)	Tare + Wet Weight (g)	Tare + Dry Weight (g)	Wet Weight (g)	Dry Weight (g)	% Dry Weight	% Wet Weight
1569*1	23.556	140.86	65.31	117.30	41.754	35.60	64.40
1569*3	23.537	169.72	105.88	146.19	82.346	56.33	43.67
1569*5	24.033	176.21	116.04	152.18	92.009	60.46	39.54
1569*7	24.309	179.59	121.16	155.28	96.854	62.37	37.63
1569*9	23.521	195.82	125.03	172.30	101.505	58.91	41.09
1569*11	24.381	219.18	127.23	194.80	102.849	52.80	47.20
1569*13	23.462	205.37	107.44	181.91	83.982	46.17	53.83
1569*15	24.233	177.63	101.37	153.40	77.136	50.28	49.72
1569*17	24.532	262.82	205.76	238.29	181.228	76.05	23.95
1569*28	23.876	187.33	113.52	163.46	89.640	54.84	45.16
1569*38	23.965	156.01	73.90	132.04	49.935	37.82	62.18
1569*40	24.003	162.17	96.04	138.17	72.034	52.13	47.87
1569*42	23.471	149.76	90.01	126.29	66.536	52.69	47.31
1569*44	23.876	186.68	99.86	162.80	75.988	46.67	53.33
1569*46	23.949	159.24	91.79	135.29	67.840	50.14	49.86

Percent Dry Weight

3/14/01

Project: Bellingham Bay
Matrix: Sediments
Analyst L. Bingler
CF#: 1596
Addendum: 4151
Balance #: 11

Sample Number	Tare Weight (g)	Tare + Wet Weight (g)	Tare + Dry Weight (g)	Wet Weight (g)	Dry Weight (g)	% Dry Weight	% Wet Weight
1569*29	24.453	224.98	135.04	200.53	110.585	55.15	44.85
1569*48	23.925	175.33	103.47	151.40	79.545	52.54	47.46
1569*50	23.999	249.94	207.63	225.94	183.634	81.28	18.72
1569*52	23.599	223.76	171.48	200.16	147.880	73.88	26.12
1569*54	23.651	258.80	196.90	235.15	173.249	73.68	26.32
1569*84	23.622	210.91	128.21	187.29	104.585	55.84	44.16

Percent Dry Weight

11/15/00

Project: Bellingham Bay
Matrix: Sediments
Analyst L. Bingler
CF#: 1569
Addendum: Kit
Balance #: 11

Sample Number	Tare Weight (g)	Tare + Wet Weight (g)	Tare + Dry Weight (g)	Wet Weight (g)	Dry Weight (g)	% Dry Weight	% Wet Weight
1569*19	23.92	166.59	79.37	142.67	55.448	38.86	61.14
1569*21	23.46	190.78	92.89	167.32	69.427	41.49	58.51
1569*23	23.82	172.42	91.16	148.60	67.340	45.32	54.68
1569*25	23.57	206.50	115.69	182.93	92.122	50.36	49.64
1569*27	23.89	204.67	122.36	180.78	98.462	54.47	45.53
1569*30	23.66	188.18	118.64	164.52	94.973	57.73	42.27
1569*32	23.47	250.44	171.95	226.97	148.484	65.42	34.58
1569*34	23.91	280.55	218.05	256.64	194.136	75.65	24.35
1569*36	23.71	278.89	223.10	255.17	199.386	78.14	21.86

Battelle Marine Sciences Laboratory
1529 West Sequim Bay Rd.
Sequim, WA 98382
(360) 683-4151
PROJECT: 1569

3/14/01

Pb-210 in Bellingham Bay Sediments
Results in disintegrations per minute per gram (dry weight)

BATTELLE CODE	SPONSOR CODE	Depth (cm)	Dry Wt. (g)	Percent Dry Wt. (g)	*Cs 137* dis/min/g (dry wt.)	SRM CERTIFIED VALUE dis/min/g	%RPD
IAEA-135	SRM		11.0		48.1	54.06	12%
IAEA-135	SRM		11.0		50.1	54.06	8%
IAEA-135	SRM		11.0		52.2	54.06	3%
1569*1	HCS-50-S1	0-2 cm	41.8	35.6	0.218		
1569*3	HCS-50-S3	4-6 cm	82.3	56.3	0.0911		
1569*5	HCS-50-S5	8-10 cm	92.0	60.5	0.106		
1569*7	HCS-50-S7	12-14 cm	96.9	62.4	0.137		
1569*9	HCS-50-S9	16-18 cm	102	58.9	0.155		
1569*11	HCS-50-S13	24-26 cm	103	52.8	0.328		
1569*13	HCS-50-S19	36-38 cm	84.0	46.2	0.0722		
1569*15	HCS-50-S25	48-50 cm	77.1	50.3	0.0695		
1569*17	HCS-50-S34	66-68 cm	181	76.1	0.0538		
1569*19	HCS-34-S1	0-2 cm	55.4	38.9	0.267		
1569*21	HCS-34-S3	4-6 cm	69.4	41.5	0.323		
1569*23	HCS-34-S5	8-10 cm	67.3	45.3	0.216		
1569*25	HCS-34-S7	12-14 cm	92.1	50.4	0.301		
1569*27	HCS-34-S9	16-18 cm	98.5	54.5	0.206		
1569*28	HCS-34-S10	18-20 cm	89.6	54.8	0.347		
1569*29	HCS-34-S11	20-22 cm	111	55.2	0.125		
1569*84	HCS-34-12	22-24 cm	105	55.8	0.130		
1569*30	HCS-34-S13	24-26 cm	95.0	57.7	0.0905 U		
1569*32	HCS-34-S19	36-38 cm	148	65.4	0.0565 U		
1569*34 R1	HCS-34-S25	48-50 cm	194	75.6	0.0444 U		
1569*34 R2	HCS-34-S25	48-50 cm	194	75.6	0.0435 U		
1569*36	HCS-34-S34	66-68 cm	199	78.1	0.0439 U		
1569*38	HCS-41-S1	0-2 cm	49.9	37.8	0.196		
1569*40	HCS-41-S3	4-6 cm	72.0	52.1	0.0980		
1569*42	HCS-41-S5	8-10 cm	66.5	52.7	0.178		
1569*44	HCS-41-S7	12-14 cm	76.0	46.7	0.119		
1569*46	HCS-41-S9	16-18 cm	67.8	49.9	0.208		
1569*48	HCS-41-S13	24-26 cm	79.5	52.5	0.201		
1569*50	HCS-41-S19	36-38 cm	184	81.3	0.0297		
1569*52	HCS-41-S25	48-50 cm	148	73.9	0.102		
1569*54	HCS-41-S34	66-68 cm	173	73.7	0.0323		

U = not detected at detection limit shown.
(detection limit = 3x square root of background)
NA indicates not available or not applicable.

Figure I-1 Cesium-137 Profile for HCS-41

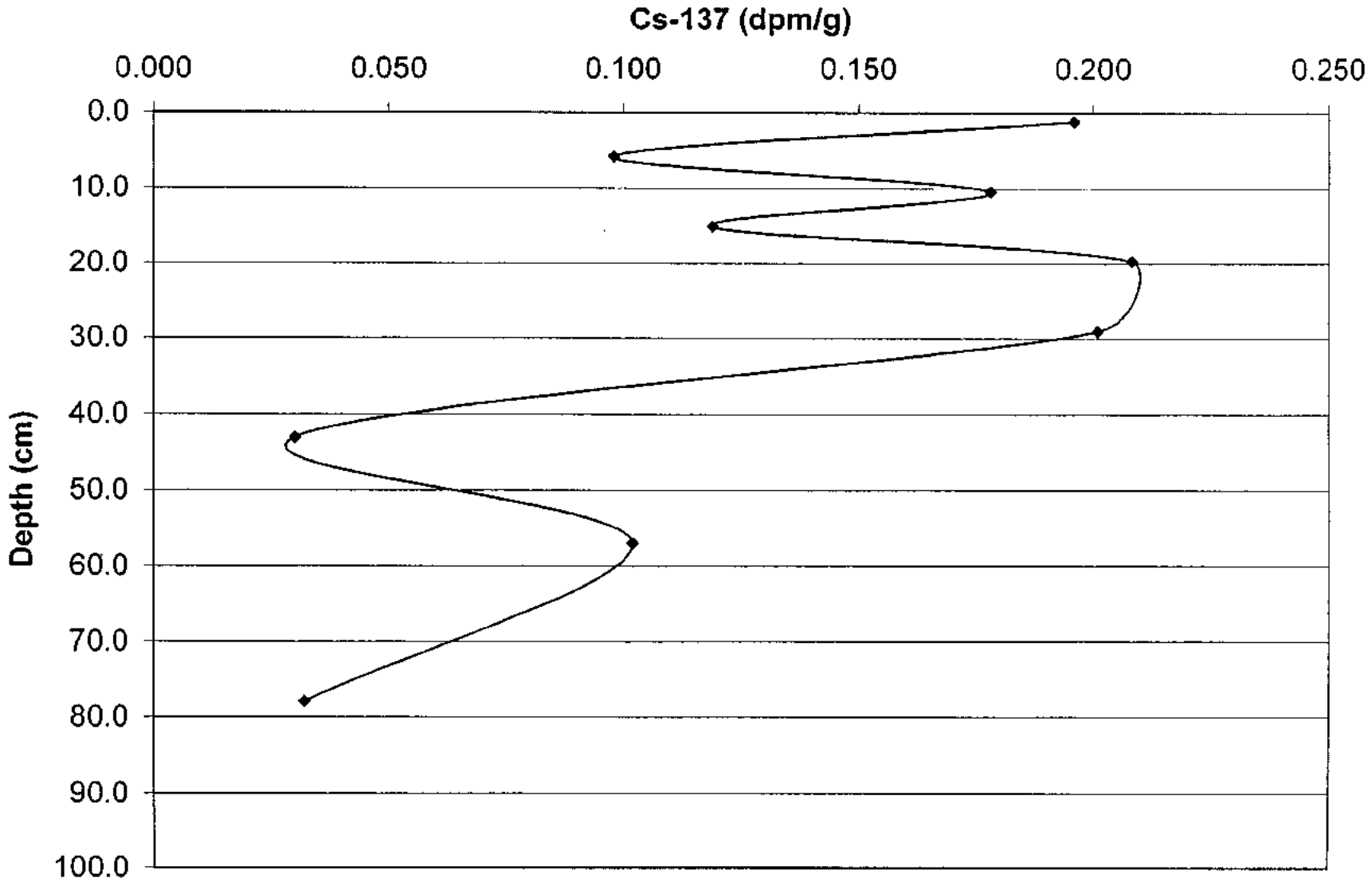
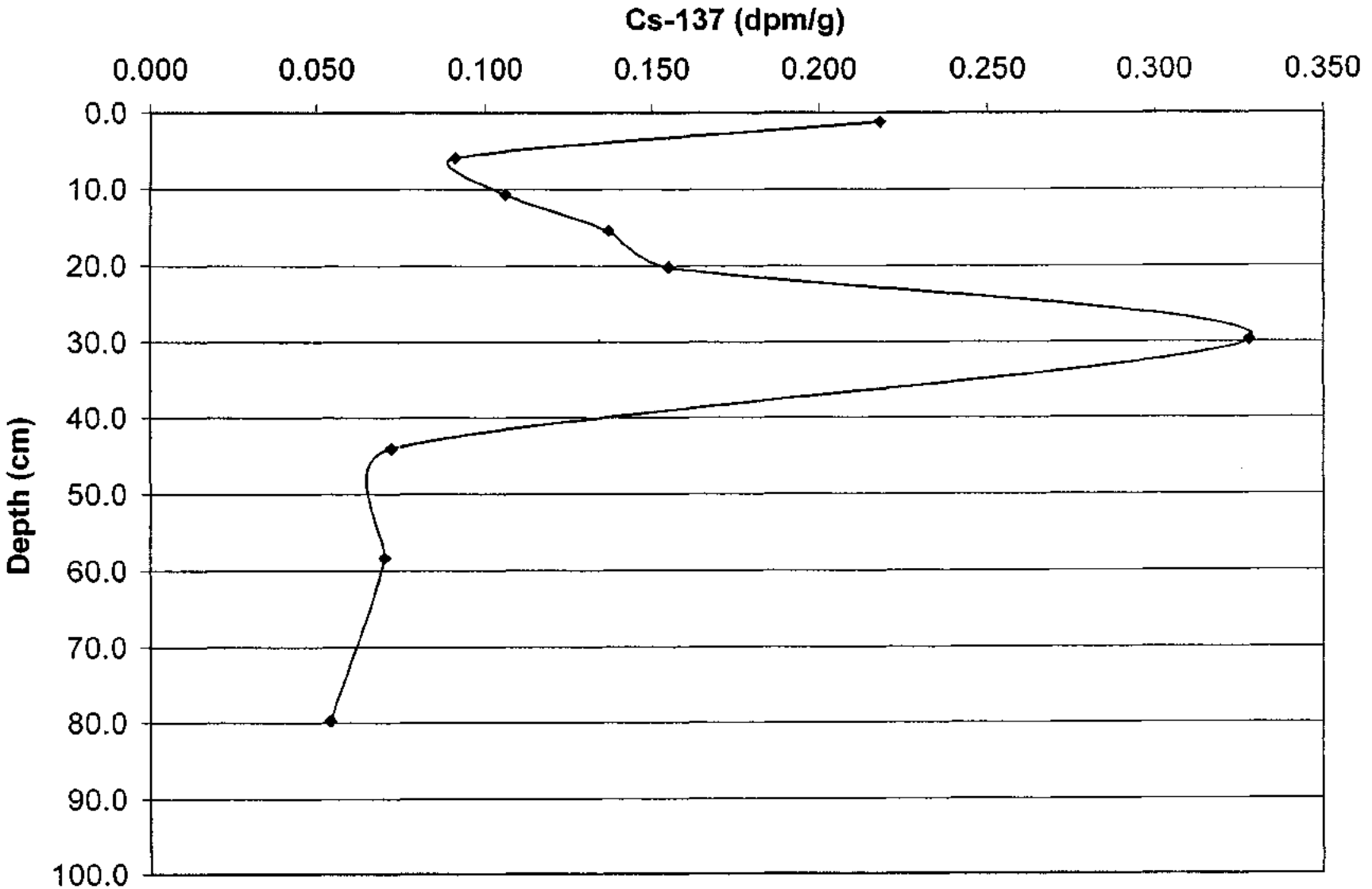


Figure I-2 Cesium-137 Profile at HCS-50



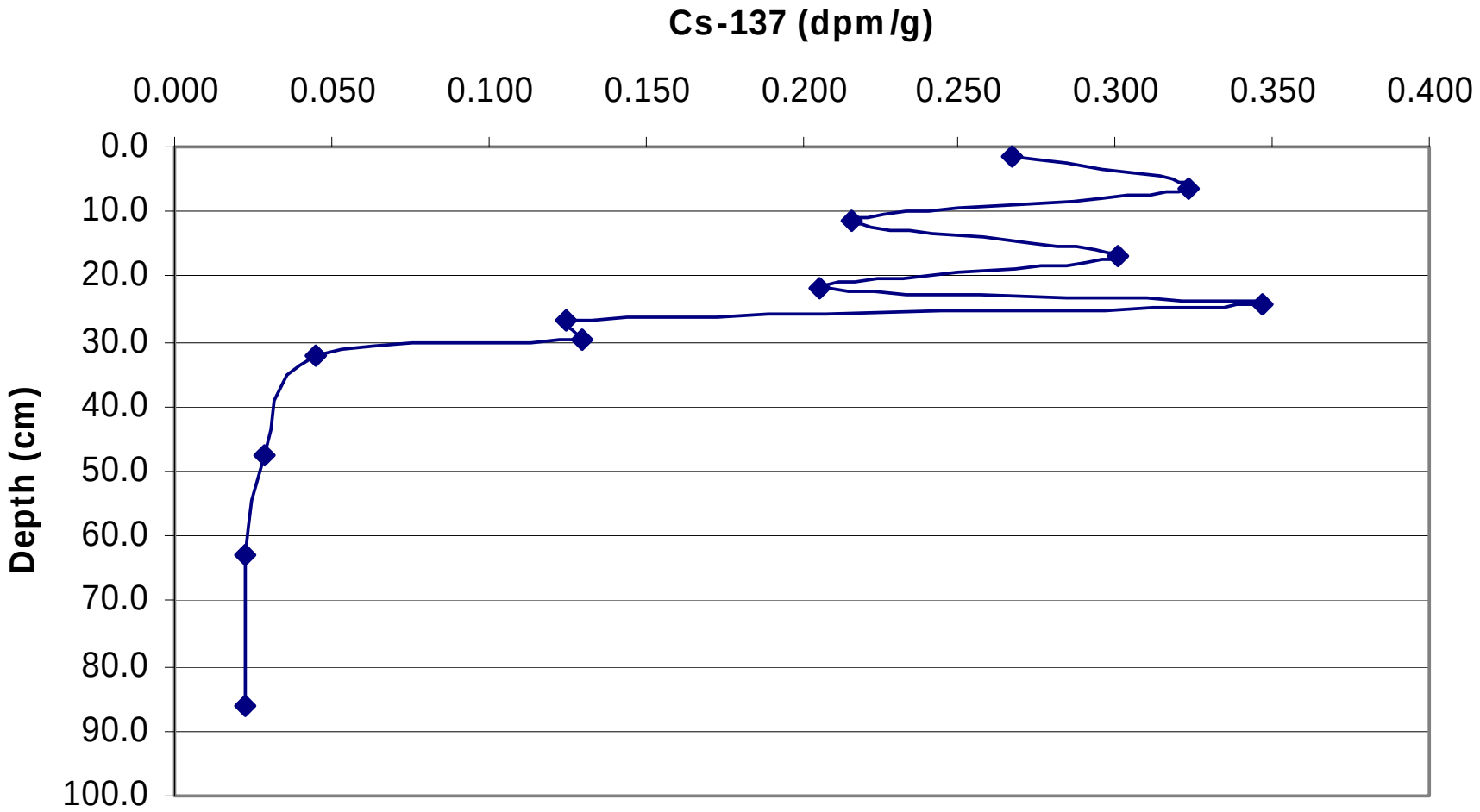
Harris Avenue Shipyard

Remedial Investigation/ Feasibility Study

Appendix I
Evaluation of Sediment Deposition

Attachment I.2
Cesium-137 Profile for HCS-34

FINAL



RETEC

HARRIS AVE SHIPYARD SEDIMENT RI/FS PORTB-04140-430		CESIUM-137 PROFILE FOR HCS-34
Date: 05/27/2004	File: P/4140	FIGURE 4-5