



APPENDIX T

SEDIMENT SAMPLE LOGS



ERM West, Inc.
1218 3rd Avenue, Suite 1412, Seattle
WA 98101

Core ID
SED-SC-01

Project Number
0155129.10

SEDIMENT CORE LOG

<u>Project Name & Location:</u> Glacier Northwest Inc. - Reichhold Inc. Site				<u>Sample Location Coordinates:</u>		N 47° 32.902		W 122° 20.423		<u>Collection Time:</u> 16:20	
<u>Contractor:</u> Gravity Environmental, L.L.C.		<u>Driller:</u> Steve Saugen		<u>Mudline (MLLW ft):</u> -8.5		<u>Depth to Sediment (ft):</u> 14.5		<u>Elevation Datum:</u> Mean Lower Low Water [MLLW](ft)		<u>Lat/Long Datum:</u> NAD83	
<u>Location within Site:</u> SE Embayment		<u>Tide Height (ft):</u> 6.0		<u>Drilling Equipment:</u> 4" Vibracore with Polycarbonate Core Liner				<u>Date Started/Completed:</u> 5/30/2012		<u>Time Logged:</u> 17:36	
<u>Total Depth/Core Drive (ft):</u> 7.0				<u>Recovery Depth (ft):</u> 6.8				<u>Average Percent Recovery (%):</u> 97			
				Drive Notes: Drive attempt # 1.				Logged By: Dave Browning			
								Checked By: Matt Crandell			
<u>DEPTH (feet Below mudline [bml])</u>	<u>Elevation MLLW (ft)</u>	<u>Munsell Color</u>	<u>USCS Classification</u>	<u>LDW Stratigraphy</u>	<u>SEDIMENT DESCRIPTION:</u>				<u>Sample ID:</u>		<u>Chemical and Physical Analyses:</u>
0.0	-8.5	5Y 4/3	SP		Liquid, soft, wet, slightly clayey (<50%) fine sand that grades to poorly sorted medium sand. Many small shell fragments.				SED-SC-01-0-1-053012	Metals, PBCs, TBT Bulk, SVOCs, D/F, Grain Size, TOC	
1.0	-9.5										
2.0	-10.5								SED-SC-01-1-2-053012	(Archived)	
3.0	-11.5										
4.0	-12.5				3.0 feet bml: Firm to hard with depth-graded, coarse sandy gravel. Gravel consists of lithic, angular and a mix of basaltic and crushed volcanoclastic rock. Sand is angular and quartzitic, trace shell fragments. Fill.				SED-SC-01-2-4-053012	Metals, PBCs, TBT Bulk, SVOCs, D/F, Grain Size, TOC	
5.0	-13.5				4.6 feet bml: Dense, firm, moderately sorted angular quartzitic sand with minor (10-20%) lithic fragment sands. Fill. Several 2" rounded cobbles/gravels and 2"+ angular gravels.				SED-SC-01-4-6-053012	(Archived)	
6.0	-14.5	5Y 5/3	SW								
7.0	-15.5				6.8 feet= Total depth below mudline. Refusal.						
8.0	-16.5										
8.0	-17.5										
10.0	-18.5										
11.0	-13.3										
12.0	-14.3										

LDW Stratigraphy Key	
	Recent
	Upper Alluvium
	Lower Alluvium



ERM West, Inc.
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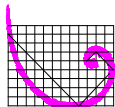
Core ID
SED-SC-02

Project Number
0155129.10

SEDIMENT CORE LOG

<u>Project Name & Location:</u> Glacier Northwest Inc. - Reichhold Inc. Site				<u>Sample Location Coordinates:</u>		N 47° 32.916		W 122° 20.479		<u>Collection Time:</u> 14:05	
<u>Contractor:</u> Gravity Environmental, L.L.C.		<u>Driller:</u> Steve Saugen		<u>Mudline (MLLW ft):</u> -2.3		<u>Depth to Sediment (ft):</u> 8.5		<u>Elevation Datum:</u> Mean Lower Low Water [MLLW](ft)		<u>Lat/Long Datum:</u> NAD83	
<u>Location within Site:</u> Embayment		<u>Tide Height (ft):</u> 6.2		<u>Drilling Equipment:</u> 4" Vibracore with Polycarbonate Core Liner				<u>Date Started/Completed:</u> 5/29/2012		<u>Time Logged:</u> 16:10	
<u>Total Depth/Core Drive (ft):</u> 12.0				<u>Recovery Depth (ft):</u> 10.8				<u>Average Percent Recovery (%):</u> 90			
				Drive Notes: Drive attempt # 1.				Logged By: Dave Browning			
								Checked By: Matt Crandell			
<u>DEPTH (feet Below mudline [bml])</u>	<u>Elevation MLLW (ft)</u>	<u>Munsell Color</u>	<u>USCS Classification</u>	<u>LDW Stratigraphy</u>	<u>SEDIMENT DESCRIPTION:</u>					<u>Sample ID:</u>	<u>Chemical and Physical Analyses:</u>
0.0	-2.3	GLE Y1 2.5N	CL		Very soft, wet, organic (25%) trace fine sandy (25%) silty (30%) clay (60-70%). Borders on fluid. Non plastic, trace small organics (plant fragments), slight H ₂ S odor at surface and very strong H ₂ S odor from 1-2 feet bml.					SED-SC-02-0-1-052912	Metals, PBCs, TBT Bulk, SVOCs, D/F, Grain Size, TOC
1.0	-3.3										
2.0	-4.3										
3.0	-5.3				2.8 feet bml: Soft, wet, organic fine to medium sandy (10-15%) clayey (20-30%) silt (<50%). H ₂ S odor. No sheen. Sand is mineral/lithic.					SED-SC-02-2-4-052912	Metals, PBCs, TBT Bulk, SVOCs, D/F, Grain Size, TOC
4.0	-6.3										
					4.0 feet bml: Soft, wet to moist, slightly plastic trace sandy (<50%) silty (40%) clay (55-60%) with interspersed small organic particles. Slight H ₂ S odor. No sheen.					SED-SC-02-4-6-052912	(Archived)
5.0	-7.3				Becomes more organic from 5-6' bml. Contacts are chevroned/bowed from coring.						
6.0	-8.3										
					6.2 feet bml: Soft, moist, plastic very silty (40%) clay (50-60%) with minor laminations and relict methane voids. No sheen.					SED-SC-02-6-8-052912	Metals, PBCs, TBT Bulk, SVOCs, D/F, Grain Size, TOC
7.0	-9.3	2.5Y 2.5/1									
8.0	-10.3										
9.0	-11.3									SED-SC-02-8-10-052912	Analyzed Archive for PCBs, D/F
10.0	-12.3	5Y 3/2	SP		9.2 feet bml: Firm, moist, silty (20-30%) fine sand (70-80%) with scattered organics (terrestrial plant fragments). Not recent.						
11.0	-13.3				10.9 feet = Total depth below mudline. Refusal						
12.0	-14.3										

LDW Stratigraphy Key	
	Recent
	Upper Alluvium
	Lower Alluvium



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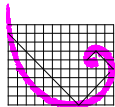
1218 3rd Avenue, Suite 1412, Seattle
WA 98101

Core ID SED-SC-03	Project Number 0155129.10

SEDIMENT CORE LOG

<u>Project Name & Location:</u> Glacier Northwest Inc. - Reichhold Inc. Site				<u>Sample Location Coordinates:</u> N 47° 32.908 W 122° 20.541		<u>Collection Time:</u> 13:56	
<u>Contractor:</u> Gravity Environmental, L.L.C.		<u>Driller:</u> Steve Saugen		<u>Mudline (MLLW ft):</u> 1.1	<u>Depth to Sediment (ft):</u> 6.7	<u>Elevation Datum:</u> Mean Lower Low Water [MLLW](ft)	<u>Lat/Long Datum:</u> NAD83
<u>Location within Site:</u> SW Embayment		<u>Tide Height (ft):</u> 7.8		<u>Drilling Equipment:</u> 4" Vibracore with Polycarbonate Core Liner		<u>Date Started/Completed:</u> 5/30/2012	<u>Time Logged:</u> 16:10
<u>Total Depth/Core Drive (ft):</u> 9.1				<u>Recovery Depth (ft):</u> 8.7		<u>Average Percent Recovery (%):</u> 95	
<u>DEPTH (feet Below mudline [bml])</u> <u>Elevation MLLW (ft)</u> <u>Munsell Color</u> <u>USCS Classification</u>				<u>Drive Notes: Drive attempt # 2.</u>		<u>Logged By: Dave Browning</u>	
						<u>Checked By: Matt Crandell</u>	
				<u>LDW Stratigraphy</u>		<u>Sample ID:</u>	<u>Chemical and Physical Analyses:</u>
				<u>SEDIMENT DESCRIPTION:</u>			
0.0	1.1	GLE1 2.5N	CL	Loose, wet, unconsolidated trace sandy (<5%) silty (20-30%) clay (70-80%) with sparse (<1%) scattered organic fragments. No sheen. Moderate H ₂ S odor.		SED-SC-03-0-1-053012	Metals, PCBs, TBT Bulk, SVOCs, D/F, Grain Size, TOC
1.0	0.1						
2.0	-0.9			1.5 feet bml: Soft, moist, trace sandy (<5%) silty (20-30%) clay (70-80%) that becomes more consolidated with depth.		SED-SC-03-1-2-053012	(Archived)
		5Y 4/4		Weathered stick fragment at 2.25 feet bml. Slightly plastic, with 2" piece of angular basalt/rip rap fragment with barnacle spot.		SED-SC-03-2-4-053012	Metals, PCBs, TBT Bulk, SVOCs, D/F, Grain Size, TOC
3.0	-1.9						
4.0	-2.9						
		GLE1 2.5N	SP	3.7 feet bml: Dense, plastic, slightly silty clay with wood fragments and small barnacle shells and small clam shell.		SED-SC-03-4-6-053012	Analyzed Archive for Metals, PCBs, Hexachloro benzene, D/F
5.0	-3.9			4.0 feet bml: Soft, moist, trace sandy (<5%) silty (20-30%) clay (70-80%) that becomes ore consolidated with depth.			
				4.4 feet bml: Wet, silty medium sand, H ₂ S odor.			
6.0	-4.9			5.3 feet bml: Uniform, moderately sorted, trace silty (<50%) medium sand. No odor, no sheen. <1% organics. Damp. Soft.			
		2.5Y 3/1		6.3 feet bml: Sands are subangular and lithic/mineral with some small pumices, volcanoclastic. No observed shell fragments. No grit.		SED-SC-03-6-8-053012	Metals, PCBs, TBT Bulk, SVOCs, D/F, Grain Size, TOC
7.0	-5.9						
8.0	-6.9						
9.0	-7.9			8.7 feet = Total depth below mudline. Refusal.			
10.0	-8.9						
11.0	-9.9						
12.0	-10.9						

LDW Stratigraphy Key	
	Recent
	Upper Alluvium
	Lower Alluvium

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WA 98101

Core ID SED-SC-04	Project Number 0155129.10

SEDIMENT CORE LOG

<u>Project Name & Location:</u> Glacier Northwest Inc. - Reichhold Inc. Site				<u>Sample Location Coordinates:</u>		N 47° 32.959 W 122° 20.473		<u>Collection Time:</u> 8:20		
<u>Contractor:</u> Gravity Environmental, L.L.C.		<u>Driller:</u> Steve Saugen		<u>Mudline (MLLW ft):</u> -1.5		<u>Depth to Sediment (ft):</u> 4.0		<u>Elevation Datum:</u> Mean Lower Low Water [MLLW](ft)		
<u>Location within Site:</u> North Embayment		<u>Tide Height (ft):</u> 2.5		<u>Drilling Equipment:</u> 4" Vibracore with Polycarbonate Core Liner			<u>Date Started/Completed:</u> 5/30/2012		<u>Lat/Long Datum:</u> NAD83	
<u>Total Depth/Core Drive (ft):</u> 8.0				<u>Recovery Depth (ft):</u> 7.6			<u>Average Percent Recovery (%):</u> 95			
DEPTH (feet Below mudline [bml]) Elevation MLLW (ft) Munsell Color USCS Classification				Drive Notes: Drive attempt # 1.			Logged By: Dave Browning			
							Checked By: Matt Crandell			
				LDW Stratigraphy			SEDIMENT DESCRIPTION:		Sample ID:	
0.0	-1.5	GLE Y1 2.5N	CL	Soft, wet, organic, trace fine sandy (<5%) silty (30%) clay (65-70%). Slight natural organic odor, slight H ₂ S odor. Non-plastic. Wood fragments and stick/rounded wood fragments.			SED-SC-04-0-1-053012		Metals, PBCs, TBT Bulk, SVOCs, D/F, Grain Size, TOC	
1.0	-2.5			Homogeneous. Recent.						
2.0	-3.5								SED-SC-04-1-2-053012	
		10YR 4/4	CL	2.1 feet bml: Wet, soft, silty (10-20%) medium sand (80-90%). Oxidized. No odor, could not produce sheen. Sands are mineral/lithic.			SED-SC-04-2-4-053012		Metals, PBCs, TBT Bulk, SVOCs, D/F, Grain Size, TOC	
3.0	-4.5	2.5Y 3/1		2.6 feet bml: Homogeneous organic silty (30%) clay (70%), soft to wet to moist. Surrounded by wet medium sand matrix. Silt in clast but does not appear to be bedding. (Possible vibration artifact.) No Sheen. Slight H ₂ S odor in silt.						
4.0	-5.5			3.9 feet bml: Soft, wet, well sorted, poorly graded trace silty (<5%) medium sand (95%). Sands are mineral/lithic/volcanoclastic. No shells.						
5.0	-6.5	5Y 3/1	SM				SED-SC-04-4-6-053012		Analyzed Archive for PAHs	
6.0	-7.5									
7.0	-8.5			Rounded gravel (< 1.5") appears andesitic at 6.9 feet bml.			SED-SC-04-6-7.1-053012		Metals, PBCs, TBT Bulk, SVOCs, D/F, Grain Size, TOC	
8.0	-9.5			7.6 feet = Total depth below mudline. Refusal.						
9.0	-10.5									
10.0	-11.5									
11.0	-12.5									
12.0	-13.5									

LDW Stratigraphy Key	
	Recent
	Upper Alluvium
	Lower Alluvium



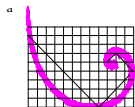
1218 3rd Avenue, Suite 1412, Seattle
WA 98101

Core ID SED-SC-04	Project Number 0155129.10

SEDIMENT CORE LOG

Project Name & Location:				Sample Location Coordinates:		N 47° 32.960		W 122° 20.471		Collection Time:	
Glacier Northwest Inc. - Reichhold Inc. Site										8:33	
Contractor:		Driller:		Mudline (MLLW ft):		Depth to Sediment (ft):		Elevation Datum:		Lat/Long Datum:	
Gravity Environmental, L.L.C.		Steve Saugen		-1.6		4.2		Mean Lower Low Water [MLLW](ft)		NAD83	
Location within Site:		Tide Height (ft):		Drilling Equipment:				Date Started/Completed:		Time Logged:	
North Embayment		2.6		4" Vibracore with Polycarbonate Core Liner				5/30/2012		10:10	
Total Depth/Core Drive (ft):				Recovery Depth (ft):				Average Percent Recovery (%):			
6.2				5.9				95			
DEPTH (feet Below mudline [bml])		Elevation MLLW (ft)		Munsell Color		USCS Classification		Drive Notes: Drive attempt # 2. Sediment composited with first core sample from SED-SC-04.			
								Logged By: Dave Browning			
								Checked By: Matt Crandell			
								SEDIMENT DESCRIPTION:			
								Sample ID:			
								Chemical and Physical Analyses:			
0.0		-1.6		GLEIY 2.5N		CL		Soft, wet, organic, trace fine sandy (5%) silty (30%) clay (70%) with scattered rounded wood fragments (natural). Slight natural organic odor, non plastic.			
1.0		-2.6						SED-SC-04-0-1-053012			
2.0		-3.6						0.9 feet bml: Soft, damp, well sorted, poorly graded trace clayey (<5%) medium sand (95%). Sands are sub-rounded, subspherical and mineral/lithic/volcanoclastic in origin/provenance. No shell fragments. Trace fine rounded gravel. No odor, no sheen.			
								SED-SC-04-1-2-053012			
3.0		-4.6									
4.0		-5.6		5Y 3/1		SP					
5.0		-6.6									
6.0		-7.6						5.9 feet = Total depth below mudline. Refusal.			
7.0		-8.6									
8.0		-9.6									
9.0		-10.6									
10.0		-11.6									
11.0		-12.6									
12.0		-13.6									

LDW Stratigraphy Key	
	Recent
	Upper Alluvium
	Lower Alluvium



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WA 98101

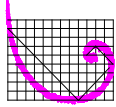
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SEDIMENT CORE LOG

Core ID SED-SC-05	Project Number 0155129.10

Project Name & Location:				Sample Location Coordinates:		N 47° 32.983		W 122° 20.475		Collection Time:	
Glacier Northwest Inc. - Reichhold Inc. Site										16:25	
Contractor:		Driller:		Mudline (MLLW ft):		Depth to Sediment (ft):		Elevation Datum:		Lat/Long Datum:	
Gravity Environmental, L.L.C.		Steve Saugen		-15.4		25		Mean Lower Low Water [MLLW](ft)		NAD83	
Location within Site:		Tide Height (ft):		Drilling Equipment:				Date Started /Completed:		Time Logged:	
North of dock		9.6		4" Vibracore with Polycarbonate Core Liner				6/1/2012		18:00	
Total Depth/Core Drive (ft):				Recovery Depth (ft):				Average Percent Recovery (%):			
15.0				14.7				98			
DEPTH (feet Below mudline [bml])	Elevation MLLW (ft)	Munsell Color	USCS Classification	Drive Notes: Drive attempt # 1.				Logged By: Dave Browning			
								Checked By: Matt Crandell			
				LDW Stratigraphy				Sample ID:		Chemical and Physical Analyses:	
				SEDIMENT DESCRIPTION:							
0.0	-15.4	GLE Y1 2.5N	ML	Soft, wet, non-plastic, dilatant, trace fine sandy (<5%) very clayey (40-50%) silt (50-60%). Collapses at 1/8" ribbon. Slight ash/cinder odor. Several small <1" long 1/8" diameter wood fragments. Sand feels sub-rounded to sub-angular. Several particles of 5Y 4/1 wet clay.				SED-SC-05-0-1-060112		Metals, PBCs, TBT Bulk, SVOCs, D/F, Grain Size, TOC	
1.0	-16.4										
								SED-SC-05-1-2		(Archived)	
2.0	-17.4										
3.0	-18.4			2.05 feet bml: Soft, wet, dilatant, non-plastic trace sandy very clayey (40%) silt (60%). Sand is fine to medium but (-1 to 0 phi) fragment of shiny black angular sand at 2.5 feet bml (grit?). Several small wood fragments. More consolidated than above and collapse at 1/4" - 3/8" string.				SED-SC-05-2-4-060112		Metals, PBCs, TBT Bulk, SVOCs, D/F, Grain Size, TOC	
4.0	-19.4	5Y 3/2		3.75 feet bml: Wet, soft, fluid, trace fine sandy (<5%) silty (30-40%) clay (60-70%) with slight ash/cinder odor. No bearing strength.							
				4.25 feet bml: Interbedded, firm slightly silty (10%) very fine sand (85-90%). Sands are near unimodal and beds of clayey (20-30%) silt (70-80%) are 0.05 - 0.1' thick. Unit as a whole is ~80% sand.				SED-SC-05-4-6-060112		Analyzed Archive for Metals, PCBs, PAHs, D/F	
5.0	-20.4	2.5Y 4/2	SM								
6.0	-21.4										
7.0	-22.4							SED-SC-05-6-8-060112		Metals, PBCs, TBT Bulk, SVOCs, D/F, Grain Size, TOC	
8.0	-23.4			7.5 feet bml: 0.2 foot layer of wood fragment in sand matrix. ~70% wood, wood fragments are sticks and naturally deposited fragments. Retains original color.							
9.0	-24.4							SED-SC-05-8-10-060112		(Archived)	
10.0	-25.4										
		10.0 feet bml: 0.1 foot layer of wood and stick fragments.									
11.0	-26.4										
12.0	-27.4					11.5 feet bml: Slightly firm, wet, very fine sandy (4 to 3 phi) (20-30%) silt (70-80%). Dilatant. Does not roll.					

LDW Stratigraphy Key	
	Recent
	Upper Alluvium
	Lower Alluvium



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WA 98101

Core ID SED-SC-05	Project Number 0155129.10

ERM

SEDIMENT CORE LOG

<u>Project Name & Location:</u> Glacier Northwest Inc. - Reichhold Inc. Site				<u>Sample Location Coordinates:</u> N 47° 32.983 W 122° 20.475		<u>Collection Time:</u> 16:25	
<u>Contractor:</u> Gravity Environmental, L.L.C.		<u>Driller:</u> Steve Saugen		<u>Mudline (MLLW ft):</u> -15.4	<u>Depth to Sediment (ft):</u> 25	<u>Elevation Datum:</u> Mean Lower Low Water [MLLW](ft)	<u>Lat/Long Datum:</u> NAD83
<u>Location within Site:</u> North of dock		<u>Tide Height (ft):</u> 9.6		<u>Drilling Equipment:</u> 4" Vibracore with Polycarbonate Core Liner		<u>Date Started/Completed:</u> 6/1/2012	<u>Time Logged:</u> 18:00
<u>Total Depth/Core Drive (ft):</u> 15.0				<u>Recovery Depth (ft):</u> 14.7		<u>Average Percent Recovery (%):</u> 98	
<u>DEPTH (feet Below mudline [bml])</u> <u>Elevation MLLW (ft)</u> <u>Munsell Color</u> <u>USCS Classification</u>				<u>Drive Notes: Drive attempt # 1.</u>		<u>Logged By: Dave Browning</u>	
						<u>Checked By: Matt Crandell</u>	
LDW Stratigraphy SEDIMENT DESCRIPTION: Sample ID: Chemical and Physical Analyses:							
12.0	-27.4					SED-SC-05-12-14-060112	(Archived)
13.0	-28.4						
					Minor bedding of very fine sand stringer/laminae from 13.4 to 13.7 feet bml.		
14.0	-29.4						
15.0	-30.4				14.7 feet = Total depth below mudline.		
16.0	-31.4						
17.0	-32.4						
18.0	-33.4						
19.0	-34.4						
20.0	-35.4						
21.0	-36.4						
22.0	-37.4						
23.0	-38.4						
24.0	-39.4						

LDW Stratigraphy Key	
	Recent
	Upper Alluvium
	Lower Alluvium



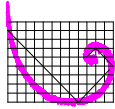
1218 3rd Avenue, Suite 1412, Seattle
WA 98101

Core ID SED-SC-06	Project Number 0155129.10

SEDIMENT CORE LOG

<u>Project Name & Location:</u> Glacier Northwest Inc. - Reichhold Inc. Site				Sample Location Coordinates:		N 47° 32.983		W 122° 20.475		<u>Collection Time:</u> 10:30	
<u>Contractor:</u> Gravity Environmental, L.L.C.		<u>Driller:</u> Steve Saugen		<u>Mudline (MLLW ft):</u> -6.5		<u>Depth to Sediment (ft):</u> 12		<u>Elevation Datum:</u> Mean Lower Low Water [MLLW](ft)		<u>Lat/Long Datum:</u> NAD83	
<u>Location within Site:</u> Central Embayment		<u>Tide Height (ft):</u> 5.5		<u>Drilling Equipment:</u> 4" Vibracore with Polycarbonate Core Liner				<u>Date Started/Completed:</u> 5/29/2012		<u>Time Logged:</u> 12:25	
<u>Total Depth/Core Drive (ft):</u> 12				<u>Recovery Depth (ft):</u> 10.8				<u>Average Percent Recovery (%):</u> 90			
DEPTH (feet Below mudline [bml])		Elevation MLLW (ft)		Munsell Color		USCS Classification		Drive Notes: Drive attempt # 2.			
								Logged By: Dave Browning			
								Checked By: Matt Crandell			
								SEDIMENT DESCRIPTION:			
								Sample ID:			
0.0	-6.5	GLEYI 2.5N				Wet, unconsolidated, trace fine sandy (<5%) silty (30-40%) clay (50-60%). Trace organic particles. Slight ash odor. No sheen. Organic particles are twig/wood fragments.		SED-SC-06-0-1-052912		Metals, PBCs, TBT Bulk, SVOCs, D/E, Grain Size, TOC	
1.0	-7.5										
2.0	-8.5					1.4 feet bml: Very soft to wet slightly fine sandy (<5%) silty (30-40%) clay (50%). Scattered small organic twig fragments and slight ash odor. No sheen. Sands are subrounded and natural lithic/mineral. Water entrained in two units from sampling.		SED-SC-06-1-2-052912		(Archived)	
3.0	-9.5										
4.0	-10.5	CL				3.5 feet bml: Soft, moist, organic trace sandy (<5%) very silty (40-50%) clay (50-60%). Slightly plastic but collapses at 3/8" ribbon. Natural organic odor, no sheen. Relict methane vesicles. Several small organic particles (natural wood fragments). Sands are mineral/lithic. Angled contact.		SED-SC-06-2-4-052912		Metals, PBCs, TBT Bulk, SVOCs, D/E, Grain Size, TOC	
5.0	-11.5										
6.0	-12.5										
7.0	-13.5					5Y 10/1				6.2 feet bml: Firm, moist to damp organic, slightly plastic very silty (40-50%) clay (50-60%). Plant fragments. Upper 3-4" stained from oxygen demand of overlying sediment (reduced). A few 1-2" wood fragments.	
8.0	-14.5										
9.0	-15.5										
10.0	-16.5									SED-SC-06-6-8-052912	
11.0	-17.5										
12.0	-18.5										
</											

LDW Stratigraphy Key	
	Recent
	Upper Alluvium
	Lower Alluvium



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WA 98101

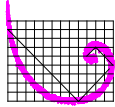
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SEDIMENT CORE LOG

Core ID SED-SC-07	Project Number 0155129.10

Project Name & Location:				Sample Location Coordinates:		N 47° 32.949		W 122° 20.455		Collection Time:	
Glacier Northwest Inc. - Reichhold Inc. Site										10:03	
Contractor:		Driller:		Mudline (MLLW ft):		Depth to Sediment (ft):		Elevation Datum:		Lat/Long Datum:	
Gravity Environmental, L.L.C.		Steve Saugen		-12.1		16.5		Mean Lower Low Water [MLLW](ft)		NAD83	
Location within Site:		Tide Height (ft):		Drilling Equipment:				Date Started/Completed:		Time Logged:	
NE Embayment				4" Vibracore with Polycarbonate Core Liner				5/30/2012		11:00	
Total Depth/Core Drive (ft):				Recovery Depth (ft):				Average Percent Recovery (%):			
12.5				11.3				90.4			
DEPTH (feet Below mudline [bml])	Elevation MLLW (ft)	Munsell Color	USCS Classification	Drive Notes: Drive attempt # 1.				Logged By: Dave Browning			
								Checked By: Matt Crandell			
				LDW Stratigraphy		SEDIMENT DESCRIPTION:		Sample ID:		Chemical and Physical Analyses:	
0.0	-12.1	GLEIY 2.5N	CL			Very soft, wet, organic trace sandy (<5%) silty (30-40%) clay (60-70%) with sparse (<1%) organic/wood fragments, slight H2S odor.				SED-SC-07-0-1-053012	Metals, PBCs, TBT Bulk, SVOCs, D/F, Grain Size, TOC
1.0	-13.1										
2.0	-14.1					Two bands of 5Y 3/2 clay from 1.80-1.85 and 1.88-1.90' bml. Bands are angled.				SED-SC-07-1-2-053012	Analyzed Archive for PCBs
3.0	-15.1										
4.0	-16.1					0.05 foot band of wet, medium sand (90%) with trace silt (10%). Strong H2S odor. Sand is lithic/mineral and sub-angular to sub-rounded at 3.8 feet bml. Band is at an angle relative to core barrel.				SED-SC-07-2-4-053012	Metals, PBCs, TBT Bulk, SVOCs, D/F, Grain Size, TOC
5.0	-17.1										
6.0	-18.1					0.1 foot layer of wood and bark fragments, unweathered, tabular at 5.6' bml.				SED-SC-07-4-6-053012	Analyzed Archive for PCBs
7.0	-19.1					Several 1-2" pieces of tabular woody debris at 6.9' bml. Smearing of 5Y 3/2 clay at 7' bml.				SED-SC-07-6-8-053012	Metals, PBCs, TBT Bulk, SVOCs, D/F, Grain Size, TOC
8.0	-20.1										
9.0	-21.1					5Y 3/2	SW			8.5 feet bml: Well sorted, soft, medium sand, ungraded, sands are lithic/mineral. Angled contact. >95% sand.	
		9.0 feet bml: Firm, dense, moist interbedded very fine sand and fine sandy silt. No odor. No sheen. Sand 80%, silt (20%).									
10.0	-22.1	2.5Y 3/1	SM								
11.0	-23.1			Elongate, weathered wood fiber at 10.6' bml.						SED-SC-07-10-11-053012	(Archived)
				11.3 feet = Total depth below mudline. Refusal.							
12.0	-24.1										

LDW Stratigraphy Key	
	Recent
	Upper Alluvium
	Lower Alluvium



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Core ID	Project Number
SED-SC-08	0155129.10

SEDIMENT CORE LOG

Project Name & Location:				Sample Location Coordinates:		N 47° 32.983		W 122° 20.475		Collection Time:	
Glacier Northwest Inc. - Reichhold Inc. Site										12:05	
Contractor:		Driller:		Mudline (MLLW ft):		Depth to Sediment (ft):		Elevation Datum:		Lat/Long Datum:	
Gravity Environmental, L.L.C.		Steve Saugen		-13.4		20.6		Mean Lower Low Water [MLLW](ft)		NAD83	
Location within Site:		Tide Height (ft):		Drilling Equipment:				Date Started/ Completed:		Time Logged:	
East Embayment		7.2		4" Vibracore with Polycarbonate Core Liner				5/30/2012		13:30	
Total Depth/Core Drive (ft):				Recovery Depth (ft):				Average Percent Recovery (%):			
15.0				14.7				98			
DEPTH (feet Below mudline [bml])	Elevation MLLW (ft)	Munsell Color	USCS Classification	Drive Notes: Drive attempt # 2.				Logged By: Dave Browning			
								Checked By: Matt Crandell			
				LDW Stratigraphy				SEDIMENT DESCRIPTION:			
0.0	-13.4	GLEIY1 2.5N	CL		Wet, fluid, trace sandy (<5%) silty (20-30%) clay (>70%). Organic particles, slight natural organic odor. Appears to have water entrained.				SED-SC-08-0-1-053012	Metals, PBCs, TBT Bulk, SVOCs, D/F, Grain Size, TOC	
1.0	-14.4								SED-SC-08-1-2-053012	(Archived)	
											
2.0	-15.4								SED-SC-08-2-4-053012	Metals, PBCs, TBT Bulk, SVOCs, D/F, Grain Size, TOC	
											
3.0	-16.4				2.5 feet bml: Very soft, wet, organic trace sandy (<5%) silty (20-30%) clay (+70%) that is compositionally similar to above but holds shape at rest. Becomes slightly more consolidated and less water rich with depth. No sheen. Slight H ₂ S odor.						
									SED-SC-08-4-6-053012	Analyzed Archive for PCBs	
4.0	-17.4										
											
5.0	-18.4								SED-SC-08-6-8-053012	Metals, PBCs, TBT Bulk, SVOCs, D/F, Grain Size, TOC	
											
6.0	-19.4				6.05 feet bml: Soft, wet, trace silty, poorly sorted, poorly graded medium to coarse sand with some urban lithics (brick, tile fragments). Minor/trace wood fibers. Gradational contact with overlying unit. Sands are angular to subangular. Small angular clasts of silty clay.						
					SM						SED-SC-08-8-10-053012
7.0	-20.4			7.9 feet bml: Wet, slightly soft, organic silty clay (40-60%) with lense of wood fragments and intact sticks (old and friable) from 8.8 to 9.0 feet bml. Wood fragments throughout with an estimated volumetric percent of 10-20.							
											
8.0	-21.4		OH						SED-SC-08-8-10-053012	Analyzed Archive for D/F	
					9.05 feet bml: Firm, moist, dense silty (30%) very fine sand (70%). Uniform, slight natural organic odor.						
9.0	-22.4										
			SM						SED-SC-08-8-10-053012	(Archived)	
10.0	-23.4				10.0 feet bml: Soft, moist silty clay (50-60%) that transitions to plastic silty (20-30%) clay with depth (70-80%). Slight natural organic odor, no sheen.						
											
			OH						SED-SC-08-8-10-053012	(Archived)	
11.0	-24.4										
											
12.0	-25.4										

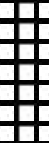
LDW Stratigraphy Key	
	Recent
	Upper Alluvium
	Lower Alluvium



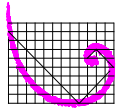
1218 3rd Avenue, Suite 1412, Seattle
WA 98101

Core ID SED-SC-08	Project Number 0155129.10

SEDIMENT CORE LOG

Project Name & Location:				Actual Coordinates:		N 47° 32.983		W 122° 20.475		Collection Time:	
Glacier Northwest Inc. - Reichhold Inc. Site										16:25	
Contractor:			Driller:	Mudline (MLLW ft):		Depth to Sediment (ft):		Elevation Datum:		Lat/Long Datum:	
Gravity Environmental, L.L.C.			Steve Saugen	-15.4		25		Mean Lower Low Water [MLLW](ft)		NAD83	
Location within Site:		Tide Height (ft):		Drilling Equipment:				Date Started/Completed:		Time Logged:	
North of dock		9.6		4" Vibracore with Polycarbonate Core Liner				6/1/2012		18:00	
Total Depth/Core Drive (ft):				Recovery Depth (ft):				Average Percent Recovery (%):			
15.0				14.7				98			
				Drive Notes: Drive attempt # 1.				Logged By: Dave Browning			
								Checked By: Matt Crandell			
DEPTH (feet Below mudline [bml])	Elevation MLLW (ft)	Munsell Color	USCS Classification	LDW Stratigraphy	SEDIMENT DESCRIPTION:					Sample ID:	Chemical and Physical Analyses:
12.0	-23.4	GLEIY1 2.5N	OH							SED-SC-08-12-14-053012	(Archived)
13.0	-24.4										
14.0	-25.4										
			SP		13.25 feet bml: Dense, interbedded fine to medium sands.						
15.0	-26.4				14.7 feet bml: Total depth below mudline.						
16.0	-27.4										
17.0	-28.4										
18.0	-29.4										
19.0	-30.4										
20.0	-31.4										
21.0	-32.4										
22.0	-33.4										
22.0	-34.4										
23.0	-35.4										

LDW Stratigraphy Key	
	Recent
	Upper Alluvium
	Lower Alluvium

**ERM****ERM West, Inc.**1218 3rd Avenue, Suite 1412, Seattle
WA 98101Core ID
SED-SC-09Project Number
0155129.10**SEDIMENT CORE LOG**

<u>Project Name & Location:</u> Glacier Northwest Inc. - Reichhold Inc. Site				<u>Actual Coordinates:</u> N 47° 32.933 W 122° 20.506		<u>Collection Time:</u> 14:56			
<u>Contractor:</u> Gravity Environmental, L.L.C.		<u>Driller:</u> Steve Saugen		<u>Mudline (MLLW ft):</u> -0.4		<u>Depth to Sediment (ft):</u> 5.6			
<u>Elevation Datum:</u> Mean Lower Low Water [MLLW](ft)		<u>Lat/Long Datum:</u> NAD83		<u>Date Started/Completed:</u> 5/29/2012		<u>Time Logged:</u> 18:00			
<u>Location within Site:</u> Embayment		<u>Tide Height (ft):</u> 5.2		<u>Drilling Equipment:</u> 4" Vibracore with Polycarbonate Core Liner		<u>Average Percent Recovery (%):</u> 90			
<u>Total Depth/Core Drive (ft):</u> 9.3				<u>Recovery Depth (ft):</u> 8.4		<u>Logged By:</u> Dave Browning			
<u>Drive Notes:</u> Drive attempt # 1.				<u>Checked By:</u> Matt Crandell					
<u>DEPTH (feet Below mudline [bml])</u>	<u>Elevation MLLW (ft)</u>	<u>Munsell Color</u>	<u>USCS Classification</u>	<u>SEDIMENT DESCRIPTION:</u>			<u>Sample ID:</u>		
0.0	-2.3	GLEIY1 2.5N	ML	Unconsolidated wet to soft and wet/moist trace fine sandy (<5%) very silty (30-40%) clay (50-60%) with trace small organic particles that appear to be vascular plant fragments. Slight ashy/cinder odor. No sheen.			SED-SC-09-0-1-052912		
1.0	-3.3			Laminations of chalky/lighter hues with stronger cinder odor at 1.25-1.6 feet bml.			SED-SC-09-1-2-052912		
2.0	-4.3			Stick fragment at 1.8 feet bml. Sands are mineral/lithic.					
3.0	-5.3			3.0 feet bml: Soft, moist, organic trace fine sandy (<5%) very silty (40%) clay (50-60%) that is slightly plastic and collapses at 1/8" - 1/4" ribbon. Slight H ₂ S odor.			SED-SC-09-2-4-052912		
4.0	-6.3			Well preserved stick at 4.75 feet bml. Sands are mineral/lithic/volcanoclastic.			SED-SC-09-4-6-052912		
5.0	-7.3								
6.0	-8.3						SED-SC-09-6-8-052912		
7.0	-9.3								
8.0	-10.3			2.5y 3/3	SP	7.4 feet bml: Firm, damp, organic, slightly silty (5-10%) very fine to fine sand (90%). Moderately sorted. No sheen. No odor. Sands are natural lithic/mineral/volcanoclastic.			
9.0	-11.3					8.4 feet = Total depth below mudline. Refusal.			
10.0	-12.3								
11.0	-13.3								
12.0	-14.3								

LDW Stratigraphy Key	
	Recent
	Upper Alluvium
	Lower Alluvium

**ERM****ERM West, Inc.**1218 3rd Avenue, Suite 1412, Seattle
WA 98101Core ID
SED-SC-13Project Number
0155129.10**SEDIMENT CORE LOG**

<u>Project Name & Location:</u> Glacier Northwest Inc. - Reichhold Inc. Site				<u>Actual Coordinates:</u> N 47° 32.919 W 122° 20.458		<u>Collection Time:</u> 9:15	
<u>Contractor:</u> Gravity Environmental, L.L.C.		<u>Driller:</u> Steve Saugen		<u>Mudline (MLLW ft):</u> -7		<u>Depth to Sediment (ft):</u> 8.2	
<u>Elevation Datum:</u> Mean Lower Low Water [MLLW](ft)		<u>Lat/Long Datum:</u> NAD83		<u>Date Started/Completed:</u> 5/31/2012		<u>Time Logged:</u> 10:30	
<u>Location within Site:</u> Embayment		<u>Tide Height (ft):</u> 1.2		<u>Drilling Equipment:</u> 4" Vibracore with Polycarbonate Core Liner		<u>Average Percent Recovery (%):</u> 93	
<u>Total Depth/Core Drive (ft):</u> 8.5		<u>Recovery Depth (ft):</u> 7.9		<u>Drive Notes:</u> Drive attempt # 1.		<u>Logged By:</u> Dave Browning	
<u>Checked By:</u> Matt Crandell							
<u>DEPTH (feet Below mudline [bml])</u>	<u>Elevation MLLW (ft)</u>	<u>Munsell Color</u>	<u>USCS Classification</u>	<u>SEDIMENT DESCRIPTION:</u>		<u>Sample ID:</u>	<u>Chemical and Physical Analyses:</u>
0.0	-7.0	GLE Y1 2.5N	CL	Very soft, wet, organic (<5%) trace fine sandy (<5%) silty (20-30%) clay (70-80%). Non plastic, small (<0.1 inch) organic fragments.		SED-SC-13-0-1-053112	Metals, PBCs, TBT Bulk, SVOCs, D/F, Grain Size, TOC
1.0	-8.0	GLE Y1 5/1	SP	0.8 feet bml: Well sorted, poorly graded medium sand, soft. 0.9-1.2 feet bml is fluid. Slightly silty (10%) medium sand and fluidization is sampling related. Sands appear to be mineral/silicic and are angular and allochthonous.		SED-SC-13-1-2-053112	(Archived)
2.0	-9.0			Lower contact is angled from 2 to 2.3 feet bml.			
3.0	-10.0	GLE Y1 2.5N	CL	2.1 feet bml: Very soft, wet, slightly fine sandy (5-10%), silty (20-30%) clay that becomes more consolidated with depth. No sheen. Slight H ₂ S odor w/ depth.		SED-SC-13-2-4-053112	Metals, PBCs, TBT Bulk, SVOCs, D/F, Grain Size, TOC
4.0	-11.0						
5.0	-12.0			2.5" wood fragment at 4 feet bml.			
6.0	-13.0	2.5y 2.5/1	SP/ML	5.0 feet bml: Well sorted, poorly graded trace silty (<10%) medium sand. Sands are lithic mineral and appear to be volcanoclastic in primarily provenance. Trace shell fragments. No odor.		SED-SC-13-4-6-053112	Analyze Archive for PCBs, D/F
7.0	-14.0	10YR 4/4	CL	6.3 feet bml: Slightly soft, organic clay. Plastic, slight H ₂ S odor. Easily rolls to 1/8".		SED-SC-13-6-7-053112	Metals, PBCs, TBT Bulk, SVOCs, D/F, Grain Size, TOC
		2.5Y 2/1	SP/CL	6.8 feet bml: Mixed silty clay clasts in medium sand matrix. No odor. Cobble in base of core/catcher that was discarded on vessel.			
8.0	-15.0			7.9 feet = Total depth below mudline. Refusal.			
9.0	-16.0						
10.0	-17.0						
11.0	-18.0						
12.0	-19.0						

LDW Stratigraphy Key	
	Recent
	Upper Alluvium
	Lower Alluvium



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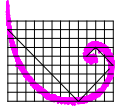
1218 3rd Avenue, Suite 1412, Seattle
WA 98101

Core ID SED-SC-14	Project Number 0155129.10

SEDIMENT CORE LOG

<u>Project Name & Location:</u> Glacier Northwest Inc. - Reichhold Inc. Site				<u>Actual Coordinates:</u> N 47° 32.961 W 122° 20.493		<u>Collection Time:</u> 12:20	
<u>Contractor:</u> Gravity Environmental, L.L.C.		<u>Driller:</u> Steve Saugen		<u>Mudline (MLLW ft):</u> 1.9	<u>Depth to Sediment (ft):</u> 5.2	<u>Elevation Datum:</u> Mean Lower Low Water [MLLW](ft)	<u>Lat/Long Datum:</u> NAD83
<u>Location within Site:</u> NW Embayment		<u>Tide Height (ft):</u> 7.1		<u>Drilling Equipment:</u> 4" Vibracore with Polycarbonate Core Liner		<u>Date Started/Completed:</u> 5/29/2012	<u>Time Logged:</u> 13:50
<u>Total Depth/Core Drive (ft):</u> 9.1				<u>Recovery Depth (ft):</u> 8.5		<u>Average Percent Recovery (%):</u> 89	
DEPTH (feet Below mudline [bml]) Elevation MLLW (ft) Munsell Color USCS Classification				Drive Notes: Drive attempt # 3.		Logged By: Dave Browning	
						Checked By: Matt Crandell	
				LDW Stratigraphy		Sample ID:	
				SEDIMENT DESCRIPTION:			
0.0	1.9	GLE Y1 2.5/N	CL	Very soft, wet organic trace fine sandy (5%) silty (30%) clay. A few small minor shell fragments (<1/8"). Some water entrained from sampling		SED-SC-14-0-1-052912	Metals, PBCs, TBT Bulk, SVOCs, D/F, Grain Size, TOC
1.0	0.9						
2.0	-0.1			1.0 foot bml: Soft moist slightly plastic trace fine sandy (5%) silty (30-40%) clay (50-60%) that collapses at 1/8" ribbon. Slight H ₂ S and natural organic odor. No sheen; sheen could not be produced with the application of H ₂ O.		SED-SC-14-1-2-052912	Analyze Archive for PCBs
3.0	-1.1						
4.0	-2.1	2.5Y 2.5/1	CL			SED-SC-14-2-4-052912	Metals, PBCs, TBT Bulk, SVOCs, D/F, Grain Size, TOC
5.0	-3.1						
6.0	-4.1	5Y 3/1	SP	4.8 feet bml: Slightly firm, well sorted, trace silty fine to medium sand. No odor, no sheen. Sand is mineral/lithic/volcanoclastic and subrounded and subspherical. Non recent. Top one foot of lithology stained from overlaying silty clay.		SED-SC-14-4-6-052912	Analyze Archive for PAHs, DF
7.0	-5.1			Minor small shell fragments and wood fragments at 5.6 feet bml.			
8.0	-6.1					SED-SC-14-6-8-052912	Metals, PBCs, TBT Bulk, SVOCs, D/F, Grain Size, TOC
9.0	-7.1			8.5 feet = Total depth below mudline.			
10.0	-8.1						
11.0	-9.1						
12.0	-10.1						

LDW Stratigraphy Key	
	Recent
	Upper Alluvium
	Lower Alluvium



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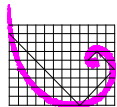
Core ID
SED-SC-15

Project Number
0155129.10

SEDIMENT CORE LOG

<u>Project Name & Location:</u> Glacier Northwest Inc. - Reichhold Inc. Site				<u>Actual Coordinates:</u> N 47° 32.946 W 122° 20.513		<u>Collection Time:</u> 14:10	
<u>Contractor:</u> Gravity Environmental, L.L.C.		<u>Driller:</u> Steve Saugen		<u>Mudline (MLLW ft):</u> 0.9	<u>Depth to Sediment (ft):</u> 7.5	<u>Elevation Datum:</u> Mean Lower Low Water [MLLW](ft)	<u>Lat/Long Datum:</u> NAD83
<u>Location within Site:</u> NW Embayment		<u>Tide Height (ft):</u> 8.4		<u>Drilling Equipment:</u> 4" Vibracore with Polycarbonate Core Liner		<u>Date Started/Completed:</u> 5/31/2012	<u>Time Logged:</u> 14:50
<u>Total Depth/Core Drive (ft):</u> 4.6				<u>Recovery Depth (ft):</u> 4.2		<u>Average Percent Recovery (%):</u> 91	
				<u>Drive Notes:</u> Drive attempt # 2.		<u>Logged By:</u> Dave Browning	
						<u>Checked By:</u> Matt Crandell	
<u>DEPTH (feet Below mudline [bml])</u>	<u>Elevation MLLW (ft)</u>	<u>Munsell Color</u>	<u>USCS Classification</u>	<u>LDW Stratigraphy</u>	<u>SEDIMENT DESCRIPTION:</u>	<u>Sample ID:</u>	<u>Chemical and Physical Analyses:</u>
0.0	0.9	GLEI 1 2.5/N	CL		Soft, wet, clayey (20-30%) silty (20-30%) medium sand (40-50%). Scattered gravels (0.5-1") that are lithic and have no syntactical relationship with unit. H2S odor. No sheen. Brick chips at 0.3 and 0.6 feet below mudline. Sands are mineral/lithic with minor urban lithics.	SED-SC-15-0-1-053112	Metals, PBCs, TBT Bulk, SVOCs, D/F, Grain Size, TOC
1.0	-0.1				0.9 feet bml: Small tile shard at 0.9 feet below mudline. Soft to semi-firm, slightly sandy (10%) silty (20-30%) clay (60-70%) with large wood fragments (10-15% by volume). Strong H2S odor. Trace scattered 0.5-1" gravel that is lithic and subrounded. With plastic, wood and metal debris.		
2.0	-1.1				1.5" round clast of cohesive gray clay at 1.8 feet bml.	SED-SC-15-1-2-053112	(Archived)
3.0	-2.1				With woody debris from 2.4 - 2.7 feet bml. H2S odor.		
4.0	-3.1			2.5Y 3/2	SM		3.1 feet bml: Dense, firm well sorted, poorly graded trace silty (<5%) fine sand. Slight H2S odor.
			3.6 feet bml: Firm, cohesive organic (10-15%) clay with very strong H2S odor, organics are wood and root fragments that are natural.				
					4.3 feet = total depth below mudline. Refusal.		
5.0	-4.1						
6.0	-5.1						
7.0	-6.1						
8.0	-7.1						
9.0	-8.1						
10.0	-9.1						
11.0	-10.1						
12.0	-11.1						

LDW Stratigraphy Key	
	Recent
	Upper Alluvium
	Lower Alluvium



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ERM West, Inc.

1218 3rd Avenue, Suite 1412, Seattle
WA 98101

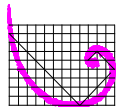
Core ID
SED-SC-16

Project Number
0155129.10

SEDIMENT CORE LOG

<u>Project Name & Location:</u> Glacier Northwest Inc. - Reichhold Inc. Site				<u>Actual Coordinates:</u> N 47° 32.924 W 122° 20.527		<u>Collection Time:</u> 15:22						
<u>Contractor:</u> Gravity Environmental, L.L.C.		<u>Driller:</u> Steve Saugen		<u>Mudline (MLLW ft):</u> 2.4		<u>Depth to Sediment (ft):</u> 6.2		<u>Elevation Datum:</u> Mean Lower Low Water [MLLW](ft)		<u>Lat/Long Datum:</u> NAD83		
<u>Location within Site:</u> SW Embayment		<u>Tide Height (ft):</u> 8.6		<u>Drilling Equipment:</u> 4" Vibracore with Polycarbonate Core Liner				<u>Date Started/Completed:</u> 5/31/2012		<u>Time Logged:</u> 16:10		
<u>Total Depth/Core Drive (ft):</u> 4.0				<u>Recovery Depth (ft):</u> 3.8				<u>Average Percent Recovery (%):</u> 95				
				Drive Notes: Drive attempt # 1.				Logged By: Dave Browning				
								Checked By: Matt Crandell				
<u>DEPTH (feet Below mudline [bml])</u>	<u>Elevation MLLW (ft)</u>	<u>Munsell Color</u>	<u>USCS Classification</u>	<u>LDW Stratigraphy</u>	<u>SEDIMENT DESCRIPTION:</u>						<u>Sample ID:</u>	<u>Chemical and Physical Analyses:</u>
0.0	2.4	GLEVI 2.5N	CL		Soft, wet, organic slightly sandy (10%) silty (20-30%) clay (60-70%). Sands are subangular and lithic and range from fine to coarse. No odor. No sheen.						SED-SC-16-0-1-053112	Metals, PBCs, TBT Bulk, SVOCs, D/F, Grain Size, TOC
1.0	1.4											
			SP		1.5 feet bml: Wet, soft, clayey (10-20%) fine sand (80-90%) that ranges from fine to coarse with mode being medium-coarse. Non-laminar contact with underlying layer.						SED-SC-16-1-2-053112	(Archived)
2.0	0.4		1.8 feet bml: Soft, moist to wet, organic slightly sandy (10-15%) silty (30%) clay (50-60%). Becomes slightly plastic with depth. 2" x 2" x 1/2" wood fragment at 2 feet bml. No odor, no sheen. A few small <0.5" wood/twig fragments in unit.									
3.0	-0.6	2.5Y 3/3	CL		2.9 feet bml: Firm, damp, plastic, mottled clay. Mottled with 1/4" spots of lacey 2.5N cohesive clay. No odor. No sheen.						SED-SC-16-2-3.5-053112	Metals, PBCs, TBT Bulk, SVOCs, D/F, Grain Size, TOC
4.0	-1.6				3.8 feet = total depth below the mudline. Refusal.							
5.0	-2.6											
6.0	-3.6											
7.0	-4.6											
8.0	-5.6											
9.0	-6.6											
10.0	-7.6											
11.0	-8.6											
12.0	-9.6											

LDW Stratigraphy Key	
	Recent
	Upper Alluvium
	Lower Alluvium



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WA 98101

Core ID
SED-SC-17

Project Number
0155129.10

SEDIMENT CORE LOG

<u>Project Name & Location:</u> Glacier Northwest Inc. - Reichhold Inc. Site				<u>Actual Coordinates:</u> N 47° 32.909 W 122° 20.506		<u>Collection Time:</u> 15:11					
<u>Contractor:</u> Gravity Environmental, L.L.C.		<u>Driller:</u> Steve Saugen		<u>Mudline (MLLW ft):</u> -1.2		<u>Depth to Sediment (ft):</u> 8.2		<u>Elevation Datum:</u> Mean Lower Low Water [MLLW](ft)		<u>Lat/Long Datum:</u> NAD83	
<u>Location within Site:</u> S Embayment		<u>Tide Height (ft):</u> 7.0		<u>Drilling Equipment:</u> 4" Vibracore with Polycarbonate Core Liner				<u>Date Started/Completed:</u> 5/30/2012		<u>Time Logged:</u> 18:30	
<u>Total Depth/Core Drive (ft):</u> 6.0				<u>Recovery Depth (ft):</u> 5.5				<u>Average Percent Recovery (%):</u> 91.6			
<u>DEPTH (feet Below mudline [bml])</u> <u>Elevation MLLW (ft)</u> <u>Munsell Color</u> <u>USCS Classification</u>				<u>Drive Notes: Drive attempt # 3.</u>				<u>Logged By: Dave Browning</u>			
								<u>Checked By: Matt Crandell</u>			
				<u>LDW Stratigraphy</u>				<u>SEDIMENT DESCRIPTION:</u>			
0.0 -1.2				GLEIY 2.5N				CL			
								Soft, wet to fluid, very silty (40%) clay with trace sand (5%). Minor organic/wood fragments.			
								Slight H ₂ O			
1.0 -2.2				GLEIY 2.4/5B				SED-SC-17-0-1-053012			
								0.7 feet bml: Very soft, wet, slightly sand (5-10%) clay (90%). No bearing strength. Has ashy odor.			
								No sheen. Dark gray rind from edge of core wall.			
2.0 -3.2				GLEIY 2.5N				SED-SC-17-1-2-053012 (Archived)			
								1.8 feet bml: Soft, wet, nonplastic slightly sandy silty (30%) clay (70%) organic. Natural organic odor.			
3.0 -4.2				5Y 4/4				SED-SC-17-2-4-053012			
								2.5 feet bml: Soft, unconsolidated trace fine sandy (10%) clay (90%) that has both olive and black clays. No bearing strength, no plasticity. Ashy odor. No sheen.			
4.0 -5.2								SED-SC-17-4-5-053012			
								3.6 feet bml: Dense, trace clayey (5-10%) medium to coarse sandy (30-40%) gravel (50-65%). Gravels are angular. With 1-2" brick/tile fragments.			
5.0 -6.2				GLEIY 2.5N				GP-GC			
6.0 -7.2								5.5 feet = Total depth below mudline. Refusal.			
7.0 -8.2											
8.0 -9.2											
9.0 -10.2											
10.0 -11.2											
11.0 -12.2											
12.0 -13.2											

LDW Stratigraphy Key	
	Recent
	Upper Alluvium
	Lower Alluvium



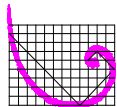
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98101

Core ID SED-SC-18	Project Number 0155129.10

SEDIMENT CORE LOG

<u>Project Name & Location:</u> Glacier Northwest Inc. - Reichhold Inc. Site				<u>Actual Coordinates:</u> N 47° 32.983 W 122° 20.455		<u>Collection Time:</u> 15:37					
<u>Contractor:</u> Gravity Environmental, L.L.C.		<u>Driller:</u> Steve Saugen		<u>Mudline (MLLW ft):</u> NR		<u>Depth to Sediment (ft):</u> NR		<u>Elevation Datum:</u> Mean Lower Low Water [MLLW](ft)		<u>Lat/Long Datum:</u> NAD83	
<u>Location within Site:</u> North of dock		<u>Tide Height (ft):</u> 9.5		<u>Drilling Equipment:</u> 4" Vibracore with Polycarbonate Core Liner				<u>Date Started/Completed:</u> 6/1/2012		<u>Time Logged:</u> 16:30	
<u>Total Depth/Core Drive (ft):</u> 3.0				<u>Recovery Depth (ft):</u> 2.8				<u>Average Percent Recovery (%):</u> 93			
				Drive Notes: Drive attempt # 11.				Logged By: Dave Browning			
								Checked By: Matt Crandell			
<u>DEPTH (feet Below mudline [bml])</u>	<u>Elevation MLLW (ft)</u>	<u>Munsell Color</u>	<u>USCS Classification</u>	<u>LDW Stratigraphy</u>	<u>SEDIMENT DESCRIPTION:</u>					<u>Sample ID:</u>	<u>Chemical and Physical Analyses:</u>
0.0	NR	GLE Y1 2.5/N	CL		Soft, wet, organic trace fine to medium sandy (<5%) silty (20-30%) clay (70-80%) with small organic particles (plant fragments). Methanogenic. Becomes lighter hued and more consolidated with depth.					SED-SC-18-0-1-060112	Metals, PBCs, TBT Bulk, SVOCs, D/E, Grain Size, TOC
1.0					Slight ash odor in 1.17 to 2.25 feet bml section.					SED-SC-18-1-2-060112	
2.0		GLE Y1 2.5/10Y								SED-SC-18-2-2-25-060112	
3.0					2.8 feet= Total depth below mudline. Refusal.						
4.0											
5.0											
6.0											
7.0											
8.0											
9.0											
10.0											
11.0											
12.0											

LDW Stratigraphy Key	
	Recent
	Upper Alluvium
	Lower Alluvium



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WA 98101

Core ID
SED-SC-20

Project Number
0155129.10

SEDIMENT CORE LOG

Project Name & Location: Glacier Northwest Inc. - Reichhold Inc. Site				Actual Coordinates:		N 47° 32.964 W 122° 20.411		Collection Time: 18:22			
Contractor: Gravity Environmental, L.L.C.		Driller: Steve Saugen		Mudline (MLLW ft): -31.3		Depth to Sediment (ft): 39		Elevation Datum: Mean Lower Low Water [MLLW](ft)		Lat/Long Datum: NAD83	
Location within Site: Shipping Channel		Tide Height (ft): 7.7		Drilling Equipment: 4" Vibracore with Polycarbonate Core Liner				Date Started/Completed: 6/1/2012		Time Logged: 20:40	
Total Depth/Core Drive (ft): 6.5				Recovery Depth (ft): 6				Average Percent Recovery (%): 92.3			
DEPTH (feet Below mudline [bml]) Elevation MLLW (ft) Munsell Color USCS Classification				Drive Notes: Drive attempt # 4.				Logged By: Dave Browning			
								Checked By: Matt Crandell			
				LDW Stratigraphy				SEDIMENT DESCRIPTION:			
0.0 -31.3				ML				Soft, wet, organic trace sandy (fine and medium) (<5%) very clayey (40-50%) silt (50-60%). Orange colored iron hydroxide on organics in upper 1" of sediment column. Infaunal burrow with oxidized walls.			
1.0 -32.3											
2.0 -33.3											
3.0 -34.3				GP-GM				Thin band of very silty fine to medium sand from 2.25 to 2.33 feet bml. Wet. Soft. Sand is mineral and subangular, sand is discontinuous across entire core.			
4.0 -35.3				CL				2.95 feet bml: Lense of clayey/silty, slightly sandy fine (1/4"<) rounded gravel of lithic (volcanic) composition. Indistinct upper and lower contact.			
5.0 -36.3								Gravel and sand smear along sidewall from 2.2 to 3.5 feet bml. Lens of gravel is not continuous across entire width of core.			
6.0 -37.3								3.2 feet bml: Soft, wet to moist organic trace sandy (<5%) very silty (40-50%) clay (50-60%), slightly plastic. Collapses at 1/8" ribbon, with methane vesicles and minor organic plant debris.			
7.0 -38.3								SED-SC-20-0-1-053012 Metals, PBCs, TBT Bulk, SVOCs, D/F, Grain Size, TOC			
8.0 -39.3								SED-SC-20-1-2-053012 (Archived)			
9.0 -40.3								SED-SC-20-2-2-053012 Metals, PBCs, TBT Bulk, SVOCs, D/F, Grain Size, TOC			
10.0 -41.3											
11.0 -42.3											
12.0 -43.3											

LDW Stratigraphy Key	
	Recent
	Upper Alluvium
	Lower Alluvium



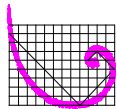
1218 3rd Avenue, Suite 1412, Seattle
WA 98101

Core ID SED-SC-21	Project Number 0155129.10

SEDIMENT CORE LOG

Project Name & Location:				Actual Coordinates:		N 47° 32.964		W 122° 20.411		Collection Time:	
Glacier Northwest Inc. - Reichhold Inc. Site										13:00	
Contractor:		Driller:		Mudline (MLLW ft):		Depth to Sediment (ft):		Elevation Datum:		Lat/Long Datum:	
Gravity Environmental, L.L.C.		Steve Saugen		-33		35.3		Mean Lower Low Water [MLLW](ft)		NAD83	
Location within Site:		Tide Height (ft):		Drilling Equipment:				Date Started/Completed:		Time Logged:	
Shipping Channel		2.3		4" Vibracore with Polycarbonate Core Liner				5/25/2012		13:40	
Total Depth/Core Drive (ft):				Recovery Depth (ft):				Average Percent Recovery (%):			
14.9				14.1				95			
DEPTH (feet Below mudline [bml])		Elevation MLLW (ft)		Munsell Color		USCS Classification		Drive Notes: Drive attempt # 1.			
								Logged By: Dave Browning			
								Checked By: Matt Crandell			
								Chemical and Physical Analyses:			
								Sample ID:			
0.0		-33.0						SED-SC-21-0-1-053012			
1.0		-34.0									
								SED-SC-21-1-2-053012 (Archived)			
2.0		-35.0									
								SED-SC-21-2-2.5-053012			
3.0		-36.0									
4.0		-37.0									
5.0		-38.0									
6.0		-39.0									
7.0		-40.0									
8.0		-41.0									
9.0		-42.0									
10.0		-43.0									
11.0		-44.0									
12.0		-45.0									

LDW Stratigraphy Key	
	Recent
	Upper Alluvium
	Lower Alluvium



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1218 3rd Avenue, Suite 1412, Seattle
WA 98101

Core ID
SED-SC-21

Project Number
0155129.10

SEDIMENT CORE LOG

<u>Project Name & Location:</u> Glacier Northwest Inc. - Reichhold Inc. Site				<u>Actual Coordinates:</u> N 47° 32.964 W 122° 20.411		<u>Collection Time:</u> 13:00																									
<u>Contractor:</u> Gravity Environmental, L.L.C.		<u>Driller:</u> Steve Saugen		<u>Mudline (MLLW ft):</u> -33		<u>Depth to Sediment (ft):</u> 35.3		<u>Elevation Datum:</u> Mean Lower Low Water [MLLW](ft)		<u>Lat/Long Datum:</u> NAD83																					
<u>Location within Site:</u> Shipping Channel		<u>Tide Height (ft):</u> 2.3		<u>Drilling Equipment:</u> 4" Vibracore with Polycarbonate Core Liner				<u>Date Started/Completed:</u> 5/25/2012		<u>Time Logged:</u> 13:40																					
<u>Total Depth/Core Drive (ft):</u> 14.9				<u>Recovery Depth (ft):</u> 14.1				<u>Average Percent Recovery (%):</u> 95																							
<u>DEPTH (feet Below mudline [bml])</u> 12.0 13.0 14.0				<u>Elevation MLLW (ft)</u> -45.0 -46.0 -47.0				<u>Munsell Color</u> 2.5Y 2.5/1				<u>USCS Classification</u> CL				<u>LDW Stratigraphy</u> [Patterned boxes]				<u>Drive Notes: Drive attempt # 1.</u>				<u>Logged By: Dave Browning</u>				<u>Checked By: Matt Crandell</u>			
																								<u>Sample ID:</u> SED-SC-21-12-13-052512				<u>Chemical and Physical Analyses:</u> (Archived)			
<u>SEDIMENT DESCRIPTION:</u>																															
14.1 feet = Total depth below mudline.																															
15.0 -48.0																															
16.0 -49.0																															
17.0 -50.0																															
18.0 -51.0																															
19.0 -52.0																															
20.0 -53.0																															
21.0 -54.0																															
22.0 -55.0																															
23.0 -56.0																															
24.0 -57.0																															

LDW Stratigraphy Key	
	Recent
	Upper Alluvium
	Lower Alluvium



APPENDIX U

SUBSURFACE IMAGE TEST PIT PHOTOLOG



Photograph: 1 Looking southeast at East Excavation



Photograph: 2 Typical sidewall within East Excavation containing carbon and sawdust from 2 to 3.5 feet below ground surface



Glacier Northwest Inc.-Reichhold, Inc. Site
5900 W. Marginal Way Southwest
 ERM Project Number 232280.08



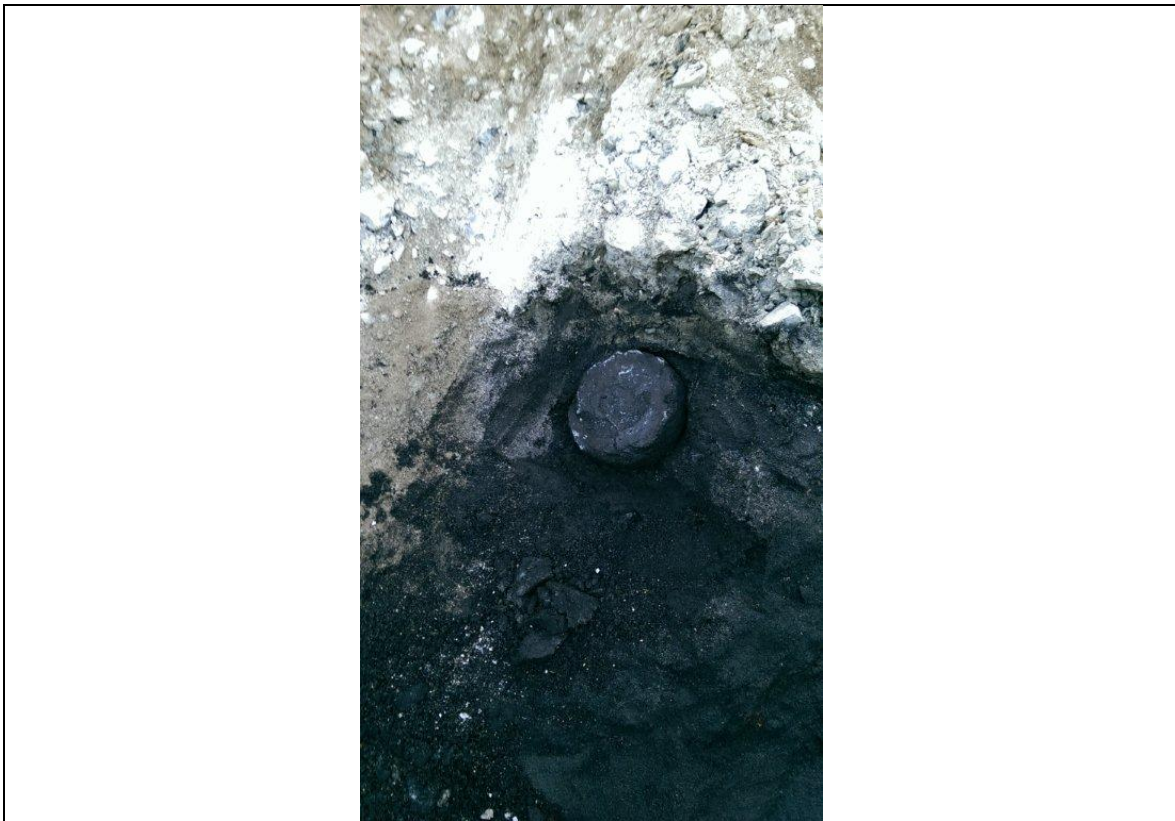
Photograph: 3 Soil horizon includes sawdust, black carbon and blue color from copper



Photograph: 4 Another photograph of carbon and blue color from copper



Glacier Northwest Inc.-Reichhold, Inc. Site
5900 W. Marginal Way Southwest
 ERM Project Number 232280.08



Photograph: 5	In situ charcoal briquette



Photograph: 6	Surface after briquette was removed



Glacier Northwest Inc.-Reichhold, Inc. Site
5900 W. Marginal Way Southwest
ERM Project Number 232280.08



Photograph: 7 Carbon material from sidewall with blue hue from copper



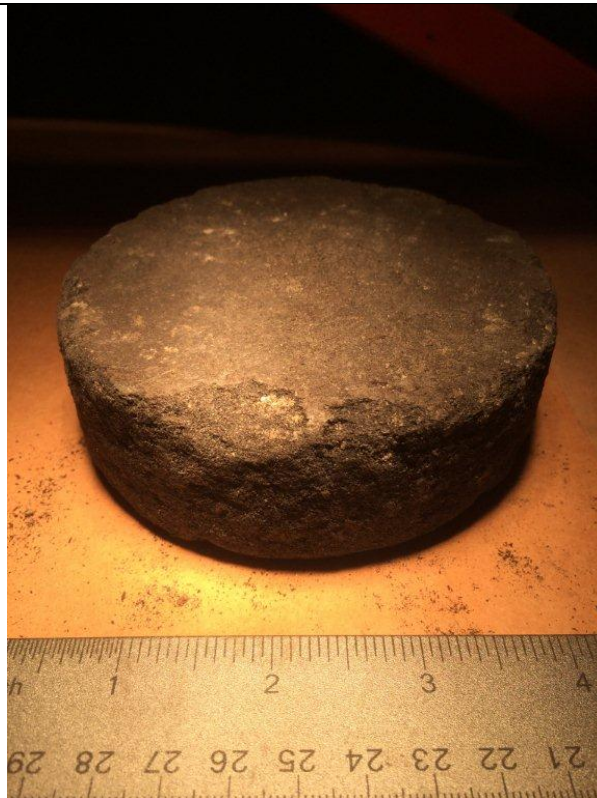
Photograph: 8 Charcoal briquette



Glacier Northwest Inc.-Reichhold, Inc. Site
5900 W. Marginal Way Southwest
 ERM Project Number 232280.08



Photograph: 9 Charcoal briquette



Photograph: 10 Charcoal briquette



Glacier Northwest Inc.-Reichhold, Inc. Site
5900 W. Marginal Way Southwest
 ERM Project Number 232280.08



Photograph: 11 Charcoal briquette



Photograph: 12 Charcoal briquette profile



Glacier Northwest Inc.-Reichhold, Inc. Site
5900 W. Marginal Way Southwest
 ERM Project Number 232280.08



APPENDIX V

COPC PREVALENCE TABLES

PUBLIC REVIEW DRAFT
Table V-1
Screening Levels and COPCs for Vadose Zone Soil
5900 West Marginal Way Site
Seattle, Washington

			Sample Statistics													Elimination Criteria			
Analyte	Most Stringent Soil pCUL Vadose Zone Potable GW	PQL ¹	Sample Count	Detect Count	Non-Detect Count	Detection Frequency (%)	Minimum Detection	Average Detection	Median Detection	Maximum Detection	Location of Maximum Detection	Number of Exceedances, Detects	Number of Exceedances, Non-Detects	Exceedance Frequency (%)	Maximum Exceedance Factor	Detected SL Exceedances > =1	SL < PQL	Maximum Detection > PQL	Retained as COPC?
Metals (mg/kg)																			
Antimony	5	0.2	4	0	4	0						0	0	0	0	No	No	NA	No
Arsenic	7	0.2	58	48	10	82.8	1.7	83.1	29.6	1290	MW-19S	40	4	69	184	Yes	No	Yes	Yes
Barium	100	0.3	10	10	0	100	9	33.8	28.8	67.5	GP-57	0	0	0	0.675	No	No	NA	No
Beryllium	10	0.1	4	1	3	25	0.5	0.5	0.5	0.5	GP-57	0	0	0	0.05	No	No	NA	No
Cadmium	1	0.1	8	3	5	37.5	0.1	0.2	0.2	0.3	GP-57	0	0	0	0.3	No	No	NA	No
Chromium	48	0.5	31	30	1	96.8	3	29	26	167	TB-06A	2	1	6.45	3.48	Yes	No	Yes	Yes
Chromium, VI	18	0.1	15	5	10	33.3	0.607	39.2	1	173	TB-06A	2	0	13.3	9.61	Yes	No	Yes	Yes
Copper	36	0.2	33	33	0	100	14.3	10400	102	337000	TB-06A	25	0	75.8	9360	Yes	No	Yes	Yes
Lead	50	0.1	10	10	0	100	1.9	13.8	10.8	34.3	MW-23D	0	0	0	0.686	No	No	NA	No
Mercury	0.07	0.025	10	6	4	60	0.03	0.07	0.065	0.12	GP-56	3	0	30	1.71	Yes	No	Yes	Yes
Nickel	48	0.5	10	9	1	90	7	16.2	11	39	GP-59	0	0	0	0.812	No	No	NA	No
Selenium	0.3	0.5	4	0	4	0						0	4	0	0	No	Yes	NA	No
Silver	0.32	0.2	27	5	22	18.5	0.5	1.76	1.5	4.1	GP-56	5	11	18.5	12.8	Yes	No	Yes	Yes
Thallium	0.088	0.2	4	0	4	0						0	4	0	0	No	Yes	NA	No
Tributyltin	0.0021	0.00386	4	2	2	50	0.0087	0.0138	0.0138	0.019	MW-30S	2	1	50	9.05	Yes	Yes	Yes	Yes
Zinc	86	1	33	33	0	100	12	78	68	208	GP-62	10	0	30.3	2.42	Yes	No	Yes	Yes
Volatile Organic Compounds (µg/kg)																			
1,1-Dichloroethane	41	1	3	0	3	0						0	1	0	0	No	No	NA	No
1,1-Dichloroethene	44	1	3	0	3	0						0	1	0	0	No	No	NA	No
1,1-Dichloropropene		1	3	0	3	0						0	0	0	0	No	NA	NA	No
1,1,1-Trichloroethane	1500	1	3	0	3	0						0	0	0	0	No	No	NA	No
1,1,1,2-Tetrachloroethane	38000	1	3	0	3	0						0	0	0	0	No	No	NA	No
1,1,2-Trichloroethane	5	1	3	0	3	0						0	1	0	0	No	No	NA	No
1,1,2,2-Tetrachloroethane	1.2	1	3	0	3	0						0	1	0	0	No	No	NA	No
1,2-Dibromo-3-chloropropane	1300	5	3	0	3	0						0	1	0	0	No	No	NA	No
1,2-Dichloroethane	23	1	3	0	3	0						0	1	0	0	No	No	NA	No
1,2-Dichloropropane	16	1	3	0	3	0						0	1	0	0	No	No	NA	No
1,2,3-Trichlorobenzene	20000	5	3	0	3	0						0	0	0	0	No	No	NA	No
1,2,3-Trichloropropane	33	2	3	0	3	0						0	1	0	0	No	No	NA	No
1,2,4-Trimethylbenzene	800000	1	3	1	2	33.3	3400	3400	3400	3400	GP-75	0	0	0	0.00425	No	No	NA	No
1,3-Dichloropropane		1	3	0	3	0						0	0	0	0	No	NA	NA	No
1,3,5-Trimethylbenzene	800000	1	3	1	2	33.3	1100	1100	1100	1100	GP-75	0	0	0	0.00138	No	No	NA	No
2-Butanone		5	3	1	2	33.3	3.1	3.1	3.1	3.1	GP-62	0	0	0	0	No	NA	NA	No
2-Chloroethyl vinyl ether		5	3	0	3	0						0	0	0	0	No	NA	NA	No
2-Hexanone	400000	5	3	0	3	0						0	0	0	0	No	No	NA	No
2-Phenylbutane		1	3	0	3	0						0	0	0	0	No	NA	NA	No
2,2-Dichloropropane		1	3	0	3	0						0	0	0	0	No	NA	NA	No
4-Chlorotoluene		1	3	0	3	0						0	0	0	0	No	NA	NA	No
4-Methyl-2-pentanone		5	3	0	3	0						0	0	0	0	No	NA	NA	No
Acetone	29000	5	3	3	0	100	2.8	2020	52	6000	GP-75	0	0	0	0.207	No	No	NA	No
Acrolein	40000	50	3	0	3	0						0	0	0	0	No	No	NA	No
Acrylonitrile	1900	5	3	0	3	0						0	0	0	0	No	No	NA	No
Benzene	8.8	1	3	1	2	33.3	4.2	4.2	4.2	4.2	GP-62	0	1	0	0.477	No	No	NA	No
Bromobenzene	640000	1	3	0	3	0						0	0	0	0	No	No	NA	No
Bromodichloromethane	14	1	3	0	3	0						0	1	0	0	No	No	NA	No
Bromoform	78	1	3	0	3	0						0	1	0	0	No	No	NA	No
Carbon disulfide	5000	1	3	0	3	0						0	0	0	0	No	No	NA	No
Carbon tetrachloride	2.9	1	3	0	3	0						0	1	0	0	No	No	NA	No
Chlorobenzene	860	1	3	0	3	0						0	0	0	0	No	No	NA	No
Chlorobromomethane		1	3	0	3	0						0	0	0	0	No	NA	NA	No
Chloroethane		1	3	0	3	0						0	0	0	0	No	NA	NA	No
Chloroform	74	1	3	1	2	33.3	0.8	0.8	0.8	0.8	GP-62	0	1	0	0.0108	No	No	NA	No

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Table V-1
Screening Levels and COPCs for Vadose Zone Soil
5900 West Marginal Way Site
Seattle, Washington

Analyte	Most Stringent Soil pCUL Vadose Zone Potable GW	PQL ¹	Sample Statistics													Elimination Criteria			
			Sample Count	Detect Count	Non-Detect Count	Detection Frequency (%)	Minimum Detection	Average Detection	Median Detection	Maximum Detection	Location of Maximum Detection	Number of Exceedances, Detects	Number of Exceedances, Non-Detects	Exceedance Frequency (%)	Maximum Exceedance Factor	Detected SL Exceedances > =1	SL < PQL	Maximum Detection > PQL	Retained as COPC?
cis-1,2-Dichloroethene	78	1	3	0	3	0						0	1	0	0	No	No	NA	No
cis-1,3-Dichloropropene	2.3	1	3	0	3	0						0	1	0	0	No	No	NA	No
Cumene		1	3	1	2	33.3	1100	1100	1100	1100	GP-75	0	0	0	0	No	NA	NA	No
Cymene		1	3	1	2	33.3	1200	1200	1200	1200	GP-75	0	0	0	0	No	NA	NA	No
Dibromochloromethane	12	1	3	0	3	0						0	1	0	0	No	No	NA	No
Dibromomethane	800000	1	3	0	3	0						0	0	0	0	No	No	NA	No
Ethyl bromide		2	3	0	3	0						0	0	0	0	No	NA	NA	No
Ethylbenzene	260	1	3	1	2	33.3	3300	3300	3300	3300	GP-75	1	0	33.3	12.7	Yes	No	Yes	Yes
Ethylene dibromide	0.27	1	3	0	3	0						0	2	0	0	No	Yes	NA	No
Freon 11		1	3	0	3	0						0	0	0	0	No	NA	NA	No
Freon 113		2	3	0	3	0						0	0	0	0	No	NA	NA	No
m,p Xylenes		1	3	1	2	33.3	3800	3800	3800	3800	GP-75	0	0	0	0	No	NA	NA	No
Methyl bromide	50	1	3	0	3	0						0	1	0	0	No	No	NA	No
Methyl chloride		1	3	1	2	33.3	0.3	0.3	0.3	0.3	GP-62	0	0	0	0	No	NA	NA	No
Methyl iodide		1	3	0	3	0						0	0	0	0	No	NA	NA	No
Methyl tert-butyl ether	100	1	3	0	3	0						0	1	0	0	No	No	NA	No
Methylene chloride	21	2	3	1	2	33.3	8200	8200	8200	8200	GP-75	1	0	33.3	390	Yes	No	Yes	Yes
n-Butylbenzene		1	3	0	3	0						0	0	0	0	No	NA	NA	No
n-Propylbenzene		1	3	0	3	0						0	0	0	0	No	NA	NA	No
o-Chlorotoluene		1	3	0	3	0						0	0	0	0	No	NA	NA	No
o-Xylene	14000	1	3	1	2	33.3	2400	2400	2400	2400	GP-75	0	0	0	0.171	No	No	NA	No
Styrene	2200	1	3	1	2	33.3	580	580	580	580	GP-75	0	0	0	0.264	No	No	NA	No
tert-Butylbenzene		1	3	0	3	0						0	0	0	0	No	NA	NA	No
Tetrachloroethene	29	1	3	0	3	0						0	1	0	0	No	No	NA	No
Toluene	920	1	3	2	1	66.7	0.6	495	495	990	GP-75	1	0	33.3	1.08	Yes	No	Yes	Yes
trans-1,2-Dichloroethene	520	1	3	0	3	0						0	0	0	0	No	No	NA	No
trans-1,3-Dichloropropene	2.3	1	3	0	3	0						0	1	0	0	No	No	NA	No
trans-1,4-Dichlorobutene		5	3	0	3	0						0	0	0	0	No	NA	NA	No
Trichloroethene	4.4	1	3	0	3	0						0	1	0	0	No	No	NA	No
Vinyl acetate	33000	5	3	0	3	0						0	0	0	0	No	No	NA	No
Vinyl chloride	1	1	3	0	3	0						0	1	0	0	No	No	NA	No
Total Petroleum Hydrocarbons (mg/kg)																			
Diesel Range Organics	260	5	5	5	0	100	5.3	1140	110	4900	GP-75	2	0	40	18.8	Yes	No	Yes	Yes
Gasoline Range Organics	30	5	3	1	2	33.3	300	300	300	300	GP-75	1	0	33.3	10	Yes	No	Yes	Yes
Motor Oil Range Organics	2000		5	4	1	80	74	3240	450	12000	GP-75	1	0	20	6	Yes	No	Yes	Yes
Semivolatile Organic Compounds (µg/kg)																			
1,2-Dichlorobenzene	36	5	3	0	3	0						0	0	0	0	No	No	NA	No
1,2,4-Trichlorobenzene	1.4	5	3	0	3	0						0	3	0	0	No	Yes	NA	No
1,3-Dichlorobenzene		1	3	0	3	0						0	0	0	0	No	NA	NA	No
1,4-Dichlorobenzene	110	1	3	0	3	0						0	0	0	0	No	No	NA	No
2-Chloronaphthalene		20	3	0	3	0						0	0	0	0	No	NA	NA	No
2-Chlorophenol	200	20	28	2	26	7.14	96	138	138	180	TP-10	0	3	0	0.9	No	No	NA	No
2-Nitroaniline	800000	100	3	0	3	0						0	0	0	0	No	No	NA	No
2,2-Oxybis(1-chloropropane)		20	3	0	3	0						0	0	0	0	No	NA	NA	No
2,3,4,6-Tetrachlorophenol	4600	20	26	5	21	19.2	9.1	308	100	1300	GP-56	0	0	0	0.283	No	No	NA	No
2,4-Dichlorophenol	69	20	28	2	26	7.14	35	132	132	230	GP-56	1	11	3.57	3.33	Yes	No	Yes	Yes
2,4-Dimethylphenol	29	40	3	0	3	0						0	0	0	0	No	Yes	NA	No
2,4-Dinitrophenol	130	850	3	0	3	0						0	0	0	0	No	Yes	NA	No
2,4-Dinitrotoluene	1.1	100	3	0	3	0						0	3	0	0	No	Yes	NA	No
2,4,5-Trichlorophenol	4000	100	28	0	28	0						0	0	0	0	No	No	NA	No
2,4,6-Trichlorophenol	3.3	100	28	3	25	10.7	26	153	44	390	GP-56	3	25	10.7	118	Yes	Yes	Yes	Yes
2,6-Dinitrotoluene	0.31	100	3	0	3	0						0	3	0	0	No	Yes	NA	No

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Table V-1
Screening Levels and COPCs for Vadose Zone Soil
5900 West Marginal Way Site
Seattle, Washington

Analyte	Most Stringent Soil pCUL Vadose Zone Potable GW	PQL ¹	Sample Statistics													Elimination Criteria			
			Sample Count	Detect Count	Non-Detect Count	Detection Frequency (%)	Minimum Detection	Average Detection	Median Detection	Maximum Detection	Location of Maximum Detection	Number of Exceedances, Detects	Number of Exceedances, Non-Detects	Exceedance Frequency (%)	Maximum Exceedance Factor	Detected SL Exceedances > =1	SL < PQL	Maximum Detection > PQL	Retained as COPC?
3-Nitroaniline		100	3	0	3	0						0	0	0	0	No	NA	NA	No
3,3'-Dichlorobenzidine	0.061	150	3	0	3	0						0	3	0	0	No	Yes	NA	No
4-Bromophenyl phenyl ether		20	3	0	3	0						0	0	0	0	No	NA	NA	No
4-Chloro-3-methylphenol		100	3	0	3	0						0	0	0	0	No	NA	NA	No
4-Chlorophenyl phenyl ether		20	3	0	3	0						0	0	0	0	No	NA	NA	No
4-Nitrophenol	7000	100	3	0	3	0						0	0	0	0	No	No	NA	No
Benzoic acid	650	400	3	1	2	33.3	130	130	130	130	GP-59	0	0	0	0.2	No	No	NA	No
Benzyl alcohol	57	20	3	0	3	0						0	0	0	0	No	No	NA	No
Benzyl butyl phthalate	3.6	5	3	0	3	0						0	3	0	0	No	Yes	NA	No
Bis(2-chloroethoxy)methane		20	3	0	3	0						0	0	0	0	No	NA	NA	No
Bis(2-ethylhexyl)phthalate	100	25	3	1	2	33.3	18	18	18	18	MW-31S	0	0	0	0.18	No	No	NA	No
Carbazole		20	3	0	3	0						0	0	0	0	No	NA	NA	No
Di-n-octyl phthalate	6200	20	3	0	3	0						0	0	0	0	No	No	NA	No
Dibutyl Phthalate	280	20	3	0	3	0						0	0	0	0	No	No	NA	No
Dichloroethyl ether	0.22	20	3	0	3	0						0	3	0	0	No	Yes	NA	No
Diethyl Phthalate	200	5	3	0	3	0						0	0	0	0	No	No	NA	No
Dimethylphthalate	71	5	3	0	3	0						0	0	0	0	No	No	NA	No
Dinitro-o-cresol		200	3	0	3	0						0	0	0	0	No	NA	NA	No
Hexachlorobenzene	0.008	5	10	4	6	40	9.5	86.9	69	200	TB-05B	4	6	40	25000	Yes	Yes	Yes	Yes
Hexachlorobutadiene	11	5	6	0	6	0						0	1	0	0	No	No	NA	No
Hexachlorocyclopentadiene	4000	400	3	0	3	0						0	0	0	0	No	No	NA	No
Hexachloroethane	0.79	20	3	0	3	0						0	3	0	0	No	Yes	NA	No
Isophorone	230	20	3	0	3	0						0	0	0	0	No	No	NA	No
n-Nitrosodi-n-propylamine	0.056	20	3	0	3	0						0	3	0	0	No	Yes	NA	No
n-Nitrosodiphenylamine	21	12	3	0	3	0						0	0	0	0	No	No	NA	No
Nitrobenzene	100	20	3	0	3	0						0	0	0	0	No	No	NA	No
o-Cresol	63	5	3	0	3	0						0	0	0	0	No	No	NA	No
p-Chloroaniline	1.2	270	3	0	3	0						0	3	0	0	No	Yes	NA	No
p-Cresol	670	10	3	2	1	66.7	67	228	228	390	GP-59	0	0	0	0.582	No	No	NA	No
p-Nitroaniline		100	3	0	3	0						0	0	0	0	No	NA	NA	No
Pentachlorophenol	0.032	50	29	11	18	37.9	9.5	1060	210	7700	GP-56	11	18	37.9	241000	Yes	Yes	Yes	Yes
Phenol	420	5	20	11	9	55	13	189	64	840	GP-58	2	0	10	2	Yes	No	Yes	Yes
Polycyclic Aromatic Hydrocarbons (µg/kg)																			
1-Methylnaphthalene	29000	5	4	3	1	75	6.8	14.9	15	23	GP-59	0	0	0	0.000793	No	No	NA	No
2-Methylnaphthalene	670	5	4	3	1	75	8.8	18.3	12	34	GP-59	0	0	0	0.0507	No	No	NA	No
Acenaphthene	500	5	4	0	4	0						0	0	0	0	No	No	NA	No
Acenaphthylene	1300	5	4	2	2	50	4.7	6.25	6.25	7.8	GP-75	0	0	0	0.006	No	No	NA	No
Anthracene	960	5	4	2	2	50	4.2	6.5	6.5	8.8	GP-75	0	0	0	0.00917	No	No	NA	No
Benzo(a)anthracene	1.1	5	4	4	0	100	3.4	9.05	4.9	23	GP-75	4	0	100	20.9	Yes	Yes	Yes	Yes
Benzo(a)pyrene	0.31	5	4	4	0	100	3.5	12	5.65	33	GP-75	4	0	100	106	Yes	Yes	Yes	Yes
Benzo(g,h,i)perylene	670	5	4	3	1	75	3.7	14.4	4.6	35	GP-75	0	0	0	0.0522	No	No	NA	No
Chrysene	130	5	4	4	0	100	5.4	16	9.85	39	GP-75	0	0	0	0.3	No	No	NA	No
Dibenzo(a,h)anthracene	0.57	5	4	1	3	25	7.6	7.6	7.6	7.6	GP-75	1	3	25	13.3	Yes	Yes	Yes	Yes
Dibenzofuran	540	5	4	2	2	50	4.3	8.15	8.15	12	GP-59	0	0	0	0.0222	No	No	NA	No
Fluoranthene	1700	5	4	4	0	100	5.2	30	22.5	70	GP-75	0	0	0	0.0412	No	No	NA	No
Fluorene	540	5	4	2	2	50	2.8	4.3	4.3	5.8	GP-59	0	0	0	0.0107	No	No	NA	No
Indeno(1,2,3-cd)pyrene	11	5	4	2	2	50	4	14	14	24	GP-75	1	0	25	2.18	Yes	No	Yes	Yes
Naphthalene	39	5	4	3	1	75	18	32.3	22	57	GP-59	1	0	25	1.46	Yes	No	Yes	Yes
Phenanthrene	1500	5	4	3	1	75	21	30.7	34	37	GP-59	0	0	0	0.0247	No	No	NA	No
Pyrene	2600	5	4	4	0	100	9.8	22.7	19	43	GP-75	0	0	0	0.0165	No	No	NA	No
Total (B+J+K) Benzofluoranthenes	3200	5	4	4	0	100	6.8	24.7	11.5	69	GP-75	0	0	0	0.0216	No	No	NA	No
Total Carcinogenic PAHs ND=0	0.31		4	4	0	100	5.1	16.4	7.35	46	GP-75	4	0	100	148	Yes	No	Yes	Yes

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Table V-1
Screening Levels and COPCs for Vadose Zone Soil
5900 West Marginal Way Site
Seattle, Washington

Analyte	Most Stringent Soil pCUL Vadose Zone Potable GW	PQL ¹	Sample Statistics													Elimination Criteria			
			Sample Count	Detect Count	Non-Detect Count	Detection Frequency (%)	Minimum Detection	Average Detection	Median Detection	Maximum Detection	Location of Maximum Detection	Number of Exceedances, Detects	Number of Exceedances, Non-Detects	Exceedance Frequency (%)	Maximum Exceedance Factor	Detected SL Exceedances > =1	SL < PQL	Maximum Detection > PQL	Retained as COPC?
Carcinogenic PAHs TEQ ND=1/2DL ²	0.31		4	4	0	100	5.4	16.6	7.5	46	GP-75	4	0	100	148	Yes	No	Yes	Yes
Polychlorinated Biphenyls (µg/kg)																			
Aroclor 1016		4	12	0	12	0						0	0	0	0	No	NA	NA	No
Aroclor 1221		4	12	0	12	0						0	0	0	0	No	NA	NA	No
Aroclor 1232		4	12	0	12	0						0	0	0	0	No	NA	NA	No
Aroclor 1242		4	12	1	11	8.3	7.7	7.7	7.7	7.7	GP-37	0	0	0	0	No	NA	NA	No
Aroclor 1248		4	12	3	9	25	7.3	8.87	7.6	11.7	GP-82	0	0	0	0	No	NA	NA	No
Aroclor 1254		4	12	9	3	75	8.8	45.7	24.9	150	TB-05B	0	0	0	0	No	NA	NA	No
Aroclor 1260		4	12	7	5	58.3	11	28.1	16	70	TB-02B	0	0	0	0	No	NA	NA	No
Aroclors, Total (ND=0)	0.043		12	9	3	75	16.5	71.4	48	200	TB-02B	9	0	75	4650	Yes	No	Yes	Yes
Aroclors, Total (ND=0/ND=1/2 DL)	0.043		12	9	3	75	18	80	50	210	TB-02B	9	3	75	4880	Yes	No	Yes	Yes
Dioxins/Furans (pg/g)																			
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	13	0.05	16	13	3	81.3	2.3	5.92	3.83	23.4	TB-05B	2	0	12.5	1.8	Yes	No	Yes	Yes
Calculated TEQ (ND=0)	5.2		16	16	0	100	0.726	1105	351	9290	TB-05B	12	0	75	1790	Yes	No	Yes	Yes
Dioxin Furan Calculated TEQ (ND=1/2 DL)	5.2		16	16	0	100	1.15	1105	351	9290	TB-05B	12	0	75	1790	Yes	No	Yes	Yes

Notes:
¹ = Source: ERM. 2012b. Revised Final Remedial Investigation Sampling and Analysis Plan. Appendix B Revised Final Remedial Investigation and Feasibility Study Work Plan. May.
² = Toxicity Equivalency Quotient calculations for cPAHs (WAC 173-340-200) using benzo(a)pyrene as the reference chemical.

COPC = Contaminant of Potential Concern
GP = Direct Push Boring
GW = groundwater
mg/kg = milligrams per kilogram
MW = Monitoring Well
NA = Not applicable.
ND = 0 = non-detect values equal to zero
ND = 1/2DL = non-detect values calculated as one-half the laboratory detection limit
PAH = polycyclic aromatic hydrocarbons
pCUL = preliminary cleanup level
pg/g = picograms per gram
PQL = Practical Quantitation Limit
S, D designation following well identification number = indicates shallow or deep monitoring well
SL = Most Stringent pCUL Potable Water
TB = top of riverbank boring
TEQ = Toxicity Equivalency Quotient
µg/kg = micrograms per kilogram

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Table V-2
Screening Levels and COPCs for Saturated Zone Soil
5900 West Marginal Way Site
Seattle, Washington

Analyte	Most Stringent Soil pCUL Saturated Zone Potable GW	PQL ¹	Sample Statistics													Elimination Criteria					Notes
			Total Number of Samples	Total Number of Detections	Number of Non-Detects	Detection Frequency (%)	Minimum Detection	Average Detection	Median Detection	Maximum Detection	Location of Maximum Detection	Number of Exceedances, Detects	Number of Exceedances, Non-Detects	Exceedance Frequency (%)	Maximum Exceedance Factor	Detected SL Exceedances > =1	SL < PQL	Max Detect > PQL	Retained as COPC?		
Metals (mg/kg)																					
Antimony	0.27	0.2	59	1	58	1.69	0.8	0.8	0.8	0.8	GP-56	1	19	1.69	2.96	Yes	No	Yes	Yes		
Arsenic	7	0.2	269	239	30	88.8	0.821	82.2	8.9	3070	GP-59	129	14	48	439	Yes	No	Yes	Yes		
Barium	8.3	0.3	13	13	0	100	7	21.9	21.6	45.5	GP-59	12	0	92.3	5.48	Yes	No	Yes	Yes		
Beryllium	3.2	0.1	59	4	55	6.78	0.4	0.475	0.4	0.7	GP-59	0	0	0	0.219	No	No	NA	No		
Cadmium	1	0.1	62	2	60	3.23	0.1	0.15	0.15	0.2	MW-14D	0	0	0	0.2	No	No	NA	No		
Chromium	48	0.5	175	175	0	100	1.3	29.1	13.2	987	SIIE-04	10	0	5.71	20.6	Yes	No	Yes	Yes		
Chromium, VI	0.93	0.1	54	7	47	13	0.505	0.775	0.788	0.978	GP-26	2	2	3.7	1.05	Yes	No	Yes	Yes		
Copper	36	0.2	183	180	3	98.4	3.4	177	22	3500	MW-45D	66	0	36.1	97.2	Yes	No	Yes	Yes		
Lead	50	0.1	62	59	3	95.2	0.3	2.92	1.7	12.1	GP-55	0	0	0	0.242	No	No	NA	No		
Mercury	0.07	0.025	62	16	46	25.8	0.02	0.0725	0.035	0.26	B-1	4	1	6.45	3.71	Yes	No	Yes	Yes		
Nickel	48	0.5	59	57	2	96.6	1	7.77	7	21	GP-59	0	0	0	0.438	No	No	NA	No		
Selenium	0.26	0.5	62	0	62	0						0	62	0	0	No	Yes	NA	No		
Silver	0.016	0.2	136	8	128	5.88	0.4	1.9	1.15	4.9	GP-32	8	128	5.88	306	Yes	Yes	Yes	Yes		
Thallium	0.0044	0.2	59	0	59	0						0	59	0	0	No	Yes	NA	No		
Tributyltin	0.0021	0.00386	23	0	23	0						0	6	0	0	No	Yes	NA	No		
Zinc	85	1	177	176	1	99.4	6	92	28	4030	MW-45D	25	0	14.1	47.4	Yes	No	Yes	Yes		
Volatile Organic Compounds (µg/kg)																					
1,1-Dichloroethane	2.6	1	26	0	26	0						0	1	0	0	No	No	NA	No		
1,1-Dichloroethene	2.4	1	26	0	26	0						0	1	0	0	No	No	NA	No		
1,1-Dichloropropene		1	26	0	26	0						0	0	0	0	No	NA	NA	No		
1,1,1-Trichloroethane	84	1	26	0	26	0						0	0	0	0	No	No	NA	No		
1,1,1,2-Tetrachloroethane	38000	1	26	0	26	0						0	0	0	0	No	No	NA	No		
1,1,2-Trichloroethane	0.33	1	26	0	26	0						0	21	0	0	No	Yes	NA	No		
1,1,2,2-Tetrachloroethane	0.08	1	26	0	26	0						0	26	0	0	No	Yes	NA	No		
1,2-Dibromo-3-chloropropane	1300	5	26	0	26	0						0	0	0	0	No	No	NA	No		
1,2-Dichloroethane	1.6	1	26	0	26	0						0	1	0	0	No	No	NA	No		
1,2-Dichloropropane	1	1	26	0	26	0						0	1	0	0	No	No	NA	No		
1,2,3-Trichlorobenzene	20000	5	26	0	26	0						0	0	0	0	No	No	NA	No		
1,2,3-Trichloropropane	33	2	26	0	26	0						0	1	0	0	No	No	NA	No		
1,2,4-Trimethylbenzene	800000	1	26	3	23	11.5	0.4	1.53	0.7	3.5	MW-43D	0	0	0	0.00000437	No	No	NA	No		
1,3-Dichloropropane		1	26	0	26	0						0	0	0	0	No	NA	NA	No		
1,3,5-Trimethylbenzene	800000	1	26	0	26	0						0	0	0	0	No	No	NA	No		
2-Butanone		5	26	7	19	26.9	2.3	9.59	3.3	36	MW-43D	0	0	0	0	No	NA	NA	No		
2-Chloroethyl vinyl ether		5	26	0	26	0						0	0	0	0	No	NA	NA	No		
2-Hexanone	400000	5	26	0	26	0						0	0	0	0	No	No	NA	No		
2-Phenylbutane		1	26	0	26	0						0	0	0	0	No	NA	NA	No		
2,2-Dichloropropane		1	26	0	26	0						0	0	0	0	No	NA	NA	No		
4-Chlorotoluene		1	26	0	26	0						0	0	0	0	No	NA	NA	No		
4-Methyl-2-pentanone		5	26	0	26	0						0	0	0	0	No	NA	NA	No		
Acetone	2100	5	26	10	16	38.5	10	206	34.5	1300	MW-45D	0	0	0	0.619	No	No	NA	No		
Acrolein	40000	50	26	0	26	0						0	0	0	0	No	No	NA	No		
Acrylonitrile	1900	5	26	0	26	0						0	0	0	0	No	No	NA	No		
Benzene	0.56	1	47	8	39	17	0.5	2.2	0.6	13	GP-28	5	35	10.6	23.2	Yes	Yes	Yes	Yes		
Bromobenzene	640000	1	26	0	26	0						0	0	0	0	No	No	NA	No		
Bromodichloromethane	0.96	1	26	0	26	0						0	1	0	0	No	Yes	NA	No		
Bromoform	5	1	26	0	26	0						0	1	0	0	No	No	NA	No		
Carbon disulfide	270	1	26	19	7	73.1	0.6	11.5	5.7	58	GP-39	0	0	0	0.215	No	No	NA	No		
Carbon tetrachloride	0.15	1	26	0	26	0						0	26	0	0	No	Yes	NA	No		
Chlorobenzene	51	1	26	0	26	0						0	0	0	0	No	No	NA	No		
Chlorobromomethane		1	26	0	26	0						0	0	0	0	No	NA	NA	No		
Chloroethane		1	26	0	26	0						0	0	0	0	No	NA	NA	No		
Chloroform	4.8	1	26	0	26	0						0	1	0	0	No	No	NA	No		
cis-1,2-Dichloroethene	5.2	1	26	0	26	0						0	1	0	0	No	No	NA	No		
cis-1,3-Dichloropropene	0.14	1	26	0	26	0						0	26	0	0	No	Yes	NA	No		
Cumene		1	26	0	26	0						0	0	0	0	No	NA	NA	No		
Cymene		1	26	4	22	15.4	0.4	2180	60.2	8600	MW-45D	0	0	0	0	No	NA	NA	No		
Dibromochloromethane	0.77	1	26	0	26	0						0	11	0	0	No	Yes	NA	No		
Dibromomethane	800000	1	26	0	26	0						0	0	0	0	No	No	NA	No		
Ethyl bromide		2	26	0	26	0						0	0	0	0	No	NA	NA	No		
Ethylbenzene	15	1	47	3	44	6.38	0.6	0.667	0.6	0.8	GP-53	0	1	0	0.0533	No	No	NA	No		
Freon 11		1	26	0	26	0						0	0	0	0	No	NA	NA	No		
Freon 113		2	26	0	26	0						0	0	0	0	No	NA	NA	No		
m,p Xylenes		1	47	3	44	6.38	0.4	1.27	0.5	2.9	GP-62	0	0	0	0	No	NA	NA	No		
Methyl bromide	3.3	1	26	1	25	3.85	0.8	0.8	0.8	0.8	GP-63	0	1	0	0.242	No	No	NA	No		
Methyl chloride		1	26	0	26	0						0	0	0	0	No	NA	NA	No		
Methyl iodide		1	26	1	25	3.85	2.5	2.5	2.5	2.5	GP-63	0	0	0	0	No	NA	NA	No		
Methyl tert-butyl ether	7.2	1	26	0	26	0						0	1	0	0	No	No	NA	No		
Methylene chloride	1.5	2	26	1	25	3.85	1.5	1.5	1.5	1.5	MW-33S	0	17	0	1	No	Yes	NA	No		
n-Butylbenzene		1	26	0	26	0						0	0	0	0	No	NA	NA	No		
n-Propylbenzene		1	26	0	26	0						0	0	0	0	No	NA	NA	No		
o-Chlorotoluene		1	26	0	26	0						0	0	0	0	No	NA	NA	No		

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Table V-2
Screening Levels and COPCs for Saturated Zone Soil
5900 West Marginal Way Site
Seattle, Washington

Analyte	Most Stringent Soil pCUL Saturated Zone Potable GW	PQL ¹	Sample Statistics												Elimination Criteria					Notes
			Total Number of Samples	Total Number of Detections	Number of Non-Detects	Detection Frequency (%)	Minimum Detection	Average Detection	Median Detection	Maximum Detection	Location of Maximum Detection	Number of Exceedances, Detects	Number of Exceedances, Non-Detects	Exceedance Frequency (%)	Maximum Exceedance Factor	Detected SL Exceedances > =1	SL < PQL	Max Detect > PQL	Retained as COPC?	
o-Xylene	840	1	47	0	47	0						0	0	0	0	No	No	NA	No	
Styrene	120	1	26	0	26	0						0	0	0	0	No	No	NA	No	
tert-Butylbenzene		1	26	0	26	0						0	0	0	0	No	NA	NA	No	
Tetrachloroethene	1.6	1	26	0	26	0						0	1	0	0	No	No	NA	No	
Toluene	55	1	47	7	40	14.9	0.4	0.857	0.5	2.8	MW-43D	0	0	0	0.0509	No	No	NA	No	
trans-1,2-Dichloroethene	32	1	26	0	26	0						0	0	0	0	No	No	NA	No	
trans-1,3-Dichloropropene	0.14	1	26	0	26	0						0	26	0	0	No	Yes	NA	No	
trans-1,4-Dichlorobutene		5	26	0	26	0						0	0	0	0	No	NA	NA	No	
Trichloroethene	0.27	1	26	0	26	0						0	21	0	0	No	Yes	NA	No	
Vinyl acetate	2300	5	26	0	26	0						0	0	0	0	No	No	NA	No	
Vinyl chloride	0.055	1	26	0	26	0						0	26	0	0	No	Yes	NA	No	
Total Petroleum Hydrocarbons (mg/kg)																				
Diesel Range Organics	260	5	56	25	31	44.6	5.9	1010	15	16000	MW-30S	5	0	8.93	61.5	Yes	No	Yes	Yes	
Gasoline Range Organics	30	5	49	5	44	10.2	4.5	51.9	38	110	GP-36	3	0	6.12	3.67	Yes	No	Yes	Yes	
Motor Oil Range Organics	2000		56	22	34	39.3	9.8	783	41.5	14000	MW-30S	1	0	1.79	7	Yes	No	Yes	Yes	
Semivolatile Organic Compounds (µg/kg)																				
1,2-Dichlorobenzene	3.1	1	87	0	87	0						0	23	0	0	No	No	NA	No	
1,2,4-Trichlorobenzene	0.072	5	87	0	87	0						0	87	0	0	No	Yes	NA	No	
1,3-Dichlorobenzene		1	87	0	87	0						0	0	0	0	No	NA	NA	No	
1,4-Dichlorobenzene	8.1	1	87	1	86	1.15	10	10	10	10	GP-61	1	4	1.15	1.23	Yes	No	Yes	Yes	
2-Chloronaphthalene		20	87	0	87	0						0	0	0	0	No	NA	NA	No	
2-Chlorophenol	11	20	192	39	153	20.3	13	195	100	3100	GP-45	39	32	20.3	282	Yes	Yes	Yes	Yes	
2-Nitroaniline	800000	100	87	0	87	0						0	0	0	0	No	No	NA	No	
2,2-Oxybis(1-chloropropane)		20	87	0	87	0						0	0	0	0	No	NA	NA	No	
2,3,4,6-Tetrachlorophenol	3200	20	132	41		31.1	11	4480	65	98000	GP-7	4	1	3.03	30.6	Yes	No	Yes	Yes	
2,4-Dichlorophenol	4.3	20	192	39	153	20.3	26	230	120	1800	GP-45	39	153	20.3	419	Yes	Yes	Yes	Yes	
2,4-Dimethylphenol	3.1	40	87	1	86	1.15	9.7	9.7	9.7	9.7	GP-46	1	84	1.15	3.13	Yes	Yes	No	Yes	Not detected in other Site media.
2,4-Dinitrophenol	9.2	850	87	0	87	0						0	87	0	0	No	Yes	NA	No	
2,4-Dinitrotoluene	0.069	100	87	0	87	0						0	87	0	0	No	Yes	NA	No	
2,4,5-Trichlorophenol	1100	100	192	19	173	9.9	23	129	54	780	GP-2	0	3	0	0.709	No	No	NA	No	
2,4,6-Trichlorophenol	0.19	100	192	30	162	15.6	21	168	66.5	910	GP-45	30	162	15.6	4790	Yes	Yes	Yes	Yes	
2,6-Dinitrotoluene	0.021	100	87	0	87	0						0	87	0	0	No	Yes	NA	No	
3-Nitroaniline		100	87	0	87	0						0	0	0	0	No	NA	NA	No	
3,3'-Dichlorobenzidine	0.0033	150	87	0	87	0						0	87	0	0	No	Yes	NA	No	
4-Bromophenyl phenyl ether		20	87	0	87	0						0	0	0	0	No	NA	NA	No	
4-Chloro-3-methylphenol		100	87	0	87	0						0	0	0	0	No	NA	NA	No	
4-Chlorophenyl phenyl ether		20	87	0	87	0						0	0	0	0	No	NA	NA	No	
4-Nitrophenol	7000	100	87	0	87	0						0	0	0	0	No	No	NA	No	
Benzoic acid	170	400	87	18	69	20.7	73	187	125	960	MW-45D	7	4	8.05	5.65	Yes	Yes	Yes	Yes	
Benzyl alcohol	57	20	87	2	85	2.3	11	27.5	27.5	44	GP-64	0	0	0	0.772	No	No	NA	No	
Benzyl butyl phthalate	0.18	5	87	2	85	2.3	19	69.5	69.5	120	GP-35	2	85	2.3	667	Yes	Yes	Yes	Yes	
Bis(2-chloroethoxy)methane		20	87	0	87	0						0	0	0	0	No	NA	NA	No	
Bis(2-ethylhexyl)phthalate	5.1	25	87	19	68	21.8	16	75.2	37	450	GP-44	19	68	21.8	88.2	Yes	Yes	Yes	Yes	
Carbazole		20	87	5	82	5.75	11	39.8	16	100	GP-63	0	0	0	0	No	NA	NA	No	
Di-n-octyl phthalate	330	20	87	2	85	2.3	12	18.5	18.5	25	GP-44	0	0	0	0.0758	No	No	NA	No	
Dibutyl Phthalate	15	20	87	10	77	11.5	11	87.4	28	530	MW-38D	7	4	8.05	35.3	Yes	Yes	Yes	Yes	
Dichloroethyl ether	0.014	20	87	0	87	0						0	87	0	0	No	Yes	NA	No	
Diethyl Phthalate	34	5	87	5	82	5.75	17	55	50	110	GP-74	3	38	3.45	3.24	Yes	No	Yes	Yes	
Dimethylphthalate	71	5	87	0	87	0						0	0	0	0	No	No	NA	No	
Dinitro-o-cresol		200	87	0	87	0						0	0	0	0	No	NA	NA	No	
Ethylene dibromide	0.018	1	26	4	22	15.4	0.4	0.425	0.4	0.5	GP-65	4	22	15.4	27.8	Yes	Yes	No	Yes	Not detected in other Site media.
Hexachlorobenzene	0.0004	5	124	12	112	9.68	12	118	23	920	GP-45	12	112	9.68	2300000	Yes	Yes	Yes	Yes	
Hexachlorobutadiene	0.54	5	113	0	113	0						0	108	0	0	No	Yes	NA	No	
Hexachlorocyclopentadiene	200	400	87	0	87	0						0	1	0	0	No	Yes	NA	No	

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Table V-2
Screening Levels and COPCs for Saturated Zone Soil
5900 West Marginal Way Site
Seattle, Washington

Analyte	Most Stringent Soil pCUL Saturated Zone Potable GW	PQL ¹	Sample Statistics												Elimination Criteria					Notes
			Total Number of Samples	Total Number of Detections	Number of Non-Detects	Detection Frequency (%)	Minimum Detection	Average Detection	Median Detection	Maximum Detection	Location of Maximum Detection	Number of Exceedances, Detects	Number of Exceedances, Non-Detects	Exceedance Frequency (%)	Maximum Exceedance Factor	Detected SL Exceedances > =1	SL < PQL	Max Detect > PQL	Retained as COPC?	
Hexachloroethane	0.041	20	87	0	87	0						0	87	0	0	No	Yes	NA	No	
Isophorone	15	20	87	0	87	0						0	1	0	0	No	Yes	NA	No	
n-Nitrosodi-n-propylamine	0.0039	20	87	0	87	0						0	87	0	0	No	Yes	NA	No	
n-Nitrosodiphenylamine	1.1	12	87	0	87	0						0	87	0	0	No	Yes	NA	No	
Nitrobenzene	6.5	20	87	0	87	0						0	22	0	0	No	Yes	NA	No	
o-Cresol	10	5	87	6	81	6.9	12	13.8	14	15	GP-36	6	4	6.9	1.5	Yes	No	Yes	Yes	
p-Chloroaniline	0.077	270	87	0	87	0						0	87	0	0	No	Yes	NA	No	
p-Cresol	670	10	87	36	51	41.4	11	76.9	28	640	GP-56	0	0	0	0.955	No	No	NA	No	
p-Nitroaniline		100	87	0	87	0						0	0	0	0	No	NA	NA	No	
Pentachlorophenol	0.0018	50	224	112	112	50	6.4	23200	230	1000000	GP-16	112	112	50	556000000	Yes	Yes	Yes	Yes	
Phenol	120	5	159	104	55	65.4	9.4	223	51.5	5200	GP-45	29	1	18.2	43.3	Yes	No	Yes	Yes	
Polycyclic Aromatic Hydrocarbons (µg/kg)																				
1-Methylnaphthalene	29000	5	89	61	28	68.5	2.4	14.8	5.5	210	GP-63	0	0	0	0.00724	No	No	NA	No	
2-Methylnaphthalene	670	5	89	64	25	71.9	2.4	17.8	5.9	230	GP-63	0	0	0	0.343	No	No	NA	No	
Acenaphthene	28	5	89	53	36	59.6	2.3	13.9	5.9	260	GP-63	3	0	3.37	9.29	Yes	No	Yes	Yes	
Acenaphthylene	1300	5	89	40	49	44.9	2.4	43.1	5.15	960	GP-63	0	0	0	0.738	No	No	NA	No	
Anthracene	51	5	89	47	42	52.8	2.6	22.9	6.1	430	GP-63	2	0	2.25	8.43	Yes	No	Yes	Yes	
Benzo(a)anthracene	0.057	5	89	54	35	60.7	2.4	69	7.25	2300	GP-63	54	35	60.7	40400	Yes	Yes	Yes	Yes	
Benzo(a)pyrene	0.016	5	89	52	37	58.4	2.4	130	8	4700	GP-63	52	37	58.4	294000	Yes	Yes	Yes	Yes	
Benzo(g,h,i)perylene	670	5	89	48	41	53.9	2.9	80.2	6.85	2700	GP-63	1	0	1.12	4.03	Yes	No	Yes	Yes	
Chrysene	6.4	5	89	62	27	69.7	2.5	98.5	8.85	3900	GP-63	40	0	44.9	609	Yes	No	Yes	Yes	
Dibenzo(a,h)anthracene	0.029	5	89	21	68	23.6	2.4	59.7	25	720	GP-63	21	68	23.6	24800	Yes	Yes	Yes	Yes	
Dibenzofuran	540	5	89	59	30	66.3	2.4	11.4	7.7	96	GP-63	0	0	0	0.178	No	No	NA	No	
Fluoranthene	90	5	89	74	15	83.1	2.4	79.2	19	2200	GP-63	5	0	5.62	24.4	Yes	No	Yes	Yes	
Fluorene	29	5	89	55	34	61.8	2.5	15.7	5.7	370	GP-63	3	0	3.37	12.8	Yes	No	Yes	Yes	
Indeno(1,2,3-cd)pyrene	0.56	5	89	40	49	44.9	3.3	78.9	8.9	2100	GP-63	40	49	44.9	3750	Yes	Yes	Yes	Yes	
Naphthalene	2.1	5	89	74	15	83.1	2.6	27.6	15	280	GP-63	74	15	83.1	133	Yes	Yes	Yes	Yes	
Phenanthrene	1500	5	89	72	17	80.9	2.4	45	19	1400	GP-63	0	0	0	0.933	No	No	NA	No	
Pyrene	140	5	89	73	16	82	2.6	148	20	6100	GP-63	4	0	4.49	43.6	Yes	No	Yes	Yes	
Total (B+J+K) Benzofluoranthenes	3200	5	89	56		62.9	2.4	138	15	5200	GP-63	1	0	1.12	1.62	Yes	No	Yes	Yes	
Total Carcinogenic PAHs ND=0	0.016		89	62	27	70	0.025	136	10	5800	GP-63	62	0	69.7	362000	Yes	No	Yes	Yes	
Carcinogenic PAHs TEQ ND=1/2DL ²	0.016		89	62	27	70	1.3	136	10	5800	GP-63	62	27	69.7	362000	Yes	No	Yes	Yes	
Polychlorinated Biphenyls (µg/kg)																				
Aroclor 1016		4	54	0	54	0						0	0	0	0	No	NA	NA	No	
Aroclor 1221		4	54	0	54	0						0	0	0	0	No	NA	NA	No	
Aroclor 1232		4	54	0	54	0						0	0	0	0	No	NA	NA	No	
Aroclor 1242		4	54	0	54	0						0	0	0	0	No	NA	NA	No	
Aroclor 1248		4	54	1	53	1.85	33	33	33	33	MW-29S	0	0	0	0	No	NA	NA	No	
Aroclor 1254		4	54	14	40	25.9	3.2	340	32.5	2300	TB-03D	0	0	0	0	No	NA	NA	No	
Aroclor 1260		4	54	5	49	9.26	3.9	44.4	7.5	190	TB-02B	0	0	0	0	No	NA	NA	No	
Aroclors, Total (ND=0)	0.0022		54	15	39	27.8	3.2	335	20	2300	TB-03D	15	0	27.8	1050000	Yes	No	Yes	Yes	
Aroclors, Total (ND=0/ND=1/2 DL)	0.0022		54	15	39	27.8	4.4	396	48	2500	TB-03D	15	39	27.8	1140000	Yes	No	Yes	Yes	
Dioxins/Furans (pg/g)																				
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	13	0.05	63	17	46	27	0.375	11.7	10.1	45.6	TB-03D	5	0	7.94	3.51	Yes	No	Yes	Yes	
Calculated TEQ (ND=0)	5.2		63	62	1	98	0.0282	645	1.87	13400	TB-06E	28	0	44.4	2580	Yes	No	Yes	Yes	
Dioxin Furan Calculated TEQ (ND=1/2 DL)	5.2		63	62	1	98	0.300496	645	2.48	13400	TB-06E	28	0	44.4	2580	Yes	No	Yes	Yes	

Notes:
¹ = Source: ERM. 2012b. Revised Final Remedial Investigation Sampling and Analysis Plan. Appendix B Revised Final Remedial Investigation and Feasibility Study Work Plan. May.
² = Toxicity Equivalency Quotient calculations for cPAHs (WAC 173-340-200) using benzo(a)pyrene as the reference chemical.

COPC = Contaminant of Potential Concern
GP = Direct Push Boring
GW = groundwater
mg/kg = milligrams per kilogram
MW = Monitoring Well
NA = Not applicable.
ND = 0 = non-detect values equal to zero
ND = 1/2DL = non-detect values calculated as one-half the laboratory detection limit
PAH = polycyclic aromatic hydrocarbons
pCUL = preliminary cleanup Level
pg/g = picograms per gram
PQL = Practical Quantitation Limit
S, D designation following well identification number = indicates shallow or deep monitoring well
SIIE = samples are anthropogenic solids, sampled during a soil excavation
SL = Most Stringent pCUL Potable Water
TB = top of riverbank boring
TEQ = Toxicity Equivalency Quotient
µg/kg = micrograms per kilogram

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Table V-3
Screening Levels and COPCs for Groundwater
5900 West Marginal Way Site
Seattle, Washington

Analyte	Most Stringent pCUL Potable Water	PQL ¹	Sample Statistics													Elimination Criteria				
			Total Number of Samples	Total Number of Detections	Number of Non-Detects	Detection Frequency (%)	Minimum Detection	Average Detection	Median Detection	Maximum Detection	Location of Maximum Detection	Number of Exceedances, Detects	Number of Exceedances, Non-Detects	Exceedance Frequency (%)	Maximum Exceedance Factor	Detected SL Exceedances > =1	SL < PQL	Max Detect > PQL	Retained as COPC?	Notes
Metals (µg/L)																				
Chromium, VI	48	10	72	3	69	4.17	10	12.3	11	16	MW-26S	0	0	0	0.333	No	No	No	No	
Dissolved Antimony	6	0.2	26	3	23	11.5	0.2	0.267	0.3	0.3	MW-18S	0	10	0	0.05	No	No	No	No	
Dissolved Arsenic	8	0.2	282	282	0	100	0.12	549	36.2	15600	MW-45S	212	0	75.2	1950	Yes	No	Yes	Yes	
Dissolved Beryllium	4	0.2	26	0	26	0						0	0	0	0	No	No	No	No	
Dissolved Chromium	100	0.5	185	72		38.9	0.17	8.65	5.75	32	MW-31D	0	0	0	0.32	No	No	No	No	
Dissolved Copper	3.1	0.5	185	77	108	41.6	0.24	4.48	2	61.7	MW-13S	26	0	14.1	19.9	Yes	No	No	Yes	
Dissolved Lead	8.1	0.1	26	0	26	0						0	0	0	0	No	No	No	No	
Dissolved Mercury	0.025	0.1	26	0	26	0						0	26	0	0	No	Yes	No	No	
Dissolved Nickel	8.2	0.5	26	24	2	92.3	0.5	1.42	0.9	8	MW-27S	0	0	0	0.976	No	No	No	No	
Dissolved Selenium	50	0.5	26	1	25	3.85	7	7	7	7	MW-27S	0	0	0	0.14	No	No	No	No	
Dissolved Silver	1.9	0.2	81	2	79	2.47	0.17	0.585	0.585	1	MW-17S	0	18	0	0.526	No	No	No	No	
Dissolved Thallium	0.062	0.2	26	0	26	0						0	26	0	0	No	Yes	No	No	
Dissolved Zinc	81	4	185	47	138	25.4	1.8	21.3	10	113	MW-13S	2	0	1.08	1.4	Yes	No	No	Yes	
Total Antimony	6	0.2	26	3	23	11.5	0.2	0.267	0.3	0.3	MW-29S	0	10	0	0.05	No	No	No	No	
Total Arsenic	8	0.2	282	279	3	98.9	0.15	568	36.3	15600	MW-45S	212	2	75.2	1950	Yes	No	Yes	Yes	
Total Beryllium	4	0.2	26	0	26	0						0	0	0	0	No	No	No	No	
Total Chromium	100	0.5	185	78		42.2	0.28	12.4	5.5	60	MW-31D	0	0	0	0.6	No	No	No	No	
Total Copper	3.1	0.5	185	126	59	68.1	0.25	10.7	3	138	MW-33S	59	0	31.9	44.5	Yes	No	No	Yes	
Total Lead	8.1	0.1	26	1	25	3.85	0.1	0.1	0.1	0.1	MW-26S	0	0	0	0.0123	No	No	No	No	
Total Mercury	0.025	0.1	26	0	26	0						0	26	0	0	No	Yes	No	No	
Total Nickel	8.2	0.5	26	26	0	100	0.5	1.95	1.1	9.2	MW-18S	1	0	3.85	1.12	Yes	No	No	Yes	
Total Selenium	50	0.5	26	1	25	3.85	6	6	6	6	MW-27S	0	0	0	0.12	No	No	No	No	
Total Silver	1.9	0.2	81	5	76	6.17	0.072	0.286	0.24	0.51	MW-2D	0	18	0	0.268	No	No	No	No	
Total Thallium	0.062	0.2	26	0	26	0						0	26	0	0	No	Yes	No	No	
Total Zinc	81	4	185	50	135	27	1.5	25.5	16.2	132	MW-13S	2	0	1.08	1.63	Yes	No	No	Yes	
Tributyltin	0.0074	0.0075	8	0	8	0						0	0	0	0	No	Yes	No	No	
Volatile Organic Compounds (µg/L)																				
1,1-Dichloroethane	7.7	0.2	16	2	14	12.5	0.1	0.15	0.15	0.2	MW-29S	0	0	0	0.026	No	No	No	No	
1,1-Dichloroethene	7	0.2	16	0	16	0						0	0	0	0	No	No	No	No	
1,1-Dichloropropene		0.2	16	0	16	0						0	0	0	0	No	NA	No	No	
1,1,1-Trichloroethane	200	0.2	16	0	16	0						0	0	0	0	No	No	No	No	
1,1,1,2-Tetrachloroethane	1.7	0.2	16	0	16	0						0	0	0	0	No	No	No	No	
1,1,2-Trichloroethane	0.9	0.2	16	0	16	0						0	0	0	0	No	No	No	No	
1,1,2,2-Tetrachloroethane	0.22	0.2	16	0	16	0						0	0	0	0	No	No	No	No	
1,2-Dibromo-3-chloropropane	0.2	0.5	16	0	16	0						0	7	0	0	No	Yes	No	No	
1,2-Dichloroethane	4.2	0.2	16	0	16	0						0	0	0	0	No	No	No	No	
1,2-Dichloropropane	3.1	0.2	16	0	16	0						0	0	0	0	No	No	No	No	
1,2,3-Trichlorobenzene		0.5	16	0	16	0						0	0	0	0	No	NA	No	No	
1,2,3-Trichloropropane	0.0015	0.5	16	0	16	0						0	16	0	0	No	Yes	No	No	
1,2,4-Trimethylbenzene	80	0.2	16	0	16	0						0	0	0	0	No	No	No	No	
1,3-Dichloropropane		0.2	16	0	16	0						0	0	0	0	No	NA	No	No	
1,3,5-Trimethylbenzene	80	0.2	16	0	16	0						0	0	0	0	No	No	No	No	
2-Butanone	4800	5	16	0	16	0						0	0	0	0	No	No	No	No	
2-Chloroethyl vinyl ether		1	16	0	16	0						0	0	0	0	No	NA	No	No	
2-Hexanone	40	5	16	0	16	0						0	0	0	0	No	No	No	No	
2-Phenylbutane	800	0.2	16	0	16	0						0	0	0	0	No	No	No	No	
2,2-Dichloropropane		0.2	16	0	16	0						0	0	0	0	No	NA	No	No	
4-Chlorotoluene		0.2	16	0	16	0						0	0	0	0	No	NA	No	No	
4-Methyl-2-pentanone	640	5	16	0	16	0						0	0	0	0	No	No	No	No	
Acetone	7200	5	16	5	11	31.2	2.8	41.5	16	120	MW-16S	0	0	0	0.0167	No	No	No	No	
Acrolein	1.1	5	16	0	16	0						0	9	0	0	No	Yes	No	No	
Acrylonitrile	0.028	1	16	0	16	0						0	16	0	0	No	Yes	No	No	
Benzene	1.6	0.2	16	0	16	0						0	0	0	0	No	No	No	No	
Bromobenzene	64	0.2	16	0	16	0						0	0	0	0	No	No	No	No	
Bromodichloromethane	1.8	0.2	16	0	16	0						0	0	0	0	No	No	No	No	
Bromoform	12	0.2	16	0	16	0						0	0	0	0	No	No	No	No	
Carbon disulfide	400	0.2	16	0	16	0						0	0	0	0	No	No	No	No	

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Table V-3
Screening Levels and COPCs for Groundwater
5900 West Marginal Way Site
Seattle, Washington

Analyte	Most Stringent pCUL Potable Water	PQL ¹	Sample Statistics													Elimination Criteria				
			Total Number of Samples	Total Number of Detections	Number of Non-Detects	Detection Frequency (%)	Minimum Detection	Average Detection	Median Detection	Maximum Detection	Location of Maximum Detection	Number of Exceedances, Detects	Number of Exceedances, Non-Detects	Exceedance Frequency (%)	Maximum Exceedance Factor	Detected SL Exceedances > =1	SL < PQL	Max Detect > PQL	Retained as COPC?	Notes
Carbon tetrachloride	0.35	0.2	16	0	16	0						0	0	0	0	No	No	No	No	
Chlorobenzene	100	0.2	16	0	16	0						0	0	0	0	No	No	No	No	
Chlorobromomethane		0.2	16	0	16	0						0	0	0	0	No	NA	No	No	
Chloroethane	19000	0.2	16	0	16	0						0	0	0	0	No	No	No	No	
Chloroform	1.2	0.2	16	1	15	6.25	0.2	0.2	0.2	0.2	MW-4S	0	0	0	0.167	No	No	No	No	
cis-1,2-Dichloroethene	16	0.2	16	0	16	0						0	0	0	0	No	No	No	No	
cis-1,3-Dichloropropene	0.44	0.2	16	0	16	0						0	0	0	0	No	No	No	No	
Cumene	800	0.2	16	0	16	0						0	0	0	0	No	No	No	No	
Cymene		0.2	16	0	16	0						0	0	0	0	No	NA	No	No	
Dibromochloromethane	2.2	0.2	16	0	16	0						0	0	0	0	No	No	No	No	
Dibromomethane	80	0.2	16	0	16	0						0	0	0	0	No	No	No	No	
Ethyl bromide		0.2	16	0	16	0						0	0	0	0	No	NA	No	No	
Ethylbenzene	31	0.2	16	0	16	0						0	0	0	0	No	No	No	No	
Ethylene dibromide	0.05	0.2	16	0	16	0						0	16	0	0	No	Yes	No	No	
Formaldehyde	1600	0	33	14	19	42.4	6	14.1	11	36	MW-1D	0	0	0	0.0225	No	No	No	No	
Freon 11	120	0.2	16	0	16	0						0	0	0	0	No	No	No	No	
Freon 113	180	0.2	16	0	16	0						0	0	0	0	No	No	No	No	
m,p Xylenes	1600	0.4	16	1	15	6.25	0.12	0.12	0.12	0.12	MW-17S	0	0	0	0.000075	No	No	No	No	
Methyl bromide	11	1	16	0	16	0						0	0	0	0	No	No	No	No	
Methyl chloride	150	0.5	16	0	16	0						0	0	0	0	No	No	No	No	
Methyl iodide		1	16	0	16	0						0	0	0	0	No	NA	No	No	
Methyl tert-butyl ether	24	0.5	16	0	16	0						0	0	0	0	No	No	No	No	
Methylene chloride	5	0.5	16	0	16	0						0	0	0	0	No	No	No	No	
n-Butylbenzene	400	0.2	16	0	16	0						0	0	0	0	No	No	No	No	
n-Propylbenzene	800	0.2	16	0	16	0						0	0	0	0	No	No	No	No	
o-Chlorotoluene	160	0.2	16	0	16	0						0	0	0	0	No	No	No	No	
o-Xylene	430	0.2	16	0	16	0						0	0	0	0	No	No	No	No	
Styrene	100	0.2	16	0	16	0						0	0	0	0	No	No	No	No	
tert-Butylbenzene	800	0.2	16	0	16	0						0	0	0	0	No	No	No	No	
Tetrachloroethene	2.9	0.2	16	2	14	12.5	0.2	0.2	0.2	0.2	MW-28S	0	0	0	0.069	No	No	No	No	
Toluene	130	0.2	16	1	15	6.25	0.1	0.1	0.1	0.1	MW-16S	0	0	0	0.000769	No	No	No	No	
trans-1,2-Dichloroethene	100	0.2	16	0	16	0						0	0	0	0	No	No	No	No	
trans-1,3-Dichloropropene	0.44	0.2	16	0	16	0						0	0	0	0	No	No	No	No	
trans-1,4-Dichlorobutene		1	16	0	16	0						0	0	0	0	No	NA	No	No	
Trichloroethene	0.7	0.2	16	0	16	0						0	0	0	0	No	No	No	No	
Vinyl acetate	7800	0.2	16	0	16	0						0	0	0	0	No	No	No	No	
Vinyl chloride	0.18	0.2	16	0	16	0						0	0	0	0	No	Yes	No	No	
Total Petroleum Hydrocarbons (mg/L)																				
Diesel Range Organics	0.5	0.1	13	7	6	53.8	0.11	0.89	0.23	3.2	MW-35S	2	0	15.4	6.4	Yes	No	No	Yes	
Gasoline Range Organics	0.8	0.03	13	1	12	7.69	0.03	0.03	0.03	0.03	MW-1S	0	0	0	0.0375	No	No	No	No	
Motor Oil Range Organics	0.5		13	0	13	0						0	0	0	0	No	No	No	No	
Semivolatile Organic Compounds (µg/L)																				
1,2-Dichlorobenzene	4.6	0.2	51	0	51	0						0	0	0	0	No	No	No	No	
1,2,4-Trichlorobenzene	0.037	0.5	51	0	51	0						0	51	0	0	No	Yes	No	No	
1,3-Dichlorobenzene	2	0.2	51	0	51	0						0	0	0	0	No	No	No	No	
1,4-Dichlorobenzene	4.9	0.2	51	0	51	0						0	0	0	0	No	No	No	No	
2-Chloronaphthalene	100	1	51	0	51	0						0	0	0	0	No	No	No	No	
2-Chlorophenol	17	1	291	1	290	0.344	0.6	0.6	0.6	0.6	MW-26S	0	0	0	0.0353	No	No	No	No	
2-Nitroaniline	160	3	51	0	51	0						0	0	0	0	No	No	No	No	
2,2-Oxybis(1-chloropropane)	320	1	51	0	51	0						0	0	0	0	No	No	No	No	
2,3,4,6-Tetrachlorophenol	480	1	265	33		12.5	1.2	14.2	9.5	54	MW-45S	0	0	0	0.112	No	No	No	No	
2,4-Dichlorophenol	10	5	291	10	281	3.44	0.95	6.66	2.5	21	MW-26S	3	1	1.03	2.1	Yes	No	No	Yes	
2,4-Dimethylphenol	6.3	1	51	0	51	0						0	0	0	0	No	No	No	No	
2,4-Dinitrophenol	32	10	51	0	51	0						0	0	0	0	No	No	No	No	

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Table V-3
Screening Levels and COPCs for Groundwater
5900 West Marginal Way Site
Seattle, Washington

Analyte	Most Stringent pCUL Potable Water	PQL ¹	Sample Statistics													Elimination Criteria				
			Total Number of Samples	Total Number of Detections	Number of Non-Detects	Detection Frequency (%)	Minimum Detection	Average Detection	Median Detection	Maximum Detection	Location of Maximum Detection	Number of Exceedances, Detects	Number of Exceedances, Non-Detects	Exceedance Frequency (%)	Maximum Exceedance Factor	Detected SL Exceedances > =1	SL < PQL	Max Detect > PQL	Retained as COPC?	Notes
2,4-Dinitrotoluene	0.18	3	51	0	51	0						0	51	0	0	No	Yes	No	No	
2,4,5-Trichlorophenol	600	5	291	5	286	1.72	0.43	1.69	1.6	3.7	MW-45S	0	0	0	0.00617	No	No	No	No	
2,4,6-Trichlorophenol	0.28	3	291	2	289	0.687	1.4	1.5	1.5	1.6	MW-16S	2	233	0.687	5.71	Yes	Yes	Yes	Yes	
2,6-Dinitrotoluene	0.058	3	51	0	51	0						0	51	0	0	No	Yes	No	No	
3-Nitroaniline		3	51	0	51	0						0	0	0	0	No	NA	No	No	
3,3'-Dichlorobenzidine	0.0033	5	51	0	51	0						0	51	0	0	No	Yes	No	No	
4-Bromophenyl phenyl ether		1	51	0	51	0						0	0	0	0	No	NA	No	No	
4-Chloro-3-methylphenol	36	3	51	0	51	0						0	0	0	0	No	No	No	No	
4-Chlorophenyl phenyl ether		1	51	0	51	0						0	0	0	0	No	NA	No	No	
4-Nitrophenol		10	51	0	51	0						0	0	0	0	No	NA	No	No	
Benzoic acid	590	10	51	0	51	0						0	0	0	0	No	No	No	No	
Benzyl alcohol	800	2	51	0	51	0						0	0	0	0	No	No	No	No	
Benzyl butyl phthalate	0.013	1	51	0	51	0						0	51	0	0	No	Yes	No	No	
Bis(2-chloroethoxy)methane		1	51	0	51	0						0	0	0	0	No	NA	No	No	
Bis(2-ethylhexyl)phthalate	0.046	1	51	2	49	3.92	1.1	1.75	1.75	2.4	MW-43S	2	49	3.92	52.2	Yes	Yes	Yes	Yes	
Carbazole		1	51	0	51	0						0	0	0	0	No	NA	No	No	
Di-n-octyl phthalate	0.0039	1	51	0	51	0						0	51	0	0	No	Yes	No	No	
Dibutyl Phthalate	8	1	51	0	51	0						0	0	0	0	No	No	No	No	
Dichloroethyl ether	0.04	1	51	0	51	0						0	51	0	0	No	Yes	No	No	
Diethyl Phthalate	93	1	51	1	50	1.96	0.8	0.8	0.8	0.8	MW-4S	0	0	0	0.0086	No	No	No	No	
Dimethylphthalate	600	1	51	0	51	0						0	0	0	0	No	No	No	No	
Dinitro-o-cresol	7	10	51	0	51	0						0	2	0	0	No	Yes	No	No	
Hexachlorobenzene	0.000005	1	123	0	123	0						0	123	0	0	No	Yes	No	No	
Hexachlorobutadiene	0.01	0.5	51	0	51	0						0	51	0	0	No	Yes	No	No	
Hexachlorocyclopentadiene	1	5	51	0	51	0						0	51	0	0	No	Yes	No	No	
Hexachloroethane	0.02	1	51	0	51	0						0	51	0	0	No	Yes	No	No	
Isophorone	46	1	51	0	51	0						0	0	0	0	No	No	No	No	
n-Nitrosodi-n-propylamine	0.013	1	51	0	51	0						0	51	0	0	No	Yes	No	No	
n-Nitrosodiphenylamine	0.69	3	51	0	51	0						0	0	0	0	No	Yes	No	No	
Nitrobenzene	16	1	51	0	51	0						0	0	0	0	No	No	No	No	
o-Cresol	27	1	51	0	51	0						0	0	0	0	No	No	No	No	
p-Chloroaniline	0.22	5	51	0	51	0						0	51	0	0	No	Yes	No	No	
p-Cresol	800	1	51	0	51	0						0	0	0	0	No	No	No	No	
p-Nitroaniline		3	51	0	51	0						0	0	0	0	No	NA	No	No	
Pentachlorophenol	0.002	0.5	291	62	229	21.3	0.14	224	27	7700	MW-13S	62	229	21.3	3850000	Yes	Yes	Yes	Yes	
Phenol	370	1	291	24	267	8.25	1.1	6.25	3.55	35	MW-35S	0	0	0	0.0946	No	No	No	No	
Polycyclic Aromatic Hydrocarbons (µg/L)																				
1-Methylnaphthalene	1.5	0.1	51	7	44	13.7	0.06	0.114	0.09	0.22	MW-35S	0	0	0	0.147	No	No	No	No	
2-Methylnaphthalene	32	0.1	51	5	46	9.8	0.05	0.074	0.07	0.11	MW-43S	0	0	0	0.00344	No	No	No	No	
Acenaphthene	5.3	0.1	51	3	48	5.88	0.05	0.137	0.14	0.22	MW-30S	0	0	0	0.0415	No	No	No	No	
Acenaphthylene		0.1	51	1	50	1.96	0.09	0.09	0.09	0.09	MW-30S	0	0	0	0	No	NA	Yes	No	
Anthracene	2.1	0.1	51	1	50	1.96	0.08	0.08	0.08	0.08	MW-30S	0	0	0	0.0381	No	No	No	No	
Benzo(a)anthracene	0.00016	0.1	51	0	51	0						0	51	0	0	No	Yes	No	No	
Benzo(a)pyrene	0.000016	0.1	51	0	51	0						0	51	0	0	No	Yes	No	No	
Benzo(g,h,i)perylene		0.1	51	0	51	0						0	0	0	0	No	NA	No	No	
Chrysene	0.016	0.1	51	0	51	0						0	51	0	0	No	Yes	No	No	
Dibenzo(a,h)anthracene	0.000016	0.1	51	0	51	0						0	51	0	0	No	Yes	No	No	
Dibenzofuran	16	0.1	51	2	49	3.92	0.36	0.68	0.68	1	MW-35S	0	0	0	0.0625	No	No	No	No	
Fluoranthene	1.8	0.1	51	3	48	5.88	0.06	0.12	0.06	0.24	MW-30S	0	0	0	0.133	No	No	No	No	
Fluorene	3.7	0.1	51	1	50	1.96	0.17	0.17	0.17	0.17	MW-30S	0	0	0	0.0459	No	No	No	No	
Indeno(1,2,3-cd)pyrene	0.00016	0.1	51	0	51	0						0	51	0	0	No	Yes	No	No	
Naphthalene	1.4	0.1	51	4	47	7.84	0.07	0.11	0.08	0.21	MW-35S	0	0	0	0.15	No	No	No	No	
Phenanthrene		0.1	51	4	47	7.84	0.07	0.168	0.08	0.44	MW-30S	0	0	0	0	No	NA	Yes	No	
Pyrene	2	0.1	51	3	48	5.88	0.08	0.16	0.09	0.31	MW-30S	0	0	0	0.155	No	No	No	No	
Total (B+J+K) Benzofluoranthenes		200	51	0	51	0						0	0	0	0	No	NA	No	No	
Total Carcinogenic PAHs ND=0 ²	0.000016	0.1	51	0	51	0						0	0	0	0	No	Yes	No	Yes	
Carcinogenic PAHs TEQ ND=1/2DL ^{2,3}	0.000016	0.1	51	0	51	0						0	0	0	0	No	Yes	No	Yes	

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Table V-3
Screening Levels and COPCs for Groundwater
5900 West Marginal Way Site
Seattle, Washington

Analyte	Most Stringent pCUL Potable Water	PQL ¹	Sample Statistics													Elimination Criteria				
			Total Number of Samples	Total Number of Detections	Number of Non-Detects	Detection Frequency (%)	Minimum Detection	Average Detection	Median Detection	Maximum Detection	Location of Maximum Detection	Number of Exceedances, Detects	Number of Exceedances, Non-Detects	Exceedance Frequency (%)	Maximum Exceedance Factor	Detected SL Exceedances > =1	SL < PQL	Max Detect > PQL	Retained as COPC?	Notes
Polychlorinated Biphenyls (µg/L)																				
Aroclor 1016		0.01	11	0	11	0						0	0	0	0	No	NA	No	No	
Aroclor 1221		0.01	11	0	11	0						0	0	0	0	No	NA	No	No	
Aroclor 1232		0.01	11	0	11	0						0	0	0	0	No	NA	No	No	
Aroclor 1242		0.01	11	0	11	0						0	0	0	0	No	NA	No	No	
Aroclor 1248		0.01	11	0	11	0						0	0	0	0	No	NA	No	No	
Aroclor 1254		0.01	11	1	10	9.09	0.006	0.006	0.006	0.006	MW-33S	0	0	0	0	No	NA	Yes	No	
Aroclor 1260		0.01	11	0	11	0						0	0	0	0	No	NA	No	No	
Aroclors, Total (ND=0)	0.000007	0.01	11	1	10	9.09	0.006	0.006	0.006	0.006	MW-33S	1	0	9.09	857	Yes	Yes	Yes	Yes	
Aroclors, Total (ND=0/ND=1/2 DL) ⁴	0.000007	0.01	11	1	10	9.09	0.0099	0.0099	0.0099	0.0099	MW-33S	1	10	9.09	1410	Yes	Yes	Yes	Yes	
Dioxins/Furans (pg/L)																				
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) ⁵	0.0051	4.4	73	0	73	0						0	73	0	0	No	Yes	No	Yes	
Calculated TEQ (ND=0)	0.0051		73	68	5	93%	0.000206	0.957	0.0697	18	MW-35S	60	0	82.2	3530	Yes	No	Yes	Yes	
Dioxin Furan Calculated TEQ (ND=1/2 DL)	0.0051		73	68	5	93%	0.802	1.85	0.996	19	MW-35S	68	5	93.2	3730	Yes	No	Yes	Yes	

Notes:

1 = Source: ERM. 2012b. Revised Final Remedial Investigation Sampling and Analysis Plan. Appendix B Revised Final Remedial Investigation and Feasibility Study Work Plan. May.

2 = Although carcinogenic PAH TEQs (ND=0 and ND=1/2DL) were not detected in groundwater, they are retained as a COPC because all sample PQLs were greater than the SL.

3 = Toxicity Equivalency Quotient calculations for cPAHs (WAC 173-340-200) using benzo(a)pyrene as the reference chemical.

4 = Aroclors detected in any site media assigned ND=1/2DL (Aroclor 1242, 1248, 1254, 1260). Aroclors not detected in any site media assigned ND=0 (Aroclor 1016, 1221, 1232).

5 = Although TCDD was not detected in groundwater, it is retained as a COPC because all sample PQLs were greater than the SL.

COPC = Contaminant of Potential Concern

GW = groundwater

mg/L = milligrams per liter

MW = Monitoring Well

NA = Not applicable.

ND = 0 = non-detect values equal to zero

ND = 1/2DL = non-detect values calculated as one-half the laboratory detection limit

PAH = polycyclic aromatic hydrocarbons

pCUL = preliminary cleanup level

pg/L = picograms per liter

PQL = Practical Quantitation Limit

S, D designation following well identification number = indicates shallow or deep monitoring well

SL = Most Stringent pCUL Potable Water

TEQ = Toxicity Equivalency Quotient

µg/L = micrograms per liter

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Table V-4
Screening Levels and COPCs for Sediment
5900 West Marginal Way Site
Seattle, Washington

			Sample Statistics													Elimination Criteria			
Analyte	Target Sediment Concentration Minimum ROD CUL + SMS Lower Tier	PQL ¹	Total Number of Samples	Total Number of Detections	Number of Non-Detects	Detection Frequency (%)	Minimum Detection	Average Detection	Median Detection	Maximum Detection	Location of Maximum Detection	Number of Exceedances, Detects	Number of Exceedances, Non-Detects	Exceedance Frequency (%)	Maximum Exceedance Factor	Detected SL Exceedances > =1	SL < PQL	Max Detect > PQL	Retained as COPC?
Metals (mg/kg)																			
Arsenic	7	0.2	78	77	1	98.7	1.28	31.5	18.7	269	SED-SS-14	69	0	88.5	38.4	Yes	No	Yes	Yes
Cadmium	5.1	0.1	78	64	14	82.1	0.03	0.477	0.4	1.2	SED-SC-09	0	0	0	0.235	No	No	NA	No
Chromium	260	0.5	78	78	0	100	9.5	35.7	37	88	SED-SC-03	0	0	0	0.338	No	No	NA	No
Copper	390	0.5	78	78	0	100	9.7	105	88.7	405	SED-SS-14	1	0	1.28	1.04	Yes	No	Yes	Yes
Lead	450	0.1	78	78	0	100	1.6	88.5	48.4	1070	SED-SC-03	3	0	3.85	2.38	Yes	No	Yes	Yes
Mercury	0.41	0.025	78	71	7	91	0.03	0.205	0.19	0.5	SED-SS-17	2	0	2.56	1.22	Yes	No	Yes	Yes
Silver	6.1	0.2	78	24	54	30.8	0.31	0.9	0.7	3.3	SED-SC-03	0	0	0	0.541	No	No	NA	No
Tributyl Tin	0.0021	0.00386	45	33	12	73.3	0.0021	0.0736	0.028	0.51	SED-SC-05	32	0	71.1	243	Yes	Yes	Yes	Yes
Zinc	410	4	78	78	0	100	19	195	152	1680	SED-SS-14	3	0	3.85	4.1	Yes	No	Yes	Yes
Volatile Organic Compounds (ug/kg)																			
1,1-Dichloroethane			1	0	1	0						0	0	0	0	No	NA	NA	No
1,1-Dichloroethene			1	0	1	0						0	0	0	0	No	NA	NA	No
1,1-Dichloropropene			1	0	1	0						0	0	0	0	No	NA	NA	No
1,1,1-Trichloroethane			1	0	1	0						0	0	0	0	No	NA	NA	No
1,1,1,2-Tetrachloroethane			1	0	1	0						0	0	0	0	No	NA	NA	No
1,1,2-Trichloroethane			1	0	1	0						0	0	0	0	No	NA	NA	No
1,1,2,2-Tetrachloroethane			1	0	1	0						0	0	0	0	No	NA	NA	No
1,2-Dibromo-3-chloropropane			1	0	1	0						0	0	0	0	No	NA	NA	No
1,2-Dichloroethane			1	0	1	0						0	0	0	0	No	NA	NA	No
1,2-Dichloropropane			1	0	1	0						0	0	0	0	No	NA	NA	No
1,2,3-Trichlorobenzene			1	0	1	0						0	0	0	0	No	NA	NA	No
1,2,3-Trichloropropane			1	0	1	0						0	0	0	0	No	NA	NA	No
1,2,4-Trimethylbenzene			1	0	1	0						0	0	0	0	No	NA	NA	No
1,3-Dichloropropane		1	1	0	1	0						0	0	0	0	No	NA	NA	No
1,3,5-Trimethylbenzene			1	0	1	0						0	0	0	0	No	NA	NA	No
2-Butanone			1	0	1	0						0	0	0	0	No	NA	NA	No
2-Hexanone			1	0	1	0						0	0	0	0	No	NA	NA	No
2,2-Dichloropropane			1	0	1	0						0	0	0	0	No	NA	NA	No
4-Chlorotoluene			1	0	1	0						0	0	0	0	No	NA	NA	No
4-Methyl-2-pentanone			1	0	1	0						0	0	0	0	No	NA	NA	No
Acetone			1	0	1	0						0	0	0	0	No	NA	NA	No
Benzene			1	0	1	0						0	0	0	0	No	NA	NA	No
Bromobenzene			1	0	1	0						0	0	0	0	No	NA	NA	No
Bromodichloromethane			1	0	1	0						0	0	0	0	No	NA	NA	No
Bromoform			1	0	1	0						0	0	0	0	No	NA	NA	No
Carbon disulfide			1	0	1	0						0	0	0	0	No	NA	NA	No
Carbon tetrachloride			1	0	1	0						0	0	0	0	No	NA	NA	No
Chlorobenzene			1	0	1	0						0	0	0	0	No	NA	NA	No
Chlorobromomethane			1	0	1	0						0	0	0	0	No	NA	NA	No
Chloroethane			1	0	1	0						0	0	0	0	No	NA	NA	No
Chloroform			1	0	1	0						0	0	0	0	No	NA	NA	No
cis-1,2-Dichloroethene			1	0	1	0						0	0	0	0	No	NA	NA	No
cis-1,3-Dichloropropene			1	0	1	0						0	0	0	0	No	NA	NA	No
Cumene			1	0	1	0						0	0	0	0	No	NA	NA	No
Cymene			1	0	1	0						0	0	0	0	No	NA	NA	No
Dibromochloromethane			1	0	1	0						0	0	0	0	No	NA	NA	No
Dibromomethane			1	0	1	0						0	0	0	0	No	NA	NA	No
Ethylbenzene			1	0	1	0						0	0	0	0	No	NA	NA	No
Ethylene dibromide			1	0	1	0						0	0	0	0	No	NA	NA	No

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Table V-4
Screening Levels and COPCs for Sediment
5900 West Marginal Way Site
Seattle, Washington

			Sample Statistics													Elimination Criteria			
Analyte	Target Sediment Concentration Minimum ROD CUL + SMS Lower Tier	PQL ¹	Total Number of Samples	Total Number of Detections	Number of Non-Detects	Detection Frequency (%)	Minimum Detection	Average Detection	Median Detection	Maximum Detection	Location of Maximum Detection	Number of Exceedances, Detects	Number of Exceedances, Non-Detects	Exceedance Frequency (%)	Maximum Exceedance Factor	Detected SL Exceedances > =1	SL < PQL	Max Detect > PQL	Retained as COPC?
Freon 11			1	0	1	0						0	0	0	0	No	NA	NA	No
Freon 113			1	0	1	0						0	0	0	0	No	NA	NA	No
m,p Xylenes			1	0	1	0						0	0	0	0	No	NA	NA	No
Methyl bromide			1	0	1	0						0	0	0	0	No	NA	NA	No
Methyl chloride			1	0	1	0						0	0	0	0	No	NA	NA	No
Methyl iodide			1	0	1	0						0	0	0	0	No	NA	NA	No
Methyl tert-butyl ether			1	0	1	0						0	0	0	0	No	NA	NA	No
Methylene chloride			1	0	1	0						0	0	0	0	No	NA	NA	No
n-Butylbenzene			1	0	1	0						0	0	0	0	No	NA	NA	No
n-Propylbenzene			1	0	1	0						0	0	0	0	No	NA	NA	No
o-Chlorotoluene			1	0	1	0						0	0	0	0	No	NA	NA	No
o-Xylene			1	0	1	0						0	0	0	0	No	NA	NA	No
Styrene			1	0	1	0						0	0	0	0	No	NA	NA	No
tert-Butylbenzene			1	0	1	0						0	0	0	0	No	NA	NA	No
Tetrachloroethene			1	0	1	0						0	0	0	0	No	NA	NA	No
Toluene			1	0	1	0						0	0	0	0	No	NA	NA	No
trans-1,2-Dichloroethene			1	0	1	0						0	0	0	0	No	NA	NA	No
trans-1,3-Dichloropropene			1	0	1	0						0	0	0	0	No	NA	NA	No
trans-1,4-Dichlorobutene			1	0	1	0						0	0	0	0	No	NA	NA	No
Trichloroethene			1	0	1	0						0	0	0	0	No	NA	NA	No
Vinyl chloride			1	0	1	0						0	0	0	0	No	NA	NA	No
Semivolatile Organic Compounds (µg/kg)																			
1,2-Dichlorobenzene	36	1	66	10	56	15.2	2.5	4	3.4	8	SED-SC-15	0	0	0	0.222	No	No	NA	No
1,2,4-Trichlorobenzene	31	5	66	6	60	9.09	2.4	3.67	3.1	5.4	SED-SC-14	0	0	0	0.174	No	No	NA	No
1,4-Dichlorobenzene	110	1	66	35	31	53	2.7	5.23	4.3	15	SED-SC-15	0	0	0	0.136	No	No	NA	No
2,4-Dichlorophenol	507000	20	11	0	11	0						0	0	0	0	No	No	NA	No
2,4-Dimethylphenol	29	20	77	37	40	48.1	2.7	6.15	4.8	24	SED-SC-16	0	3	0	0.828	No	No	NA	No
3-Nitroaniline			11	0	11	0						0	0	0	0	No	NA	NA	No
3,3'-Dichlorobenzidine	1900		11	0	11	0						0	0	0	0	No	No	NA	No
Benzyl alcohol	57	20	77	61	16	79.2	6.8	75.3	51	330	SED-SS-11	27	2	35.1	5.79	Yes	No	Yes	Yes
Benzyl butyl phthalate	63	5	77	63	14	81.8	2.9	23.3	15	160	SED-SC-16	6	2	7.79	2.54	Yes	No	Yes	Yes
Bis(2-chloroethoxy)methane		20	11	0	11	0						0	0	0	0	No	NA	NA	No
Bis(2-ethylhexyl)phthalate	1300	25	77	56	21	72.7	24	209	155	940	DR124	0	0	0	0.723	No	No	NA	No
Di-n-octyl phthalate	6200	20	77	1	76	1.3	40	40	40	40	SED-SC-01	0	0	0	0.00645	No	No	NA	No
Dibutyl Phthalate	1400	20	77	25	52	32.5	10	37.6	20	350	SED-SC-03	0	0	0	0.25	No	No	NA	No
Diethyl Phthalate	200	5	76	19	57	25	4.4	24.2	16	62	SED-SC-08	0	0	0	0.31	No	No	NA	No
Dimethylphthalate	71	5	77	45	32	58.4	2.4	6.92	5.9	20	SED-SC-05	0	2	0	0.282	No	No	NA	No
Hexachlorobenzene	22	5	78	16	62	20.5	2.1	321	9	4800	SED-SC-03	3	1	3.85	218	Yes	No	Yes	Yes
Hexachlorobutadiene	11	5	77	0	77	0						0	4	0	0	No	No	NA	No
Isophorone	898000	20	11	0	11	0						0	0	0	0	No	No	NA	No
n-Nitrosodiphenylamine	28	12	77	19	58	24.7	2.5	6.82	3.9	37	SED-SS-18	1	5	1.3	1.32	Yes	No	Yes	Yes
o-Cresol	63	5	77	30	47	39	2.4	6.12	4.45	24	SED-SC-16	0	2	0	0.381	No	No	NA	No
p-Cresol	670	10	76	48	28	63.2	9.3	45.9	23.5	430	SED-SC-15	0	0	0	0.642	No	No	NA	No
Pentachlorophenol	360	50	77	39	38	50.6	16	728	96	20000	SED-SC-03	7	2	9.09	55.6	Yes	No	Yes	Yes
Phenol	420	5	77	58	19	75.3	9.2	139	85.5	680	SED-SC-03	5	0	6.49	1.62	Yes	No	Yes	Yes
Polycyclic Aromatic Hydrocarbons (µg/kg)																			
2-Methylnaphthalene	670	5	81	49	32	60.5	9.4	53.4	20	650	SED-SS-18	0	0	0	0.97	No	No	NA	No
Acenaphthene	500	5	82	45	37	54.9	9.6	128	25	2200	SED-SC-06	3	0	3.66	4.4	Yes	No	Yes	Yes
Acenaphthylene	1300	5	82	36	46	43.9	6.9	66.2	27.5	500	SED-SC-14	0	0	0	0.385	No	No	NA	No
Anthracene	960	5	82	71	11	86.6	14	235	40	9300	SED-SC-06	3	0	3.66	9.69	Yes	No	Yes	Yes

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Table V-4
Screening Levels and COPCs for Sediment
5900 West Marginal Way Site
Seattle, Washington

			Sample Statistics													Elimination Criteria			
Analyte	Target Sediment Concentration Minimum ROD CUL + SMS Lower Tier	PQL ¹	Total Number of Samples	Total Number of Detections	Number of Non-Detects	Detection Frequency (%)	Minimum Detection	Average Detection	Median Detection	Maximum Detection	Location of Maximum Detection	Number of Exceedances, Detects	Number of Exceedances, Non-Detects	Exceedance Frequency (%)	Maximum Exceedance Factor	Detected SL Exceedances > =1	SL < PQL	Max Detect > PQL	Retained as COPC?
Benzo(a)anthracene	1300	5	82	77	5	93.9	5.8	269	120	4100	SED-SC-06	3	0	3.66	3.15	Yes	No	Yes	Yes
Benzo(a)pyrene	1600	5	82	76	6	92.7	5.6	262	140	2000	SED-SC-06	2	0	2.44	1.25	Yes	No	Yes	Yes
Benzo(g,h,i)perylene	670	5	82	74	8	90.2	12	145	96.5	870	B4A	2	0	2.44	1.3	Yes	No	Yes	Yes
Chrysene	1400	5	82	77	5	93.9	6.9	403	210	5600	SED-SC-06	4	0	4.88	4	Yes	No	Yes	Yes
Dibenzo(a,h)anthracene	230	5	82	70	12	85.4	2.6	50.2	33	350	SED-SC-06	1	0	1.22	1.52	Yes	No	Yes	Yes
Dibenzofuran	540	5	81	50	31	61.7	8.4	74.8	21.5	1300	SED-SS-18	2	0	2.47	2.41	Yes	No	Yes	Yes
Fluoranthene	1700	5	82	79	3	96.3	8.4	730	250	14000	SED-SC-06	6	0	7.32	8.24	Yes	No	Yes	Yes
Fluorene	540	5	82	56	26	68.3	9.5	128	27	3000	SED-SS-18	2	0	2.44	5.56	Yes	No	Yes	Yes
Indeno(1,2,3-cd)pyrene	600	5	82	71	11	86.6	18	142	86	890	B4A	3	0	3.66	1.48	Yes	No	Yes	Yes
Naphthalene	2100	5	71	60	11	84.5	12	78.2	41	600	SED-SC-14	0	0	0	0.286	No	No	NA	No
Phenanthrene	1500	5	82	76	6	92.7	3.1	385	120	7800	SED-SS-18	3	0	3.66	5.2	Yes	No	Yes	Yes
Pyrene	2600	5	82	80	2	97.6	9.9	766	295	13000	SED-SC-06	5	0	6.1	5	Yes	No	Yes	Yes
Total (B+J+K) Benzofluoranthenes	3200	5	71	68	3	95.8	7	468	290	4000	SED-SC-06	1	0	1.41	1.25	Yes	No	Yes	Yes
Total Carcinogenic PAHs ND=0	90		74	74	0	100	0	318	160	2900	SED-SC-06	52	0	70.3	32.2	Yes	No	Yes	Yes
Carcinogenic PAHs TEQ ND=1/2DL ²	90		79	79	0	100	3.5	364	210	2900	SED-SC-06	59	0	74.7	32.2	Yes	No	Yes	Yes
Polychlorinated Biphenyls (µg/kg)																			
Aroclor 1016		4	87	0	87	0						0	0	0	0	No	NA	NA	No
Aroclor 1221		4	87	0	87	0						0	0	0	0	No	NA	NA	No
Aroclor 1232		4	87	0	87	0						0	0	0	0	No	NA	NA	No
Aroclor 1242		4	87	0	87	0						0	0	0	0	No	NA	NA	No
Aroclor 1248		4	87	55	32	63.2	5.8	111	48	770	SED-SC-06	0	0	0	0	No	NA	NA	No
Aroclor 1254		4	87	81	6	93.1	3.4	198	120	1300	SED-SC-05	0	0	0	0	No	NA	NA	No
Aroclor 1260		4	87	78	9	89.7	8.9	95.1	65	370	SED-SC-06	0	0	0	0	No	NA	NA	No
Aroclors, Total (ND=0)	128	4	87	81	6	93.1	3.4	365	243	2240	SED-SC-06	52	0	59.8	17.5	Yes	No	Yes	Yes
Aroclors, Total (ND=0/ND=1/2 DL)	128	4	87	87	0	100	2	343	200	2200	SED-SC-06	54	0	62.1	17.2	Yes	No	Yes	Yes
Dioxins/Furans (pg/g)																			
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)		0.05	83	67	16	80.7	0.229	3.35	1.49	50.4	SED-SC-03	0	0	0	0	No	NA	NA	No
Dioxin Furan Calculated TEQ (ND=1/2 DL)	2	5	83	83	0	100	0.101	348	75.7	4335	SED-SC-03	77	0	92.8	2170	Yes	Yes	Yes	Yes

Notes:
¹ = Source: ERM. 2012b. Revised Final Remedial Investigation Sampling and Analysis Plan. Appendix B Revised Final Remedial Investigation and Feasibility Study Work Plan. May.
² = Toxicity Equivalency Quotient calculations for cPAHs (WAC 173-340-200) using benzo(a)pyrene as the reference chemical.

COPC = Contaminant of Potential Concern
mg/kg = milligrams per kilogram
NA = Not applicable.
ND = 0 = non-detect values equal to zero
ND = 1/2DL = non-detect values calculated as one-half the laboratory detection limit
PAH = polycyclic aromatic hydrocarbons
pCUL = preliminary cleanup level
pg/g = picograms per gram
PQL = Practical Quantitation Limit
ROD = Record of Decision
SC = sediment core sample
SED = sediment sample
SL = Target Sediment Concentration Minimum ROD CUL + SMS Lower Tier
SMS = Sediment Management Standards
SS = surface sediment sample
TEQ = Toxicity Equivalency Quotient
µg/kg = micrograms per kilogram

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Table V-5
Screening Levels and COPCs for Stormwater Solids
5900 West Marginal Way Site
Seattle, Washington

Analyte	Target Sediment Concentration Minimum ROD CUL + SMS Lower Tier	PQL ¹	Sample Statistics														Elimination Criteria			
			Total Number of Samples	Total Number of Detections	Number of Non-Detects	Detection Frequency (%)	Minimum Detection	Average Detection	Median Detection	Maximum Detection	Location of Maximum Detection	Number of Exceedances, Detects	Number of Exceedances, Non-Detects	Exceedance Frequency (%)	Maximum Exceedance Factor	Detected SL Exceedances > =1	SL < PQL	Max Detect > PQL	Retained as COPC?	
Metals (mg/kg)																				
Antimony	87.7		4	1	3	25	1.2	1.2	1.2	1.2	CB-01	0	0	0	0.0137	No	No	NA	No	
Arsenic	7	0.2	4	4	0	100	2.6	14.8	16.5	23.6	CB-01	3	1	75	2.37	Yes	No	Yes	Yes	
Beryllium	438		4	3	1	75	0.2	0.4	0.4	0.6	TANK-01	0	0	0	0.00137	No	No	NA	No	
Cadmium	5.1	0.1	4	4	0	100	0.2	8.4	2.25	28.9	TANK-01	1	0	25	5.67	Yes	No	Yes	Yes	
Chromium	260	0.5	4	4	0	100	18.7	36.9	33.5	62	CB-01	0	0	0	0.238	No	No	NA	No	
Copper	390	0.5	4	4	0	100	40.1	199	209	338	SWD-01	0	0	0	0.8667	No	No	NA	No	
Lead	450	0.1	4	4	0	100	5.7	79.2	43	225	CB-01	0	0	0	0.5	No	No	NA	No	
Mercury	0.41	0.025	4	4	0	100	0.02	0.105	0.095	0.21	SWD-01	0	0	0	0.512	No	No	NA	No	
Nickel	4380		4	4	0	100	27.5	36.3	37.6	42.4	SWD-01	0	0	0	0.00968	No	No	NA	No	
Silver	6.1	0.2	4	0	4	0						0	0	0		No	No	NA	No	
Thallium	2.19		4	0	4	0						0	0	0		No	No	NA	No	
Zinc	410	4	4	4	0	100	62	540	571	955	CB-01	3	0	75	2.33	Yes	No	Yes	Yes	
Semivolatile Organic Compounds (µg/kg)																				
1,2,4-Trichlorobenzene	31	5	4	0	4	0						0	0	0		No	No	NA	No	
1,2-Dichlorobenzene	36	1	4	0	4	0						0	0	0		No	No	NA	No	
1,3-Dichlorobenzene			1	0	1	0										No	NA	NA	No	
1,4-Dichlorobenzene	110	1	4	0	4	0						0	0	0		No	No	NA	No	
2,4,5-Trichlorophenol	16900000		0	0	0	0						0	0	0		No	No	NA	No	
2,4,6-Trichlorophenol	77600		0	0	0	0						0	0	0		No	No	NA	No	
2,4-Dichlorophenol	507000	20	0	0	0	0						0	0	0		No	No	NA	No	
2,4-Dimethylphenol	29	20	4	1	3	25	16	16	16	16	SWD-01	0	1	0	0.552	No	No	NA	No	
2-Chlorophenol	845000		0	0	0	0						0	0	0		No	No	NA	No	
Benzoic acid	650	400	4	2	2	50	5500	13800	13800	22000	SWD-01	2	0	50	33.8	Yes	No	Yes	Yes	
Benzyl alcohol	57	20	4	3	1	75	35	22000	13000	53000	SWD-01	2	0	50	930	Yes	No	Yes	Yes	
Benzyl butyl phthalate	63	5	4	4	0	100	8.5	371	37.5	1400	CB-01	1	0	25	22.2	Yes	No	Yes	Yes	
Bis(2-ethylhexyl)phthalate	1300	25	4	3	1	75	290	10900	480	32000	CB-01	1	0	25	24.6	Yes	No	Yes	Yes	
Di-n-octyl phthalate	6200	20	4	1	3	25	800	800	800	800	CB-01	0	0	0	0.129	No	No	NA	No	
Dibutyl Phthalate	1400	20	4	2	2	50	11	196	196	380	CB-01	0	0	0	0.271	No	No	NA	No	
Diethyl Phthalate	200	5	4	1	3	25	97	97	97	97	CB-01	0	0	0	0.485	No	No	NA	No	
Dimethylphthalate	71	5	4	2	2	50	2.5	26.2	26.2	50	CB-01	0	1	0	0.704	No	No	NA	No	
Hexachlorobenzene	22	5	4	1	3	25	15	15	15	15	SWD-01	0	1	0	0.682	No	No	NA	No	
Hexachlorobutadiene	11	5	4	0	4	0						0	1	0		No	No	NA	No	
Pentachlorophenol	360	50	4	1	3	25	310	310	310	310	SWD-01	0	0	0	0.861	No	No	NA	No	
Phenol	420	5	4	2	2	50	1500	2300	2300	3100	SWD-01	2	0	50	7.38	Yes	No	Yes	Yes	
n-Nitrosodiphenylamine	28	12	4	2	2	50	2.6	28.3	28.3	54	CB-01	1	0	25	1.93	Yes	No	Yes	Yes	
o-Cresol	63	5	4	1	3	25	55	55	55	55	CB-01	0	0	0	0.873	No	No	NA	No	
p-Cresol	670	10	4	2	2	50	150	625	625	1100	CB-01	1	0	25	1.64	Yes	No	Yes	Yes	
Polycyclic Aromatic Hydrocarbons (µg/kg)																				
2-Methylnaphthalene	670	5	4	0	4	0						0	0	0		No	No	NA	No	
Acenaphthene	500	5	4	0	4	0						0	0	0		No	No	NA	No	
Acenaphthylene	1300	5	4	0	4	0						0	0	0		No	No	NA	No	
Anthracene	960	5	4	0	4	0						0	0	0		No	No	NA	No	
Benzo(a)anthracene	1300	5	4	2	2	50	51	120	120	190	CB-01	0	0	0	0.146	No	No	NA	No	
Benzo(a)pyrene	1600	5	4	3	1	75	10	120	71	280	CB-01	0	0	0	0.175	No	No	NA	No	
Benzo(g,h,i)perylene	670	5	4	4	0	100	11	102	63	270	CB-01	0	0	0	0.403	No	No	NA	No	
Chrysene	1400	5	4	4	0	100	10	199	103	580	CB-01	0	0	0	0.414	No	No	NA	No	
Dibenzo(a,h)anthracene	230	5	4	3	1	75	3.2	25.7	28	46	CB-01	0	0	0	0.2	No	No	NA	No	
Dibenzofuran	540	5	4	1	3	25	10	10	10	10	TANK-01	0	0	0	0.0185	No	No	NA	No	
Fluoranthene	1700	5	4	4	0	100	10	246	108	760	CB-01	0	0	0	0.447	No	No	NA	No	

PUBLIC REVIEW DRAFT
Table V-5
Screening Levels and COPCs for Stormwater Solids
5900 West Marginal Way Site
Seattle, Washington

Analyte	Target Sediment Concentration Minimum ROD CUL + SMS Lower Tier	PQL ¹	Sample Statistics													Elimination Criteria			
			Total Number of Samples	Total Number of Detections	Number of Non-Detects	Detection Frequency (%)	Minimum Detection	Average Detection	Median Detection	Maximum Detection	Location of Maximum Detection	Number of Exceedances, Detects	Number of Exceedances, Non-Detects	Exceedance Frequency (%)	Maximum Exceedance Factor	Detected SL Exceedances > =1	SL < PQL	Max Detect > PQL	Retained as COPC?
Fluorene	540	5	4	0	4	0						0	0	0		No	No	NA	No
Indeno(1,2,3-cd)pyrene	600	5	4	3	1	75	12	81	71	160	CB-01	0	0	0	0.267	No	No	NA	No
Naphthalene	2100	5	4	1	3	25	45	45	45	45	SWD-01	0	0	0	0.0214	No	No	NA	No
Phenanthrene	1500	5	4	3	1	75	33	261	140	610	CB-01	0	0	0	0.407	No	No	NA	No
Pyrene	2600	5	4	4	0	100	9.3	216	102	650	CB-01	0	0	0	0.25	No	No	NA	No
Total (B+J+K) Benzofluoranthenes	3200	5	4	4	0	100	16	262	146	740	CB-01	0	0	0	0.231	No	No	NA	No
Total Carcinogenic PAHs ND=0	90		4	4	0	100	2	138	69	413	CB-01	2	0	50	4.58	Yes	No	Yes	Yes
Total Carcinogenic PAHs ND=1/2DL ²	90		4	4	0	100	5	139	69	413	CB-01	2	0	50	4.58	Yes	No	Yes	Yes
Polychlorinated Biphenyls (µg/kg)																			
Aroclor 1016		4	4	0	6	0										No	NA	NA	No
Aroclor 1221		4	4	0	6	0										No	NA	NA	No
Aroclor 1232		4	4	0	6	0										No	NA	NA	No
Aroclor 1242		4	4	0	6	0										No	NA	NA	No
Aroclor 1248		4	4	0	6	0										No	NA	NA	No
Aroclor 1254		4	4	4	0	100	3	24.5	22.5	50	CB-01					No	NA	NA	No
Aroclor 1260		4	4	2	2	50	17	28.5	28.5	40	CB-01					No	NA	NA	No
Aroclors, Total	128	4	4	4	0	100	3	38.8	31	90	CB-01	0	0	0	0.703	No	No	NA	No
Dioxins/Furans (pg/g)																			
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)		0.05	4	4	0	100	0.259	2.13	1.72	4.8	CB-01					No	NA	NA	No
Dioxin Furan Calculated TEQ (ND=0)	2	5	4	4	0	100	16.1	158	156	305	SWD-01	4	0	100	152	Yes	Yes	Yes	Yes
Dioxin Furan Calculated TEQ (ND=1/2 DL)	2	5	4	4	0	100	16.6	158	156	305	SWD-01	4	0	100	152	Yes	Yes	Yes	Yes

Notes:
¹ = Source: ERM. 2012b. Revised Final Remedial Investigation Sampling and Analysis Plan. Appendix B Revised Final Remedial Investigation and Feasibility Study Work Plan. May.
² = Toxicity Equivalency Quotient calculations for cPAHs (WAC 173-340-200) using benzo(a)pyrene as the reference chemical.

COPC = Contaminant of Potential Concern
mg/kg = milligrams per kilogram
NA = Not applicable.
ND = 0 = non-detect values equal to zero
ND = 1/2DL = non-detect values calculated as one-half the laboratory detection limit
PAH = polycyclic aromatic hydrocarbons
pCUL = preliminary cleanup level
pg/g = picograms per gram
PQL = Practical Quantitation Limit
ROD = Record of Decision
SC = sediment core sample
SED = sediment sample
SL = Target Sediment Concentration Minimum ROD CUL + SMS Lower Tier
SMS = Sediment Management Standards
SS = surface sediment sample
TEQ = Toxicity Equivalency Quotient
µg/kg = micrograms per kilogram



APPENDIX W

SOIL AND GROUNDWATER
COMPREHENSIVE ANALYTICAL DATA
SUMMARY TABLES

PUBLIC REVIEW DRAFT
Table W-1
Vadose Zone Soil Analytical
Results Summary - Metals
5900 West Marginal Way Site
Seattle, Washington

Location		GP-10		GP-15		GP-22		MW-18S		MW-19S		MW-20S		MW-21S		MW-22S		MW-23S		MW-24S		MW-24S		MW-25S	
Sample Date		3/26/1996		12/4/1995		3/26/1996		10/14/1998		10/14/1998		10/14/1998		10/14/1998		7/22/2003		7/22/2003		7/23/2003		7/23/2003		7/23/2003	
Sample ID		GP-10-3261996		GP-15:3-4:12071995		GP-22-3261996		MW-18:5.5-6.5:10141998		MW-19:5.5-6.5:10141998		MW-20:5.5-6.5:10141998		MW-21:5.5-6.5:10141998		MW-22:5-5.5:07222003		MW-23:5-5.5:07222003		MW-24:3.5-4:07232003		MW-24:5-5.5:07232003		MW-25:3.5-4:07232003	
Sample Type		N		N		N		N		N		N		N		N		N		N		N		N	
Sample Depth		7-9 ft		3-4 ft		7-9 ft		5.5-6.5 ft		5.5-6.5 ft		5.5-6.5 ft		5.5-6.5 ft		5-5.5 ft		5-5.5 ft		3.5-4 ft		5-5.5 ft		3.5-4 ft	
Soil Layer		Dredged Fill		Shallow Fill		Dredged Fill		Dredged Fill		Dredged Fill		Dredged Fill		Shallow Fill		Dredged Fill		Shallow Fill		Shallow Fill		Dredged Fill		Shallow Fill	
Metals (mg/kg)	Screening Level																								
Arsenic	7	320		5.1	U	21	U	46.8		1290		13.5		60.2		160		7.2		4.2	U	4.2	U	2.7	U
Chromium	48																								
Chromium, VI	18																								
Copper	36																								
Zinc	86																								
Antimony	5																								
Barium	100																								
Beryllium	10																								
Cadmium	1																								
Lead	50																								
Mercury	0.07																								
Nickel	48																								
Selenium	0.3																								
Silver	0.32			2.0	U																				
Thallium	0.088																								
Tributyl Tin	0.0021																								

PUBLIC REVIEW DRAFT
Table W-1
Vadose Zone Soil Analytical
Results Summary - Metals
5900 West Marginal Way Site
Seattle, Washington

Location		MW-26S	MW-27S	MW-27S	TP-1 (95)	TP-10	TP-14	TP-14	TP-3 (95)	TP-4 (95)	TP-6	TP-8	GP-34
Sample Date		7/23/2003	7/23/2003	7/22/2003	11/30/1995	11/30/1995	12/1/1995	12/1/1995	11/30/1995	12/1/1995	12/1/1995	11/30/1995	9/6/2012
Sample ID		MW-26:5.5-6:07232003	MW-27:5.5-6:07232003	MW-27:8-8.5:07232003	TP-1:4-5:11301995	TP-10:2-3:11301995	TP-14:3-4:12011995	TP-20:3-4:12011995	TP-3:2-3:11301995	TP-4:0-1:12011995	TP-6:0-1:12011995	TP-8:2-3:11301995	GP-34-0-2
Sample Type		N	N	N	N	N	N	FD	N	N	N	N	N
Sample Depth		5.5-6 ft	5.5-6 ft	8-8.5 ft	4-5 ft	2-3 ft	3-4 ft	3-4 ft	2-3 ft	0-1 ft	0-1 ft	2-3 ft	0-2 ft
Soil Layer		Shallow Fill	Dredged Fill	Dredged Fill	Dredged Fill	Shallow Fill	Dredged Fill	Dredged Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill
Metals (mg/kg)	Screening Level												
Arsenic	7	180	3.6 U	3.7 U	77	18 U	90	38	15 U	36	48	23 U	23.7
Chromium	48												27.6
Chromium, VI	18												
Copper	36												55.1
Zinc	86												72
Antimony	5												
Barium	100												
Beryllium	10												
Cadmium	1												
Lead	50												
Mercury	0.07												
Nickel	48												
Selenium	0.3												
Silver	0.32				1.5	2	1.5 U	1.5 U	0.99 U	1 U	1.1 U	1.5 U	0.3 U
Thallium	0.088												
Tributyl Tin	0.0021												

PUBLIC REVIEW DRAFT
Table W-1
Vadose Zone Soil Analytical
Results Summary - Metals
5900 West Marginal Way Site
Seattle, Washington

Location		GP-37	GP-41	GP-47	GP-48	GP-52	GP-56	GP-56	GP-57	GP-57	GP-57	GP-58	GP-58
Sample Date		9/10/2012	9/4/2012	9/5/2012	9/4/2012	10/9/2013	8/30/2012	8/30/2012	8/31/2012	10/10/2012	10/10/2012	8/31/2012	10/8/2012
Sample ID		GP-37-0-2	GP-41-0-0.16	GP-47-0-0.25	GP-48-0-0.5	GP-52-3.5-5.5	GP-56-3.3-3.75	DUP-083012-1	GP-57-1.5-3.5	GP-57-4-6.25	GP-57-6.25-6.8	GP-58-1.75-3.75	GP-58-4.25-6.25
Sample Type		N	N	N	N	N	N	FD	N	N	N	N	N
Sample Depth		0-2 ft	0-0.16 ft	0-0.25 ft	0-0.5 ft	3.5-5.5 ft	3.3-3.75 ft	3.3-3.75 ft	1.5-3.5 ft	4-6.25 ft	6.25-6.8 ft	1.75-3.75 ft	4.25-6.25 ft
Soil Layer		Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Dredged Fill	Dredged Fill	Shallow Fill	Dredged Fill
Metals (mg/kg)	Screening Level												
Arsenic	7	7.1	6.6	10.6	13.4	26.7	53.8	58.7	6.2	78.7	24.0	4.6	86.3
Chromium	48			7	4		29.6	31.5	25.5	12.7	23.5	3	10.2
Chromium, VI	18			0.410 U			0.506 U	0.512 U	0.450 U	0.414 U	1.00	20.8	0.607
Copper	36			276 J	168		566	573	22.4	22.1 J+	37.9 J+	14.9	68.8
Zinc	86			54	30		72	76	56	31	59	12	40
Antimony	5									0.2 UJ	0.3 UJ		0.2 UJ
Barium	100			28.9			27.7	26.3	49.8	28.8	67.5	9.0	26.0
Beryllium	10									0.2 U	0.5		0.2 U
Cadmium	1						0.2	0.2	0.1	0.1 U	0.3	0.2 U	0.1 U
Lead	50			2.8			22.1	21.5	26.6	3.9	10.0	1.9	4.9
Mercury	0.07			0.05 J+			0.12	0.12	0.03 U	0.02 U	0.11	0.04 U	0.03
Nickel	48			12			7	8	30	8	23	2 U	7
Selenium	0.3									0.5 U	0.7 U		0.5 U
Silver	0.32			0.7 U	1 U		4.1	4.4	0.3 U	0.3 U	0.4 U	0.6 U	0.3 U
Thallium	0.088									0.2 U	0.3 U		0.2 U
Tributyl Tin	0.0021			0.0015 U									

PUBLIC REVIEW DRAFT
Table W-1
Vadose Zone Soil Analytical
Results Summary - Metals
5900 West Marginal Way Site
Seattle, Washington

Location		GP-59		GP-59		GP-62		GP-67		GP-69		GP-73		GP-76		GP-77		GP-78		GP-79		GP-79		GP-80	
Sample Date		8/31/2012		10/10/2012		9/5/2012		10/7/2013		10/7/2013		10/8/2013		5/14/2019		5/14/2019		5/14/2019		5/15/2019		5/15/2019		5/14/2019	
Sample ID		GP-59-2.3-3.9		GP-59-4.25-6.25		GP-62-0-2		GP-67-3.0-4.8		GP-69-0-2		GP-73-4.0-5.8		GP-76-1-3-051419		GP-77-2.75-4.75-051419		GP-78-1-2.5-051419		GP-79-2-4-051519		DUP-051519-01		GP-80-1.5-3.5-051419	
Sample Type		N		N		N		N		N		N		N		N		N		N		FD		N	
Sample Depth		2.3-3.9 ft		4.25-6.25 ft		0-2 ft		3-4.8 ft		0-2 ft		4-5.8 ft		1 - 3 ft		2.75 - 4.75 ft		1 - 2.5 ft		2 - 4 ft		2 - 4 ft		1.5 - 3.5 ft	
Soil Layer		Shallow Fill		Dredged Fill		Shallow Fill		Shallow Fill		Shallow Fill		Shallow Fill		Shallow Fill		Shallow Fill		Shallow Fill		Shallow Fill		Shallow Fill		Shallow Fill	
Metals (mg/kg)	Screening Level																								
Arsenic	7	20.7		33.2		27.8		78.7				562		10.5		6.91		7.54						14.9	
Chromium	48	32.1		18.6		30.7																			
Chromium, VI	18	0.424	U	0.758						0.442	R														
Copper	36	39.1		158	J+	102		274				278													
Zinc	86	45		40		208		117				77													
Antimony	5			0.2	UJ																				
Barium	100	39.5		26.6																					
Beryllium	10			0.2	U																				
Cadmium	1	0.1	U	0.1	U																				
Lead	50	20.3		11.7	J																				
Mercury	0.07	0.02	U	0.03																					
Nickel	48	39		11																					
Selenium	0.3			0.6	U																				
Silver	0.32	0.3	U	0.3	U	0.3	U																		
Thallium	0.088			0.2	U																				
Tributyl Tin	0.0021					0.0087																			

PUBLIC REVIEW DRAFT
Table W-1
Vadose Zone Soil Analytical
Results Summary - Metals
5900 West Marginal Way Site
Seattle, Washington

Location		GP-81	GP-82	GP-83	GP-83	MW-23D	MW-23D	MW-30S	MW-30S	MW-31S	MW-31S	MW-33S	MW-35S
Sample Date		5/15/2019	5/15/2019	5/17/2019	5/17/2019	9/4/2012	9/4/2012	11/8/2011	11/8/2011	11/8/2011	11/8/2011	11/10/2011	11/9/2011
Sample ID		GP-81-1.5-3.5-051519	GP-82-3.5-051519	GP-83-3.25-4-051719	GP-83-4-6-051719	MW-23D-2.75-5.25	DUP-090412-1	MW-30S-0-2	DUP-110811-2	MW-31S-1-2	DUP-110811-3	MW-33S-.7-1.3	MW-35S-1.3-3.3
Sample Type		N	N	N	N	N	FD	N	FD	N	FD	N	N
Sample Depth		1.5 - 3.5 ft	3 - 5 ft	3.25 - 4 ft	4 - 6 ft	2.75-5.25 ft	2.75-5.25 ft	0-2 ft	0-2 ft	1-2 ft	1-2 ft	0.7-1.3 ft	1.3-3.3 ft
Soil Layer		Shallow Fill	Shallow Fill	Shallow Fill	Dredged Fill	Dredged Fill	Dredged Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill
Metals (mg/kg)	Screening Level												
Arsenic	7					35.8 J	70.2	8.5	10.2	2.2		1.7	5.9
Chromium	48					22.2	25.5	40.9	39.9	21.1		25.9	26.9
Chromium, VI	18							0.438 UJ					
Copper	36					103	244	88.3 J	81.9 J	14.3 J		19.4	101
Zinc	86					44	50	105	108	27		32	33
Antimony	5												
Barium	100					33.7	39.0						
Beryllium	10												
Cadmium	1												
Lead	50												
Mercury	0.07					34.3 J-	30.1						
Nickel	48					0.08	0.10						
Selenium	0.3					9	9						
Silver	0.32												
Thallium	0.088					0.7	1.0	0.5	0.3 U	0.3 U		0.3 U	0.3 U
Tributyl Tin	0.0021							0.019		0.0033 U	0.0033 U		

PUBLIC REVIEW DRAFT
Table W-1
Vadose Zone Soil Analytical
Results Summary - Metals
5900 West Marginal Way Site
Seattle, Washington

Location		MW-36S		MW-36S		MW-36S		MW-43S		MW-45D		MW-45D		MW-45D		TB-01B		TB-02B		TB-04A		TB-05B		TB-06A	
Sample Date		2/22/2012		2/22/2012		2/22/2012		1/20/2014		10/7/2013		10/7/2013		10/7/2013		1/14/2014		1/13/2014		1/13/2014		1/15/2014		1/14/2014	
Sample ID		MW-36S-2.8-4.8		MW-36S-4.8-6		DUP-022212		MW-43S-3.3-4.5		MW-45D-2.3-4.2		MW-45D-4.2-6.2		DUP-100713-1		TB-01B-0.8-2.4		TB-02B-0.5-2.5		TB-04A-0.5-1.25		TB-05B-2.4-5		TB-06A-1.5	
Sample Type		N		N		FD		N		N		N		FD		N		N		N		N		N	
Sample Depth		2.8-4.8 ft		4.8-6 ft		4.8-6 ft		3.3-4.5 ft		2.3-4.2 ft		4.2-6.2 ft		4.2-6.2 ft		0.8-2.4 ft		0.5-2.5 ft		0.5-1.25 ft		2.4-5 ft		1.5 ft	
Soil Layer		Shallow Fill		Dredged Fill		Shallow Fill		Shallow Fill		Shallow Fill		Dredged Fill		Dredged Fill		Shallow Fill		Shallow Fill		Shallow Fill		Shallow Fill		Shallow Fill	
Metals (mg/kg)	Screening Level																								
Arsenic	7	22.0		3.4		3.1		63.6		18.8		95.2 J+	90.3		70.0 J-	10.3		92.4		44.8		6.4 J-			
Chromium	48	9.9		13.9		13.0		32.7		20		10.9	11.2		26 J	47.0		30.8		50.5		167			
Chromium, VI	18							0.475 U		0.902 R												173			
Copper	36	31.3		19.0		16.8		292		286		287	296		284	148		265		340		17			
Zinc	86	27		31		28		89		139		82	95		200 J+	134		102		85 J-		50 J+			
Antimony	5																								
Barium	100																								
Beryllium	10																								
Cadmium	1																								
Lead	50																								
Mercury	0.07																								
Nickel	48																								
Selenium	0.3																								
Silver	0.32	0.3 U		0.4 U		0.4 U																			
Thallium	0.088																								
Tributyl Tin	0.0021																								

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Table W-1
Vadose Zone Soil Analytical
Results Summary - Metals
5900 West Marginal Way Site
Seattle, Washington

Location		TB-06A		TB-06C		TB-06E		TB-07	
Sample Date		1/14/2014		1/14/2014		1/15/2014		1/24/2014	
Sample ID		TB-06A-5-6		TB-06C-1.25-4.6		TB-06E-3.4-5		TB-07-0-1	
Sample Type		N		N		N		N	
Sample Depth		5-6 ft		1.25-4.6 ft		3.4-5 ft		0-1 ft	
Soil Layer		Shallow Fill		Shallow Fill		Shallow Fill		Shallow Fill	
Metals (mg/kg)	Screening Level								
Arsenic	7	60 J-		31.3 J		13.0		8.4	
Chromium	48	50 U		37.9 J		33.0		29	
Chromium, VI	18	0.451 U							
Copper	36	337000		92.0		61.2		243	
Zinc	86	190 J+		68		76 J-		148	
Antimony	5								
Barium	100								
Beryllium	10								
Cadmium	1								
Lead	50								
Mercury	0.07								
Nickel	48								
Selenium	0.3								
Silver	0.32								
Thallium	0.088								
Tributyl Tin	0.0021								

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Table W-1

**Vadose Zone Soil Analytical
Results Summary - Metals
5900 West Marginal Way Site
Seattle, Washington**

Notes:

Units are in milligrams per kilogram (mg/kg).

Bolded values indicate compound was detected.

Cells are left blank where compound was not analyzed.

Green-shaded, bolded values indicate at least detected concentration exceeds the selected screening level.

Light gray-shaded values indicate that the detection limit exceeds the screening level.

NFGs (National Functional Guidelines) = U.S. Environmental Protection Agency (USEPA) Contract Laboratory Program National Functional Guidelines for Organic Data Review, October 1999 or USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004.

Key:

DUP = field duplicate sample

FD = field duplicate sample

ft = feet below ground surface

GP = direct-push boring

mg/kg = milligrams per kilogram

MW = monitoring well

N = normal field sample

TB = top of riverbank boring

Laboratory Data Qualifiers:

- = Compound concentration biased low.

+ = Compound concentration biased high.

J = The detected results are qualified as estimated in accordance with National Functional Guidelines (NFGs).

R = Rejected data in accordance with NFGs; associated matrix spike recoveries were less than laboratory control limits.

U = Result is $\leq$ the laboratory detection limit or qualified as non-detect in accordance with NFGs.

UJ = Non-detected compound qualified as estimated in accordance with NFGs.

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Table W-2
Vadose Zone Soil Analytical Results
Summary - Volatile Organic Compounds
& Total Petroleum Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location	B-1	B-1	B-2	B-2	B-3	B-3	TP-1 (90)	TP-2 (90)	TP-3 (90)	TP-4 (90)	TP-5 (90)	GP-62
Sample Date	5/17/1990	5/17/1990	5/17/1990	5/17/1990	5/17/1990	5/17/1990	5/17/1990	5/17/1990	5/17/1990	5/17/1990	5/17/1990	9/5/2012
Sample ID	B-1:4:05171990	B-1:8:05171990	B-2:4:05171990	B-2:8:05171990	B-3:4:05171990	B-3:8:05171990	TP-1:1.5:051790	TP-2:1.5:051790	TP-3:1.5:051790	TP-4:1.5:051790	TP-5:1.5:051790	GP-62-1
Sample Type	N	N	N	N	N	N	N	N	N	N	N	N
Sample Depth	4 ft	6 ft	4 ft	6 ft	4 ft	6 ft	1.5 ft	1.5 ft	1.5 ft	1.5 ft	1.5 ft	1 ft
Soil Layer	Dredged Fill	Dredged Fill	Dredged Fill	Dredged Fill	Shallow Fill	Dredged Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill
VOCs (ug/kg)	Screening Level											
1,1,1,2-Tetrachloroethane	38000											0.6 U
1,1,1-Trichloroethane	1500											0.6 U
1,1,2,2-Tetrachloroethane	1.2											0.6 U
1,1,2-Trichloroethane	5											0.6 U
1,1-Dichloroethane	41											0.6 U
1,1-Dichloroethene	44											0.6 U
1,1-Dichloropropene	NS											0.6 U
1,2,3-Trichlorobenzene	20000											3.2 U
1,2,3-Trichloropropane	33											1.3 U
1,2,4-Trimethylbenzene	800000											0.6 U
1,2-Dibromo-3-chloropropane	1300											3.2 U
1,2-Dichloroethane	23											0.6 U
1,2-Dichloropropane	16											0.6 U
1,3,5-Trimethylbenzene	800000											0.6 U
1,3-Dichloropropane	NS											0.6 U
2,2-Dichloropropane	NS											0.6 U
2-Butanone	NS											3.1 U
2-Chloroethyl vinyl ether	NS											3.2 U
2-Hexanone	400000											3.2 U
2-Phenylbutane	NS											0.6 U
4-Chlorotoluene	NS											0.6 U
4-Methyl-2-pentanone	NS											3.2 U
Acetone	29000											62 U
Acrolein	40000											3.2 U
Acrylonitrile	1900											3.2 U
Benzene	8.8											4.2 U
Bromobenzene	640000											0.6 U
Bromodichloromethane	14											0.6 U
Bromoform	78											0.6 U
Carbon disulfide	5000											0.6 U
Carbon tetrachloride	2.9											0.6 U
Chlorobenzene	860											0.6 U
Chlorobromomethane	NS											0.6 U
Chloroethane	NS											0.6 U
Chloroform	74											0.8 U
cis-1,2-Dichloroethene	78											0.6 U
cis-1,3-Dichloropropene	2.3											0.6 U
Cumene	NS											0.6 U
Cymene	NS											0.6 U
Dibromochloromethane	12											0.6 U
Dibromomethane	800000											0.6 U
Ethyl bromide	NS											1.3 U
Ethylbenzene	260											0.6 U
Ethylene dibromide	0.27											0.6 U
Freon 11	NS											0.6 U
Freon 113	NS											1.3 U
m,p Xylenes	NS											0.6 U
Methyl bromide	50											0.6 U
Methyl chloride	NS											0.3 U
Methyl iodide	NS											0.6 U
Methyl tert-butyl ether	100											0.6 U
Methylene chloride	21											1.3 U
n-Butylbenzene	NS											0.6 U
n-Propylbenzene	NS											0.6 U
o-Chlorotoluene	NS											0.6 U
o-Xylene	14000											0.6 U
Styrene	2200											0.6 U
tert-Butylbenzene	NS											0.6 U
Tetrachloroethene	29											0.6 U
Toluene	920											0.6 U
trans-1,2-Dichloroethene	520											0.6 U
trans-1,3-Dichloropropene	2.3											0.6 U
trans-1,4-Dichlorobutene	NS											3.2 U
Trichloroethene	4.4											0.6 U
Vinyl acetate	33000											3.2 U
Vinyl chloride	1											0.6 U
TPH (mg/kg)												
Gasoline Range Organics	30											
Diesel Range Organics	260											
Motor Oil Range Organics	2000											
TPH DRO/MORO	260											
Total Petroleum Hydrocarbons	NS	36	28	51	57	63	67	92	240	10000	130	180

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Table W-2
Vadose Zone Soil Analytical Results
Summary - Volatile Organic Compounds
& Total Petroleum Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location	GP-64	GP-64	GP-75	GP-75	GP-75	MW-33S	MW-35S	MW-35S	MW-43S
Sample Date	9/5/2012	9/5/2012	10/1/2013	10/1/2013	10/1/2013	11/10/2011	11/9/2011	11/9/2011	12/20/2014
Sample ID	GP-64-1	GP-64-0-2	GP-75-0-2.0	GP-75-4.0	DUP-100113-1	MW-33S-1.3	MW-35S-1.3-3.3	MW-35S-1.7	MW-43S-3.3-4.5
Sample Type	N	N	N	N	FD	N	N	N	N
Sample Depth	1 ft	0-2 ft	0-2 ft	4 ft	4 ft	1.3 ft	1.3-3.3 ft	1.7 ft	3.3-4.5 ft
Soil Layer	Shallow Fill	Shallow Fill	Shallow Fill	Dredged Fill	Dredged Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill
VOCs (ug/kg)	Screening Level								
1,1,1,2-Tetrachloroethane	38000			620 U	750 U	0.23 U			
1,1,1-Trichloroethane	1500			260 U	310 U	0.23 U			
1,1,2,2-Tetrachloroethane	1.2			460 U	560 U	0.25 U			
1,1,2-Trichloroethane	5			390 U	470 U	0.29 U			
1,1-Dichloroethane	41			390 U	470 U	0.20 U			
1,1-Dichloroethene	44			440 U	530 U	0.34 U			
1,1-Dichloropropene	NS			590 U	710 U	0.31 U			
1,2,3-Trichlorobenzene	20000			1000 U	1300 U	0.31 U			
1,2,3-Trichloropropane	33			1700 U	2100 U	0.52 U			
1,2,4-Trimethylbenzene	800000			3400 U	7000 U	0.23 U			
1,2-Dibromo-3-chloropropane	1300			1400 UJ	1700 UJ	0.59 U			
1,2-Dichloroethane	23			330 U	400 U	0.19 U			
1,2-Dichloropropane	18			440 U	530 U	0.16 U			
1,3,5-Trimethylbenzene	800000			1100 U	2200 U	0.26 U			
1,3-Dichloropropane	NS			550 U	670 U	0.21 U			
2,2-Dichloropropane	NS			660 U	790 U	0.29 U			
2-Butanone	NS			1800 U	2200 U	0.52 U			
2-Chloroethyl vinyl ether	NS			1400 U	1700 U	0.26 U			
2-Hexanone	400000			450 U	550 U	0.44 U			
2-Phenylbutane	NS			640 U	780 U	0.24 U			
4-Chlorotoluene	NS			690 U	830 U	0.28 U			
4-Methyl-2-pentanone	NS			3600 U	4400 U	0.42 U			
Acetone	29000			6000 U	6900 U	2.8 U			
Acrolein	40000			2500 U	3100 U	3.8 U			
Acrylonitrile	1900			320 U	390 U	1.0 U			
Benzene	8.8			300 U	370 U	0.30 U			
Bromobenzene	640000			280 U	340 U	0.15 U			
Bromodichloromethane	14			410 U	500 U	0.26 U			
Bromoform	78			470 U	560 U	0.30 U			
Carbon disulfide	5000			270 U	320 U	0.56 U			
Carbon tetrachloride	2.8			420 U	500 U	0.21 U			
Chlorobenzene	860			400 U	490 U	0.22 U			
Chlorobromomethane	NS			410 U	500 U	0.32 U			
Chloroethane	NS			520 U	630 U	0.46 UJ			
Chloroform	74			330 U	400 U	0.24 U			
cis-1,2-Dichloroethene	78			400 U	480 U	0.24 U			
cis-1,3-Dichloropropene	2.3			460 U	550 U	0.23 U			
Cumene	NS			510 U	1100 U	0.23 U			
Cymene	NS			650 U	1200 U	0.24 U			
Dibromochloromethane	12			430 U	520 U	0.27 U			
Dibromomethane	800000			630 U	770 U	0.15 U			
Ethyl bromide	NS			260 U	310 U	0.44 U			
Ethylbenzene	260			3300 U	6400 U	0.20 U			
Ethylene dibromide	0.27			480 U	590 U	0.18 U			
Freon 11	NS			330 U	400 U	0.27 U			
Freon 113	NS			410 U	500 U	0.29 U			
m,p Xylenes	NS			3800 U	7000 U	0.39 U			
Methyl bromide	50			870 U	1000 U	0.19 UJ			
Methyl chloride	NS			420 U	510 U	0.26 UJ			
Methyl iodide	NS			500 U	600 U	0.22 U			
Methyl tert-butyl ether	100			530 U	640 U	0.23 U			
Methylene chloride	21			8200 U	8800 U	0.64 U			
n-Butylbenzene	NS			760 U	920 U	0.26 U			
n-Propylbenzene	NS			550 U	660 U	0.27 U			
o-Chlorotoluene	NS			590 U	720 U	0.30 U			
o-Xylene	14000			2400 U	4500 U	0.23 U			
Styrene	2200			580 J	720 J	0.14 U			
tert-Butylbenzene	NS			590 U	710 U	0.31 U			
Tetrachloroethene	29			390 U	470 U	0.26 U			
Toluene	920			990 U	1600 U	0.15 U			
trans-1,2-Dichloroethene	520			410 U	490 U	0.27 U			
trans-1,3-Dichloropropene	2.3			480 U	580 U	0.22 U			
trans-1,4-Dichlorobutene	NS			4200 U	5100 U	0.44 U			
Trichloroethene	4.4			290 U	350 U	0.21 U			
Vinyl acetate	33000			400 U	490 U	0.38 U			
Vinyl chloride	1			430 U	520 U	0.24 U			
TPH (mg/kg)									
Gasoline Range Organics	30	3.4 U		300				2.2 U	
Diesel Range Organics	260		600	71	4900		5.3 NJ		110
Motor Oil Range Organics	2000		480	420	12000		2.6 U		74
TPH DRO/MORO	260		1080	491	16900		5.3		184
Total Petroleum Hydrocarbons	NS								

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Table W-2

Vadose Zone Soil Analytical Results Summary - Volatile Organic Compounds & Total Petroleum Hydrocarbons 5900 West Marginal Way Site Seattle, Washington

Notes:

Cells are left blank where compound was not analyzed.

Green-shaded, bolded values indicate detected concentration exceeds the selected screening level.

Light gray-shaded values indicate that the method detection limit exceeds the screening level.

NFG (National Functional Guidelines) = U.S. Environmental Protection Agency (USEPA) Contract Laboratory Program National Functional Guidelines for Organic Data Review, October 1999 or USEPA Contract. Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004.

Key:

B = boring

DRO/MORO = diesel range organics/motor oil range organics

DUP = field duplicate sample

FD = field duplicate sample

ft = feet below ground surface

GP = direct-push boring

mg/kg = milligrams per kilogram

MW = monitoring well

N = normal field sample

NS = no screening level

TP = test pit

TPH = total petroleum hydrocarbons

ug/kg - micrograms per kilogram

VOC = volatile organic compounds

Laboratory Data Qualifiers:

j = The value reported is less than the reporting limit and should be considered an estimate; qualifier reported by the laboratory.

J = The detected results are qualified as estimated in accordance with National Functional Guidelines (NFGs).

NJ = Tentatively identified and estimated.

U = Result is $\leq$ the laboratory detection limit or qualified as non-detect in accordance with NFGs.

UJ = Non-detected compound qualified as estimated in accordance with NFGs.

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Table W-3

Vadose Zone Soil Analytical Results Summary - Semivolatile
Organic Compounds & Polycyclic Aromatic Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location		GP-15	MW-19S	TP-1 (95)	TP-3 (95)	TP-4 (95)	TP-6	TP-8	TP-10	TP-14	TP-14	GP-34	GP-47	GP-48	
Sample Date		12/4/1995	10/14/1998	11/30/1995	11/30/1995	12/1/1995	12/1/1995	11/30/1995	11/30/1995	12/1/1995	12/1/1995	9/6/2012	9/5/2012	9/4/2012	
Sample ID		GP-15-3-4-12071995	MW-19-5-5-6-5-10141998	TP-1-4-5-11301995	TP-3-2-3-11301995	TP-4-0-1-12011995	TP-6-0-1-12011995	TP-8-2-3-11301995	TP-10-2-3-11301995	TP-14-3-4-12011995	TP-20-3-4-12011995	GP-34-0-2	GP-47-0-0.25	GP-48-0-0.5	
Sample Type		N	N	N	N	N	N	N	N	N	FD	N	N	N	
Sample Depth		3-4 ft	5.5-6.5 ft	4-5 ft	2-3 ft	0-1 ft	0-1 ft	2-3 ft	2-3 ft	3-4 ft	3-4 ft	ft	0-0.25 ft	0-0.5 ft	
Soil Layer		Shallow Fill	Dredged Fill	Dredged Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Dredged Fill	Dredged Fill	Shallow Fill	Shallow Fill	Shallow Fill	
SVOCs (ug/kg)		TEF	Screening Level												
Pentachlorophenol	--	4600	1200 U	50 U	280 U	320 U	290 U	340 U	450 U	1900	450 U	430 U	210	43 U	44 U
2,3,4,6-Tetrachlorophenol	--	NS	230 U		140 U	160 U	140 U	170 U	220 U	180 U	220 U	210 U	19	4.3 U	4.4 U
2,3,5,6-Tetrachlorophenol	--	4000	230 U		140 U	160 U	140 U	170 U	220 U	110 j	220 U	210 U			
2,4,5-Trichlorophenol	--	3.3	230 U		140 U	160 U	150 U	170 U	230 U	180 U	230 U	220 U	19 U	19 U	20 U
2,4,6-Trichlorophenol	--	69	230 U		140 U	160 U	140 U	170 U	220 U	180 U	220 U	210 U	20 U	20 U	20 U
2,4-Dichlorophenol	--	200	230 U		70 U	80 U	73 U	85 U	110 U	90 U	110 U	110 U	20 U	19 U	20 U
2-Chlorophenol	--	420			160 U	180 U	160 U	190 U	250 U	180 j	250 U	250 U	2.2 U	2.1 U	2.2 U
Phenol	--	0.008											64	7.7 U	7.9 U
Hexachlorobenzene	--	1.4													
1,2,4-Trichlorobenzene	--	36													
1,2-Dichlorobenzene	--	NS													
1,3-Dichlorobenzene	--	110													
1,4-Dichlorobenzene	--	NS													
2,2-Oxybis(1-chloropropane)	--	29													
2,4-Dimethylphenol	--	130													
2,4-Dinitrophenol	--	1.1													
2,6-Dinitrotoluene	--	0.31													
2-Chloronaphthalene	--	800000													
2-Nitroaniline	--	NS													
2-Nitrophenol	--	0.061													
3,3'-Dichlorobenzidine	--	NS													
3-Nitroaniline	--	NS													
4-Bromophenyl phenyl ether	--	NS													
4-Chloro-3-methylphenol	--	NS													
4-Chlorophenyl phenyl ether	--	7000													
4-Nitrophenol	--	650													
Benzoic acid	--	57													
Benzyl alcohol	--	3.6													
Benzyl butyl phthalate	--	NS													
Bis(2-chloroethoxy)methane	--	100													
Bis(2-ethylhexyl)phthalate	--	NS													
Carbazole	--	260													
Diethyl Phthalate	--	0.22													
Diethyl Phthalate	--	200													
Dimethylphthalate	--	71													
Dinitro-o-cresol	--	NS													
Di-n-octyl phthalate	--	6200													
Hexachloroethane	--	0.79													
Hexachlorocyclopentadiene	--	4000													
Hexachlorobutadiene	--	11													
Isophorone	--	230													
Nitrobenzene	--	100													
n-Nitrosodi-n-propylamine	--	0.056													
n-Nitrosodiphenylamine	--	21													
o-Cresol	--	63													
p-Chloroaniline	--	1.2													
p-Cresol	--	670													
p-Nitroaniline	--	NS													
PAHs (ug/kg)															
1-Methylnaphthalene	--	29000													
2-Methylnaphthalene	--	670													
Acenaphthene	--	500													
Acenaphthylene	--	1300													
Anthracene	--	960													
Benzo(a)anthracene	0.1	1.1													
Benzo(a)pyrene	1	0.31													
Total (B+J+K) Benzofluoranthenes	0.1	3200													
Benzo(g,h,i)perylene	--	670													
Chrysene	0.01	130													
Dibenz(a,h)anthracene	0.1	0.57													
Dibenzofuran	--	540													
Fluoranthene	--	1700													
Fluorene	--	540													
Indeno(1,2,3-cd)pyrene	0.1	11													
Naphthalene	--	39													
Phenanthrene	--	1500													
Pyrene	--	2600													
Carcinogenic PAHs TEQ ND=0 ¹	--	0.31													
Carcinogenic PAHs TEQ ND=1/2DL ¹	--	0.31													

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Table W-3

Vadose Zone Soil Analytical Results Summary - Semivolatile

Organic Compounds & Polycyclic Aromatic Hydrocarbons

5900 West Marginal Way Site

Seattle, Washington

		Location	GP-56	GP-56	GP-58	GP-58	GP-59	GP-59	GP-62	GP-62	GP-75	GP-75	GP-75	MW-30S	MW-31S	MW-33S
		Sample Date	8/30/2012	8/30/2012	8/31/2012	10/8/2012	8/31/2012	10/10/2012	9/5/2012	9/5/2012	10/1/2013	10/1/2013	10/1/2013	11/8/2011	11/8/2011	11/10/2011
		Sample ID	GP-56-3.3-3.75	DUP-603012-1	GP-58-1.75-3.75	GP-58-4.25-6.25	GP-59-2.3-3.9	GP-59-4.25-6.25	GP-62-0-2	GP-62-1	GP-75-0-2.0	GP-75-4.0	DUP-100113-1	MW-30S-0-2	MW-31S-1-2	MW-33S-7-1.3
		Sample Type	N	FD	N	N	N	N	N	N	N	N	FD	N	N	N
		Sample Depth	3.3-3.75 ft	3.3-3.75 ft	1.75-3.75 ft	4.25-6.25 ft	2.3-3.9 ft	4.25-6.25 ft	0-2 ft	1 ft	0-2 ft	4 ft	4 ft	0-2 ft	1-2 ft	0.7-1.3 ft
		Soil Layer	Shallow Fill	Shallow Fill	Shallow Fill	Dredged Fill	Shallow Fill	Dredged Fill	Shallow Fill	Shallow Fill	Shallow Fill	Dredged Fill	Dredged Fill	Shallow Fill	Shallow Fill	Shallow Fill
		SVOCs (ug/kg)	TEF	Screening Level												
		Pentachlorophenol	--	0.032	7700	320	140 U	45 U	85	79	280 U			710 U	44 U	47 U
		2,3,4,6-Tetrachlorophenol	--	4600	1300	18	14 U		9.1		28 U			71 U	4.4 U	4.7 U
		2,3,5,6-Tetrachlorophenol	--	NS												
		2,4,5-Trichlorophenol	--	4000	100 U	20 U	63 U	20 U	20 U	21 U	130 U			310 U	20 U	21 U
		2,4,6-Trichlorophenol	--	3.3	390	21 U	66 U	21 U	22 U	130 U				330 U	20 U	22 U
		2,4-Dichlorophenol	--	69	230	20 U	63 U	20 U	21 U	130 U				310 U	20 U	21 U
		2-Chlorophenol	--	200	96	2.2 U	7.0 U	2.2 U	2.3 U	14 U				35 U	2.2 U	2.3 U
		Phenol	--	420	210	99	840	8.0 U	43	210	51 U			130 U	7.9 U	8.3 U
		Hexachlorobenzene	--	0.008				4.0 U		4.2 U						3.9 U
		1,2,4-Trichlorobenzene	--	1.4				3.2 U		3.4 U			1200 U		1400 U	3.2 U
		1,2-Dichlorobenzene	--	36				2.3 U		2.4 U			480 U		560 U	2.3 U
		1,3-Dichlorobenzene	--	NS				2.4 U		2.6 U			560 U		680 U	2.4 U
		1,4-Dichlorobenzene	--	110				2.6 U		2.8 U			520 U		750 U	2.6 U
		2,2-Oxybis(1-chloropropane)	--	NS				3.5 U		3.7 U						3.4 U
		2,4-Dimethylphenol	--	29				3.2 U		3.4 U						3.2 U
		2,4-Dinitrophenol	--	130				100 U		110 U						100 U
		2,4-Dinitrotoluene	--	1.1				18 U		19 U						18 U
		2,6-Dinitrotoluene	--	0.31				28 U		30 U						28 U
		2-Chloronaphthalene	--	NS				2.4 U		2.6 U						2.4 U
		2-Nitroaniline	--	800000				17 U		18 U						17 U
		2-Nitrophenol	--	NS				36 U		38 U						35 U
		3,3'-Dichlorobenzidine	--	0.061				16 U		17 U						16 U
		3-Nitroaniline	--	NS				21 U		22 U						21 U
		4-Bromophenyl phenyl ether	--	NS				4.7 U		4.9 U						4.6 U
		4-Chloro-3-methylphenol	--	NS				14 U		15 U						14 U
		4-Chlorophenyl phenyl ether	--	NS				4.9 U		5.2 U						4.8 U
		4-Nitrophenol	--	7000				32 U		34 U						32 U
		Benzoic acid	--	650				94 U		130						92 U
		Benzyl alcohol	--	57				5.6 U		5.9 U						5.6 U
		Benzyl butyl phthalate	--	3.6				5.7 U		6.0 U						5.6 U
		Bis(2-chloroethoxy)methane	--	NS				1.9 U		2.0 U						1.8 U
		Bis(2-ethylhexyl)phthalate	--	100				24 U		25 U						18
		Carbazole	--	NS				2.5 U		2.6 U						2.5 U
		Dibutyl Phthalate	--	280				7.6 U		8.0 U						7.5 U
		Dichloroethyl ether	--	0.22				3.1 U		3.3 U						3.1 U
		Diethyl Phthalate	--	200				34 U		36 U						33 U
		Dimethylphthalate	--	71				2.7 U		2.8 U						2.7 U
		Dinitro-o-cresol	--	NS				20 U		21 U						19 U
		Di-n-octyl phthalate	--	6200				5.4 U		5.7 U						5.3 U
		Hexachloroethane	--	0.79				2.7 U		2.9 U						2.7 U
		Hexachlorocyclopentadiene	--	4000				61 U		65 U						61 U
		Hexachlorobutadiene	--	11				4.2 U		4.5 U	3.2 U		980 U		1200 U	4.2 U
		Isophorone	--	230				2.6 U		2.8 U						2.6 U
		Nitrobenzene	--	100				3.8 U		4.0 U						3.7 U
		n-Nitrosodi-n-propylamine	--	0.056				3.1 U		3.3 U						3.1 U
		n-Nitrosodiphenylamine	--	21				5.0 U		5.3 U						4.9 U
		o-Cresol	--	63				4.9 U		5.1 U						4.8 U
		p-Chloroaniline	--	1.2				21 U		22 U						20 U
		p-Cresol	--	670				67		390						6.1 U
		p-Nitroaniline	--	NS				35 U		37 U						35 U
		PAHs (ug/kg)														
		1-Methylnaphthalene	--	29000				15		23			6.8 J			1.6 U
		2-Methylnaphthalene	--	670				12		34			8.8 J			1.4 U
		Acenaphthene	--	500				1.2 U		1.3 U			3.7 U			1.2 U
		Acenaphthylene	--	1300				1.1 U		4.7 J			7.8 J			1.2 U
		Anthracene	--	960				1.3 U		4.2 J			8.8 J			1.4 U
		Benzo(a)anthracene	0.1	1.1				4.4		5.4			23 J			3.4 J
		Benzo(a)pyrene	1	0.31				3.5		3.7			33 J			7.6
		Total (B+J+K) Benzo(a)fluoranthenes	0.1	3200				11		12			69 J			6.8
		Benzo(g,h,i)perylene	--	670				3.7 J		3.0 U			36 J			4.6 J
		Chrysene	0.01	130				7.7		12			39 J			5.4
		Dibenzo(a,h)anthracene	0.1	0.57				2.1 U		2.3 U			7.6 J			2.2 U
		Dibenzofuran	--	540				4.3 J		12			3.5 U			1.4 U
		Fluoranthene	--	1700				23		22			70 J			5.2
		Fluorene	--	540				2.8		5.6			3.7 U			1.2 U
		Indeno(1,2,3-cd)pyrene	0.1	11				3.1 U		3.4 U						4.9 J
		Naphthalene	--	39				22		57			18 J	88000	140000	2.5 U
		Phenanthrene	--	1500				37		37			34 J			1.9 U
		Pyrene	--	2600				17		21			43 J			9.8
		Carcinogenic PAHs TEQ ND=0 ⁻¹	--	0.31				5.1		5.6			46			9.1
		Carcinogenic PAHs TEQ ND=1/2DL ⁻¹	--	0.31				5.4		5.8			46			9.2

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Table W-3

Vadose Zone Soil Analytical Results Summary - Semivolatile
Organic Compounds & Polycyclic Aromatic Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

	Location	MW-33S	MW-35S	MW-36S	MW-45D	MW-45D	TB-01B	TB-02B	TB-04A	TB-05B	TB-06E	TB-07	
	Sample Date	11/10/2011	11/9/2011	11/9/2011	10/7/2013	10/7/2013	1/14/2014	1/13/2014	1/13/2014	1/15/2014	1/15/2014	1/24/2014	
	Sample ID	MW-33S-1.3	MW-35S-1.3-3.3	DUP-110911-2	MW-45D-4.2-6.2	DUP-100713-1	TB-01B-0.8-2.4	TB-02B-0.5-2.5	TB-04A-0.5-1.25	TB-05B-2.4-5	TB-06E-3.4-5	TB-07-0-1	
	Sample Type	N	N	FD	N	FD	N	N	N	N	N	N	
	Sample Depth	1.3 ft	1.3-3.3 ft	1.3-3.3 ft	4.2-6.2 ft	4.2-6.2 ft	0.8-2.4 ft	0.5-2.5 ft	0.5-1.25 ft	2.4-5 ft	3.4-5 ft	0-1 ft	
	Soil Layer	Shallow Fill	Shallow Fill	Shallow Fill	Dredged Fill	Dredged Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	
	SVOCs (ug/kg)	TEF	Screening Level										
Pentachlorophenol	--	0.032		44 U	45 U	0.93 U	0.93 U	56	530	310	740	76	9.5
2,3,4,6-Tetrachlorophenol	--	4600		4.4 U	4.5 U	5.2 U	5.2 U	5.1 U	15 U	100 U	110	5.0 U	5.0 U
2,3,5,6-Tetrachlorophenol	--	NS											
2,4,5-Trichlorophenol	--	4000		19 U	20 U	26 U	26 U	25 U	77 U	26 U	25 U	25 U	25 U
2,4,6-Trichlorophenol	--	3.3		20 U	21 U	25 U	25 U	24 U	73 U	26	44	24 U	24 U
2,4-Dichlorophenol	--	69		20 U	20 U	31 U	31 U	30 U	92 U	35	30 U	30 U	30 U
2-Chlorophenol	--	200		2.2 U	2.2 U	6.3 U	6.3 U	6.1 U	19 U	6.2 U	6.1 U	6.0 U	6.1 U
Phenol	--	420		7.9 U	8.1 U	13	160	21	63	520	80	18	46 U
Hexachlorobenzene	--	0.008				4.6 U	4.6 U	9.5	14 U	110	200	28	4.4 U
1,2,4-Trichlorobenzene	--	1.4	0.33 U										
1,2-Dichlorobenzene	--	36	0.29 U										
1,3-Dichlorobenzene	--	NS	0.23 U										
1,4-Dichlorobenzene	--	110	0.23 U										
2,2-Oxybis(1-chloropropane)	--	NS											
2,4-Dimethylphenol	--	29											
2,4-Dinitrophenol	--	130											
2,4-Dinitrotoluene	--	1.1											
2,6-Dinitrotoluene	--	0.31											
2-Chloronaphthalene	--	NS											
2-Nitroaniline	--	800000											
2-Nitrophenol	--	NS											
3,3'-Dichlorobenzidine	--	0.061											
3-Nitroaniline	--	NS											
4-Bromophenyl phenyl ether	--	NS											
4-Chloro-3-methylphenol	--	NS											
4-Chlorophenyl phenyl ether	--	NS											
4-Nitrophenol	--	7000											
Benzoic acid	--	650											
Benzyl alcohol	--	57											
Benzyl butyl phthalate	--	3.6											
Bis(2-chloroethoxy)methane	--	NS											
Bis(2-ethylhexyl)phthalate	--	100											
Carbazole	--	NS											
Dibutyl Phthalate	--	280											
Dichloroethyl ether	--	0.22											
Diethyl Phthalate	--	200											
Dimethylphthalate	--	71											
Dinitro-o-cresol	--	NS											
Di-n-octyl phthalate	--	6200											
Hexachloroethane	--	0.79											
Hexachlorocyclopentadiene	--	4000											
Hexachlorobutadiene	--	11	0.41 U										
Isophorone	--	230											
Nitrobenzene	--	100											
n-Nitrosodi-n-propylamine	--	0.056											
n-Nitrosodiphenylamine	--	21											
o-Cresol	--	63											
p-Chloroaniline	--	1.2											
p-Cresol	--	670											
p-Nitroaniline	--	NS											
PAHs (ug/kg)													
1-Methylnaphthalene	--	29000											
2-Methylnaphthalene	--	670											
Acenaphthene	--	500											
Acenaphthylene	--	1300											
Anthracene	--	960											
Benzo(a)anthracene	0.1	1.1											
Benzo(a)pyrene	1	0.31											
Total (B+J+K) Benzo(a)fluoranthenes	0.1	3200											
Benzo(g,h,i)perylene	--	670											
Chrysene	0.01	130											
Dibenzo(a,h)anthracene	0.1	0.57											
Dibenzofuran	--	540											
Fluoranthene	--	1700											
Fluorene	--	540											
Indeno(1,2,3-cd)pyrene	0.1	11											
Naphthalene	--	39	0.43 U										
Phenanthrene	--	1500											
Pyrene	--	2600											
Carcinogenic PAHs TEQ ND=0 ¹	--	0.31											
Carcinogenic PAHs TEQ ND=1/2DL ¹	--	0.31											

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Table W-3

**Vadose Zone Soil Analytical Results Summary - Semivolatile Organic Compounds & Polycyclic Aromatic Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington**

Notes:

¹ = Toxicity Equivalency Quotient calculations for cPAHs (WAC 173-340-200 and 173-340-900, Table 708-2) using benzo(a)pyrene as the reference chemical. If all compounds non-detect, then detection limit equal to maximum detection limit (modified by chemical's toxicity factor).

Units are in micrograms per kilogram (µg/kg).

Cells are left blank where compound was not analyzed.

"--" = No value available.

Green-shaded, bolded values indicate detected concentration exceeds the selected screening level.

Light gray-shaded values indicate that the method detection limit exceeds the screening level.

Underlined data indicates samples analyzed using volatile organic compound methods, not as semi-volatile organic compounds.

NFG (National Functional Guidelines) = U.S. Environmental Protection Agency (USEPA) Contract Laboratory Program National Functional Guidelines for Organic Data Review, October 1999 or USEPA Contract. Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004.

Key:

DUP = field duplicate sample

FD = field duplicate sample

ft = feet

GP = direct-push boring

MW = monitoring well

N = normal field sample

ND=0 = non-detect values calculation method where only positively identified compounds are included

ND=1/2DL = non-detect values calculated as one-half the laboratory detection limit

NS = no screening level

PAHs = polycyclic aromatic hydrocarbons

SVOCs = semi-volatile organic compounds

TB = top of riverbank boring

TEF = Toxic Equivalency Factor

TEQ = Toxicity Equivalency Quotient

TP = test pit

ug/kg = micrograms per kilogram

Laboratory Data Qualifiers:

j = The value reported is less than the reporting limit and should be considered an estimate; qualifier reported by the laboratory.

J = The detected results are qualified as estimated in accordance with National Functional Guidelines (NFGs).

U = Result is ≤ the laboratory detection limit or qualified as non-detect in accordance with NFGs.

UJ = Non-detected compound qualified as estimated in accordance with NFGs.

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Table W-4
Vadose Zone Soil Analytical Results
Summary - Polychlorinated Biphenyls
5900 West Marginal Way Site
Seattle, Washington

Location		GP-37		GP-77		GP-79		GP-79		GP-81		GP-82	
Sample Date		9/10/2012		5/14/2019		5/15/2019		5/15/2019		5/15/2019		5/15/2019	
Sample ID		GP-37-0-2		GP-77-2.75-4.75-051419		GP-79-2-4-051519		DUP-051519-01		GP-81-1.5-3.5-051519		GP-82-3-5-051519	
Sample Type		N		N		N		FD		N		N	
Sample Depth		0-2 ft		2.75 - 4.75 ft		2 - 4 ft		2 - 4 ft		1.5 - 3.5 ft		3 - 5 ft	
Soil Layer		Shallow Fill		Shallow Fill		Shallow Fill		Shallow Fill		Shallow Fill		Shallow Fill	
PCBs (ug/kg)	Screening Level												
Aroclor 1016	NS	1.0	U	4.0	UJ	4.0	UJ	4.0	UJ	4.0	UJ	4.0	UJ
Aroclor 1221	NS	1.3	U	4.0	UJ	4.0	UJ	4.0	UJ	4.0	UJ	4.0	UJ
Aroclor 1232	NS	1.3	U	4.0	UJ	4.0	UJ	4.0	UJ	4.0	UJ	4.0	UJ
Aroclor 1242	NS	7.7		4.0	UJ	4.0	UJ	4.0	UJ	4.0	UJ	4.0	UJ
Aroclor 1248	NS	1.3	U	4.0	UJ	4.0	UJ	4.0	UJ	4.0	UJ	11.7	J
Aroclor 1254	NS	8.8		4.0	UJ	4.0	UJ	4.0	UJ	32.3	J+	28.6	J+
Aroclor 1260	NS	1.3	U	4.0	UJ	4.0	UJ	4.0	UJ	54.0	J	16.9	J
Aroclor 1262	NS			4.0	UJ	4.0	UJ	4.0	UJ	4.0	UJ	4.0	UJ
Aroclor 1268	NS			4.0	UJ	4.0	UJ	4.0	UJ	4.0	UJ	4.0	UJ
Aroclors, Total (ND=0)	0.043	16.5		0		0		0		86		57	
Aroclors, Total (ND=0/ND=1/2DL)	0.043	18		8.0		8.0		8.0		90		59	

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Table W-4

Vadose Zone Soil Analytical Results

Summary - Polychlorinated Biphenyls

5900 West Marginal Way Site

Seattle, Washington

Location		GP-83		GP-83		MW-31S		TB-02B		TB-05B		TB-06E		TB-07	
Sample Date		5/17/2019		5/17/2019		11/8/2011		1/13/2014		1/15/2014		1/15/2014		1/24/2014	
Sample ID		GP-83-3.25-4-051719		GP-83-4-6-051719		MW-31S-1-2		TB-02B-0.5-2.5		TB-05B-2.4-5		TB-06E-3.4-5		TB-07-0-1	
Sample Type		N		N		N		N		N		N		N	
Sample Depth		3.25 - 4 ft		4 - 6 ft		1-2 ft		0.5-2.5 ft		2.4-5 ft		3.4-5 ft		0-1 ft	
Soil Layer		Shallow Fill		Dredged Fill		Shallow Fill		Shallow Fill		Shallow Fill		Shallow Fill		Shallow Fill	
PCBs (ug/kg)	Screening Level														
Aroclor 1016	NS	4.0	UJ	4.0	UJ	1.2	UJ	1.5	U	1.6	U	1.5	U	1.5	U
Aroclor 1221	NS	4.0	UJ	4.0	UJ	1.6	UJ	1.5	U	1.6	U	1.5	U	1.3	U
Aroclor 1232	NS	4.0	UJ	4.0	UJ	1.6	UJ	1.5	U	1.6	U	1.5	U	1.3	U
Aroclor 1242	NS	4.0	UJ	4.0	UJ	1.6	UJ	1.5	U	1.6	U	1.5	U	0.55	U
Aroclor 1248	NS	7.6	J	7.3	J	1.6	UJ	13	U	18	U	1.5	U	0.55	U
Aroclor 1254	NS	15.9	J+	24.9	J+	1.6	UJ	130		150		10		11	
Aroclor 1260	NS	13.2	J	15.6	J	1.6	UJ	70	J	80	U	11		16	
Aroclor 1262	NS	4.0	UJ	4.0	UJ										
Aroclor 1268	NS	4.0	UJ	4.0	UJ										
Aroclors, Total (ND=0)	0.043	37		48		0		200		150		21		27	
Aroclors, Total (ND=0/ND=1/2DL)	0.043	39		50		3.2		210		200		23		28	

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Table W-4

Vadose Zone Soil Analytical Results Summary - Polychlorinated Biphenyls

5900 West Marginal Way Site

Seattle, Washington

Notes:

Units are in micrograms per kilogram (µg/kg).

Green-shaded, bolded values indicate detected concentration exceeds the selected screening level.

Light gray-shaded values indicate that the method detection limit exceeds the screening level.

NFG (National Functional Guidelines) = U.S. Environmental Protection Agency (USEPA) Contract Laboratory Program National Functional Guidelines for Organic Data Review, October 1999 or USEPA Contract. Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004.

Key:

ft = feet

GP = direct-push boring

MW = monitoring well

N = normal field sample

ND=0 = non-detect values calculation method where only positively identified compounds are included

NS = no screening level

TB = top of riverbank boring

PCB = polychlorinated biphenyls

ug/kg = micrograms per kilogram

Laboratory Data Qualifiers:

- = Compound concentration biased low.

+ = Compound concentration biased high.

J = The detected results are qualified as estimated in accordance with National Functional Guidelines (NFGs).

U = Result is ≤ the laboratory detection limit or qualified as non-detect in accordance with NFGs.

UJ = Non-detected compound qualified as estimated in accordance with NFGs.

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Table W-5

Vadose Zone Soil Analytical Results Summary - Dioxins & Furans

5900 West Marginal Way Site

Seattle, Washington

Location			GP-76	GP-77	GP-78	GP-79
Sample Date			5/14/2019	5/14/2019	5/14/2019	5/15/2019
Sample ID			GP-76-1-3-051419	GP-77-2.75-4.75-051419	GP-78-1-2.5-051419	GP-79-2-4-051519
Sample Type			N	N	N	N
Sample Depth			1 - 3 ft	2.75 - 4.75 ft	1 - 2.5 ft	2 - 4 ft
Soil Layer			Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill
Dioxins and Furans (pg/g)	TEF	Screening Level				
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1	13			0.092 j	0.097 j
Tetrachlorodibenzo-p-dioxin homologs (Total TCDD)	--	NS			1.50	2.45
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	1	NS			0.268 U	0.189 j
Pentachlorodibenzo-p-dioxin homologs (Total PeCDD)	--	NS			2.25	1.45
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS			0.392 j	0.238 J+
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS			2.00 j	0.419 J+
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS			0.914 j	0.357 j
Hexachlorodibenzo-p-dioxin homologs (Total HxCDD)	--	NS			8.29	3.35
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	0.01	NS			84.4	5.75 J+
Heptachlorodibenzo-p-dioxin homologs (Total HpCDD)	--	NS			148	12.0 J+
Octachlorodibenzo-P-Dioxin (OCDD)	0.0003	NS			1790	114 J+
1,2,6,7-Tetrachlorodibenzofuran	--	NS			3.81	7.80
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	0.1	NS			0.219 j	0.300 j
Tetrachlorodibenzofuran homologs (Total TCDF)	--	NS				
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	0.03	NS			0.232 U	0.407 j
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	0.3	NS			0.698 U	0.506 j
Pentachlorodibenzofuran homologs (Total PeCDF)	--	NS			5.82	7.56
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS			7.41	2.63 j
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS			1.23 j	1.09 j
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	0.1	NS			0.087 j	0.061 U
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS			0.547 j	0.622 j
Hexachlorodibenzofuran homologs (Total HxCDF)	--	NS			40.9	10.4
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	0.01	NS			25.2	17.4
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	0.01	NS			4.57 j	1.20 j
Heptachlorodibenzofuran homologs (Total HpCDF)	--	NS			107	22.7
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	0.0003	NS			62.1	14.8
Dioxin Furan Calculated TEQ (ND=0)	--	5.2			3.07	1.30
Dioxin Furan Calculated TEQ (ND=1/2DL)	--	5.2			3.31	1.30

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Table W-5

Vadose Zone Soil Analytical Results Summary - Dioxins & Furans

5900 West Marginal Way Site

Seattle, Washington

Location			GP-79		GP-80		GP-81		GP-82	
Sample Date			5/15/2019		5/14/2019		5/15/2019		5/15/2019	
Sample ID			DUP-051519-01		GP-80-1.5-3.5-051419		GP-81-1.5-3.5-051519		GP-82-3-5-051519	
Sample Type			FD		N		N		N	
Sample Depth			2 - 4 ft		1.5 - 3.5 ft		1.5 - 3.5 ft		3 - 5 ft	
Soil Layer			Shallow Fill		Shallow Fill		Shallow Fill		Shallow Fill	
Dioxins and Furans (pg/g)	TEF	Screening Level								
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1	13	0.111	U	0.190	j	1.23		8.47	
Tetrachlorodibenzo-p-dioxin homologs (Total TCDD)	--	NS	2.78		7.36		47.1		428	
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	1	NS	0.228	U	0.626	j	16.2		69.7	
Pentachlorodibenzo-p-dioxin homologs (Total PeCDD)	--	NS	2.20		7.04		77.8		1340	
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	0.231	J+	0.812	j	29.9		182	
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	0.477	J+	1.87	j	182		1370	
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	0.383	j	1.50	j	69.8		286	
Hexachlorodibenzo-p-dioxin homologs (Total HxCDD)	--	NS	3.21		14.1		698		4980	
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	0.01	NS	5.80	J+	39.9		4500		21800	
Heptachlorodibenzo-p-dioxin homologs (Total HpCDD)	--	NS	11.4	J+	75.8		7370		34700	
Octachlorodibenzo-P-Dioxin (OCDD)	0.0003	NS	116	J+	439		77400		554000	
1,2,6,7-Tetrachlorodibenzofuran	--	NS	8.73		16.6		63.9		762	
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	0.1	NS	0.331	j	0.777	j	3.67		43.7	
Tetrachlorodibenzofuran homologs (Total TCDF)	--	NS								
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	0.03	NS	0.455	j	0.449	U	12.1		101	
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	0.3	NS	0.629	j	0.702	j	52.2		380	
Pentachlorodibenzofuran homologs (Total PeCDF)	--	NS	9.54		12.9		601		5510	
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	1.51	j	2.24	j	443		2190	
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	1.31	j	0.748	j	76.4		456	j
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.091	U	0.097	U	4.04	j	36.4	j
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.992	j	0.523	j	33.8		188	j
Hexachlorodibenzofuran homologs (Total HxCDF)	--	NS	11.5		16.5		2650		15200	
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	0.01	NS	15.8		9.14		1300		7700	
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	0.01	NS	1.27	j	1.18	j	292		1130	j
Heptachlorodibenzofuran homologs (Total HpCDF)	--	NS	20.3		26.3		5760		31800	
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	0.0003	NS	26.2		14.8		2290	j	28600	
Dioxin Furan Calculated TEQ (ND=0)	--	5.2	0.997		2.51		203		1,150	
Dioxin Furan Calculated TEQ (ND=1/2DL)	--	5.2	1.17		2.52		203		1,150	

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Table W-5

Vadose Zone Soil Analytical Results Summary - Dioxins & Furans

5900 West Marginal Way Site

Seattle, Washington

Location			GP-83	GP-83	MW-45D	MW-45D
Sample Date			5/17/2019	5/17/2019	10/7/2013	10/7/2013
Sample ID			GP-83-3.25-4-051719	GP-83-4-6-051719	MW-45D-2.3-4.2	MW-45D-4.2-6.2
Sample Type			N	N	N	N
Sample Depth			3.25 - 4 ft	4 - 6 ft	2.3-4.2 ft	4.2-6.2 ft
Soil Layer			Shallow Fill	Dredged Fill	Shallow Fill	Dredged Fill
Dioxins and Furans (pg/g)	TEF	Screening Level				
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1	13	3.83	4.90	2.24 U	0.498 U
Tetrachlorodibenzo-p-dioxin homologs (Total TCDD)	--	NS	94.0	70.7	4.78	6.12
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	1	NS	20.0	25.9	5.26 j	0.378 j
Pentachlorodibenzo-p-dioxin homologs (Total PeCDD)	--	NS	190	151	26.1	2.96
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	32.6	58.6	11.5 j	0.276 j
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	424	545	80.1 j	0.461 j
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	61.9	83.4	36.3 j	0.410 j
Hexachlorodibenzo-p-dioxin homologs (Total HxCDD)	--	NS	1800	2040	293	3.34
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	0.01	NS	7420	10300	1940	4.42 j
Heptachlorodibenzo-p-dioxin homologs (Total HpCDD)	--	NS	12500	17400	3280	9.56
Octachlorodibenzo-P-Dioxin (OCDD)	0.0003	NS	109000	166000	35800	55.4
1,2,6,7-Tetrachlorodibenzofuran	--	NS	165	195		
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	0.1	NS	10.1	12.4	1.92 U	0.975 U
Tetrachlorodibenzofuran homologs (Total TCDF)	--	NS			33.1	20.4
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	0.03	NS	56.0	74.8	4.35 j	0.539 j
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	0.3	NS	151	287	19.5 j	0.822 U
Pentachlorodibenzofuran homologs (Total PeCDF)	--	NS	2350	3280	231	9.51
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	1530	2080	142	0.615 j
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	297	385 j	26.9 j	0.408 j
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	0.1	NS	31.3	26.9 j	2.08 U	0.135 U
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	102	148 j	13.7 j	0.360 j
Hexachlorodibenzofuran homologs (Total HxCDF)	--	NS	8350	11600	814	4.68
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	0.01	NS	5880	5180	377	1.46 j
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	0.01	NS	1130	1040 j	71.1 j	0.315 j
Heptachlorodibenzofuran homologs (Total HpCDF)	--	NS	21700	20600	1340	3.87
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	0.0003	NS	5970	9420	814	1.99 U
Dioxin Furan Calculated TEQ (ND=0)	--	5.2	498	671	77.2	0.726
Dioxin Furan Calculated TEQ (ND=1/2DL)	--	5.2	498	671	78.5	1.15

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Table W-5

Vadose Zone Soil Analytical Results Summary - Dioxins & Furans

5900 West Marginal Way Site

Seattle, Washington

Location			TB-01B	TB-02B	TB-04A	TB-05B
Sample Date			1/14/2014	1/13/2014	1/13/2014	1/15/2014
Sample ID			TB-01B-0.8-2.4	TB-02B-0.5-2.5	TB-04A-0.5-1.25	TB-05B-2.4-5
Sample Type			N	N	N	N
Sample Depth			0.8-2.4 ft	0.5-2.5 ft	0.5-1.25 ft	2.4-5 ft
Soil Layer			Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill
Dioxins and Furans (pg/g)	TEF	Screening Level				
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1	13	2.30 j	7.76 j	16.5 j	23.4
Tetrachlorodibenzo-p-dioxin homologs (Total TCDD)	--	NS	128	110	819	1950
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	1	NS	21.6 j	92.2 j	133	156
Pentachlorodibenzo-p-dioxin homologs (Total PeCDD)	--	NS	292	389	1160	2590
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	58.5 j	191	219	481
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	523	1120	1870	3500
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	213	443	584	968
Hexachlorodibenzo-p-dioxin homologs (Total HxCDD)	--	NS	2250	4160	7600	13100
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	0.01	NS	17900	28700	52300	118000
Heptachlorodibenzo-p-dioxin homologs (Total HpCDD)	--	NS	30500	48900	115000	231000
Octachlorodibenzo-P-Dioxin (OCDD)	0.0003	NS	184000	335000	928000 J	1500000
1,2,6,7-Tetrachlorodibenzofuran	--	NS				
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	0.1	NS	11.9 j	26.3	38.6	121
Tetrachlorodibenzofuran homologs (Total TCDF)	--	NS	155	285	665	1670
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	0.03	NS	51.6 j	109	160	326
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	0.3	NS	162	388	588	1390
Pentachlorodibenzofuran homologs (Total PeCDF)	--	NS	2410	5230	11200	27700
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	1350	3880	8850	13000
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	233	655	1580	2090
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	0.1	NS	16.4 j	39.3 j	85.7 j	129
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	107	269	564	965
Hexachlorodibenzofuran homologs (Total HxCDF)	--	NS	12700	25800	54500	103000
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	0.01	NS	6870	11900	26400	74900
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	0.01	NS	861	1740	5500	6610
Heptachlorodibenzofuran homologs (Total HpCDF)	--	NS	39000	55000	141000	289000
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	0.0003	NS	28400	26600	31700	196000
Dioxin Furan Calculated TEQ (ND=0)	--	5.2	645	1410	2840	9290
Dioxin Furan Calculated TEQ (ND=1/2DL)	--	5.2	645	1,410	2,840	9,290

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Table W-5

Vadose Zone Soil Analytical Results Summary - Dioxins & Furans

5900 West Marginal Way Site

Seattle, Washington

Location			TB-06C	TB-06E	TB-07
Sample Date			1/14/2014	1/15/2014	1/24/2014
Sample ID			TB-06C-1.25-4.6	TB-06E-3.4-5	TB-07-0-1
Sample Type			N	N	N
Sample Depth			1.25-4.6 ft	3.4-5 ft	0-1 ft
Soil Layer			Shallow Fill	Shallow Fill	Shallow Fill
Dioxins and Furans (pg/g)	TEF	Screening Level			
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1	13	5.40 j	2.76 j	0.598 U
Tetrachlorodibenzo-p-dioxin homologs (Total TCDD)	--	NS	150	69.5	6.08
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	1	NS	22.8 j	8.41 j	3.33 j
Pentachlorodibenzo-p-dioxin homologs (Total PeCDD)	--	NS	317	34.6	22.1
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	134	15.4 j	6.46 j
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	531	99.6	20.2
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	163	45.1 j	13.6
Hexachlorodibenzo-p-dioxin homologs (Total HxCDD)	--	NS	1910	430	126
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	0.01	NS	12400	2850	399
Heptachlorodibenzo-p-dioxin homologs (Total HpCDD)	--	NS	20600	5550	749
Octachlorodibenzo-P-Dioxin (OCDD)	0.0003	NS	137000	241000	3760
1,2,6,7-Tetrachlorodibenzofuran	--	NS			
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	0.1	NS	10.8 j	3.39 j	1.10 j
Tetrachlorodibenzofuran homologs (Total TCDF)	--	NS	343	37.8	17.1
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	0.03	NS	46.5 j	8.61 j	1.92 j
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	0.3	NS	275	36.1 j	2.37 j
Pentachlorodibenzofuran homologs (Total PeCDF)	--	NS	3420	547	38.6
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	2120	290	5.58 j
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	335	55.2 j	4.02 j
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	0.1	NS	20.6 j	3.66 U	0.299 j
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	136	21.2 j	3.39 j
Hexachlorodibenzofuran homologs (Total HxCDF)	--	NS	11900	1720	82.6
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	0.01	NS	4720	876	49.2
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	0.01	NS	722	127	3.24 j
Heptachlorodibenzofuran homologs (Total HpCDF)	--	NS	18400	2890	131
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	0.0003	NS	5800	2920	70.5
Dioxin Furan Calculated TEQ (ND=0)	--	5.2	678	187	15.2
Dioxin Furan Calculated TEQ (ND=1/2DL)	--	5.2	678	187	15.5

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Table W-5

Vadose Zone Soil Analytical Results Summary - Dioxins & Furans

5900 West Marginal Way Site

Seattle, Washington

Notes:

Units are in picograms per gram (pg/g).

Green-shaded, bolded values indicate detected concentration exceeds the selected screening level.

"—" = No value available.

U.S. Environmental Protection Agency (USEPA) Contract Laboratory Program National Functional Guidelines for Organic Data Review, October 1999 and the EPA Region 10 SOP for the Validation of Polychlorinated Dibenzodioxin (PCDD) and Polychlorinated Dibenzofuran (PCDF) Data, January 1996.

NFG (National Functional Guidelines) = USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, October 1999 or USEPA Contract. Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004.

Key:

ft = feet

MW = monitoring well

N = normal field sample

ND=1/2DL = Non-detect values calculated as one-half the laboratory detection limit.

NS = no screening level

pg/g = picogram per gram

TB = top of riverbank boring

TEF = Toxic Equivalency Factor

TEQ = Toxicity Equivalency Quotient

Laboratory Data Qualifiers:

j = The value reported is less than the reporting limit and should be considered an estimate; qualifier reported by the laboratory.

J = The detected results are qualified as estimated in accordance with National Functional Guidelines (NFGs).

U = Result is $\leq$ the laboratory detection limit or qualified as non-detect in accordance with NFGs.

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Table W-6
Saturated Soil Analytical
Results Summary - Metals
5900 West Marginal Way Site
Seattle, Washington

Location		B-1		B-2		B-3		GP-1		GP-1		GP-2		GP-2		GP-3		GP-3		GP-4		GP-5		GP-5	
Sample Date		5/17/1990		5/17/1990		5/17/1990		12/4/1995		12/4/1995		12/4/1995		12/5/1995		12/4/1995		12/4/1995		12/4/1995		12/4/1995		12/4/1995	
Sample ID		B-1:COMP:05171990		B-2:COMP:05171990		B-3:COMP:05171990		GP-1:3-4:12041995		GP-1:11-12:12041995		GP-2:3-4:12041995		GP-2:13-14:12041995		GP-3:3-4:12041995		GP-3:7-8:12041995		GP-4:3-4:12041995		GP-5:3-4:12041995		GP-5:7-8:12041995	
Sample Type		N		N		N		N		N		N		N		N		N		N		N		N	
Sample Depth		0-20 ft		0-15 ft		0-15 ft		3-4 ft		11-12 ft		3-4 ft		13-14 ft		3-4 ft		7-8 ft		3-4 ft		3-4 ft		7-8 ft	
Soil Layer		Multiple		Multiple		Multiple		Dredged Fill		Middle Silt		Dredged Fill		Middle Silt		Dredged Fill		Dredged Fill		Shallow Fill		Dredged Fill		Dredged Fill	
Metals (mg/kg)	Screening Level																								
Arsenic	7	0.5 U		79		150		5.5 U		6.5 U		5.5 U		11		13		6.2 U		5 U		5.9 U		5.7 U	
Chromium	48	21		24		22																			
Chromium, VI	0.93																								
Copper	36																								
Zinc	85																								
Antimony	0.27																								
Barium	8.3	20		25		20																			
Beryllium	3.2																								
Cadmium	1	1 U		1 U		1 U																			
Lead	50	10 U		10 U		10 U																			
Mercury	0.07	0.26		0.22		0.15 U																			
Nickel	48																								
Selenium	0.26	0.5 U		0.5 U		0.5 U																			
Silver	0.016	2 U		2 U		2 U		2.2 U		2.6 U		2.2 U		3.1 U		2.4 U		2.5 U		2 U		2.3 U		2.3 U	
Thallium	0.0044																								
Tributyltin	0.0021																								

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Table W-6
Saturated Soil Analytical
Results Summary - Metals
5900 West Marginal Way Site
Seattle, Washington

Location		GP-5		GP-6		GP-7		GP-7		GP-7		GP-9		GP-11		GP-12		GP-13		GP-14		GP-14		GP-15	
Sample Date		12/4/1995		12/4/1995		12/4/1995		12/4/1995		12/4/1995		12/5/1995		3/26/1996		3/26/1996		3/26/1996		3/26/1996		3/26/1996		3/26/1996	
Sample ID		GP-5:11-12:12041995		GP-6:3-4:12041995		GP-7:7-8:12041995		GP-7:9-10:12041995		GP-7:15-16:12041995		GP-9:11-12:12051995		GP-11-3261996		GP-12-3261996		GP-13-3261996		GP-14-3261996		GP-101		GP-15-3261996	
Sample Type		N		N		N		N		N		N		N		N		N		N		FD		N	
Sample Depth		11-12 ft		3-4 ft		7-8 ft		9-10 ft		15-16 ft		11-12 ft		7-9 ft		7-9 ft		7-9 ft		7-9 ft		7-9 ft		7-9 ft	
Soil Layer		Middle Silt		Dredged Fill		Dredged Fill		Dredged Fill		Interface at Top of Silt		Middle Silt		Dredged Fill		Dredged Fill		Dredged Fill		Dredged Fill		Dredged Fill		Dredged Fill	
Metals (mg/kg)	Screening Level																								
Arsenic	7	10		5.7	U	15		8.7		85		1100		99		140		120		28		36		140	
Chromium	48																								
Chromium, VI	0.93																								
Copper	36																								
Zinc	85																								
Antimony	0.27																								
Barium	8.3																								
Beryllium	3.2																								
Cadmium	1																								
Lead	50																								
Mercury	0.07																								
Nickel	48																								
Selenium	0.26																								
Silver	0.016	3.2	U	2.3	U	2.6	U	2.2	U	3.2	U	2.9	U												
Thallium	0.0044																								
Tributyltin	0.0021																								

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Results Summary - Metals
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Location		GP-16		GP-16		GP-18		GP-19		GP-20		GP-21		GP-21		GP-23		GP-24		GP-25		MW-2D		MW-2D	
Sample Date		12/4/1995		3/26/1996		3/26/1996		3/26/1996		3/26/1996		3/26/1996		3/26/1996		3/26/1996		3/26/1996		3/26/1996		12/6/1995		12/6/1995	
Sample ID		GP-16:7-8:12071995		GP-16-3261996		GP-18-3261996		GP-19-3261996		GP-20-3261996		GP-21-3261996		GP-102		GP-23-3261996		GP-24-3261996		GP-25-3262996		MW-2D:10-11:12061995		MW-2D:17-18:12061995	
Sample Type		N		N		N		N		N		N		FD		N		N		N		N		N	
Sample Depth		7-8 ft		7-9 ft		7-9 ft		7-9 ft		7-9 ft		7-9 ft		7-9 ft		7-9 ft		7-9 ft		7-9 ft		10-11 ft		17-18 ft	
Soil Layer		Dredged Fill		Dredged Fill		Dredged Fill		Dredged Fill		Dredged Fill		Dredged Fill		Dredged Fill		Dredged Fill		Dredged Fill		Dredged Fill		Middle Silt		Lower Sand	
Metals (mg/kg)	Screening Level																								
Arsenic	7	15		66		21	U	93		60		21	U	21	U	24	U	22	U	21	U	13		5.7	U
Chromium	48																								
Chromium, VI	0.93																								
Copper	36																								
Zinc	85																								
Antimony	0.27																								
Barium	8.3																								
Beryllium	3.2																								
Cadmium	1																								
Lead	50																								
Mercury	0.07																								
Nickel	48																								
Selenium	0.26																								
Silver	0.016	2.5	U																			2.7	U	2.3	U
Thallium	0.0044																								
Tributyltin	0.0021																								

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Saturated Soil Analytical
Results Summary - Metals
5900 West Marginal Way Site
Seattle, Washington

Location		MW-2D		MW-2S		MW-4S		MW-10S		MW-10S		MW-11S		MW-11S		MW-12S		MW-12S		MW-13S		MW-13S		MW-14S	
Sample Date		12/6/1995		12/6/1995		12/6/1995		10/13/1998		10/13/1998		10/13/1998		10/13/1998		10/13/1998		10/13/1998		10/13/1998		10/13/1998		10/13/1998	
Sample ID		MW-10D:17-18:12061995		MW-2S:10-11:12061995		MW-4S:10-11:12061995		MW-10:10-10.5:10131998		MW-10:5-5-6.5:10131998		MW-11:10-10.5:10131998		MW-11:5.5-6.5:10131998		MW-12:10-11.5:10131998		MW-12:5.5-6.5:10131998		MW-13:11-11.5:10131998		MW-13:5.5-6.5:10131998		MW-14:10-11.5:10131998	
Sample Type		FD		N		N		N		N		N		N		N		N		N		N		N	
Sample Depth		17-18 ft		10-11 ft		10-11 ft		10-10.5 ft		5.5-6.5 ft		10-10.5 ft		5.5-6.5 ft		10-11.5 ft		5.5-6.5 ft		11-11.5 ft		5.5-6.5 ft		10-11.5 ft	
Soil Layer		Lower Sand		Middle Silt		Interface at Top of Silt		Middle Silt		Dredged Fill		Middle Silt		Dredged Fill		Middle Silt		Dredged Fill		Middle Silt		Dredged Fill		Dredged Fill	
Metals (mg/kg)	Screening Level																								
Arsenic	7	5.8	U	18		8.4		12		15.2		11.7		6.86		26.5		4.69		216		182		166	
Chromium	48																								
Chromium, VI	0.93																								
Copper	36																								
Zinc	85																								
Antimony	0.27																								
Barium	8.3																								
Beryllium	3.2																								
Cadmium	1																								
Lead	50																								
Mercury	0.07																								
Nickel	48																								
Selenium	0.26																								
Silver	0.016	2.3	U	3.2	U	2.8	U																		
Thallium	0.0044																								
Tributyltin	0.0021																								

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Saturated Soil Analytical
Results Summary - Metals
5900 West Marginal Way Site
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Location		MW-14S	MW-15S	MW-15S	MW-16S	MW-16S	MW-17S	MW-17S	MW-18S	MW-19S	MW-20S	MW-21S	MW-22S
Sample Date		10/13/1998	10/13/1998	10/13/1998	10/13/1998	10/13/1998	10/14/1998	10/14/1998	10/14/1998	10/14/1998	10/14/1998	10/14/1998	7/22/2003
Sample ID		MW-14:5.5-6.5:10131998	MW-15:10-11.5:10131998	MW-15:5.5-6.5:10131998	MW-16:10.5-11.5:10131998	MW-16:5.5-6.5:10131998	MW-17:10-11.5:10141998	MW-17:5.5-6.5:10141998	MW-18:13-13.5:10141998	MW-19:13-13.5:10141998	MW-20:13-13.5:10141998	MW-21:13-13.5:10141998	MW-22:8-8.5:07222003
Sample Type		N	N	N	N	N	N	N	N	N	N	N	N
Sample Depth		5.5-6.5 ft	10-11.5 ft	5.5-6.5 ft	10.5-11.5 ft	5.5-6.5 ft	10-11.5 ft	5.5-6.5 ft	13-13.5 ft	13-13.5 ft	13-13.5 ft	13-13.5 ft	8-8.5 ft
Soil Layer		Dredged Fill	Middle Silt	Dredge Fill	Middle Silt	Dredged Fill	Dredged Fill	Dredged Fill	Middle Silt	Middle Silt	Dredged Fill	Middle Silt	Dredged Fill
Metals (mg/kg)	Screening Level												
Arsenic	7	103	12.1	2.36	25.4	0.821	4.77	38.4	4.33	2240	2.6	118	5.7
Chromium	48												
Chromium, VI	0.93												
Copper	36												
Zinc	85												
Antimony	0.27												
Barium	8.3												
Beryllium	3.2												
Cadmium	1												
Lead	50												
Mercury	0.07												
Nickel	48												
Selenium	0.26												
Silver	0.016												
Thallium	0.0044												
Tributyltin	0.0021												

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Saturated Soil Analytical
Results Summary - Metals
5900 West Marginal Way Site
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Location		MW-22S	MW-23S	MW-23S	MW-24S	MW-24S	MW-25S	MW-25S	MW-26S	MW-26S	MW-26S	MW-27S	MW-27S
Sample Date		7/22/2003	7/22/2003	7/22/2003	7/22/2003	7/22/2003	7/22/2003	7/22/2003	7/22/2003	7/22/2003	7/23/2003	7/22/2003	7/23/2003
Sample ID		MW-22:13-13.5:07222003	MW-23:8.5-9:07222003	MW-23:13-13.5:07222003	MW-24:8.5-9:07232003	MW-24:13-13.5:07232003	MW-25:8-8.5:07232003	MW-25:13-13.5:07232003	MW-26:8-8.5:07232003	MW-26:13-13.5:07232003	MW-26:10.5-11:07232003	MW-27:13-13.5:07232003	MW-27:10.5-11:07232003
Sample Type		N	N	N	N	N	N	N	N	N	N	N	N
Sample Depth		13-13.5 ft	8.5-9 ft	13-13.5 ft	8.5-9 ft	13-13.5 ft	8-8.5 ft	13-13.5 ft	8-8.5 ft	13-13.5 ft	10.5-11 ft	13-13.5 ft	10.5-11 ft
Soil Layer		Interface at Top of Silt	Dredged Fill	Dredged Fill	Dredged Fill	Middle Silt	Dredged Fill	Interface at Top of Silt	Dredged Fill	Interface at Top of Silt	Dredged Fill	Interface at Top of Silt	Dredged Fill
Metals (mg/kg)	Screening Level												
Arsenic	7	7.9	4.2 U	6.2 U	4 U	5.9 U	11	7.8 U	9.1	24	250	3.6 U	4.4 U
Chromium	48												
Chromium, VI	0.93												
Copper	36												
Zinc	85												
Antimony	0.27												
Barium	8.3												
Beryllium	3.2												
Cadmium	1												
Lead	50												
Mercury	0.07												
Nickel	48												
Selenium	0.26												
Silver	0.016												
Thallium	0.0044												
Tributyltin	0.0021												

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Saturated Soil Analytical
Results Summary - Metals
5900 West Marginal Way Site
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Location		TP-2 (95)		TP-2 (95)		TP-3 (95)		TP-3 (95)		TP-5 (95)		TP-7		TP-9		TP-9		TP-10		TP-11		TP-11		TP-12	
Sample Date		11/30/1995		11/30/1995		11/30/1995		11/30/1995		12/1/1995		12/1/1995		11/30/1995		11/30/1995		11/30/1995		12/1/1995		12/1/1995		12/1/1995	
Sample ID		TP-2:4-5:11301995		TP-2:5-6:11301995		TP-3:3-4:11301995		TP-3:5-6:11301995		TP-5:2-3:12011955		TP-7:2-3:12011995		TP-9:3-4:11301995		TP-9:5-6:11301995		TP-10:6-7:11301995		TP-11:3-4:11301995		TP-11:6-7:11301995		TP-12:6-7:11301995	
Sample Type		N		N		N		N		N		N		N		N		N		N		N		N	
Sample Depth		4-5 ft		5-6 ft		3-4 ft		5-6 ft		2-3 ft		2-3 ft		3-4 ft		5-6 ft		6-7 ft		3-4 ft		3-7 ft		6-7 ft	
Soil Layer		Dredged Fill		Dredged Fill		Shallow Fill		Dredged Fill		Shallow Fill		Dredged Fill		Shallow Fill		Dredged Fill		Dredge Fill		Shallow Fill		Dredged Fill		Dredged Fill	
Metals (mg/kg)	Screening Level																								
Arsenic	7	21	U	17	U	50		22	U	16	U	19	U	24	U	28		16	U	15		17	U	30	
Chromium	48																								
Chromium, VI	0.93																								
Copper	36																								
Zinc	85																								
Antimony	0.27																								
Barium	8.3																								
Beryllium	3.2																								
Cadmium	1																								
Lead	50																								
Mercury	0.07																								
Nickel	48																								
Selenium	0.26																								
Silver	0.016	1.4	U	1.2	U	2.1	U	1.4	U	1	U	1.3	U	1.6	U	1.3	U	1.1	U	0.96	U	1.1	U	1.1	U
Thallium	0.0044																								
Tributyltin	0.0021																								

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Table W-6
Saturated Soil Analytical
Results Summary - Metals
5900 West Marginal Way Site
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Location		TP-13		GP-26		GP-26		GP-26		GP-26		GP-26		GP-27		GP-27		GP-27		GP-27		GP-27	
Sample Date		12/1/1995		9/7/2012		9/7/2012		10/10/2012		10/10/2012		10/10/2012		9/7/2012		9/7/2012		10/11/2012		10/11/2012		10/11/2012	
Sample ID		TP-13:6-7:11301995		GP-26-3.1-3.5		GP-26-4-5.1		GP-26-5.1-7.1		DUP101012-3		GP-26-9.1-10.3		GP-27-0-2		GP-27-2.3-4.3		GP-27-4.3-6.3		DUP101112-1		GP-27-6.3-8.3	
Sample Type		N		N		N		N		FD		N		N		N		N		FD		N	
Sample Depth		6-7 ft		3.1-3.5 ft		4-5.1 ft		5.1-7.1 ft		5.1-7.1 ft		9.1-10.3 ft		0-2 ft		2.3-4.3 ft		4.3-6.3 ft		4.3-6.3 ft		6.3-8.3 ft	
Soil Layer		Dredged Fill		Shallow Fill		Dredged Fill		Dredged Fill		Dredged Fill		Interface at Top of Silt		Shallow Fill		Dredged Fill		Dredged Fill		Dredged Fill		Interface at Top of Silt	
Metals (mg/kg)	Screening Level																						
Arsenic	7	120		10.1		1.1		1.7		2.1		3.4		34.4		5.8		1.5		2.0		1.4	
Chromium	48			18.9		11.1		10.3		10.5		13.6		27.6		14.8		11.2		11.7		9.5	
Chromium, VI	0.93			0.469 U		0.517 U		0.505		0.505		0.978											
Copper	36			35.8		8.6		10.4 J+		10.1 J+		21.9 J+		107		19.3		9.3		10.5		9.0	
Zinc	85			37		19		21		21		28		72		41		21		22		19	
Antimony	0.27							0.2 UJ		0.2 UJ		0.3 UJ						0.2 UJ		0.2 UJ		0.3 UJ	
Barium	8.3																						
Beryllium	3.2							0.2 U		0.2 U		0.3 U						0.2 U		0.2 U		0.3 U	
Cadmium	1							0.1 U		0.1 U		0.1 U						0.1 U		0.1 U		0.1 U	
Lead	50							1.2		1.2		2.8						1.3		2.2		1.6	
Mercury	0.07							0.02 U		0.03 U		0.03 U						0.02 U		0.03 U		0.03 U	
Nickel	48							8		8		10						8		9		7	
Selenium	0.26							0.6 U		0.6 U		0.7 U						0.6 U		0.6 U		0.6 U	
Silver	0.016	1.1 U		0.3 U		0.4 U		0.4 U		0.4 U		0.4 U		0.3 U		0.4 U		0.4 U		0.4 U		0.4 U	
Thallium	0.0044							0.2 U		0.2 U		0.3 U						0.2 U		0.2 U		0.3 U	
Tributyltin	0.0021													0.0016 U		0.0015 U		0.0015 U		0.0015 U		0.0016 U	

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Results Summary - Metals
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Location		GP-28		GP-28		GP-28		GP-28		GP-28		GP-28		GP-29		GP-29		GP-29		GP-29		GP-30		GP-30	
Sample Date		9/7/2012		9/7/2012		10/11/2012		10/11/2012		10/11/2012		10/11/2012		10/9/2012		10/9/2012		10/9/2012		10/9/2012		9/7/2012		9/7/2012	
Sample ID		GP-28-0-2		GP-28-2-4		GP-28-4.1-6.1		DUP101112-2		GP-28-6.1-8.3		DUP101112-3		GP-29-2.9-4.9		GP-29-4.9-6.9		GP-29-6.9-8.9		GP-29-8.9-11.2		GP-30-3.3-5.3		GP-30-5.3-6.6	
Sample Type		N		N		N		FD		N		FD		N		N		N		N		N		N	
Sample Depth		0-2 ft		2-4 ft		4.1-6.1 ft		4.1-6.1 ft		6.1-8.3 ft		6.1-8.3 ft		2.9-4.9 ft		4.9-6.9 ft		6.9-8.9 ft		8.9-11.2 ft		3.3-5.3 ft		5.3-6.6 ft	
Soil Layer		Shallow Fill		Dredged Fill		Dredged Fill		Dredged Fill		Interface at Top of Silt		Interface at Top of Silt		Shallow Fill		Dredged Fill		Dredged Fill		Dredged Fill		Dredged Fill		Dredged Fill	
Metals (mg/kg)	Screening Level																								
Arsenic	7	16.3		4.0		1.9		2.2		1.9		2.1		2.0 J+		1.4 J+		1.8 J+		2.3 J+		4.7		2.3	
Chromium	48	22.1		18.6		11.2		13.4		11.2		10.1		11.8		10.0		19.2		9.2		10.4		13.8	
Chromium, VI	0.93																								
Copper	36	79.4		27.9		10.1		10.8		13.2		12.4		74.2 J+		7.6 J+		21.5 J+		8.1 J+		12.6		10.0	
Zinc	85	55		41		20		20		22		20		24		18		25		17		24		24	
Antimony	0.27					0.2 UJ		0.3 UJ		0.2 UJ		0.2 UJ		0.2 UJ		0.2 UJ		0.2 UJ		0.2 UJ					
Barium	8.3					17.8		19.8		23.4		23.7													
Beryllium	3.2					0.2 U		0.3 U		0.2 U		0.2 U		0.2 U		0.2 U		0.2 U		0.2 U					
Cadmium	1					0.1 U		0.1 U		0.1 U		0.1 U		0.1 U		0.1 U		0.1 U		0.1 U					
Lead	50					1.5		1.9		1.6		1.7		1.5		1.0		1.2		1.7					
Mercury	0.07					0.03 U		0.03 U		0.03 U		0.03 U		0.02 U		0.02 U		0.02 U		0.02 U					
Nickel	48					7		7		9		7		9		6		19		6					
Selenium	0.26					0.6 U		0.6 U		0.6 U		0.6 U		0.5 U		0.6 U		0.6 U		0.6 U					
Silver	0.016	0.3 U		0.3 U		0.4 U		0.4 U		0.4 U		0.4 U		0.3 U		0.4 U		0.3 U		0.3 U		0.3 U		0.3 U	
Thallium	0.0044					0.2 U		0.3 U		0.2 U		0.2 U		0.2 U		0.2 U		0.2 U		0.2 U					
Tributyltin	0.0021	0.0015 U		0.0017 U		0.0015 U		0.0016 U		0.0016 U		0.0016 U													

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Results Summary - Metals
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Location		GP-30		GP-31		GP-31		GP-31		GP-31		GP-31		GP-32		GP-32		GP-32		GP-32		GP-33		GP-33	
Sample Date		10/9/2012		9/6/2012		9/6/2012		9/6/2012		10/11/2012		10/11/2012		9/10/2012		9/10/2012		10/11/2012		10/11/2012		9/6/2012		9/6/2012	
Sample ID		GP-30-7-9		GP-31-3-5		DUP-090612-2		GP-31-5-5.9		GP-31-5.9-7.9		GP-31-7.9-9.9		GP-32-0.25-2.25		GP-32-4.1-6.1		GP-32-6.1-8.1		GP-32-8.1-9.1		GP-33-3.25-5.25		GP-33-5.25-5.9	
Sample Type		N		N		FD		N		N		N		N		N		N		N		N		N	
Sample Depth		7-9 ft		3-5 ft		3-5 ft		5-5.9 ft		5.9-7.9 ft		7.9-9.9 ft		0.25-2.25 ft		4.1-6.1 ft		6.1-8.1 ft		8.1-9.1 ft		3.25-5.25 ft		5.25-5.9 ft	
Soil Layer		Interface at Top of Silt		Shallow Fill		Dredged Fill		Dredged Fill		Dredged Fill		Interface at Top of Silt		Shallow Fill		Shallow Fill		Dredged Fill		Interface at Top of Silt		Dredged Fill		Dredged Fill	
Metals (mg/kg)	Screening Level																								
Arsenic	7	3.8	J+	1.6		1.1		1.4		2.1		1.3		31.2		4.1		1.0		3.8		3.8		3.9	
Chromium	48	10.1		12.8		11.2		12.3		9.4		8.8		85.4		14.3		9.7		11.2		13.6		11.6	
Chromium, VI	0.93			0.434	U	0.457	U	0.432	U								0.487	U		0.497	U				
Copper	36	10.9	J+	10.7		10.5		11.6		9.3		8.7		842		47.8		8.5		16.2		13.7		8.3	
Zinc	85	22		23		24		24		19		17		93		28		20		25		44		44	
Antimony	0.27	0.2	UJ							0.2	UJ	0.2	UJ				0.2	UJ		0.3	UJ				
Barium	8.3																								
Beryllium	3.2	0.2	U							0.2	U	0.2	U				0.2	U		0.3	U				
Cadmium	1	0.1	U							0.1	U	0.1	U				0.1	U		0.1	U				
Lead	50	3.3								1.1		1.2					0.9			4.4					
Mercury	0.07	0.02	U							0.03	U	0.02	U				0.03	U		0.04					
Nickel	48	8								7		6					8			8					
Selenium	0.26	0.6	U							0.6	U	0.6	U				0.6	U		0.7	U				
Silver	0.016	0.4	U	0.3	U	0.3	U	0.3	U	0.4	U	0.4	U	4.9		0.3	U	0.3	U	0.4	U	0.3	U	0.3	U
Thallium	0.0044	0.2	U							0.2	U	0.2	U				0.2	U		0.3	U				
Tributyltin	0.0021																								

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Location		GP-33	GP-34	GP-34	GP-34	GP-34	GP-34	GP-36	GP-36	GP-36	GP-36	GP-37	GP-37
Sample Date		10/10/2012	9/6/2012	9/6/2012	10/10/2012	10/10/2012	10/10/2012	8/30/2012	10/8/2012	10/8/2012	10/8/2012	9/10/2012	10/8/2012
Sample ID		GP-33-5.9-8.3	GP-34-3.25-4.4	GP-34-4.4-6.4	GP-34-6.4-8.4	DUP101012-1	GP-34-8.4-9.4	GP-36-2.6-4.6	GP-36-7-9	GP-36-9-11	GP-36-11-12	GP-37-4.4-6.4	GP-37-7-9
Sample Type		N	N	N	N	FD	N	N	N	N	N	N	N
Sample Depth		5.9-8.3 ft	3.25-4.4 ft	4.4-6.4 ft	6.4-8.4 ft	6.4-8.4 ft	8.4-9.4 ft	2.6-4.6 ft	7-9 ft	9-11 ft	11-12 ft	4.4-6.4 ft	7-9 ft
Soil Layer		Dredged Fill	Shallow Fill	Dredged Fill	Dredged Fill	Dredged Fill	Interface at Top of Silt	Shallow Fill	Dredged Fill	Dredged Fill	Interface at Top of Silt	Dredged Fill	Dredged Fill
Metals (mg/kg)	Screening Level												
Arsenic	7	1.9	4.5	2.0	1.2	1.1	5.6	41.9	4.6	1.8	2.3	2.1	1.6
Chromium	48	9.6	14.2	11.1	10.1	9.2	11.6		17.0	9.9	10.8		10.0
Chromium, VI	0.93												
Copper	36	10.4 J+	15.4	8.9	8.9 J+	7.5 J+	18.2 J+		18.3	8.5	21.3		8.8
Zinc	85	23	31	21	18	17	30		25	20	23		19
Antimony	0.27	0.2 UJ			0.2 UJ	0.2 UJ	0.3 UJ		0.2 UJ	0.2 UJ	0.3 UJ		0.2 UJ
Barium	8.3												
Beryllium	3.2	0.2 U			0.2 U	0.2 U	0.4		0.2 U	0.2 U	0.3 U		0.2 U
Cadmium	1	0.1 U			0.1 U	0.1 U	0.1 U		0.1 U	0.1 U	0.1 U		0.1 U
Lead	50	1.4			1.0	1.0	3.8		2.5	1.0	2.3		1.0
Mercury	0.07	0.02 U			0.03 U	0.19	0.03 U		0.03 U	0.02 U	0.03		0.03 U
Nickel	48	8			5	5	14		16	8	8		7
Selenium	0.26	0.6 U			0.6 U	0.6 U	0.7 U		0.6 U	0.6 U	0.6 U		0.6 U
Silver	0.016	0.4 U	0.3 U	0.3 U	0.4 U	0.4 U	0.4 U		0.3 U	0.4 U	0.4 U		0.4 U
Thallium	0.0044	0.2 U			0.2 U	0.2 U	0.3 U		0.2 U	0.2 U	0.3 U		0.2 U
Tributyltin	0.0021												

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Location		GP-37		GP-38		GP-38		GP-38		GP-38		GP-39		GP-39		GP-39		GP-39		GP-44		GP-44		GP-44	
Sample Date		10/8/2012		9/10/2012		9/10/2012		10/9/2012		10/9/2012		8/30/2012		10/8/2012		10/8/2012		10/8/2012		9/4/2012		10/9/2012		10/9/2012	
Sample ID		GP-37-9-10		GP-38-2.7-4.7		GP-38-5-7		GP-38-7-9		GP-38-9-11		GP-39-2.5-4.5		GP-39-4.5-6.5		GP-39-6.5-8.5		GP-39-10.5-11.5		GP-44-2-4.8		GP-44-4.8-6.8		GP-44-6.8-8.8	
Sample Type		N		N		N		N		N		N		N		N		N		N		N		N	
Sample Depth		9-10 ft		2.7-4.7 ft		5-7 ft		7-9 ft		9-11 ft		2.5-4.5 ft		4.5-6.5 ft		6.5-8.5 ft		10.5-11.5 ft		2-4.8 ft		4.8-6.8 ft		6.8-8.8 ft	
Soil Layer		Interface at Top of Silt		Dredged Fill		Dredged Fill		Dredged Fill		Interface at Top of Silt		Shallow Fill		Dredged Fill		Dredged Fill		Interface at Top of Silt		Dredged Fill		Dredged Fill		Dredged Fill	
Metals (mg/kg)	Screening Level																								
Arsenic	7	3.2		18.5		3.1		2.2	J+	2.4	J+	50.3		10.2		3.1		3.0		40.7		40.7	J+	14.4	J+
Chromium	48	12.1						9.7		9.8		146		19.4		172		268				11.3			4.9
Chromium, VI	0.93											0.486	U												
Copper	36	17.0						8.6	J+	13.1	J+	1410		24.9		9.8		14.3				39.4	J+	9.7	J+
Zinc	85	25						19		20				28		24		25				36		10	
Antimony	0.27	0.3	UJ					0.2	UJ	0.3	UJ			0.2	UJ	0.2	UJ	0.3	UJ			0.2	UJ	0.2	UJ
Barium	8.3																								
Beryllium	3.2	0.3	U					0.2	U	0.3	U			0.2	U	0.2	U	0.3	U			0.2	U	0.2	U
Cadmium	1	0.1	U					0.1	U	0.1	U			0.1	U	0.1	U	0.1	U			0.1	U	0.1	U
Lead	50	3.0						1.0		1.7				2.9		1.5		2.5				6.9		1.4	
Mercury	0.07	0.04						0.03	U	0.03	U			0.03	U	0.02	U	0.03	U			0.03		0.03	U
Nickel	48	9						7		7				8		7		9				5		1	
Selenium	0.26	0.7	U					0.6	U	0.7	U			0.6	U	0.5	U	0.7	U			0.5	U	0.6	U
Silver	0.016	0.4	U					0.4	U	0.4	U	4.8		0.4	U	0.3	U	0.4	U			0.3	U	0.4	U
Thallium	0.0044	0.3	U					0.2	U	0.3	U			0.2	U	0.2	U	0.3	U			0.2	U	0.2	U
Tributyltin	0.0021																								

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Location		GP-44		GP-45		GP-45		GP-45		GP-45		GP-46		GP-46		GP-46		GP-50		GP-50		GP-50		GP-50	
Sample Date		10/9/2012		9/4/2012		10/9/2012		10/9/2012		10/9/2012		8/31/2012		10/9/2012		10/9/2012		9/7/2012		9/7/2012		9/7/2012		10/11/2012	
Sample ID		GP-44-8.8-11.1		GP-45-2-4.25		GP-45-4.5-6.5		GP-45-6.5-8.5		GP-45-8.5-9.5		GP-46-2.5-4.2		GP-46-5.2-7.2		GP-46-7.2-8.7		GP-50-0-2		GP-50-3-5.9		DUP-090712-1		GP-50-5.9-7	
Sample Type		N		N		N		N		N		N		N		N		N		N		FD		N	
Sample Depth		8.8-11.1 ft		2-4.25 ft		4.5-6.5 ft		6.5-8.5 ft		8.5-9.5 ft		2.5-4.2 ft		5.2-7.2 ft		7.2-8.7 ft		0-2 ft		3-5.9 ft		3-5.9 ft		5.9-7 ft	
Soil Layer		Dredged Fill		Shallow Fill		Dredged Fill		Dredged Fill		Dredged Fill		Shallow Fill		Dredged Fill		Interface at Top of Silt		Shallow Fill		Dredged Fill		Dredged Fill		Dredged Fill	
Metals (mg/kg)	Screening Level																								
Arsenic	7	32.8	J+	224		16.9	J+	7.9	J+	4.0	J+	23.8		6.6	J+	8.9	J+	29.0		5.3		8.3		2.7	
Chromium	48	3.6	J			3.2		1.3		15.7				4.8		13.9		25.7		9.9		8.9		10.7	
Chromium, VI	0.93																								
Copper	36	17.5	J+			41.8	J+	3.4	J+	20.3	J+			8.8	J+	17.3	J+	530		14.3		14.5		10.7	
Zinc	85	7	J			47		1	U	9				20		14		112		26		25		21	
Antimony	0.27	0.2	UJ			0.2	UJ	0.2	UJ	0.2	UJ			0.2	UJ	0.2	UJ							0.2	UJ
Barium	8.3																								
Beryllium	3.2	0.2	U			0.2	U	0.2	U	0.2	U			0.2	U	0.2	U							0.2	U
Cadmium	1	0.1	U			0.1	U	0.1	U	0.1	U			0.1	U	0.1	U							0.1	U
Lead	50	0.9				8.3		0.3		1.9				4.0		2.4								1.1	
Mercury	0.07	0.03	U			0.03		0.02	U	0.02	U			0.03	U	0.03	U							0.03	U
Nickel	48	1	U			2		1	U	3				1		5								5	
Selenium	0.26	0.6	U			0.6	U	0.6	U	0.6	U			0.6	U	0.6	U							0.6	U
Silver	0.016	0.4	U			0.3	U	0.4	U	0.3	U			0.3	U	0.4	U	0.6		0.3	U	0.3	U	0.4	U
Thallium	0.0044	0.2	U			0.2	U	0.2	U	0.2	U			0.2	U	0.2	U							0.2	U
Tributyltin	0.0021																								

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Location		GP-50		GP-53		GP-53		GP-53		GP-53		GP-55		GP-55		GP-55		GP-55		GP-55		GP-56		GP-56	
Sample Date		10/11/2012		9/10/2012		9/10/2012		10/10/2012		10/10/2012		8/31/2012		10/8/2012		10/8/2012		10/8/2012		10/8/2012		10/10/2012		10/10/2012	
Sample ID		GP-50-7-7.75		GP-53-3-5		GP-53-5-5.3		GP-53-5.3-7.3		GP-53-7.3-9.3		GP-55-2.5-4		GP-55-4.4-6.4		GP-55-6.4-8.4		GP-55-8.4-10.4		DUP100812-1		GP-56-4.2-5.2		GP-56-5.2-7.2	
Sample Type		N		N		N		N		N		N		N		N		N		FD		N		N	
Sample Depth		7-7.75 ft		3-5 ft		5-5.3 ft		5.3-7.3 ft		7.3-9.3 ft		2.5-4 ft		4.4-6.4 ft		6.4-8.4 ft		8.4-10.4 ft		8.4-10.4 ft		4.2-5.2 ft		5.2-7.2 ft	
Soil Layer		Dredged Fill		Dredged Fill		Dredged Fill		Dredged Fill		Interface at Top of Silt		Shallow Fill		Dredged Fill		Dredged Fill		Interface at Top of Silt		Interface at Top of Silt		Shallow Fill		Dredged Fill	
Metals (mg/kg)	Screening Level																								
Arsenic	7	5.3		3.4		3.0		4.0		2.4		17.5		9.7		4.3		4.4		3.6		99.7		65.8	
Chromium	48	14.8		10.3		11.3		10.5		8.3		15.6		9.9		9.4		14.5		12.9		4		12.6	
Chromium, VI	0.93																					0.832 U		0.750	
Copper	36	22.2		8.6		8.1		8.7 J+		9.4 J+		435		24.7		8.1		12.0		9.2		571 J+		68.4 J+	
Zinc	85	38		18		20		20		17		30		23		19		29		27		78		51	
Antimony	0.27	0.3 UJ						0.3 UJ		0.2 UJ				0.2 UJ		0.2 UJ		0.3 UJ		0.2 UJ		0.8 J-		0.2 UJ	
Barium	8.3																					7		22.0	
Beryllium	3.2	0.4						0.3 U		0.2 U				0.2 U		0.2 U		0.3 U		0.2 U		0.4 U		0.2 U	
Cadmium	1	0.1 U						0.1 U		0.1 U				0.1 U		0.1 U		0.1 U		0.1 U		0.2 U		0.1 U	
Lead	50	5.3						1.1		1.2				12.1		1.1		3.7		2.7		10.8		6.1	
Mercury	0.07	0.03						0.03 U		0.03				0.02		0.02 U		0.03 U		0.02 U		0.04 U		0.02 U	
Nickel	48	18						9		6				7		6		10		9		4		5	
Selenium	0.26	0.7 U						0.6 U		0.6 U				0.5 U		0.6 U		0.6 U		0.6 U		1 U		0.6 U	
Silver	0.016	0.4 U		0.3 U		0.4 U		0.4 U		0.4 U		0.9		0.3 U		0.3 U		0.4 U		0.4 U		0.7 U		0.3 U	
Thallium	0.0044	0.3 U						0.3 U		0.2 U				0.2 U		0.2 U		0.3 U		0.2 U		0.4 U		0.2 U	
Tributyltin	0.0021																								

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Location		GP-56		GP-57		GP-57		GP-58		GP-59		GP-59		GP-61		GP-61		GP-61		GP-61		GP-61		GP-62	
Sample Date		10/10/2012		10/10/2012		10/10/2012		10/8/2012		10/10/2012		10/10/2012		9/6/2012		9/6/2012		9/6/2012		10/12/2012		10/12/2012		9/5/2012	
Sample ID		GP-56-7.2-9.5		GP-57-10.8-12		GP-57-8.8-10.8		GP-58-8.25-10.5		GP-59-8.25-10.25		GP-59-10.25-11.5		GP-61-0-2		GP-61-2.5-4.5		DUP-090612-1		GP-61-4.5-7.5		GP-61-7.5-8.5		GP-62-3-5	
Sample Type		N		N		N		N		N		N		N		N		FD		N		N		N	
Sample Depth		7.2-9.5 ft		10.8-12 ft		8.8-10.8 ft		8.25-10.5 ft		8.25-10.25 ft		10.25-11.5 ft		0-2 ft		2.5-4.5 ft		2.5-4.5 ft		4.5-7.5 ft		7.5-8.5 ft		3-5 ft	
Soil Layer		Interface at Top of Silt		Interface at Top of Silt		Dredged Fill		Dredged Fill		Dredged Fill		Interface at Top of Silt		Shallow Fill		Dredged Fill		Dredged Fill		Dredged Fill		Interface at Top of Silt		Dredged Fill	
Metals (mg/kg)	Screening Level																								
Arsenic	7	634	J	4.0		8.4		203		868		3070		8.2		3.0		2.8		1.5		4.7		1.3	
Chromium	48	15.8		10.4		10.1		11.4		10.9		20.2		19.9		11.9		12.6		9.3		11.5		9.8	
Chromium, VI	0.93	0.534	U	0.965		0.497	U	0.503	U	0.849		0.788													
Copper	36	133	J+	14.0	J+	9.0	J+	15.7		31.9	J+	80.3	J+	56.9		15.1		17.0		10.4		19.9		8.4	
Zinc	85	28		23		21		63		89		2080		51		28		28		19		27		22	
Antimony	0.27	0.3	UJ	0.3	UJ	0.2	UJ	0.3	UJ	0.2	UJ	0.3	UJ							0.2	U	0.3	U		
Barium	8.3	21.6		26.1		16.1		22.0		18.5		45.5													
Beryllium	3.2	0.3	U	0.3	U	0.2	U	0.3	U	0.2	U	0.7								0.2	U	0.3	U		
Cadmium	1	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.2	U							0.1	U	0.1	U		
Lead	50	3.8		2.2		1.0		3.4		4.5		11.0								1.1		6.8			
Mercury	0.07	0.03	U	0.06	U	0.03	U	0.03		0.02	U	0.05								0.03	U	0.04			
Nickel	48	5		8		7		10		7		21								6		8			
Selenium	0.26	0.6	U	0.6	U	0.6	U	0.6	U	0.6	U	0.8	U							0.6	U	0.7	U		
Silver	0.016	0.4	U	0.4	U	0.4	U	0.4	U	0.4	U	0.5	U	0.3	U	0.3	U	0.3	U	0.4	U	0.4	U	0.3	U
Thallium	0.0044	0.3	U	0.3	U	0.2	U	0.3	U	0.2	U	0.3	U							0.2	U	0.3	U		
Tributyltin	0.0021													0.0015	U	0.0016	U	0.0016	U	0.0016	U	0.0015	U	0.0015	U

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Location		GP-62		GP-62		GP-62		GP-62		GP-63		GP-63		GP-63		GP-63		GP-64		GP-64		GP-66		GP-66	
Sample Date		10/12/2012		10/12/2012		10/12/2012		10/12/2012		10/12/2012		10/12/2012		10/12/2012		10/12/2012		10/12/2012		10/12/2012		9/10/2012		9/10/2012	
Sample ID		GP-62-5-6.7		DUP101212-1		GP-62-6.7-7.7		DUP101212-2		GP-63-4-6		DUP101212-3		GP-63-6-8		GP-63-8-9		GP-64-4.3-6		GP-64-6-7		GP-66-0.6-2.6		GP-66-3.75-5.75	
Sample Type		N		FD		N		FD		N		FD		N		N		N		N		N		N	
Sample Depth		5-6.7 ft		5-6.7 ft		6.7-7.7 ft		6.7-7.7 ft		4-6 ft		4-6 ft		6-8 ft		8-9 ft		4.3-6 ft		6-7 ft		0.6-2.6 ft		3.75-5.75 ft	
Soil Layer		Dredged Fill		Dredged Fill		Interface at Top of Silt		Interface at Top of Silt		Shallow Fill		Shallow Fill		Shallow Fill		Shallow Fill		Dredged Fill		Interface at Top of Silt		Shallow Fill		Dredged Fill	
Metals (mg/kg)	Screening Level																								
Arsenic	7	1.6		1.6		3.8		4.3														23.2		4.1	
Chromium	48	9.9		9.1		11.8		11.5														46.6		14.8	
Chromium, VI	0.93									0.508 U		0.427 U		0.499 U		0.584 U									
Copper	36	8.8		8.7		15.2		16.5														322		124	
Zinc	85	19		21		30		24														57		27	
Antimony	0.27	0.2 U		0.2 U		0.3 U		0.3 U																	
Barium	8.3																								
Beryllium	3.2	0.2 U		0.2 U		0.3 U		0.3 U																	
Cadmium	1	0.1 U		0.1 U		0.1 U		0.1 U																	
Lead	50	1.2		1.2		2.6		3.3																	
Mercury	0.07	0.03 U		0.02 U		0.03 U		0.03 U																	
Nickel	48	6		5		9		11																	
Selenium	0.26	0.6 U		0.6 U		0.7 U		0.6 U																	
Silver	0.016	0.3 U		0.4 U		0.4 U		0.4 U														1.4		0.3 U	
Thallium	0.0044	0.2 U		0.2 U		0.3 U		0.3 U																	
Tributyltin	0.0021																	0.0015 U		0.0015 U					

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Location		GP-66		GP-66		GP-42		GP-51		GP-51		GP-68		GP-68		GP-68		GP-69		GP-71		GP-71		GP-74	
Sample Date		10/11/2012		10/11/2012		1/22/2014		1/22/2014		1/22/2014		1/23/2014		1/23/2014		1/23/2014		1/20/2014		1/22/2014		1/22/2014		1/22/2014	
Sample ID		GP-66-5.75-7.75		GP-66-7.75-8.4		GP-42-20-22		GP-51-17.4-19.4		GP-51-24.4-26.4		GP-68-4-6		DUP-012314-1		GP-68-9.4-10.4		GP-69-20-22		GP-71-15-17		DUP012214-1		GP-74-17.7-19.7	
Sample Type		N		N		N		N		N		N		FD		N		N		N		FD		N	
Sample Depth		5.75-7.75 ft		7.75-7.75 ft		20-22 ft		17.4-19.4 ft		24.4-26.4 ft		4-6 ft		4-6 ft		9.4-10.4 ft		20-22 ft		15-17 ft		15-17 ft		17.7-19.7 ft	
Soil Layer		Dredged Fill		Interface at Top of Silt		Lower Sand		Middle Silt		Lower Sand		Dredged Fill		Dredged Fill		Interface at Top of Silt		Lower Sand		Lower Sand		Lower Sand		Lower Sand	
Metals (mg/kg)	Screening Level																								
Arsenic	7	1.0		5.0		4.2		11.5	J	2.5		2.5	J	2.3		4.1		7.5		1.5		1.3			
Chromium	48	9.6		14.0		12.1				13.2		10.6		10.2		11.2		12.7	J	12.5		11.6			
Chromium, VI	0.93	0.488	U		0.534	U						0.523	UJ	0.519	UJ	0.622	UJ	0.495	U	0.519	U	0.501	U	0.486	U
Copper	36	530		20.8		12.5		33.8		22.7		8.5	U	8.3	U	12.8	U	11.2		44.4		15.1			
Zinc	85	19		31		29		35		28		21		19		23		27		31		28			
Antimony	0.27	0.2	UJ	0.3	UJ																				
Barium	8.3																								
Beryllium	3.2	0.2	U	0.4																					
Cadmium	1	0.1	U	0.1	U																				
Lead	50	0.8		6.0																					
Mercury	0.07	0.02	U	0.09																					
Nickel	48	6		14																					
Selenium	0.26	0.6	U	0.7	U																				
Silver	0.016	0.4	U	0.4	U																				
Thallium	0.0044	0.2	U	0.3	U																				
Tributyltin	0.0021	0.0015	U	0.0016	U																				

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Results Summary - Metals
5900 West Marginal Way Site
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Location		MW-14D	MW-14D	MW-20D	MW-28S	MW-28S	MW-29S	MW-29S	MW-30S	MW-31S	MW-32D	MW-32D	MW-32D
Sample Date		11/14/2011	11/14/2011	1/17/2014	11/8/2011	11/8/2011	11/8/2011	11/8/2011	11/8/2011	11/8/2011	11/9/2011	11/9/2011	11/11/2011
Sample ID		MW-14D-3-6	MW-14D-6.5-7.5	MW-20D-22.5-24.5	MW-28S-1-2	MW-28S-3.5-4	MW-29S-0-2	MW-29S-3-3.5	MW-30S-3-3.5	MW-31S-5-6	MW-32D-1.6-3.6	DUP-110911-1	MW-32D-5-7
Sample Type		N	N	N	N	N	N	N	N	N	N	FD	N
Sample Depth		3-6 ft	6.5-7.5 ft	22.5-24.5 ft	1-2 ft	3.5-4 ft	0-2 ft	3-3.5 ft	3-3.5 ft	5-6 ft	1.6-3.6 ft	1.6-3.6 ft	5-7 ft
Soil Layer		Dredged Fill	Dredged Fill	Lower Sand	Shallow Fill	Dredged Fill	Shallow Fill	Shallow Fill	Dredged Fill	Dredged Fill	Shallow Fill	Shallow Fill	Dredged Fill
Metals (mg/kg)	Screening Level												
Arsenic	7	88.2 J	129 J	1.8 J+	67.9	1.7	23.1	2.2	1.1	4.1	53.3 J	35.0 J	1.0
Chromium	48	9.5	8.9	14.0	23.5	11.3	23.4	17.1	10.5	11.4	23.7 J	33.3 J	9.4
Chromium, VI	0.93								0.478 UJ				
Copper	36	387 J	326	10.2	119 J	10.9 J	66.7 J	31.6 J	16.7 J	12.3 J	75.1 J	168 J	7.7
Zinc	85	99	125	30	89	22	47	25	23	26	62	62	18
Antimony	0.27	5 UJ	5 UJ										
Barium	8.3												
Beryllium	3.2	0.1 U	0.1 U										
Cadmium	1	0.2	0.1										
Lead	50	4.3	2.8										
Mercury	0.07	0.03	0.02 U										
Nickel	48	5	5										
Selenium	0.26	5 U	5 U										
Silver	0.016	0.3 U	0.3 U		0.3 U	0.4 U	0.3 U	0.7	0.3 U	0.4 U	0.3 U	1.5	0.3 U
Thallium	0.0044	5 U	5 U										
Tributyltin	0.0021				0.0034 U	0.0034 U	0.0037 U	0.0032 U	0.0033 U	0.0034 U			

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Location		MW-32S	MW-32S	MW-33S	MW-34S	MW-34S	MW-35S	MW-31D	MW-35D	MW-43D	MW-43D	MW-45D	MW-45D
Sample Date		11/8/2011	11/11/2011	11/14/2011	11/9/2011	11/9/2011	11/9/2011	1/22/2014	1/23/2014	1/21/2014	1/21/2014	1/16/2014	1/17/2014
Sample ID		MW-32S-1.7-4	MW-32S-5-7	MW-33S-4-7	MW-34S-1.3-3.2	MW-34S-3.8-4.2	MW-35S-5.7-6.3	MW31D-19-20	MW-35D-19.3-20	MW-43D-14.5-16.5	MW-43D-19.3-21.3	MW-45D-12.5-13.0	MW-45D-17.3-19.3
Sample Type		N	N	N	N	N	N	N	N	N	N	N	N
Sample Depth		1.7-4 ft	5-7 ft	4-7 ft	1.3-3.2 ft	3.8-4.2 ft	5.7-6.3 ft	19-20 ft	19.3-20 ft	14.5-16.5 ft	19.3-21.3 ft	12.5-13 ft	17.3-19.3 ft
Soil Layer		Shallow Fill	Dredged Fill	Dredged Fill	Shallow Fill	Dredged Fill	Dredged Fill	Lower Sand	Lower Sand	Middle Silt	Lower Sand	Interface at Top of Silt	Lower Sand
Metals (mg/kg)	Screening Level												
Arsenic	7	21.8 J	1.4	13.6 J	2.7 J	2.1 J	1.6	1.9	1.0	61.7 J	37.5	493	76.8 J+
Chromium	48	24.6 J	11.2	10.9	19.5 J	13.3 J	38.0	12.0	15.2	14.7	12.3	17.5	14.3
Chromium, VI	0.93							0.488 U	0.485 UJ			0.670 U	0.517 U
Copper	36	69.4 J	11.4	31.5	16.2 J	13.0 J	313	10.6	10.6 U	125	20.4	260 J-	9.7 J
Zinc	85	47	22	24	30	23	23	26	26	49	36	4030	46
Antimony	0.27												
Barium	8.3												
Beryllium	3.2												
Cadmium	1												
Lead	50												
Mercury	0.07												
Nickel	48												
Selenium	0.26												
Silver	0.016	0.4	0.4 U	0.3 U	0.3 U	0.4 U	0.3 U						
Thallium	0.0044												
Tributyltin	0.0021												

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Location		MW-45D		SIIE-01		SIIE-02		SIIE-03		SIIE-04		SIIE-06		TB-01B		TB-01B		TB-02B		TB-02B		TB-02B		TB-03D	
Sample Date		1/17/2014		8/8/2014		8/8/2014		8/8/2014		8/8/2014		8/12/2014		1/14/2014		1/14/2014		1/13/2014		1/13/2014		1/13/2014		1/13/2014	
Sample ID		DUP 011714-1		SIIE-01-080814		SIIE-02-080814		SIIE-03-080814		SIIE-04-080814		SIIE-06-081214		TB-01B-5-6.9		TB-01B-6.9-7.9		TB-02B-8-9.5		TB-02B-9.5-10.5		DUP011314-1		TB-03D-4.25-7	
Sample Type		FD		N		N		N		N		N		N		N		N		N		FD		N	
Sample Depth		17.3-19.3 ft		2 ft		2 ft		2 ft		2 ft		2 ft		5-6.9 ft		6.9-7.9 ft		8-9.5 ft		9.5-10.5 ft		9.5-10.5 ft		4.25-7 ft	
Soil Layer		Lower Sand		Shallow Fill		Shallow Fill		Shallow Fill		Shallow Fill		Shallow Fill		Dredged Fill		Interface at Top of Silt		Dredged Fill		Interface at Top of Silt		Interface at Top of Silt		Shallow Fill	
Metals (mg/kg)	Screening Level																								
Arsenic	7	71.9	J+	20.1	J	22.4	J	33.5	J	91.0	J	12.3		4.4	J-	3.8	J-	8.0		10.9		14.3		81.1	
Chromium	48	13.1		102		8		713		987		27		72.1		18.1		54.2		57.4		61.5		41.2	
Chromium, VI	0.93	0.510	U	0.398	U	6.04	U	0.725	U	0.750	U	5.14	U												
Copper	36	8.6		2110		56.5		3260		3250		1090		421		87.8		336		442		393		211	
Zinc	85	44		309		131		21		6		10		56	J+	29	J+	62		67		56		146	
Antimony	0.27																								
Barium	8.3																								
Beryllium	3.2																								
Cadmium	1																								
Lead	50																								
Mercury	0.07																								
Nickel	48																								
Selenium	0.26																								
Silver	0.016																								
Thallium	0.0044																								
Tributyltin	0.0021																								

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Location		TB-03D		TB-03D		TB-04A		TB-04A		TB-05B		TB-05B		TB-05B		TB-06E		TB-06E		TB-06F		TB-06F		GP-35	
Sample Date		1/13/2014		1/13/2014		1/13/2014		1/13/2014		1/15/2014		1/15/2014		1/15/2014		1/15/2014		1/15/2014		1/24/2014		1/24/2014		10/8/2013	
Sample ID		TB-03D-7-9		TB-03D-12.6-13.6		TB-04A-1.25-3		TB-04A-7.1-8.1		TB-05B-13.6-15.6		DUP011514-2		TB-05B-18.2-19.2		TB-06E-8.8-10.6		DUP011514-1		TB-06F-20-22		TB-06F-14-16		GP-35-3.5-5.5	
Sample Type		N		N		N		N		N		FD		N		N		FD		N		N		N	
Sample Depth		7-9 ft		12.6-13.6 ft		1.25-3 ft		7.1-8.1 ft		13.6-15.6 ft		13.6-15.6 ft		18.2-19.2 ft		8.8-10.6 ft		8.8-10.6 ft		20-22 ft		14-16 ft		3.5-5.5 ft	
Soil Layer		Dredged Fill		Interface at Top of Silt		Dredged Fill		Interface at Top of Silt		Dredged Fill		Dredged Fill		Interface at Top of Silt		Dredged Fill		Dredged Fill		Lower Sand		Dredged Fill		Dredged Fill	
Metals (mg/kg)	Screening Level																								
Arsenic	7	16.0		10.5		18.6		23.1		1160 J		286		148		74.3				13.1		162			
Chromium	48	10.4		18.3		7.3		20.6		37.1 J		32		18.6		23.7				11.6		38.5			
Chromium, VI	0.93															0.478 UJ		0.475 UJ				0.492 U			
Copper	36	26.6		22.6		17.6		41.0		322 J		6530		74.3		155				10.6		191		195	
Zinc	85	28		57		14		27		95 J-		48		154 J-		136 J-				30		98			
Antimony	0.27																								
Barium	8.3																								
Beryllium	3.2																								
Cadmium	1																								
Lead	50																								
Mercury	0.07																								
Nickel	48																								
Selenium	0.26																								
Silver	0.016																								
Thallium	0.0044																								
Tributyltin	0.0021																								

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Results Summary - Metals
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Location		GP-35		GP-40		GP-42		GP-43		GP-43		GP-43		GP-49		GP-49		GP-49		GP-51		GP-51		GP-51	
Sample Date		10/8/2013		10/8/2013		10/9/2013		10/10/2013		10/10/2013		10/10/2013		10/4/2013		10/4/2013		10/4/2013		10/9/2013		10/9/2013		10/9/2013	
Sample ID		GP-35-11.25-12.25		GP-40-11.3-12.3		GP-42-12.5-13.5		GP-43-3.0-5.0		GP-43-11.1-12.1		GP-43-6.4-8.4		GP-49-3.5-5.5		GP-49-6.0-8.0		GP-49-11.75-12.75		GP-51-4.3-6.3		GP-51-8.6-10.6		GP-51-11.9-12.9	
Sample Type		N		N		N		N		N		N		N		N		N		N		N		N	
Sample Depth		11.25-12.25 ft		11.3-12.3 ft		12.5-13.5 ft		3-5 ft		11.1-12.1 ft		6.4-8.4 ft		3.5-5.5 ft		6-8 ft		11.75-12.75 ft		4.3-6.3 ft		8.6-10.6 ft		11.9-12.9 ft	
Soil Layer		Interface at Top of Silt		Interface at Top of Silt		Interface at Top of Silt		Shallow Fill		Interface at Top of Silt		Dredged Fill		Shallow Fill		Dredged Fill		Interface at Top of Silt		Shallow Fill		Dredged Fill		Interface at Top of Silt	
Metals (mg/kg)	Screening Level																								
Arsenic	7	3.3		3.8		5.1		54.5		667 J		38.0		16.8		11.5 J		3.8 J		888		13.1		193	
Chromium	48	12.5		14.7		18.8				35.0 J				29.6		12.1		13.2		28.3				13.4	
Chromium, VI	0.93																								
Copper	36	15.7		23.1		40.3		173		281 J		31.9		158		14.5		23.8		559		450		487	
Zinc	85	26		31		40		53		139 J		44		69		29		27		102		99		528	
Antimony	0.27																								
Barium	8.3																								
Beryllium	3.2																								
Cadmium	1																								
Lead	50																								
Mercury	0.07																								
Nickel	48																								
Selenium	0.26																								
Silver	0.016																								
Thallium	0.0044																								
Tributyltin	0.0021																								

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Results Summary - Metals
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Location		GP-52		GP-52		GP-54		GP-54		GP-54		GP-60		GP-60		GP-67		GP-67		GP-69		GP-69		GP-69	
Sample Date		10/9/2013		10/9/2013		10/9/2013		10/9/2013		10/9/2013		10/1/2013		10/4/2013		10/7/2013		10/7/2013		10/7/2013		10/7/2013		10/7/2013	
Sample ID		GP-52-7.1-9.1		GP-52-12.1-13.1		GP-54-4.1-6.1		DUP-100913-1		GP-54-10.9-11.9		GP-60-4.5-5.0		GP-60-8.8-9.8		GP-67-4.8-6.8		GP-67-10-11		GP-69-7.6-9.6		GP-69-12.6-13.6		DUP-100713-2	
Sample Type		N		N		N		FD		N		N		N		N		N		N		N		FD	
Sample Depth		7.1-9.1 ft		12.1-13.1 ft		4.1-6.1 ft		4.1-6.1 ft		10.9-11.9 ft		4.5-5 ft		8.8-9.8 ft		4.8-6.8 ft		10-11 ft		7.6-9.6 ft		12.6-13.6 ft		12.6-13.6 ft	
Soil Layer		Dredged Fill		Interface at Top of Silt		Dredged Fill		Dredged Fill		Interface at Top of Silt		Dredged Fill		Interface at Top of Silt		Dredged Fill		Interface at Top of Silt		Dredged Fill		Interface at Top of Silt		Interface at Top of Silt	
Metals (mg/kg)	Screening Level																								
Arsenic	7	104		10.3		1.2		1.5		4.8		1.6 J+		3.1		123		176 J+		56.6 J+		5.4 J+		5.9 J+	
Chromium	48	13.6		15.3		11.0		11.6		15.4		11.9		13.4				15.0		10.3		15.6		13.8	
Chromium, VI	0.93											0.500 U		0.544 U						0.592 J		0.568 UJ		0.574 UJ	
Copper	36	11.1		22.1		8.6		8.9		23.3		11.6		332		527		239		8.6		22.5		22.6	
Zinc	85	25		26		19		19		30		48		24		97		259		19		25		27	
Antimony	0.27																								
Barium	8.3																								
Beryllium	3.2																								
Cadmium	1																								
Lead	50																								
Mercury	0.07																								
Nickel	48																								
Selenium	0.26																								
Silver	0.016																								
Thallium	0.0044																								
Tributyltin	0.0021																								

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Results Summary - Metals
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Location		GP-70		GP-70		GP-70		GP-70		GP-71		GP-71		GP-71		GP-72		GP-72		GP-73		GP-73		GP-73	
Sample Date		10/9/2013		10/9/2013		10/9/2013		10/9/2013		10/8/2013		10/8/2013		10/8/2013		10/1/2013		10/8/2013		10/8/2013		10/8/2013		10/8/2013	
Sample ID		GP-70-3.0-5.0		GP-70-6.1-8.1		DUP-100913-2		GP-70-10.8-11.8		GP-71-2.25-4		GP-71-7.1-9.1		GP-71-10.6-11.6		GP-72-2.0-4.0		GP-72-8.2-9.2		GP-73-5.8-7.8		GP-73-11.5-12.5		DUP-100813-2	
Sample Type		N		N		FD		N		N		N		N		N		N		N		N		FD	
Sample Depth		3-5 ft		6.1-8.1 ft		6.1-8.1 ft		10.8-11.8 ft		2.25-4 ft		7.1-9.1 ft		10.6-11.6 ft		2-4 ft		8.2-9.2 ft		5.8-7.8 ft		11.5-12.5 ft		11.5-12.5 ft	
Soil Layer		Shallow Fill		Dredged Fill		Dredged Fill		Interface at Top of Silt		Shallow Fill		Dredged Fill		Interface at Top of Silt		Dredged Fill		Interface at Top of Silt		Dredged Fill		Interface at Top of Silt		Interface at Top of Silt	
Metals (mg/kg)	Screening Level																								
Arsenic	7	382		488		32.9		35.6						5.1		24.3	J+	5.9		303		220		222	
Chromium	48			11.6		15.4		12.7						19.7		12.9		17.1				15.6		19.2	
Chromium, VI	0.93			0.472	U	0.469	U	0.579	U					0.578	U										
Copper	36	197		16.2		147		23.7		539		9.4		18.1		78.0		25.3		900		754		1850	
Zinc	85			69		43		83						49		93		42		120		1340		997	
Antimony	0.27																								
Barium	8.3																								
Beryllium	3.2																								
Cadmium	1																								
Lead	50																								
Mercury	0.07																								
Nickel	48																								
Selenium	0.26																								
Silver	0.016																								
Thallium	0.0044																								
Tributyltin	0.0021																								

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Table W-6
Saturated Soil Analytical
Results Summary - Metals
5900 West Marginal Way Site
Seattle, Washington

Location		GP-74		GP-74		GP-74		GP-75		GP-75		GP-76		GP-76		GP-76		GP-77		GP-77		GP-78		GP-78		GP	
Sample Date		10/8/2013		10/8/2013		10/10/2013		10/1/2013		10/4/2013		5/14/2019		5/14/2019		5/17/2019		5/14/2019		5/17/2019		5/14/2019		5/17/2019		5/17/	
Sample ID		GP-74-3.0-4.0		GP-74-4.0-5.0		GP-74-7.6-8.6		GP-75-4.0-6.0		GP-75-8.5-9.5		DUP-051419-01		GP-76-4.25-6.25-051419		GP-76-10.2-11.2-051719		GP-77-5-7-051419		GP-77-10.5-11.5-051719		GP-78-3-5-051419		DUP-051719-01		GP-78-10.5-	
Sample Type		N		N		N		N		N		FD		N		N		N		N		N		FD		I	
Sample Depth		3-4 ft		4-5 ft		7.6-8.6 ft		4-6 ft		8.5-9.5 ft		4.25 - 6.25 ft		4.25 - 6.25 ft		10.2 - 11.2 ft		5 - 7 ft		10.5 - 11.5 ft		3 - 5 ft		10.5 - 11.5 ft		10.5 -	
Soil Layer		Shallow Fill		Dredged Fill		Interface at Top of Silt		Dredged Fill		Interface at Top of Silt		Dredged Fill		Dredged Fill		Interface at Top of Silt		Dredged Fill		Interface at Top of Silt		Dredged Fill		Interface at Top of Silt		Interface at	
Metals (mg/kg)	Screening Level																										
Arsenic	7	11.1	J	3.1		3.5		2.5	J+	3.6		2.53		1.55		4.60		1.81		4.06		1.54		5.57		5.61	
Chromium	48	41.2		15.4		14.5		11.6		14.8																	
Chromium, VI	0.93					0.532	UJ	0.486	U	0.536	U																
Copper	36	420		18.8		20.0		13.2		24.6																	
Zinc	85	71		34		29		25		33																	
Antimony	0.27																										
Barium	8.3																										
Beryllium	3.2																										
Cadmium	1																										
Lead	50																										
Mercury	0.07																										
Nickel	48																										
Selenium	0.26																										
Silver	0.016																										
Thallium	0.0044																										
Tributyltin	0.0021																										

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Table W-6
Saturated Soil Analytical
Results Summary - Metals
5900 West Marginal Way Site
Seattle, Washington

Location		-78	GP-80		GP-80		MW-20D		MW-20D		MW-31D		MW-31D		MW-35D		MW-35D		MW-38D	
Sample Date		2019	5/14/2019		5/17/2019		10/8/2013		10/8/2013		10/10/2013		10/10/2013		10/1/2013		10/10/2013		10/2/2013	
Sample ID		11.5-051719	GP-80-4-5.5-051419		GP-80-13-14-051719		MW-20D-6.6-8.6		MW-20D-12-13		MW-31D-5.0-7.0		MW-31D-8.25-9.25		MW-35D-4.25-5.5		MW-35D-8.5-9.5		MW-38D-0.83-2.0	
Sample Type		N	N		N		N		N		N		N		N		N		N	
Sample Depth		11.5 ft	4 - 5.5 ft		13 - 14 ft		6.6-8.6 ft		12-13 ft		5-7 ft		8.25-9.25 ft		4.25-5.5 ft		8.5-9.5 ft		0.83-2 ft	
Soil Layer		Top of Silt	Dredged Fill		Interface at Top of Silt		Dredged Fill		Interface at Top of Silt		Dredged Fill		Interface at Top of Silt		Dredged Fill		Interface at Top of Silt		Dredged Fill	
Metals (mg/kg)	Screening Level																			
Arsenic	7		2.92		5.29		5.5		4.5		3.1	7.3	2.1	J+	4.5		80.8			
Chromium	48						17.7		12.4		13.5	16.8	19.1		12.6		13.9			
Chromium, VI	0.93											0.627	R		0.553	UJ	0.468	U		
Copper	36						23.1		17.0		15.8	23.3	71.9		21.5		71.3			
Zinc	85						43		25		29	27	26		32		56			
Antimony	0.27																			
Barium	8.3																			
Beryllium	3.2																			
Cadmium	1																			
Lead	50																			
Mercury	0.07																			
Nickel	48																			
Selenium	0.26																			
Silver	0.016																			
Thallium	0.0044																			
Tributyltin	0.0021																			

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Table W-6
Saturated Soil Analytical
Results Summary - Metals
5900 West Marginal Way Site
Seattle, Washington

Location		MW-38D		MW-43D		MW-43D		MW-43D		MW-45D	
Sample Date		10/7/2013		10/10/2013		10/10/2013		10/10/2013		10/7/2013	
Sample ID		MW-38D-8.5-9.5		MW-43D-5.25-6.75		MW-43D-7.25-9.25		MW-43D-11.25-12.25		MW-45D-9.5-10.5	
Sample Type		N		N		N		N		N	
Sample Depth		8.5-9.5 ft		5.25-6.7 ft		7.25-9.25 ft		11.25-12.25 ft		9.5-10.5 ft	
Soil Layer		Interface at Top of Silt		Shallow Fill		Dredged Fill		Interface at Top of Silt		Interface at Top of Silt	
Metals (mg/kg)	Screening Level										
Arsenic	7	3.1	J+	104		68.7		300		288	J+
Chromium	48	14.7				10.9		13.0		13.7	
Chromium, VI	0.93	0.541	UJ							0.540	UJ
Copper	36	23.3		124		241		383		3500	
Zinc	85	32				43		72		923	
Antimony	0.27										
Barium	8.3										
Beryllium	3.2										
Cadmium	1										
Lead	50										
Mercury	0.07										
Nickel	48										
Selenium	0.26										
Silver	0.016										
Thallium	0.0044										
Tributyltin	0.0021										

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Table W-6

Saturated Soil Analytical Results Summary - Metals 5900 West Marginal Way Site Seattle, Washington

Notes:

Units are in milligrams per kilogram (mg/kg).

Cells are left blank where compound was not analyzed.

NFG (National Functional Guidelines) = U.S. Environmental Protection Agency (USEPA) Contract Laboratory Program National Functional Guidelines for Organic Data Review, October 1999 or USEPA Contract. Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004.

Green-shaded, bolded values indicate detected concentration exceeds the selected screening level.

Light gray-shaded values indicate that the method detection limit exceeds the screening level.

Key:

B = boring

COMP = composite sample

DUP = field duplicate sample

ft = feet below ground surface

FD = field duplicate sample

GP = direct-push boring

mg/kg = milligrams per kilogram

MW = monitoring well

N = normal field sample

SIIE = samples are anthropogenic solids, sampled during a soil excavation

TB = top of riverbank boring

TP = test pit

Laboratory Data Qualifiers:

- = Compound concentration biased low.

+ = Compound concentration biased high.

J = The detected results are qualified as estimated in accordance with National Functional Guidelines (NFGs).

R = Rejected data in accordance with NFGs; associated matrix spike recoveries were less than laboratory control limits.

U = Result is $\leq$ the laboratory detection limit or qualified as non-detect in accordance with NFGs.

UJ = Non-detected compound qualified as estimated in accordance with NFGs.

**Saturated Soil Analytical Results Summary - Volatile
Organic Compounds & Total Petroleum Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington**

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Table W-7
Saturated Soil Analytical Results Summary - Volatile
Organic Compounds & Total Petroleum Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location			GP-28	GP-28	GP-28	GP-28	GP-28	GP-28	GP-28	GP-29	GP-29	GP-29	GP-29	GP-29	GP-29	GP-29	GP-31	GP-31
Sample Date			10/11/2012	10/11/2012	10/11/2012	10/11/2012	10/11/2012	10/11/2012	10/11/2012	10/9/2012	10/9/2012	10/9/2012	10/9/2012	10/9/2012	10/9/2012	10/9/2012	9/6/2012	9/6/2012
Sample ID			GP-28-5.1	DUP101112-2A	GP-28-6.1-8.3	DUP101112-3	GP-28-7.1	DUP101112-3A	GP-29-2.9-4.9	GP-29-3.9	GP-29-4.9-6.9	GP-29-5.9	GP-29-6.9-8.9	GP-29-7.9	GP-29-8.9-11.2	GP-29-10	GP-31-3-5	DUP-090612-2
Sample Type			N	FD	N	FD	N	FD	N	N	N	N	N	N	N	N	N	FD
Sample Depth			5.1 ft	5.1 ft	6.1-8.3 ft	6.1-8.3 ft	7.1 ft	7.1 ft	2.9-4.9 ft	3.9 ft	4.9-6.9 ft	5.9 ft	6.9-8.9 ft	7.9 ft	8.9-11.2 ft	10 ft	3-5 ft	3-5 ft
Soil Layer			Dredged Fill	Dredged Fill	Interface at Top of Silt	Interface at Top of Silt	Interface at Top of Silt	Interface at Top of Silt	Shallow Fill	Shallow Fill	Dredged Fill	Dredged Fill	Dredged Fill	Dredged Fill	Dredged Fill	Shallow Fill	Shallow Fill	Dredged Fill
VOCs (ug/kg)	Units	Screening Level																
1,1,1,2-Tetrachloroethane	ug/kg	38000																
1,1,1-Trichloroethane	ug/kg	84																
1,1,2,2-Tetrachloroethane	ug/kg	0.08																
1,1,2-Trichloroethane	ug/kg	1																
1,1-Dichloroethane	ug/kg	2.6																
1,1-Dichloroethene	ug/kg	2.4																
1,1-Dichloropropene	ug/kg	NS																
1,2,3-Trichlorobenzene	ug/kg	20000																
1,2,3-Trichloropropane	ug/kg	33																
1,2,4-Trimethylbenzene	ug/kg	800000																
1,2-Dibromo-3-chloropropane	ug/kg	1300																
1,2-Dichloroethane	ug/kg	1.6																
1,2-Dichloropropane	ug/kg	1																
1,3,5-Trimethylbenzene	ug/kg	800000																
1,3-Dichloropropane	ug/kg	NS																
2,2-Dichloropropane	ug/kg	NS																
2-Butanone	ug/kg	NS																
2-Chloroethyl vinyl ether	ug/kg	NS																
2-Hexanone	ug/kg	400000																
2-Phenylbutane	ug/kg	NS																
4-Chlorotoluene	ug/kg	NS																
4-Methyl-2-pentanone	ug/kg	NS																
Acetone	ug/kg	2100																
Acrolein	ug/kg	40000																
Acrylonitrile	ug/kg	1900																
Benzene	ug/kg	0.56	13	12				0.7	U	0.7	U		0.7	U		0.8	U	
Bromobenzene	ug/kg	640000																
Bromodichloromethane	ug/kg	0.96																
Bromoform	ug/kg	5																
Carbon disulfide	ug/kg	270																
Carbon tetrachloride	ug/kg	0.15																
Chlorobenzene	ug/kg	51																
Chlorobromomethane	ug/kg	NS																
Chloroethane	ug/kg	NS																
Chloroform	ug/kg	4.8																
cis-1,2-Dichloroethene	ug/kg	5.2																
cis-1,3-Dichloropropene	ug/kg	0.14																
Cumene	ug/kg	NS																
Cymene	ug/kg	NS																
Dibromochloromethane	ug/kg	0.77																
Dibromomethane	ug/kg	800000																
Ethyl bromide	ug/kg	NS																
Ethylbenzene	ug/kg	15	0.7	U	0.7	U		0.7	U	0.7	U		0.7	U		0.8	U	
Ethylene dibromide	ug/kg	0.018																
Freon 11	ug/kg	NS																
Freon 113	ug/kg	NS																
m,p Xylenes	ug/kg	NS	0.5	j	0.7	U		0.7	U	0.7	U		0.7	U		0.8	U	
Methyl bromide	ug/kg	3.3																
Methyl chloride	ug/kg	NS																
Methyl iodide	ug/kg	NS																
Methyl tert-butyl ether	ug/kg	7.2																
Methylene chloride	ug/kg	1.5																
n-Butylbenzene	ug/kg	NS																
n-Propylbenzene	ug/kg	NS																
o-Chlorotoluene	ug/kg	NS																
o-Xylene	ug/kg	840	0.7	U	0.7	U		0.7	U	0.7	U		0.7	U		0.8	U	
Styrene	ug/kg	120																
tert-Butylbenzene	ug/kg	NS																
Tetrachloroethene	ug/kg	1.6																
Toluene	ug/kg	55	0.7		0.4	j		0.7	U	0.7	U		0.7	U		0.8	U	
trans-1,2-Dichloroethene	ug/kg	32																
trans-1,3-Dichloropropene	ug/kg	0.14																
trans-1,4-Dichlorobutene	ug/kg	NS																
Trichloroethene	ug/kg	0.27																
Vinyl acetate	ug/kg	2300																
Vinyl chloride	ug/kg	0.055																
Formaldehyde	ug/kg	NS																
TPH (mg/kg)																		
Gasoline Range Organics	mg/kg	30	4.7	U	9.7	U				5.0	U	4.9	U			4.6	U	
Diesel Range Organics	mg/kg	260					6.4	U	6.3	U			5.0	U		5.7	U	
Motor Oil Range Organics	mg/kg	2000					13	U	13	U			10	U		11	U	
TPH DROMORO	mg/kg	260					13	U	13	U			10	U		11	U	

**Saturated Soil Analytical Results Summary - Volatile
Organic Compounds & Total Petroleum Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington**

PH (mg/kg)		PH (mg/kg)																				
Gasoline Range Organics	mg/kg	30						110			7.0	U			6.6	U			7.5	U		
Diesel Range Organics	mg/kg	260	5.7	U	18		12	1600		6.0	U		6.0	U			6.5					53
Motor Oil Range Organics	mg/kg	2000	11	U	47		12	100		12	U		12	U			13	U				20
TPH DROMORO	mg/kg	260	11	U	65		24	1700		12	U		12	U			6.5					73

Table W-7
Saturated Soil Analytical Results Summary - Volatile
Organic Compounds & Total Petroleum Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Gasoline Range Organics	mg/kg	30	3.6	U		5.6	U		5.1	U		4.4	U		4.8	U		4.5	U		3.9	U		4.0	U	
Diesel Range Organics	mg/kg	260		16				6.5		14				5.7	U		6.3	U		9.2			6.1	U		98
Motor Oil Range Organics	mg/kg	2000		12	U			12	U	21				11	U		13			11			14			130
TPH DRO/MORO	mg/kg	260		16				6.5		35				11	U		13			20.2			14			228

**Saturated Soil Analytical Results Summary - Volatile
Organic Compounds & Total Petroleum Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington**

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Table W-7
Saturated Soil Analytical Results Summary - Volatile
Organic Compounds & Total Petroleum Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location			GP-61		GP-61		GP-61		GP-62		GP-62		GP-62		GP-62		GP-62		GP-63		GP-63		GP-63		GP-63		GP-63		GP-63		GP-64					
Sample Date			10/12/2012		10/12/2012		10/12/2012		9/5/2012		10/12/2012		10/12/2012		10/12/2012		10/12/2012		10/12/2012		10/12/2012		10/12/2012		10/12/2012		10/12/2012		10/12/2012		9/5/2012					
Sample ID			GP-61-6		GP-61-7.5-8.5		GP-61-8		GP-62-4		DUP101212-1A		DUP101212-2A		GP-62-5.8		GP-62-7.2		GP-63-4-6		DUP101212-3		GP-63-5		DUP101212-3A		GP-63-6-8		GP-63-7		GP-63-8-9		GP-63-8.5		GP-64-3.3-4.3	
Sample Type			N		N		N		N		FD		FD		N		N		N		FD		N		FD		N		N		N		N		N	
Sample Depth			6 ft		7.5-8.5 ft		8 ft		4 ft		5.8 ft		7.2 ft		5.8 ft		7.2 ft		4-6 ft		4-6 ft		5 ft		5 ft		6-8 ft		7 ft		8-9 ft		8.5 ft		3.3-4.3 ft	
Soil Layer			Dredged Fill		Interface at Top of Si		Interface at Top of Si		Dredged Fill		Dredged Fill		Interface at Top of Si		Dredged Fill		Interface at Top of Si		Shallow Fill		Shallow Fill		Shallow Fill		Shallow Fill		Shallow Fill		Shallow Fill		Shallow Fill		Dredged Fill			
VOCs (ug/kg)			Units		Screening Level																															
1,1,1,2-Tetrachloroethane			ug/kg		38000	0.6	U			0.7	U	0.7	U	0.6	U	0.8	U	0.7	U					0.6	U	0.8	U		0.7	U		0.8	U			
1,1,1-Trichloroethane			ug/kg		84	0.6	U			0.7	U	0.7	U	0.6	U	0.8	U	0.7	U					0.6	U	0.8	U		0.7	U		0.8	U			
1,1,2,2-Tetrachloroethane			ug/kg		0.08	0.6	U			0.7	U	0.7	U	0.6	U	0.8	U	0.7	U					0.6	U	0.8	U		0.7	U		0.8	U			
1,1,2-Trichloroethane			ug/kg		1	0.6	U			0.7	U	0.7	U	0.6	U	0.8	U	0.7	U					0.6	U	0.8	U		0.7	U		0.8	U			
1,1-Dichloroethane			ug/kg		2.6	0.6	U			0.7	U	0.7	U	0.6	U	0.8	U	0.7	U					0.6	U	0.8	U		0.7	U		0.8	U			
1,1-Dichloroethene			ug/kg		2.4	0.6	U			0.7	U	0.7	U	0.6	U	0.8	U	0.7	U					0.6	U	0.8	U		0.7	U		0.8	U			
1,1-Dichloropropene			ug/kg		NS	0.6	U			0.7	U	0.7	U	0.6	U	0.8	U	0.7	U					0.6	U	0.8	U		0.7	U		0.8	U			
1,2,3-Trichlorobenzene			ug/kg		20000	3.2	U			3.3	U	3.3	U	2.9	U	4.1	U	3.3	U	3.9	U			3.0	U	4.0	U		3.5	U		4.1	U			
1,2,3-Trichloropropane			ug/kg		33	1.3	U			1.3	U	1.3	U	1.2	U	1.6	U	1.3	U	1.6	U			1.2	U	1.6	U		1.4	U		1.6	U			
1,2,4-Trimethylbenzene			ug/kg		800000	0.6	U			0.7	U	0.7	U	0.6	U	0.8	U	0.7	U	0.4	J			0.6	U	0.8	U		0.7	U		0.8	U			
1,2-Dibromo-3-chloropropane			ug/kg		1300	3.2	U			3.3	U	3.3	U	2.9	U	4.1	U	3.3	U	3.9	U			3.0	U	4.0	U		3.5	U		4.1	U			
1,2-Dichloroethane			ug/kg		1.6	0.6	U			0.7	U	0.7	U	0.6	U	0.8	U	0.7	U	0.8	U			0.6	U	0.8	U		0.7	U		0.8	U			
1,2-Dichloropropane			ug/kg		1	0.6	U			0.7	U	0.7	U	0.6	U	0.8	U	0.7	U	0.8	U			0.6	U	0.8	U		0.7	U		0.8	U			
1,3,5-Trimethylbenzene			ug/kg		800000	0.6	U			0.7	U	0.7	U	0.6	U	0.8	U	0.7	U	0.8	U			0.6	U	0.8	U		0.7	U		0.8	U			
1,3-Dichloropropane			ug/kg		NS	0.6	U			0.7	U	0.7	U	0.6	U	0.8	U	0.7	U	0.8	U			0.6	U	0.8	U		0.7	U		0.8	U			
2,2-Dichloropropane			ug/kg		NS	0.6	U			0.7	U	0.7	U	0.6	U	0.8	U	0.7	U	0.8	U			0.6	U	0.8	U		0.7	U		0.8	U			
2-Butanone			ug/kg		NS	3.2	U			3.3	U	3.3	U	2.9	U	6.8	U	3.3	U	12	U			3.0	U	4.0	U		3.5	U		2.6	J			
2-Chloroethyl vinyl ether			ug/kg		NS	3.2	U			3.3	U	3.3	U	2.9	U	4.1	U	3.3	U	3.9	U			3.0	U	4.0	U		3.5	U		4.1	U			
2-Hexanone			ug/kg		400000	3.2	U			3.3	U	3.3	U	2.9	U	4.1	U	3.3	U	3.9	U			3.0	U	4.0	U		3.5	U		4.1	U			
2-Phenylbutane			ug/kg		NS	0.6	U			0.7	U	0.7	U	0.6	U	0.8	U	0.7	U	0.8	U			0.6	U	0.8	U		0.7	U		0.8	U			
4-Chlorotoluene			ug/kg		NS	0.6	U			0.7	U	0.7	U	0.6	U	0.8	U	0.7	U	0.8	U			0.6	U	0.8	U		0.7	U		0.8	U			
4-Methyl-2-pentanone			ug/kg		NS	3.2	U			3.3	U	3.3	U	2.9	U	4.1	U	3.3	U	3.9	U			3.0	U	4.0	U		3.5	U		4.1	U			
Acetone			ug/kg		2100	6.5	U			11	U	11	U	5.3	U	37	U	5.0	U	69	U			14	U	4.0	U		6.8	U		21	U			
Acrolein			ug/kg		40000	32	U			33	U	33	U	29	U	41	U	33	U	39	U			30	U	40	U		35	U		41	U			
Acrylonitrile			ug/kg		1900	3.2	U			3.3	U	3.3	U	2.9	U	4.1	U	3.3	U	3.9	U			3.0	U	4.0	U		3.5	U		4.1	U			
Benzene			ug/kg		0.56	0.6	U			0.7	U	0.7	U	0.6	U	0.8	U	0.7	U	0.6	J			0.6	U	0.8	U		0.7	U		0.8	U			
Bromobenzene			ug/kg		640000	0.6	U			0.7	U	0.7	U	0.6	U	0.8	U	0.7	U	0.8	U			0.6	U	0.8	U		0.7	U		0.8	U			
Bromodichloromethane			ug/kg		0.96	0.6	U			0.7	U	0.7	U	0.6	U	0.8	U	0.7	U	0.8	U			0.6	U	0.8	U		0.7	U		0.8	U			
Bromoform			ug/kg		5	0.6	U			0.7	U	0.7	U	0.6	U	0.8	U	0.7	U	0.8	U			0.6	U	0.8	U		0.7	U		0.8	U			
Carbon disulfide			ug/kg		270	9.1	U			2.0	U	0.7	U	2.5	U	2.4	U	0.7	U	4.2	U			0.6	U	0.8	U		3.4	U		3.6	U			
Carbon tetrachloride			ug/kg		0.15	0.6	U			0.7	U	0.7	U	0.6	U	0.8	U	0.7	U	0.8	U			0.6	U	0.8	U		0.7	U		0.8	U			
Chlorobenzene			ug/kg		51	0.6	U			0.7	U	0.7	U	0.6	U	0.8	U	0.7	U	0.8	U			0.6	U	0.8	U		0.7	U		0.8	U			
Chlorobromomethane			ug/kg		NS	0.6	U			0.7	U	0.7	U	0.6	U	0.8	U	0.7	U	0.8	U			0.6	U	0.8	U		0.7	U		0.8	U			
Chloroethane			ug/kg		NS	0.6	U			0.7	U	0.7	U	0.6	U	0.8	U	0.7	U	0.8	U			0.6	U	0.8	U		0.7	U		0.8	U			
Chloroform			ug/kg		4.8	0.6	U			0.7	U	0.7	U	0.6	U	0.8	U	0.7	U	0.8	U			0.6	U	0.8	U		0.7	U		0.8	U			
cis-1,2-Dichloroethene			ug/kg		5.2	0.6	U			0.7	U	0.7	U	0.6	U	0.8	U	0.7	U	0.8	U			0.6	U	0.8	U		0.7	U		0.8	U			
cis-1,3-Dichloropropene			ug/kg		0.14	0.6	U			0.7	U	0.7	U	0.6	U	0.8	U	0.7	U	0.8	U			0.6	U	0.8	U		0.7	U		0.8	U			
Cumene			ug/kg		NS	0.6	U			0.7	U	0.7	U	0.6	U	0.8	U	0.7	U	0.8	U			0.6	U	0.8	U		0.7	U		0.8	U			
Cymene			ug/kg		NS	0.6	U			0.7	U	0.7	U	0.6	U	0.8	U	0.7	U	0.8	U			0.6	U	0.8	U		0.7	U		0.8	U			
Dibromochloromethane			ug/kg		0.77	0.6	U			0.7	U	0.7	U	0.6	U	0.8	U	0.7	U	0.8	U			0.6	U	0.8	U		0.7	U		0.8	U			
Dibromomethane			ug/kg		800000	0.6	U			0.7	U	0.7	U	0.6	U	0.8	U	0.7	U	0.8	U			0.6	U	0.8	U		0.7	U		0.8	U			
Ethyl bromide			ug/kg		NS	1.3	U			1.3	U	1.3																								

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Table W-7
Saturated Soil Analytical Results Summary - Volatile
Organic Compounds & Total Petroleum Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location			GP-64		GP-64		GP-64		GP-64		GP-64		GP-65		GP-65		GP-65		GP-65		GP-65		GP-65		GP-75		MW-30S		MW-32S		MW-33S		MW-34S		MW-34S			
Sample Date			9/5/2012		10/12/2012		10/12/2012		10/12/2012		10/12/2012		9/5/2012		9/5/2012		10/12/2012		10/12/2012		10/12/2012		10/12/2012		10/4/2013		11/8/2011		11/11/2011		11/14/2011		11/9/2011		11/9/2011			
Sample ID			GP-64-3.3		GP-64-4.3-6		GP-64-5.1		GP-64-6-7		GP-64-6.5		GP-65-1.5-3.5		GP-65-2		GP-65-4-6		GP-65-5		GP-65-6-7		GP-65-6.5		GP-75-8.5-9.5		MW-30S-2.8		MW-32S-7		MW-33S-5.5		MW-34S-1.3-3.2		MW-34S-3			
Sample Type			N		N		N		N		N		N		N		N		N		N		N		N		N		N		N		N		N			
Sample Depth			3.3 ft		4.3-6 ft		5.1 ft		6-7 ft		6.5 ft		1.5-3.5 ft		2 ft		4-6 ft		5 ft		6-7 ft		6.5 ft		8.5-9.5 ft		2.8 ft		7 ft		5.5 ft		1.3-3.2 ft		3 ft			
Soil Layer			Shallow Fill		Dredged Fill		Dredged Fill		Interface at Top of Si		Interface at Top of Si		Shallow Fill		Shallow Fill		Dredged Fill		Dredged Fill		Interface at Top of Si		Dredged Fill		Interface at Top of Si		Dredged Fill		Dredged Fill		Dredged Fill		Shallow Fill		Shallow Fill			
VOCs (ug/kg)		Units	Screening Level																																			
1,1,1,2-Tetrachloroethane		ug/kg	38000				0.7		U		0.9		U						0.8		U		0.8		U						0.23		U		0.21		U	
1,1,1-Trichloroethane		ug/kg	84				0.7		U		0.9		U						0.8		U		0.8		U						0.22		U		0.21		U	
1,1,2,2-Tetrachloroethane		ug/kg	0.08				0.7		U		0.9		U						0.8		U		0.8		U				0.24		U		0.23		U			
1,1,2-Trichloroethane		ug/kg	1				0.7		U		0.9		U						0.8		U		0.8		U				0.28		U		0.26		U			
1,1-Dichloroethane		ug/kg	2.6				0.7		U		0.9		U						0.8		U		0.8		U				0.20		UJ		0.19		U			
1,1-Dichloroethene		ug/kg	2.4				0.7		U		0.9		U						0.8		U		0.8		U				0.32		U		0.31		U			
1,1-Dichloropropene		ug/kg	NS				0.7		U		0.9		U						0.8		U		0.8		U				0.30		U		0.29		U			
1,2,3-Trichlorobenzene		ug/kg	20000				3.5		U		4.7		U						3.9		U		3.8		U				0.29		U		0.28		U			
1,2,3-Trichloropropane		ug/kg	33				1.4		U		1.9		U						1.6		U		1.5		U				0.50		U		0.47		U			
1,2,4-Trimethylbenzene		ug/kg	800000				0.7		U		0.9		U						0.8		U		0.8		U				0.22		U		0.21		U			
1,2-Dibromo-3-chloropropane		ug/kg	1300				3.5		U		4.7		U						3.9		U		3.8		U				0.57		U		0.54		U			
1,2-Dichloroethane		ug/kg	1.6				0.7		U		0.9		U						0.8		U		0.8		U				0.18		U		0.17		U			
1,2-Dichloropropane		ug/kg	1				0.7		U		0.9		U						0.8		U		0.8		U				0.16		U		0.15		U			
1,3,5-Trimethylbenzene		ug/kg	800000				0.7		U		0.9		U						0.8		U		0.8		U				0.25		U		0.23		U			
1,3-Dichloropropane		ug/kg	NS				0.7		U		0.9		U						0.8		U		0.8		U				0.20		U		0.19		U			
2,2-Dichloropropane		ug/kg	NS				0.7		U		0.9		U						0.8		U		0.8		U				0.28		U		0.27		U			
2-Butanone		ug/kg	NS				3.5		U		8.4								3.9		U		2.3		J				0.50		U		0.47		U			
2-Chloroethyl vinyl ether		ug/kg	NS				3.5		U		4.7		U						3.9		U		3.8		U				0.27		U		0.25		U			
2-Hexanone		ug/kg	400000				3.5		U		4.7		U						3.9		U		3.8		U				0.42		U		0.40		U			
2-Phenylbutane		ug/kg	NS				0.7		U		0.9		U						0.8		U		0.8		U				0.23		U		0.22		U			
4-Chlorotoluene		ug/kg	NS				0.7		U		0.9		U						0.8		U		0.8		U				0.27		U		0.25		U			
4-Methyl-2-pentanone		ug/kg	NS				3.5		U		4.7		U						3.9		U		3.8		U				0.41		U		0.38		U			
Acetone		ug/kg	2100				8.1		U		53								17		U		15		U				21				7.2		U			
Acrolein		ug/kg	40000				35		U		47		U						39		U		38		U				3.7		UJ		3.5		UJ			
Acrylonitrile		ug/kg	1900				3.5		U		4.7		U						3.9		U		3.8		U				1.0		U		0.94		U			
Benzene		ug/kg	0.56				0.7		U		0.9		U						0.8		U		0.8		U				0.29		U		0.27		U			
Bromobenzene		ug/kg	640000				0.7		U		0.9		U						0.8		U		0.8		U				0.15		U		0.14		U			
Bromodichloromethane		ug/kg	0.96				0.7		U		0.9		U						0.8		U		0.8		U				0.25		U		0.23		U			
Bromoform		ug/kg	5				0.7		U		0.9		U						0.8		U		0.8		U				0.29		U		0.27		U			
Carbon disulfide		ug/kg	270				11		J		13								7.4		J		9.0		J				1.9				0.51		U			
Carbon tetrachloride		ug/kg	0.15				0.7		U		0.9		U						0.8		U		0.8		U				0.21		U		0.19		U			
Chlorobenzene		ug/kg	51				0.7		U		0.9		U						0.8		U		0.8		U				0.21		U		0.20		U			
Chlorobromomethane		ug/kg	NS				0.7		U		0.9		U						0.8		U		0.8		U				0.31		U		0.30		U			
Chloroethane		ug/kg	NS				0.7		U		0.9		U						0.8		U		0.8		U				0.45		UJ		0.42		U			
Chloroform		ug/kg	4.8				0.7		U		0.9		U						0.8		U		0.8		U				0.23		U		0.21		U			
cis-1,2-Dichloroethene		ug/kg	5.2				0.7		U		0.9		U						0.8		U		0.8		U				0.23		U		0.22		U			
cis-1,3-Dichloropropene		ug/kg	0.14				0.7		U		0.9		U						0.8		U		0.8		U				0.22		U		0.21		U			
Cumene		ug/kg	NS				0.7		U		0.9		U						0.8		U		0.8		U				0.23		U		0.21		U			
Cymene		ug/kg	NS				0.7		U		0.9		U						0.8		U		0.8		U				0.23		U		0.22		U			
Dibromochloromethane		ug/kg	0.77				0.7		U		0.9		U						0.8		U		0.8		U				0.26		U		0.24		U			
Dibromomethane		ug/kg	800000				0.7		U		0.9		U						0.8		U		0.8		U				0.14		U		0.13		U			
Ethyl bromide		ug/kg	NS				1.4		U		1.9		U						1.6		U		1.5		U				0.43		U		0.40		U			
Ethylbenzene		ug/kg	15				0.7		U		0.9		U						0.8		U		0.8		U				0.20		U		0.18		U			
Ethylene dibromide		ug/kg	0.018				0.4		J		0.9		U						0.5		J		0.8		U				0.17		U		0.16		U			
Freon 11		ug/kg	NS				0.7		U		0.9		U						0.8		U		0.8		U				0.26		U		0.24		U			
Freon 113		ug/kg	NS				1.4		U		1.9		U						1.6		U		1.5		U				0.28		U		0.26		U			
m,p Xylenes		ug/kg	NS				0.7		U		0.9		U						0.8		U		0.8		U				0.38		U		0.36		U			
Methyl bromide		ug/kg	3.3				0.7		U		0.9		U						0.8		U		0.8		U				0.18		UJ		0.17		UJ			
Methyl chloride		ug/kg	NS				0.7		U		0.9		U						0.8		U		0.8		U				0.25		UJ		0.24		U			
Methyl iodide		ug/kg	NS				0.7		U		0.9		U						0.8		U		0.8		U				0.21		U		0.20		U			
Methyl tert-butyl ether		ug/kg	7.2				0.7		U		0.9		U						0.8		U		0.8		U				0.22		UJ		0.21		UJ			
Methylene chloride		ug/kg	1.5				1.8		U		1.9		U						1.8		U		1.5		U				1.5		J		0.58		U			
n-Butylbenzene		ug/kg	NS				0.7		U		0.9		U						0.8		U		0.8		U				0.25		U		0.24		U			
n-Propylbenzene		ug/kg	NS				0.7		U		0.9		U						0.8		U		0.8		U				0.26		U		0.25		U			
o-Chlorotoluene		ug/kg	NS				0.7		U		0.9		U						0.8		U		0.8		U				0.29		U		0.27		U			
o-Xylene		ug/kg	840				0.7		U		0.9		U						0.8		U		0.8		U				0.22		U		0.20		U			
Styrene		ug/kg	120				0.7		U		0.9		U						0.8		U		0.8		U				0.13		U		0.13		U			
tert-Butylbenzene		ug/kg	NS				0.7		U		0.9		U						0.8		U		0.8		U				0.30		U		0.28		U			

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Table W-7
Saturated Soil Analytical Results Summary - Volatile
Organic Compounds & Total Petroleum Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location			MW-34S	MW-34S	MW-35S	MW-35S	MW-35D	MW-43D	MW-43D	MW-43D	MW-45D	TB-06B	TB-06B					
Sample Date			11/9/2011	11/9/2011	11/9/2011	11/9/2011	10/10/2013	10/10/2013	10/10/2013	10/10/2013	1/16/2014	1/14/2014	1/14/2014					
Sample ID			MW-34S-3.8-4.2	DUP-110911-3	MW-35S-5.7-6.3	MW-35S-6.3	MW-35D-7.0	MW-43D-5.25-6.75	MW-43D-6.9	MW-45D-12.5-13.0	TB-06B-6-11	DUP011414-1						
Sample Type			N	FD	N	N	N	N	N	N	N	N	FD					
Sample Depth			3.8-4.2 ft	3.8-4.2 ft	5.7-6.3 ft	6.3 ft	7 ft	5.25-6.7 ft	6.9 ft	12.5-13 ft	6-11 ft	6-11 ft						
Soil Layer			Dredged Fill	Dredged Fill	Dredged Fill	Dredged Fill	Dredged Fill	Shallow Fill	Dredged Fill	Interface at Top of Si	Shallow Fill	Shallow Fill						
VOCs (ug/kg)	Units	Screening Level																
1,1,1,2-Tetrachloroethane	ug/kg	38000	0.25	U	0.27	U		0.17	U		0.71	U	0.17	U	0.19	U		
1,1,1-Trichloroethane	ug/kg	84	0.25	U	0.26	U		0.16	U		0.69	U	0.27	U	0.17	U	0.19	U
1,1,2,2-Tetrachloroethane	ug/kg	0.08	0.28	U	0.29	U		0.18	U		0.78	U	0.30	U	0.19	U	0.21	U
1,1,2-Trichloroethane	ug/kg	1	0.31	U	0.33	U		0.21	U		0.88	U	0.34	U	0.21	U	0.24	U
1,1-Dichloroethane	ug/kg	2.6	0.22	U	0.24	U		0.15	U		0.62	U	0.24	U	0.15	U	0.17	U
1,1-Dichloroethene	ug/kg	2.4	0.37	U	0.39	U		0.25	U		1.0	U	0.39	U	0.25	U	0.28	U
1,1-Dichloropropene	ug/kg	NS	0.34	U	0.36	U		0.23	U		0.96	U	0.37	U	0.23	U	0.26	U
1,2,3-Trichlorobenzene	ug/kg	20000	0.33	U	0.35	U		0.22	U		0.94	U	0.36	U	0.22	U	0.25	U
1,2,3-Trichloropropane	ug/kg	33	0.56	U	0.60	U		0.38	U		1.6	U	0.61	U	0.38	U	0.43	U
1,2,4-Trimethylbenzene	ug/kg	800000	0.25	U	0.27	U		0.17	U		3.5		27	U	0.17	U	0.19	U
1,2-Dibromo-3-chloropropane	ug/kg	1300	0.64	U	0.68	U		0.43	UJ		1.8	UJ	69	U	0.43	U	0.49	U
1,2-Dichloroethane	ug/kg	1.6	0.21	U	0.22	U		0.14	U		0.59	U	22	U	0.14	U	0.16	U
1,2-Dichloropropane	ug/kg	1	0.18	U	0.19	U		0.12	U		0.50	U	19	U	0.12	U	0.14	U
1,3,5-Trimethylbenzene	ug/kg	800000	0.28	U	0.29	U		0.19	U		0.78	U	0.30	U	0.19	U	0.21	U
1,3-Dichloropropane	ug/kg	NS	0.23	U	0.24	U		0.15	U		0.64	U	0.25	U	0.15	U	0.17	U
2,2-Dichloropropane	ug/kg	NS	0.32	U	0.34	U		0.21	U		0.90	U	0.34	U	0.21	U	0.24	U
2-Butanone	ug/kg	NS	3.3	J	0.60	U		0.37	U		36		60	U	0.38	U	0.43	U
2-Chloroethyl vinyl ether	ug/kg	NS	0.30	U	0.32	U		0.20	U		0.85	U	32	U	0.20	U	0.23	U
2-Hexanone	ug/kg	400000	0.48	U	0.51	U		0.32	U		1.3	U	52	U	0.32	U	0.37	U
2-Phenylbutane	ug/kg	NS	0.26	U	0.28	U		0.18	U		0.74	U	28	U	0.18	U	0.20	U
4-Chlorotoluene	ug/kg	NS	0.30	U	0.32	U					0.85	U	33	U	0.20	U	0.23	U
4-Methyl-2-pentanone	ug/kg	NS	0.46	U	0.49	U		0.31	U		1.3	U	49	U	0.31	U	0.35	U
Acetone	ug/kg	2100	48		36			20	U		520		1300		0.35	U	0.40	U
Acrolein	ug/kg	40000	4.2	UJ	4.4	UJ		2.8	U		12	U	450	U	2.8	U	3.2	U
Acrylonitrile	ug/kg	1900	1.1	U	1.2	U		0.75	U		3.2	U	120	U	0.76	U	0.86	U
Benzene	ug/kg	0.56	0.32	U	0.34	U		0.22	U		0.91	U	35	U	0.5	J	0.6	J
Bromobenzene	ug/kg	640000	0.17	U	0.18	U		0.11	U		0.47	U	18	U	0.11	U	0.13	U
Bromodichloromethane	ug/kg	0.96	0.28	U	0.29	U		0.19	U		0.78	U	30	U	0.19	U	0.21	U
Bromoform	ug/kg	5	0.32	U	0.34	U		0.22	U		0.91	U	35	U	0.22	U	0.25	U
Carbon disulfide	ug/kg	270	5.7		3.9			43	J		1.7	U	66	U	0.41	U	0.47	U
Carbon tetrachloride	ug/kg	0.15	0.23	U	0.25	U		0.16	U		0.85	U	25	U	0.16	U	0.18	U
Chlorobenzene	ug/kg	51	0.24	U	0.25	U		0.16	U		0.67	U	26	U	0.16	U	0.18	U
Chlorobromomethane	ug/kg	NS	0.35	U	0.37	UJ		0.24	U		0.99	U	38	U	0.24	U	0.27	U
Chloroethane	ug/kg	NS	0.50	U	0.54	U		0.34	U		1.4	U	54	U	0.34	U	0.39	U
Chloroform	ug/kg	4.8	0.26	U	0.27	U		0.17	U		0.72	U	27	U	0.17	U	0.20	U
cis-1,2-Dichloroethene	ug/kg	5.2	0.26	U	0.28	U		0.18	U		0.74	U	28	U	0.18	U	0.20	U
cis-1,3-Dichloropropene	ug/kg	0.14	0.25	U	0.26	U		0.16	U		0.69	U	27	U	0.17	U	0.19	U
Cumene	ug/kg	NS	0.25	U	0.27	U		0.17	U		0.71	U	27	U	0.17	U	0.19	U
Cymene	ug/kg	NS	0.26	U	0.27	U		0.5	J		120		8600		0.17	U	0.20	U
Dibromochloromethane	ug/kg	0.77	0.29	U	0.31	U		0.19	U		0.82	U	31	U	0.20	U	0.22	U
Dibromomethane	ug/kg	800000	0.16	U	0.17	U		0.11	U		0.45	U	17	U	0.11	U	0.12	U
Ethyl bromide	ug/kg	NS	0.48	U	0.51	U		0.32	U		1.3	U	52	U	0.32	U	0.37	U
Ethylbenzene	ug/kg	15	0.22	U	0.23	U		0.15	U		0.62	U	24	U	0.15	U	0.17	U
Ethylene dibromide	ug/kg	0.018	0.19	U	0.20	U		0.13	U		0.54	U	21	U	0.13	U	0.15	U
Freon 11	ug/kg	NS	0.29	U	0.31	U		0.19	U		0.82	U	31	U	0.20	U	0.22	U
Freon 113	ug/kg	NS	0.31	U	0.33	U		0.21	U		0.88	U	34	U	0.21	U	0.24	U
m,p Xylenes	ug/kg	NS	0.43	U	0.45	U		0.29	U		1.2	U	46	U	0.29	U	0.33	U
Methyl bromide	ug/kg	3.3	0.20	UJ	0.22	U		0.14	U		0.57	U	22	U	0.14	UJ	0.16	UJ
Methyl chloride	ug/kg	NS	0.29	U	0.31	U		0.19	U		0.81	U	31	U	0.19	U	0.22	U
Methyl iodide	ug/kg	NS	0.23	U	0.25	U		0.16	U		0.66	U	25	U	0.16	U	0.18	U
Methyl tert-butyl ether	ug/kg	7.2	0.25	U	0.27	U		0.17	U		0.71	U	27	U	0.17	U	0.19	U
Methylene chloride	ug/kg	1.5	3.0	U	2.9	U		7.6	UJ		26	UJ	75	U	0.47	U	0.53	U
n-Butylbenzene	ug/kg	NS	0.29	U	0.30	U		0.19	U		0.80	U	31	U	0.19	U	0.22	U
n-Propylbenzene	ug/kg	NS	0.30	U	0.32	U		0.20	U		0.83	U	32	U	0.20	U	0.23	U
o-Chlorotoluene	ug/kg	NS	0.33	U	0.35	U		0.22	U		0.92	U	35	U	0.22	U	0.25	U
o-Xylene	ug/kg	840	0.24	U	0.26	U		0.16	U		0.69	U	26	U	0.16	U	0.19	U
Styrene	ug/kg	120	0.15	U	0.16	U		0.10	U		0.42	U	16	U	0.10	U	0.12	U
tert-Butylbenzene	ug/kg	NS	0.33	U	0.35	U		0.22	U		0.94	U	36	U	0.22	U	0.26	U
Tetrachloroethene	ug/kg	1.6	0.28	U	0.30	U		0.19	U		0.79	U	30	U	0.19	U	0.21	U
Toluene	ug/kg	55	0.16	U	0.18	U		0.5	J		2.8	J	18	U	0.11	U	0.13	U
trans-1,2-Dichloroethene	ug/kg	32	0.29	U	0.31	U		0.19	U		0.82	U	31	U	0.20	U	0.22	U
trans-1,3-Dichloropropene	ug/kg	0.14	0.24	U	0.25	U		0.16	U		0.66	U	25	U	0.16	U	0.18	U
trans-1,4-Dichlorobutene	ug/kg	NS	0.48	U	0.51	U		0.32	U		1.3	U	51	U	0.32	U	0.36	U
Trichloroethene	ug/kg	0.27	0.23	U	0.25	U		0.15	U		0.65	U	25	U	0.16	U	0.18	U
Vinyl acetate	ug/kg	2300	0.42	U	0.44	U		0.28	U		1.2	U	45	U	0.28	U	0.32	U
Vinyl chloride	ug/kg	0.055	0.26	U	0.27	U		0.17	U		0.72	U	28	U	0.17	U	0.20	U
Formaldehyde	ug/kg	NS																
TPH (mg/kg)																		
Gasoline Range Organics	mg/kg	30	3.2	U	3.0	U		3.2	U		1.6	U	38					
Diesel Range Organics	mg/kg	260	1.6	U	1.6	U	1.6	U			16	UJ	2000	J				
Motor Oil Range Organics	mg/kg	2000	3.0	U	3.0	U	3.0	U			20	U	760					
TPH DRO/MORO	mg/kg	260	3	U	3	U	3	U			20	U	2760					

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Table W-7

Saturated Soil Analytical Results Summary - Volatile Organic Compounds & Total Petroleum Hydrocarbons 5900 West Marginal Way Site Seattle, Washington

Notes:

Units are in micrograms per kilogram ($\mu\text{g}/\text{kg}$).

Cells are left blank where compound was not analyzed.

Green-shaded, bolded values indicate detected concentration exceeds the selected screening level.

Light gray-shaded values indicate that the method detection limit exceeds the screening level.

NFG (National Functional Guidelines) = U.S. Environmental Protection Agency (USEPA) Contract Laboratory Program

National Functional Guidelines for Organic Data Review, October 1999 or USEPA Contract. Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004.

Key:

$\mu\text{g}/\text{kg}$ = micrograms per kilogram

DRO/MORO = diesel range organics/motor oil range organics

DUP = field duplicate sample

ft = feet

FD = field duplicate sample

GP = direct-push boring

N = normal field sample

NS = no screening level

mg/kg = milligrams per kilogram

MW = monitoring well

TB = top of riverbank boring

TP = test pit

TPH = total petroleum hydrocarbon

VOCs = volatile organic compounds

Laboratory Data Qualifiers:

j = The value reported is less than the reporting limit and should be considered an estimate; qualifier reported by the laboratory.

J = The detected results are qualified as estimated in accordance with National Functional Guidelines (NFGs).

NJ = Tentatively identified and estimated.

U = Result is $\leq$ the laboratory detection limit or qualified as non-detect in accordance with NFGs.

UJ = Non-detected compound qualified as estimated in accordance with NFGs.

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Table W-8
Saturated Soil Analytical Results Summary - Semivolatile
Organic Compounds & Polycyclic Aromatic Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location			GP-1	GP-1	GP-2	GP-2	GP-3	GP-3	GP-4	GP-5	GP-5	GP-5	GP-6	GP-7	GP-7	GP-7	GP-9	GP-16	MW-2S
Sample Date			12/4/1995	12/4/1995	12/4/1995	12/5/1995	12/4/1995	12/4/1995	12/4/1995	12/4/1995	12/4/1995	12/4/1995	12/4/1995	12/4/1995	12/4/1995	12/4/1995	12/5/1995	12/4/1995	12/6/1995
Sample ID			GP-1:3-4:12041995	GP-1:11-12:12041995	GP-2:3-4:12041995	GP-2:13-14:12041995	GP-3:3-4:12041995	GP-3:7-8:12041995	GP-4:3-4:12041995	GP-5:3-4:12041995	GP-5:7-8:12041995	GP-5:11-12:12041995	GP-6:3-4:12041995	GP-7:7-8:12041995	GP-7:9-10:12041995	GP-7:15-16:12041995	GP-9:11-12:12051995	GP-16:7-8:12071995	MW-2S:10-11:12061995
Sample Type			N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Sample Depth			3-4 ft	11-12 ft	3-4 ft	13-14 ft	3-4 ft	7-8 ft	3-4 ft	3-4 ft	7-8 ft	11-12 ft	3-4 ft	7-8 ft	9-10 ft	15-16 ft	11-12 ft	7-8 ft	10-11 ft
Soil Layer			Dredged Fill	Middle Silt	Dredged Fill	Middle Silt	Dredged Fill	Dredged Fill	Shallow Fill	Dredged Fill	Dredged Fill	Middle Silt	Dredged Fill	Dredged Fill	Dredged Fill	Interface at Top of Silt	Middle Silt	Dredged Fill	Middle Silt
SVOCs (ug/kg)			TEF	Screening Level															
Pentachlorophenol	--	0.0018	1200 U	1300 U	2200	69000	240 j	1200 U	1100 U	250 j	1200 U	1600 U	1300 U	830000 D	880 j	2000	1500 U	1000000 D	1700 U
2,3,4,6-Tetrachlorophenol	--	270	240 U	260 U	340	650 U	230 U	240 U	220 U	230 U	240 U	320 U	250 U	98000 E	250 U	300 U	290 U	62000 E	350 U
2,3,5,6-Tetrachlorophenol	--	NS	240 U	260 U	220 U	5000	230 U	240 U	220 U	230 U	240 U	320 U	250 U	240 U	250 U	300 U	290 U	240 U	350 U
2,4,5-Trichlorophenol	--	1100	240 U	260 U	220 U	780	230 U	240 U	220 U	230 U	240 U	320 U	250 U	240 U	250 U	300 U	290 U	240 U	350 U
2,4,6-Trichlorophenol	--	0.19	240 U	260 U	220 U	650 U	230 U	240 U	220 U	230 U	240 U	320 U	250 U	220 j	250 U	300 U	290 U	200 j	350 U
2,4-Dichlorophenol	--	4.3	240 U	260 U	220 U	650 U	230 U	240 U	220 U	230 U	240 U	320 U	250 U	420	250 U	300 U	290 U	270	350 U
2-Chlorophenol	--	11	240 U	260 U	220 U	650 U	230 U	240 U	220 U	230 U	240 U	320 U	250 U	91 j	250 U	110 j	290 U	66 j	220 j
Phenol	--	120																	
Hexachlorobenzene	--	0.0004																	
1,2,4-Trichlorobenzene	--	0.072																	
1,2-Dichlorobenzene	--	3.1																	
1,3-Dichlorobenzene	--	NS																	
1,4-Dichlorobenzene	--	8.1																	
2,2-Oxybis(1-chloropropane)	--	NS																	
2,4-Dimethylphenol	--	3.1																	
2,4-Dinitrophenol	--	9.2																	
2,4-Dinitrotoluene	--	0.069																	
2,6-Dinitrotoluene	--	0.021																	
2-Chloronaphthalene	--	NS																	
2-Nitroaniline	--	800000																	
2-Nitrophenol	--	NS																	
3,3'-Dichlorobenzidine	--	0.0033																	
3-Nitroaniline	--	NS																	
4-Bromophenyl phenyl ether	--	NS																	
4-Chloro-3-methylphenol	--	NS																	
4-Chlorophenyl phenyl ether	--	NS																	
4-Nitrophenol	--	7000																	
Benzoic acid	--	170																	
Benzyl alcohol	--	57																	
Benzyl butyl phthalate	--	0.18																	
Bis(2-chloroethoxy)methane	--	NS																	
Bis(2-ethylhexyl)phthalate	--	5.1																	
Carbazole	--	NS																	
Dibutyl Phthalate	--	15																	
Dichloroethyl ether	--	0.014																	
Diethyl Phthalate	--	34																	
Dimethylphthalate	--	71																	
Dinitro-o-cresol	--	NS																	
Di-n-octyl phthalate	--	330																	
Hexachloroethane	--	0.041																	
Hexachlorocyclopentadiene	--	200																	
Hexachlorobutadiene	--	0.54																	
Isophorone	--	15																	
Nitrobenzene	--	6.5																	
n-Nitrosodi-n-propylamine	--	0.0039																	
n-Nitrosodiphenylamine	--	1.1																	
o-Cresol	--	10																	
p-Chloroaniline	--	0.077																	
p-Cresol	--	670																	
p-Nitroaniline	--	NS																	
PAHs (ug/kg)																			
1-Methylnaphthalene	--	29000																	
2-Methylnaphthalene	--	670																	
Acenaphthene	--	28																	
Acenaphthylene	--	1300																	
Anthracene	--	51																	
Benzo(a)anthracene	0.1	0.057																	
Benzo(a)pyrene	1	0.016																	
Total (B+J+K) Benzofluoranthenes	0.1	3200																	
Benzo(g,h,i)perylene	--	670																	
Chrysene	0.01	6.4																	
Dibenzo(a,h)anthracene	0.1	0.029																	
Dibenzofuran	--	540																	
Fluoranthene	--	90																	
Fluorene	--	29																	
Indeno(1,2,3-cd)pyrene	0.1	0.56																	
Naphthalene	--	2.1																	
Phenanthrene	--	1500																	
Pyrene	--	140																	
Carcinogenic PAHs TEQ ND=0 ⁻¹	--	0.016																	
Carcinogenic PAHs TEQ ND=1/2DL ⁻¹	--	0.016																	

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Table W-8
Saturated Soil Analytical Results Summary - Semivolatile
Organic Compounds & Polycyclic Aromatic Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location			MW-2D	MW-2D	MW-2D	MW-4S	MW-5S	MW-5S	MW-6S	MW-6S	MW-7S	MW-7S	TP-2 (95)	TP-2 (95)	TP-3 (95)	TP-3 (95)	TP-5 (95)	TP-7	TP-9	
Sample Date			12/6/1995	12/6/1995	12/6/1995	12/6/1995	4/10/1996	4/10/1996	4/10/1996	4/10/1996	4/10/1996	4/10/1996	11/30/1995	11/30/1995	11/30/1995	11/30/1995	11/30/1995	12/1/1995	12/1/1995	11/30/1995
Sample ID			MW-2D:10-11:12061995	MW-2D:17-18:12061995	MW-10D:17-18:12061995	MW-4S:10-11:12061995	MW-5S:5-6.5:4101996	MW-5S:7.5-9:4101996	MW-6S:5-6.5:4101996	MW-6S:7.5-9:4101996	MW-7S:5-6.5:4101996	MW-7S:7.5-9:4101996	TP-2:4-5:11301995	TP-2:5-6:11301995	TP-3:3-4:11301995	TP-3:5-6:11301995	TP-5:2-3:12011955	TP-7:2-3:12011995	TP-9:3-4:11301995	
Sample Type			N	N	FD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Sample Depth			10-11 ft	17-18 ft	17-18 ft	10-11 ft	5-6.5 ft	7.5-9 ft	5-6.5 ft	7.5-9 ft	5-6.5 ft	7.5-9 ft	4-5 ft	5-6 ft	3-4 ft	5-6 ft	2-3 ft	2-3 ft	3-4 ft	
Soil Layer			Middle Silt	Lower Sand	Lower Sand	Interface at Top of Silt	Shallow Fill	Dredged Fill	Shallow Fill	Dredged Fill	Dredged Fill	Dredged Fill	Dredged Fill	Dredged Fill	Shallow Fill	Dredged Fill	Shallow Fill	Dredged Fill	Shallow Fill	
SVOCs (ug/kg)			TEF	Screening Level																
Pentachlorophenol	--	0.0018	1400 U	1100 U	1200 U	1600 U	14 U	54	17 U	15 U	1800	420	430 U	310 U	1200 U	390 U	5000	3400 U	540 U	
2,3,4,6-Tetrachlorophenol	--	270	280 U	230 U	240 U	320 U							210 U	160 U	230 U	190 U	170 U	1700 U	270 U	
2,3,5,6-Tetrachlorophenol	--	NS	280 U	230 U	240 U	320 U							210 U	160 U	230 U	190 U	67	1700 U	270 U	
2,4,5-Trichlorophenol	--	1100	280 U	230 U	240 U	320 U							220 U	160 U	230 U	200 U	170 U	1700 U	270 U	
2,4,6-Trichlorophenol	--	0.19	280 U	230 U	240 U	320 U							210 U	160 U	230 U	190 U	170 U	1700 U	270 U	
2,4-Dichlorophenol	--	4.3	280 U	230 U	240 U	320 U							110 U	79 U	230 U	99 U	86 U	860 U	140 U	
2-Chlorophenol	--	11	280 U	230 U	240 U	320 U							240 U	180 U	230 U	220 U	190 U	1900 U	300 U	
Phenol	--	120																		
Hexachlorobenzene	--	0.0004																		
1,2,4-Trichlorobenzene	--	0.072																		
1,2-Dichlorobenzene	--	3.1																		
1,3-Dichlorobenzene	--	NS																		
1,4-Dichlorobenzene	--	8.1																		
2,2-Oxybis(1-chloropropane)	--	NS																		
2,4-Dimethylphenol	--	3.1																		
2,4-Dinitrophenol	--	9.2																		
2,4-Dinitrotoluene	--	0.069																		
2,6-Dinitrotoluene	--	0.021																		
2-Chloronaphthalene	--	NS																		
2-Nitroaniline	--	800000																		
2-Nitrophenol	--	NS																		
3,3'-Dichlorobenzidine	--	0.0033																		
3-Nitroaniline	--	NS																		
4-Bromophenyl phenyl ether	--	NS																		
4-Chloro-3-methylphenol	--	NS																		
4-Chlorophenyl phenyl ether	--	NS																		
4-Nitrophenol	--	7000																		
Benzoic acid	--	170																		
Benzyl alcohol	--	57																		
Benzyl butyl phthalate	--	0.18																		
Bis(2-chloroethoxy)methane	--	NS																		
Bis(2-ethylhexyl)phthalate	--	5.1																		
Carbazole	--	NS																		
Dibutyl Phthalate	--	15																		
Dichloroethyl ether	--	0.014																		
Diethyl Phthalate	--	34																		
Dimethylphthalate	--	71																		
Dinitro-o-cresol	--	NS																		
Di-n-octyl phthalate	--	330																		
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Chrysene	0.01	6.4																		
Dibenzo(a,h)anthracene	0.1	0.029																		
Dibenzofuran	--	540																		
Fluoranthene	--	90																		
Fluorene	--	29																		
Indeno(1,2,3-cd)pyrene	0.1	0.56																		
Naphthalene	--	2.1																		
Phenanthrene	--	1500																		
Pyrene	--	140																		
Carcinogenic PAHs TEQ ND=0 ¹	--	0.016																		
Carcinogenic PAHs TEQ ND=1/2DL ¹	--	0.016																		

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Table W-8
Saturated Soil Analytical Results Summary - Semivolatile
Organic Compounds & Polycyclic Aromatic Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location			TP-9	TP-10	TP-11	TP-11	TP-12	TP-13	MW-10S	MW-10S	MW-11S	MW-11S	MW-12S	MW-12S	MW-13S	MW-13S	MW-15S	MW-15S
Sample Date			11/30/1995	11/30/1995	12/1/1995	12/1/1995	12/1/1995	12/1/1995	10/13/1998	10/13/1998	10/13/1998	10/13/1998	10/13/1998	10/13/1998	10/13/1998	10/13/1998	10/13/1998	10/13/1998
Sample ID			TP-9-5-6:11301995	TP-10-6-7:11301995	TP-11-3-4:11301995	TP-11-6-7:11301995	TP-12-6-7:11301995	TP-13-6-7:11301995	MW-10-5-5-6.5:10131998	MW-10-10-10.5:10131998	MW-11-5.5-6.5:10131998	MW-11-10-10.5:10131998	MW-12-5.5-6.5:10131998	MW-12-10-11.5:10131998	MW-13-5.5-6.5:10131998	MW-13-11-11.5:10131998	MW-15-5.5-6.5:10131998	MW-15-10-11.5:10131998
Sample Type			N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Sample Depth			5-6 ft	6-7 ft	3-4 ft	3-7 ft	6-7 ft	6-7 ft	5.5-6.5 ft	10-10.5 ft	5.5-6.5 ft	10-10.5 ft	5.5-6.5 ft	10-11.5 ft	5.5-6.5 ft	11-11.5 ft	5.5-6.5 ft	10-11.5 ft
Soil Layer			Dredged Fill	Dredged Fill	Shallow Fill	Dredged Fill	Dredged Fill	Dredged Fill	Dredged Fill	Middle Silt	Dredged Fill	Middle Silt	Dredged Fill	Middle Silt	Dredged Fill	Middle Silt	Dredged Fill	Middle Silt
SVOCs (ug/kg)			TEF	Screening Level														
Pentachlorophenol			--	0.0018	340 U	980	300 U	210000	1000	270 j	1920	330	1580	79.9	50 U	50 U	50 U	4400
2,3,4,6-Tetrachlorophenol			--	270	170 U	170 U	150 U	3600 U	150 U	160 U								
2,3,5,6-Tetrachlorophenol			--	NS	170 U	67 j	150 U	5600	150 U	160 U								
2,4,5-Trichlorophenol			--	1100	170 U	170 U	150 U	3700 U	160 U	160 U								
2,4,6-Trichlorophenol			--	0.19	170 U	170 U	150 U	3600 U	150 U	160 U								
2,4-Dichlorophenol			--	4.3	86 U	86 U	75 U	1900 U	79 U	82 U								
2-Chlorophenol			--	11	190 U	190 U	65 j	4200 U	180 U	180 U								
Phenol			--	120														
Hexachlorobenzene			--	0.0004														
1,2,4-Trichlorobenzene			--	0.072														
1,2-Dichlorobenzene			--	3.1														
1,3-Dichlorobenzene			--	NS														
1,4-Dichlorobenzene			--	8.1														
2,2-Oxybis(1-chloropropane)			--	NS														
2,4-Dimethylphenol			--	3.1														
2,4-Dinitrophenol			--	9.2														
2,4-Dinitrotoluene			--	0.069														
2,6-Dinitrotoluene			--	0.021														
2-Chloronaphthalene			--	NS														
2-Nitroaniline			--	800000														
2-Nitrophenol			--	NS														
3,3'-Dichlorobenzidine			--	0.0033														
3-Nitroaniline			--	NS														
4-Bromophenyl phenyl ether			--	NS														
4-Chloro-3-methylphenol			--	NS														
4-Chlorophenyl phenyl ether			--	NS														
4-Nitrophenol			--	7000														
Benzoic acid			--	170														
Benzyl alcohol			--	57														
Benzyl butyl phthalate			--	0.18														
Bis(2-chloroethoxy)methane			--	NS														
Bis(2-ethylhexyl)phthalate			--	5.1														
Carbazole			--	NS														
Dibutyl Phthalate			--	15														
Dichloroethyl ether			--	0.014														
Diethyl Phthalate			--	34														
Dimethylphthalate			--	71														
Dinitro-o-cresol			--	NS														
Di-n-octyl phthalate			--	330														
Hexachloroethane			--	0.041														
Hexachlorocyclopentadiene			--	200														
Hexachlorobutadiene			--	0.54														
Isophorone			--	15														
Nitrobenzene			--	6.5														
n-Nitrosodi-n-propylamine			--	0.0039														
n-Nitrosodiphenylamine			--	1.1														
o-Cresol			--	10														
p-Chloroaniline			--	0.077														
p-Cresol			--	670														
p-Nitroaniline			--	NS														
PAHs (ug/kg)																		
1-Methylnaphthalene			--	29000														
2-Methylnaphthalene			--	670														
Acenaphthene			--	28														
Acenaphthylene			--	1300														
Anthracene			--	51														
Benzo(a)anthracene			0.1	0.057														
Benzo(a)pyrene			1	0.016														
Total (B+J+K) Benzofluoranthenes			0.1	3200														
Benzo(g,h,i)perylene			--	670														
Chrysene			0.01	6.4														
Dibenzo(a,h)anthracene			0.1	0.029														
Dibenzofuran			--	540														
Fluoranthene			--	90														
Fluorene			--	29														
Indeno(1,2,3-cd)pyrene			0.1	0.56														
Naphthalene			--	2.1														
Phenanthrene			--	1500														
Pyrene			--	140														
Carcinogenic PAHs TEQ ND=0 ¹			--	0.016														
Carcinogenic PAHs TEQ ND=1/2DL ¹			--	0.016														

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Table W-8
Saturated Soil Analytical Results Summary - Semivolatile
Organic Compounds & Polycyclic Aromatic Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location			MW-16S	MW-16S	MW-17S	MW-17S	GP-26	GP-26	GP-26	GP-26	GP-26	GP-27	GP-27	GP-27	GP-27	GP-27	GP-28	GP-28	GP-28
Sample Date			10/13/1998	10/13/1998	10/14/1998	10/14/1998	9/7/2012	9/7/2012	10/10/2012	10/10/2012	10/10/2012	9/7/2012	9/7/2012	10/11/2012	10/11/2012	10/11/2012	9/7/2012	9/7/2012	10/11/2012
Sample ID			MW-16-5.5-6.5:10131998	MW-16-10.5-11.5:10131998	MW-17-5.5-6.5:10141998	MW-17-10-11.5:10141998	GP-26-3.1-3.5	GP-26-4-5.1	GP-26-5.1-7.1	DUP101012-3	GP-26-9.1-10.3	GP-27-0-2	GP-27-2.3-4.3	GP-27-4.3-6.3	DUP101112-1	GP-27-6.3-8.3	GP-28-0-2	GP-28-2-4	GP-28-4.1-6.1
Sample Type			N	N	N	N	N	N	N	FD	N	N	N	N	FD	N	N	N	N
Sample Depth			5.5-6.5 ft	10.5-11.5 ft	5.5-6.5 ft	10-11.5 ft	3.1-3.5 ft	4-5.1 ft	5.1-7.1 ft	5.1-7.1 ft	9.1-10.3 ft	0-2 ft	2.3-4.3 ft	4.3-6.3 ft	4.3-6.3 ft	6.3-8.3 ft	0-2 ft	2-4 ft	4.1-6.1 ft
Soil Layer			Dredged Fill	Middle Silt	Dredged Fill	Dredged Fill	Shallow Fill	Dredged Fill	Dredged Fill	Dredged Fill	Interface at Top of Silt	Shallow Fill	Dredged Fill	Dredged Fill	Dredged Fill	Interface at Top of Silt	Shallow Fill	Dredged Fill	Dredged Fill
SVOCs (ug/kg)			TEF	Screening Level															
Pentachlorophenol	--	0.0018		50 U		50 U		50 U		50 U									
2,3,4,6-Tetrachlorophenol	--	270																	
2,3,5,6-Tetrachlorophenol	--	NS																	
2,4,5-Trichlorophenol	--	1100																	
2,4,6-Trichlorophenol	--	0.19																	
2,4-Dichlorophenol	--	4.3																	
2-Chlorophenol	--	11																	
Phenol	--	120																	
Hexachlorobenzene	--	0.0004																	
1,2,4-Trichlorobenzene	--	0.072																	
1,2-Dichlorobenzene	--	3.1																	
1,3-Dichlorobenzene	--	NS																	
1,4-Dichlorobenzene	--	8.1																	
2,2-Oxybis(1-chloropropane)	--	NS																	
2,4-Dimethylphenol	--	3.1																	
2,4-Dinitrophenol	--	9.2																	
2,4-Dinitrotoluene	--	0.069																	
2,6-Dinitrotoluene	--	0.021																	
2-Chloronaphthalene	--	NS																	
2-Nitroaniline	--	800000																	
2-Nitrophenol	--	NS																	
3,3'-Dichlorobenzidine	--	0.0033																	
3-Nitroaniline	--	NS																	
4-Bromophenyl phenyl ether	--	NS																	
4-Chloro-3-methylphenol	--	NS																	
4-Chlorophenyl phenyl ether	--	NS																	
4-Nitrophenol	--	7000																	
Benzoic acid	--	170																	
Benzyl alcohol	--	57																	
Benzyl butyl phthalate	--	0.18																	
Bis(2-chloroethoxy)methane	--	NS																	
Bis(2-ethylhexyl)phthalate	--	5.1																	
Carbazole	--	NS																	
Dibutyl Phthalate	--	15																	
Dichloroethyl ether	--	0.014																	
Diethyl Phthalate	--	34																	
Dimethylphthalate	--	71																	
Dinitro-o-cresol	--	NS																	
Di-n-octyl phthalate	--	330																	
Hexachloroethane	--	0.041																	
Hexachlorocyclopentadiene	--	200																	
Hexachlorobutadiene	--	0.54																	
Isophorone	--	15																	
Nitrobenzene	--	6.5																	
n-Nitrosodi-n-propylamine	--	0.0039																	
n-Nitrosodiphenylamine	--	1.1																	
o-Cresol	--	10																	
p-Chloroaniline	--	0.077																	
p-Cresol	--	670																	
p-Nitroaniline	--	NS																	
PAHs (ug/kg)																			
1-Methylnaphthalene	--	29000																	
2-Methylnaphthalene	--	670																	
Acenaphthene	--	28																	
Acenaphthylene	--	1300																	
Anthracene	--	51																	
Benzo(a)anthracene	0.1	0.057																	
Benzo(a)pyrene	1	0.016																	
Total (B+J+K) Benzofluoranthenes	0.1	3200																	
Benzo(g,h,i)perylene	--	670																	
Chrysene	0.01	6.4																	
Dibenzo(a,h)anthracene	0.1	0.029																	
Dibenzofuran	--	540																	
Fluoranthene	--	90																	
Fluorene	--	29																	
Indeno(1,2,3-cd)pyrene	0.1	0.56																	
Naphthalene	--	2.1																	
Phenanthrene	--	1500																	
Pyrene	--	140																	
Carcinogenic PAHs TEQ ND=0 ⁻¹	--	0.016																	
Carcinogenic PAHs TEQ ND=1/2DL ⁻¹	--	0.016																	

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Table W-8
Saturated Soil Analytical Results Summary - Semivolatile
Organic Compounds & Polycyclic Aromatic Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location			GP-28	GP-28	GP-28	GP-29	GP-29	GP-29	GP-29	GP-29	GP-30	GP-30	GP-30	GP-31	GP-31	GP-31	GP-31	GP-31	GP-32	GP-32
Sample Date			10/11/2012	10/11/2012	10/11/2012	10/9/2012	10/9/2012	10/9/2012	10/9/2012	9/7/2012	9/7/2012	10/9/2012	9/6/2012	9/6/2012	9/6/2012	10/11/2012	10/11/2012	9/10/2012	9/10/2012	
Sample ID			DUP101112-2	GP-28-6.1-8.3	DUP101112-3	GP-29-2.9-4.9	GP-29-4.9-6.9	GP-29-6.9-8.9	GP-29-8.9-11.2	GP-30-3.3-5.3	GP-30-5.3-6.6	GP-30-7.9	GP-31-3-5	DUP-090612-2	GP-31-5-5.9	GP-31-7.9-9.9	GP-32-0.25-2.25	GP-32-4.1-6.1		
Sample Type			FD	N	FD	N	N	N	N	N	N	N	N	FD	N	N	N	N		
Sample Depth			4.1-6.1 ft	6.1-8.3 ft	6.1-8.3 ft	2.9-4.9 ft	4.9-6.9 ft	6.9-8.9 ft	8.9-11.2 ft	3.3-5.3 ft	5.3-6.6 ft	7-9 ft	3-5 ft	3-5 ft	5-5.9 ft	5.9-7.9 ft	7.9-9.9 ft	0.25-2.25 ft	4.1-6.1 ft	
Soil Layer			Dredged Fill	Interface at Top of Silt	Interface at Top of Silt	Shallow Fill	Dredged Fill	Dredged Fill	Dredged Fill	Dredged Fill	Dredged Fill	Interface at Top of Silt	Shallow Fill	Dredged Fill	Dredged Fill	Dredged Fill	Interface at Top of Silt	Shallow Fill	Shallow Fill	
SVOCs (ug/kg)			TEF	Screening Level																
Pentachlorophenol	--	0.0018	48 U	45 U	45 U	46 U	47 U	150 j	82 j	46 U	47 U	83 j	48 U	48 U	47 U	72 j	190	1200	58 j	
2,3,4,6-Tetrachlorophenol	--	270								4.6 U	4.7 U		4.8 U	4.8 U	4.7 U			620	22	
2,3,5,6-Tetrachlorophenol	--	NS																		
2,4,5-Trichlorophenol	--	1100	21 U	20 U	20 U	20 U	21 U	20 U	20 U	20 U	21 U	20 U	21 U	21 U	21 U	20 U	20 U	62 j	20 U	
2,4,6-Trichlorophenol	--	0.19	22 U	21 U	21 U	21 U	22 U	21 U	20 U	21 U	22 U	21 U	22 U	22 U	22 U	21 U	21 U	290	21 U	
2,4-Dichlorophenol	--	4.3	21 U	20 U	20 U	20 U	21 U	20 U	20 U	20 U	21 U	21 U	21 U	21 U	21 U	32 j	40 j	450	21 U	
2-Chlorophenol	--	11	2.4 U	2.2 U	2.2 U	2.2 U	2.3 U	2.3 U	2.2 U	2.2 U	2.3 U	2.3 U	2.4 U	2.4 U	2.3 U	2.3 U	2.3 U	130	2.3 U	
Phenol	--	120	8.5 UJ	8.1 U	8.0 UJ	9.4 j	20	8.2 U	40	8.1 U	8.4 U	36	8.6 U	8.5 U	8.4 U	9.5 j	26	230	18 j	
Hexachlorobenzene	--	0.0004	4.2 U	4.0 U	4.0 U	4.0 U	4.2 U	4.1 U	3.9 U			4.1 U				4.1 U	4.1 U			
1,2,4-Trichlorobenzene	--	0.072	3.4 U	3.3 U	3.2 U	3.3 U	3.4 U	3.3 U	3.2 U			3.3 U				3.3 U				
1,2-Dichlorobenzene	--	3.1	2.5 U	2.3 U	2.3 U	2.3 U	2.4 U	2.4 U	2.3 U			2.4 U				2.4 U	2.4 U			
1,3-Dichlorobenzene	--	NS	2.6 U	2.5 U	2.4 U	2.5 U	2.6 U	2.5 U	2.4 U			2.5 U				2.5 U	2.5 U			
1,4-Dichlorobenzene	--	8.1	2.8 U	2.7 U	2.7 U	2.7 U	2.8 U	2.7 U	2.6 U			2.7 U				2.7 U	2.7 U			
2,2-Oxybis(1-chloropropane)	--	NS	3.7 U	3.5 U	3.5 U	3.5 U	3.7 U	3.6 U	3.4 U			3.6 U				3.6 U	3.6 U			
2,4-Dimethylphenol	--	3.1	3.4 U	3.2 U	3.2 U	3.3 U	3.4 U	3.3 U	3.2 U			3.3 U				3.3 U	3.3 U			
2,4-Dinitrophenol	--	9.2	110 U	100 U	100 U	100 U	110 U	110 U	100 U			110 U				110 U	110 U			
2,4-Dinitrotoluene	--	0.069	19 U	18 U	18 U	18 U	19 U	19 U	18 U			19 U				19 U	18 U			
2,6-Dinitrotoluene	--	0.021	30 U	29 U	28 U	29 U	30 U	29 U	28 U			29 U				29 U	29 U			
2-Chloronaphthalene	--	NS	2.6 U	2.5 U	2.5 U	2.5 U	2.6 U	2.5 U	2.4 U			2.5 U				2.5 U	2.5 U			
2-Nitroaniline	--	800000	18 U	17 U	17 U	17 U	18 U	18 U	17 U			18 U				18 U	17 U			
2-Nitrophenol	--	NS	38 U	36 U	36 U	36 U	38 U	37 U	35 U			37 U				37 U	37 U			
3,3'-Dichlorobenzidine	--	0.0033	18 U	17 UJ	17 U	17 U	17 U	17 U	16 U			17 U				17 UJ	17 UJ			
3-Nitroaniline	--	NS	22 U	21 U	21 U	21 U	22 U	21 U	21 U			22 U				21 U	21 U			
4-Bromophenyl phenyl ether	--	NS	5.0 U	4.7 U	4.7 U	4.7 U	4.9 U	4.8 U	4.6 U			4.8 U				4.8 U	4.8 U			
4-Chloro-3-methylphenol	--	NS	15 U	14 U	14 U	14 U	15 U	14 U	14 U			14 U				14 U	14 U			
4-Chlorophenyl phenyl ether	--	NS	5.2 U	5.0 U	4.9 U	5.0 U	5.2 U	5.0 U	4.8 U			5.1 U				5.0 U	5.0 U			
4-Nitrophenol	--	7000	34 U	33 U	32 U	33 U	34 U	33 U	32 U			33 U				33 U	33 U			
Benzoic acid	--	170	100 U	95 U	94 U	95 U	98 U	96 U	92 U			97 U				96 U	96 U			
Benzyl alcohol	--	57	6.0 UJ	5.7 U	5.7 UJ	5.7 U	5.9 U	5.8 U	5.6 U			5.8 U				5.8 U	5.8 U			
Benzyl butyl phthalate	--	0.18	6.1 U	5.8 U	5.7 U	5.8 U	6.0 U	5.8 U	5.6 U			5.9 U				5.9 U	5.8 U			
Bis(2-chloroethoxy)methane	--	NS	2.0 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.8 U			1.9 U				1.9 U	1.9 U			
Bis(2-ethylhexyl)phthalate	--	5.1	27 U	25 U	14 U	25	14 U	28	13 U			28				33 U	14 U			
Carbazole	--	NS	2.7 U	2.5 UJ	2.5 U	2.5 U	2.6 U	11 j	2.5 U			2.6 U				2.6 UJ	2.5 UJ			
Dibutyl Phthalate	--	15	8.1 U	7.6 U	7.6 U	7.7 U	8.0 U	7.8 U	7.5 U			7.8 U				7.8 U	7.7 U			
Dichloroethyl ether	--	0.014	3.3 U	3.1 U	3.1 U	3.1 U	3.3 U	3.2 U	3.1 U			3.2 U				3.2 U	3.2 U			
Diethyl Phthalate	--	34	36 U	50	34 U	34 U	36 U	35 U	33 U			35 U				35 U	35 U			
Dimethylphthalate	--	71	2.9 U	2.7 U	2.7 U	2.7 U	2.8 U	2.8 U	2.7 U			2.8 U				2.8 U	2.7 U			
Dinitro-o-cresol	--	NS	21 U	20 U	20 U	20 U	21 U	20 U	19 U			20 U				20 U	20 U			
Di-n-octyl phthalate	--	330	5.8 U	5.5 U	5.4 U	5.5 U	5.7 U	5.6 U	5.3 U			5.6 U				5.6 U	5.5 U			
Hexachloroethane	--	0.041	2.9 U	2.8 U	2.7 U	2.8 U	2.9 U	2.8 U	2.7 U			2.8 U				2.8 U	2.8 U			
Hexachlorocyclopentadiene	--	200	66 U	62 U	62 U	62 U	65 U	63 U	61 U			63 U				63 U	63 U			
Hexachlorobutadiene	--	0.54	4.5 U	4.3 U	4.3 U	4.3 U	4.5 U	4.3 U	4.2 U			4.4 U				4.4 U	4.3 U			
Isophorone	--	15	2.8 U	2.7 U	2.7 U	2.7 U	2.8 U	2.7 U	2.6 U			2.7 U				2.7 U	2.7 U			
Nitrobenzene	--	6.5	4.0 U	3.8 U	3.8 U	3.8 U	4.0 U	3.9 U	3.7 U			3.9 U				3.9 U	3.8 U			
n-Nitrosodi-n-propylamine	--	0.0039	3.3 U	3.1 U	3.1 U	3.2 U	3.3 U	3.2 U	3.1 U			3.2 U				3.2 U	3.2 U			
n-Nitrosodiphenylamine	--	1.1	5.3 U	5.1 U	5.0 U	5.1 U	5.3 U	5.1 U	4.9 U			5.2 U				5.1 U	5.1 U			
o-Cresol	--	10	5.2 U	4.9 U	4.9 U	4.9 U	5.1 U	5.0 U	4.8 U			5.0 U				5.0 U	5.0 U			
p-Chloroaniline	--	0.077	22 U	21 U	21 U	21 U	22 U	21 U	20 U			21 U				21 U	21 U			
p-Cresol	--	670	6.5 U	13 j	6.2 U	6.2 U	6.5 U	6.3 U	6.1 U			19 j				6.3 U	13 j			
p-Nitroaniline	--	NS	37 U	36 U	35 U	36 U	37 U	36 U	35 U			36 U				36 U	36 U			
PAHs (ug/kg)											</									

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Table W-8
Saturated Soil Analytical Results Summary - Semivolatile
Organic Compounds & Polycyclic Aromatic Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location			GP-32	GP-32	GP-33	GP-33	GP-33	GP-34	GP-34	GP-34	GP-34	GP-34	GP-34	GP-36	GP-36	GP-36	GP-36	GP-39	GP-39	GP-39
Sample Date			10/11/2012	10/11/2012	9/6/2012	9/6/2012	10/10/2012	9/6/2012	9/6/2012	10/10/2012	10/10/2012	10/10/2012	10/10/2012	8/30/2012	10/8/2012	10/8/2012	10/8/2012	10/8/2012	10/8/2012	10/8/2012
Sample ID			GP-32-6.1-8.1	GP-32-8.1-9.1	GP-33-3.25-5.25	GP-33-5.25-5.9	GP-33-5.9-8.3	GP-34-3.25-4.4	GP-34-4.4-6.4	GP-34-6.4-8.4	DUP101012-1	GP-34-8.4-9.4	GP-36-2.6-4.6	GP-36-7-9	GP-36-9-11	GP-36-11-12	GP-39-4.5-6.5	GP-39-5.5	GP-39-6.5-8.5	
Sample Type			N	N	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N	
Sample Depth			6.1-8.1 ft	8.1-9.1 ft	3.25-5.25 ft	5.25-5.9 ft	5.9-8.3 ft	3.25-4.4 ft	4.4-6.4 ft	6.4-8.4 ft	6.4-8.4 ft	6.4-8.4 ft	8.4-9.4 ft	2.6-4.6 ft	7-9 ft	9-11 ft	11-12 ft	4.5-6.5 ft	5.5 ft	6.5-8.5 ft
Soil Layer			Dredged Fill	Interface at Top of Silt	Dredged Fill	Dredged Fill	Dredged Fill	Shallow Fill	Dredged Fill	Dredged Fill	Dredged Fill	Dredged Fill	Interface at Top of Silt	Shallow Fill	Dredged Fill	Dredged Fill	Interface at Top of Silt	Dredged Fill	Dredged Fill	Dredged Fill
SVOCs (ug/kg)			TEF	Screening Level																
Pentachlorophenol			--	0.0018	47 U	49 j	62 j	48 U	110 j	470 U	130 U	46 U	45 U	47 U	180000	47 U	180 j	45 U	45 U	48 j
2,3,4,6-Tetrachlorophenol			--	270			4.5 U	4.8 U		47 U	13 U			13000						
2,3,5,6-Tetrachlorophenol			--	NS																
2,4,5-Trichlorophenol			--	1100	21 U	20 U	20 U	21 U	20 U	210 U	56 U	20 U	20 U	21 U	200 j	21 U	20 U	20 U	20 U	20 U
2,4,6-Trichlorophenol			--	0.19	21 U	21 U	21 U	22 U	21 U	220 U	59 U	21 U	21 U	22 U	200 U	21 U	21 U	21 U	21 U	21 U
2,4-Dichlorophenol			--	4.3	21 U	20 U	20 U	21 U	20 U	210 U	56 U	20 U	20 U	21 U	190 U	21 U	20 U	20 U	20 U	20 U
2-Chlorophenol			--	11	2.3 U	2.3 U	2.2 U	2.4 U	2.3 U	23 U	6.3 U	2.3 U	2.2 U	2.3 U	21 U	2.3 U	2.2 U	2.2 U	2.2 U	2.2 U
Phenol			--	120	8.3 U	26	50	8.5 U	15 J-	85 U	23 U	13 j	16 j	58	110 j	8.3 U	16 j	200	8.0 U	8.0 U
Hexachlorobenzene			--	0.0004	4.1 U	4.1 U			4.1 U			4.1 U	4.0 U	4.2 U		4.1 U	4.0 U	4.0 U	4.0 U	4.0 U
1,2,4-Trichlorobenzene			--	0.072	3.3 U	3.3 U			3.3 U			3.4 U	3.2 U	3.2 U		3.3 U	3.2 U	3.2 U	3.2 U	4.0 U
1,2-Dichlorobenzene			--	3.1	2.4 U	2.4 U			2.4 U			2.4 U	2.3 U	2.4 U		2.4 U	2.3 U	2.3 U	2.3 U	0.8 U
1,3-Dichlorobenzene			--	NS	2.5 U	2.5 U			2.5 U			2.5 U	2.4 U	2.6 U		2.5 U	2.5 U	2.4 U	2.4 U	0.8 U
1,4-Dichlorobenzene			--	8.1	2.7 U	2.7 U			2.7 U			2.7 U	2.7 U	2.8 U		2.7 U	2.7 U	2.6 U	2.6 U	0.8 U
2,2-Oxybis(1-chloropropane)			--	NS	3.6 U	3.6 U			3.6 U			3.6 U	3.5 U	3.7 U		3.6 U	3.5 U	3.5 U	3.5 U	
2,4-Dimethylphenol			--	3.1	3.3 U	3.3 U			3.3 U			3.3 U	3.2 U	3.4 U		3.3 U	3.2 U	3.2 U	3.2 U	
2,4-Dinitrophenol			--	9.2	110 U	110 U			110 U			110 U	100 U	110 U		110 U	100 U	100 U	100 U	
2,4-Dinitrotoluene			--	0.069	19 U	18 U			19 U			19 U	18 U	19 U		19 U	18 U	18 U	18 U	
2,6-Dinitrotoluene			--	0.021	29 U	29 U			29 U			29 U	28 U	30 U		29 U	29 U	28 U	28 U	
2-Chloronaphthalene			--	NS	2.5 U	2.5 U			2.5 U			2.5 U	2.5 U	2.6 U		2.5 U	2.5 U	2.4 U	2.4 U	
2-Nitroaniline			--	800000	18 U	17 U			17 U			17 U	17 U	18 U		18 U	17 U	17 U	17 U	
2-Nitrophenol			--	NS	37 U	37 U			37 U			37 U	36 U	38 U		37 U	36 U	36 U	36 U	
3,3'-Dichlorobenzidine			--	0.0033	17 UJ	17 UJ			17 U			17 U	17 U	17 U		17 U	17 U	16 U	16 U	
3-Nitroaniline			--	NS	22 U	21 U			21 U			21 U	21 U	22 U		22 U	21 U	21 U	21 U	
4-Bromophenyl phenyl ether			--	NS	4.8 U	4.8 U			4.8 U			4.8 U	4.7 U	4.9 U		4.8 U	4.7 U	4.6 U	4.7 U	
4-Chloro-3-methylphenol			--	NS	14 U	14 U			14 U			14 U	14 U	15 U		14 U	14 U	14 U	14 U	
4-Chlorophenyl phenyl ether			--	NS	5.1 U	5.0 U			5.0 U			5.0 U	4.9 U	5.2 U		5.1 UJ	4.9 UJ	4.9 UJ	4.9 UJ	
4-Nitrophenol			--	7000	33 U	33 U			33 U			33 UJ	32 UJ	34 UJ		33 U	32 U	32 U	32 U	
Benzoic acid			--	170	97 U	96 U			96 U			96 U	94 U	98 U		97 U	94 U	97 j	93 U	
Benzyl alcohol			--	57	5.8 U	5.8 U			5.8 UJ			5.8 U	5.7 U	5.9 U		5.8 U	5.7 U	5.6 U	5.6 U	
Benzyl butyl phthalate			--	0.18	5.9 U	5.8 U			5.8 U			5.8 U	5.7 U	6.0 U		5.9 U	5.7 U	5.7 U	5.7 U	
Bis(2-chloroethoxy)methane			--	NS	1.9 U	1.9 U			1.9 U			1.9 U	1.9 U	1.9 U		1.9 U	1.9 U	1.8 U	1.9 U	
Bis(2-ethylhexyl)phthalate			--	5.1	14 U	14 U			14 U			14 U	14 U	14 U		14 U	14 U	13 U	14 U	
Carbazole			--	NS	2.6 UJ	2.5 UJ			2.6 U			2.6 U	2.5 U	2.6 U		2.6 U	2.5 U	2.5 U	2.5 U	
Dibutyl Phthalate			--	15	7.8 U	7.7 U			7.7 U			7.7 U	7.6 U	8.0 U		7.8 U	7.6 U	7.5 U	7.6 U	
Dichloroethyl ether			--	0.014	3.2 U	3.2 U			3.2 U			3.2 U	3.1 U	3.3 U		3.2 U	3.1 U	3.1 U	3.1 U	
Diethyl Phthalate			--	34	35 U	35 U			35 U			35 U	34 U	36 U		35 U	34 U	34 U	34 U	
Dimethylphthalate			--	71	2.8 U	2.7 U			2.8 U			2.8 U	2.7 U	2.8 U		2.8 U	2.7 U	2.7 U	2.7 U	
Dinitro-o-cresol			--	NS	20 U	20 U			20 U			20 U	20 U	21 U		20 U	20 U	20 U	20 U	
Di-n-octyl phthalate			--	330	5.6 U	5.5 U			5.6 U			5.5 U	5.4 U	5.7 U		5.6 U	5.4 U	5.4 U	5.4 U	
Hexachloroethane			--	0.041	2.8 U	2.8 U			2.8 U			2.8 U	2.7 U	2.9 U		2.8 U	2.7 U	2.7 U	2.7 U	
Hexachlorocyclopentadiene			--	200	64 U	63 U			63 U			63 U	62 U	65 U		64 U	62 U	61 U	61 U	
Hexachlorobutadiene			--	0.54	4.4 U	4.3 U			4.3 U			4.3 U	4.2 U	4.5 U		4.4 U	4.3 U	4.2 U	4.2 U	
Isophorone			--	15	2.7 U	2.7 U			2.7 U			2.7 U	2.7 U	2.7 U		2.7 U	2.6 U	2.6 U	2.6 U	
Nitrobenzene			--	6.5	3.9 U	3.8 U			3.9 U			3.9 U	3.8 U	4.0 U		3.9 U	3.8 U	3.7 U	3.8 U	
n-Nitrosodi-n-propylamine			--	0.0039	3.2 U	3.2 U			3.2 U			3.2 U	3.1 U	3.3 U		3.2 U	3.1 U	3.1 U	3.1 U	
n-Nitrosodiphenylamine			--	1.1	5.2 U	5.1 U			5.1 U			5.1 U	5.0 U	5.3 U		5.2 U	5.0 U	5.0 U	5.0 U	
o-Cresol			--	10	5.0 U	5.0 U			5.0 U			5.0 U	4.9 U	5.1 U		5.0 U	4.9 U	4.9 U	4.9 U	
p-Chloroaniline			--	0.077	21 U	21 U			21 U			21 U	21 U	22 U		21 U	21 U	21 U	21 U	
p-Cresol			--	670	6.4 U	19 j			6.3 U			6.3 U	6.2 U	25 j		6.4 U	6.2 U	6.1 U	6.2 U	
p-Nitroaniline			--	NS	36 U	36 U			36 U			36 U	35 U	37 U		36 U	35 U	35 U	35 U	
PAHs (ug/kg)																				
1-Methylnaphthalene			--	29000	1.6 U	3.4 j			1.6 U			1.6 U	3.0 j	5.2		1.6 U	1.6 U	6.5	5.0	2.6 j
2-Methylnaphthalene			--	670	2.4 j	2.9 j			1.4 U			2.6 j	2.6 j	6.5		1.4 U	1.4 U	6.9	5.3	4.3 j
Acenaphthene			--	28	6.2	5.4			6.2			1.3 U	4.2 j	7.0		1.2 U	1.2 U	5.9	3.2 j	1.2 U
Acenaphthylene			--	1300	1.2 U	4.0 j			1.2 U			2.6 j	7.2	2.8 j		1.2 U	1.2 U	5.2	1.2 U	1.2 U
Anthracene			--	51	14	4.1 j			1.4 U			3.6 j	7.5	4.0 j		1.4 U	1.4 U	9.6	4.7	1.4 U
Benzo(a)anthracene			0.1	0.057	16	4.1 j			1.5 U			7.6	22	4.3 j		1.5 U	1.5 U	10	7.8	1.5 U
Benzo(a)pyrene			1	0.016	3.6 j	6.0			1.6 U			6.4	25	4.8 j		1.7 U	1.6 U	9.4	6.4	1.6 U
Total (B+J+K) Benzofluoranthenes			0.1	3200	16	12			1.7 U			11	34	4.0 j		1.8 U	1.7 U	19	13	1.7 U
Benzo(g,h,i)perylene			--	670	2.9 U	6.4			2.8 U			3.8 j	12	3.4 j		2.9 U	2.9 U	9.1	2.9 U	2.8 U

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Table W-8
Saturated Soil Analytical Results Summary - Semivolatile
Organic Compounds & Polycyclic Aromatic Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location			GP-39	GP-39	GP-39	GP-44	GP-44	GP-44	GP-44	GP-45	GP-45	GP-45	GP-45	GP-46	GP-46	GP-46	GP-50	GP-50	GP-50
Sample Date			10/8/2012	10/8/2012	10/8/2012	9/4/2012	10/9/2012	10/9/2012	10/9/2012	9/4/2012	10/9/2012	10/9/2012	10/9/2012	8/31/2012	10/9/2012	10/9/2012	9/7/2012	9/7/2012	9/7/2012
Sample ID			GP-39-7.5	GP-39-10.5-11.5	GP-39-11	GP-44-2-4.8	GP-44-4.8-6.8	GP-44-6.8-8.8	GP-44-8.8-11.1	GP-45-2-4.25	GP-45-4.5-6.5	GP-45-6.5-8.5	GP-45-8.5-9.5	GP-46-2.5-4.2	GP-46-5.2-7.2	GP-46-7.2-8.7	GP-50-0-2	DUP-090712-1	GP-50-3-5.9
Sample Type			N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	FD	N
Sample Depth			7.5 ft	10.5-11.5 ft	11 ft	2-4.8 ft	4.8-6.8 ft	6.8-8.8 ft	8.8-11.1 ft	2-4.25 ft	4.5-6.5 ft	6.5-8.5 ft	8.5-9.5 ft	2.5-4.2 ft	5.2-7.2 ft	7.2-8.7 ft	0-2 ft	3-5.9 ft	3-5.9 ft
Soil Layer			Dredged Fill	Interface at Top of Silt	Interface at Top of Silt	Dredged Fill	Dredged Fill	Dredged Fill	Dredged Fill	Shallow Fill	Dredged Fill	Dredged Fill	Dredged Fill	Shallow Fill	Dredged Fill	Interface at Top of Silt	Shallow Fill	Dredged Fill	Dredged Fill
SVOCs (ug/kg)			TEF	Screening Level															
Pentachlorophenol			--	0.0018			240												
2,3,4,6-Tetrachlorophenol			--	270				2000											
2,3,5,6-Tetrachlorophenol			--	NS				170											
2,4,5-Trichlorophenol			--	1100			60 j												
2,4,6-Trichlorophenol			--	0.19			22 U												
2,4-Dichlorophenol			--	4.3			58 j												
2-Chlorophenol			--	11			140												
Phenol			--	120			870												
Hexachlorobenzene			--	0.0004			4.1 U												
1,2,4-Trichlorobenzene			--	0.072			3.4 U												
1,2-Dichlorobenzene			--	3.1			0.7 U												
1,3-Dichlorobenzene			--	NS			0.7 U												
1,4-Dichlorobenzene			--	8.1			0.7 U												
2,2-Oxybis(1-chloropropane)			--	NS															
2,4-Dimethylphenol			--	3.1			3.3 U												
2,4-Dinitrophenol			--	9.2			110 U												
2,4-Dinitrotoluene			--	0.069			19 U												
2,6-Dinitrotoluene			--	0.021			30 U												
2-Chloronaphthalene			--	NS			2.6 U												
2-Nitroaniline			--	800000			18 U												
2-Nitrophenol			--	NS			37 U												
3,3'-Dichlorobenzidine			--	0.0033			17 U												
3-Nitroaniline			--	NS			22 U												
4-Bromophenyl phenyl ether			--	NS			4.9 U												
4-Chloro-3-methylphenol			--	NS			15 U												
4-Chlorophenyl phenyl ether			--	NS			5.1 UJ												
4-Nitrophenol			--	7000			34 U												
Benzoic acid			--	170			190 j												
Benzyl alcohol			--	57			5.9 U												
Benzyl butyl phthalate			--	0.18			5.9 U												
Bis(2-chloroethoxy)methane			--	NS			1.9 U												
Bis(2-ethylhexyl)phthalate			--	5.1			14 U												
Carbazole			--	NS			2.6 U												
Dibutyl Phthalate			--	15			7.9 U												
Dichloroethyl ether			--	0.014			3.2 U												
Diethyl Phthalate			--	34			35 U												
Dimethylphthalate			--	71			2.8 U												
Dinitro-o-cresol			--	NS			21 U												
Di-n-octyl phthalate			--	330			5.6 U												
Hexachloroethane			--	0.041			2.8 U												
Hexachlorocyclopentadiene			--	200			64 U												
Hexachlorobutadiene			--	0.54			4.4 U												
Isophorone			--	15			2.8 U												
Nitrobenzene			--	6.5			3.9 U												
n-Nitrosodi-n-propylamine			--	0.0039			3.2 U												
n-Nitrosodiphenylamine			--	1.1			5.2 U												
o-Cresol			--	10			13 j												
p-Chloroaniline			--	0.077			22 U												
p-Cresol			--	670			77												
p-Nitroaniline			--	NS			37 U												
PAHs (ug/kg)																			
1-Methylnaphthalene			--	29000			11												
2-Methylnaphthalene			--	670			13												
Acenaphthene			--	28			8.7												
Acenaphthylene			--	1300			13												
Anthracene			--	51			12												
Benzo(a)anthracene			0.1	0.057			13												
Benzo(a)pyrene			1	0.016			20												
Total (B+J+K) Benzofluoranthenes			0.1	3200			39												
Benzo(g,h,i)perylene			--	670			25												
Chrysene			0.01	6.4			19												
Dibenzo(a,h)anthracene			0.1	0.029			23 U												
Dibenzofuran			--	540			13												
Fluoranthene			--	90			70												
Fluorene			--	29			10												
Indeno(1,2,3-cd)pyrene			0.1	0.56			18												
Naphthalene			--	2.1			3.4 UJ												
Phenanthrene			--	1500			66												
Pyrene			--	140			72												
Carcinogenic PAHs TEQ ND=0 ¹			--	0.016			27												
Carcinogenic PAHs TEQ ND=1/2DL ¹			--	0.016			27												

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Table W-8
Saturated Soil Analytical Results Summary - Semivolatile
Organic Compounds & Polycyclic Aromatic Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location			GP-50	GP-50	GP-53	GP-53	GP-53	GP-53	GP-53	GP-53	GP-53	GP-55	GP-55	GP-55	GP-55	GP-55	GP-56	GP-56			
Sample Date			10/11/2012	10/11/2012	9/10/2012	9/10/2012	9/10/2012	9/10/2012	9/10/2012	9/10/2012	9/10/2012	8/31/2012	10/8/2012	10/8/2012	10/8/2012	10/8/2012	10/10/2012	10/10/2012			
Sample ID			GP-50-5-9-7	GP-50-7-7.75	GP-53-3-5	GP-53-4	GP-53-5-5.3	GP-53-5	GP-53-5.3-7.3	GP-53-6.3	GP-53-7.3-9.3	GP-53-8.3	GP-55-2.5-4	DUP100812-1	GP-55-4.4-6.4	GP-55-6.4-8.4	GP-55-8.4-10.4	GP-56-4.2-5.2			
Sample Type			N	N	N	N	N	N	N	N	N	N	N	FD	N	N	N	N			
Sample Depth			5.9-7 ft	7-7.75 ft	3-5 ft	4 ft	5-5.3 ft	5 ft	5.3-7.3 ft	6.3 ft	7.3-9.3 ft	8.3 ft	2.5-4 ft	8.4-10.4 ft	4.4-6.4 ft	6.4-8.4 ft	8.4-10.4 ft	4.2-5.2 ft			
Soil Layer			Dredged Fill	Dredged Fill	Dredged Fill	Dredged Fill	Dredged Fill	Dredged Fill	Dredged Fill	Dredged Fill	Interface at Top of Silt	Interface at Top of Silt	Shallow Fill	Interface at Top of Silt	Dredged Fill	Dredged Fill	Interface at Top of Silt	Shallow Fill			
SVOCs (ug/kg)			TEF	Screening Level																	
Pentachlorophenol	--	0.0018	120 j	170 j	45 U		46 U			46 U		54 j			20000	55 j	44 U	44 U	47 U	1300	5100
2,3,4,6-Tetrachlorophenol	--	270			4.5 U		4.6 U							1300							
2,3,5,6-Tetrachlorophenol	--	NS																			
2,4,5-Trichlorophenol	--	1100	20 U	23 j	20 U		20 U			20 U		21 U			370	20 U	20 U	19 U	21 U	28 U	61 U
2,4,6-Trichlorophenol	--	0.19	21 U	46 j	21 U		21 U			21 U		22 U			260 j	21 U	21 U	20 U	22 U	30 U	64 U
2,4-Dichlorophenol	--	4.3	20 U	73 j	20 U		20 U			20 U		21 U			330 j	27 j	20 U	20 U	26 j	28 U	62 U
2-Chlorophenol	--	11	2.3 U	59	2.2 U		2.3 U			2.3 U		2.3 U			310	2.2 U	2.2 U	2.2 U	31	3.2 U	6.9 U
Phenol	--	120	20	100	120		280			140 J-		190 J-			2600	30	17 j	7.8 U	33	11 U	25 UJ
Hexachlorobenzene	--	0.0004	4.0 U	4.1 U	4.0 U		4.1 U			4.0 U		4.1 U				4.0 U	3.9 U	3.9 U	4.2 U	5.7 U	89
1,2,4-Trichlorobenzene	--	0.072	3.3 U	3.3 U	3.2 U	4.2 U	3.3 U	4.3 U		3.3 U	3.5 U	3.4 U				3.2 U	3.2 U	3.2 U	3.4 U	4.6 U	10 U
1,2-Dichlorobenzene	--	3.1	2.4 U	2.4 U	2.3 U	0.8 U	2.4 U	0.9 U		2.4 U	0.7 U	2.4 U				2.3 U	2.3 U	2.3 U	2.4 U	3.3 U	7.2 U
1,3-Dichlorobenzene	--	NS	2.5 U	2.5 U	2.4 U	0.8 U	2.5 U	0.9 U		2.5 U	0.7 U	2.5 U				2.4 U	2.4 U	2.4 U	2.6 U	3.5 U	7.6 U
1,4-Dichlorobenzene	--	8.1	2.7 U	2.7 U	2.6 U	0.8 U	2.7 U	0.9 U		2.7 U	0.7 U	2.8 U				2.6 U	2.6 U	2.6 U	2.8 U	3.8 U	8.2 U
2,2-Oxybis(1-chloropropane)	--	NS	3.5 U	3.6 U	3.5 U		3.6 U			3.5 U		3.6 U				3.5 U	3.4 U	3.4 U	3.7 U	5.0 U	11 U
2,4-Dimethylphenol	--	3.1	3.3 U	3.3 U	3.2 U		3.3 U			3.3 U		3.3 U				3.2 U	3.2 U	3.1 U	3.4 U	4.6 U	9.9 U
2,4-Dinitrophenol	--	9.2	100 U	110 U	100 U		110 U			100 U		110 U				100 U	100 U	100 U	110 U	150 U	320 U
2,4-Dinitrotoluene	--	0.069	18 U	19 U	18 U		19 U			18 U		19 U				18 U	18 U	18 U	19 U	26 U	56 U
2,6-Dinitrotoluene	--	0.021	29 U	29 U	28 U		29 U			29 U		29 U				28 U	28 U	28 U	30 U	40 U	88 U
2-Chloronaphthalene	--	NS	2.5 U	2.5 U	2.4 U		2.5 U			2.5 U		2.5 U				2.4 U	2.4 U	2.4 U	2.6 U	3.5 U	7.6 U
2-Nitroaniline	--	800000	17 U	17 U	17 U		17 U			17 U		18 U				17 U	17 U	17 U	18 U	24 U	53 U
2-Nitrophenol	--	NS	36 U	37 U	36 U		37 U			36 U		37 U				36 U	35 U	35 U	38 U	51 U	110 U
3,3'-Dichlorobenzidine	--	0.0033	17 UJ	17 UJ	16 U		17 U			17 U		17 U				16 U	16 U	16 U	17 U	23 U	51 U
3-Nitroaniline	--	NS	21 U	21 U	21 U		21 U			21 U		22 U				21 U	21 U	20 U	22 U	30 U	65 U
4-Bromophenyl phenyl ether	--	NS	4.7 U	4.8 U	4.6 U		4.8 U			4.7 U		4.8 U				4.6 U	4.6 U	4.6 U	4.9 U	6.6 U	14 U
4-Chloro-3-methylphenol	--	NS	14 U	14 U	14 U		14 U			14 U		15 U				14 U	14 U	14 U	15 U	20 U	43 U
4-Chlorophenyl phenyl ether	--	NS	5.0 U	5.0 U	4.9 U		5.0 U			5.0 U		5.1 U				4.9 UJ	4.8 UJ	4.8 UJ	5.2 UJ	7.0 U	15 U
4-Nitrophenol	--	7000	33 U	33 U	32 U		33 U			33 U		33 U				32 U	32 U	31 U	34 U	46 UJ	100 U
Benzoic acid	--	170	95 U	120 j	93 U		96 U			95 U		97 U				93 U	93 U	92 U	99 U	130 U	290 U
Benzyl alcohol	--	57	5.7 U	5.8 U	5.6 U		5.8 U			5.7 UJ		5.9 UJ				5.6 U	5.6 U	5.5 U	5.9 U	8.0 U	18 UJ
Benzyl butyl phthalate	--	0.18	5.8 U	5.8 U	5.7 U		5.8 U			5.7 U		5.9 U				5.7 U	5.6 U	5.6 U	6.0 U	8.1 U	18 U
Bis(2-chloroethoxy)methane	--	NS	1.9 U	1.9 U	1.8 U		1.9 U			1.9 U		1.9 U				1.8 U	1.8 U	1.8 U	2.0 U	2.6 U	5.7 U
Bis(2-ethylhexyl)phthalate	--	5.1	24 U	28 U	35 U		14 U			14 U		14 U				13 U	13 U	13 U	14 U	53 U	42 U
Carbazole	--	NS	2.5 UJ	2.6 UJ	2.5 U		2.6 U			2.5 U		2.6 U				2.5 U	2.5 U	2.4 U	2.6 U	3.5 U	7.7 U
Dibutyl Phthalate	--	15	7.7 U	7.7 U	7.5 U		7.7 U			7.7 U		7.9 U				7.5 U	7.5 U	7.4 U	8.0 U	11 U	23 U
Dichloroethyl ether	--	0.014	3.2 U	3.2 U	3.1 U		3.2 U			3.2 U		3.2 U				3.1 U	3.1 U	3.0 U	3.3 U	4.4 U	9.6 U
Diethyl Phthalate	--	34	34 U	35 U	34 U		35 U			34 U		35 U				34 U	34 U	33 U	36 U	48 U	110 U
Dimethylphthalate	--	71	2.7 U	2.8 U	2.7 U		2.8 U			2.7 U		2.8 U				2.7 U	2.7 U	2.6 U	2.8 U	3.8 U	8.3 U
Dinitro-o-cresol	--	NS	20 U	20 U	20 U		20 U			20 U		20 U				20 U	19 U	19 U	21 U	28 U	61 U
Di-n-octyl phthalate	--	330	5.5 U	5.5 U	5.4 U		5.5 U			5.5 U		5.6 U				5.4 U	5.4 U	5.3 U	5.7 U	7.7 U	17 U
Hexachloroethane	--	0.041	2.8 U	2.8 U	2.7 U		2.8 U			2.8 U		2.8 U				2.7 U	2.7 U	2.7 U	2.9 U	3.9 U	8.4 U
Hexachlorocyclopentadiene	--	200	63 U	63 U	61 U		63 U			63 U		64 U				61 U	61 U	60 U	65 U	88 U	190 U
Hexachlorobutadiene	--	0.54	4.3 U	4.3 U	4.2 U	4.2 UJ	4.3 U	4.3 UJ		4.3 U	3.5 U	4.4 U				4.2 U	4.2 U	4.1 U	4.5 U	6.0 U	13 U
Isophorone	--	15	2.7 U	2.7 U	2.6 U		2.7 U			2.7 U		2.8 U				2.6 U	2.6 U	2.6 U	2.8 U	3.8 U	8.2 U
Nitrobenzene	--	6.5	3.8 U	3.9 U	3.8 U		3.9 U			3.8 U		3.9 U				3.7 U	3.7 U	3.7 U	4.0 U	5.4 U	12 U
n-Nitrosodi-n-propylamine	--	0.0039	3.2 U	3.2 U	3.1 U		3.2 U			3.2 U		3.2 U				3.1 U	3.1 U	3.0 U	3.3 U	4.4 U	9.7 U
n-Nitrosodiphenylamine	--	1.1	5.1 U	5.1 U	5.0 U		5.1 U			5.1 U		5.2 U				5.0 U	4.9 U	4.9 U	5.3 U	7.1 U	15 U
o-Cresol	--	10	4.9 U	5.0 U	4.9 U		12 j			14 j		5.1 U				4.8 U	4.8 U	4.8 U	5.1 U	6.9 U	15 U
p-Chloroaniline	--	0.077	21 U	21 U	21 U		21 U			21 U		21 U				21 U	20 U	20 U	22 U	29 U	64 U
p-Cresol	--	670	6.2 U	17 j	6.1 U		21 j			6.2 U		6.4 U				6.1 U	6.1 U	6.0 U	11 j	640	19 U
p-Nitroaniline	--	NS	36 U	36 U	35 U		36 U			36 U		37 U				35 U	35 U	34 U	37 U	50 U	110 U
PAHs (ug/kg)																					
1-Methylnaphthalene	--	29000	7.2	26	1.6 U		1.6 U			1.6 U		4.8 j				2.3 j	5.6	1.6 U	2.6 j	57	3.1 j
2-Methylnaphthalene	--	670	1.4 U	3.9 j	1.4 U		1.4 U			1.4 U		2.8 j				2.8 j	5.7	1.4 U	2.6 j	79	4.3 j
Acenaphthene	--	28	1.2 U	3.6 j	1.2 U		1.3 U			1.2 U		3.2 j				1.2 U	2.3 j	1.2 U	1.3 U	3.7 U	1.3 U
Acenaphthylene	--	1300	1.2 U	3.1 j	1.2 U		1.2 U			1.2 U						1.1 U	1.2 U	1.2 U	1.2 U	23	1.2 U
Anthracene	--	51	1.4 U	3.2 j	1.4 U		1.4 U			1.4 U		1.4 U				1.3 U	1.3 U	1.3 U	1.4 U	4.1 U	1.4 U
Benzo(a)anthracene	0.1	0.057	1.5 U	3.2 j	1.5 U		1.5 U		</												

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Table W-8
Saturated Soil Analytical Results Summary - Semivolatile
Organic Compounds & Polycyclic Aromatic Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location			GP-56	GP-58	GP-59	GP-59	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-61	GP-6

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Table W-8
Saturated Soil Analytical Results Summary - Semivolatile
Organic Compounds & Polycyclic Aromatic Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location			GP-62	GP-62	GP-62	GP-62	GP-63	GP-63	GP-63	GP-63	GP-63	GP-63	GP-63	GP-64	GP-64	GP-64	GP-64	GP-65
Sample Date			10/12/2012	10/12/2012	10/12/2012	10/12/2012	10/12/2012	10/12/2012	10/12/2012	10/12/2012	10/12/2012	10/12/2012	10/12/2012	10/12/2012	10/12/2012	10/12/2012	10/12/2012	10/12/2012
Sample ID			GP-62-5.8	GP-62-6.7-7.7	GP-62-7.2	DUP101212-2A	GP-63-4-6	DUP101212-3	GP-63-5	DUP101212-3A	GP-63-6-8	GP-63-7	GP-63-8-9	GP-63-8.5	GP-64-4.3-6	GP-64-5.1	GP-64-6-7	GP-65-4-6
Sample Type			N	N	N	FD	N	FD	N	FD	N	N	N	N	N	N	N	N
Sample Depth			5.8 ft	6.7-7.7 ft	7.2 ft	7.2 ft	4-6 ft	4-6 ft	5 ft	5 ft	6-8 ft	7 ft	8-9 ft	8.5 ft	4.3-6 ft	5.1 ft	6-7 ft	4-6 ft
Soil Layer			Dredged Fill	Interface at Top of Silt	Interface at Top of Silt	Interface at Top of Silt	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Shallow Fill	Dredged Fill	Dredged Fill	Interface at Top of Silt	Interface at Top of Silt
SVOCs (ug/kg)			TEF	Screening Level														
Pentachlorophenol	--	0.0018			70 j		280 j	280 U			140 U		120 j		59 j		150 j	50 j
2,3,4,6-Tetrachlorophenol	--	270																
2,3,5,6-Tetrachlorophenol	--	NS																
2,4,5-Trichlorophenol	--	1100		20 U			120 U	120 U			62 U		20 U		20 U		20 U	20 U
2,4,6-Trichlorophenol	--	0.19		21 U			120 U	130 U			64 U		21 U		21 U		21 U	21 U
2,4-Dichlorophenol	--	4.3		20 U			120 U	120 U			62 U		20 U		20 U		30 j	21 U
2-Chlorophenol	--	11		2.2 U			13 U	14 U			6.9 U		2.3 U		2.2 U		49	2.3 U
Phenol	--	120		8.1 U			48 U	50 U			25 U		28		10 j		54	8.3 U
Hexachlorobenzene	--	0.0004		4.0 U			24 U	25 U			12 U		4.0 U		4.0 U		4.0 U	4.1 U
1,2,4-Trichlorobenzene	--	0.072	3.3 U	3.2 U	3.9 U	4.1 U	19 U	20 U	3.0 U	4.0 U	10 U	3.5 U	3.3 U	4.1 U	3.3 U	3.5 U	3.2 U	3.3 U
1,2-Dichlorobenzene	--	3.1	0.7 U	2.3 U	0.8 U	0.8 U	14 U	14 U	0.6 U	0.8 U	7.2 U	0.7 U	2.4 U	0.8 U	2.3 U	0.7 U	2.3 U	2.4 U
1,3-Dichlorobenzene	--	NS	0.7 U	2.4 U	0.8 U	0.8 U	15 U	15 U	0.6 U	0.8 U	7.6 U	0.7 U	2.5 U	0.8 U	2.5 U	0.7 U	2.5 U	2.5 U
1,4-Dichlorobenzene	--	8.1	0.7 U	2.7 U	0.8 U	0.8 U	16 U	17 U	0.6 U	0.8 U	8.2 U	0.7 U	2.7 U	0.8 U	2.7 U	0.7 U	2.7 U	2.7 U
2,2-Oxybis(1-chloropropane)	--	NS		3.5 U			21 U	22 U			11 U		3.5 U		3.5 U		3.5 U	3.6 U
2,4-Dimethylphenol	--	3.1		3.2 U			19 U	20 U			10 U		3.3 U		3.2 U		3.2 U	3.3 U
2,4-Dinitrophenol	--	9.2		100 U			620 U	640 U			320 U		100 U		100 U		100 U	110 U
2,4-Dinitrotoluene	--	0.069		18 U			110 U	110 U			56 U		18 U		18 U		18 U	19 U
2,6-Dinitrotoluene	--	0.021		28 U			170 U	180 U			88 U		29 U		29 U		29 U	29 U
2-Chloronaphthalene	--	NS		2.5 U			15 U	15 U			7.6 U		2.5 U		2.5 U		2.5 U	2.5 U
2-Nitroaniline	--	800000		17 U			100 U	110 U			53 U		17 U		17 U		17 U	18 U
2-Nitrophenol	--	NS		36 U			210 U	220 U			110 U		36 U		36 U		36 U	37 U
3,3'-Dichlorobenzidine	--	0.0033		17 U	17 U		99 U	100 U			51 U		17 U		17 U	17 U	17 U	17 U
3-Nitroaniline	--	NS		21 U			120 U	130 U			65 U		21 U		21 U		21 U	22 U
4-Bromophenyl phenyl ether	--	NS		4.7 U			28 U	29 U			14 U		4.7 U		4.7 U		4.7 U	4.8 U
4-Chloro-3-methylphenol	--	NS		14 U			84 U	87 U			43 U		14 U		14 U		14 U	14 U
4-Chlorophenyl phenyl ether	--	NS		4.9 U			29 U	31 U			15 U		5.0 U		5.0 U		4.9 U	5.1 U
4-Nitrophenol	--	7000		32 U			190 U	200 U			100 U		33 U		32 U		32 U	33 U
Benzoic acid	--	170		94 U			560 U	580 U			290 U		95 U		95 U		130 j	97 U
Benzyl alcohol	--	57		5.7 U			34 U	35 U			18 U		5.7 U		44		5.7 U	5.8 U
Benzyl butyl phthalate	--	0.18		5.7 U			34 U	36 U			18 U		5.8 U		5.7 U		5.7 U	5.9 U
Bis(2-chloroethoxy)methane	--	NS		1.9 U			11 U	12 U			5.8 U		1.9 U		1.9 U		1.9 U	1.9 U
Bis(2-ethylhexyl)phthalate	--	5.1		15 U			81 U	85 U			42 U		14 U		15 U		14 U	16 U
Carbazole	--	NS		2.5 U			100 j	93 j			60		2.5 U		2.5 U		2.5 U	2.6 U
Dibutyl Phthalate	--	15		7.6 U			45 U	47 U			23 U		7.7 U		7.6 U		7.6 U	7.8 U
Dichloroethyl ether	--	0.014		3.1 U			19 U	19 U			9.6 U		3.2 U		3.1 U		3.1 U	3.2 U
Diethyl Phthalate	--	34		34 U			200 U	210 U			110 U		34 U		34 U		34 U	35 U
Dimethylphthalate	--	71		2.7 U			16 U	17 U			8.3 U		2.7 U		2.7 U		2.7 U	2.8 U
Dinitro-o-cresol	--	NS		20 U			120 U	120 U			61 U		20 U		20 U		20 U	20 U
Di-n-octyl phthalate	--	330		5.4 U			32 U	34 U			17 U		5.5 U		5.5 U		5.5 U	5.6 U
Hexachloroethane	--	0.041		2.7 U			16 U	17 U			8.5 U		2.8 U		2.8 U		2.7 U	2.8 U
Hexachlorocyclopentadiene	--	200		62 U			370 U	380 U			190 U		63 U		62 U		62 U	64 U
Hexachlorobutadiene	--	0.54	3.3 U	4.3 U	3.9 U	4.1 U	25 U	26 U	3.0 U	4.0 U	13 U	3.5 U	4.3 U	4.1 U	4.3 U	3.5 U	4.3 U	4.4 U
Isophorone	--	15		2.7 U			16 U	17 U			8.2 U		2.7 U		2.7 U		2.7 U	2.7 U
Nitrobenzene	--	6.5		3.8 U			23 U	24 U			12 U		3.8 U		3.8 U		3.8 U	3.9 U
n-Nitrosodi-n-propylamine	--	0.0039		3.1 U			19 U	19 U			9.7 U		3.2 U		3.1 U		3.1 U	3.2 U
n-Nitrosodiphenylamine	--	1.1		5.0 U			30 U	31 U			16 U		5.1 U		5.0 U		5.0 U	5.2 U
o-Cresol	--	10		4.9 U			29 U	30 U			15 U		4.9 U		4.9 U		4.9 U	5.0 U
p-Chloroaniline	--	0.077		21 U			120 U	130 U			64 U		21 U		21 U		21 U	21 U
p-Cresol	--	670		14 j			37 U	38 U			19 U		17 j		6.2 U		37	6.3 U
p-Nitroaniline	--	NS		35 U	35 U		210 U	220 U			110 U		36 U		35 U	35 U	35 U	36 U
PAHs (ug/kg)																		
1-Methylnaphthalene	--	29000		18			120	140			210		10		8.7		8.4	5.4
2-Methylnaphthalene	--	670		8.4			220	210			230		6.7		12		7.6	2.4 j
Acenaphthene	--	28		20			60	58			260		6.4		16		20	6.1
Acenaphthylene	--	1300		7.3			960	1500			440		2.4 j		25		7.4	4.7 j
Anthracene	--	51		6.9			300	340			430		3.1 j		19		7.6	1.4 U
Benzo(a)anthracene	0.1	0.057		4.4 j			2300	2800			860		3.8 j		73		7.5	7.5
Benzo(a)pyrene	1	0.016		4.5 j			4700	6600			1300		5.2		90		7.6	12
Total (B+J+K) Benzofluoranthenes	0.1	3200		11			5200	7300			1400		8.9		110		16	15
Benzo(g,h,i)perylene	--	670		7.5			2700	3900			630		5.2		50		8.1	7.0
Chrysene	0.01	6.4		7.3			3900	5000			1300		6.2		110		10	11
Dibenzo(a,h)anthracene	0.1	0.029		2.2 U			720	870			180		2.2 U		13		2.2 U	3.3 j
Dibenzofuran	--	540		6.3			51	100			96		4.4 j		5.6		6.8	1.4 U
Fluoranthene	--	90		22			2200	3400			1700		12		120		31	14
Fluorene	--	29		15			110	140			370		3.0 j		11		9.4	2.6 j
Indeno(1,2,3-cd)pyrene	0.1	0.56		5.0			2100	3300			540		3.2 U		39		5.5	5.5
Naphthalene	--	2.1	3.3 U	48	1.2 j	4.1 U	280	310	3.0 U	0.8 j	220	1.5 j	8.3	4.1 U	17	3.5 U	22	5.5
Phenanthrene	--	1500		26			260	260			1400		12		34		29	5.2
Pyrene	--	140		25			6100	7600			2700		13		200		30	24
Carcinogenic PAHs TEQ ND=0 ⁻¹	--	0.016		6.6			5,800	8,100			1,600		6.5		110		11	15
Carcinogenic PAHs TEQ ND=1/2DL ⁻¹	--	0.016		6.7			5,800	8,100			1,600		6.8		110		11	15

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Table W-8
Saturated Soil Analytical Results Summary - Semivolatile
Organic Compounds & Polycyclic Aromatic Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location			GP-65	GP-65	GP-65	GP-66	GP-66	GP-66	GP-66	GP-35	GP-35	GP-35	GP-40	GP-40	GP-42	GP-42	GP-43	GP-43	GP-43	
Sample Date			10/12/2012	10/12/2012	10/12/2012	9/10/2012	9/10/2012	10/11/2012	10/8/2013	10/8/2013	10/8/2013	10/8/2013	10/8/2013	10/8/2013	10/9/2013	10/9/2013	10/10/2013	10/10/2013	10/10/2013	
Sample ID			GP-65-5	GP-65-6-7	GP-65-6.5	GP-66-0.6-2.6	GP-66-3.75-5.75	GP-66-5.75-7.75	GP-66-7.75-8.4	DUP-100813-1	GP-35-3.5-5.5	GP-35-11.25-12.25	GP-40-3.5-5.5	GP-40-11.3-12.3	GP-42-6.75-8.75	GP-42-12.5-13.5	GP-43-3.0-5.0	GP-43-11.1-12.1	GP-43-6.4-8.4	
Sample Type			N	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N	N	
Sample Depth			5 ft	6-7 ft	6.5 ft	0.6-2.6 ft	3.75-5.75 ft	5.75-7.75 ft	7.75-7.75 ft	3.5-5.5 ft	3.5-5.5 ft	11.25-12.25 ft	3.5-5.5 ft	11.3-12.3 ft	6.75-8.75 ft	12.5-13.5 ft	3-5 ft	11.1-12.1 ft	6.4-8.4 ft	
Soil Layer			Dredged Fill	Interface at Top of Silt	Dredged Fill	Shallow Fill	Dredged Fill	Dredged Fill	Interface at Top of Silt	Dredged Fill	Dredged Fill	Interface at Top of Silt	Dredged Fill	Interface at Top of Silt	Dredged Fill	Interface at Top of Silt	Shallow Fill	Interface at Top of Silt	Dredged Fill	
SVOCs (ug/kg)	TEF	Screening Level																		
Pentachlorophenol	--	0.0018		680			270	46 U	46 U	77 j	50	45	1.1 U	200	1.1 U	0.98 U	1.1 U	290	1.1 U	67
2,3,4,6-Tetrachlorophenol	--	270				48		4.6 U			14 j	12 j	5.0 U	22	5.2 U	5.3 U	5.1 U		5.3 U	5.0 U
2,3,5,6-Tetrachlorophenol	--	NS																		
2,4,5-Trichlorophenol	--	1100		20 U			20 U	20 U	20 U	21 U	25 U	25 U	25 U	25 U	26 U	27 U	25 U		27 U	25 U
2,4,6-Trichlorophenol	--	0.19		42 j			32 j	21 U	21 U	33 j	24 U	24 U	24 U	23 U	25 U	25 U	24 U		25 U	24 U
2,4-Dichlorophenol	--	4.3		120 j			20 U	20 U	20 U	120 j	30 U	30 U	30 U	29 U	31 U	32 U	30 U		58 j	30 U
2-Chlorophenol	--	11		18			2.2 U	2.2 U	2.3 U	78	6.1 U	6.0 U	6.1 U	6.0 U	6.3 U	6.4 U	6.1 U		180	6.0 U
Phenol	--	120		54			21	8.1 U	8.2 U	130	14 j	7.7 U	120	40	17 j	8.1 U	15 j		81	7.7 U
Hexachlorobenzene	--	0.0004		3.9 U					4.1 U	4.1 U	4.4 U	4.4 U	4.4 U	26	4.6 U	4.7 U	4.5 U		4.7 U	4.4 U
1,2,4-Trichlorobenzene	--	0.072	3.9 U	3.2 U	3.8 U				3.3 U	3.3 U	5.6 U	5.6 U	5.6 U	5.5 U	5.8 U					
1,2-Dichlorobenzene	--	3.1	0.8 U	2.3 U	0.8 U				2.4 U	2.4 U	4.4 U	4.4 U	4.4 U	4.3 U	4.5 U					
1,3-Dichlorobenzene	--	NS	0.8 U	2.4 U	0.8 U				2.5 U	2.5 U	4.8 U	4.7 U	4.7 U	4.7 U	4.9 U					
1,4-Dichlorobenzene	--	8.1	0.8 U	2.6 U	0.8 U				2.7 U	2.8 U	4.1 U	4.1 U	4.1 U	4.0 U	4.3 U					
2,2-Oxybis(1-chloropropane)	--	NS		3.5 U					3.6 U	3.6 U	5.3 U	5.3 U	5.3 U	5.2 U	5.5 U					
2,4-Dimethylphenol	--	3.1		3.2 U					3.3 U	3.3 U	25 U	25 U	25 U	25 U	26 U					
2,4-Dinitrophenol	--	9.2		100 U					110 U	110 U	39 U	39 U	39 U	38 U	40 U					
2,4-Dinitrotoluene	--	0.069		18 U					19 U	19 U	21 U	21 U	21 U	21 U	22 U					
2,6-Dinitrotoluene	--	0.021		28 U					29 U	29 U	25 U	25 U	25 U	25 U	26 U					
2-Chloronaphthalene	--	NS		2.4 U					2.5 U	2.5 U	4.2 U	4.1 U	4.2 U	4.1 U	4.3 U					
2-Nitroaniline	--	800000		17 U					17 U	18 U	28 U	28 U	28 U	28 U	29 U					
2-Nitrophenol	--	NS		36 U					37 U	37 U	6.5 U	6.5 U	6.5 U	6.4 U	6.7 U					
3,3'-Dichlorobenzidine	--	0.0033		16 U					17 U j	17 U j	29 U	29 U	29 U	29 U	30 U					
3-Nitroaniline	--	NS		21 U					21 U	22 U	35 U	35 U	35 U	35 U	37 U					
4-Bromophenyl phenyl ether	--	NS		4.6 U					4.8 U	4.8 U	5.7 U	5.7 U	5.7 U	5.6 U	5.9 U					
4-Chloro-3-methylphenol	--	NS		14 U					14 U	15 U	27 U	27 U	27 U	27 U	28 U					
4-Chlorophenyl phenyl ether	--	NS		4.9 U					5.0 U	5.1 U	6.5 U	6.5 U	6.5 U	6.4 U	6.8 U					
4-Nitrophenol	--	7000		32 U					33 U	33 U	42 U	41 U	42 U	41 U	43 U					
Benzoic acid	--	170		110 j					96 U	180 j	78 j	55 U	120 j	54 U	110 j					
Benzyl alcohol	--	57		5.6 U					5.8 U	5.9 U	14 U	14 U	14 U	14 U	15 U					
Benzyl butyl phthalate	--	0.18		5.6 U					5.8 U	5.9 U	160	120	7.5 U	7.4 U	7.8 U					
Bis(2-chloroethoxy)methane	--	NS		1.8 U					1.9 U	1.9 U	5.9 U	5.9 U	5.9 U	5.8 U	6.2 U					
Bis(2-ethylhexyl)phthalate	--	5.1		15 U					14 U	14 U	27 U	27 U	27 U	27 U	28 U					
Carbazole	--	NS		2.5 U					2.6 U j	2.6 U j	6.9 U	6.9 U	6.9 U	6.8 U	7.2 U					
Dibutyl Phthalate	--	15		7.5 U					7.8 U	7.9 U	24	27	5.0 U	15 j	5.2 U					
Dichloroethyl ether	--	0.014		3.1 U					3.2 U	3.2 U	6.4 U	6.3 U	6.3 U	6.2 U	6.6 U					
Diethyl Phthalate	--	34		34 U					35 U	35 U	74 U	24 U	46 U	27 U	20 U					
Dimethylphthalate	--	71		2.7 U					2.8 U	2.8 U	6.0 U	6.0 U	6.0 U	5.9 U	6.3 U					
Dinitro-o-cresol	--	NS		20 U					20 U	20 U	47 U	47 U	47 U	47 U	49 U					
Di-n-octyl phthalate	--	330		5.4 U					5.6 U	5.6 U	8.2 U	8.1 U	8.2 U	8.0 U	8.5 U					
Hexachloroethane	--	0.041		2.7 U					2.8 U	2.8 U	5.3 U	5.3 U	5.3 U	5.2 U	5.5 U					
Hexachlorocyclopentadiene	--	200		61 U					63 U	64 U	39 U	39 U	39 U	38 U	40 U					
Hexachlorobutadiene	--	0.54	3.9 U	4.2 U	3.8 U				4.3 U	4.4 U	4.7 U	4.7 U	4.7 U	4.6 U	4.9 U					
Isophorone	--	15		2.6 U					2.7 U	2.8 U	7.3 U	7.2 U	7.2 U	7.1 U	7.6 U					
Nitrobenzene	--	6.5		3.7 U					3.9 U	3.9 U	7.5 U	7.4 U	7.4 U	7.3 U	7.7 U					
n-Nitrosodi-n-propylamine	--	0.0039		3.1 U					3.2 U	3.2 U	10 U	10 U	10 U	9.9 U	11 U					
n-Nitrosodiphenylamine	--	1.1		5.0 U					5.1 U	5.2 U	9.0 U	8.9 U	9.0 U	8.8 U	9.3 U					
o-Cresol	--	10		4.8 U					5.0 U	5.1 U	7.3 U	7.3 U	7.3 U	7.2 U	7.6 U					
p-Chloroaniline	--	0.077		21 U					21 U	21 U	32 U	31 U	32 U	31 U	33 U					
p-Cresol	--	670		18 j					6.3 U	28 j	14 U	14 U	36	14 U	16 j					
p-Nitroaniline	--	NS		35 U					36 U	36 U	33 U	33 U	33 U	32 U	34 U					
PAHs (ug/kg)																				
1-Methylnaphthalene	--	29000		6.0					1.6 U	9.8	10	11	3.5 j	9.0	9.3					
2-Methylnaphthalene	--	670		6.7					1.4 U	8.5	19	19	4.8	16	11					
Acenaphthene	--	28		8.6					1.2 U	6.6	3.3 j	2.5 j	2.9 j	14	8.5					
Acenaphthylene	--	1300		2.8 j					1.2 U	6.7	4.0 j	4.7	2.8 j	1.5 U	11					
Anthracene	--	51		6.5					1.4 U	7.2	2.8 j	2.8 j	3.3 j	1.6 U	14					
Benzo(a)anthracene	0.1	0.057		6.9					1.5 U	6.8										

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Table W-8
Saturated Soil Analytical Results Summary - Semivolatile
Organic Compounds & Polycyclic Aromatic Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location			GP-49	GP-49	GP-49	GP-51	GP-51	GP-52	GP-52	GP-54	GP-54	GP-54	GP-60	GP-60	GP-67	GP-67	GP-68	GP-68	GP-68
Sample Date			10/4/2013	10/4/2013	10/4/2013	10/9/2013	10/9/2013	10/9/2013	10/9/2013	10/9/2013	10/9/2013	10/9/2013	10/1/2013	10/4/2013	10/7/2013	10/7/2013	1/23/2014	1/23/2014	1/23/2014
Sample ID			GP-49-3.5-5.5	GP-49-6.0-8.0	GP-49-11.75-12.75	GP-51-8.6-10.6	GP-51-11.9-12.9	GP-52-7.1-9.1	GP-52-12.1-13.1	DUP-100913-1	GP-54-1.5-3.0	GP-54-4.1-6.1	GP-60-4.5-5.0	GP-60-8.8-9.8	GP-67-4.8-6.8	GP-67-10-11	GP-68-4-6	DUP-012314-1	GP-68-9.4-10.4
Sample Type			N	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	FD	N
Sample Depth			3.5-5.5 ft	6-8 ft	11.75-12.75 ft	8.6-10.6 ft	11.9-12.9 ft	7.1-9.1 ft	12.1-13.1 ft	4.1-6.1 ft	1.5-3 ft	4.1-6.1 ft	4.5-5 ft	8.8-9.8 ft	4.8-6.8 ft	10-11 ft	4-6 ft	4-6 ft	9.4-10.4 ft
Soil Layer			Shallow Fill	Dredged Fill	Interface at Top of Silt	Dredged Fill	Interface at Top of Silt	Dredged Fill	Interface at Top of Silt	Dredged Fill	Shallow Fill	Dredged Fill	Dredged Fill	Interface at Top of Silt	Dredged Fill	Interface at Top of Silt	Dredged Fill	Dredged Fill	Interface at Top of Silt
SVOCs (ug/kg)	TEF	Screening Level																	
Pentachlorophenol	--	0.0018	420	1.0 U	1.1 U	0.96 U	1.1 U	0.89 U	1.1 U	10	1000	14	1.0 U	58	0.93 U	95	6.4 j	6.6 j	1.3 U
2,3,4,6-Tetrachlorophenol	--	270	140			5.1 U	5.1 U	5.3 U	5.1 U	5.1 U		5.1 U	5.1 U		5.3 U	12 j			
2,3,5,6-Tetrachlorophenol	--	NS																	
2,4,5-Trichlorophenol	--	1100	29 j			25 U	25 U	27 U	26 U	25 U		26 U	26 U		27 U	26 U	25 U	26 U	
2,4,6-Trichlorophenol	--	0.19	24 U			24 U	24 U	25 U	24 U	24 U		24 U	24 U		25 U	24 U	25 U	25 U	
2,4-Dichlorophenol	--	4.3	31 U			30 U	30 U	32 U	30 U	30 U		31 U	30 U		32 U	85 j	30 U	31 U	
2-Chlorophenol	--	11	6.2 U			6.1 U	6.1 U	6.4 U	6.2 U	6.1 U		6.2 U	6.1 U		6.4 U	160	6.1 U	6.2 U	
Phenol	--	120	560			7.7 U	17 j	16 j	21	7.8 U		7.9 U	7.8 U		8.1 U	98	51 U	60 U	
Hexachlorobenzene	--	0.0004	12 j			4.5 U	4.5 U	4.7 U	4.5 U	4.5 U		4.5 U	4.5 U		4.7 U	4.6 U	4.5 U	4.6 U	
1,2,4-Trichlorobenzene	--	0.072	5.7 U										5.7 U				5.6 U	5.8 U	
1,2-Dichlorobenzene	--	3.1	4.5 U										4.4 U				4.4 U	4.5 U	
1,3-Dichlorobenzene	--	NS	4.9 U										4.8 U				4.8 U	4.9 U	
1,4-Dichlorobenzene	--	8.1	4.2 U										4.2 U				4.2 U	4.2 U	
2,2-Oxybis(1-chloropropane)	--	NS	5.5 U										5.4 U				5.4 U	5.5 U	
2,4-Dimethylphenol	--	3.1	26 U										25 U				25 U	26 U	
2,4-Dinitrophenol	--	9.2	40 U										39 U				39 U	40 U	
2,4-Dinitrotoluene	--	0.069	22 U										22 U				22 U	22 U	
2,6-Dinitrotoluene	--	0.021	26 U										25 U				25 U	26 U	
2-Chloronaphthalene	--	NS	4.3 U										4.2 U				4.2 U	4.3 U	
2-Nitroaniline	--	800000	29 U										29 U				29 U	29 U	
2-Nitrophenol	--	NS	6.7 U										6.6 U				6.5 U	6.7 U	
3,3'-Dichlorobenzidine	--	0.0033	30 UJ										30 U				30 U	30 U	
3-Nitroaniline	--	NS	36 U										36 U				36 U	36 U	
4-Bromophenyl phenyl ether	--	NS	5.8 U										5.8 U				5.7 U	5.9 U	
4-Chloro-3-methylphenol	--	NS	28 U										27 U				27 U	28 U	
4-Chlorophenyl phenyl ether	--	NS	6.7 U										6.6 U				6.6 U	6.7 U	
4-Nitrophenol	--	7000	43 U										42 U				42 U	43 U	
Benzoic acid	--	170	73 j										56 U				56 U	57 U	
Benzyl alcohol	--	57	14 UJ										14 U				14 U	14 U	
Benzyl butyl phthalate	--	0.18	7.7 U										7.6 U				7.6 U	7.8 U	
Bis(2-chloroethoxy)methane	--	NS	6.1 U										6.0 U				6.0 U	6.1 U	
Bis(2-ethylhexyl)phthalate	--	5.1	28 U										30 j				27 U	28 U	
Carbazole	--	NS	7.1 U										7.0 U				7.0 U	7.1 U	
Dibutyl Phthalate	--	15	140										5.0 U				5.0 U	12 j	
Dichloroethyl ether	--	0.014	6.5 U										6.4 U				6.4 U	6.5 U	
Diethyl Phthalate	--	34	17 U										74 U				17 U	17 U	
Dimethylphthalate	--	71	6.2 U										6.1 U				6.1 U	6.2 U	
Dinitro-o-cresol	--	NS	49 U										48 U				48 U	49 U	
Di-n-octyl phthalate	--	330	8.4 U										8.3 U				8.2 U	8.4 U	
Hexachloroethane	--	0.041	5.4 U										5.4 U				5.3 U	5.5 U	
Hexachlorocyclopentadiene	--	200	40 U										39 U				39 U	40 U	
Hexachlorobutadiene	--	0.54	4.8 U										4.8 U				4.7 U	4.8 U	
Isophorone	--	15	7.5 U										7.4 U				7.3 U	7.5 U	
Nitrobenzene	--	6.5	7.7 U										7.5 U				7.5 U	7.7 U	
n-Nitrosodi-n-propylamine	--	0.0039	10 U										10 U				10 U	10 U	
n-Nitrosodiphenylamine	--	1.1	9.2 U										9.1 U				9.1 U	9.2 U	
o-Cresol	--	10	7.5 U										7.4 U				7.4 U	7.6 U	
p-Chloroaniline	--	0.077	32 U										32 U				32 U	33 U	
p-Cresol	--	670	14 U										14 U				14 U	14 U	
p-Nitroaniline	--	NS	34 UJ										33 U				33 U	34 U	
PAHs (ug/kg)																			
1-Methylnaphthalene	--	29000	16										2.4 J				1.5 U	4.5 j	
2-Methylnaphthalene	--	670	25										5.4				2.9 j	5.8	
Acenaphthene	--	28	4.0 J										1.4 U				1.4 U	1.4 U	
Acenaphthylene	--	1300	4.5 J										1.5 U				1.5 U	1.6 U	
Anthracene	--	51	6.1										1.7 U				1.7 U	1.7 U	
Benzo(a)anthracene	0.1	0.057	15										2.1 U				2.1 U	2.1 U	
Benzo(a)pyrene	1	0.016	20										2.3 U				2.3 U	2.3 U	
Total (B+J+K) Benzofluoranthenes	0.1	3200	23										3.8 J				2.2 U	2.2 U	
Benzo(g,h,i)perylene	--	670	12										2.9 J				2.6 U	2.7 U	
Chrysene	0.01	6.4	23										5.7				1.8 U	1.9 U	
Dibenzo(a,h)anthracene	0.1	0.029	27										2.4 U				2.4 U	2.5 U	
Dibenzofuran	--	540	10										4.3 J				1.3 U	1.4 U	
Fluoranthene	--	90	33										14				3.8 j	3.8 j	
Fluorene	--	29	5.3										1.4 U				1.4 U	1.4 U	
Indeno(1,2,3-cd)pyrene	0.1	0.56	20										2.9 U				2.8 U	2.9 U	
Naphthalene	--	2.1	59										11				2.6 j	2.8 j	
Phenanthrene	--	1500	38										15				2.9 j	5.8	
Pyrene	--	140	34										8.9				2.9 j	3.0 j	
Carcinogenic PAHs TEQ ND=0 ¹	--	0.016	29										0.44				0 U	0 U	
Carcinogenic PAHs TEQ ND=1/2DL ¹	--	0.016	29										2.0				1.6 U	1.6 U	

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Table W-8
Saturated Soil Analytical Results Summary - Semivolatile
Organic Compounds & Polycyclic Aromatic Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location			GP-69	GP-69	GP-69	GP-70	GP-70	GP-70	GP-70	GP-71	GP-71	GP-71	GP-72	GP-72	GP-73	GP-73	GP-73	GP-74	GP-74
Sample Date			10/7/2013	10/7/2013	10/7/2013	10/9/2013	10/9/2013	10/9/2013	10/9/2013	10/8/2013	10/8/2013	10/8/2013	10/1/2013	10/8/2013	10/8/2013	10/8/2013	10/8/2013	10/8/2013	10/8/2013
Sample ID			GP-69-7.6-9.6	GP-69-12.6-13.6	DUP-100713-2	GP-70-3.0-5.0	GP-70-6.1-8.1	DUP-100913-2	GP-70-10.8-11.8	GP-71-2.25-4	GP-71-7.1-9.1	GP-71-10.6-11.6	GP-72-2.0-4.0	GP-72-8.2-9.2	GP-73-5.8-7.8	GP-73-11.5-12.5	DUP-100813-2	GP-74-3.0-4.0	GP-74-4.0-5.0
Sample Type			N	N	FD	N	N	FD	N	N	N	N	N	N	N	N	FD	N	N
Sample Depth			7.6-9.6 ft	12.6-13.6 ft	12.6-13.6 ft	3-5 ft	6.1-8.1 ft	6.1-8.1 ft	10.8-11.8 ft	2.25-4 ft	7.1-9.1 ft	10.6-11.6 ft	2-4 ft	8.2-9.2 ft	5.8-7.8 ft	11.5-12.5 ft	11.5-12.5 ft	3-4 ft	4-5 ft
Soil Layer			Dredged Fill	Interface at Top of Silt	Interface at Top of Silt	Shallow Fill	Dredged Fill	Dredged Fill	Interface at Top of Silt	Shallow Fill	Dredged Fill	Interface at Top of Silt	Dredged Fill	Interface at Top of Silt	Dredged Fill	Interface at Top of Silt	Interface at Top of Silt	Shallow Fill	Dredged Fill
SVOCs (ug/kg)			TEF	Screening Level															
Pentachlorophenol	--	0.0018	0.91 U	1.1 U	1.2 U	4400	1500 J	900 J	78	9.4	10	1.2 U	41	270	0.93 U	73	67	220	46
2,3,4,6-Tetrachlorophenol	--	270	5.1 U	5.1 U	5.2 U		94	140	5.1 U		5.0 U	5.2 U	5.3 U	140	5.1 U	5.1 U	5.1 U		12 j
2,3,5,6-Tetrachlorophenol	--	NS																	
2,4,5-Trichlorophenol	--	1100	26 U	25 U	26 U		54 j	69 j	25 U		25 U	26 U	26 U	25 U	26 U	26 U	26 U		25 U
2,4,6-Trichlorophenol	--	0.19	24 U	24 U	25 U		25 U	24 U	24 U		23 U	25 U	25 U	28 j	24 U	24 U	24 U		24 U
2,4-Dichlorophenol	--	4.3	30 U	30 U	31 U		32 U	30 U	30 U		30 U	150	31 U	30 U	30 U	31 U	31 U		30 U
2-Chlorophenol	--	11	6.2 U	6.1 U	6.3 U		6.4 U	6.0 U	110		6.0 U	320	6.3 U	35	6.2 U	6.2 U	6.2 U		6.1 U
Phenol	--	120	7.8 U	37	33		8.2 U	7.7 U	56		7.6 U	170	11 j	90	7.8 U	48	41		30
Hexachlorobenzene	--	0.0004	4.5 U	4.5 U	4.6 U		4.7 U	4.4 U	4.5 U		4.4 U	4.6 U	20	4.5 U	4.5 U	4.5 U	4.5 U		4.5 U
1,2,4-Trichlorobenzene	--	0.072					5.9 U	5.5 U	5.6 U		5.5 U	5.8 U							5.6 U
1,2-Dichlorobenzene	--	3.1					4.6 U	4.3 U	4.4 U		4.3 U	4.5 U							4.4 U
1,3-Dichlorobenzene	--	NS					5.0 U	4.7 U	4.8 U		4.7 U	4.9 U							4.8 U
1,4-Dichlorobenzene	--	8.1					4.4 U	4.1 U	4.2 U		4.1 U	4.3 U							4.2 U
2,2-Oxybis(1-chloropropane)	--	NS					5.6 U	5.3 U	5.4 U		5.2 U	5.5 U							5.4 U
2,4-Dimethylphenol	--	3.1					27 U	25 U	25 U		25 U	26 U							25 U
2,4-Dinitrophenol	--	9.2					41 U	38 U	39 U		38 U	40 U							39 U
2,4-Dinitrotoluene	--	0.069					23 U	21 U	22 U		21 U	22 U							22 U
2,6-Dinitrotoluene	--	0.021					26 U	25 U	25 U		25 U	26 U							25 U
2-Chloronaphthalene	--	NS					4.4 U	4.1 U	4.2 U		4.1 U	4.3 U							4.2 U
2-Nitroaniline	--	800000					30 U	28 U	29 U		28 U	29 U							29 U
2-Nitrophenol	--	NS					6.9 U	6.4 U	6.6 U		6.4 U	6.7 U							6.6 U
3,3'-Dichlorobenzidine	--	0.0033					31 U	29 U	30 U		29 U	30 U							30 U
3-Nitroaniline	--	NS					37 U	35 U	36 U		35 U	37 U							36 U
4-Bromophenyl phenyl ether	--	NS					6.0 U	5.6 U	5.8 U		5.6 U	5.9 U							5.8 U
4-Chloro-3-methylphenol	--	NS					29 U	27 U	27 U		27 U	28 U							27 U
4-Chlorophenyl phenyl ether	--	NS					6.9 U	6.5 U	6.6 U		6.4 U	6.8 U							6.6 U
4-Nitrophenol	--	7000					44 U	41 U	42 U		41 U	43 U							42 U
Benzoic acid	--	170					59 U	55 U	95 j		55 U	240							56 U
Benzyl alcohol	--	57					15 U	14 U	14 U		14 U	15 U							14 U
Benzyl butyl phthalate	--	0.18					8.0 U	7.5 U	7.6 U		7.4 U	7.8 U							7.6 U
Bis(2-chloroethoxy)methane	--	NS					6.3 U	5.9 U	6.0 U		5.9 U	6.2 U							6.0 U
Bis(2-ethylhexyl)phthalate	--	5.1					29 U	27 U	27 U		27 U	28 U							27 U
Carbazole	--	NS					7.3 U	6.9 U	7.0 U		6.8 U	7.2 U							7.0 U
Dibutyl Phthalate	--	15					38	50	55		4.9 U	5.2 U							5.0 U
Dichloroethyl ether	--	0.014					6.7 U	6.3 U	6.4 U		6.3 U	6.6 U							6.4 U
Diethyl Phthalate	--	34					18 U	22	17 j		19 U	74 U							69 U
Dimethylphthalate	--	71					6.4 U	6.0 U	6.1 U		5.9 U	6.3 U							6.1 U
Dinitro-o-cresol	--	NS					50 U	47 U	48 U		47 U	49 U							48 U
Di-n-octyl phthalate	--	330					8.7 U	8.1 U	8.3 U		8.1 U	8.5 U							8.3 U
Hexachloroethane	--	0.041					5.6 U	5.3 U	5.4 U		5.2 U	5.5 U							5.4 U
Hexachlorocyclopentadiene	--	200					41 U	38 U	39 U		38 U	40 U							39 U
Hexachlorobutadiene	--	0.54					5.0 U	4.7 U	4.7 U		4.6 U	4.9 U							4.7 U
Isophorone	--	15					7.7 U	7.2 U	7.3 U		7.2 U	7.5 U							7.3 U
Nitrobenzene	--	6.5					7.9 U	7.4 U	7.5 U		7.3 U	7.7 U							7.5 U
n-Nitrosodi-n-propylamine	--	0.0039					11 U	10 U	10 U		10 U	11 U							10 U
n-Nitrosodiphenylamine	--	1.1					9.5 U	8.9 U	9.1 U		8.8 U	9.3 U							9.1 U
o-Cresol	--	10					7.8 U	7.3 U	7.4 U		7.2 U	7.6 U							7.4 U
p-Chloroaniline	--	0.077					33 U	31 U	32 U		31 U	33 U							32 U
p-Cresol	--	670					15 U	14 U	23		14 U	37							14 U
p-Nitroaniline	--	NS					35 U	32 U	33 U		32 U	34 U							33 U
PAHs (ug/kg)																			
1-Methylnaphthalene	--	29000					1.6 U	1.5 U	3.2 j		1.5 U	7.4							5.3
2-Methylnaphthalene	--	670					1.7 U	1.6 U	5.0		2.4 J	9.9							7.4
Acenaphthene	--	28					1.5 U	1.4 U	5.4		1.4 U	5.8							3.1 J
Acenaphthylene	--	1300					1.6 U	1.5 U	3.9 j		1.5 U	5.4							7.3
Anthracene	--	51					1.8 U	1.7 U	4.7		1.6 U	8.5							8.9
Benzo(a)anthracene	0.1	0.057					2.2 U	2.1 U	4.9		2.1 U	7.4							23
Benzo(a)pyrene	1	0.016					2.4 U	2.2 U	16		2.2 U	17							30
Total (B+J+K) Benzofluoranthenes	0.1	3200					2.3 U	2.1 U	16		2.1 U	18							36
Benzo(g,h,i)perylene	--	670					2.8 U	2.6 U	12		2.6 U	14							19
Chrysene	0.01	6.4					1.9 U	1.8 U	7.4		1.8 U	10							29
Dibenzo(a,h)anthracene	0.1	0.029					2.5 U	2.4 U	26		2.4 U	27							28
Dibenzofuran	--	540					1.4 U	1.3 U	5.0		1.3 U	8.3							8.2
Fluoranthene	--	90					1.9 U	1.7 U	22		1.7 U	34							47
Fluorene	--	29					1.5 U	1.4 U	4.6 j		1.4 U	9.1							8.3
Indeno(1,2,3-cd)pyrene	0.1	0.56					3.0 U	2.8 U	21		2.8 U	23							26
Naphthalene	--	2.1					2.2 U	3.4 j	19		9.9	29							10
Phenanthrene	--	1500					1.6 U	2.8 j	23		1.5 U	30							25
Pyrene	--	140					2.2 U	2.1 U	25		2.1 U	37							

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Table W-8
Saturated Soil Analytical Results Summary - Semivolatile
Organic Compounds & Polycyclic Aromatic Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location			GP-74	GP-74	GP-75	GP-75	MW-14D	MW-14D	MW-14D	MW-20D	MW-28S	MW-28S	MW-29S	MW-29S	MW-30S	MW-31S	MW-31D	MW-31D	MW-32D
Sample Date			10/10/2013	1/22/2014	10/1/2013	10/4/2013	11/14/2011	11/14/2011	11/14/2011	10/8/2013	11/8/2011	11/8/2011	11/8/2011	11/8/2011	11/8/2011	11/8/2011	10/10/2013	10/10/2013	11/9/2011
Sample ID			GP-74-7.6-8.6	GP-74-11.9-13.9	GP-75-4.0-6.0	GP-75-8.5-9.5	MW-14D-3-6	DUP-111411-1	MW-14D-6.5-7.5	MW-20D-6.6-8.6	MW-28S-1-2	MW-28S-3.5-4	MW-29S-0-2	MW-29S-3-3.5	MW-30S-3-3.5	MW-31S-5-6	MW-31D-5.0-7.0	MW-31D-8.25-9.25	MW-32D-1.6-3.6
Sample Type			N	N	N	N	N	FD	N	N	N	N	N	N	N	N	N	N	N
Sample Depth			7.6-8.6 ft	11.9-13.9 ft	4-6 ft	8.5-9.5 ft	3-6 ft	3-6 ft	6.5-7.5 ft	6.6-8.6 ft	1-2 ft	3.5-4 ft	0-2 ft	3-3.5 ft	3-3.5 ft	5-6 ft	5-7 ft	8.25-9.25 ft	1.6-3.6 ft
Soil Layer			Interface at Top of Silt	Lower Sand	Dredged Fill	Interface at Top of Silt	Dredged Fill	Dredged Fill	Dredged Fill	Dredged Fill	Shallow Fill	Dredged Fill	Shallow Fill	Shallow Fill	Dredged Fill	Dredged Fill	Dredged Fill	Interface at Top of Silt	Shallow Fill
SVOCs (ug/kg)			TEF	Screening Level															
Pentachlorophenol	--	0.0018	110	1.1 U	10 U		43 U	43 U	47 U	0.91 U	270	47 U	79 J	44 U	46 U	47 U	10 j	1.2 U	46 U
2,3,4,6-Tetrachlorophenol	--	270	130		320 U		4.3 U	4.3 U	4.7 U	5.2 U	15 j	4.7 U	21 J	4.4 U	4.6 U	4.7 U	5.1 U	5.1 U	4.6 U
2,3,5,6-Tetrachlorophenol	--	NS																	
2,4,5-Trichlorophenol	--	1100	25 U		1600 U		19 U	19 U	21 U	26 U	20 U	21 U	21 UJ	19 U	20 U	21 U	26 U	26 U	20 U
2,4,6-Trichlorophenol	--	0.19	24 U		1500 U		20 U	20 U	22 U	25 U	21 U	22 U	22 UJ	20 U	21 U	22 U	24 U	24 U	21 U
2,4-Dichlorophenol	--	4.3	32 j		1900 U		19 U	19 U	21 U	31 U	20 U	21 U	21 UJ	20 U	20 U	21 U	30 U	30 U	20 U
2-Chlorophenol	--	11	26		390 U		2.1 U	2.1 U	2.3 U	6.3 U	2.2 U	2.3 U	2.3 UJ	2.2 U	2.3 U	2.3 U	6.2 U	6.2 U	2.3 U
Phenol	--	120	47		500 U		7.6 U	7.6 U	8.3 U	11 j	26	8.4 U	28 J	12 j	8.2 U	8.4 U	10 j	53	34
Hexachlorobenzene	--	0.0004	4.5 U		290 U		3.8 U	3.8 U	4.1 U	4.6 U	4.0 U	4.2 U				4.2 U	4.5 U	4.5 U	
1,2,4-Trichlorobenzene	--	0.072	5.6 U				3.1 U	3.1 U	3.4 U		3.2 U	3.4 U				3.4 U			
1,2-Dichlorobenzene	--	3.1	4.4 U				2.2 U	2.2 U	2.4 U		2.3 U	2.4 U				2.4 U			
1,3-Dichlorobenzene	--	NS	4.8 U				2.3 U	2.3 U	2.5 U		2.4 U	2.6 U				2.6 U			
1,4-Dichlorobenzene	--	8.1	4.2 U				2.5 U	2.5 U	2.8 U		2.6 U	2.8 U				2.8 U			
2,2-Oxybis(1-chloropropane)	--	NS	5.4 U				3.3 U	3.3 U	3.6 U		3.5 U	3.7 U				3.7 U			
2,4-Dimethylphenol	--	3.1	25 U				3.0 U	3.0 U	3.3 U		3.2 U	3.4 U				3.4 U			
2,4-Dinitrophenol	--	9.2	39 U				98 UJ	98 UJ	110 UJ		100 U	110 U				110 U			
2,4-Dinitrotoluene	--	0.069	22 U				17 U	17 U	19 U		18 U	19 U				19 U			
2,6-Dinitrotoluene	--	0.021	25 U				27 U	27 U	30 U		28 U	30 U				30 U			
2-Chloronaphthalene	--	NS	4.2 U				2.3 U	2.3 U	2.5 U		2.4 U	2.6 U				2.6 U			
2-Nitroaniline	--	800000	29 U				16 U	16 U	18 U		17 U	18 U				18 U			
2-Nitrophenol	--	NS	6.5 U				34 U	34 U	37 U		36 U	38 U				38 U			
3,3'-Dichlorobenzidine	--	0.0033	30 U				16 UJ	16 UJ	17 UJ		16 U	17 U				17 U			
3-Nitroaniline	--	NS	36 U				20 U	20 U	22 U		21 U	22 U				22 U			
4-Bromophenyl phenyl ether	--	NS	5.7 U				4.4 U	4.4 U	4.9 U		4.7 U	4.9 U				4.9 U			
4-Chloro-3-methylphenol	--	NS	27 U				13 U	13 U	15 U		14 U	15 U				15 U			
4-Chlorophenyl phenyl ether	--	NS	6.6 U				4.6 U	4.7 U	5.1 U		4.9 U	5.2 U				5.2 U			
4-Nitrophenol	--	7000	42 U				30 U	31 U	33 U		32 U	34 U				34 U			
Benzoic acid	--	170	56 U				89 U	89 U	97 U		93 U	98 U				99 U			
Benzyl alcohol	--	57	14 U				5.4 UJ	5.4 UJ	5.9 UJ		5.6 U	5.9 U				5.9 U			
Benzyl butyl phthalate	--	0.18	7.6 U				5.4 U	5.4 U	5.9 U		5.7 U	6.0 U				6.0 U			
Bis(2-chloroethoxy)methane	--	NS	6.0 U				1.8 U	1.8 U	1.9 U		1.9 U	1.9 U				2.0 U			
Bis(2-ethylhexyl)phthalate	--	5.1	27 U				98	130	33		81	20 j				14 U			
Carbazole	--	NS	7.0 U				2.4 U	2.4 U	2.6 U		12 j	2.6 U				2.6 U			
Dibutyl Phthalate	--	15	5.0 U				7.2 U	7.2 U	7.9 U		17 j	8.0 U				8.0 U			
Dichloroethyl ether	--	0.014	6.4 U				2.9 U	2.9 U	3.2 U		3.1 U	3.3 U				3.3 U			
Diethyl Phthalate	--	34	110				32 U	32 U	35 U		34 U	36 U				36 U			
Dimethylphthalate	--	71	6.1 U				2.5 U	2.6 U	2.8 U		2.7 U	2.8 U				2.8 U			
Dinitro-o-cresol	--	NS	48 U				19 U	19 U	20 U		20 U	21 U				21 U			
Di-n-octyl phthalate	--	330	8.2 U				5.1 U	5.1 U	5.6 U		5.4 U	5.7 U				5.7 U			
Hexachloroethane	--	0.041	5.3 U				2.6 U	2.6 U	2.8 U		2.7 U	2.9 U				2.9 U			
Hexachlorocyclopentadiene	--	200	39 U				58 U	58 U	64 U		61 U	65 U				65 U			
Hexachlorobutadiene	--	0.54	4.7 U				4.0 U	4.0 U	4.4 U		4.2 U	4.5 U				4.5 U			
Isophorone	--	15	7.3 U				2.5 U	2.5 U	2.8 U		2.6 U	2.8 U				2.8 U			
Nitrobenzene	--	6.5	7.5 U				3.6 U	3.6 U	3.9 U		3.8 U	4.0 U				4.0 U			
n-Nitrosodi-n-propylamine	--	0.0039	10 U				3.0 U	3.0 U	3.2 U		3.1 U	3.3 U				3.3 U			
n-Nitrosodiphenylamine	--	1.1	9.1 U				4.7 U	4.7 U	5.2 U		5.0 U	5.3 U				5.3 U			
o-Cresol	--	10	7.4 U				4.6 U	4.6 U	5.1 U		4.9 U	5.1 U				5.1 U			
p-Chloroaniline	--	0.077	32 U				20 U	20 U	22 U		21 U	22 U				22 U			
p-Cresol	--	670	17 j				28 j	36	6.4 U		6.1 U	6.5 U				6.5 U			
p-Nitroaniline	--	NS	33 U				33 U	33 U	37 U		35 U	37 U				37 U			
PAHs (ug/kg)																			
1-Methylnaphthalene	--	29000	3.8 j			32	40	24	1.7 U		42	1.7 U				25	8.2		
2-Methylnaphthalene	--	670	3.9 j			40	23	13	1.5 U		69	1.5 U				14	6.6		
Acenaphthene	--	28	3.1 j			16	1.2 U	1.2 U	1.3 U		15	1.3 U				19	1.4 U		
Acenaphthylene	--	1300	1.5 U			22	7.7	3.7 j	1.2 U		49	1.2 U				12	1.5 U		
Anthracene	--	51	1.7 U			29	5.9	3.0 j	1.4 U		22	1.4 U				7.9	2.8 j		
Benzo(a)anthracene	0.1	0.057	3.4 j			27	10	9.3	1.6 U		92	1.6 U				7.2	3.2 j		
Benzo(a)pyrene	1	0.016	13			23	7.6	6.8	1.7 U		160	1.7 U				7.8	2.3 U		
Total (B+J+K) Benzofluoranthenes	0.1	3200	9.4			36	19	18	1.8 U		230	1.8 U				16	7.5		
Benzo(g,h,i)perylene	--	670	6.5			20	5.7	6.7	3.0 U		99	3.0 U				6.0	3.6 j		
Chrysene	0.01	6.4	4.7			33	14	14	1.9 U		150	1.9 U				9.5	5.6		
Dibenzo(a,h)anthracene	0.1	0.029	25			3.3 j	2.2 U	2.1 U	2.3 U		33	2.3 U				2.3 U	2.4 U		
Dibenzofuran	--	540	4.0 j			15	10	5											

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Table W-8
Saturated Soil Analytical Results Summary - Semivolatile
Organic Compounds & Polycyclic Aromatic Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location			MW-32D	MW-32S	MW-32S	MW-33S	MW-33S	MW-34S	MW-34S	MW-34S	MW-35S	MW-35D	MW-35D	MW-35D	MW-35D	MW-38D	MW-38D	MW-43D
Sample Date			11/11/2011	11/8/2011	11/11/2011	11/14/2011	11/14/2011	11/9/2011	11/9/2011	11/9/2011	11/9/2011	10/1/2013	10/1/2013	10/10/2013	10/10/2013	10/2/2013	10/7/2013	10/10/2013
Sample ID			MW-32D-5-7	MW-32S-1.7-4	MW-32S-5-7	MW-33S-5.5	MW-33S-4-7	MW-34S-1.3-3.2	MW-34S-3	MW-34S-3.8-4.2	DUP-110911-3	MW-35S-5.7-6.3	MW-35D-3.25-4.25	MW-35D-4.25-5.5	MW-35D-7.0	MW-35D-8.5-9.5	MW-38D-0.83-2.0	MW-38D-8.5-9.5
Sample Type			N	N	N	N	N	N	N	N	FD	N	N	N	N	N	N	N
Sample Depth			5-7 ft	1.7-4 ft	5-7 ft	5.5 ft	4-7 ft	1.3-3.2 ft	3 ft	3.8-4.2 ft	3.8-4.2 ft	5.7-6.3 ft	3.25-4.25 ft	4.25-5.5 ft	7 ft	8.5-9.5 ft	0.83-2 ft	8.5-9.5 ft
Soil Layer			Dredged Fill	Shallow Fill	Dredged Fill	Dredged Fill	Dredged Fill	Shallow Fill	Shallow Fill	Dredged Fill	Dredged Fill	Dredged Fill	Shallow Fill	Dredged Fill	Dredged Fill	Interface at Top of Silt	Dredged Fill	Interface at Top of Silt
SVOCs (ug/kg)			TEF	Screening Level														
Pentachlorophenol	--	0.0018		44 U	45 U	45 U	0.0018	47 U	46 U	120 j	45 U	24	49	110	67 J+	1.1 U		
2,3,4,6-Tetrachlorophenol	--	270		4.4 U	4.5 U	4.5 U		4.7 U	4.6 U	40	12 j	11 j	18 j	21	5.2 U			
2,3,5,6-Tetrachlorophenol	--	NS																
2,4,5-Trichlorophenol	--	1100		19 U	20 U	20 U		21 U	20 U	20 U	20 U	25 U	26 U	26 U	26 U			
2,4,6-Trichlorophenol	--	0.19		20 U	21 U	21 U		22 U	21 U	21 U	21 U	24 U	25 U	25 U				
2,4-Dichlorophenol	--	4.3		19 U	20 U	20 U		21 U	20 U	20 U	20 U	30 U	31 U	31 U	31 U			
2-Chlorophenol	--	11		2.2 U	2.2 U	2.2 U		2.3 U	2.3 U	2.3 U	2.2 U	6.1 U	6.3 U	6.2 U	6.3 U			
Phenol	--	120		7.8 U	16 j	8.0 U		8.4 U	8.2 U	40	28	25	97	29 J	210			
Hexachlorobenzene	--	0.0004		4.0 U	4.0 U			4.0 U	4.0 U			4.5 U	4.6 U	4.5 U	4.6 U			
1,2,4-Trichlorobenzene	--	0.072		3.3 U	3.2 U	0.32 U		3.3 U	0.36 U	0.39 U	0.39 U		0.24 U	5.7 U	5.8 U	1.0 U		
1,2-Dichlorobenzene	--	3.1		2.3 U	2.3 U	0.28 U		2.4 U	0.27 U	0.32 U	0.34 U			4.5 U	4.5 U	0.90 U		
1,3-Dichlorobenzene	--	NS		2.3 U	2.4 U	0.22 U		2.5 U	0.21 U	0.25 U	0.26 U			4.9 U	4.9 U	0.70 U		
1,4-Dichlorobenzene	--	8.1		2.7 U	2.6 U	0.22 U		2.7 U	0.21 U	0.25 U	0.27 U			4.2 U	4.3 U	0.71 U		
2,2-Oxybis(1-chloropropane)	--	NS		3.5 U	3.5 U			3.5 U		3.5 U				5.4 U	5.5 U			
2,4-Dimethylphenol	--	3.1		3.2 U	3.2 U			3.3 U		3.3 U				26 U	26 U			
2,4-Dinitrophenol	--	9.2		100 U	100 U			100 U	100 U	100 U				40 U	40 U			
2,4-Dinitrotoluene	--	0.069		18 U	18 U			18 U		18 U				22 U	22 U			
2,6-Dinitrotoluene	--	0.021		29 U	28 U			29 U		29 U				26 U	26 U			
2-Chloronaphthalene	--	NS		2.5 U	2.4 U			2.5 U		2.5 U				4.3 U	4.3 U			
2-Nitroaniline	--	800000		17 U	17 U			17 U		17 U				29 U	29 U			
2-Nitrophenol	--	NS		36 U	36 U			37 U		37 U				6.6 U	6.7 U			
3,3'-Dichlorobenzidine	--	0.0033		17 U	16 U			17 U		17 U				30 U	30 U			
3-Nitroaniline	--	NS		21 U	21 U			21 U		21 U				36 U	37 U			
4-Bromophenyl phenyl ether	--	NS		4.7 U	4.6 U			4.7 U		4.7 U				5.8 U	5.9 U			
4-Chloro-3-methylphenol	--	NS		14 U	14 U			14 U		14 U				28 U	28 U			
4-Chlorophenyl phenyl ether	--	NS		4.9 U	4.9 U			5.0 U		5.0 U				6.7 U	6.8 U			
4-Nitrophenol	--	7000		32 U	32 U			33 U		33 U				43 U	43 U			
Benzoic acid	--	170		94 U	93 U			95 U		95 U				150 j	240			
Benzyl alcohol	--	57		11 j	5.6 U			5.7 U		5.7 U				14 U	14 U			
Benzyl butyl phthalate	--	0.18		5.7 U	5.7 U			5.8 U		5.8 U				7.7 U	7.8 U			
Bis(2-chloroethoxy)methane	--	NS		1.9 U	1.8 U			1.9 U		1.9 U				6.1 U	6.2 U			
Bis(2-ethylhexyl)phthalate	--	5.1		44	51			16 j		19 j				28 U	28 U			
Carbazole	--	NS		2.5 U	2.5 U			2.5 U		2.5 U				7.1 U	7.2 U			
Dibutyl Phthalate	--	15		7.6 U	7.5 U			7.7 U		7.7 U				530	5.2 U			
Dichloroethyl ether	--	0.014		3.1 U	3.1 U			3.2 U		3.2 U				6.5 U	6.6 U			
Diethyl Phthalate	--	34		34 U	34 U			35 U		35 U				17 U	23 U			
Dimethylphthalate	--	71		2.7 U	2.7 U			2.7 U		2.7 U				6.2 U	6.3 U			
Dinitro-o-cresol	--	NS		20 U	20 U			20 U		20 U				48 U	49 U			
Di-n-octyl phthalate	--	330		12 j	5.4 U			5.5 U		5.5 U				8.4 U	8.5 U			
Hexachloroethane	--	0.041		2.8 U	2.7 U			2.8 U		2.8 U				5.4 U	5.5 U			
Hexachlorocyclopentadiene	--	200		62 U	61 U			63 U		63 U				40 U	40 U			
Hexachlorobutadiene	--	0.54		4.3 U	4.2 U	0.40 U		4.3 U	0.37 U	0.45 U	0.48 U		0.30 U	4.8 U	4.9 U	1.3 U		
Isophorone	--	15		2.7 U	2.6 U			2.7 U		2.7 U				7.4 U	7.5 U			
Nitrobenzene	--	6.5		3.8 U	3.7 U			3.8 U		3.8 U				7.6 U	7.7 U			
n-Nitrosodi-n-propylamine	--	0.0039		3.1 U	3.1 U			3.2 U		3.2 U				10 U	11 U			
n-Nitrosodiphenylamine	--	1.1		5.0 U	5.0 U			5.1 U		5.1 U				9.2 U	9.3 U			
o-Cresol	--	10		4.9 U	4.8 U			5.0 U		5.0 U				7.5 U	7.6 U			
p-Chloroaniline	--	0.077		21 U	21 U			21 U		21 U				32 U	33 U			
p-Cresol	--	670		66	6.1 U			6.3 U		6.3 U				14 U	81			
p-Nitroaniline	--	NS		35 U	35 U			36 U		36 U				33 U	34 U			
PAHs (ug/kg)																		
1-Methylnaphthalene	--	29000		14	1.6 U			1.6 U		1.6 U				1.5 U	4.7 J			
2-Methylnaphthalene	--	670		18	1.5 U			1.4 U		4.2 j				5.3	3.1 J			
Acenaphthene	--	28		11	1.3 U			1.2 U		1.2 U				1.4 U	9.2			
Acenaphthylene	--	1300		9.2	1.2 U			1.2 U		1.2 U				1.5 U	4.8 J			
Anthracene	--	51		16	1.4 U			1.4 U		1.4 U				1.7 U	9.8			
Benzo(a)anthracene	0.1	0.057		27	3.1 j			1.5 U		1.5 U				2.1 U	12			
Benzo(a)pyrene	1	0.016		31	4.8 j			1.6 U		1.6 U				2.3 U	20			
Total (B+J+K) Benzofluoranthenes	0.1	3200		50	7.0			1.7 U		1.7 U				8.0	29			
Benzo(g,h,i)perylene	--	670		16	4.5 j			2.9 U		2.9 U				3.3 j	16			
Chrysene	0.01	6.4		33	4.5 j			1.8 U		2.5 j				7.2	14			
Dibenzo(a,h)anthracene	0.1	0.029		5.0	2.3 U			2.2 U		2.2 U				2.4 U	28			
Dibenzofuran	--	540		18	1.5 U			1.4 U		3.7 j				8.9	8.5			
Fluoranthene	--	90		87	4.3 j			1.7 U		6.3				13	45			
Fluorene	--	29		13	1.2 U			1.2 U		4.0 j				1.4 U	8.2			
Indeno(1,2,3-cd)pyrene	0.1	0.56		14	3.7 j			3.3 U		3.3 U				2.9 U	24			
Naphthalene	--	2.1		42	2.5 U	0.41 U		2.5 U	0.39 U	6.2	0.50 U			30	21	45		
Phenanthrene	--	1500		57	1.9 U			1.9 U		10				19	30			
Pyrene	--	140		71	6.5			2.1 U		4.8				7.1	51			
Carcinogenic PAHs TEQ ND=0 ¹	--	0.016		41	6.2			0 U		0.025				0.87	29			
Carcinogenic PAHs TEQ ND=1/2DL ¹	--	0.016		41	6.3			1.2 U		1.3				2.4	29			

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Table W-8
Saturated Soil Analytical Results Summary - Semivolatile
Organic Compounds & Polycyclic Aromatic Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location			MW-43D	MW-43D	MW-45D	MW-45D	TB-01B	TB-01B	TB-02B	TB-02B	TB-02B	TB-02B	TB-03D	TB-03D	TB-03D	TB-04A	TB-04A	TB-05B	TB-05B	TB-05B
Sample Date			10/10/2013	10/10/2013	10/7/2013	1/16/2014	1/14/2014	1/14/2014	1/13/2014	1/13/2014	1/13/2014	1/13/2014	1/13/2014	1/13/2014	1/13/2014	1/13/2014	1/13/2014	1/15/2014	1/15/2014	1/15/2014
Sample ID			MW-43D-7.25-9.25	MW-43D-11.25-12.25	MW-45D-9.5-10.5	MW-45D-12.5-13.0	TB-01B-5-6.9	TB-01B-6.9-7.9	TB-02B-8-9.5	TB-02B-9.5-10.5	DUP011314-1	TB-03D-4.25-7	TB-03D-7-9	TB-03D-12.6-13.6	TB-04A-1.25-3	TB-04A-7.1-8.1	TB-05B-13.6-15.6	DUP011514-2	TB-05B-18.2-19.2	
Sample Type			N	N	N	N	N	N	N	N	FD	N	N	N	N	N	N	FD	N	
Sample Depth			7.25-9.25 ft	11.25-12.25 ft	9.5-10.5 ft	12.5-13 ft	5-6.9 ft	6.9-7.9 ft	8-9.5 ft	9.5-10.5 ft	9.5-10.5 ft	4.25-7 ft	7-9 ft	12.6-13.6 ft	1.25-3 ft	7.1-8.1 ft	13.6-15.6 ft	13.6-15.6 ft	18.2-19.2 ft	
Soil Layer			Dredged Fill	nterface at Top of Sil	nterface at Top of Sil	nterface at Top of Sil	Dredged Fill	nterface at Top of Sil	Dredged Fill	nterface at Top of Sil	nterface at Top of Sil	Shallow Fill	Dredged Fill	nterface at Top of Sil	Dredged Fill	nterface at Top of Sil	Dredged Fill	Dredged Fill	nterface at Top of Sil	
SVOCs (ug/kg)			TEF	Screening Level																
Pentachlorophenol	--	0.0018	0.97 U	1.1 U	40	1.4 U	42	38 j	820	900	1000	700	1.0 U	44	54	360	94	93	1.2 U	
2,3,4,6-Tetrachlorophenol	--	270	5.1 U	5.1 U	5.2 U		14 j	5.3 U	200 J	360 J	390 J	88 J	5.1 UJ	24 J	55 J	690 J	170	120	5.0 U	
2,3,5,6-Tetrachlorophenol	--	NS																		
2,4,5-Trichlorophenol	--	1100	26 U	25 U	26 U	27 U	26 U	27 U	29 j	70 j	65 j	25 U	26 U	26 U	26 U	40 j	25 U	31 j	25 U	
2,4,6-Trichlorophenol	--	0.19	24 U	24 U	25 U	25 U	24 U	25 U	38 j	46 j	46 j	32 j	24 U	50 j	42 j	560	32 j	29 j	24 U	
2,4-Dichlorophenol	--	4.3	30 U	30 U	58 j	32 U	31 U	32 U	210	110	100	220	31 U	180	72 j	1300	84 j	87 j	30 U	
2-Chlorophenol	--	11	6.1 U	6.1 U	100	6.4 U	6.2 U	6.4 U	31	100	150	56	6.2 U	95	13 j	130	84	75	55	
Phenol	--	120	84	54	54	170	21	200	440	760	990	180	28	580	57	590	1300	1000	400	
Hexachlorobenzene	--	0.0004	4.5 U	4.5 U	4.6 U	4.7 U	4.6 U	4.7 U	26	16 j	20	220	4.5 U	4.6 U	4.6 U	4.6 U	18 j	9.7 j	4.4 U	
1,2,4-Trichlorobenzene	--	0.072	5.7 U	5.6 U		5.9 U														
1,2-Dichlorobenzene	--	3.1	4.4 U	4.4 U		4.6 U														
1,3-Dichlorobenzene	--	NS	4.8 U	4.8 U		5.0 U														
1,4-Dichlorobenzene	--	8.1	4.2 U	4.1 U		4.4 U														
2,2-Oxybis(1-chloropropane)	--	NS	5.4 U	5.3 U		5.6 U														
2,4-Dimethylphenol	--	3.1	25 U	25 U		27 U														
2,4-Dinitrophenol	--	9.2	39 U	39 U		41 UJ														
2,4-Dinitrotoluene	--	0.069	22 U	22 U		23 U														
2,6-Dinitrotoluene	--	0.021	25 U	25 U		26 U														
2-Chloronaphthalene	--	NS	4.2 U	4.2 U		4.4 U														
2-Nitroaniline	--	800000	29 U	28 U		30 U														
2-Nitrophenol	--	NS	6.6 U	6.5 U		6.9 U														
3,3'-Dichlorobenzidine	--	0.0033	30 U	29 U		31 U														
3-Nitroaniline	--	NS	36 U	35 U		37 U														
4-Bromophenyl phenyl ether	--	NS	5.8 U	5.7 U		6.0 U														
4-Chloro-3-methylphenol	--	NS	27 U	27 U		29 U														
4-Chlorophenyl phenyl ether	--	NS	6.6 U	6.5 U		6.9 U														
4-Nitrophenol	--	7000	42 U	42 U		44 U														
Benzoic acid	--	170	56 U	56 U		960 J														
Benzyl alcohol	--	57	14 U	14 U		15 U														
Benzyl butyl phthalate	--	0.18	7.6 U	7.6 U		19 J														
Bis(2-chloroethoxy)methane	--	NS	6.0 U	6.0 U		6.3 U														
Bis(2-ethylhexyl)phthalate	--	5.1	27 U	27 U		29 U														
Carbazole	--	NS	7.0 U	6.9 U		7.3 U														
Dibutyl Phthalate	--	15	29	5.0 U		5.3 U														
Dichloroethyl ether	--	0.014	6.4 U	6.4 U		6.7 U														
Diethyl Phthalate	--	34	76	17 U		18 U														
Dimethylphthalate	--	71	6.1 U	6.1 U		6.4 U														
Dinitro-o-cresol	--	NS	48 U	48 U		50 U														
Di-n-octyl phthalate	--	330	8.3 U	8.2 U		8.6 U														
Hexachloroethane	--	0.041	5.4 U	5.3 U		5.6 U														
Hexachlorocyclopentadiene	--	200	39 U	39 U		41 UJ														
Hexachlorobutadiene	--	0.54	4.8 U	4.7 U		5.0 U														
Isophorone	--	15	7.4 U	7.3 U		7.7 U														
Nitrobenzene	--	6.5	7.5 U	7.5 U		7.9 U														
n-Nitrosodi-n-propylamine	--	0.0039	10 U	10 U		11 U														
n-Nitrosodiphenylamine	--	1.1	9.1 U	9.0 U		9.5 U														
o-Cresol	--	10	7.4 U	7.4 U		7.8 U														
p-Chloroaniline	--	0.077	32 U	32 U		33 U														
p-Cresol	--	670	290	37		300														
p-Nitroaniline	--	NS	33 U	33 U		35 U														
PAHs (ug/kg)																				
1-Methylnaphthalene	--	29000	33	5.0		8.3 U														
2-Methylnaphthalene	--	670	50	5.7		23														
Acenaphthene	--	28	1.4 U	4.9		1.5 U														
Acenaphthylene	--	1300	1.5 U	2.5 j		1.6 U														
Anthracene	--	51	1.7 U	6.3		1.8 U														
Benzo(a)anthracene	0.1	0.057	2.1 U	8.4		2.2 U														
Benzo(a)pyrene	1	0.016	2.3 U	15		2.4 U														
Total (B+J+K) Benzofluoranthenes	0.1	3200	2.2 U	17		2.3 U														
Benzo(g,h,i)perylene	--	670	2.6 U	8.5		2.8 U														
Chrysene	0.01	6.4	1.8 U	8.5		1.9 U														
Dibenzo(a,h)anthracene	0.1	0.029	2.4 U	26		2.5 U														
Dibenzofuran	--	540	1.3 U	6.7		1.4 U														
Fluoranthene	--	90	1.8 U	33		5.1														
Fluorene	--	29	6.3	6.5		1.5 U														
Indeno(1,2,3-cd)pyrene	0.1	0.56	2.9 U	20		3.0 U														
Naphthalene	--	2.1	18	13		8.2														
Phenanthrene	--	1500	11	21		6.9														
Pyrene	--	140	2.1 U	36		4.6 j														
Carcinogenic PAHs TEQ ND=0 ¹	--	0.016	0 U	22		0 U														
Carcinogenic PAHs TEQ ND=1/2DL ¹	--	0.016	1.6 U	22		1.7 U														

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Table W-8
Saturated Soil Analytical Results Summary - Semivolatile
Organic Compounds & Polycyclic Aromatic Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location			TB-06B	TB-06B	TB-06E	TB-06F	TB-06F
Sample Date			1/14/2014	1/14/2014	1/15/2014	1/24/2014	1/24/2014
Sample ID			TB-06B-6-11	DUP011414-1	TB-06E-8.8-10.6	TB-06F-14-16	TB-06F-20-22
Sample Type			N	FD	N	N	N
Sample Depth			6-11 ft	6-11 ft	8.8-10.6 ft	14-16 ft	20-22 ft
Soil Layer			Shallow Fill	Shallow Fill	Dredged Fill	Dredged Fill	Lower Sand
SVOCs (ug/kg)	TEF	Screening Level					
Pentachlorophenol	--	0.0018			360	80	1.0 U
2,3,4,6-Tetrachlorophenol	--	270			31	5.1 U	
2,3,5,6-Tetrachlorophenol	--	NS					
2,4,5-Trichlorophenol	--	1100			26 U	26 U	
2,4,6-Trichlorophenol	--	0.19			25 U	24 U	
2,4-Dichlorophenol	--	4.3			31 U	41 j	
2-Chlorophenol	--	11			6.3 U	6.2 U	
Phenol	--	120			120	270	
Hexachlorobenzene	--	0.0004			15 j	32	
1,2,4-Trichlorobenzene	--	0.072	0.24 U	0.28 U			
1,2-Dichlorobenzene	--	3.1					
1,3-Dichlorobenzene	--	NS					
1,4-Dichlorobenzene	--	8.1					
2,2-Oxybis(1-chloropropane)	--	NS					
2,4-Dimethylphenol	--	3.1					
2,4-Dinitrophenol	--	9.2					
2,4-Dinitrotoluene	--	0.069					
2,6-Dinitrotoluene	--	0.021					
2-Chloronaphthalene	--	NS					
2-Nitroaniline	--	800000					
2-Nitrophenol	--	NS					
3,3'-Dichlorobenzidine	--	0.0033					
3-Nitroaniline	--	NS					
4-Bromophenyl phenyl ether	--	NS					
4-Chloro-3-methylphenol	--	NS					
4-Chlorophenyl phenyl ether	--	NS					
4-Nitrophenol	--	7000					
Benzoic acid	--	170					
Benzyl alcohol	--	57					
Benzyl butyl phthalate	--	0.18					
Bis(2-chloroethoxy)methane	--	NS					
Bis(2-ethylhexyl)phthalate	--	5.1					
Carbazole	--	NS					
Dibutyl Phthalate	--	15					
Dichloroethyl ether	--	0.014					
Diethyl Phthalate	--	34					
Dimethylphthalate	--	71					
Dinitro-o-cresol	--	NS					
Di-n-octyl phthalate	--	330					
Hexachloroethane	--	0.041					
Hexachlorocyclopentadiene	--	200					
Hexachlorobutadiene	--	0.54	0.30 U	0.34 U			
Isophorone	--	15					
Nitrobenzene	--	6.5					
n-Nitrosodi-n-propylamine	--	0.0039					
n-Nitrosodiphenylamine	--	1.1					
o-Cresol	--	10					
p-Chloroaniline	--	0.077					
p-Cresol	--	670					
p-Nitroaniline	--	NS					
PAHs (ug/kg)							
1-Methylnaphthalene	--	29000					
2-Methylnaphthalene	--	670					
Acenaphthene	--	28					
Acenaphthylene	--	1300					
Anthracene	--	51					
Benzo(a)anthracene	0.1	0.057					
Benzo(a)pyrene	1	0.016					
Total (B+J+K) Benzofluoranthenes	0.1	3200					
Benzo(g,h,i)perylene	--	670					
Chrysene	0.01	6.4					
Dibenzo(a,h)anthracene	0.1	0.029					
Dibenzofuran	--	540					
Fluoranthene	--	90					
Fluorene	--	29					
Indeno(1,2,3-cd)pyrene	0.1	0.56					
Naphthalene	--	2.1					
Phenanthrene	--	1500					
Pyrene	--	140					
Carcinogenic PAHs TEQ ND=0 ¹	--	0.016					
Carcinogenic PAHs TEQ ND=1/2DL ¹	--	0.016					

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Table W-8

Saturated Soil Analytical Results Summary - Semivolatile Organic Compounds & Polycyclic Aromatic Hydrocarbons 5900 West Marginal Way Site Seattle, Washington

Notes:

¹ = Toxicity Equivalency Quotient calculations for cPAHs (WAC 173-340-200 and 173-340-900, Table 708-2) using benzo(a)pyrene as the reference chemical. If all compounds non-detect, then detection limit equal to maximum detection Units are in micrograms per kilogram ($\mu\text{g}/\text{kg}$).

Cells are left blank where compound was not analyzed.

"--" = No value available.

Green-shaded, bolded values indicate detected concentration exceeds the selected screening level.

Light gray-shaded values indicate that the method detection limit exceeds the screening level.

Underlined data = Samples analyzed using volatile organic compound methods, not as semi-volatile organic compounds.

NFG (National Functional Guidelines) = U.S. Environmental Protection Agency (USEPA) Contract Laboratory Program

National Functional Guidelines for Organic Data Review, October 1999 or USEPA Contract. Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004.

Key:

$\mu\text{g}/\text{kg}$ = micrograms per kilogram

DUP = field duplicate sample

ft = feet below ground surface

FD = field duplicate sample

GP = direct-push boring

N = normal field sample

ND = 1/2DL = Non-detect values calculated as one-half the laboratory detection limit.

NS = no screening level

MW = monitoring well

PAHs = polycyclic aromatic hydrocarbons

SVOCs = semi-volatile organic compounds

TB = top of riverbank boring

TEF = Toxicity Equivalency Factor

TEQ = Toxicity Equivalency Quotient

TP = test pit

Laboratory Data Qualifiers:

- = Compound concentration biased low.

+ = Compound concentration biased high.

j = The value reported is less than the reporting limit and should be considered an estimate; qualifier reported by the laboratory.

J = The detected results are qualified as estimated in accordance with National Functional Guidelines (NFGs).

U = Result is $\leq$ the laboratory detection limit or qualified as non-detect in accordance with NFGs.

UJ = Non-detected compound qualified as estimated in accordance with NFGs.

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Table W-9
Saturated Soil Analytical Results Summary -
Polychlorinated Biphenyls
5900 West Marginal Way Site
Seattle, Washington

Location			GP-27		GP-27		GP-27		GP-28		GP-28		GP-28	
Sample Date			10/11/2012		10/11/2012		10/11/2012		10/11/2012		10/11/2012		10/11/2012	
Sample ID			GP-27-4.3-6.3		DUP101112-1		GP-27-6.3-8.3		GP-28-4.1-6.1		DUP101112-2		GP-28-6.1-8.3	
Sample Type			N		FD		N		N		FD		N	
Sample Depth			4.3-6.3 ft		4.3-6.3 ft		6.3-8.3 ft		4.1-6.1 ft		4.1-6.1 ft		6.1-8.3 ft	
Soil Layer			Dredged Fill		Dredged Fill		Interface at Top of Silt		Dredged Fill		Dredged Fill		Interface at Top of Silt	
PCBs	Units	Screening Level												
Aroclor 1016	ug/kg	NS	0.95	U	1.0	U	0.96	U	0.97	U	0.95	U	0.97	U
Aroclor 1221	ug/kg	NS	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U
Aroclor 1232	ug/kg	NS	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U
Aroclor 1242	ug/kg	NS	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U
Aroclor 1248	ug/kg	NS	1.3	U	1.3	U	1.3	U	1.3	U	4.7	U	1.3	U
Aroclor 1254	ug/kg	NS	1.3	U	1.3	U	1.3	U	4.3		6.3		1.3	U
Aroclor 1260	ug/kg	NS	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U
Aroclor 1262	ug/kg	NS												
Aroclor 1268	ug/kg	NS												
Aroclors, Total ND =0	ug/kg	0.0022	0		0		0		4.3		6.3		0	
Aroclors, Total (ND=0/ND=1/2DL)	ug/kg	4	2.6		2.6		2.6		6.3		10		2.6	

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Table W-9
Saturated Soil Analytical Results Summary -
Polychlorinated Biphenyls
5900 West Marginal Way Site
Seattle, Washington

Location			GP-28		GP-31		GP-31		GP-32		GP-32		GP-32	
Sample Date			10/11/2012		10/11/2012		10/11/2012		9/10/2012		9/10/2012		10/11/2012	
Sample ID			DUP101112-3		GP-31-5.9-7.9		GP-31-7.9-9.9		GP-32-0.25-2.25		GP-32-4.1-6.1		GP-32-6.1-8.1	
Sample Type			FD		N		N		N		N		N	
Sample Depth			6.1-8.3 ft		5.9-7.9 ft		7.9-9.9 ft		0.25-2.25 ft		4.1-6.1 ft		6.1-8.1 ft	
Soil Layer			Interface at Top of Silt		Dredged Fill		Interface at Top of Silt		Shallow Fill		Shallow Fill		Dredged Fill	
PCBs	Units	Screening Level												
Aroclor 1016	ug/kg	NS	0.97	U	0.98	U	0.98	U	0.97	U	1.0	U	0.99	U
Aroclor 1221	ug/kg	NS	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U
Aroclor 1232	ug/kg	NS	1.3	U	4.8	U	1.3	U	1.3	U	1.3	U	1.3	U
Aroclor 1242	ug/kg	NS	1.3	U	1.3	U	1.3	U	6.2	U	1.3	U	1.3	U
Aroclor 1248	ug/kg	NS	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U
Aroclor 1254	ug/kg	NS	1.3	U	1.3	U	1.3	U	20		12		1.3	U
Aroclor 1260	ug/kg	NS	1.3	U	1.3	U	1.3	U	48	U	1.3	U	1.3	U
Aroclor 1262	ug/kg	NS												
Aroclor 1268	ug/kg	NS												
Aroclors, Total ND =0	ug/kg	0.0022	0		0		0		20		12		0	
Aroclors, Total (ND=0/ND=1/2DL)	ug/kg	4	2.6		2.6		2.6		48		14		2.6	

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Table W-9
Saturated Soil Analytical Results Summary -
Polychlorinated Biphenyls
5900 West Marginal Way Site
Seattle, Washington

Location			GP-32		GP-33		GP-34		GP-34		GP-34		GP-37	
Sample Date			10/11/2012		10/10/2012		10/10/2012		10/10/2012		10/10/2012		9/10/2012	
Sample ID			GP-32-8.1-9.1		GP-33-5.9-8.3		GP-34-6.4-8.4		DUP101012-1		GP-34-8.4-9.4		GP-37-4.4-6.4	
Sample Type			N		N		N		FD		N		N	
Sample Depth			8.1-9.1 ft		5.9-8.3 ft		6.4-8.4 ft		6.4-8.4 ft		8.4-9.4 ft		4.4-6.4 ft	
Soil Layer			Interface at Top of Silt		Dredged Fill		Dredged Fill		Dredged Fill		Interface at Top of Silt		Dredged Fill	
PCBs	Units	Screening Level												
Aroclor 1016	ug/kg	NS	0.98	U	0.95	U	0.95	U	0.99	U	0.96	U	0.98	U
Aroclor 1221	ug/kg	NS	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U
Aroclor 1232	ug/kg	NS	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U
Aroclor 1242	ug/kg	NS	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U
Aroclor 1248	ug/kg	NS	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U
Aroclor 1254	ug/kg	NS	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U
Aroclor 1260	ug/kg	NS	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U
Aroclor 1262	ug/kg	NS												
Aroclor 1268	ug/kg	NS												
Aroclors, Total ND =0	ug/kg	0.0022	0		0		0		0		0		0	
Aroclors, Total (ND=0/ND=1/2DL)	ug/kg	4	2.6		2.6		2.6		2.6		2.6		2.6	

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Table W-9
Saturated Soil Analytical Results Summary -
Polychlorinated Biphenyls
5900 West Marginal Way Site
Seattle, Washington

Location			GP-37		GP-37		GP-38		GP-38		GP-38		GP-38	
Sample Date			10/8/2012		10/8/2012		9/10/2012		9/10/2012		10/9/2012		10/9/2012	
Sample ID			GP-37-7-9		GP-37-9-10		GP-38-2.7-4.7		GP-38-5-7		GP-38-7-9		GP-38-9-11	
Sample Type			N		N		N		N		N		N	
Sample Depth			7-9 ft		9-10 ft		2.7-4.7 ft		5-7 ft		7-9 ft		9-11 ft	
Soil Layer			Dredged Fill		Interface at Top of Silt		Dredged Fill		Dredged Fill		Dredged Fill		Interface at Top of Silt	
PCBs	Units	Screening Level												
Aroclor 1016	ug/kg	NS	0.96	U	0.97	U	0.96	U	0.97	U	0.95	U	0.94	U
Aroclor 1221	ug/kg	NS	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U
Aroclor 1232	ug/kg	NS	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U
Aroclor 1242	ug/kg	NS	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U
Aroclor 1248	ug/kg	NS	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U
Aroclor 1254	ug/kg	NS	1.3	U	1.3	U	5.8		1.3	U	1.3	U	1.3	U
Aroclor 1260	ug/kg	NS	1.3	U	1.3	U	3.9		1.3	U	1.3	U	1.3	U
Aroclor 1262	ug/kg	NS												
Aroclor 1268	ug/kg	NS												
Aroclors, Total ND =0	ug/kg	0.0022	0		0		9.7		0		0		0	
Aroclors, Total (ND=0/ND=1/2DL)	ug/kg	4	2.6		2.6		11		2.6		2.6		2.6	

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Table W-9
Saturated Soil Analytical Results Summary -
Polychlorinated Biphenyls
5900 West Marginal Way Site
Seattle, Washington

Location			GP-39		GP-39		GP-39		GP-39		GP-50		GP-50	
Sample Date			8/30/2012		10/8/2012		10/8/2012		10/8/2012		9/7/2012		9/7/2012	
Sample ID			GP-39-2.5-4.5		GP-39-4.5-6.5		GP-39-6.5-8.5		GP-39-10.5-11.5		GP-50-0-2		GP-50-3-5.9	
Sample Type			N		N		N		N		N		N	
Sample Depth			2.5-4.5 ft		4.5-6.5 ft		6.5-8.5 ft		10.5-11.5 ft		0-2 ft		3-5.9 ft	
Soil Layer			Shallow Fill		Dredged Fill		Dredged Fill		Interface at Top of Silt		Shallow Fill		Dredged Fill	
PCBs	Units	Screening Level												
Aroclor 1016	ug/kg	NS	1.0	U	0.96	U	0.92	U	0.94	U	0.96	U	0.98	U
Aroclor 1221	ug/kg	NS	1.3	U	1.3	U	1.2	U	1.3	U	1.3	U	1.3	U
Aroclor 1232	ug/kg	NS	1.3	U	1.3	U	1.2	U	1.3	U	1.3	U	1.3	U
Aroclor 1242	ug/kg	NS	1.3	U	1.3	U	1.2	U	1.3	U	1.3	U	1.3	U
Aroclor 1248	ug/kg	NS	1.3	U	1.3	U	1.2	U	1.3	U	1.3	U	1.3	U
Aroclor 1254	ug/kg	NS	1.3	U	1.3	U	1.2	U	1.3	U	1.3	U	1.3	U
Aroclor 1260	ug/kg	NS	6.5		1.3	U	1.2	U	1.3	U	1.3	U	1.3	U
Aroclor 1262	ug/kg	NS												
Aroclor 1268	ug/kg	NS												
Aroclors, Total ND =0	ug/kg	0.0022	6.5		0		0		0		0		0	
Aroclors, Total (ND=0/ND=1/2DL)	ug/kg	4	8.5		2.6		2.4		2.6		2.6		2.6	

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Table W-9
Saturated Soil Analytical Results Summary -
Polychlorinated Biphenyls
5900 West Marginal Way Site
Seattle, Washington

Location			GP-50		GP-50		GP-50		GP-61		GP-61		GP-62	
Sample Date			9/7/2012		10/11/2012		10/11/2012		10/12/2012		10/12/2012		10/12/2012	
Sample ID			DUP-090712-1		GP-50-5.9-7		GP-50-7-7.75		GP-61-4.5-7.5		GP-61-7.5-8.5		GP-62-5-6.7	
Sample Type			FD		N		N		N		N		N	
Sample Depth			3-5.9 ft		5.9-7 ft		7-7.75 ft		4.5-7.5 ft		7.5-8.5 ft		5-6.7 ft	
Soil Layer			Dredged Fill		Dredged Fill		Dredged Fill		Dredged Fill		Interface at Top of Silt		Dredged Fill	
PCBs	Units	Screening Level												
Aroclor 1016	ug/kg	NS	0.99	U	0.97	U	0.99	U	0.95	U	1.0	U	0.96	U
Aroclor 1221	ug/kg	NS	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U
Aroclor 1232	ug/kg	NS	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U
Aroclor 1242	ug/kg	NS	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U
Aroclor 1248	ug/kg	NS	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U
Aroclor 1254	ug/kg	NS	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U
Aroclor 1260	ug/kg	NS	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U
Aroclor 1262	ug/kg	NS												
Aroclor 1268	ug/kg	NS												
Aroclors, Total ND =0	ug/kg	0.0022	0		0		0		0		0		0	
Aroclors, Total (ND=0/ND=1/2DL)	ug/kg	4	2.6		2.6		2.6		2.6		2.6		2.6	

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Table W-9
Saturated Soil Analytical Results Summary -
Polychlorinated Biphenyls
5900 West Marginal Way Site
Seattle, Washington

Location			GP-62		GP-62		GP-62		GP-67		GP-69		GP-72	
Sample Date			10/12/2012		10/12/2012		10/12/2012		10/7/2013		10/7/2013		10/1/2013	
Sample ID			DUP101212-1		GP-62-6.7-7.7		DUP101212-2		GP-67-10-11		GP-69-7.6-9.6		GP-72-2.0-4.0	
Sample Type			FD		N		FD		N		N		N	
Sample Depth			5-6.7 ft		6.7-7.7 ft		6.7-7.7 ft		10-11 ft		7.6-9.6 ft		2-4 ft	
Soil Layer			Dredged Fill		Interface at Top of Silt		Interface at Top of Silt		Interface at Top of Silt		Dredged Fill		Dredged Fill	
PCBs	Units	Screening Level												
Aroclor 1016	ug/kg	NS	0.92	U	0.96	U	0.97	U	1.5	U	1.5	U	1.6	U
Aroclor 1221	ug/kg	NS	1.2	U	1.3	U	1.3	U	1.5	U	1.5	U	1.6	U
Aroclor 1232	ug/kg	NS	1.2	U	1.3	U	1.3	U	1.5	U	1.5	U	1.6	U
Aroclor 1242	ug/kg	NS	1.2	U	1.3	U	1.3	U	1.5	U	1.5	U	1.6	U
Aroclor 1248	ug/kg	NS	1.2	U	1.3	U	1.3	U	1.5	U	1.5	U	1.6	U
Aroclor 1254	ug/kg	NS	1.2	U	1.3	U	1.3	U	1.5	U	1.5	U	15	
Aroclor 1260	ug/kg	NS	1.2	U	1.3	U	1.3	U	0.57	U	0.57	U	6.0	U
Aroclor 1262	ug/kg	NS												
Aroclor 1268	ug/kg	NS												
Aroclors, Total ND =0	ug/kg	0.0022	0		0		0		0		0		15	
Aroclors, Total (ND=0/ND=1/2DL)	ug/kg	4	2.4		2.6		2.6		2.5		2.5		20	

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Table W-9
Saturated Soil Analytical Results Summary -
Polychlorinated Biphenyls
5900 West Marginal Way Site
Seattle, Washington

Location			GP-72		GP-77		GP-77		GP-79		GP-79		GP-81		GP-81		GP-81	
Sample Date			10/8/2013		5/14/2019		5/17/2019		5/15/2019		5/17/2019		5/15/2019		5/15/2019		5/23/2019	
Sample ID			GP-72-8.2-9.2		GP-77-5-7-051419		GP-77-10.5-11.5-051719		GP-79-5-7-051519		GP-79-11.5-12.5-051719		DUP-051519-02		GP-81-5-6.5-051519		GP-81-9-10-052319	
Sample Type			N		N		N		N		N		FD		N		N	
Sample Depth			8.2-9.2 ft		5 - 7 ft		10.5 - 11.5 ft		5 - 7 ft		11.5 - 12.5 ft		5 - 6.5 ft		5 - 6.5 ft		9 - 10 ft	
Soil Layer			Interface at Top of Silt		Dredged Fill		Interface at Top of Silt		Dredged Fill		Interface at Top of Silt		Dredged Fill		Dredged Fill		Interface at Top of Silt	
PCBs	Units	Screening Level																
Aroclor 1016	ug/kg	NS	1.5	U	4.0	UJ	4.0	UJ	4.0	UJ	4.0	UJ	4.0	UJ	4.0	UJ	4.0	U
Aroclor 1221	ug/kg	NS	1.5	U	4.0	UJ	4.0	UJ	4.0	UJ	4.0	UJ	4.0	UJ	4.0	UJ	4.0	U
Aroclor 1232	ug/kg	NS	7.7	U	4.0	UJ	4.0	UJ	4.0	UJ	4.0	UJ	4.0	UJ	4.0	UJ	4.0	U
Aroclor 1242	ug/kg	NS	1.5	U	4.0	UJ	4.0	UJ	4.0	UJ	4.0	UJ	4.0	UJ	4.0	UJ	4.0	U
Aroclor 1248	ug/kg	NS	1.5	U	4.0	UJ	4.0	UJ	4.0	UJ	4.0	UJ	4.0	UJ	4.0	UJ	4.0	U
Aroclor 1254	ug/kg	NS	1.5	U	4.0	UJ	4.0	UJ	4.0	UJ	4.0	UJ	7.1	UJ	8.2	J+	4.0	U
Aroclor 1260	ug/kg	NS	0.56	U	4.0	UJ	4.0	UJ	4.0	UJ	4.0	UJ	7.9	J	9.2	J	4.0	U
Aroclor 1262	ug/kg	NS			4.0	UJ	4.0	UJ	4.0	UJ	4.0	UJ	4.0	UJ	4.0	UJ	4.0	U
Aroclor 1268	ug/kg	NS			4.0	UJ	4.0	UJ	4.0	UJ	4.0	UJ	4.0	UJ	4.0	UJ	4.0	U
Aroclors, Total ND =0	ug/kg	0.0022	0		0		0		0		0		7.9		17		0	
Aroclors, Total (ND=0/ND=1/2DL)	ug/kg	4	2.5		8.0		8.0		8.0		8.0		15		21		8.0	

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Table W-9
Saturated Soil Analytical Results Summary -
Polychlorinated Biphenyls
5900 West Marginal Way Site
Seattle, Washington

Location			GP-82		GP-82		GP-83		MW-29S		MW-29S		MW-29S		MW-31S		MW-45D	
Sample Date			5/15/2019		5/17/2019		5/17/2019		11/8/2011		11/8/2011		11/8/2011		11/8/2011		10/7/2013	
Sample ID			GP-82-5-7-051519		GP-82-8.5-9.5-051719		GP-83-11.7-12.7-051719		MW-29S-0-2		DUP-110811-1		MW-29S-3-3.5		MW-31S-5-6		MW-45D-9.5-10.5	
Sample Type			N		N		N		N		FD		N		N		N	
Sample Depth			5 - 7 ft		8.5 - 9.5 ft		11.7 - 12.7 ft		0-2 ft		0-2 ft		3-3.5 ft		5-6 ft		9.5-10.5 ft	
Soil Layer			Dredged Fill		Interface at Top of Silt		Interface at Top of Silt		Shallow Fill		Shallow Fill		Shallow Fill		Dredged Fill		Interface at Top of Silt	
PCBs	Units	Screening Level																
Aroclor 1016	ug/kg	NS	4.0	UJ	4.0	UJ	4.0	UJ	1.2	U	1.2	U	1.1	U	1.2	U	1.5	U
Aroclor 1221	ug/kg	NS	4.0	UJ	4.0	UJ	4.0	UJ	1.6	U	1.6	U	1.5	U	1.6	U	1.5	U
Aroclor 1232	ug/kg	NS	4.0	UJ	4.0	UJ	4.0	UJ	1.6	U	1.6	U	1.5	U	1.6	U	1.5	U
Aroclor 1242	ug/kg	NS	4.0	UJ	4.0	UJ	4.0	UJ	1.6	U	1.6	U	1.5	U	1.6	U	1.5	U
Aroclor 1248	ug/kg	NS	7.9	J	4.0	UJ	4.0	UJ	33		38		1.5	U	1.6	U	1.5	U
Aroclor 1254	ug/kg	NS	18.7	J+	4.0	UJ	4.0	UJ	100		120		1.5	U	1.6	U	1.5	U
Aroclor 1260	ug/kg	NS	10.9	J	4.0	UJ	4.0	UJ	93	U	94	U	1.5	U	1.6	U	0.56	U
Aroclor 1262	ug/kg	NS	4.0	UJ	4.0	UJ	4.0	UJ										
Aroclor 1268	ug/kg	NS	4.0	UJ	4.0	UJ	4.0	UJ										
Aroclors, Total ND =0	ug/kg	0.0022	38		0		0		133		158		0		0		0	
Aroclors, Total (ND=0/ND=1/2DL)	ug/kg	4	40		8.0		8.0		180		210		3.0		3.2		2.5	

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Table W-9
Saturated Soil Analytical Results Summary -
Polychlorinated Biphenyls
5900 West Marginal Way Site
Seattle, Washington

Location			TB-01B		TB-01B		TB-02B		TB-02B		TB-02B		TB-03D	
Sample Date			1/14/2014		1/14/2014		1/13/2014		1/13/2014		1/13/2014		1/13/2014	
Sample ID			TB-01B-5-6.9		TB-01B-6.9-7.9		TB-02B-8-9.5		TB-02B-9.5-10.5		DUP011314-1		TB-03D-4.25-7	
Sample Type			N		N		N		N		FD		N	
Sample Depth			5-6.9 ft		6.9-7.9 ft		8-9.5 ft		9.5-10.5 ft		9.5-10.5 ft		4.25-7 ft	
Soil Layer			Dredged Fill		Interface at Top of Silt		Dredged Fill		Interface at Top of Silt		Interface at Top of Silt		Shallow Fill	
PCBs	Units	Screening Level												
Aroclor 1016	ug/kg	NS	1.5	U	1.5	U	37	U	15	U	15	U	1.9	U
Aroclor 1221	ug/kg	NS	1.3	U	1.3	U	32	U	13	U	13	U	1.9	U
Aroclor 1232	ug/kg	NS	1.3	U	1.3	U	32	U	13	U	13	U	1.9	U
Aroclor 1242	ug/kg	NS	0.58	U	0.58	U	14	U	5.8	U	5.6	U	1.9	U
Aroclor 1248	ug/kg	NS	0.58	U	0.58	U	380	U	120	U	95	U	120	U
Aroclor 1254	ug/kg	NS	4.3		1.3	U	1500		390		370		2300	
Aroclor 1260	ug/kg	NS	7.5		1.3	U	140	U	190		48	U	180	U
Aroclor 1262	ug/kg	NS												
Aroclor 1268	ug/kg	NS												
Aroclors, Total ND =0	ug/kg	0.0022	11.8		0		1500		580		370		2300	
Aroclors, Total (ND=0/ND=1/2DL)	ug/kg	4	12		1.9		1800		640		440		2500	

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Table W-9
Saturated Soil Analytical Results Summary -
Polychlorinated Biphenyls
5900 West Marginal Way Site
Seattle, Washington

Location			TB-03D		TB-03D		TB-04A		TB-04A		TB-05B		TB-05B	
Sample Date			1/13/2014		1/13/2014		1/13/2014		1/13/2014		1/15/2014		1/15/2014	
Sample ID			TB-03D-7-9		TB-03D-12.6-13.6		TB-04A-1.25-3		TB-04A-7.1-8.1		TB-05B-13.6-15.6		DUP011514-2	
Sample Type			N		N		N		N		N		FD	
Sample Depth			7-9 ft		12.6-13.6 ft		1.25-3 ft		7.1-8.1 ft		13.6-15.6 ft		13.6-15.6 ft	
Soil Layer			Dredged Fill		Interface at Top of Silt		Dredged Fill		Interface at Top of Silt		Dredged Fill		Dredged Fill	
PCBs	Units	Screening Level												
Aroclor 1016	ug/kg	NS	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U
Aroclor 1221	ug/kg	NS	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U
Aroclor 1232	ug/kg	NS	12	U	5.9	U	20	U	1.3	U	1.3	U	1.3	U
Aroclor 1242	ug/kg	NS	0.58	U	0.58	U	0.58	U	0.58	U	0.58	U	0.57	U
Aroclor 1248	ug/kg	NS	0.58	U	0.58	U	0.58	U	0.58	U	25	U	20	U
Aroclor 1254	ug/kg	NS	1.3	U	1.3	U	3.2	j	1.3	U	45		38	
Aroclor 1260	ug/kg	NS	1.3	U	1.3	U	1.3	U	1.3	U	14		11	
Aroclor 1262	ug/kg	NS												
Aroclor 1268	ug/kg	NS												
Aroclors, Total ND =0	ug/kg	0.0022	0		0		3.2		0		59		49	
Aroclors, Total (ND=0/ND=1/2DL)	ug/kg	4	1.9		1.9		4.4		1.9		72		59	

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Table W-9

Saturated Soil Analytical Results Summary -

Polychlorinated Biphenyls

5900 West Marginal Way Site

Seattle, Washington

Location			TB-05B		TB-06E		TB-06F		TB-06F	
Sample Date			1/15/2014		1/15/2014		1/24/2014		1/24/2014	
Sample ID			TB-05B-18.2-19.2		TB-06E-8.8-10.6		TB-06F-14-16		TB-06F-20-22	
Sample Type			N		N		N		N	
Sample Depth			18.2-19.2 ft		8.8-10.6 ft		14-16 ft		20-22 ft	
Soil Layer			Interface at Top of Silt		Dredged Fill		Dredged Fill		Lower Sand	
PCBs	Units	Screening Level								
Aroclor 1016	ug/kg	NS	1.5	U	15	U	1.5	U	1.5	U
Aroclor 1221	ug/kg	NS	1.3	U	13	U	1.3	U	1.5	U
Aroclor 1232	ug/kg	NS	1.3	U	13	U	1.3	U	1.5	U
Aroclor 1242	ug/kg	NS	0.57	U	5.8	U	0.58	U	1.5	U
Aroclor 1248	ug/kg	NS	0.57	U	5.8	U	49	U	1.5	U
Aroclor 1254	ug/kg	NS	1.3	U	300		65		1.5	U
Aroclor 1260	ug/kg	NS	1.3	U	200	U	240	U	0.57	U
Aroclor 1262	ug/kg	NS								
Aroclor 1268	ug/kg	NS								
Aroclors, Total ND =0	ug/kg	0.0022	0		300		65		0	
Aroclors, Total (ND=0/ND=1/2DL)	ug/kg	4	1.9		410		210		2.5	

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Table W-9

**Saturated Soil Analytical Results Summary -
Polychlorinated Biphenyls
5900 West Marginal Way Site
Seattle, Washington**

Notes:

Units are in micrograms per kilogram (µg/kg).

Cells are left blank where compound was not analyzed.

Green-shaded, bolded values indicate detected concentration exceeds the selected screening level.

Light gray-shaded values indicate that the method detection limit exceeds the screening level.

NFG (National Functional Guidelines) = U.S. Environmental Protection Agency (USEPA) Contract Laboratory Program

National Functional Guidelines for Organic Data Review, October 1999 or USEPA Contract. Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004.

Key:

DUP = field duplicate sample

ft = feet below ground surface

FD = field duplicate sample

GP = direct-push boring

MW = monitoring well

N = normal field sample

ND=0 = Non-detect values calculation method where only positively identified compounds are included.

NS = no screening level

PCBs = polychlorinated biphenyls

TB = top of riverbank boring

Laboratory Data Qualifiers:

j = The value reported is less than the reporting limit and should be considered an estimate; qualifier reported by the laboratory.

U = Result is ≤ the laboratory detection limit or qualified as non-detect in accordance with National Functional Guidelines (NFGs).

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Table W-10

Saturated Soil Analytical Results Summary - Dioxins & Furans**5900 West Marginal Way Site****Seattle, Washington**

Location			GP-29	GP-29	GP-29	GP-29	GP-30	GP-34	GP-34
Sample Date			10/9/2012	10/9/2012	10/9/2012	10/9/2012	10/9/2012	10/10/2012	10/10/2012
Sample ID			GP-29-2.9-4.9	GP-29-4.9-6.9	GP-29-6.9-8.9	GP-29-8.9-11.2	GP-30-7-9	GP-34-6.4-8.4	DUP101012-1
Sample Type			N	N	N	N	N	N	FD
Sample Depth			2.9-4.9 ft	4.9-6.9 ft	6.9-8.9 ft	8.9-11.2 ft	7-9 ft	6.4-8.4 ft	6.4-8.4 ft
Soil Layer			Shallow Fill	Dredged Fill	Dredged Fill	Dredged Fill	Interface at Top of Silt	Dredged Fill	Dredged Fill
Dioxins and Furans (pg/g)			TEF	Screening Level					
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1	13	0.219 U	0.127 U	0.282 U	0.230 U	0.285 U	0.288 U	0.256 U
Tetrachlorodibenzo-p-dioxin homologs (Total TCDD)	--	NS	0.149	0.127 U	0.128	0.554	1.50	0.133	0.588
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	1	NS	0.096 U	0.185 U	0.108 U	0.104 U	0.109 U	0.129 J+	0.106 U
Pentachlorodibenzo-p-dioxin homologs (Total PeCDD)	--	NS	0.796	0.185 U	0.396	0.104 U	0.479	0.129	0.195
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	0.179 J+	0.139 U	0.125 U	0.137 J+	0.102 U	0.214 J+	0.212 U
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	1.76 J+	0.335 U	0.509 J+	0.342 J+	0.191 J+	0.838 U	1.49 J+
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	0.442 J+	0.229 U	0.250 U	0.327 J+	0.197 U	0.565 U	0.503 U
Hexachlorodibenzo-p-dioxin homologs (Total HxCDD)	--	NS	9.15	2.86	1.42	4.61	0.191	2.09	2.44
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	0.01	NS	52.7	9.02 j	14.2	8.15 j	3.81 j	22.0	41.7
Heptachlorodibenzo-p-dioxin homologs (Total HpCDD)	--	NS	95.2	17.8	27.8	17.4	9.34	38.9	73.3
Octachlorodibenzo-P-Dioxin (OCDD)	0.0003	NS	688	676	989	124	144	323	1230
1,2,6,7-Tetrachlorodibenzofuran (TCDF)		NS							
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	0.1	NS	0.130 U	0.501 U	0.108 U	0.104 U	0.188 j	0.107 U	0.119 U
Tetrachlorodibenzofuran homologs (Total TCDF)	--	NS	1.29	0.107 U	0.808	0.380	2.74	0.107 U	0.106 U
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	0.03	NS	0.302 J+	0.141 U	0.108 U	0.104 U	0.102 U	0.130 U	0.139 J+
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	0.3	NS	0.912 U	0.241 U	0.320 U	0.287 U	0.249 U	0.550 U	0.139 U
Pentachlorodibenzofuran homologs (Total PeCDF)	--	NS	11.6	1.47	2.30	1.59	0.546 U	3.88	6.48
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	6.65 j	0.582 j	1.09 j	0.671 U	0.233 j	2.89 j	6.56 j
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	1.02 J+	0.155 U	0.210 U	0.159 U	0.102 U	0.568 J+	0.974 U
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.106 U	0.110 U	0.125 U	0.104 U	0.102 U	0.107 U	0.106 U
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.422 U	0.288 U	0.108 U	0.104 U	0.102 U	0.224 J+	0.384 J+
Hexachlorodibenzofuran homologs (Total HxCDF)	--	NS	46.7	4.09	8.03	3.71	1.56	17.3	32.5
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	0.01	NS	22.4	2.22 j	3.91 j	1.73 j	0.815 U	8.71 j	18.2
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	0.01	NS	3.02 J+	0.225 J+	0.567 J+	0.327 U	0.187 J+	1.33 J+	3.40 J+
Heptachlorodibenzofuran homologs (Total HpCDF)	--	NS	107	2.44	15.1	6.78	2.87	38.4	74.7
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	0.0003	NS	62.1	6.69 j	11.6 j	3.71 j	4.20 j	23.0	42.8
Calculated TEQ (ND=0)	--	5.2	2.02039	0.377657	0.64685	0.217713	0.14563	0.9428	1.86241
Dioxin Furan Calculated TEQ (ND=1/2 DL)	--	5.2	2.34759	0.659772	0.93777	0.488058	0.415835	1.2521	2.26406

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Table W-10

Saturated Soil Analytical Results Summary - Dioxins & Furans**5900 West Marginal Way Site****Seattle, Washington**

Location			GP-34	GP-35	GP-35	GP-35	GP-40	GP-40	GP-43	GP-43
Sample Date			10/10/2012	10/8/2013	10/8/2013	10/8/2013	10/8/2013	10/8/2013	10/10/2013	10/10/2013
Sample ID			GP-34-8.4-9.4	GP-35-3.5-5.5	DUP-100813-1	GP-35-11.25-12.25	GP-40-3.5-5.5	GP-40-11.3-12.3	GP-43-3.0-5.0	GP-43-6.4-8.4
Sample Type			N	N	FD	N	N	N	N	N
Sample Depth			8.4-9.4 ft	3.5-5.5 ft	3.5-5.5 ft	11.25-12.25 ft	3.5-5.5 ft	11.3-12.3 ft	3-5 ft	6.4-8.4 ft
Soil Layer			Interface at Top of Silt	Dredged Fill	Dredged Fill	Interface at Top of Silt	Dredged Fill	Interface at Top of Silt	Shallow Fill	Dredged Fill
Dioxins and Furans (pg/g)	TEF	Screening Level								
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1	13	0.257 U	1.31 U	0.859 U	0.360 U	31.2	0.316 U	3.16 U	0.268 U
Tetrachlorodibenzo-p-dioxin homologs (Total TCDD)	--	NS	1.14	68.7	58.5	4.30	3550	5.11	217	0.863
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	1	NS	0.100 U	8.52 j	4.67 j	0.211 U	63.2 j	0.129 j	23.9 J	0.105 j
Pentachlorodibenzo-p-dioxin homologs (Total PeCDD)	--	NS	0.503	86.9	65.9	4.73	1130	5.93	249 J	0.268
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	0.100 U	15.3	8.49 j	0.129 j	104	0.142 j	56.7 j	0.131 U
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	0.120 U	43.6	37.9	0.220 U	859	0.211 U	315	0.382 U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	0.192 U	34.4	19.3	0.260 j	284	0.279 j	114	0.357 j
Hexachlorodibenzo-p-dioxin homologs (Total HxCDD)	--	NS	1.10	269	186	1.64	3280	1.35	1060	1.29
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	0.01	NS	1.51 U	922	860	1.86 U	22200	1.96 U	6230	9.90 j
Heptachlorodibenzo-p-dioxin homologs (Total HpCDD)	--	NS	3.86	1650	1550	3.83	39300	4.71	10700	18.2
Octachlorodibenzo-P-Dioxin (OCDD)	0.0003	NS	39.2 U	20600	23300	18.5 j	482000	22.4	90200	620
1,2,6,7-Tetrachlorodibenzofuran (TCDF)		NS								
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	0.1	NS	0.282 j	3.12	2.69	0.382 U	15.4	0.205 U	3.94 j	0.113 U
Tetrachlorodibenzofuran homologs (Total TCDF)	--	NS	4.31	58.3	51.5	6.53	292	2.75	64.5 J	0.165
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	0.03	NS	0.100 U	2.85 j	3.32 j	0.255 U	79.2 j	0.166 U	23.9 j	0.111 j
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	0.3	NS	0.242 U	6.75 j	7.56 j	0.461 U	299	0.370 U	97.3	0.289 U
Pentachlorodibenzofuran homologs (Total PeCDF)	--	NS	0.147 U	106	109	1.98 U	4220	1.09 U	1270	1.06 U
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.112 U	41.6	48.1	0.235 U	3520	0.206 j	1270	0.600 j
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.100 U	11.3	13.1	0.194 U	655	0.118 U	217	0.206 U
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.100 U	0.743 j	0.722 j	0.107 U	34.9 j	0.108 U	11.8 j	0.100 U
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.100 U	6.07 j	5.90 j	0.132 U	213	0.108 U	76.4 j	0.172 U
Hexachlorodibenzofuran homologs (Total HxCDF)	--	NS	0.100 U	295	344	0.715 U	21800	0.591 U	6980	2.99
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	0.01	NS	0.160 U	171	191	0.489 j	11500	0.376 j	3020	2.54 j
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	0.01	NS	0.100 U	24.8	29.7	0.147 U	1620	0.108 U	643	0.420 U
Heptachlorodibenzofuran homologs (Total HpCDF)	--	NS	0.100 U	574	669	1.23	43600	0.928	11200	6.80
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	0.0003	NS	0.443 U	419	485	0.931 U	21000	0.621 U	4050	10.2 j
Calculated TEQ (ND=0)	--	5.2	0.0282	43.7275	38.6003	0.0493	1,259.11	0.202	387	0.51749
Dioxin Furan Calculated TEQ (ND=1/2 DL)	--	5.2	0.300	44.3825	39.0298	0.481	1,259.11	0.466	389	0.75214

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Table W-10

Saturated Soil Analytical Results Summary - Dioxins & Furans**5900 West Marginal Way Site****Seattle, Washington**

Location			GP-44	GP-44	GP-44	GP-45	GP-45	GP-45	GP-46	GP-46
Sample Date			10/9/2012	10/9/2012	10/9/2012	10/9/2012	10/9/2012	10/9/2012	10/9/2012	10/9/2012
Sample ID			GP-44-4.8-6.8	GP-44-6.8-8.8	GP-44-8.8-11.1	GP-45-4.5-6.5	GP-45-6.5-8.5	GP-45-8.5-9.5	GP-46-5.2-7.2	GP-46-7.2-8.7
Sample Type			N	N	N	N	N	N	N	N
Sample Depth			4.8-6.8 ft	6.8-8.8 ft	8.8-11.1 ft	4.5-6.5 ft	6.5-8.5 ft	8.5-9.5 ft	5.2-7.2 ft	7.2-8.7 ft
Soil Layer			Dredged Fill	Dredged Fill	Dredged Fill	Dredged Fill	Dredged Fill	Dredged Fill	Dredged Fill	Interface at Top of Silt
Dioxins and Furans (pg/g)	TEF	Screening Level								
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1	13	11.3 J+	0.245 U	0.344 U	10.8 J+	0.272 U	0.300 U	3.38 J+	0.279 U
Tetrachlorodibenzo-p-dioxin homologs (Total TCDD)	--	NS	3010	0.331	2.33	439	0.161	0.481	42.4	0.271
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	1	NS	36.7 J+	0.111 U	0.180 J+	32.3 J+	0.105 U	0.108 U	26.7 J+	0.097 U
Pentachlorodibenzo-p-dioxin homologs (Total PeCDD)	--	NS	448	0.111 U	2.15	1250	0.105 U	0.108 U	110	0.448
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	93.5 J+	0.182 U	0.280 J+	57.5 J+	0.105 U	0.108 U	39.1 J+	0.097 U
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	536 J+	1.21 J+	1.31 J+	786 J+	0.195 U	0.108 U	223 J+	0.182 J+
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	170 J+	0.348 J+	0.730 J+	149 J+	0.129 U	0.108 U	87.5 J+	0.199 J+
Hexachlorodibenzo-p-dioxin homologs (Total HxCDD)	--	NS	2000	2.22	5.42	2410	1.07	0.174	820	0.381
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	0.01	NS	15000	23.1	31.7	22200	5.38 j	1.31 U	5570	3.54 j
Heptachlorodibenzo-p-dioxin homologs (Total HpCDD)	--	NS	26500	38.2	58.8	38900	12.8	2.33	9990	7.10
Octachlorodibenzo-P-Dioxin (OCDD)	0.0003	NS	1260000	510	1970	3450000	377	49.2 U	279000	157
1,2,6,7-Tetrachlorodibenzofuran (TCDF)		NS								
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	0.1	NS	7.46	0.137 U	0.548 j	7.76	0.235 U	0.294 j	4.48	0.347 j
Tetrachlorodibenzofuran homologs (Total TCDF)	--	NS	216	5.56	10.7	169	3.56	3.05	625	6.42
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	0.03	NS	35.3 J+	0.106 U	0.243 J+	37.3 J+	0.105 U	0.108 U	19.9 J+	0.119 U
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	0.3	NS	144 J+	0.387 U	0.608 U	150 J+	0.265 U	0.229 U	61.1 J+	0.291 U
Pentachlorodibenzofuran homologs (Total PeCDF)	--	NS	1870	3.15	4.44	2500	0.700 U	0.498 U	1290	0.909 U
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	1630	2.03 j	2.55 j	3110	0.331 j	0.108 U	997	0.412 j
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	261 J+	0.439 J+	0.566 J+	505 J+	0.105 U	0.108 U	158 J+	0.144 U
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	0.1	NS	15.4 J+	0.105 U	0.104 U	25.5 J+	0.105 U	0.108 U	8.42 J+	0.097 U
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	86.5 J+	0.181 U	0.234 J+	174 J+	0.105 U	0.108 U	61.9 J+	0.097 U
Hexachlorodibenzofuran homologs (Total HxCDF)	--	NS	10900	16.4	17.2	20100	1.68	0.108 U	5670	1.31
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	0.01	NS	5200	10.0 j	10.0 j	15900	0.984 j	0.238 U	3280	1.22 j
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	0.01	NS	840 J+	1.89 J+	1.71 J+	1450 J+	0.183 J+	0.108 U	426 J+	0.210 J+
Heptachlorodibenzofuran homologs (Total HpCDF)	--	NS	22500	42.4	42.7	43900	2.99	0.446	11400	3.79
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	0.0003	NS	17800	25.9	34.2	122000	3.55 j	0.745 U	4640	2.58 U
Calculated TEQ (ND=0)	--	5.2	965.985	0.91337	1.84445	2037.795	0.212735	0.0294	384.799	0.2108
Dioxin Furan Calculated TEQ (ND=1/2 DL)	--	5.2	965.985	1.18126	2.11285	2037.795	0.49151	0.32294175	384.799	0.466372

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Table W-10

Saturated Soil Analytical Results Summary - Dioxins & Furans**5900 West Marginal Way Site****Seattle, Washington**

Location			GP-49	GP-49	GP-49	GP-51	GP-55	GP-55	GP-55	GP-55
Sample Date			10/4/2013	10/4/2013	10/4/2013	10/9/2013	8/31/2012	10/8/2012	10/8/2012	10/8/2012
Sample ID			GP-49-3.5-5.5	GP-49-6.0-8.0	GP-49-11.75-12.75	GP-51-4.3-6.3	GP-55-2.5-4	GP-55-4.4-6.4	GP-55-6.4-8.4	GP-55-8.4-10.4
Sample Type			N	N	N	N	N	N	N	N
Sample Depth			3.5-5.5 ft	6-8 ft	11.75-12.75 ft	4.3-6.3 ft	2.5-4 ft	4.4-6.4 ft	6.4-8.4 ft	8.4-10.4 ft
Soil Layer			Shallow Fill	Dredged Fill	Interface at Top of Silt	Shallow Fill	Shallow Fill	Dredged Fill	Dredged Fill	Interface at Top of Silt
Dioxins and Furans (pg/g)			TEF	Screening Level						
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)			1	13	20.7					
Tetrachlorodibenzo-p-dioxin homologs (Total TCDD)			--	NS	548					
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)			1	NS	128					
Pentachlorodibenzo-p-dioxin homologs (Total PeCDD)			--	NS	970					
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)			0.1	NS	425					
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)			0.1	NS	4840					
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)			0.1	NS	916					
Hexachlorodibenzo-p-dioxin homologs (Total HxCDD)			--	NS	15000					
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)			0.01	NS	147000					
Heptachlorodibenzo-p-dioxin homologs (Total HpCDD)			--	NS	235000					
Octachlorodibenzo-P-Dioxin (OCDD)			0.0003	NS	1540000					
1,2,6,7-Tetrachlorodibenzofuran (TCDF)				NS						
2,3,7,8-Tetrachlorodibenzofuran (TCDF)			0.1	NS	61.3					
Tetrachlorodibenzofuran homologs (Total TCDF)			--	NS	1020					
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)			0.03	NS	347					
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)			0.3	NS	1270					
Pentachlorodibenzofuran homologs (Total PeCDF)			--	NS	19000					
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)			0.1	NS	21900					
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)			0.1	NS	3460					
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)			0.1	NS	150					
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)			0.1	NS	1070					
Hexachlorodibenzofuran homologs (Total HxCDF)			--	NS	130000					
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)			0.01	NS	76400					
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)			0.01	NS	10600					
Heptachlorodibenzofuran homologs (Total HpCDF)			--	NS	324000					
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)			0.0003	NS	188000					
Calculated TEQ (ND=0)			--	5.2	6681					
Dioxin Furan Calculated TEQ (ND=1/2 DL)			--	5.2	6681					

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Table W-10

Saturated Soil Analytical Results Summary - Dioxins & Furans**5900 West Marginal Way Site****Seattle, Washington**

Location			GP-55	GP-67	GP-69	GP-69	GP-70	GP-71	GP-72	GP-72	
Sample Date			10/8/2012	10/7/2013	10/7/2013	10/7/2013	10/9/2013	10/8/2013	10/1/2013	10/8/2013	
Sample ID			DUP100812-1	GP-67-4.8-6.8	GP-69-7.6-9.6	GP-69-12.6-13.6	GP-70-6.1-8.1	GP-71-7.1-9.1	GP-72-2.0-4.0	GP-72-8.2-9.2	
Sample Type			FD	N	N	N	N	N	N	N	
Sample Depth			8.4-10.4 ft	4.8-6.8 ft	7.6-9.6 ft	12.6-13.6 ft	6.1-8.1 ft	7.1-9.1 ft	2-4 ft	8.2-9.2 ft	
Soil Layer			Interface at Top of Silt	Dredged Fill	Dredged Fill	Interface at Top of Silt	Dredged Fill	Dredged Fill	Dredged Fill	Interface at Top of Silt	
Dioxins and Furans (pg/g)		TEF	Screening Level								
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)		1	13	0.282 U	0.417 U	0.317 U	0.359 U	0.374 U	0.208 U	2.48 U	0.375 U
Tetrachlorodibenzo-p-dioxin homologs (Total TCDD)		--	NS	2.18	6.57	0.110 U	0.732	2.57	0.111 U	39.0	5.23
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)		1	NS	0.100 U	0.547 j	0.142 U	0.111 U	0.225 j	0.111 U	10.9 j	0.140 U
Pentachlorodibenzo-p-dioxin homologs (Total PeCDD)		--	NS	0.246	7.43	0.148	0.111 U	1.47	0.111 U	138	7.25
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)		0.1	NS	0.100 U	1.14 j	0.191 U	0.146 j	0.186 U	0.111 U	29.9 j	0.205 j
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)		0.1	NS	0.174 J+	4.85 j	0.395 j	0.236 j	1.14 j	0.116 j	405	0.474 U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)		0.1	NS	0.197 J+	2.64 j	0.240 j	0.274 j	0.488 j	0.111 U	115	0.405 j
Hexachlorodibenzo-p-dioxin homologs (Total HxCDD)		--	NS	1.22	23.8	3.28	2.15	3.73	0.724	1450	6.36
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)		0.01	NS	3.59 U	188	5.77 j	3.83 j	28.9	2.42 j	18500	9.69 j
Heptachlorodibenzo-p-dioxin homologs (Total HpCDD)		--	NS	3.81	333	13.9	9.01	47.2	4.97	32000	23.8
Octachlorodibenzo-P-Dioxin (OCDD)		0.0003	NS	304	16800	125	173	558	183	614000 J	115
1,2,6,7-Tetrachlorodibenzofuran (TCDF)			NS								
2,3,7,8-Tetrachlorodibenzofuran (TCDF)		0.1	NS	0.210 U	0.749 j	0.806 U	0.645 U	0.109 j	0.111 U	2.99 j	0.235 U
Tetrachlorodibenzofuran homologs (Total TCDF)		--	NS	2.69	18.0	0.561	1.07	0.286	0.111 U	56.9	2.29
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)		0.03	NS	0.130 U	0.664 j	0.161 j	0.123 j	0.206 U	0.111 U	14.7 U	0.170 U
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)		0.3	NS	0.309 U	0.122 U	0.471 U	0.367 U	0.464 U	0.198 U	50.0 j	0.467 U
Pentachlorodibenzofuran homologs (Total PeCDF)		--	NS	0.752 U	14.0	1.19	1.09	2.05	0.111 U	1460	3.54
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)		0.1	NS	0.285 j	9.50 j	0.952 j	0.227 j	1.36 j	0.148 U	532	1.15 j
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)		0.1	NS	0.100 U	1.85 j	0.212 j	0.111 U	0.380 j	0.111 U	122	0.281 U
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)		0.1	NS	0.100 U	0.287 U	0.200 U	0.111 U	0.111 U	0.111 U	6.65 U	0.167 U
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)		0.1	NS	0.100 U	0.739 j	0.227 j	0.217 U	0.187 j	0.111 U	70.4 j	0.167 U
Hexachlorodibenzofuran homologs (Total HxCDF)		--	NS	1.01	54.8	5.08	1.07	12.7	0.261	11600	8.94
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)		0.01	NS	0.530 j	39.4	2.36 j	0.669 U	8.80 j	0.429 j	12300	3.35 j
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)		0.01	NS	0.100 U	5.80 j	0.431 j	0.159 j	1.15 j	0.111 U	737	0.562 U
Heptachlorodibenzofuran homologs (Total HpCDF)		--	NS	0.530	124	8.58	2.09	31.5	0.910	64700	13.1
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)		0.0003	NS	3.68 j	213	3.47 j	2.64 j	20.6 j	2.48 j	42700	6.31 j
Calculated TEQ (ND=0)		--	5.2	0.163204	10.1496	0.332	0.185	1.15348	0.095734	666	0.343
Dioxin Furan Calculated TEQ (ND=1/2 DL)		--	5.2	0.451454	10.3908	0.692	0.532	1.42802	0.327854	668	0.742

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Table W-10

Saturated Soil Analytical Results Summary - Dioxins & Furans**5900 West Marginal Way Site****Seattle, Washington**

Location			GP-73	GP-74	GP-74	GP-74	GP-78	GP-78	GP-79	GP-79
Sample Date			10/8/2013	10/8/2013	10/8/2013	10/10/2013	5/14/2019	5/17/2019	5/15/2019	5/17/2019
Sample ID			GP-73-5.8-7.8	GP-74-3.0-4.0	GP-74-4.0-5.0	GP-74-7.6-8.6	GP-78-3-5-051419	GP-78-10.5-11.5-05171	GP-79-5-7-051519	GP-79-11.5-12.5-05171
Sample Type			N	N	N	N	N	N	N	N
Sample Depth			5.8-7.8 ft	3-4 ft	4-5 ft	7.6-8.6 ft	3 - 5 ft	10.5 - 11.5 ft	5 - 7 ft	11.5 - 12.5 ft
Soil Layer			Dredged Fill	Shallow Fill	Dredged Fill	Interface at Top of Silt	Dredged Fill	Interface at Top of Silt	Dredged Fill	Interface at Top of Silt
Dioxins and Furans (pg/g)	TEF	Screening Level								
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1	13	0.289 U	11.0 j	1.83 U	0.397 U	0.050 U	0.089 U	0.081 U	0.121 U
Tetrachlorodibenzo-p-dioxin homologs (Total TCDD)	--	NS	0.115 U	678	500	6.22	0.191	1.69	0.620	3.27
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	1	NS	0.115 U	75.3 j	3.45 j	0.135 U	0.050 U	0.103 U	0.193 U	0.139 U
Pentachlorodibenzo-p-dioxin homologs (Total PeCDD)	--	NS	0.297	2240	641	7.22	0.053	0.531	0.614	1.15
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	0.163 U	166	12.0 j	0.195 U	0.068 U	0.066 J+	0.245 U	0.121 U
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	0.163 U	2280	111	0.252 U	0.190 U	0.139 U	0.381 U	0.164 J+
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	0.163 U	499	33.7 j	0.312 j	0.153 j	0.230 U	0.547 j	0.228 U
Hexachlorodibenzo-p-dioxin homologs (Total HxCDD)	--	NS	0.163 U	11000	3550	4.87	0.756	1.48	3.32	0.801
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	0.01	NS	1.26 j	49800	4140	5.39 j	4.02 J+	2.44 J+	5.33 J+	1.48 J+
Heptachlorodibenzo-p-dioxin homologs (Total HpCDD)	--	NS	2.26 U	85700	10300	16.0	7.34 J+	4.89 J+	12.2 J+	4.13 J+
Octachlorodibenzo-P-Dioxin (OCDD)	0.0003	NS	23.0 U	713000 J	81500	120	76.3 J+	24.0 U	71.4 J+	19.3 U
1,2,6,7-Tetrachlorodibenzofuran (TCDF)		NS					0.058	5.04	0.985	11.4
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	0.1	NS	0.103 j	125	6.31	0.241 U	0.050 U	0.213 j	0.072 U	0.488 j
Tetrachlorodibenzofuran homologs (Total TCDF)	--	NS	0.751	1780	804	2.78				
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	0.03	NS	0.115 U	226	7.13 j	0.208 U	0.050 U	0.121 J+	0.100 U	0.245 U
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	0.3	NS	0.285 U	987	38.2 j	0.446 U	0.060 U	0.076 U	0.065 U	0.199 J+
Pentachlorodibenzofuran homologs (Total PeCDF)	--	NS	0.115 U	19200	1310	2.38 U	0.171 U	0.933 J+	0.201 U	1.50
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.151 j	8890	410	0.587 j	0.394 J+	0.095 U	0.065 U	0.112 U
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.115 U	1510	75.4 j	0.219 U	0.081 J+	0.057 U	0.050 U	0.125 J+
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.115 U	79.0 j	6.05 j	0.219 U	0.050 U	0.046 U	0.050 U	0.050 U
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.115 U	606	27.5 j	0.219 U	0.050 U	0.046 U	0.050 U	0.091 j
Hexachlorodibenzofuran homologs (Total HxCDF)	--	NS	0.420	74400	4480	4.17	1.97 J+	0.311 U	0.050 U	0.711 U
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	0.01	NS	0.371 j	32600	1560	1.69 j	1.23 J+	0.283 U	0.227 U	0.226 U
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	0.01	NS	0.115 U	3740	261	0.294 U	0.229 U	0.080 U	0.050 U	0.050 U
Heptachlorodibenzofuran homologs (Total HpCDF)	--	NS	1.01	176000	6740	6.56	3.62 J+	0.695 U	0.227 U	0.307 U
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	0.0003	NS	1.06 U	84700	4780	4.45 j	2.20 J+	0.403 U	0.505 U	0.165 U
Calculated TEQ (ND=0)	--	5.2	0.04171	2910	168.814	0.198	0.139	0.0559	0.129	0.161
Dioxin Furan Calculated TEQ (ND=1/2 DL)	--	5.2	0.334069	2,910	169.729	0.603	0.220	0.199	0.325	0.325

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Table W-10

Saturated Soil Analytical Results Summary - Dioxins & Furans**5900 West Marginal Way Site****Seattle, Washington**

Location			GP-80	GP-80	GP-81	GP-81	GP-81	GP-82	GP-82
Sample Date			5/14/2019	5/17/2019	5/15/2019	5/15/2019	5/23/2019	5/15/2019	5/17/2019
Sample ID			GP-80-4-5.5-051419	GP-80-13-14-051719	DUP-051519-02	GP-81-5-6.5-051519	GP-81-9-10-052319	GP-82-5-7-051519	GP-82-8.5-9.5-051719
Sample Type			N	N	FD	N	N	N	N
Sample Depth			4 - 5.5 ft	13 - 14 ft	5 - 6.5 ft	5 - 6.5 ft	9 - 10 ft	5 - 7 ft	8.5 - 9.5 ft
Soil Layer			Dredged Fill	Interface at Top of Silt	Dredged Fill	Dredged Fill	Interface at Top of Silt	Dredged Fill	Interface at Top of Silt
Dioxins and Furans (pg/g)			TEF	Screening Level					
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1	13	0.048 U	0.080 j	0.182 U	0.178 U	0.077 U	11.8	0.086 U
Tetrachlorodibenzo-p-dioxin homologs (Total TCDD)	--	NS	0.654	0.500	4.46	6.50	1.03	397	1.39
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	1	NS	0.071 U	0.055 U	1.84 j	1.99 j	0.167 j	98.3	0.143 j
Pentachlorodibenzo-p-dioxin homologs (Total PeCDD)	--	NS	0.334	0.471	17.7	16.9	1.35	2830	1.53
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	0.074 U	0.084 U	18.4	14.1	0.266 J+	211	0.120 J+
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	0.148 U	0.183 J+	33.8	36.9	1.69 j	1230	0.563 J+
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	0.137 j	0.131 j	8.95	9.57	0.500 j	309	0.258 j
Hexachlorodibenzo-p-dioxin homologs (Total HxCDD)	--	NS	0.216 J+	1.24	206	201	7.59	7230	4.40
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	0.01	NS	2.13 J+	2.78 J+	1450	1370	47.6	18300	13.5
Heptachlorodibenzo-p-dioxin homologs (Total HpCDD)	--	NS	4.62 J+	5.81 J+	2110	2020	78.8	29700	25.5
Octachlorodibenzo-P-Dioxin (OCDD)	0.0003	NS	23.4 U	39.8 J+	14200	15700	987	385000	226
1,2,6,7-Tetrachlorodibenzofuran (TCDF)		NS	0.965	3.87	9.44	10.1	4.66	909	6.81
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	0.1	NS	0.067 j	0.158 j	0.518 j	0.570 j	0.229 j	37.1	0.247 j
Tetrachlorodibenzofuran homologs (Total TCDF)	--	NS							
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	0.03	NS	0.048 U	0.070 J+	1.46 j	1.65 j	0.221 J+	56.9	0.158 J+
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	0.3	NS	0.049 U	0.072 U	5.61	7.26	0.615 j	223	0.181 J+
Pentachlorodibenzofuran homologs (Total PeCDF)	--	NS	0.317 J+	0.702 J+	70.0	80.9	6.76	4430	3.15
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.107 U	0.286 U	53.4	60.9	5.19	1400	0.920 J+
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.056 U	0.067 U	10.0	10.8	0.863 j	250 j	0.245 J+
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.048 U	0.045 U	0.621 U	0.738 j	0.088 U	17.2 U	0.048 U
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.048 U	0.067 j	4.07 j	4.54 j	0.366 U	102 j	0.138 j
Hexachlorodibenzofuran homologs (Total HxCDF)	--	NS	0.669 U	1.22 J+	385	408	30.0	8860	6.48 J+
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	0.01	NS	0.400 U	0.744 U	312	311	16.5	4020	3.48 J+
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	0.01	NS	0.060 U	0.166 J+	46.3	51.5	2.57 j	895 j	0.566 J+
Heptachlorodibenzofuran homologs (Total HpCDF)	--	NS	1.16 U	2.86 U	1440	1390	58.8	16100	14.2 J+
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	0.0003	NS	0.854 U	1.51 U	1210	1170	33.4	10000	12.3
Calculated TEQ (ND=0)	--	5.2	0.0417	0.177	39.2	40.4	2.20	883	0.698
Dioxin Furan Calculated TEQ (ND=1/2 DL)	--	5.2	0.139	0.244	39.3	40.5	2.27	884	0.743

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Table W-10

Saturated Soil Analytical Results Summary - Dioxins & Furans

5900 West Marginal Way Site

Seattle, Washington

Location			GP-83	MW-34S	MW-38D	MW-38D	MW-38D	MW-43D	SIIE-01
Sample Date			5/17/2019	11/9/2011	10/2/2013	10/7/2013	10/10/2013	8/8/2014	
Sample ID			GP-83-11.7-12.7-051719	MW-34S-3.8-4.2	MW-38D-0.83-2.0	MW-38D-8.5-9.5	MW-43D-7.25-9.25	SIIE-01-080814	
Sample Type			N	N	N	N	N	N	
Sample Depth			11.7 - 12.7 ft	3.8-4.2 ft	0.83-2 ft	8.5-9.5 ft	7.25-9.25 ft	2-2 ft	
Soil Layer			Interface at Top of Silt	Dredged Fill	Dredged Fill	Interface at Top of Silt	Dredged Fill	Shallow Fill	
Dioxins and Furans (pg/g)	TEF	Screening Level							
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1	13	0.050 U	0.375 j	0.192 U	0.412 U	0.341 U	0.514 U	
Tetrachlorodibenzo-p-dioxin homologs (Total TCDD)	--	NS	0.686	7.75	1220	3.27	6.10	2.75	
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	1	NS	0.069 U	3.8	8.76 j	0.210 U	0.142 U	0.533 U	
Pentachlorodibenzo-p-dioxin homologs (Total PeCDD)	--	NS	0.426	22.9	65.1	2.25 J	6.39	5.70	
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	0.073 U	12.6	17.8	0.151 j	0.129 j	0.672	
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	0.305 J+	94.5	62.1	0.452 j	0.321 U	2.57	
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	0.227 U	43.5	40.3	0.351 j	0.266 j	1.85	
Hexachlorodibenzo-p-dioxin homologs (Total HxCDD)	--	NS	2.13	445	297	4.64	1.89	19.8	
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	0.01	NS	6.94 J+	2600	2160	7.30 j	6.03 j	50.0	
Heptachlorodibenzo-p-dioxin homologs (Total HpCDD)	--	NS	13.9 J+	4650	3850	15.4 J	11.7	95.7	
Octachlorodibenzo-P-Dioxin (OCDD)	0.0003	NS	111 J+	33200	134000	131	101	472	
1,2,6,7-Tetrachlorodibenzofuran (TCDF)		NS	2.79						
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	0.1	NS	0.095 j	0.945	2.57	0.745 U	0.221 U	1.88	
Tetrachlorodibenzofuran homologs (Total TCDF)	--	NS		18.5	52.6	7.87	0.333 U	16.0	
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	0.03	NS	0.115 J+	2.44 j	4.50 j	0.226 J	0.164 U	0.939	
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	0.3	NS	0.142 U	10.9	11.4	0.515 U	0.386 U	1.31 U	
Pentachlorodibenzofuran homologs (Total PeCDF)	--	NS	1.32	119	154	3.51 J	1.59 U	17.1	
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.910 J+	103	78.2	1.04 j	0.573 j	1.52	
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.201 J+	15.6	17.3	0.333 j	0.194 U	1.07	
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.050 U	1.04 j	1.05 j	0.148 U	0.102 U	0.098	
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)		NS	0.082 j	8.14	7.92 j	0.236 j	0.112 j	0.853	
Hexachlorodibenzofuran homologs (Total HxCDF)	--	NS	4.99 J+	528	430	6.66	2.86	20.5	
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	0.01	NS	2.67 J+	301	259	2.64 j	1.81 j	15.4	
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	0.01	NS	0.484 J+	75.5	39.5	0.556 j	0.289 U	1.07	
Heptachlorodibenzofuran homologs (Total HpCDF)	--	NS	9.84 J+	1330	833	9.23	5.17	36.5	
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	0.0003	NS	5.50 J+	923	660 j	5.33 J	2.95 j	34.5	
Calculated TEQ (ND=0)	--	5.2	0.299	75.5	100	0.409	0.218	1.90	
Dioxin Furan Calculated TEQ (ND=1/2 DL)	--	5.2	0.397	75.5	100	0.842	0.563	2.62	

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Table W-10

Saturated Soil Analytical Results Summary - Dioxins & Furans**5900 West Marginal Way Site****Seattle, Washington**

Location			SIIE-02		SIIE-03		SIIE-05		SIIE-06		TB-01B		TB-01B		TB-02B		TB-02B	
Sample Date			8/8/2014		8/8/2014		8/8/2014		8/12/2014		1/14/2014		1/14/2014		1/13/2014		1/13/2014	
Sample ID			SIIE-02-080814		SIIE-03-080814		SIIE-05-080814		SIIE-06-081214		TB-01B-5-6.9		TB-01B-6.9-7.9		TB-02B-8-9.5		TB-02B-9.5-10.5	
Sample Type			N		N		N		N		N		N		N		N	
Sample Depth			2-2 ft		2-2 ft		2-2 ft		2-2 ft		5-6.9 ft		6.9-7.9 ft		8-9.5 ft		9.5-10.5 ft	
Soil Layer			Shallow Fill		Shallow Fill		Shallow Fill		Shallow Fill		Dredged Fill		Interface at Top of Silt		Dredged Fill		Interface at Top of Silt	
Dioxins and Furans (pg/g)			TEF	Screening Level														
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)			1	13	0.507	U	0.627	U	0.368	U	0.361	U	1.06	j	0.378	U	10.1	j
Tetrachlorodibenzo-p-dioxin homologs (Total TCDD)			--	NS	4.96		5.87		0.614	U	0.615	U	108		6.65		219	
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)			1	NS	1.66		0.691	U	0.217	j	0.095	U	2.26	U	0.287	j	91.3	
Pentachlorodibenzo-p-dioxin homologs (Total PeCDD)			--	NS	9.91		4.46		0.634	U	1.06	U	104		6.89		937	
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)			0.1	NS	2.77		0.643	U	0.345	U	0.319	U	6.81	j	0.606	j	199	
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)			0.1	NS	8.38		2.14		1.38	j	1.68	j	59.4	j	4.87	j	1360	
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)			0.1	NS	8.22		1.60		0.691	U	1.34	j	20.2	j	1.41	j	508	
Hexachlorodibenzo-p-dioxin homologs (Total HxCDD)			--	NS	54.7		11.8		4.55		8.23		254		22.9		7260	
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)			0.01	NS	207		36.3		24.5		22.2		1820		161		35600	
Heptachlorodibenzo-p-dioxin homologs (Total HpCDD)			--	NS	404		63.0		43.5		37.1		3170		267		61000	
Octachlorodibenzo-P-Dioxin (OCDD)			0.0003	NS	6460		1040		659		356		22000		1870		715000	
1,2,6,7-Tetrachlorodibenzofuran (TCDF)				NS														
2,3,7,8-Tetrachlorodibenzofuran (TCDF)			0.1	NS	0.940		1.73		0.237	U	0.421	U	1.65	j	0.312	j	27.3	
Tetrachlorodibenzofuran homologs (Total TCDF)			--	NS	15.8		53.5		0.983		0.558		34.8		6.75		928	
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)			0.03	NS	0.903		2.90		0.337	j	0.095	U	7.78	j	0.576	j	133	
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)			0.3	NS	2.49		3.98		0.572	U	0.310	U	27.2	j	2.11	j	510	
Pentachlorodibenzofuran homologs (Total PeCDF)			--	NS	29.6		51.8		3.30		1.41	U	347		22.1		8310	
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)			0.1	NS	16.2		7.16		3.20	j	0.659	j	224		16.6		6830	
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)			0.1	NS	3.11		5.02		1.02	j	0.144	j	36.0	j	2.81	j	1060	
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)			0.1	NS	0.263		0.691		0.104	U	0.120	U	3.17	j	0.234	j	47.1	j
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)			0.1	NS	1.84		3.57		0.433	j	0.147	j	13.8	j	1.06	j	386	
Hexachlorodibenzofuran homologs (Total HxCDF)			--	NS	90.2		53.3		15.5		4.35		1390		95.6		36100	
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)			0.01	NS	53.7		26.2		15.0		2.80	j	680		51.6		21000	
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)			0.01	NS	7.64		3.93		1.01	j	0.446	U	102		8.06	j	3400	
Heptachlorodibenzofuran homologs (Total HpCDF)			--	NS	171		54.9		28.8		7.36		3160		231		72800	
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)			0.0003	NS	103		31.1		20.3		5.36	j	1770		151		33100	
Calculated TEQ (ND=0)			--	5.2	11.3		4.46		1.44		0.755		79.1		6.54		2130	
Dioxin Furan Calculated TEQ (ND=1/2 DL)			--	5.2	11.5		5.15		1.78		1.08		80.2		6.73		2130	

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Table W-10

Saturated Soil Analytical Results Summary - Dioxins & Furans**5900 West Marginal Way Site****Seattle, Washington**

Location			TB-02B	TB-03D	TB-03D	TB-03D	TB-03D	TB-04A	TB-04A	TB-05B	TB-05B
Sample Date			1/13/2014	1/13/2014	1/13/2014	1/13/2014	1/13/2014	1/13/2014	1/13/2014	1/15/2014	1/15/2014
Sample ID			DUP011314-1	TB-03D-4.25-7	TB-03D-7-9	TB-03D-12.6-13.6	TB-04A-1.25-3	TB-04A-7.1-8.1	TB-05B-13.6-15.6	DUP011514-2	
Sample Type			FD	N	N	N	N	N	N	N	FD
Sample Depth			9.5-10.5 ft	4.25-7 ft	7-9 ft	12.6-13.6 ft	1.25-3 ft	7.1-8.1 ft	13.6-15.6 ft	13.6-15.6 ft	
Soil Layer			Interface at Top of Silt	Shallow Fill	Dredged Fill	Interface at Top of Silt	Dredged Fill	Interface at Top of Silt	Dredged Fill	Dredged Fill	
Dioxins and Furans (pg/g)		TEF	Screening Level								
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)		1	13	14.0 j		0.337 U	0.346 U	0.385 U	0.384 U	1.81 U	1.07 U
Tetrachlorodibenzo-p-dioxin homologs (Total TCDD)		--	NS	302	769	0.105 U	1.49	4.78	2.21	84.6	53.5
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)		1	NS	89.8 j	217	0.219 j	0.108 U	0.682 j	0.198 j	8.74 j	11.4 U
Pentachlorodibenzo-p-dioxin homologs (Total PeCDD)		--	NS	1260	2210	1.03	0.950	5.97	1.19	192	165
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)		0.1	NS	175	528	0.814 j	0.108 U	1.76 j	3.51 U	22.4 j	21.8 j
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)		0.1	NS	1760	1560	0.907 j	0.159 j	7.64 j	3.51 U	153	191
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)		0.1	NS	486	993	0.802 j	0.339 j	4.28 j	3.51 U	58.9 j	59.5 j
Hexachlorodibenzo-p-dioxin homologs (Total HxCDD)		--	NS	7820	7270	6.04	2.31	34.0	3.51 U	878	944
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)		0.01	NS	52500	39300	25.4	3.91 j	251	35.2 j	3980	4440
Heptachlorodibenzo-p-dioxin homologs (Total HpCDD)		--	NS	90700	70300	41.1	8.12	468	65.2	6810	8060
Octachlorodibenzo-P-Dioxin (OCDD)		0.0003	NS	656000	2280000 J	751	97.5	4970	728	97500	121000
1,2,6,7-Tetrachlorodibenzofuran (TCDF)			NS								
2,3,7,8-Tetrachlorodibenzofuran (TCDF)		0.1	NS	28.0	31.5	0.105 U	0.257 j	0.273 j	0.301 j	7.98 j	9.62 j
Tetrachlorodibenzofuran homologs (Total TCDF)		--	NS	1050	515	0.105 U	5.77	6.34	8.00	316	339
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)		0.03	NS	168	135	0.105 U	0.192 U	0.622 j	0.378 j	13.1 j	22.2 j
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)		0.3	NS	541	453	0.410 j	0.360 j	2.15 j	0.709 j	51.5 j	100
Pentachlorodibenzofuran homologs (Total PeCDF)		--	NS	10800	6560	1.36	0.604	26.2	5.57	1470	1930
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)		0.1	NS	10600	4950	2.11 j	0.297 j	28.4	6.28 j	488	910
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)		0.1	NS	1550	946	0.409 U	0.143 U	4.96 j	4.94 U	92.6 j	153
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)		0.1	NS	78.5 j	58.3 j	0.105 U	0.108 U	0.333 j	4.94 U	5.03 j	7.50 U
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)		0.1	NS	517	375	0.198 U	0.115 U	1.79 j	4.94 U	36.9 j	52.2 j
Hexachlorodibenzofuran homologs (Total HxCDF)		--	NS	57400	30600	9.65	0.971	166	17.9	3940	5670
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)		0.01	NS	22300	13700	5.51 j	0.608 U	84.2	14.8 j	1630	2140
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)		0.01	NS	5580	1960	0.878 j	0.137 U	19.0	4.19 U	218	290
Heptachlorodibenzofuran homologs (Total HpCDF)		--	NS	102000	48500	16.4	1.54	321	55.0	6400	8170
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)		0.0003	NS	37900	26700	11.7 j	1.84 j	168	40.4 j	3130 J	2980
Calculated TEQ (ND=0)		--	5.2	2800	2590	1.35	0.282	11.4	1.81	200	276
Dioxin Furan Calculated TEQ (ND=1/2 DL)		--	5.2	2800	2,590	1.56	0.539	11.6	3.29	200	283

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Table W-10
Saturated Soil Analytical Results Summary - Dioxins & Furans
5900 West Marginal Way Site
Seattle, Washington

Location			TB-05B	TB-06E	TB-06F	TB-06F
Sample Date			1/15/2014	1/15/2014	1/24/2014	1/24/2014
Sample ID			TB-05B-18.2-19.2	TB-06E-8.8-10.6	TB-06F-20-22	TB-06F-14-16
Sample Type			N	N	N	N
Sample Depth			18.2-19.2 ft	8.8-10.6 ft	20-22 ft	14-16 ft
Soil Layer			Interface at Top of Silt	Dredged Fill	Lower Sand	Dredged Fill
Dioxins and Furans (pg/g)	TEF	Screening Level				
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1	13	0.315 U	21.8	0.390 U	8.55
Tetrachlorodibenzo-p-dioxin homologs (Total TCDD)	--	NS	0.721	837	3.13	495
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	1	NS	0.112 U	185	0.316 j	56.9
Pentachlorodibenzo-p-dioxin homologs (Total PeCDD)	--	NS	0.285	1440	5.28	1990
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	0.112 U	362	0.504 j	382
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	0.407 U	9040	3.45 j	1250
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	0.348 j	1020	1.13 j	300
Hexachlorodibenzo-p-dioxin homologs (Total HxCDD)	--	NS	1.91	24000	17.5	9000
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	0.01	NS	9.69 j	209000	105	40500
Heptachlorodibenzo-p-dioxin homologs (Total HpCDD)	--	NS	18.1	339000	204	66500
Octachlorodibenzo-P-Dioxin (OCDD)	0.0003	NS	208	2210000	1740	619000
1,2,6,7-Tetrachlorodibenzofuran (TCDF)		NS				
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	0.1	NS	0.178 j	60.2	0.761 U	39.0
Tetrachlorodibenzofuran homologs (Total TCDF)	--	NS	3.51	1540	3.01	991
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	0.03	NS	0.194 U	737	0.521 j	123
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	0.3	NS	0.502 j	2460	1.81 j	463
Pentachlorodibenzofuran homologs (Total PeCDF)	--	NS	2.30	37100	26.1	8450
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	1.29 j	56800	17.4	5330
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.330 j	9610	2.96 j	796
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.112 U	586	0.295 j	49.0
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.153 U	2940	1.44 j	288
Hexachlorodibenzofuran homologs (Total HxCDF)	--	NS	6.16	334000	103	31300
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	0.01	NS	3.39 j	123000	53.4	13300
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	0.01	NS	0.603 j	32100	9.69 j	2290
Heptachlorodibenzofuran homologs (Total HpCDF)	--	NS	13.3	494000	191	45100
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	0.0003	NS	8.61 j	158000	101	17300
Calculated TEQ (ND=0)	--	5.2	0.567	13400	5.83	1800
Dioxin Furan Calculated TEQ (ND=1/2 DL)	--	5.2	0.823	13400	6.06	1800

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Table W-10

Saturated Soil Analytical Results Summary - Dioxins & Furans

5900 West Marginal Way Site

Seattle, Washington

Notes:

Units are in picograms per gram (pg/g).

Green-shaded, bolded values indicate detected concentration exceeds the selected screening level.

TEQ = Toxicity Equivalency Quotient to 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) where non-detected compounds are equal to one-half the detection limit.

"--" = No value available.

U.S. Environmental Protection Agency (USEPA) Contract Laboratory Program National Functional Guidelines for Organic Data Review, October 1999 and the EPA Region 10 SOP for the Validation of Polychlorinated Dibenzodioxin (PCDD) and Polychlorinated Dibenzofuran (PCDF) Data, January 1996.

Key:

DUP = field duplicate sample

ft = feet below ground surface

FD = field duplicate sample

GP = direct-push boring

MW = monitoring well

N = normal field sample

ND=1/2DL = non-detect values calculated as one-half the laboratory detection limit

NS = no screening level for this compound

pg/g = picograms per gram

SIIE = samples are anthropogenic solids, sampled during a soil excavation

TB = top of riverbank boring

TEF = Toxicity Equivalency Factor

Laboratory Data Qualifiers:

+ = Compound concentration biased high

j = The value reported is less than the reporting limit and should be considered an estimate; qualifier reported by the laboratory.

J = The detected results are qualified as estimated in accordance with National Functional Guidelines (NFGs).

U = Result is $\leq$ the laboratory detection limit or qualified as non-detect in accordance with NFGs.

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Table W-11
Groundwater Analytical Results
Summary - Metals
5900 West Marginal Way Site
Seattle, Washington

Location		MW-1S		MW-1S		MW-1S		MW-1S		MW-1S		MW-1S		MW-1S		MW-1S		MW-1S		MW-1S		MW-1S					
Sample Date		23 Mar 2009		23 Mar 2009		27 Apr 2010		27 Apr 2010		27 Oct 2010		27 Oct 2010		25 Apr 2011		25 Apr 2011		29 Nov 2011		29 Nov 2011		25 Apr 2012		14 Mar 2014		26 Aug 2014	
Sample ID		MW-01S-032309		DUP032309		DUP-042710		MW-01S-042710		DUP-102710		MW-01S-102710		DUP042511-1		MW-1S-042511		DUP-112911-1		MW-1S-112911		MW-1S-042512		MW-1S-031414		MW-1S-082614-P	
Sample Type		N		FD		FD		N		FD		N		FD		N		FD		N		N		N		N	
Sample Method		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow	
Analyte	Screening Level																										
Total Arsenic	8	10.7		10.8		17.9		15.7		11.2		11.0		8.9		9.2		15.4		16.1		9.9		9.4		3.2	
Dissolved Arsenic	8	8.89		8.88		9.1		8.9		9.9		10.2		8.4		8.4		13.0		14.9		8.2		8.6		3.6	J
Arsenic (III)	NS	4.15		3.98																							
Arsenic (Inorganic)	NS	6.88		6.99																							
Total Chromium	100	0.458 j		0.12 U		0.75		0.47 j		1.0		0.94				0.5 U				1.9 U		0.5 U		5 U		5 U	
Dissolved Chromium	100	0.17 j		0.14 U		0.24 U		0.24 U		0.79		0.75				0.5 U				1.0		0.5 U		5 U		5 U	
Chromium, VI	48													10 U		10 U				10 UJ		10 U		R		R	
Total Copper	3.1	0.608 j		1 j		3.0		2.1		2.5		2.4				1.5				7		1.8		2		2 U	
Dissolved Copper	3.1	2 U		2 U		0.60		0.70		1.1		1.1				0.7				2		0.9		2 U		2 U	
Total Zinc	81	50.5		47.3		37.5		37.1		48.9		45.9				20				70		29		50		10 U	
Dissolved Zinc	81	53.4		52.4		26.7		26.9		43.1 J		45.3 J				20				70		22		60		10 U	
Total Antimony	6																										
Dissolved Antimony	6																										
Total Beryllium	4																										
Dissolved Beryllium	4																										
Total Cadmium	1.2																										
Dissolved Cadmium	1.2																										
Total Lead	8.1																										
Dissolved Lead	8.1																										
Total Mercury	0.025																										
Dissolved Mercury	0.025																										
Total Nickel	8.2																										
Dissolved Nickel	8.2																										
Total Selenium	50																										
Dissolved Selenium	50																										
Total Silver	1.9	0.085 U		0.085 U		0.15 J		0.072 J		0.071 UJ		0.071 UJ				0.2 U				3 U		0.2 U					
Dissolved Silver	1.9	0.028 U		0.028 U		0.071 U		0.071 U		0.071 U		0.071 U				0.2 U				3 U		0.2 U					
Total Thallium	0.062																										
Dissolved Thallium	0.062																										
Tributyltin	0.0074																										

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Table W-11
Groundwater Analytical Results
Summary - Metals
5900 West Marginal Way Site
Seattle, Washington

Location		MW-1S		MW-1S		MW-1D		MW-1D		MW-1D		MW-1D		MW-1D		MW-1D		MW-1D		MW-1D		MW-1D		MW-1D		MW-1D	
Sample Date		31 Mar 2015		02 Sep 2015		23 Mar 2009		27 Apr 2010		27 Oct 2010		25 Apr 2011		29 Nov 2011		25 Apr 2012		14 Mar 2014		26 Aug 2014		26 Aug 2014		31 Mar 2015		02 Sep 2015	
Sample ID		MW-1S-033115-P		MW-1S-090215-P		MW-01D-032309		MW-01D-042710		MW-01D-102710		MW-1D-042511		MW-1D-112911		MW-1D-042512		MW-1D-031414		MW-1D-082614		DUP-082614-01		MW-1D-033115		MW-1D-090215	
Sample Type		N		N		N		N		N		N		N		N		N		N		FD		N		N	
Sample Method		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow	
Analyte	Screening Level																										
Total Arsenic	8	9.8	U	3.0		12.4		11.5		10.3		10.9		9.2		9.1		6.7		6.6				8.7	U	7.9	
Dissolved Arsenic	8	8.0		2.9		11.6		9.8		8.2		9.6		8.0		8.1		6.5		6.4	J			7.9		7.1	
Arsenic (III)	NS					8.55																					
Arsenic (Inorganic)	NS					9.26																					
Total Chromium	100	5	U	1.2	U	7.6		35.2		31.7								20		17				18		17	
Dissolved Chromium	100	5	U	1.2	U	8.2		27.0		16.9								12		10				11		9	
Chromium, VI	48	10	U	3	U														R		R		R	10	U	3	U
Total Copper	3.1	2	U	0.9	U	3.5		17.1		36.9								14		15				14		15	
Dissolved Copper	3.1	2	U	0.9	U	0.93	j	5.3		1.9								4		3				6		4	
Total Zinc	81	40		1	U	5.9	j	25.0	U	13.7								10	U	10	U			10	U	1	U
Dissolved Zinc	81	40		1	U	4.8	j	3.5	j	1.9	j							10	U	10	U			10	U	1	U
Total Antimony	6																										
Dissolved Antimony	6																										
Total Beryllium	4																										
Dissolved Beryllium	4																										
Total Cadmium	1.2																										
Dissolved Cadmium	1.2																										
Total Lead	8.1																										
Dissolved Lead	8.1																										
Total Mercury	0.025																										
Dissolved Mercury	0.025																										
Total Nickel	8.2																										
Dissolved Nickel	8.2																										
Total Selenium	50																										
Dissolved Selenium	50																										
Total Silver	1.9					0.085	U	0.36	UJ	0.071	UJ																
Dissolved Silver	1.9					0.028	U	0.071	U	0.071	U																
Total Thallium	0.062																										
Dissolved Thallium	0.062																										
Tributyltin	0.0074																										

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Table W-11
Groundwater Analytical Results
Summary - Metals
5900 West Marginal Way Site
Seattle, Washington

Location		MW-2S		MW-2S		MW-2S		MW-2S		MW-2S		MW-2S		MW-2S		MW-2S		MW-2S		MW-2D		MW-2D		MW-2D			
Sample Date		24 Mar 2009		27 Apr 2010		27 Oct 2010		26 Apr 2011		30 Nov 2011		26 Apr 2012		26 Mar 2014		27 Aug 2014		01 Apr 2015		31 Aug 2015		24 Mar 2009		27 Apr 2010		27 Oct 2010	
Sample ID		MW-02S-032409		MW-02S-042710		MW-02S-102710		MW-2S-042611		MW-2S-113011		MW-2S-042612		MW-2S-032614P		MW-2S-082714-P		MW-2S-040115-P		MW-2S-083115-P		MW-02D-032409		MW-02D-042710		MW-02D-102710	
Sample Type		N		N		N		N		N		N		N		N		N		N		N		N		N	
Sample Method		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow	
Analyte	Screening Level																										
Total Arsenic	8	703		1340		190		1050		462		621		332		538		264		1340		11.8		20.5		28.8	
Dissolved Arsenic	8	665		1000		202		970		499		658		291		528		268		1280		12.0		21.4		28.4	
Arsenic (III)	NS	591																				8.43					
Arsenic (Inorganic)	NS	619																				9.91					
Total Chromium	100	0.12 U		0.73		0.48 j								5 U		5 U		5 U		1.2 U		31.1		6.6		7.0	
Dissolved Chromium	100	0.52 j		0.24 U		0.48 j								5 U		5 U		5 U		1.2 U		3.6		5.5		5.5	
Chromium, VI	48																										
Total Copper	3.1	0.52 U		0.49 j		1.1								2 U		2 U		2 U		0.9 U		8.6		1.3		1.4	
Dissolved Copper	3.1	0.079 U		0.31 j		0.52 j								2 U		2 U		2 U		0.9 U		0.079 U		0.25 j		0.24 j	
Total Zinc	81	10 U		3.2 j		4.6 j								10 U		10 U		10 U		1 U		54.8		5.0 U		1.5 j	
Dissolved Zinc	81	10 U		1.3 U		2.2 j								10 U		10 U		10 U		1 U		10 U		2.8 j		3.2 j	
Total Antimony	6																										
Dissolved Antimony	6																										
Total Beryllium	4																										
Dissolved Beryllium	4																										
Total Cadmium	1.2																										
Dissolved Cadmium	1.2																										
Total Lead	8.1																										
Dissolved Lead	8.1																										
Total Mercury	0.025																										
Dissolved Mercury	0.025																										
Total Nickel	8.2																										
Dissolved Nickel	8.2																										
Total Selenium	50																										
Dissolved Selenium	50																										
Total Silver	1.9	0.085 U		0.071 UJ		0.071 UJ																0.51 j		0.071 UJ		0.071 UJ	
Dissolved Silver	1.9	0.028 U		0.071 U		0.071 U																0.028 U		0.071 U		0.071 U	
Total Thallium	0.062																										
Dissolved Thallium	0.062																										
Tributyltin	0.0074																										

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Table W-11
Groundwater Analytical Results
Summary - Metals
5900 West Marginal Way Site
Seattle, Washington

Location		MW-2D	MW-2D	MW-2D	MW-2D	MW-2D	MW-2D	MW-2D	MW-3S	MW-3S	MW-3S	MW-3S	MW-3S	MW-3S
Sample Date		26 Apr 2011	30 Nov 2011	26 Apr 2012	13 Mar 2014	27 Aug 2014	02 Apr 2015	31 Aug 2015	23 Mar 2009	28 Apr 2010	28 Oct 2010	27 Apr 2011	27 Apr 2011	01 Dec 2011
Sample ID		MW-2D-042611	MW-2D-113011	MW-2D-042612	MW-2D-031314 P	MW-2D-082714-P	MW-2D-040215-P	MW-2D-083115-P	MW-03S-032309	MW-03S-042810	MW-03S-102810	MW-3S-042711	DUP042711-3	MW-3S-120111
Sample Type		N	N	N	N	N	N	N	N	N	N	N	FD	N
Sample Method		low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow
Analyte	Screening Level													
Total Arsenic	8	36.1	34.3	35.7	34.7	34.6	38.4	33.4	604	445	546	480		414
Dissolved Arsenic	8	35.5	36.6	35.3	36.0	33.5	36.4	34.9	601	442	574	460		412
Arsenic (III)	NS								618					
Arsenic (Inorganic)	NS								617					
Total Chromium	100				27	25	26	18	0.351 j	0.64	0.77	0.5 U	0.5 U	1 U
Dissolved Chromium	100				16	16	16	17	0.37 j	0.62	0.83	0.5 U	0.5 U	1 U
Chromium, VI	48													
Total Copper	3.1				8	5	7	2	0.584 j	2.0	4.7	2.0	2.0	2
Dissolved Copper	3.1				2 U	2 U	2 U	0.9 U	2 U	0.20 U	1.1	0.5 U	0.7	2 U
Total Zinc	81				10 U	10 U	10 U	1 U	10 U	5.0 U	1.3 U	4 U	4 U	10 U
Dissolved Zinc	81				10 U	10 U	10 U	1 U	10 U	3.1 j	1.3 U	4 U	4 U	10 U
Total Antimony	6											0.2 U	0.2 U	50 U
Dissolved Antimony	6											0.2 U	0.2 U	50 U
Total Beryllium	4											0.2 U	0.2 U	0.2 U
Dissolved Beryllium	4											0.2 U	0.2 U	0.2 U
Total Cadmium	1.2											0.1 U	0.1 U	0.1 U
Dissolved Cadmium	1.2											0.1 U	0.1 U	0.1 U
Total Lead	8.1											0.1 U	0.1 U	0.1 U
Dissolved Lead	8.1											0.1 U	0.1 U	0.1 U
Total Mercury	0.025											0.1 U	0.1 U	0.1 U
Dissolved Mercury	0.025											0.1 U	0.1 U	0.1 U
Total Nickel	8.2											0.8	0.5 U	1.0
Dissolved Nickel	8.2											0.8	1.2	0.9
Total Selenium	50											0.5 U	0.5 U	0.5 U
Dissolved Selenium	50											0.5 U	0.5 U	0.5 U
Total Silver	1.9								0.085 U	0.071 UJ	0.071 UJ	0.2 U	0.2 U	3 U
Dissolved Silver	1.9								0.028 U	0.071 U	0.071 UJ	0.2 U	0.2 U	3 UJ
Total Thallium	0.062											0.2 U	0.2 U	0.2 U
Dissolved Thallium	0.062											0.2 U	0.2 U	0.2 U
Tributyltin	0.0074													

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Summary - Metals
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Location		MW-3S	MW-3S	MW-3S	MW-3S	MW-3S	MW-3D	MW-3D	MW-3D	MW-3D	MW-3D	MW-3D	MW-3D	MW-3D
Sample Date		27 Apr 2012	10 Mar 2014	25 Aug 2014	30 Mar 2015	02 Sep 2015	23 Mar 2009	28 Apr 2010	28 Oct 2010	27 Apr 2011	01 Dec 2011	27 Apr 2012	10 Mar 2014	28 Aug 2014
Sample ID		MW-3S-042712	MW-03S-031014	MW-3S-082514	MW-3S-033015	MW-3S-090215	MW-03D-032309	MW-03D-042810	MW-03D-102810	MW-3D-042711	MW-3D-120111	MW-3D-042712	MW-03D-031014	MW-3D-082814-P
Sample Type		N	N	N	N	N	N	N	N	N	N	N	N	N
Sample Method		low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow
Analyte	Screening Level													
Total Arsenic	8	387	522	517	455	521	55.0	31.1	34.8	35.6	34.8	27.7	32.6	28.2
Dissolved Arsenic	8	383	510	513	468	503	54.2	31.1	35.6	39.4	35.8	28.1	33.2	29.0
Arsenic (III)	NS						43.8							
Arsenic (Inorganic)	NS						49.7							
Total Chromium	100	0.5 U	5 U	5 U	5 U	1.2 U	3.7	3.7	4.4	3.1	5 U	3.9	5	5 U
Dissolved Chromium	100	0.5 U	5 U	5 U	5 U	1.2 U	3.5	3.3	4.1	3.4	4	3.9	6	5
Chromium, VI	48		10 U	10 UJ	10 U	3 U							10	10 UJ
Total Copper	3.1	0.9	2	2 U	2 U	0.9 U	0.59 j	0.20 U	0.25 j	0.7	2 U	0.9	2 U	2 U
Dissolved Copper	3.1	0.9	2 U	2 U	2 U	0.9 U	0.48 j	0.20 U	0.20 U	0.5 U	2 U	0.6	2 U	2 U
Total Zinc	81	4 U	10 U	10 U	10	1 U	9.4 j	5.0 U	1.3 U	4 U	10 U	4 U	10 U	10 U
Dissolved Zinc	81	4 U	10 U	10 U	10 U	1 U	3.1 j	5.0 U	1.3 U	4 U	10 U	4 U	10 U	10 U
Total Antimony	6	0.2 U												
Dissolved Antimony	6	0.2 U												
Total Beryllium	4	0.2 U												
Dissolved Beryllium	4	0.2 U												
Total Cadmium	1.2	0.1												
Dissolved Cadmium	1.2	0.1 U												
Total Lead	8.1	0.1 U												
Dissolved Lead	8.1	0.1 U												
Total Mercury	0.025	0.1 U												
Dissolved Mercury	0.025	0.1 U												
Total Nickel	8.2	0.5 J												
Dissolved Nickel	8.2	0.6												
Total Selenium	50	2 U												
Dissolved Selenium	50	2 U												
Total Silver	1.9	0.2 U					0.085 U	0.071 UJ	0.071 UJ	0.2 U	3 U	0.2 U		
Dissolved Silver	1.9	0.2 U					0.028 U	0.071 U	0.071 UJ	0.2 U	3 U	0.2 U		
Total Thallium	0.062	0.2 U												
Dissolved Thallium	0.062	0.2 U												
Tributyltin	0.0074													

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Groundwater Analytical Results
Summary - Metals
5900 West Marginal Way Site
Seattle, Washington

Location		MW-3D	MW-3D	MW-4S	MW-4S	MW-4S	MW-4S	MW-4S	MW-4S	MW-4S	MW-4S	MW-4S	MW-4S	MW-5S
Sample Date		30 Mar 2015	02 Sep 2015	25 Mar 2009	27 Apr 2010	25 Oct 2010	26 Apr 2011	28 Nov 2011	25 Apr 2012	03 Mar 2014	28 Aug 2014	01 Apr 2015	02 Sep 2015	25 Mar 2009
Sample ID		MW-3D-033015-P	MW-3D-090215-P	MW-04S-032509	MW-04S-042710	MW-04S-102510	MW-04S-042611	MW-04S-112811	MW-4S-042512	MW-4S-030314	MW-4S-082814	MW-4S-040115	MW-4S-090215	MW-05S-032509
Sample Type		N	N	N	N	N	N	N	N	N	N	N	N	N
Sample Method		low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow
Analyte	Screening Level													
Total Arsenic	8	39	22.2	30.9	47.7	59.0	56.5	44.7	46.4	43.5	22.0	47.0	28.6	4.80
Dissolved Arsenic	8	38	22.6	29.3	40.4	55.3	48.4	42.7 J	45.0	40.7	21.6	52.9	27.9	4.38
Arsenic (III)	NS													
Arsenic (Inorganic)	NS													
Total Chromium	100	6	1.2 U	0.46 j	0.44 j	0.24 UJ				5 U	5 U	5 U	1.2 U	
Dissolved Chromium	100	6	1.2 U	0.27 j	0.26 j	0.24 UJ				5 U	5 U	5 U	1.2 U	
Chromium, VI	48	10 U	3 U							10 U	10 UJ	10 U	3 U	
Total Copper	3.1	2 U	0.9 U	1.8 j	5.5	3.0				3	2 U	2	3	
Dissolved Copper	3.1	2 U	0.9 U	2 U	3.2	3.0				4	2 U	2 U	3	
Total Zinc	81	10 U	1 U	27.4 U	6.8	5.3				10 U	10 U	10 U	1 U	
Dissolved Zinc	81	10 U	1 U	16.9 U	6.3	9.3				10 U	10 U	10 U	10	
Total Antimony	6													
Dissolved Antimony	6													
Total Beryllium	4													
Dissolved Beryllium	4													
Total Cadmium	1.2													
Dissolved Cadmium	1.2													
Total Lead	8.1													
Dissolved Lead	8.1													
Total Mercury	0.025													
Dissolved Mercury	0.025													
Total Nickel	8.2													
Dissolved Nickel	8.2													
Total Selenium	50													
Dissolved Selenium	50													
Total Silver	1.9			0.085 U	0.071 UJ	0.50 U								
Dissolved Silver	1.9			0.028 U	0.071 U	0.50 U								
Total Thallium	0.062													
Dissolved Thallium	0.062													
Tributyltin	0.0074													

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Groundwater Analytical Results
Summary - Metals
5900 West Marginal Way Site
Seattle, Washington

Location		MW-5S	MW-5S	MW-5S	MW-5S	MW-5S	MW-5S	MW-5S	MW-5S	MW-5S	MW-5S	MW-5S	MW-5S	MW-5S	MW-5S	MW-5S	MW-5S	MW-6S	MW-6S	MW-6S	MW-6S	MW-6S	MW-6S	MW-6S	MW-6S
Sample Date		29 Apr 2010	27 Oct 2010	28 Apr 2011	01 Dec 2011	01 May 2012	03 Mar 2014	25 Aug 2014	30 Mar 2015	31 Aug 2015	25 Mar 2009	29 Apr 2010	27 Oct 2010	27 Apr 2011											
Sample ID		MW-05S-042910	MW-05S-102710	MW-5S-042811	MW-5S-120111	MW-5S-050112	MW-5S-030314	MW-5S-082514	MW-5S-033015	MW-5S-083115	MW-06S-032509	MW-06S-042910	MW-06S-102710	MW-6S-042711											
Sample Type		N	N	N	N	N	N	N	N	N	N	N	N	N											
Sample Method		low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow											
Analyte	Screening Level																								
Total Arsenic	8	4.4	6.0	5.2	7.2	8.7	3.0	8.0	5.2	2.8	11.6	24.9	23.6	13.4											
Dissolved Arsenic	8	6.1	5.5	4.4	7.4	8.1	3.0	8.2	5.2	2.9	9.51	16.4	24.0	12.9											
Arsenic (III)	NS																								
Arsenic (Inorganic)	NS																								
Total Chromium	100						5 U	5 U	5 U	1.75 j															
Dissolved Chromium	100						5 U	5 U	5 U	1.2 U															
Chromium, VI	48						10 U	10 UJ	10 U	3 U															
Total Copper	3.1						16	2 U	7	40															
Dissolved Copper	3.1						16	2 U	5	38															
Total Zinc	81						10	10 U	10	40															
Dissolved Zinc	81						10	10 U	10	50															
Total Antimony	6																								
Dissolved Antimony	6																								
Total Beryllium	4																								
Dissolved Beryllium	4																								
Total Cadmium	1.2																								
Dissolved Cadmium	1.2																								
Total Lead	8.1																								
Dissolved Lead	8.1																								
Total Mercury	0.025																								
Dissolved Mercury	0.025																								
Total Nickel	8.2																								
Dissolved Nickel	8.2																								
Total Selenium	50																								
Dissolved Selenium	50																								
Total Silver	1.9																								
Dissolved Silver	1.9																								
Total Thallium	0.062																								
Dissolved Thallium	0.062																								
Tributyltin	0.0074																								

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Groundwater Analytical Results
Summary - Metals
5900 West Marginal Way Site
Seattle, Washington

Location		MW-6S		MW-6S		MW-7S		MW-7S		MW-7S		MW-7S		MW-7S		MW-7S		MW-10S		MW-10S		MW-10S		MW-10S		MW-10S	
Sample Date		30 Nov 2011		26 Apr 2012		25 Mar 2009		27 Apr 2010		25 Oct 2010		26 Apr 2011		29 Nov 2011		27 Apr 2012		24 Mar 2009		28 Apr 2010		25 Oct 2010		26 Apr 2011		29 Nov 2011	
Sample ID		MW-6S-113011		MW-6S-042612		MW-07S-032509		MW-07S-042710		MW-07S-102510		MW-07S-042611		MW-7S-112911		MW-7S-042712		MW-10-032409		MW-10-042810		MW-10-102610		MW-10-042611		MW-10-112911	
Sample Type		N		N		N		N		N		N		N		N		N		N		N		N		N	
Sample Method		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow	
Analyte	Screening Level																										
Total Arsenic	8	29.0		13.7		55.2		36.3		19.7		25.4		22.6		24.4		24.1		9.3		12.6		14.3		23.8	
Dissolved Arsenic	8	27.9		11.8		54.9		35.1		17.2		25.2		22.0		23		23.8		9.1		12.6		14.7		22.4	
Arsenic (III)	NS																	29.2									
Arsenic (Inorganic)	NS																	29.7									
Total Chromium	100					0.76 j		0.56		0.24 UJ								1.3		0.38 j		0.48 j					
Dissolved Chromium	100					0.46 j		0.41 j		0.24 UJ								0.8 j		0.57		0.24 UJ					
Chromium, VI	48																										
Total Copper	3.1					0.52 U		0.56		0.71								2		0.97		2.3					
Dissolved Copper	3.1					0.079 U		0.71		0.20 U								0.079 U		0.44 j		1.4					
Total Zinc	81					12.3 U		5.0		3.9 j								21.5		5.0 U		2.3 j					
Dissolved Zinc	81					10 U		2.6 j		4.5 j								10 U		2.8 j		2.2 j					
Total Antimony	6																										
Dissolved Antimony	6																										
Total Beryllium	4																										
Dissolved Beryllium	4																										
Total Cadmium	1.2																										
Dissolved Cadmium	1.2																										
Total Lead	8.1																										
Dissolved Lead	8.1																										
Total Mercury	0.025																										
Dissolved Mercury	0.025																										
Total Nickel	8.2																										
Dissolved Nickel	8.2																										
Total Selenium	50																										
Dissolved Selenium	50																										
Total Silver	1.9					0.085 U		0.071 U		0.50 U								0.22 j		0.071 UJ		0.071 U					
Dissolved Silver	1.9					0.028 U		0.071 UJ		0.50 U								0.028 U		0.071 U		0.17 j					
Total Thallium	0.062																										
Dissolved Thallium	0.062																										
Tributyltin	0.0074																										

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Groundwater Analytical Results
Summary - Metals
5900 West Marginal Way Site
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Location		MW-10S	MW-11S	MW-11S	MW-11S	MW-11S	MW-11S	MW-11S	MW-11S	MW-12S	MW-12S	MW-12S	MW-12S	MW-12S	MW-12S
Sample Date		27 Apr 2012	25 Mar 2009	30 Apr 2010	28 Oct 2010	28 Apr 2011	01 Dec 2011	01 May 2012	01 May 2012	25 Mar 2009	30 Apr 2010	28 Oct 2010	28 Apr 2011	01 Dec 2011	01 May 2012
Sample ID		MW-10-042712	MW-11-032509	MW-11-043010	MW-11-102810	MW-11-042811	MW-11-120111	MW-11-050112	MW-11-050112	MW-12-032509	MW-12-043010	MW-12-102810	MW-12-042811	MW-12-120111	MW-12-050112
Sample Type		N	N	N	N	N	N	N	N	N	N	N	N	N	N
Sample Method		low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow
Analyte	Screening Level														
Total Arsenic	8	10.0	753	73.2	77.4	22.0	97.6	467	467	138	216	268	172	123	159
Dissolved Arsenic	8	10.1	711	63.8	74.4	17.0	97.7	471	471	121	172	256	156	116	149
Arsenic (III)	NS														
Arsenic (Inorganic)	NS														
Total Chromium	100														
Dissolved Chromium	100														
Chromium, VI	48														
Total Copper	3.1														
Dissolved Copper	3.1														
Total Zinc	81														
Dissolved Zinc	81														
Total Antimony	6														
Dissolved Antimony	6														
Total Beryllium	4														
Dissolved Beryllium	4														
Total Cadmium	1.2														
Dissolved Cadmium	1.2														
Total Lead	8.1														
Dissolved Lead	8.1														
Total Mercury	0.025														
Dissolved Mercury	0.025														
Total Nickel	8.2														
Dissolved Nickel	8.2														
Total Selenium	50														
Dissolved Selenium	50														
Total Silver	1.9														
Dissolved Silver	1.9														
Total Thallium	0.062														
Dissolved Thallium	0.062														
Tributyltin	0.0074														

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Summary - Metals
5900 West Marginal Way Site
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Location		MW-12S		MW-12S		MW-12S		MW-12S		MW-13S		MW-13S		MW-13S		MW-13S		MW-13S		MW-13S		MW-14S		MW-14S		MW-14S	
Sample Date		03 Mar 2014		25 Aug 2014		30 Mar 2015		31 Aug 2015		24 Mar 2009		28 Apr 2010		25 Oct 2010		26 Apr 2011		29 Nov 2011		30 Apr 2012		25 Mar 2009		25 Mar 2009		29 Apr 2010	
Sample ID		MW-12S-030314		MW-12S-082514		MW-12S-033015		MW-12S-083115		MW-13-032409		MW-13-042810		MW-13-102610		MW-13-042611		MW-13-112911		MW-13-043012		MW-14-032509		DUP032509		DUP-042910	
Sample Type		N		N		N		N		N		N		N		N		N		N		N		FD		FD	
Sample Method		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow	
Analyte	Screening Level																										
Total Arsenic	8									1130		197		312		580		1010		1130		2630		2570		3640	
Dissolved Arsenic	8									1130		218		415		580		963		1150		2600		2500		1300	J1
Arsenic (III)	NS									851												2420		2720			
Arsenic (Inorganic)	NS									999												2590		2930			
Total Chromium	100									3.7		2.9		3.6													
Dissolved Chromium	100									3.8		2.8		0.24	UJ												
Chromium, VI	48	10	U	10	UJ	10	U	3	U																		
Total Copper	3.1									114		48.7		12.3													
Dissolved Copper	3.1									61.7		11.1		2.9													
Total Zinc	81									132		110		18.6													
Dissolved Zinc	81									104		113		15.8													
Total Antimony	6																										
Dissolved Antimony	6																										
Total Beryllium	4																										
Dissolved Beryllium	4																										
Total Cadmium	1.2																										
Dissolved Cadmium	1.2																										
Total Lead	8.1																										
Dissolved Lead	8.1																										
Total Mercury	0.025																										
Dissolved Mercury	0.025																										
Total Nickel	8.2																										
Dissolved Nickel	8.2																										
Total Selenium	50																										
Dissolved Selenium	50																										
Total Silver	1.9									0.24	j	0.39	J	0.071	U												
Dissolved Silver	1.9									0.028	U	0.071	U	0.071	U												
Total Thallium	0.062																										
Dissolved Thallium	0.062																										
Tributyltin	0.0074																										

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Groundwater Analytical Results
Summary - Metals
5900 West Marginal Way Site
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Location		MW-14S	MW-14S	MW-14S	MW-14S	MW-14S	MW-14S	MW-14S	MW-14S	MW-14S	MW-14S	MW-14S	MW-14S	MW-14S	MW-14S	MW-14S	MW-14S	MW-14S	MW-14S	MW-14S	MW-14S	MW-14S	MW-14S	MW-14S	MW-14S
Sample Date		29 Apr 2010	27 Oct 2010	27 Oct 2010	27 Apr 2011	27 Apr 2011	14 Jul 2011	14 Jul 2011	02 Dec 2011	02 Dec 2011	30 Apr 2012	07 Mar 2014	07 Mar 2014	29 Aug 2014											
Sample ID		MW-14-042910	MW-14-102710	DUP-102710-B	MW-14-042711	DUP042711-2	MW-14-071411	MW-14-071411R	MW-14-120211	DUP-120211-1	MW-14-043012	MW-14S-030714	DUP-030714-1	MW-14S-082914											
Sample Type		N	N	FD	N	FD	N	N	N	FD	N	N	FD	N											
Sample Method		low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow											
Analyte	Screening Level																								
Total Arsenic	8	3290	824	912	4140	4300	116	120	933	858	6130	949	1020	84.8											
Dissolved Arsenic	8	2700	870	1010	3790	4490	116	119	935	892	5810	1220	1420	81.4											
Arsenic (III)	NS																								
Arsenic (Inorganic)	NS																								
Total Chromium	100								1 U		0.7	5 U	5 U	5 U											
Dissolved Chromium	100								1 U		0.7	5 U	5 U	5 U											
Chromium, VI	48											10 U	10 U	R											
Total Copper	3.1								9		24.2	14	15	6											
Dissolved Copper	3.1								2 U		2.3	2 U	2 U	2 U											
Total Zinc	81								10 U		35	10	20	10 U											
Dissolved Zinc	81								10 U		35	10 U	10	10 U											
Total Antimony	6																								
Dissolved Antimony	6																								
Total Beryllium	4																								
Dissolved Beryllium	4																								
Total Cadmium	1.2																								
Dissolved Cadmium	1.2																								
Total Lead	8.1																								
Dissolved Lead	8.1																								
Total Mercury	0.025																								
Dissolved Mercury	0.025																								
Total Nickel	8.2																								
Dissolved Nickel	8.2																								
Total Selenium	50																								
Dissolved Selenium	50																								
Total Silver	1.9								3 U		0.2 U														
Dissolved Silver	1.9								3 U		0.2 U														
Total Thallium	0.062																								
Dissolved Thallium	0.062																								
Tributyltin	0.0074																								

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Groundwater Analytical Results
Summary - Metals
5900 West Marginal Way Site
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Location		MW-14S	MW-14S	MW-14S	MW-14S	MW-14S	MW-14D	MW-14D	MW-14D	MW-14D	MW-14D	MW-14D	MW-16S	MW-16S
Sample Date		29 Aug 2014	03 Apr 2015	03 Apr 2015	03 Sep 2015	03 Sep 2015	02 Dec 2011	30 Apr 2012	07 Mar 2014	29 Aug 2014	03 Apr 2015	03 Sep 2015	26 Mar 2009	29 Apr 2010
Sample ID		DUP-082914-01	MW-14S-040315	DUP-040315-01	MW-14S-090315	DUP-090315-04	MW-14D-120211	MW-14D-043012	MW-14D-030714	MW-14D-082914	MW-14D-040315	MW-14D-090315	MW-16-032609	MW-16-042910
Sample Type		FD	N	FD	N	FD	N	N	N	N	N	N	N	N
Sample Method		low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow
Analyte	Screening Level													
Total Arsenic	8	79.6	10200	10100	293	263	427	361	296	288	311	306	3.91	5.2
Dissolved Arsenic	8	79.6	9950	9200	280	238	390	361	301	295	301	288	1.68	3.9
Arsenic (III)	NS													
Arsenic (Inorganic)	NS													
Total Chromium	100	5 U	5 U	5 U	0.47 U	0.47 U	13	11.5	12	12	11	14		
Dissolved Chromium	100	5 U	5 U	5 U	0.47 U	0.47 U	9	9.4	11	8	8	11		
Chromium, VI	48	R	10 U	10 U	3 U	3 U								
Total Copper	3.1	5	12	11	4	4	4 J	3.1	3	3	3	3		
Dissolved Copper	3.1	2 U	2	2	0.2 U	0.2 U	2 U	1.1	2 U	2 U	2 U	0.2 U		
Total Zinc	81	10 U	10 U	10 U	2 U	2 U	10 U	4 U	10 U	10 U	10 U	2 U		
Dissolved Zinc	81	10 U	10 U	10 U	2 U	2 U	10 U	4 U	10 U	10 U	10 U	2 U		
Total Antimony	6													
Dissolved Antimony	6													
Total Beryllium	4													
Dissolved Beryllium	4													
Total Cadmium	1.2													
Dissolved Cadmium	1.2													
Total Lead	8.1													
Dissolved Lead	8.1													
Total Mercury	0.025													
Dissolved Mercury	0.025													
Total Nickel	8.2													
Dissolved Nickel	8.2													
Total Selenium	50													
Dissolved Selenium	50													
Total Silver	1.9						3 U	0.2 UJ						
Dissolved Silver	1.9						3 U	0.2 UJ						
Total Thallium	0.062													
Dissolved Thallium	0.062													
Tributyltin	0.0074													

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Location		MW-16S	MW-16S	MW-16S	MW-16S	MW-17S	MW-17S	MW-17S	MW-17S	MW-17S	MW-17S	MW-17S	MW-17S	MW-17S
Sample Date		27 Oct 2010	28 Apr 2011	06 Dec 2011	30 Apr 2012	23 Mar 2009	27 Apr 2010	25 Oct 2010	25 Apr 2011	28 Nov 2011	25 Apr 2012	04 Mar 2014	04 Mar 2014	26 Aug 2014
Sample ID		MW-16-102710	MW-16-042811	MW-16-120611	MW-16-043012	MW-17-032309	MW-17-042710	MW-17-102510	MW-17-042511	MW-17-112811	MW-17-042512	DUP-030414-1	MW-17S-030414P	MW-17S-082614-P
Sample Type		N	N	N	N	N	N	N	N	N	N	FD	N	N
Sample Method		low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow
Analyte	Screening Level													
Total Arsenic	8	5.9	5.3	13.3	22.6	205	92.1	103	96.2	49.8	121	62	70	99.3
Dissolved Arsenic	8	3.7	2.7	11.7	16.9	197	79.1	94.8	109	47.5 J	115	61	64	96.0 J
Arsenic (III)	NS					181								
Arsenic (Inorganic)	NS					147								
Total Chromium	100					1 U	0.31 j	0.24 UJ				5 U	5 U	5 U
Dissolved Chromium	100					1 U	0.24 U	0.24 UJ				5 U	5 U	5 U
Chromium, VI	48													
Total Copper	3.1					0.52 U	0.20 U	0.20 U				2 U	2 U	2 U
Dissolved Copper	3.1					0.079 U	0.20 U	0.20 U				2 U	2 U	2 U
Total Zinc	81					10 U	2.7 j	1.3 U				10 U	10 U	10 U
Dissolved Zinc	81					10 U	1.8 j	6.4				10 U	10 U	10 U
Total Antimony	6													
Dissolved Antimony	6													
Total Beryllium	4													
Dissolved Beryllium	4													
Total Cadmium	1.2													
Dissolved Cadmium	1.2													
Total Lead	8.1													
Dissolved Lead	8.1													
Total Mercury	0.025													
Dissolved Mercury	0.025													
Total Nickel	8.2													
Dissolved Nickel	8.2													
Total Selenium	50													
Dissolved Selenium	50													
Total Silver	1.9					0.085 U	0.071 UJ	0.50 U						
Dissolved Silver	1.9					0.028 U	0.071 U	1.0						
Total Thallium	0.062													
Dissolved Thallium	0.062													
Tributyltin	0.0074													

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Summary - Metals
5900 West Marginal Way Site
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Location		MW-17S	MW-17S	MW-18S	MW-18S	MW-18S	MW-18S	MW-18S	MW-18S	MW-18S	MW-18S	MW-19S	MW-19S	MW-19S	MW-19S
Sample Date		31 Mar 2015	01 Sep 2015	26 Mar 2009	29 Apr 2010	27 Oct 2010	27 Apr 2011	30 Nov 2011	30 Nov 2011	30 Nov 2011	26 Apr 2012	26 Mar 2009	30 Apr 2010	28 Oct 2010	28 Apr 2011
Sample ID		MW-17S-033115-P	MW-17S-090115-P	MW-18-032609	MW-18-042910	MW-18-102710	MW-18-042711	MW-18-113011	DUP-113011-2	MW-18-042612	MW-19-032609	MW-19-043010	MW-19-102810	MW-19-042811	
Sample Type		N	N	N	N	N	N	N	FD	N	N	N	N	N	
Sample Method		low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	
Analyte	Screening Level														
Total Arsenic	8	366	159	4.11	10.3	8.4	11.4	3.6		6.2	349	327	384	260	
Dissolved Arsenic	8	344	156	3.70	9.5	8.0	13.1	4.0		5.9	320	290	384	259	
Arsenic (III)	NS										312				
Arsenic (Inorganic)	NS										347				
Total Chromium	100	5 U	1.2 U				0.9	0.5 U	0.5	0.6					
Dissolved Chromium	100	5 U	1.2 U				0.8	0.5 U	0.5 U	0.5 U					
Chromium, VI	48														
Total Copper	3.1	2 U	0.9 U				1.7	2 U	2 U	1.9					
Dissolved Copper	3.1	2 U	0.9 U				1.0	2 U	2 U	1.7					
Total Zinc	81	10 U	1 U				4 U	10 U	10 U	4 U					
Dissolved Zinc	81	10 U	1 U				4 U	10 U	10 U	4 U					
Total Antimony	6						0.2 U	50 U	50 U	0.2					
Dissolved Antimony	6						0.2 U	50 U	50 U	0.3					
Total Beryllium	4						0.2 U	0.2 U	0.2 U	0.2 U					
Dissolved Beryllium	4						0.2 U	0.2 U	0.2 U	0.2 U					
Total Cadmium	1.2						0.1 U	0.1 U	0.1 U	0.1 U					
Dissolved Cadmium	1.2						0.1 U	0.1 U	0.1 U	0.1 U					
Total Lead	8.1						0.1 U	0.1 U	0.1 U	0.1 U					
Dissolved Lead	8.1						0.1 U	0.1 U	0.1 U	0.1 U					
Total Mercury	0.025						0.1 U	0.1 U	0.1 U	0.1 U					
Dissolved Mercury	0.025						0.1 U	0.1 U	0.1 U	0.1 U					
Total Nickel	8.2						1.2	0.7	0.7	9.2 J					
Dissolved Nickel	8.2						2.7 J	0.6	0.5 U	0.5 U					
Total Selenium	50						0.5 U	0.5 U	0.5 U	0.5 U					
Dissolved Selenium	50						0.5 U	0.5 U	0.5 U	0.5 U					
Total Silver	1.9						0.2 U	3 U	3 U	0.2 U					
Dissolved Silver	1.9						0.2 U	3 UJ	3 U	0.2 U					
Total Thallium	0.062						0.2 U	0.2 U	0.2 U	0.2 U					
Dissolved Thallium	0.062						0.2 U	0.2 U	0.2 U	0.2 U					
Tributyltin	0.0074														

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Summary - Metals
5900 West Marginal Way Site
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Location		MW-19S	MW-19S	MW-19S	MW-19S	MW-19S	MW-19S	MW-20S	MW-20S	MW-20S	MW-20S	MW-20S	MW-20S	MW-20S
Sample Date		01 Dec 2011	01 May 2012	05 Mar 2014	25 Aug 2014	30 Mar 2015	31 Aug 2015	26 Mar 2009	28 Apr 2010	25 Oct 2010	27 Apr 2011	30 Nov 2011	26 Apr 2012	26 Apr 2012
Sample ID		MW-19-120111	MW-19-050112	MW-19S-030514	MW-19S-082514	MW-19S-033015	MW-19S-083115	MW-20-032609	MW-20-042810	MW-20-102510	MW-20-042711	MW-20-113011	DUP-042612-2	MW-20-042612
Sample Type		N	N	N	N	N	N	N	N	N	N	N	FD	N
Sample Method		low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow
Analyte	Screening Level													
Total Arsenic	8	402	246	240	672	260	2370	1490	2000	1340	1080	2770	1020	957
Dissolved Arsenic	8	420	249	242	635	257	2410	1430	1760	1350	1080	2600	896	869
Arsenic (III)	NS													
Arsenic (Inorganic)	NS													
Total Chromium	100			5 U	5 U	5 U	1.2 U				0.5 U	0.5 U		0.5 U
Dissolved Chromium	100			5 U	5 U	5 U	1.2 U				1 U	0.5 U		0.5 U
Chromium, VI	48													
Total Copper	3.1			2 U	2 U	2 U	0.9 U				1.3	3		0.8
Dissolved Copper	3.1			2 U	2 U	2 U	0.9 U				0.8	2 U		0.5
Total Zinc	81			80	50	50	30				4 U	10 U		6
Dissolved Zinc	81			30	50	40	30				4 U	10 U		5
Total Antimony	6										0.2 U	50 U		0.2 U
Dissolved Antimony	6										0.2 U	50 U		0.2 U
Total Beryllium	4										0.2 U	0.2 U		0.2 U
Dissolved Beryllium	4										0.2 U	0.2 U		0.2 U
Total Cadmium	1.2										0.1 U	0.2		0.1 U
Dissolved Cadmium	1.2										0.1 U	0.1 U		0.1 U
Total Lead	8.1										0.1 U	0.1 U		0.1 U
Dissolved Lead	8.1										0.1 U	0.1 U		0.1 U
Total Mercury	0.025										0.1 U	0.1 U		0.1 U
Dissolved Mercury	0.025										0.1 U	0.1 U		0.1 U
Total Nickel	8.2										0.9	1.5		2.9
Dissolved Nickel	8.2										1.4	0.5		1.2
Total Selenium	50										0.5 U	0.5 U		0.5 U
Dissolved Selenium	50										0.5 U	0.5 U		0.5 U
Total Silver	1.9										0.2 U	3 U		0.2 U
Dissolved Silver	1.9										0.2 U	3 UJ		0.2 U
Total Thallium	0.062										0.2 U	0.2 U		0.2 U
Dissolved Thallium	0.062										0.2 U	0.2 U		0.2 U
Tributyltin	0.0074													

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Summary - Metals
5900 West Marginal Way Site
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Location		MW-20S		MW-20S		MW-20S		MW-20S		MW-20D		MW-20D		MW-20D		MW-20D		MW-21S		MW-21S		MW-21S		MW-21S		MW-21S	
Sample Date		12 Mar 2014		28 Aug 2014		02 Apr 2015		01 Sep 2015		12 Mar 2014		28 Aug 2014		02 Apr 2015		01 Sep 2015		24 Mar 2009		24 Mar 2009		28 Apr 2010		28 Apr 2010		26 Oct 2010	
Sample ID		MW-20S-031214		MW-20S-082814		MW-20S-040215		MW-20S-090115		MW-20D-031214		MW-20D-082814		MW-20D-040215		MW-20D-090115		DUP032409		MW-21-032409		DUP-042810		MW-21-042810		DUP-102610	
Sample Type		N		N		N		N		N		N		N		N		FD		N		FD		N		FD	
Sample Method		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow	
Analyte	Screening Level																										
Total Arsenic	8	82.5		3020		2680		2390		1.0		1.0		1.1		0.8		3090		3080		3280		3280		2530	
Dissolved Arsenic	8	87.5		3080		2490		2480		0.9		1.0		1.1		0.7		2870		2770		3380		3370		2310	
Arsenic (III)	NS																										
Arsenic (Inorganic)	NS																										
Total Chromium	100	5 U		5 U		5 U		1.2 U		5 U		5 U		5 U		1.2 U											
Dissolved Chromium	100	5 U		5 U		5 U		1.2 U		5 U		5 U		5 U		1.2 U											
Chromium, VI	48																										
Total Copper	3.1	8		2 U		2 U		1.1 j		2 U		2 U		2 U		0.9 U											
Dissolved Copper	3.1	6		2 U		2 U		0.9 U		2 U		2 U		2 U		0.9 U											
Total Zinc	81	20		10 U		10 U		2 j		10 U		10 U		10 U		1 U											
Dissolved Zinc	81	10		10 U		10 U		3 j		10 U		10 U		10 U		1 U											
Total Antimony	6																										
Dissolved Antimony	6																										
Total Beryllium	4																										
Dissolved Beryllium	4																										
Total Cadmium	1.2																										
Dissolved Cadmium	1.2																										
Total Lead	8.1																										
Dissolved Lead	8.1																										
Total Mercury	0.025																										
Dissolved Mercury	0.025																										
Total Nickel	8.2																										
Dissolved Nickel	8.2																										
Total Selenium	50																										
Dissolved Selenium	50																										
Total Silver	1.9																										
Dissolved Silver	1.9																										
Total Thallium	0.062																										
Dissolved Thallium	0.062																										
Tributyltin	0.0074																										

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Summary - Metals
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Location		MW-21S	MW-21S	MW-21S	MW-21S	MW-21S	MW-21S	MW-21S	MW-21S	MW-21S	MW-21S	MW-21S	MW-21S	MW-21S	MW-21S	MW-21S	MW-21S	MW-21S	MW-21S	MW-21S	MW-22S	MW-22S
Sample Date		26 Oct 2010	27 Apr 2011	27 Apr 2011	30 Nov 2011	30 Nov 2011	26 Apr 2012	26 Apr 2012	05 Mar 2014	26 Aug 2014	30 Mar 2015	01 Sep 2015	24 Mar 2009	28 Apr 2010								
Sample ID		MW-21-102610	DUP042711-1	MW-21-042711	DUP-113011-1	MW-21-113011	DUP-042612-1	MW-21-042612	MW-21S-030514	MW-21S-082614	MW-21S-033015	MW-21S-090115	MW-22-032409	MW-22-042810								
Sample Type		N	FD	N	FD	N	FD	N	N	N	N	N	N	N								
Sample Method		low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow								
Analyte	Screening Level																					
Total Arsenic	8	2350	3320	3310	1820	1870	1820	1930	755	3920	1440	2130	9.31	10.6								
Dissolved Arsenic	8	2300	3250	3540	1800	1850	1850	1920	708	3660	J	1450	2090	10.6								
Arsenic (III)	NS																					
Arsenic (Inorganic)	NS																					
Total Chromium	100								5 U	5 U	5 U	1.2 U		0.28 j								
Dissolved Chromium	100								5 U	5 U	5 U	1.2 U		0.24 U								
Chromium, VI	48																					
Total Copper	3.1								2 U	2 U	2 U	1.4 j		0.29 j								
Dissolved Copper	3.1								2 U	2 U	2 U	0.9 U		0.20 U								
Total Zinc	81								10 U	10 U	10	1 U		5.0 U								
Dissolved Zinc	81								10 U	10 U	10 U	1 U		2.2 j								
Total Antimony	6																					
Dissolved Antimony	6																					
Total Beryllium	4																					
Dissolved Beryllium	4																					
Total Cadmium	1.2																					
Dissolved Cadmium	1.2																					
Total Lead	8.1																					
Dissolved Lead	8.1																					
Total Mercury	0.025																					
Dissolved Mercury	0.025																					
Total Nickel	8.2																					
Dissolved Nickel	8.2																					
Total Selenium	50																					
Dissolved Selenium	50																					
Total Silver	1.9													0.071 UJ								
Dissolved Silver	1.9													0.071 U								
Total Thallium	0.062																					
Dissolved Thallium	0.062																					
Tributyltin	0.0074																					

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Summary - Metals
5900 West Marginal Way Site
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Location		MW-22S	MW-22S	MW-22S	MW-22S	MW-23S	MW-23S	MW-23S	MW-23S	MW-23S	MW-23S	MW-24S	MW-24S	MW-24S
Sample Date		25 Oct 2010	26 Apr 2011	28 Nov 2011	25 Apr 2012	24 Mar 2009	28 Apr 2010	26 Oct 2010	27 Apr 2011	28 Nov 2011	25 Apr 2012	25 Mar 2009	28 Apr 2010	25 Oct 2010
Sample ID		MW-22-102610	MW-22-042611	MW-22-112811	MW-22-042512	MW-23-032409	MW-23-042810	MW-23-102610	MW-23-042711	MW-23-112811	MW-23-042512	MW-24-032509	MW-24-042810	MW-24-102610
Sample Type		N	N	N	N	N	N	N	N	N	N	N	N	N
Sample Method		low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow
Analyte	Screening Level													
Total Arsenic	8	10.4	164	7.9	68.3	2.95	3.5	2.9	4.7	2.7	4.7	0.595	0.36 j	0.15 j
Dissolved Arsenic	8	10.0	127	7.9 J	61.6	2.54	3.2	2.7	4.8	2.9	4.6	0.501	0.32 j	0.12 j
Arsenic (III)	NS													
Arsenic (Inorganic)	NS													
Total Chromium	100						0.4 j							
Dissolved Chromium	100						0.27 j							
Chromium, VI	48													
Total Copper	3.1						0.28 j							
Dissolved Copper	3.1						0.20 U							
Total Zinc	81						5.0 U							
Dissolved Zinc	81						2.3 j							
Total Antimony	6													
Dissolved Antimony	6													
Total Beryllium	4													
Dissolved Beryllium	4													
Total Cadmium	1.2													
Dissolved Cadmium	1.2													
Total Lead	8.1													
Dissolved Lead	8.1													
Total Mercury	0.025													
Dissolved Mercury	0.025													
Total Nickel	8.2													
Dissolved Nickel	8.2													
Total Selenium	50													
Dissolved Selenium	50													
Total Silver	1.9						0.071 UJ							
Dissolved Silver	1.9						0.071 U							
Total Thallium	0.062													
Dissolved Thallium	0.062													
Tributyltin	0.0074													

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Summary - Metals
5900 West Marginal Way Site
Seattle, Washington

Location		MW-24S	MW-24S	MW-24S	MW-26S	MW-26S	MW-26S	MW-26S	MW-26S	MW-26S	MW-26S	MW-26S	MW-26S	
Sample Date		27 Apr 2011	30 Nov 2011	25 Apr 2012	26 Mar 2009	29 Apr 2010	27 Oct 2010	28 Apr 2011	01 Dec 2011	30 Apr 2012	11 Mar 2014	25 Aug 2014	01 Apr 2015	02 Sep 2015
Sample ID		MW-24-042711	MW-24-113011	MW-24-042512	MW-26-032609	MW-26-042910	MW-26-102710	MW-26-042811	MW-26-120111	MW-26-043012	MW-26S-031114	MW-26S-082514-P	MW-26S-040115-P	MW-26S-090215-P
Sample Type		N	N	N	N	N	N	N	N	N	N	N	N	N
Sample Method		low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow
Analyte	Screening Level													
Total Arsenic	8	0.7	0.2 U	0.4	1070	1400	356	984	432	780	170	366	292	214
Dissolved Arsenic	8	0.7	0.2	0.3 J	957	1270	351	1060	448	770	188	391	310	257
Arsenic (III)	NS				966									
Arsenic (Inorganic)	NS				971									
Total Chromium	100	0.5 U	1 U	0.5 U				0.8	1 U	1.1	5 U	5 U	5 U	1.2 U
Dissolved Chromium	100	0.5 U	0.5 U	0.5 U				0.9	2 U	1.0	5 U	5 U	5 U	1.2 U
Chromium, VI	48										R	10 UJ	16	3 U
Total Copper	3.1	0.6	2 U	0.5 U				0.9	4	2.1	6	3	2	3
Dissolved Copper	3.1	0.6	2 U	0.8				0.5 U	2 U	0.9	2 U	2 U	2 U	0.9 U
Total Zinc	81	4 U	10 U	4 U				4 U	10 U	4 U	10	10 U	10 U	1 U
Dissolved Zinc	81	4 U	10 U	4 U				4 U	10 U	4 U	10 U	10 U	10 U	1 U
Total Antimony	6	0.2 U	50 U	0.2 U				0.2 U	50 U	0.2 U				
Dissolved Antimony	6	0.2 U	50 U	0.2 U				0.2 U	50 U	0.2 U				
Total Beryllium	4	0.2 U	0.2 U	0.2 U				0.2 U	0.2 U	0.2 U				
Dissolved Beryllium	4	0.2 U	0.2 U	0.2 U				0.2 U	0.2 U	0.2 U				
Total Cadmium	1.2	0.1 U	0.1 U	0.1 U				0.1 U	0.1 U	0.2				
Dissolved Cadmium	1.2	0.1 U	0.1 U	0.1 U				0.1 U	0.1 U	0.1 U				
Total Lead	8.1	0.1 U	0.1 U	0.1 U				0.1 U	0.1 U	0.1				
Dissolved Lead	8.1	0.1 U	0.1 U	0.1 U				0.1 U	0.1 U	0.1 U				
Total Mercury	0.025	0.1 U	0.1 U	0.1 U				0.1 U	0.1 U	0.1 U				
Dissolved Mercury	0.025	0.1 U	0.1 U	0.1 U				0.1 U	0.1 U	0.1 U				
Total Nickel	8.2	0.8	1.1	1.1 J				0.6	1.9	0.9				
Dissolved Nickel	8.2	0.5 U	0.7	0.7				0.8	1.8	0.9				
Total Selenium	50	0.5 U	0.5 U	0.5 U				0.5 U	0.5 U	0.5 U				
Dissolved Selenium	50	0.5 U	0.5 U	0.5 U				0.5 U	0.5 U	0.5 U				
Total Silver	1.9	0.2 U	3 U	0.2 U				0.2 U	3 U	0.2 UJ				
Dissolved Silver	1.9	0.2 U	3 UJ	0.2 U				0.2 U	3 UJ	0.2 UJ				
Total Thallium	0.062	0.2 U	0.2 U	0.2 U				0.2 U	0.2 U	0.2 U				
Dissolved Thallium	0.062	0.2 U	0.2 U	0.2 U				0.2 U	0.2 U	0.2 U				
Tributyltin	0.0074													

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Location		MW-27S		MW-27S		MW-27S		MW-27S		MW-27S		MW-27S		MW-28S		MW-28S		MW-29S		MW-29S		MW-29S		MW-30S		MW-30S	
Sample Date		26 Mar 2009		29 Apr 2010		27 Oct 2010		28 Apr 2011		01 Dec 2011		30 Apr 2012		02 Dec 2011		01 May 2012		02 Dec 2011		02 Dec 2011		02 May 2012		05 Dec 2011		05 Dec 2011	
Sample ID		MW-27-032609		MW-27-042910		MW-27-102710		MW-27-042811		MW-27-120111		MW-27-043012		MW-28S-120211		MW-28S-050112		DUP-120211-3		MW-29S-120211		MW-29S-050212		DUP-120511-1		MW-30S-120511	
Sample Type		N		N		N		N		N		N		N		N		FD		N		N		FD		N	
Sample Method		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow	
Analyte	Screening Level																										
Total Arsenic	8	25.3		35.8		20.3		15.2		13		9.1		11.2		14.0		2.6		2.5		3.4				8.5	
Dissolved Arsenic	8	22.6		28.6		19.4		14.9		13		9.3		11.9		13.8		2.5		2.4		3.5				9.2	
Arsenic (III)	NS	19.5																									
Arsenic (Inorganic)	NS	24.5																									
Total Chromium	100							0.5 U		1 U		0.7		1 U		0.5 U				1 U		0.5 U				1 U	
Dissolved Chromium	100							0.5 U		1 U		0.5 U		0.5 U		0.5 U				1 U		0.5 U				1 U	
Chromium, VI	48																										
Total Copper	3.1							0.6		3		1.0		2 U		0.8				2 U		0.5				2 U	
Dissolved Copper	3.1							0.5		2 U		0.6		2 U		0.8				3		1.9				2 U	
Total Zinc	81							4 U		10 U		4 U		10 U		4 U				10 U		4 U				10 U	
Dissolved Zinc	81							4 U		10 U		4 U		10 U		4 U				10 U		4 U				10 U	
Total Antimony	6							0.2 U		50 U		0.2 U		50 U		0.2 U				50 U		0.3				50 U	
Dissolved Antimony	6							0.2 U		50 U		0.2 U		50 U		0.2 U				50 U		0.3				50 U	
Total Beryllium	4							0.2 U		0.5 U		0.2 U		0.2 U		0.2 U				0.2 U		0.2 U				0.2 U	
Dissolved Beryllium	4							0.2 U		0.5 U		0.2 U		0.2 U		0.2 U				0.2 U		0.2 U				0.2 U	
Total Cadmium	1.2							0.1 U		0.2 U		0.1 U		0.1 U		0.1 U				0.1 U		0.1 U				0.1 U	
Dissolved Cadmium	1.2							0.1 U		0.2 U		0.1 U		0.1 U		0.1 U				0.1 U		0.1 U				0.1 U	
Total Lead	8.1							0.1 U		0.2 U		0.1 U		0.1 U		0.1 U				0.1 U		0.1 U				0.1 U	
Dissolved Lead	8.1							0.1 U		0.2 U		0.1 U		0.1 U		0.1 U				0.1 U		0.1 U				0.1 U	
Total Mercury	0.025							0.1 U		0.1 U		0.1 U		0.1 U		0.1 U				0.1 U		0.1 U				0.1 U	
Dissolved Mercury	0.025							0.1 U		0.1 U		0.1 U		0.1 U		0.1 U				0.1 U		0.1 U				0.1 U	
Total Nickel	8.2							2.0		8		2.8		1.8		4.0				0.7		0.8				0.9	
Dissolved Nickel	8.2							2.6		8		2.2		1.9		0.9				0.7		0.6				1.1	
Total Selenium	50							0.5 U		6		0.5 U		0.5 U		0.5 U				0.5 U		0.5 U				0.5 U	
Dissolved Selenium	50							0.5 U		7		0.5 U		0.5 U		0.5 U				0.5 U		0.5 U				0.5 U	
Total Silver	1.9							0.2 U		3 U		0.2 UJ		3 U		0.2 U				3 U		0.2 U				3 U	
Dissolved Silver	1.9							0.2 U		3 UJ		0.2 UJ		3 U		0.2 U				3 U		0.2 U				3 U	
Total Thallium	0.062							0.2 U		0.5 U		0.2 U		0.2 U		0.2 U				0.2 U		0.2 U				0.2 U	
Dissolved Thallium	0.062							0.2 U		0.5 U		0.2 U		0.2 U		0.2 U				0.2 U		0.2 U				0.2 U	
Tributyltin	0.0074													0.005 U		0.005 U				0.005 U		0.005 U		0.005 U		0.005 U	

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5900 West Marginal Way Site
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Location		MW-30S	MW-30S	MW-30S	MW-30S	MW-30S	MW-30S	MW-30S	MW-30S	MW-31S	MW-31S	MW-31S	MW-31S	MW-31S
Sample Date		02 May 2012	10 Mar 2014	10 Mar 2014	26 Aug 2014	01 Apr 2015	01 Apr 2015	03 Sep 2015	03 Sep 2015	05 Dec 2011	05 Dec 2011	02 May 2012	02 May 2012	12 Mar 2014
Sample ID		MW-30S-050212	DUP-031014-1	MW-30S-031014	MW-30S-082614	DUP-040115-01	MW-30S-040115	DUP-090315-03	MW-30S-090315	DUP-120511-2	MW-31S-120511	DUP-050212-1	MW-31S-050212	MW-31S-031214
Sample Type		N	FD	N	N	FD	N	FD	N	FD	N	FD	N	N
Sample Method		low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow
Analyte	Screening Level													
Total Arsenic	8	9.5												
Dissolved Arsenic	8	9.6									2.2	1.3	1.5	1.2
Arsenic (III)	NS										2.2	1.2	1.3	1.2
Arsenic (Inorganic)	NS													
Total Chromium	100	0.5 U								0.5 U	1.1	0.5 U	0.5 U	5 U
Dissolved Chromium	100	0.5 U								0.7	0.5 U	0.5 U	0.5 U	5 U
Chromium, VI	48		10 U	10 U	11 J	10 U	10 U	3 U	3 U		10 U	10 U	10 U	10 U
Total Copper	3.1	0.5 U								2 U	2 U	8.1 J	0.9	2 U
Dissolved Copper	3.1	0.5 U								2 U	2 U	0.9	0.5	2 U
Total Zinc	81	4 U								10 U	10 U	4 U	4 U	10 U
Dissolved Zinc	81	4 U								10 U	10 U	4 U	4 U	10 U
Total Antimony	6	0.2 U										50 U	0.2	0.3
Dissolved Antimony	6	0.2 U										50 U	0.2	
Total Beryllium	4	0.2 U										0.2 U	0.2 U	0.2 U
Dissolved Beryllium	4	0.2 U										0.2 U	0.2 U	
Total Cadmium	1.2	0.1 U										0.1 U	0.1 U	0.1 U
Dissolved Cadmium	1.2	0.1 U										0.1 U	0.1 U	0.1 U
Total Lead	8.1	0.1 U										0.1 U	0.1 U	0.1 U
Dissolved Lead	8.1	0.1 U										0.1 U	0.1 U	0.1 U
Total Mercury	0.025	0.1 U										0.1 U	0.1 U	0.1 U
Dissolved Mercury	0.025	0.1 U										0.1 U	0.1 U	0.1 U
Total Nickel	8.2	0.8										1.7	15.6	2.0
Dissolved Nickel	8.2	0.5										1.0	1.0	1.0
Total Selenium	50	0.5 U										0.5 U	0.5 U	0.5 U
Dissolved Selenium	50	0.5 U										0.5 U	0.5 U	0.5 U
Total Silver	1.9	0.2 U								3 U	3 U	0.2 U	0.2 U	
Dissolved Silver	1.9	0.2 U								3 U	3 U	0.2 U	0.2 U	
Total Thallium	0.062	0.2 U										0.2 U	0.2 U	0.2 U
Dissolved Thallium	0.062	0.2 U										0.2 U	0.2 U	0.2 U
Tributyltin	0.0074	0.005 U										0.005 U	0.005 U	0.005 U

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Location		MW-31S		MW-31S		MW-31S		MW-31D		MW-31D		MW-31D		MW-31D		MW-32DR		MW-32S		MW-32S		MW-33S		MW-33S		MW-33S	
Sample Date		28 Aug 2014		02 Apr 2015		03 Sep 2015		12 Mar 2014		28 Aug 2014		02 Apr 2015		03 Sep 2015		01 May 2012		06 Dec 2011		01 May 2012		05 Dec 2011		02 May 2012		06 Mar 2014	
Sample ID		MW-31S-082814		MW-31S-040215		MW-31S-090315		MW-31D-031214		MW-31D-082814		MW-31D-040215		MW-31D-090315		MW-32DR-050112		MW-32S-120611		MW-32S-050112		MW-33S-120511		MW-33S-050212		MW-33S-030614	
Sample Type		N		N		N		N		N		N		N		N		N		N		N		N		N	
Sample Method		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow	
Analyte	Screening Level																										
Total Arsenic	8	1.9		1.0		3.5		4		3.3		4.4		3.4		1.7		2.2		8.5		299		245		46.7	
Dissolved Arsenic	8	1.8		1.0		3.1		4		3.4		4.6		3.2		1.4		2.1		8.5		257		204		41.6	
Arsenic (III)	NS																										
Arsenic (Inorganic)	NS																										
Total Chromium	100	5 U		5 U		0.47 U		54		60		55		41		12.9		0.5 U		0.8		6		2.4		5 U	
Dissolved Chromium	100	5 U		5 U		0.47 U		29		32		29		29		13.1		0.8		0.7		4		1 U		5 U	
Chromium, VI	48	10 UJ		10 U		3 U		10 U		10 UJ		10 U		3 U													
Total Copper	3.1	2 U		2 U		0.2 U		23		26		33		16		6.5		2 U		0.5 U		138		75.1		35	
Dissolved Copper	3.1	2 U		2 U		0.2 U		6		8		9		9		4.9		2 U		0.5 U		3		3.8		19	
Total Zinc	81	10 U		10 U		2 U		10		10 U		10 U		2 U		8		10 U		5		10 U		5		10 U	
Dissolved Zinc	81	10 U		10 U		2 U		10 U		10 U		10 U		2 U		4		10 U		4 U		10 U		4 U		10 U	
Total Antimony	6																										
Dissolved Antimony	6																										
Total Beryllium	4																										
Dissolved Beryllium	4																										
Total Cadmium	1.2																										
Dissolved Cadmium	1.2																										
Total Lead	8.1																										
Dissolved Lead	8.1																										
Total Mercury	0.025																										
Dissolved Mercury	0.025																										
Total Nickel	8.2																										
Dissolved Nickel	8.2																										
Total Selenium	50																										
Dissolved Selenium	50																										
Total Silver	1.9															0.2 U		3 U		0.2 U		3 U		0.2 U			
Dissolved Silver	1.9															0.2 U		3 U		0.2 U		3 U		0.2 U			
Total Thallium	0.062																										
Dissolved Thallium	0.062																										
Tributyltin	0.0074																										

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Summary - Metals
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Location		MW-33S	MW-33S	MW-33S	MW-33S	MW-33S	MW-33S	MW-34S	MW-34S	MW-34S	MW-34S	MW-34S	MW-34S	MW-34S
Sample Date		26 Aug 2014	26 Aug 2014	31 Mar 2015	31 Mar 2015	01 Sep 2015	01 Sep 2015	06 Dec 2011	06 Dec 2011	03 May 2012	07 Mar 2014	27 Aug 2014	01 Apr 2015	02 Sep 2015
Sample ID		DUP-082614-03	MW-33S-082614-P	DUP-033115-P-01	MW-33S-033115-P	DUP-090115-02	MW-33S-090115-P	DUP-120611-1	MW-34S-120611	MW-34S-050312	MW-34S-030714	MW-34S-082714	MW-34S-040115	MW-34S-090215
Sample Type		FD	N	FD	N	FD	N	FD	N	N	N	N	N	N
Sample Method		low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow
Analyte	Screening Level													
Total Arsenic	8	21.2	21.1	121	130	38.8	40.5		2.2	2.0				
Dissolved Arsenic	8	20.8 J	22.0 J	100	86.3	40.5	38.8		2.0	2.0				
Arsenic (III)	NS													
Arsenic (Inorganic)	NS													
Total Chromium	100	5 U	5 U	5 U	5 U	1.2 U	1.2 U		0.5 U	0.5 U				
Dissolved Chromium	100	5 U	5 U	5 U	5 U	1.2 U	1.2 U		0.5 U	0.5 U				
Chromium, VI	48							10 U	10 U	10 U	10 U	R	10 U	3 U
Total Copper	3.1	2	2	21	21	4	4		3	3.4				
Dissolved Copper	3.1	2 U	2 U	5	5	1.3 j	1.2 j		3	3.5				
Total Zinc	81	10 U	10 U	10 U	10 U	1 U	1 U		10 U	4 U				
Dissolved Zinc	81	10 U	10 U	10 U	10 U	1 U	1 U		10 U	4 U				
Total Antimony	6													
Dissolved Antimony	6													
Total Beryllium	4													
Dissolved Beryllium	4													
Total Cadmium	1.2													
Dissolved Cadmium	1.2													
Total Lead	8.1													
Dissolved Lead	8.1													
Total Mercury	0.025													
Dissolved Mercury	0.025													
Total Nickel	8.2													
Dissolved Nickel	8.2													
Total Selenium	50													
Dissolved Selenium	50													
Total Silver	1.9								3 U	0.2 U				
Dissolved Silver	1.9								3 U	0.2 U				
Total Thallium	0.062													
Dissolved Thallium	0.062													
Tributyltin	0.0074													

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Summary - Metals
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Location		MW-35S	MW-35S	MW-35S	MW-35S	MW-35S	MW-35S	MW-35D	MW-35D	MW-35D	MW-35D	MW-36S	MW-36S	MW-38D
Sample Date		06 Dec 2011	03 May 2012	06 Mar 2014	27 Aug 2014	02 Apr 2015	31 Aug 2015	06 Mar 2014	27 Aug 2014	01 Apr 2015	31 Aug 2015	03 May 2012	03 May 2012	14 Mar 2014
Sample ID		MW-35S-120611	MW-35S-050312	MW-35S-030614	MW-35S-082714-P	MW-35S-040215-P	MW-35S-083115-P	MW-35D-030614	MW-35D-082714-P	MW-35D-040115-P	MW-35D-083115-P	DUP-050312-1	MW-36S-050312	MW-38D-031414
Sample Type		N	N	N	N	N	N	N	N	N	N	FD	N	N
Sample Method		low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow
Analyte	Screening Level													
Total Arsenic	8	1.4	0.6	0.3	1.4	0.4	0.8	4.4	7.8	8	8.9	0.5	0.5	1.8
Dissolved Arsenic	8	1.3	0.9	0.3	1.5	0.4	0.6	4.8	7.7	9	9.0	0.5	0.5	1.7
Arsenic (III)	NS													
Arsenic (Inorganic)	NS													
Total Chromium	100	0.5 U	0.5 U	5 U	5 U	5 U	1.2 U	32	32	31	39	0.5 U	1 U	35
Dissolved Chromium	100	0.5 U	0.5 U	5 U	5 U	5 U	1.2 U	31	19	16	27	0.5 U	1 U	18
Chromium, VI	48			R	R	10 U	3 U	R	R	10 U	3 U			R
Total Copper	3.1	3	67.7	41	2 U	69	3	15	14	18	16	0.8	0.7	9
Dissolved Copper	3.1	2 U	2.7	2	2 U	2 U	0.9 U	12	5	8	10	0.5	0.5	2
Total Zinc	81	10 U	4 U	10 U	10 U	10 U	1 U	10 U	10 U	10 U	1 U	4 U	4 U	10 U
Dissolved Zinc	81	10 U	4 U	10 U	10 U	10 U	1 U	10 U	10 U	10 U	1 U	4 U	4 U	10 U
Total Antimony	6													
Dissolved Antimony	6													
Total Beryllium	4													
Dissolved Beryllium	4													
Total Cadmium	1.2													
Dissolved Cadmium	1.2													
Total Lead	8.1													
Dissolved Lead	8.1													
Total Mercury	0.025													
Dissolved Mercury	0.025													
Total Nickel	8.2													
Dissolved Nickel	8.2													
Total Selenium	50													
Dissolved Selenium	50													
Total Silver	1.9	3 U	0.2 U									0.2 U	0.2 U	
Dissolved Silver	1.9	3 U	0.2 U									0.2 U	0.2 U	
Total Thallium	0.062													
Dissolved Thallium	0.062													
Tributyltin	0.0074													

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Summary - Metals
5900 West Marginal Way Site
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Location		MW-38D	MW-38D	MW-38D	MW-43S	MW-43S	MW-43S	MW-43S	MW-43S	MW-43S	MW-43S	MW-43S	MW-43D	MW-43D
Sample Date		29 Aug 2014	03 Apr 2015	02 Sep 2015	04 Mar 2014	04 Mar 2014	25 Aug 2014	25 Aug 2014	30 Mar 2015	30 Mar 2015	03 Sep 2015	03 Sep 2015	04 Mar 2014	25 Aug 2014
Sample ID		MW-38D-082914	MW-38D-040315	MW-38D-090215	DUP-030414-2	MW-43S-030414	DUP-082514-02	MW-43S-082514-P	DUP-033015-01	MW-43S-033015-P	DUP-090315-02	MW-43S-090315-P	MW-43D-030414	MW-43D-082514
Sample Type		N	N	N	FD	N	FD	N	FD	N	FD	N	N	N
Sample Method		low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow		low-flow	low-flow	low-flow	low-flow	low-flow
Analyte	Screening Level													
Total Arsenic	8	2.1	1.3	0.8	76	70	73.2	72.1	80.2	73.5	97.9	111	586	637
Dissolved Arsenic	8	1.9	1.1	0.8	68	68	75.0	72.0	78.1	79.3	101	102	613	612
Arsenic (III)	NS													
Arsenic (Inorganic)	NS													
Total Chromium	100	41	17	9	5 U	5 U	5 U	5 U	5 U	5 U	0.47 U	0.47 U	17	16
Dissolved Chromium	100	22	9	7	5 U	5 U	5 U	5 U	5 U	5 U	0.47 U	0.47 U	10	10
Chromium, VI	48	R	10 U	3 U										
Total Copper	3.1	10	4	2	3	3	2 U	2	2 U	2	0.2 U	0.2 U	6	5
Dissolved Copper	3.1	4	3	0.9 U	2 U	2 U	2 U	2 U	2 U	2	0.2 U	0.2 U	2 U	2 U
Total Zinc	81	10 U	10 U	1 U	20	10 U	10 U	10 U	10 U	10 U	2 U	2 U	20	10 U
Dissolved Zinc	81	10 U	10 U	1 U	10 U	10 U	10 U	10 U	10 U	10 U	2 U	2 U	10 U	10 U
Total Antimony	6													
Dissolved Antimony	6													
Total Beryllium	4													
Dissolved Beryllium	4													
Total Cadmium	1.2													
Dissolved Cadmium	1.2													
Total Lead	8.1													
Dissolved Lead	8.1													
Total Mercury	0.025													
Dissolved Mercury	0.025													
Total Nickel	8.2													
Dissolved Nickel	8.2													
Total Selenium	50													
Dissolved Selenium	50													
Total Silver	1.9													
Dissolved Silver	1.9													
Total Thallium	0.062													
Dissolved Thallium	0.062													
Tributyltin	0.0074													

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Table W-11
Groundwater Analytical Results
Summary - Metals
5900 West Marginal Way Site
Seattle, Washington

Location		MW-43D		MW-43D		MW-45S		MW-45S		MW-45S		MW-45S		MW-45D		MW-45D		MW-45D		MW-45D	
Sample Date		30 Mar 2015		03 Sep 2015		11 Mar 2014		26 Aug 2014		31 Mar 2015		01 Sep 2015		11 Mar 2014		26 Aug 2014		31 Mar 2015		01 Sep 2015	
Sample ID		MW-43D-033015		MW-43D-090315		MW-45S-031114		MW-45S-082614-P		MW-45S-033115-P		MW-45S-090115-P		MW-45D-031114		MW-45D-082614-P		MW-45D-033115-P		MW-45D-090115-P	
Sample Type		N		N		N		N		N		N		N		N		N		N	
Sample Method		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow	
Analyte	Screening Level																				
Total Arsenic	8	882		766		6470		15600		12900		11700		72		57.1		63.0		54.3	
Dissolved Arsenic	8	907		747		6300		15600		12700		11600		69.1		55.1 J		63.6		56.1	
Arsenic (III)	NS																				
Arsenic (Inorganic)	NS																				
Total Chromium	100	23		23		5 U		5 U		5 U		1.2 U		5 U		5 U		5 U		4.0 j	
Dissolved Chromium	100	12		13		5 U		5 U		5 U		1.2 U		5 U		5 U		5 U		3.1 j	
Chromium, VI	48																				
Total Copper	3.1	9		8		28		14		13		11		2 U		2 U		2 U		1.2 j	
Dissolved Copper	3.1	3		0.2 U		2 U		2 U		3		1.3 j		2 U		2 U		2 U		0.9 U	
Total Zinc	81	10 U		2 U		40		20		20		10		10 U		10 U		10 U		1 U	
Dissolved Zinc	81	10 U		2 U		30		20		10		10		10 U		10 U		10 U		1 U	
Total Antimony	6																				
Dissolved Antimony	6																				
Total Beryllium	4																				
Dissolved Beryllium	4																				
Total Cadmium	1.2																				
Dissolved Cadmium	1.2																				
Total Lead	8.1																				
Dissolved Lead	8.1																				
Total Mercury	0.025																				
Dissolved Mercury	0.025																				
Total Nickel	8.2																				
Dissolved Nickel	8.2																				
Total Selenium	50																				
Dissolved Selenium	50																				
Total Silver	1.9																				
Dissolved Silver	1.9																				
Total Thallium	0.062																				
Dissolved Thallium	0.062																				
Tributyltin	0.0074																				

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Table W-11
Groundwater Analytical Results
Summary - Metals
5900 West Marginal Way Site
Seattle, Washington

Notes:

Units are in micrograms per liter (µg/L).

Cells are left blank where compound was not analyzed.

low-flow = Sample collected following standard low-flow techniques, as described in RI/FS Work Plan Addendum dated Sept. 2013.

Shallow (S) = Refers to shallow groundwater monitoring wells screened at the water table.

Deep (D) = Refers to deeper groundwater at the Site.

National Functional Guidelines (NFG) = USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, October 1999 or USEPA Contract. Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004.

Laboratory Detection Limits = Organic compounds are reported to the Method Detection Limit (MDL) and other parameters are reported to the Reporting Limit (RL).

Green-shaded, bolded values indicate detected concentration exceeds the selected screening level.

Light gray-shaded values indicate that the method detection limit exceeds the screening level.

Key:

DUP = field duplicate sample

FD = field duplicate sample

MW = monitoring well

N = normal field sample

Laboratory Data Qualifiers:

j = The value reported is less than the reporting limit and should be considered an estimate; qualifier reported by the laboratory.

J = The detected results are qualified as estimated in accordance with NFGs.

R = Rejected data in accordance with NFGs; associated matrix spike recoveries were less than laboratory control limits.

U = Result is ≤ the laboratory detection limit or qualified as non-detect in accordance with NFGs.

UJ = Non-detected compound qualified as estimated in accordance with NFGs.

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Table W-12
Groundwater Analytical Results
Summary - Volatile Organic
Compounds & Total Petroleum
Hydrocarbons

5900 West Marginal Way Site
Seattle, Washington

Location		MW-1S	MW-1S	MW-1S	MW-1S	MW-1S	MW-1S
Sample Date		23 Mar 2009	27 Apr 2010	27 Oct 2010	25 Apr 2011	25 Apr 2011	29 Nov 2011
Sample ID		MW-01S-032309	MW-01S-042710	MW-01S-102710	DUP042511-1	MW-1S-042511	MW-1S-112911
Sample Type		N	N	N	FD	N	N
Sample Method		low-flow	low-flow	low-flow	low-flow	low-flow	low-flow
Analyte	Screening Level						
VOCs (µg/L)							
1,1,1,2-Tetrachloroethane	1.7						
1,1,1-Trichloroethane	200						
1,1,2,2-Tetrachloroethane	0.22						
1,1,2-Trichloroethane	0.9						
1,1-Dichloroethane	7.7						
1,1-Dichloroethene	7						
1,1-Dichloropropene	NS						
1,2,3-Trichlorobenzene	NS						
1,2,3-Trichloropropane	0.0015						
1,2,4-Trimethylbenzene	80						
1,2-Dibromo-3-chloropropane	0.2						
1,2-Dichloroethane	4.2						
1,2-Dichloropropane	3.1						
1,3,5-Trimethylbenzene	80						
1,3-Dichloropropane	NS						
2,2-Dichloropropane	NS						
2-Butanone	4800						
2-Chloroethyl vinyl ether	NS						
2-Hexanone	40						
2-Phenylbutane	800						
4-Chlorotoluene	NS						
4-Methyl-2-pentanone	640						
Acetone	7200						
Acrolein	1.1						
Acrylonitrile	0.028						
Benzene	1.6						
Bromobenzene	64						
Bromodichloromethane	1.8						
Bromoform	12						
Carbon disulfide	400						
Carbon tetrachloride	0.35						
Chlorobenzene	100						
Chlorobromomethane	NS						
Chloroethane	19000						
Chloroform	1.2						
cis-1,2-Dichloroethene	16						
cis-1,3-Dichloropropene	0.44						
Cumene	800						
Cymene	NS						
Dibromochloromethane	2.2						
Dibromomethane	80						
Ethyl bromide	0.2						
Ethylbenzene	31						
Ethylene dibromide	0.05						
Formaldehyde	1600	5 U	5 U	5 U			
Freon 11	120						
Freon 113	180						
m,p Xylenes	1600						
Methyl bromide	11						
Methyl chloride	153						
Methyl iodide	NS						
Methyl tert-butyl ether	24						
Methylene chloride	5						
n-Butylbenzene	400						
n-Propylbenzene	800						
o-Chlorotoluene	160						
o-Xylene	430						
Styrene	100						
tert-Butylbenzene	800						
Tetrachloroethene	2.9						
Toluene	130						
trans-1,2-Dichloroethene	100						
trans-1,3-Dichloropropene	0.44						
trans-1,4-Dichlorobutene	NS						
Trichloroethene	0.7						
Vinyl acetate	7808						
Vinyl chloride	0.18						
Total Petroleum Hydrocarbons (mg/L)							
Gasoline Range Organics	0.8				0.060 U	0.060 U	0.03 NJ
Diesel Range Organics	0.5				0.02 U	0.02 U	0.19
Motor Oil Range Organics	0.5				0.05 U	0.05 U	0.04 U
TPH-DRO/MORO	0.5				0.05 U	0.05 U	0.19

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Table W-12
Groundwater Analytical Results
Summary - Volatile Organic
Compounds & Total Petroleum
Hydrocarbons

5900 West Marginal Way Site
Seattle, Washington

Location		MW-1S	MW-1D	MW-1D	MW-1D	MW-2S	MW-2S
Sample Date		25 Apr 2012	23 Mar 2009	27 Apr 2010	27 Oct 2010	24 Mar 2009	27 Apr 2010
Sample ID		MW-1S-042512	MW-01D-032309	MW-01D-042710	MW-01D-102710	MW-02S-032409	MW-02S-042710
Sample Type		N	N	N	N	N	N
Sample Method		low-flow	low-flow	low-flow	low-flow	low-flow	low-flow
Analyte	Screening Level						
VOCs (µg/L)							
1,1,1,2-Tetrachloroethane	1.7						
1,1,1-Trichloroethane	200						
1,1,2,2-Tetrachloroethane	0.22						
1,1,2-Trichloroethane	0.9						
1,1-Dichloroethane	7.7						
1,1-Dichloroethene	7						
1,1-Dichloropropene	NS						
1,2,3-Trichlorobenzene	NS						
1,2,3-Trichloropropane	0.0015						
1,2,4-Trimethylbenzene	80						
1,2-Dibromo-3-chloropropane	0.2						
1,2-Dichloroethane	4.2						
1,2-Dichloropropane	3.1						
1,3,5-Trimethylbenzene	80						
1,3-Dichloropropane	NS						
2,2-Dichloropropane	NS						
2-Butanone	4800						
2-Chloroethyl vinyl ether	NS						
2-Hexanone	40						
2-Phenylbutane	800						
4-Chlorotoluene	NS						
4-Methyl-2-pentanone	640						
Acetone	7200						
Acrolein	1.1						
Acrylonitrile	0.028						
Benzene	1.6						
Bromobenzene	64						
Bromodichloromethane	1.8						
Bromoform	12						
Carbon disulfide	400						
Carbon tetrachloride	0.35						
Chlorobenzene	100						
Chlorobromomethane	NS						
Chloroethane	19000						
Chloroform	1.2						
cis-1,2-Dichloroethene	16						
cis-1,3-Dichloropropene	0.44						
Cumene	800						
Cymene	NS						
Dibromochloromethane	2.2						
Dibromomethane	80						
Ethyl bromide	0.2						
Ethylbenzene	31						
Ethylene dibromide	0.05						
Formaldehyde	1600		29	36	10	5 U	11
Freon 11	120						
Freon 113	180						
m,p Xylenes	1600						
Methyl bromide	11						
Methyl chloride	153						
Methyl iodide	NS						
Methyl tert-butyl ether	24						
Methylene chloride	5						
n-Butylbenzene	400						
n-Propylbenzene	800						
o-Chlorotoluene	160						
o-Xylene	430						
Styrene	100						
tert-Butylbenzene	800						
Tetrachloroethene	2.9						
Toluene	130						
trans-1,2-Dichloroethene	100						
trans-1,3-Dichloropropene	0.44						
trans-1,4-Dichlorobutene	NS						
Trichloroethene	0.7						
Vinyl acetate	7808						
Vinyl chloride	0.18						
Total Petroleum Hydrocarbons (mg/L)							
Gasoline Range Organics	0.8	0.011 U					
Diesel Range Organics	0.5	0.02 U					
Motor Oil Range Organics	0.5	0.04 U					
TPH-DRO/MORO	0.5	0.04 U					

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Table W-12
Groundwater Analytical Results
Summary - Volatile Organic
Compounds & Total Petroleum
Hydrocarbons

5900 West Marginal Way Site
Seattle, Washington

Location		MW-2S	MW-2D	MW-2D	MW-2D	MW-3S	MW-3S
Sample Date		27 Oct 2010	24 Mar 2009	27 Apr 2010	27 Oct 2010	23 Mar 2009	28 Apr 2010
Sample ID		MW-02S-102710	MW-02D-032409	MW-02D-042710	MW-02D-102710	MW-03S-032309	MW-03S-042810
Sample Type		N	N	N	N	N	N
Sample Method		low-flow	low-flow	low-flow	low-flow	low-flow	low-flow
Analyte	Screening Level						
VOCs (µg/L)							
1,1,1,2-Tetrachloroethane	1.7						
1,1,1-Trichloroethane	200						
1,1,2,2-Tetrachloroethane	0.22						
1,1,2-Trichloroethane	0.9						
1,1-Dichloroethane	7.7						
1,1-Dichloroethene	7						
1,1-Dichloropropene	NS						
1,2,3-Trichlorobenzene	NS						
1,2,3-Trichloropropane	0.0015						
1,2,4-Trimethylbenzene	80						
1,2-Dibromo-3-chloropropane	0.2						
1,2-Dichloroethane	4.2						
1,2-Dichloropropane	3.1						
1,3,5-Trimethylbenzene	80						
1,3-Dichloropropane	NS						
2,2-Dichloropropane	NS						
2-Butanone	4800						
2-Chloroethyl vinyl ether	NS						
2-Hexanone	40						
2-Phenylbutane	800						
4-Chlorotoluene	NS						
4-Methyl-2-pentanone	640						
Acetone	7200						
Acrolein	1.1						
Acrylonitrile	0.028						
Benzene	1.6						
Bromobenzene	64						
Bromodichloromethane	1.8						
Bromoform	12						
Carbon disulfide	400						
Carbon tetrachloride	0.35						
Chlorobenzene	100						
Chlorobromomethane	NS						
Chloroethane	19000						
Chloroform	1.2						
cis-1,2-Dichloroethene	16						
cis-1,3-Dichloropropene	0.44						
Cumene	800						
Cymene	NS						
Dibromochloromethane	2.2						
Dibromomethane	80						
Ethyl bromide	0.2						
Ethylbenzene	31						
Ethylene dibromide	0.05						
Formaldehyde	1600	5 U	13	25	10	11	11
Freon 11	120						
Freon 113	180						
m,p Xylenes	1600						
Methyl bromide	11						
Methyl chloride	153						
Methyl iodide	NS						
Methyl tert-butyl ether	24						
Methylene chloride	5						
n-Butylbenzene	400						
n-Propylbenzene	800						
o-Chlorotoluene	160						
o-Xylene	430						
Styrene	100						
tert-Butylbenzene	800						
Tetrachloroethene	2.9						
Toluene	130						
trans-1,2-Dichloroethene	100						
trans-1,3-Dichloropropene	0.44						
trans-1,4-Dichlorobutene	NS						
Trichloroethene	0.7						
Vinyl acetate	7808						
Vinyl chloride	0.18						
Total Petroleum Hydrocarbons (mg/L)							
Gasoline Range Organics	0.8						
Diesel Range Organics	0.5						
Motor Oil Range Organics	0.5						
TPH-DRO/MORO	0.5						

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Table W-12
Groundwater Analytical Results
Summary - Volatile Organic
Compounds & Total Petroleum
Hydrocarbons

5900 West Marginal Way Site
Seattle, Washington

Location		MW-3S	MW-3D	MW-3D	MW-3D	MW-4S	MW-4S
Sample Date		28 Oct 2010	23 Mar 2009	28 Apr 2010	28 Oct 2010	25 Mar 2009	27 Apr 2010
Sample ID		MW-03S-102810	MW-03D-032309	MW-03D-042810	MW-03D-102810	MW-04S-032509	MW-04S-042710
Sample Type		N	N	N	N	N	N
Sample Method		low-flow	low-flow	low-flow	low-flow	low-flow	low-flow
Analyte	Screening Level						
VOCs (µg/L)							
1,1,1,2-Tetrachloroethane	1.7						
1,1,1-Trichloroethane	200						
1,1,2,2-Tetrachloroethane	0.22						
1,1,2-Trichloroethane	0.9						
1,1-Dichloroethane	7.7						
1,1-Dichloroethene	7						
1,1-Dichloropropene	NS						
1,2,3-Trichlorobenzene	NS						
1,2,3-Trichloropropane	0.0015						
1,2,4-Trimethylbenzene	80						
1,2-Dibromo-3-chloropropane	0.2						
1,2-Dichloroethane	4.2						
1,2-Dichloropropane	3.1						
1,3,5-Trimethylbenzene	80						
1,3-Dichloropropane	NS						
2,2-Dichloropropane	NS						
2-Butanone	4800						
2-Chloroethyl vinyl ether	NS						
2-Hexanone	40						
2-Phenylbutane	800						
4-Chlorotoluene	NS						
4-Methyl-2-pentanone	640						
Acetone	7200						
Acrolein	1.1						
Acrylonitrile	0.028						
Benzene	1.6						
Bromobenzene	64						
Bromodichloromethane	1.8						
Bromoform	12						
Carbon disulfide	400						
Carbon tetrachloride	0.35						
Chlorobenzene	100						
Chlorobromomethane	NS						
Chloroethane	19000						
Chloroform	1.2						
cis-1,2-Dichloroethene	16						
cis-1,3-Dichloropropene	0.44						
Cumene	800						
Cymene	NS						
Dibromochloromethane	2.2						
Dibromomethane	80						
Ethyl bromide	0.2						
Ethylbenzene	31						
Ethylene dibromide	0.05						
Formaldehyde	1600	5 U	11	5 U	6	5 U	8
Freon 11	120						
Freon 113	180						
m,p Xylenes	1600						
Methyl bromide	11						
Methyl chloride	153						
Methyl iodide	NS						
Methyl tert-butyl ether	24						
Methylene chloride	5						
n-Butylbenzene	400						
n-Propylbenzene	800						
o-Chlorotoluene	160						
o-Xylene	430						
Styrene	100						
tert-Butylbenzene	800						
Tetrachloroethene	2.9						
Toluene	130						
trans-1,2-Dichloroethene	100						
trans-1,3-Dichloropropene	0.44						
trans-1,4-Dichlorobutene	NS						
Trichloroethene	0.7						
Vinyl acetate	7808						
Vinyl chloride	0.18						
Total Petroleum Hydrocarbons (mg/L)							
Gasoline Range Organics	0.8						
Diesel Range Organics	0.5						
Motor Oil Range Organics	0.5						
TPH-DRO/MORO	0.5						

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Table W-12
Groundwater Analytical Results
Summary - Volatile Organic
Compounds & Total Petroleum
Hydrocarbons

5900 West Marginal Way Site
Seattle, Washington

Location		MW-4S		MW-4S		MW-4S		MW-7S		MW-7S		MW-7S	
Sample Date		25 Oct 2010		28 Nov 2011		25 Apr 2012		25 Mar 2009		27 Apr 2010		25 Oct 2010	
Sample ID		MW-4S-102510		MW-04S-112811		MW-4S-042512		MW-07S-032509		MW-07S-042710		MW-7S-102510	
Sample Type		N		N		N		N		N		N	
Sample Method		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow	
Analyte	Screening Level												
VOCs (µg/L)													
1,1,1,2-Tetrachloroethane	1.7			0.07	U	0.04	U						
1,1,1-Trichloroethane	200			0.09	U	0.04	U						
1,1,2,2-Tetrachloroethane	0.22			0.07	U	0.06	U						
1,1,2-Trichloroethane	0.9			0.04	U	0.13	U						
1,1-Dichloroethane	7.7			0.05	U	0.05	U						
1,1-Dichloroethene	7			0.09	U	0.05	U						
1,1-Dichloropropene	NS			0.09	U	0.03	U						
1,2,3-Trichlorobenzene	NS			0.09	U	0.11	U						
1,2,3-Trichloropropane	0.0015			0.23	U	0.13	U						
1,2,4-Trimethylbenzene	80			0.06	U	0.02	U						
1,2-Dibromo-3-chloropropane	0.2			0.21	U	0.04	U						
1,2-Dichloroethane	4.2			0.08	U	0.07	U						
1,2-Dichloropropane	3.1			0.09	U	0.04	U						
1,3,5-Trimethylbenzene	80			0.06	U	0.02	U						
1,3-Dichloropropane	NS			0.02	U	0.06	U						
2,2-Dichloropropane	NS			0.08	U	0.05	U						
2-Butanone	4800			0.81	U	0.81	U						
2-Chloroethyl vinyl ether	NS			0.09	U	0.25	U						
2-Hexanone	40			0.31	U	0.90	U						
2-Phenylbutane	800			0.08	U	0.02	U						
4-Chlorotoluene	NS			0.07	U	0.02	U						
4-Methyl-2-pentanone	640			0.38	U	0.97	U						
Acetone	7200			0.72	U	16	J						
Acrolein	1.1			0.29	U	2.5	UJ						
Acrylonitrile	0.028			0.18	U	0.60	U						
Benzene	1.6			0.06	U	0.03	U						
Bromobenzene	64			0.05	U	0.06	U						
Bromodichloromethane	1.8			0.05	U	0.05	U						
Bromoform	12			0.07	U	0.06	U						
Carbon disulfide	400			0.09	U	0.04	U						
Carbon tetrachloride	0.35			0.08	U	0.04	U						
Chlorobenzene	100			0.04	U	0.02	U						
Chlorobromomethane	NS			0.07	U	0.06	U						
Chloroethane	19000			0.15	U	0.09	UJ						
Chloroform	1.2			0.08	U	0.2	j						
cis-1,2-Dichloroethene	16			0.10	U	0.04	U						
cis-1,3-Dichloropropene	0.44			0.06	U	0.06	U						
Cumene	800			0.06	U	0.02	U						
Cymene	NS			0.08	U	0.03	U						
Dibromochloromethane	2.2			0.09	U	0.05	U						
Dibromomethane	80			0.08	U	0.14	U						
Ethyl bromide	0.2			0.09	U	0.04	U						
Ethylbenzene	31			0.09	U	0.04	U						
Ethylene dibromide	0.05			0.08	U	0.08	U						
Formaldehyde	1600	300	U					5	U	5	U	300	U
Freon 11	120			0.09	U	0.04	U						
Freon 113	180			0.11	U	0.04	U						
m,p Xylenes	1600			0.14	U	0.05	U						
Methyl bromide	11			0.04	U	0.25	U						
Methyl chloride	153			0.10	U	0.10	U						
Methyl iodide	NS			0.04	U	0.23	U						
Methyl tert-butyl ether	24			0.05	U	0.07	U						
Methylene chloride	5			0.39	U	0.48	U						
n-Butylbenzene	400			0.11	U	0.02	U						
n-Propylbenzene	800			0.08	U	0.02	U						
o-Chlorotoluene	160			0.04	U	0.02	U						
o-Xylene	430			0.06	U	0.04	U						
Styrene	100			0.07	U	0.04	U						
tert-Butylbenzene	800			0.06	U	0.03	U						
Tetrachloroethene	2.9			0.09	U	0.05	U						
Toluene	130			0.06	U	0.04	U						
trans-1,2-Dichloroethene	100			0.08	U	0.05	U						
trans-1,3-Dichloropropene	0.44			0.06	U	0.08	U						
trans-1,4-Dichlorobutene	NS			0.24	U	0.32	U						
Trichloroethene	0.7			0.08	U	0.05	U						
Vinyl acetate	7808			0.07	U	0.07	U						
Vinyl chloride	0.18			0.08	U	0.06	U						
Total Petroleum Hydrocarbons (mg/L)													
Gasoline Range Organics	0.8												
Diesel Range Organics	0.5												
Motor Oil Range Organics	0.5												
TPH-DRO/MORO	0.5												

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Table W-12
Groundwater Analytical Results
Summary - Volatile Organic
Compounds & Total Petroleum
Hydrocarbons

5900 West Marginal Way Site
Seattle, Washington

Location		MW-10S	MW-10S	MW-10S	MW-13S	MW-13S	MW-13S
Sample Date		24 Mar 2009	28 Apr 2010	25 Oct 2010	24 Mar 2009	28 Apr 2010	25 Oct 2010
Sample ID		MW-10-032409	MW-10-042810	MW-10-102610	MW-13-032409	MW-13-042810	MW-13-102610
Sample Type		N	N	N	N	N	N
Sample Method		low-flow	low-flow	low-flow	low-flow	low-flow	low-flow
Analyte	Screening Level						
VOCs (µg/L)							
1,1,1,2-Tetrachloroethane	1.7						
1,1,1-Trichloroethane	200						
1,1,2,2-Tetrachloroethane	0.22						
1,1,2-Trichloroethane	0.9						
1,1-Dichloroethane	7.7						
1,1-Dichloroethene	7						
1,1-Dichloropropene	NS						
1,2,3-Trichlorobenzene	NS						
1,2,3-Trichloropropane	0.0015						
1,2,4-Trimethylbenzene	80						
1,2-Dibromo-3-chloropropane	0.2						
1,2-Dichloroethane	4.2						
1,2-Dichloropropane	3.1						
1,3,5-Trimethylbenzene	80						
1,3-Dichloropropane	NS						
2,2-Dichloropropane	NS						
2-Butanone	4800						
2-Chloroethyl vinyl ether	NS						
2-Hexanone	40						
2-Phenylbutane	800						
4-Chlorotoluene	NS						
4-Methyl-2-pentanone	640						
Acetone	7200						
Acrolein	1.1						
Acrylonitrile	0.028						
Benzene	1.6						
Bromobenzene	64						
Bromodichloromethane	1.8						
Bromoform	12						
Carbon disulfide	400						
Carbon tetrachloride	0.35						
Chlorobenzene	100						
Chlorobromomethane	NS						
Chloroethane	19000						
Chloroform	1.2						
cis-1,2-Dichloroethene	16						
cis-1,3-Dichloropropene	0.44						
Cumene	800						
Cymene	NS						
Dibromochloromethane	2.2						
Dibromomethane	80						
Ethyl bromide	0.2						
Ethylbenzene	31						
Ethylene dibromide	0.05						
Formaldehyde	1600	5 U	9	300 U	5 U	5 U	300 U
Freon 11	120						
Freon 113	180						
m,p Xylenes	1600						
Methyl bromide	11						
Methyl chloride	153						
Methyl iodide	NS						
Methyl tert-butyl ether	24						
Methylene chloride	5						
n-Butylbenzene	400						
n-Propylbenzene	800						
o-Chlorotoluene	160						
o-Xylene	430						
Styrene	100						
tert-Butylbenzene	800						
Tetrachloroethene	2.9						
Toluene	130						
trans-1,2-Dichloroethene	100						
trans-1,3-Dichloropropene	0.44						
trans-1,4-Dichlorobutene	NS						
Trichloroethene	0.7						
Vinyl acetate	7808						
Vinyl chloride	0.18						
Total Petroleum Hydrocarbons (mg/L)							
Gasoline Range Organics	0.8						
Diesel Range Organics	0.5						
Motor Oil Range Organics	0.5						
TPH-DRO/MORO	0.5						

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Table W-12
Groundwater Analytical Results
Summary - Volatile Organic
Compounds & Total Petroleum
Hydrocarbons

5900 West Marginal Way Site
Seattle, Washington

Location		MW-13S		MW-13S		MW-16S		MW-16S		MW-17S		MW-17S	
Sample Date		29 Nov 2011		30 Apr 2012		06 Dec 2011		30 Apr 2012		23 Mar 2009		27 Apr 2010	
Sample ID		MW-13-112911		MW-13-043012		MW-16-120611		MW-16-043012		MW-17-032309		MW-17-042710	
Sample Type		N		N		N		N		N		N	
Sample Method		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow	
Analyte	Screening Level												
VOCs (µg/L)													
1,1,1,2-Tetrachloroethane	1.7	0.07	U	0.04	U	0.07	U	0.04	U				
1,1,1-Trichloroethane	200	0.09	U	0.04	U	0.09	U	0.04	U				
1,1,2,2-Tetrachloroethane	0.22	0.07	U	0.06	U	0.07	U	0.06	U				
1,1,2-Trichloroethane	0.9	0.04	U	0.13	U	0.04	U	0.13	U				
1,1-Dichloroethane	7.7	0.05	U	0.05	U	0.05	U	0.05	U				
1,1-Dichloroethene	7	0.09	U	0.05	U	0.09	U	0.05	U				
1,1-Dichloropropene	NS	0.09	U	0.03	U	0.09	U	0.03	U				
1,2,3-Trichlorobenzene	NS	0.09	U	0.11	U	0.09	U	0.11	U				
1,2,3-Trichloropropane	0.0015	0.23	U	0.13	U	0.23	U	0.13	U				
1,2,4-Trimethylbenzene	80	0.06	U	0.02	U	0.06	U	0.02	U				
1,2-Dibromo-3-chloropropane	0.2	0.21	U	0.04	U	0.21	UJ	0.04	U				
1,2-Dichloroethane	4.2	0.08	U	0.07	U	0.08	U	0.07	U				
1,2-Dichloropropane	3.1	0.09	U	0.04	U	0.09	U	0.04	U				
1,3,5-Trimethylbenzene	80	0.06	U	0.02	U	0.06	U	0.02	U				
1,3-Dichloropropane	NS	0.02	U	0.06	U	0.02	U	0.06	U				
2,2-Dichloropropane	NS	0.08	U	0.05	U	0.08	U	0.05	U				
2-Butanone	4800	0.81	U	0.81	U	0.81	U	0.81	U				
2-Chloroethyl vinyl ether	NS	0.09	U	0.25	U	0.09	U	0.25	U				
2-Hexanone	40	0.31	U	0.90	U	0.31	U	0.90	U				
2-Phenylbutane	800	0.08	U	0.02	U	0.08	U	0.02	U				
4-Chlorotoluene	NS	0.07	U	0.02	U	0.07	U	0.02	U				
4-Methyl-2-pentanone	640	0.38	U	0.97	U	0.38	U	0.97	U				
Acetone	7200	0.72	U	5.6		5.1	U	120					
Acrolein	1.1	0.29	U	2.5	U	0.29	UJ	2.5	UJ				
Acrylonitrile	0.028	0.18	U	0.60	U	0.18	U	0.60	U				
Benzene	1.6	0.06	U	0.03	U	0.06	U	0.03	U				
Bromobenzene	64	0.05	U	0.06	U	0.05	U	0.06	U				
Bromodichloromethane	1.8	0.05	U	0.05	U	0.05	U	0.05	U				
Bromoform	12	0.07	U	0.06	U	0.07	U	0.06	U				
Carbon disulfide	400	0.09	U	0.04	U	0.09	U	0.04	U				
Carbon tetrachloride	0.35	0.08	U	0.04	U	0.08	U	0.04	U				
Chlorobenzene	100	0.04	U	0.02	U	0.04	U	0.02	U				
Chlorobromomethane	NS	0.07	U	0.06	U	0.07	U	0.06	U				
Chloroethane	19000	0.15	U	0.09	U	0.15	U	0.09	U				
Chloroform	1.2	0.08	U	0.03	U	0.08	U	0.03	U				
cis-1,2-Dichloroethene	16	0.10	U	0.04	U	0.10	U	0.04	U				
cis-1,3-Dichloropropene	0.44	0.06	U	0.06	U	0.06	U	0.06	U				
Cumene	800	0.06	U	0.02	U	0.06	U	0.02	U				
Cymene	NS	0.08	U	0.03	U	0.08	U	0.03	U				
Dibromochloromethane	2.2	0.09	U	0.05	U	0.09	U	0.05	U				
Dibromomethane	80	0.08	U	0.14	U	0.08	U	0.14	U				
Ethyl bromide	0.2	0.09	U	0.04	U	0.09	U	0.04	U				
Ethylbenzene	31	0.09	U	0.04	U	0.09	U	0.04	U				
Ethylene dibromide	0.05	0.08	U	0.08	U	0.08	U	0.08	U				
Formaldehyde	1600									5	U	7	
Freon 11	120	0.09	U	0.04	U	0.09	U	0.04	U				
Freon 113	180	0.11	U	0.04	U	0.11	U	0.04	U				
m,p Xylenes	1600	0.14	U	0.05	U	0.14	U	0.05	U				
Methyl bromide	11	0.04	U	0.25	U	0.04	U	0.25	U				
Methyl chloride	153	0.10	U	0.10	U	0.10	U	0.10	U				
Methyl iodide	NS	0.04	U	0.23	U	0.04	U	0.23	U				
Methyl tert-butyl ether	24	0.05	U	0.07	U	0.05	U	0.07	U				
Methylene chloride	5	0.39	U	0.48	U	0.5	U	0.48	U				
n-Butylbenzene	400	0.11	U	0.02	U	0.11	U	0.02	U				
n-Propylbenzene	800	0.08	U	0.02	U	0.08	U	0.02	U				
o-Chlorotoluene	160	0.04	U	0.02	U	0.04	U	0.02	U				
o-Xylene	430	0.06	U	0.04	U	0.06	U	0.04	U				
Styrene	100	0.07	U	0.04	U	0.07	U	0.04	U				
tert-Butylbenzene	800	0.06	U	0.03	U	0.06	U	0.03	U				
Tetrachloroethene	2.9	0.09	U	0.05	U	0.09	U	0.05	U				
Toluene	130	0.06	U	0.04	U	0.06	U	0.1	j				
trans-1,2-Dichloroethene	100	0.08	U	0.05	U	0.08	U	0.05	U				
trans-1,3-Dichloropropene	0.44	0.06	U	0.08	U	0.06	U	0.08	U				
trans-1,4-Dichlorobutene	NS	0.24	U	0.32	U	0.24	UJ	0.32	U				
Trichloroethene	0.7	0.08	U	0.05	U	0.08	U	0.05	U				
Vinyl acetate	7808	0.07	U	0.07	U	0.07	U	0.07	U				
Vinyl chloride	0.18	0.08	U	0.06	U	0.08	U	0.06	U				
Total Petroleum Hydrocarbons (mg/L)													
Gasoline Range Organics	0.8												
Diesel Range Organics	0.5												
Motor Oil Range Organics	0.5												
TPH-DRO/MORO	0.5												

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Table W-12
Groundwater Analytical Results
Summary - Volatile Organic
Compounds & Total Petroleum
Hydrocarbons

5900 West Marginal Way Site
Seattle, Washington

Location		MW-17S		MW-17S		MW-17S		MW-28S		MW-28S		MW-28S	
Sample Date		25 Oct 2010		04 Mar 2014		04 Mar 2014		02 Dec 2011		02 Dec 2011		01 May 2012	
Sample ID		MW-17-102510		DUP-030414-1		MW-17S-030414P		DUP-120211-2		MW-28S-120211		MW-28S-050112	
Sample Type		N		FD		N		FD		N		N	
Sample Method		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow	
Analyte	Screening Level												
VOCs (µg/L)													
1,1,1,2-Tetrachloroethane	1.7			0.04	U	0.04	U	0.07	U	0.07	U	0.04	U
1,1,1-Trichloroethane	200			0.04	UJ	0.04	UJ	0.09	U	0.09	U	0.04	U
1,1,2,2-Tetrachloroethane	0.22			0.06	U	0.06	U	0.07	U	0.07	U	0.06	U
1,1,2-Trichloroethane	0.9			0.13	U	0.13	U	0.04	U	0.04	U	0.13	U
1,1-Dichloroethane	7.7			0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
1,1-Dichloroethene	7			0.05	U	0.05	U	0.09	U	0.09	U	0.05	U
1,1-Dichloropropene	NS			0.03	U	0.03	U	0.09	U	0.09	U	0.03	U
1,2,3-Trichlorobenzene	NS			0.11	U	0.11	U	0.09	U	0.09	U	0.11	U
1,2,3-Trichloropropane	0.0015			0.13	U	0.13	U	0.23	U	0.23	U	0.13	U
1,2,4-Trimethylbenzene	80			0.02	U	0.02	U	0.06	U	0.06	U	0.02	U
1,2-Dibromo-3-chloropropane	0.2			0.04	U	0.04	U	0.21	U	0.21	U	0.04	U
1,2-Dichloroethane	4.2			0.07	U	0.07	U	0.08	U	0.08	U	0.07	U
1,2-Dichloropropane	3.1			0.04	U	0.04	U	0.09	U	0.09	U	0.04	U
1,3,5-Trimethylbenzene	80			0.02	U	0.02	U	0.06	U	0.06	U	0.02	U
1,3-Dichloropropane	NS			0.06	U	0.06	U	0.02	U	0.02	U	0.06	U
2,2-Dichloropropane	NS			0.05	U	0.05	U	0.08	U	0.08	U	0.05	U
2-Butanone	4800			0.81	U	0.81	U	0.81	U	0.81	U	0.81	U
2-Chloroethyl vinyl ether	NS			0.25	U	0.25	U	0.09	U	0.09	U	0.25	U
2-Hexanone	40			0.90	U	0.90	U	0.31	U	0.31	U	0.90	U
2-Phenylbutane	800			0.02	U	0.02	U	0.08	U	0.08	U	0.02	U
4-Chlorotoluene	NS			0.02	U	0.02	U	0.07	U	0.07	U	0.02	U
4-Methyl-2-pentanone	640			0.97	U	0.97	U	0.38	U	0.38	U	0.97	U
Acetone	7200			2.1	U	2.1	U	5.0	U	5	U	63	
Acrolein	1.1			2.5	UJ	2.5	UJ	0.29	U	0.29	U	2.5	UJ
Acrylonitrile	0.028			0.60	UJ	0.60	UJ	0.18	U	0.18	U	0.60	U
Benzene	1.6			0.03	U	0.03	U	0.06	U	0.06	U	0.03	U
Bromobenzene	64			0.06	U	0.06	U	0.05	U	0.05	U	0.06	U
Bromodichloromethane	1.8			0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
Bromoform	12			0.06	U	0.06	U	0.07	U	0.07	U	0.06	U
Carbon disulfide	400			0.04	U	0.04	U	0.09	U	0.09	U	0.04	U
Carbon tetrachloride	0.35			0.04	UJ	0.04	UJ	0.08	U	0.08	U	0.04	U
Chlorobenzene	100			0.02	U	0.02	U	0.04	U	0.04	U	0.02	U
Chlorobromomethane	NS			0.06	U	0.06	U	0.07	U	0.07	U	0.06	U
Chloroethane	19000			0.09	U	0.09	U	0.15	U	0.15	U	0.09	U
Chloroform	1.2			0.03	U	0.03	U	0.08	U	0.08	U	0.03	U
cis-1,2-Dichloroethene	16			0.04	U	0.04	U	0.10	U	0.10	U	0.04	U
cis-1,3-Dichloropropene	0.44			0.06	U	0.06	U	0.06	U	0.06	U	0.06	U
Cumene	800			0.02	U	0.02	U	0.06	U	0.06	U	0.02	U
Cymene	NS			0.03	U	0.03	U	0.08	U	0.08	U	0.03	U
Dibromochloromethane	2.2			0.05	U	0.05	U	0.09	U	0.09	U	0.05	U
Dibromomethane	80			0.14	U	0.14	U	0.08	U	0.08	U	0.14	U
Ethyl bromide	0.2			0.04	U	0.04	U	0.09	U	0.09	U	0.04	U
Ethylbenzene	31			0.04	U	0.04	U	0.09	U	0.09	U	0.04	U
Ethylene dibromide	0.05			0.07	U	0.07	U	0.08	U	0.08	U	0.08	U
Formaldehyde	1600	300	U										
Freon 11	120			0.04	U	0.04	U	0.09	U	0.09	U	0.04	U
Freon 113	180			0.04	U	0.04	U	0.11	U	0.11	U	0.04	U
m,p Xylenes	1600			0.05	U	0.12	j	0.14	U	0.14	U	0.05	U
Methyl bromide	11			0.25	U	0.25	U	0.04	U	0.04	U	0.25	U
Methyl chloride	153			0.09	UJ	0.09	UJ	0.10	U	0.10	U	0.10	U
Methyl iodide	NS			0.23	U	0.23	U	0.04	U	0.04	U	0.23	U
Methyl tert-butyl ether	24			0.07	U	0.07	U	0.05	U	0.05	U	0.07	U
Methylene chloride	5			0.48	U	0.48	U	0.39	U	0.39	U	0.48	U
n-Butylbenzene	400			0.02	U	0.02	U	0.11	U	0.11	U	0.02	U
n-Propylbenzene	800			0.02	U	0.02	U	0.08	U	0.08	U	0.02	U
o-Chlorotoluene	160			0.02	U	0.02	U	0.04	U	0.04	U	0.02	U
o-Xylene	430			0.03	U	0.03	U	0.06	U	0.06	U	0.04	U
Styrene	100			0.05	U	0.05	U	0.07	U	0.07	U	0.04	U
tert-Butylbenzene	800			0.03	U	0.03	U	0.06	U	0.06	U	0.03	U
Tetrachloroethene	2.9			0.05	U	0.05	U	0.2		0.2	j	0.05	U
Toluene	130			0.04	U	0.04	U	0.06	U	0.06	U	0.04	U
trans-1,2-Dichloroethene	100			0.05	U	0.05	U	0.08	U	0.08	U	0.05	U
trans-1,3-Dichloropropene	0.44			0.08	U	0.08	U	0.06	U	0.06	U	0.08	U
trans-1,4-Dichlorobutene	NS			0.32	U	0.32	U	0.24	U	0.24	U	0.32	U
Trichloroethene	0.7			0.05	U	0.05	U	0.08	U	0.08	U	0.05	U
Vinyl acetate	7808			0.07	UJ	0.07	UJ	0.07	U	0.07	U	0.07	U
Vinyl chloride	0.18			0.06	U	0.06	U	0.08	U	0.08	U	0.06	U
Total Petroleum Hydrocarbons (mg/L)													
Gasoline Range Organics	0.8									0.030	U	0.011	U
Diesel Range Organics	0.5									0.02	U	0.02	U
Motor Oil Range Organics	0.5									0.04	U	0.04	U
TPH-DRO/MORO	0.5									0.04	U	0.04	U

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Table W-12
Groundwater Analytical Results
Summary - Volatile Organic
Compounds & Total Petroleum
Hydrocarbons

5900 West Marginal Way Site
Seattle, Washington

Location		MW-29S		MW-29S		MW-30S		MW-30S		MW-30S		MW-31S	
Sample Date		02 Dec 2011		02 May 2012		05 Dec 2011		05 Dec 2011		02 May 2012		05 Dec 2011	
Sample ID		MW-29S-120211		MW-29S-050212		DUP-120511-1		MW-30S-120511		MW-30S-050212		DUP-120511-2	
Sample Type		N		N		FD		N		N		FD	
Sample Method		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow	
Analyte	Screening Level												
VOCs (µg/L)													
1,1,1,2-Tetrachloroethane	1.7	0.07	U	0.04	U			0.07	U	0.04	U		
1,1,1-Trichloroethane	200	0.09	U	0.04	U			0.09	U	0.04	U		
1,1,2,2-Tetrachloroethane	0.22	0.07	U	0.06	U			0.07	U	0.06	U		
1,1,2-Trichloroethane	0.9	0.04	U	0.13	U			0.04	U	0.13	U		
1,1-Dichloroethane	7.7	0.2	j	0.1	j			0.05	U	0.05	U		
1,1-Dichloroethene	7	0.09	U	0.05	U			0.09	U	0.05	U		
1,1-Dichloropropene	NS	0.09	U	0.03	U			0.09	U	0.03	U		
1,2,3-Trichlorobenzene	NS	0.09	U	0.11	U			0.09	U	0.11	U		
1,2,3-Trichloropropane	0.0015	0.23	U	0.13	U			0.23	U	0.13	U		
1,2,4-Trimethylbenzene	80	0.06	U	0.02	U			0.06	U	0.02	U		
1,2-Dibromo-3-chloropropane	0.2	0.21	U	0.04	U			0.21	U	0.04	U		
1,2-Dichloroethane	4.2	0.08	U	0.07	U			0.08	U	0.07	U		
1,2-Dichloropropane	3.1	0.09	U	0.04	U			0.09	U	0.04	U		
1,3,5-Trimethylbenzene	80	0.06	U	0.02	U			0.06	U	0.02	U		
1,3-Dichloropropane	NS	0.02	U	0.06	U			0.02	U	0.06	U		
2,2-Dichloropropane	NS	0.08	U	0.05	U			0.08	U	0.05	U		
2-Butanone	4800	0.81	U	0.81	U			0.81	U	0.81	U		
2-Chloroethyl vinyl ether	NS	0.09	U	0.25	U			0.09	U	0.25	U		
2-Hexanone	40	0.31	U	0.90	U			0.31	U	0.90	U		
2-Phenylbutane	800	0.08	U	0.02	U			0.08	U	0.02	U		
4-Chlorotoluene	NS	0.07	U	0.02	U			0.07	U	0.02	U		
4-Methyl-2-pentanone	640	0.38	U	0.97	U			0.38	U	0.97	U		
Acetone	7200	5.1	U	15	U			0.72	U	7.0	U		
Acrolein	1.1	0.29	U	2.5	U			0.29	U	2.5	U		
Acrylonitrile	0.028	0.18	U	0.60	U			0.18	U	0.60	U		
Benzene	1.6	0.06	U	0.03	U			0.06	U	0.03	U		
Bromobenzene	64	0.05	U	0.06	U			0.05	U	0.06	U		
Bromodichloromethane	1.8	0.05	U	0.05	U			0.05	U	0.05	U		
Bromoform	12	0.07	U	0.06	U			0.07	U	0.06	U		
Carbon disulfide	400	0.09	U	0.04	U			0.09	U	0.04	U		
Carbon tetrachloride	0.35	0.08	U	0.04	U			0.08	U	0.04	U		
Chlorobenzene	100	0.04	U	0.02	U			0.04	U	0.02	U		
Chlorobromomethane	NS	0.07	U	0.06	U			0.07	U	0.06	U		
Chloroethane	19000	0.15	U	0.09	U			0.15	U	0.09	U		
Chloroform	1.2	0.08	U	0.03	U			0.08	U	0.03	U		
cis-1,2-Dichloroethene	16	0.10	U	0.04	U			0.10	U	0.04	U		
cis-1,3-Dichloropropene	0.44	0.06	U	0.06	U			0.06	U	0.06	U		
Cumene	800	0.06	U	0.02	U			0.06	U	0.02	U		
Cymene	NS	0.08	U	0.03	U			0.08	U	0.03	U		
Dibromochloromethane	2.2	0.09	U	0.05	U			0.09	U	0.05	U		
Dibromomethane	80	0.08	U	0.14	U			0.08	U	0.14	U		
Ethyl bromide	0.2	0.09	U	0.04	U			0.09	U	0.04	U		
Ethylbenzene	31	0.09	U	0.04	U			0.09	U	0.04	U		
Ethylene dibromide	0.05	0.08	U	0.08	U			0.08	U	0.08	U		
Formaldehyde	1600												
Freon 11	120	0.09	U	0.04	U			0.09	U	0.04	U		
Freon 113	180	0.11	U	0.04	U			0.11	U	0.04	U		
m,p Xylenes	1600	0.14	U	0.05	U			0.14	U	0.05	U		
Methyl bromide	11	0.04	U	0.25	U			0.04	U	0.25	U		
Methyl chloride	153	0.10	U	0.10	U			0.10	U	0.10	U		
Methyl iodide	NS	0.04	U	0.23	U			0.04	U	0.23	U		
Methyl tert-butyl ether	24	0.05	U	0.07	U			0.05	U	0.07	U		
Methylene chloride	5	0.5	U	0.48	U			0.39	U	0.48	U		
n-Butylbenzene	400	0.11	U	0.02	U			0.11	U	0.02	U		
n-Propylbenzene	800	0.08	U	0.02	U			0.08	U	0.02	U		
o-Chlorotoluene	160	0.04	U	0.02	U			0.04	U	0.02	U		
o-Xylene	430	0.06	U	0.04	U			0.06	U	0.04	U		
Styrene	100	0.07	U	0.04	U			0.07	U	0.04	U		
tert-Butylbenzene	800	0.06	U	0.03	U			0.06	U	0.03	U		
Tetrachloroethene	2.9	0.09	U	0.05	U			0.2		0.05	U		
Toluene	130	0.06	U	0.04	U			0.06	U	0.04	U		
trans-1,2-Dichloroethene	100	0.08	U	0.05	U			0.08	U	0.05	U		
trans-1,3-Dichloropropene	0.44	0.06	U	0.08	U			0.06	U	0.08	U		
trans-1,4-Dichlorobutene	NS	0.24	U	0.32	U			0.24	U	0.32	U		
Trichloroethene	0.7	0.08	U	0.05	U			0.08	U	0.05	U		
Vinyl acetate	7808	0.07	U	0.07	U			0.07	U	0.07	U		
Vinyl chloride	0.18	0.08	U	0.06	U			0.08	U	0.06	U		
Total Petroleum Hydrocarbons (mg/L)													
Gasoline Range Organics	0.8	0.030	U	0.022	U			0.030	U	0.011	U	0.030	U
Diesel Range Organics	0.5	0.11	NJ	0.02	U	0.23	NJ	0.23	NJ	0.02	U		
Motor Oil Range Organics	0.5	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U		
TPH-DRO/MORO	0.5	0.11		0.04	U	0.23		0.23		0.04	U		

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Table W-12
Groundwater Analytical Results
Summary - Volatile Organic
Compounds & Total Petroleum
Hydrocarbons

5900 West Marginal Way Site
Seattle, Washington

Location		MW-31S		MW-31S		MW-31S		MW-34S		MW-35S		MW-35S	
Sample Date		05 Dec 2011		02 May 2012		02 May 2012		07 Mar 2014		06 Dec 2011		03 May 2012	
Sample ID		MW-31S-120511		DUP-050212-1		MW-31S-050212		MW-34S-030714		MW-35S-120611		MW-35S-050312	
Sample Type		N		FD		N		N		N		N	
Sample Method		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow	
Analyte	Screening Level												
VOCs (µg/L)													
1,1,1,2-Tetrachloroethane	1.7	0.07	U	0.04	U	0.04	U	0.04	U				
1,1,1-Trichloroethane	200	0.09	U	0.04	U	0.04	U	0.04	U				
1,1,2,2-Tetrachloroethane	0.22	0.07	U	0.06	U	0.06	U	0.06	U				
1,1,2-Trichloroethane	0.9	0.04	U	0.13	U	0.13	U	0.13	U				
1,1-Dichloroethane	7.7	0.05	U	0.05	U	0.05	U	0.05	U				
1,1-Dichloroethene	7	0.09	U	0.05	U	0.05	U	0.05	U				
1,1-Dichloropropene	NS	0.09	U	0.03	U	0.03	U	0.03	U				
1,2,3-Trichlorobenzene	NS	0.09	U	0.11	U	0.11	U	0.11	U				
1,2,3-Trichloropropane	0.0015	0.23	U	0.13	U	0.13	U	0.13	U				
1,2,4-Trimethylbenzene	80	0.06	U	0.02	U	0.02	U	0.02	U				
1,2-Dibromo-3-chloropropane	0.2	0.21	U	0.04	U	0.04	U	0.04	U				
1,2-Dichloroethane	4.2	0.08	U	0.07	U	0.07	U	0.07	U				
1,2-Dichloropropane	3.1	0.09	U	0.04	U	0.04	U	0.04	U				
1,3,5-Trimethylbenzene	80	0.06	U	0.02	U	0.02	U	0.02	U				
1,3-Dichloropropane	NS	0.02	U	0.06	U	0.06	U	0.06	U				
2,2-Dichloropropane	NS	0.08	U	0.05	U	0.05	U	0.05	U				
2-Butanone	4800	0.81	U	0.81	U	0.81	U	0.81	U				
2-Chloroethyl vinyl ether	NS	0.09	U	0.25	U	0.25	U	0.25	U				
2-Hexanone	40	0.31	U	0.90	U	0.90	U	0.90	U				
2-Phenylbutane	800	0.08	U	0.02	U	0.02	U	0.02	U				
4-Chlorotoluene	NS	0.07	U	0.02	U	0.02	U	0.02	U				
4-Methyl-2-pentanone	640	0.38	U	0.97	U	0.97	U	0.97	U				
Acetone	7200	0.72	U	2.1	U	2.1	U	2.8	J				
Acrolein	1.1	0.29	U	2.5	U	2.5	U	2.5	U				
Acrylonitrile	0.028	0.18	U	0.60	U	0.60	U	0.60	U				
Benzene	1.6	0.06	U	0.03	U	0.03	U	0.03	U				
Bromobenzene	64	0.05	U	0.06	U	0.06	U	0.06	U				
Bromodichloromethane	1.8	0.05	U	0.05	U	0.05	U	0.05	U				
Bromoform	12	0.07	U	0.06	U	0.06	U	0.06	U				
Carbon disulfide	400	0.09	U	0.04	U	0.04	U	0.04	U				
Carbon tetrachloride	0.35	0.08	U	0.04	U	0.04	U	0.04	U				
Chlorobenzene	100	0.04	U	0.02	U	0.02	U	0.02	U				
Chlorobromomethane	NS	0.07	U	0.06	U	0.06	U	0.06	U				
Chloroethane	19000	0.15	U	0.09	U	0.09	U	0.09	U				
Chloroform	1.2	0.08	U	0.03	U	0.03	U	0.03	U				
cis-1,2-Dichloroethene	16	0.10	U	0.04	U	0.04	U	0.04	U				
cis-1,3-Dichloropropene	0.44	0.06	U	0.06	U	0.06	U	0.06	U				
Cumene	800	0.06	U	0.02	U	0.02	U	0.02	U				
Cymene	NS	0.08	U	0.03	U	0.03	U	0.03	U				
Dibromochloromethane	2.2	0.09	U	0.05	U	0.05	U	0.05	U				
Dibromomethane	80	0.08	U	0.14	U	0.14	U	0.14	U				
Ethyl bromide	0.2	0.09	U	0.04	U	0.04	U	0.04	U				
Ethylbenzene	31	0.09	U	0.04	U	0.04	U	0.04	U				
Ethylene dibromide	0.05	0.08	U	0.08	U	0.08	U	0.07	U				
Formaldehyde	1600												
Freon 11	120	0.09	U	0.04	U	0.04	U	0.04	U				
Freon 113	180	0.11	U	0.04	U	0.04	U	0.04	U				
m,p Xylenes	1600	0.14	U	0.05	U	0.05	U	0.05	U				
Methyl bromide	11	0.04	U	0.25	U	0.25	U	0.25	U				
Methyl chloride	153	0.10	U	0.10	U	0.10	U	0.09	U				
Methyl iodide	NS	0.04	U	0.23	U	0.23	U	0.23	U				
Methyl tert-butyl ether	24	0.05	U	0.07	U	0.07	U	0.07	U				
Methylene chloride	5	0.39	U	0.48	U	0.48	U	0.48	U				
n-Butylbenzene	400	0.11	U	0.02	U	0.02	U	0.02	U				
n-Propylbenzene	800	0.08	U	0.02	U	0.02	U	0.02	U				
o-Chlorotoluene	160	0.04	U	0.02	U	0.02	U	0.02	U				
o-Xylene	430	0.06	U	0.04	U	0.04	U	0.03	U				
Styrene	100	0.07	U	0.04	U	0.04	U	0.05	U				
tert-Butylbenzene	800	0.06	U	0.03	U	0.03	U	0.03	U				
Tetrachloroethene	2.9	0.09	U	0.05	U	0.05	U	0.05	U				
Toluene	130	0.06	U	0.04	U	0.04	U	0.04	U				
trans-1,2-Dichloroethene	100	0.08	U	0.05	U	0.05	U	0.05	U				
trans-1,3-Dichloropropene	0.44	0.06	U	0.08	U	0.08	U	0.08	U				
trans-1,4-Dichlorobutene	NS	0.24	U	0.32	U	0.32	U	0.32	U				
Trichloroethene	0.7	0.08	U	0.05	U	0.05	U	0.05	U				
Vinyl acetate	7808	0.07	U	0.07	U	0.07	U	0.07	U				
Vinyl chloride	0.18	0.08	U	0.06	U	0.06	U	0.06	U				
Total Petroleum Hydrocarbons (mg/L)													
Gasoline Range Organics	0.8	0.030	U	0.022	U	0.022	U			0.030	U	0.011	U
Diesel Range Organics	0.5	0.27	NJ	0.28	NJ	0.23	NJ			2.0		3.2	NJ
Motor Oil Range Organics	0.5	0.04	U	0.04	U	0.04	U			0.04	U	0.04	U
TPH-DRO/MORO	0.5	0.27		0.28		0.23				2		3.2	

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Table W-12

**Groundwater Analytical Results Summary - Volatile
Organic Compounds & Total Petroleum Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington**

Notes:

Units are in micrograms per liter (µg/L).

Laboratory Detection Limits = Organic compounds are reported to the Method Detection Limit (MDL) and other parameters are reported to the Reporting Limit (RL).

*Cells are left blank where compound was not analyzed
flow techniques, as described in RI/FS Work Plan*

Shallow (S) = Refers to shallow groundwater monitorin

Deep (D) = Refers to deeper groundwater at the Site.

*National Functional Guidelines (NFG) = USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, October 1999 or
USEPA Contract. Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004.*

Green-shaded, bolded values indicate detected concentration exceeds the selected screening level.

Light gray-shaded values indicate that the method detection limit exceeds the screening level.

Key:

DUP = field duplicate sample

FD = field duplicate sample

mg/L = milligrams per liter

MW = monitoring well

NS = no screening level

N = normal field sample

TPH = total petroleum hydrocarbons

TPH-DRO/MORO = Combined diesel- and motor oil-range total petroleum hydrocarbons

µg/L = micrograms per liter

VOC = volatile organic compounds

Laboratory Data Qualifiers:

j = The value reported is less than the reporting limit and should be considered an estimate; qualifier reported by the laboratory.

J = The detected results are qualified as estimated in accordance with NFGs.

NJ = Estimated value - chromatogram did not resemble the standard hydrocarbon pattern.

U = Result is ≤ the laboratory detection limit or qualified as non-detect in accordance with NFGs.

UJ = Non-detected compound qualified as estimated in accordance with NFGs.

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Table W-13
Groundwater Analytical Results Summary - Semivolatile
Organic Compounds & Polycyclic Aromatic
Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location			MW-1S	MW-1S	MW-1S	MW-1S	MW-1S	MW-1S	MW-1S	MW-1S	MW-1S	MW-1S	MW-1S	MW-1S	MW-1S	MW-1S
Sample Date			23 Mar 2009	23 Mar 2009	27 Apr 2010	27 Apr 2010	27 Oct 2010	27 Oct 2010	25 Apr 2011	25 Apr 2011	29 Nov 2011	25 Apr 2012	14 Mar 2014	26 Aug 2014	31 Mar 2015	02 Sep 2015
Sample ID			DUP032309	MW-01S-032309	DUP-042710	MW-01S-042710	DUP-102710	MW-01S-102710	DUP042511-1	MW-1S-042511	MW-1S-112911	MW-1S-042512	MW-1S-031414	MW-1S-082614-P	MW-1S-033115-P	MW-1S-090215-P
Sample Type			FD	N	FD	N	FD	N	FD	N	N	N	N	N	N	N
Sample Method			low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow
Analyte	TEF	Screening Level Used														
SVOCs (µg/L)																
Pentachlorophenol	--	0.002	0.68 U	0.7 U	0.43 U	0.43 U	0.43 U	0.44 U	2.4 U	2.4 U	2.4 U	0.085 U	0.085 U	0.25 U	0.085 U	0.25 U
2,3,4,6-Tetrachlorophenol	--	480			0.45 U	0.45 U	0.45 U	0.45 U	0.50 U	0.50 U	0.50 U	0.50 U	0.24 U	0.24 U	0.24 U	0.24 U
2,4,5-Trichlorophenol	--	600	0.43 U	0.45 U	0.41 U	0.41 U	0.41 U	0.41 U	2.2 U	2.2 U	2.2 U	2.2 U	1.1 U	1.1 U	1.1 U	1.1 U
2,4,6-Trichlorophenol	--	0.28	0.3 U	0.31 U	0.19 U	0.19 U	0.19 U	0.19 U	2.4 U	2.4 U	2.4 U	2.4 U	1.0 U	1.0 U	1.0 U	1.0 U
2,4-Dichlorophenol	--	10	0.29 U	0.3 U	0.38 U	0.38 U	0.38 U	0.38 U	2.6 U	2.6 U	2.6 U	2.6 U	1.1 U	1.1 U	1.1 U	1.1 U
2-Chlorophenol	--	17	0.57 U	0.58 U	0.36 U	0.36 U	0.36 U	0.36 U	0.50 U	0.50 U	0.50 U	0.50 U	0.22 U	0.22 U	0.22 U	0.22 U
Phenol	--	365	0.53 U	0.54 U	0.12 U	0.12 U	0.12 U	0.12 U	0.50 U	0.50 U	0.50 U	0.50 U	0.27 U	1.2	1.1	0.27 U
Hexachlorobenzene	--	0.000005											0.28 U	0.28 U	0.28 U	0.28 U
1,2,4-Trichlorobenzene	--	0.037														
1,2-Dichlorobenzene	--	4.6														
1,3-Dichlorobenzene	--	2														
1,4-Dichlorobenzene	--	4.9														
2,2-Oxybis(1-chloropropane)	--	320														
2,4-Dimethylphenol	--	6.3														
2,4-Dinitrophenol	--	32														
2,4-Dinitrotoluene	--	0.18														
2,6-Dinitrotoluene	--	0.058														
2-Chloronaphthalene	--	100														
2-Nitroaniline	--	160														
2-Nitrophenol	--	NS														
3,3'-Dichlorobenzidine	--	0.0033														
3-Nitroaniline	--	NS														
4-Bromophenyl phenyl ether	--	NS														
4-Chloro-3-methylphenol	--	36														
4-Chlorophenyl phenyl ether	--	NS														
4-Nitrophenol	--	NS														
Benzoic acid	--	590														
Benzyl alcohol	--	800														
Benzyl butyl phthalate	--	0.013														
Bis(2-chloroethoxy)methane	--	NS														
Bis(2-ethylhexyl)phthalate	--	0.046														
Carbazole	--	NS														
Dibutyl Phthalate	--	8														
Dichloroethyl ether	--	0.04														
Diethyl Phthalate	--	93														
Dimethylphthalate	--	600														
Dinitro-o-cresol	--	7														
Di-n-octyl phthalate	--	0.0039														
Isophorone	--	46														
Nitrobenzene	--	16														
n-Nitrosodi-n-propylamine	--	0.013														
n-Nitrosodiphenylamine	--	0.69														
o-Cresol	--	27														
p-Chloroaniline	--	0.22														
p-Cresol	--	800														
p-Nitroaniline	--	NS														
Hexachloroethane	--	0.02														
Hexachlorocyclopentadiene	--	1														
Hexachlorobutadiene	--	0.01														
PAHs																
1-Methylnaphthalene	--	1.5														
2-Methylnaphthalene	--	32														
Acenaphthene	--	5.3														
Acenaphthylene	--	NS														
Anthracene	--	2.1														
Benzo(a)anthracene	0.1	0.00016														
Benzo(a)pyrene	1	0.000016														
Total (B+J+K) Benzofluoranthenes	0.1	NS														
Benzo(g,h,i)perylene	--	NS														
Chrysene	0.01	0.016														
Dibenzo(a,h)anthracene	0.1	0.000016														
Dibenzofuran	--	16														
Fluoranthene	--	1.8														
Fluorene	--	3.7														
Indeno(1,2,3-cd)pyrene	0.1	0.00016														
Naphthalene	--	1.4														
Phenanthrene	--	NS														
Pyrene	--	2														
Carcinogenic PAH TEQ ND=0,	--	0.000016														
Carcinogenic PAHs TEQ ND=1/2DL, Total ¹		0.000016														

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Table W-13
Groundwater Analytical Results Summary - Semivolatile
Organic Compounds & Polycyclic Aromatic
Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location			MW-1D	MW-1D	MW-1D	MW-1D	MW-1D	MW-1D	MW-1D	MW-1D	MW-1D	MW-1D	MW-2S	MW-2S	MW-2S	MW-2S
Sample Date			23 Mar 2009	27 Apr 2010	27 Oct 2010	25 Apr 2011	29 Nov 2011	25 Apr 2012	14 Mar 2014	26 Aug 2014	31 Mar 2015	02 Sep 2015	24 Mar 2009	27 Apr 2010	27 Oct 2010	26 Apr 2011
Sample ID			MW-01D-032309	MW-01D-042710	MW-01D-102710	MW-1D-042511	MW-1D-112911	MW-1D-042512	MW-1D-031414	MW-1D-082614	MW-1D-033115	MW-1D-090215	MW-02S-032409	MW-02S-042710	MW-02S-102710	MW-2S-042611
Sample Type			N	N	N	N	N	N	N	N	N	N	N	N	N	N
Sample Method			low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow
Analyte	TEF	Screening Level Used														
SVOCs (µg/L)																
Pentachlorophenol	--	0.002	0.68 U	0.44 U	0.44 U	2.4 UJ	2.4 U	0.085 U	0.085 U	0.25 U	0.085 U	0.25 U	0.68 U	0.43 U	0.43 U	2.4 U
2,3,4,6-Tetrachlorophenol	--	480		0.45 U	0.45 U	0.50 UJ	0.50 U	0.50 U	0.24 U	0.24 U	0.24 U	0.24 U		0.45 U	0.45 U	0.50 U
2,4,5-Trichlorophenol	--	600	0.43 U	0.41 U	0.41 U	2.2 UJ	2.2 U	2.2 U	1.1 U	1.1 U	1.1 U	1.1 U	0.43 U	0.41 U	0.41 U	2.2 U
2,4,6-Trichlorophenol	--	0.28	0.3 U	0.19 U	0.19 U	2.4 UJ	2.4 U	2.4 U	1.0 U	1.0 U	1.0 U	1.0 U	0.3 U	0.19 U	0.19 U	2.4 U
2,4-Dichlorophenol	--	10	0.29 U	0.38 U	0.38 U	2.6 UJ	2.6 U	2.6 U	1.1 U	1.1 U	1.1 U	1.1 U	0.29 U	0.38 U	0.38 U	2.6 U
2-Chlorophenol	--	17	0.57 U	0.36 U	0.36 U	0.50 UJ	0.50 U	0.50 U	0.22 U	0.22 U	0.22 U	0.22 U	0.57 U	0.36 U	0.36 U	0.50 U
Phenol	--	365	0.53 U	0.12 U	0.12 U	0.50 UJ	2.5	0.50 U	2.4	1.1	1.3	0.27 U	0.53 U	0.12 U	0.12 U	0.50 U
Hexachlorobenzene	--	0.000005							0.28 U	0.28 U	0.28 U	0.28 U				
1,2,4-Trichlorobenzene	--	0.037														
1,2-Dichlorobenzene	--	4.6														
1,3-Dichlorobenzene	--	2														
1,4-Dichlorobenzene	--	4.9														
2,2-Oxybis(1-chloropropane)	--	320														
2,4-Dimethylphenol	--	6.3														
2,4-Dinitrophenol	--	32														
2,4-Dinitrotoluene	--	0.18														
2,6-Dinitrotoluene	--	0.058														
2-Chloronaphthalene	--	100														
2-Nitroaniline	--	160														
2-Nitrophenol	--	NS														
3,3'-Dichlorobenzidine	--	0.0033														
3-Nitroaniline	--	NS														
4-Bromophenyl phenyl ether	--	NS														
4-Chloro-3-methylphenol	--	36														
4-Chlorophenyl phenyl ether	--	NS														
4-Nitrophenol	--	NS														
Benzoic acid	--	590														
Benzyl alcohol	--	800														
Benzyl butyl phthalate	--	0.013														
Bis(2-chloroethoxy)methane	--	NS														
Bis(2-ethylhexyl)phthalate	--	0.046														
Carbazole	--	NS														
Dibutyl Phthalate	--	8														
Dichloroethyl ether	--	0.04														
Diethyl Phthalate	--	93														
Dimethylphthalate	--	600														
Dinitro-o-cresol	--	7														
Di-n-octyl phthalate	--	0.0039														
Isophorone	--	46														
Nitrobenzene	--	16														
n-Nitrosodi-n-propylamine	--	0.013														
n-Nitrosodiphenylamine	--	0.69														
o-Cresol	--	27														
p-Chloroaniline	--	0.22														
p-Cresol	--	800														
p-Nitroaniline	--	NS														
Hexachloroethane	--	0.02														
Hexachlorocyclopentadiene	--	1														
Hexachlorobutadiene	--	0.01														
PAHs																
1-Methylnaphthalene	--	1.5														
2-Methylnaphthalene	--	32														
Acenaphthene	--	5.3														
Acenaphthylene	--	NS														
Anthracene	--	2.1														
Benzo(a)anthracene	0.1	0.00016														
Benzo(a)pyrene	1	0.000016														
Total (B+J+K) Benzofluoranthenes	0.1	NS														
Benzo(g,h,i)perylene	--	NS														
Chrysene	0.01	0.016														
Dibenzo(a,h)anthracene	0.1	0.000016														
Dibenzofuran	--	16														
Fluoranthene	--	1.8														
Fluorene	--	3.7														
Indeno(1,2,3-cd)pyrene	0.1	0.00016														
Naphthalene	--	1.4														
Phenanthrene	--	NS														
Pyrene	--	2														
Carcinogenic PAH TEQ ND=0,		0.000016														
Carcinogenic PAHs TEQ ND=1/2DL, Total ¹		0.000016														

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Table W-13
Groundwater Analytical Results Summary - Semivolatile
Organic Compounds & Polycyclic Aromatic
Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location			MW-2S	MW-2S	MW-2S	MW-2S	MW-2S	MW-2S	MW-2D	MW-2D	MW-2D	MW-2D	MW-2D	MW-2D	MW-2D	MW-2D
Sample Date			30 Nov 2011	26 Apr 2012	26 Mar 2014	27 Aug 2014	01 Apr 2015	31 Aug 2015	24 Mar 2009	27 Apr 2010	27 Oct 2010	26 Apr 2011	30 Nov 2011	26 Apr 2012	13 Mar 2014	27 Aug 2014
Sample ID			MW-2S-113011	MW-2S-042612	MW-2S-032614P	MW-2S-082714-P	MW-2S-040115-P	MW-2S-083115-P	MW-02D-032409	MW-02D-042710	MW-02D-102710	MW-2D-042611	MW-2D-113011	MW-2D-042612	MW-2D-031314 P	MW-2D-082714-P
Sample Type			N	N	N	N	N	N	N	N	N	N	N	N	N	N
Sample Method			low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow
Analyte	TEF	Screening Level Used														
SVOCs (µg/L)																
Pentachlorophenol	--	0.002	2.4 U	0.085 U	0.26	0.14	0.46	0.32 U	0.68 U	0.43 U	0.44 U	2.4 U	2.4 U	0.085 U	0.085 U	0.25 U
2,3,4,6-Tetrachlorophenol	--	480	0.50 U	0.50 U	0.24 U	0.24 U	0.24 U	0.24 U		0.45 U	0.46 U	0.50 U	0.50 U	0.50 U	0.24 U	0.24 U
2,4,5-Trichlorophenol	--	600	2.2 U	2.2 U	1.1 U	1.1 U	1.1 U	1.1 U	0.43 U	0.41 U	0.41 U	2.2 U	2.2 U	2.2 U	1.1 U	1.1 U
2,4,6-Trichlorophenol	--	0.28	2.4 U	2.4 U	1.0 U	1.0 U	1.0 U	1.0 U	0.3 U	0.19 U	0.19 U	2.4 U	2.4 U	2.4 U	1.0 U	1.0 U
2,4-Dichlorophenol	--	10	2.6 U	2.6 U	1.1 U	1.1 U	1.1 U	1.1 U	0.29 U	0.38 U	0.38 U	2.6 U	2.6 U	2.6 U	1.1 U	1.1 U
2-Chlorophenol	--	17	0.50 U	0.50 U	0.22 U	0.22 U	0.22 U	0.22 U	0.57 U	0.36 U	0.36 U	0.50 U	0.50 U	0.50 U	0.22 U	0.22 U
Phenol	--	365	0.50 U	0.50 U	0.27 U	0.27 U	0.27 U	0.27 U	0.53 U	0.12 U	0.12 U	0.50 U	0.50 U	0.50 U	0.27 U	0.27 U
Hexachlorobenzene	--	0.000005			0.28 U	0.28 U	0.28 U	0.28 U							0.28 U	0.28 U
1,2,4-Trichlorobenzene	--	0.037													0.25 U	0.25 U
1,2-Dichlorobenzene	--	4.6													0.25 U	0.25 U
1,3-Dichlorobenzene	--	2													0.27 U	0.27 U
1,4-Dichlorobenzene	--	4.9													0.27 U	0.27 U
2,2-Oxybis(1-chloropropane)	--	320													0.24 U	0.24 U
2,4-Dimethylphenol	--	6.3													1.1 U	1.1 U
2,4-Dinitrophenol	--	32													3.4 U	3.4 U
2,4-Dinitrotoluene	--	0.18													1.1 U	1.1 U
2,6-Dinitrotoluene	--	0.058													1.1 U	1.1 U
2-Chloronaphthalene	--	100										0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
2-Nitroaniline	--	160													1.5 U	1.5 U
2-Nitrophenol	--	NS													0.26 U	0.26 U
3,3'-Dichlorobenzidine	--	0.0033													1.8 U	1.8 U
3-Nitroaniline	--	NS													1.5 U	1.5 U
4-Bromophenyl phenyl ether	--	NS													0.24 U	0.24 U
4-Chloro-3-methylphenol	--	36													1.1 U	1.1 U
4-Chlorophenyl phenyl ether	--	NS													0.27 U	0.27 U
4-Nitrophenol	--	NS													1.8 U	1.8 U
Benzoic acid	--	590													3.9 U	3.9 U
Benzyl alcohol	--	800													0.55 U	0.55 U
Benzyl butyl phthalate	--	0.013													0.30 U	0.30 U
Bis(2-chloroethoxy)methane	--	NS													0.24 U	0.24 U
Bis(2-ethylhexyl)phthalate	--	0.046													2.1 U	2.1 U
Carbazole	--	NS													0.31 U	0.31 U
Dibutyl Phthalate	--	8													0.29 U	0.29 U
Dichloroethyl ether	--	0.04													0.25 U	0.25 U
Diethyl Phthalate	--	93													0.27 U	0.27 U
Dimethylphthalate	--	600													0.26 U	0.26 U
Dinitro-o-cresol	--	7													3.6 U	3.6 U
Di-n-octyl phthalate	--	0.0039													0.27 U	0.27 U
Isophorone	--	46													0.42 U	0.42 U
Nitrobenzene	--	16													0.25 U	0.25 U
n-Nitrosodi-n-propylamine	--	0.013													0.27 U	0.27 U
n-Nitrosodiphenylamine	--	0.69													0.30 U	0.30 U
o-Cresol	--	27													0.21 U	0.21 U
p-Chloroaniline	--	0.22													1.7 U	1.7 U
p-Cresol	--	800													0.47 U	0.47 U
p-Nitroaniline	--	NS													2.0 U	2.0 U
Hexachloroethane	--	0.02													0.30 U	0.30 U
Hexachlorocyclopentadiene	--	1													1.1 U	1.1 U
Hexachlorobutadiene	--	0.01													0.34 U	0.34 U
PAHs																
1-Methylnaphthalene	--	1.5													0.029 U	0.10 U
2-Methylnaphthalene	--	32													0.030 U	0.10 U
Acenaphthene	--	5.3													0.030 U	0.10 U
Acenaphthylene	--	NS													0.038 U	0.10 U
Anthracene	--	2.1													0.035 U	0.10 U
Benzo(a)anthracene	0.1	0.00016													0.040 U	0.10 U
Benzo(a)pyrene	1	0.000016													0.043 U	0.10 U
Total (B+J+K) Benzofluoranthenes	0.1	NS													0.041 U	0.10 U
Benzo(g,h,i)perylene	--	NS													0.039 U	0.10 U
Chrysene	0.01	0.016													0.032 U	0.10 U
Dibenzo(a,h)anthracene	0.1	0.000016													0.054 U	0.10 U
Dibenzofuran	--	16													0.028 U	0.10 U
Fluoranthene	--	1.8													0.035 U	0.10 U
Fluorene	--	3.7													0.028 U	0.10 U
Indeno(1,2,3-cd)pyrene	0.1	0.00016													0.042 U	0.10 U
Naphthalene	--	1.4													0.030 U	0.10 U
Phenanthrene	--	NS													0.028 U	0.10 U
Pyrene	--	2													0.043 U	0.10 U
Carcinogenic PAH TEQ ND=0,	--	0.000016													0 U	0 U
Carcinogenic PAHs TEQ ND=1/2DL, Total ¹		0.000016													0.03051 U	0.0705 U

Table W-13
Groundwater Analytical Results Summary - Semivolatile
Organic Compounds & Polycyclic Aromatic
Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

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Table W-13
Groundwater Analytical Results Summary - Semivolatile
Organic Compounds & Polycyclic Aromatic
Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location			MW-3D	MW-3D	MW-3D	MW-3D	MW-3D	MW-3D	MW-3D	MW-3D	MW-4S	MW-4S	MW-4S	MW-4S	MW-4S	MW-4S
Sample Date			28 Oct 2010	27 Apr 2011	01 Dec 2011	27 Apr 2012	10 Mar 2014	28 Aug 2014	30 Mar 2015	02 Sep 2015	25 Mar 2009	27 Apr 2010	02 Jun 2010	02 Jun 2010	25 Oct 2010	26 Apr 2011
Sample ID			MW-03D-102810	MW-3D-042711	MW-3D-120111	MW-3D-042712	MW-03D-031014	MW-3D-082814-P	MW-3D-033015-P	MW-3D-090215-P	MW-04S-032509	MW-04S-042710	MW-04S-060210	MW-04S-060210-S	MW-04S-102510	MW-04S-042611
Sample Type			N	N	N	N	N	N	N	N	N	N	N	N	N	N
Sample Method			low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow
Analyte	TEF	Screening Level Used														
SVOCs (µg/L)																
Pentachlorophenol	--	0.002	0.44 UJ	2.4 UJ	2.4 U	0.085 U	0.085 U	0.25 U	0.085 U	0.25 U	2.1	648	141	140	0.43 U	120 J
2,3,4,6-Tetrachlorophenol	--	480	0.46 UJ	0.50 UJ	0.50 U	0.50 U	0.24 U	0.24 U	0.24 U	0.24 U		10.5	3.3 j	0.7 U	0.45 U	1.7
2,4,5-Trichlorophenol	--	600	0.41 UJ	2.2 UJ	2.2 U	2.2 U	1.1 U	1.1 U	1.1 U	1.1 U	0.43 U	0.41 U	0.41 U	1 U	0.41 U	2.2 UJ
2,4,6-Trichlorophenol	--	0.28	0.19 UJ	2.4 UJ	2.4 U	2.4 U	1.0 U	1.0 U	1.0 U	1.0 U	0.3 U	0.19 U	0.19 U	0.6 U	0.19 U	2.4 UJ
2,4-Dichlorophenol	--	10	0.38 UJ	2.6 UJ	2.6 U	2.6 U	1.1 U	1.1 U	1.1 U	1.1 U	0.29 U	0.38 U	0.38 U	0.52 U	0.38 U	2.6 UJ
2-Chlorophenol	--	17	0.37 UJ	0.50 UJ	0.50 U	0.50 U	0.22 U	0.22 U	0.22 U	0.22 U	0.57 U	0.36 U	0.37 U	0.57 U	0.36 U	0.50 U
Phenol	--	365	0.12 UJ	0.50 UJ	0.50 U	0.50 U	0.27 U	0.27 U	0.27 U	0.27 U	0.53 U	0.12 U	0.12 U	0.7 U	0.12 U	0.50 U
Hexachlorobenzene	--	0.000005					0.28 U	0.28 U	0.28 U	0.28 U						
1,2,4-Trichlorobenzene	--	0.037														
1,2-Dichlorobenzene	--	4.6														
1,3-Dichlorobenzene	--	2														
1,4-Dichlorobenzene	--	4.9														
2,2-Oxybis(1-chloropropane)	--	320														
2,4-Dimethylphenol	--	6.3														
2,4-Dinitrophenol	--	32														
2,4-Dinitrotoluene	--	0.18														
2,6-Dinitrotoluene	--	0.058														
2-Chloronaphthalene	--	100														
2-Nitroaniline	--	160														
2-Nitrophenol	--	NS														
3,3'-Dichlorobenzidine	--	0.0033														
3-Nitroaniline	--	NS														
4-Bromophenyl phenyl ether	--	NS														
4-Chloro-3-methylphenol	--	36														
4-Chlorophenyl phenyl ether	--	NS														
4-Nitrophenol	--	NS														
Benzoic acid	--	590														
Benzyl alcohol	--	800														
Benzyl butyl phthalate	--	0.013														
Bis(2-chloroethoxy)methane	--	NS														
Bis(2-ethylhexyl)phthalate	--	0.046														
Carbazole	--	NS														
Dibutyl Phthalate	--	8														
Dichloroethyl ether	--	0.04														
Diethyl Phthalate	--	93														
Dimethylphthalate	--	600														
Dinitro-o-cresol	--	7														
Di-n-octyl phthalate	--	0.0039														
Isophorone	--	46														
Nitrobenzene	--	16														
n-Nitrosodi-n-propylamine	--	0.013														
n-Nitrosodiphenylamine	--	0.69														
o-Cresol	--	27														
p-Chloroaniline	--	0.22														
p-Cresol	--	800														
p-Nitroaniline	--	NS														
Hexachloroethane	--	0.02														
Hexachlorocyclopentadiene	--	1														
Hexachlorobutadiene	--	0.01														
PAHs																
1-Methylnaphthalene	--	1.5														
2-Methylnaphthalene	--	32														
Acenaphthene	--	5.3														
Acenaphthylene	--	NS														
Anthracene	--	2.1														
Benzo(a)anthracene	0.1	0.00016														
Benzo(a)pyrene	1	0.000016														
Total (B+J+K) Benzofluoranthenes	0.1	NS														
Benzo(g,h,i)perylene	--	NS														
Chrysene	0.01	0.016														
Dibenzo(a,h)anthracene	0.1	0.000016														
Dibenzofuran	--	16														
Fluoranthene	--	1.8														
Fluorene	--	3.7														
Indeno(1,2,3-cd)pyrene	0.1	0.00016														
Naphthalene	--	1.4														
Phenanthrene	--	NS														
Pyrene	--	2														
Carcinogenic PAH TEQ ND=0,	--	0.000016														
Carcinogenic PAHs TEQ ND=1/2DL, Total ¹		0.000016														

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Table W-13
Groundwater Analytical Results Summary - Semivolatile
Organic Compounds & Polycyclic Aromatic
Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location			MW-4S	MW-4S	MW-4S	MW-4S	MW-4S	MW-4S	MW-4S	MW-4S	MW-4S	MW-4S	MW-4S	MW-4S	MW-4S	MW-4S
Sample Date			14 Jul 2011	14 Jul 2011	28 Nov 2011	28 Nov 2011	25 Apr 2012	25 Apr 2012	03 Mar 2014	28 Aug 2014	01 Apr 2015	02 Sep 2015	25 Mar 2009	29 Apr 2010	27 Oct 2010	28 Apr 2011
Sample ID			MW-04S-071411	MW-04S-071411R	DUP-112811-1	MW-04S-112811	DUP-042512-1	MW-4S-042512	MW-4S-030314	MW-4S-082814	MW-4S-040115	MW-4S-090215	MW-05S-032509	MW-05S-042910	MW-05S-102710	MW-5S-042811
Sample Type			N	N	FD	N	FD	N	N	N	N	N	N	N	N	N
Sample Method			low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow
Analyte	TEF	Screening Level Used														
SVOCs (µg/L)																
Pentachlorophenol	--	0.002	2.4 U	0.44 U	2.4 U	2.4 U	0.085 U	0.085 U	0.085 U	0.25 U	2.7	0.25 U	0.67 U	0.46 U	0.44 U	2.4 UJ
2,3,4,6-Tetrachlorophenol	--	480	0.50 U	0.45 U	0.50 U	0.50 U	0.50 U	0.50 U	0.24 U	0.24 U	0.24 U	0.24 U		0.48 U	0.46 U	0.50 U
2,4,5-Trichlorophenol	--	600	2.2 U	0.41 U	2.2 U	2.2 U	2.2 U	2.2 U	1.1 U	1.1 U	1.1 U	1.1 U	0.43 UJ	0.43 U	0.41 U	2.2 UJ
2,4,6-Trichlorophenol	--	0.28	2.4 U	0.19 U	2.4 U	2.4 U	2.4 U	2.4 U	1.0 U	1.0 U	1.0 U	1.0 U	0.3 U	0.20 U	0.19 U	2.4 UJ
2,4-Dichlorophenol	--	10	2.6 U	0.38 U	2.6 U	2.6 U	2.6 U	2.6 U	1.1 U	1.1 U	1.1 U	1.1 U	0.29 U	0.40 U	0.38 U	2.6 UJ
2-Chlorophenol	--	17	0.50 U	0.36 U	0.50 U	0.50 U	0.50 U	0.50 U	0.22 U	0.22 U	0.22 U	0.22 U	0.56 U	0.38 U	0.36 U	0.50 U
Phenol	--	365	0.50 U	0.12 U	0.50 U	0.50 U	0.50 U	0.50 U	0.27 U	0.27 U	0.27 U	0.27 U	0.52 U	0.13 U	0.12 U	0.50 U
Hexachlorobenzene	--	0.000005							0.28 U	0.28 U	0.28 U	0.28 U				
1,2,4-Trichlorobenzene	--	0.037				0.10 U		0.11 U	0.25 U	0.25 U	0.25 U	0.25 U				
1,2-Dichlorobenzene	--	4.6				0.06 U		0.04 U	0.25 U	0.25 U	0.25 U	0.25 U				
1,3-Dichlorobenzene	--	2				0.04 U		0.04 U	0.27 U	0.27 U	0.27 U	0.27 U				
1,4-Dichlorobenzene	--	4.9				0.06 U		0.04 U	0.27 U	0.27 U	0.27 U	0.27 U				
2,2-Oxybis(1-chloropropane)	--	320							0.24 U	0.24 U	0.24 UJ	0.24 U				
2,4-Dimethylphenol	--	6.3							1.1 U	1.1 U	1.1 U	1.1 U				
2,4-Dinitrophenol	--	32							3.4 U	3.4 UJ	3.4 U	20 UJ				
2,4-Dinitrotoluene	--	0.18							1.1 U	1.1 U	1.1 U	1.1 U				
2,6-Dinitrotoluene	--	0.058							1.1 U	1.1 U	1.1 U	1.1 U				
2-Chloronaphthalene	--	100							0.25 U	0.25 U	0.25 U	0.25 U				
2-Nitroaniline	--	160							1.5 U	1.5 U	1.5 U	1.5 U				
2-Nitrophenol	--	NS							0.26 U	0.26 U	0.26 U	0.26 U				
3,3'-Dichlorobenzidine	--	0.0033							1.8 U	1.8 U	1.8 U	1.8 U				
3-Nitroaniline	--	NS							1.5 U	1.5 U	1.5 U	1.5 U				
4-Bromophenyl phenyl ether	--	NS							0.24 U	0.24 U	0.24 U	0.24 U				
4-Chloro-3-methylphenol	--	36							1.1 U	1.1 U	1.1 UJ	1.1 U				
4-Chlorophenyl phenyl ether	--	NS							0.27 U	0.27 U	0.27 U	0.27 U				
4-Nitrophenol	--	NS							1.8 U	1.8 U	1.8 U	10 UJ				
Benzoic acid	--	590							3.9 U	3.9 UJ	3.9 U	20 UJ				
Benzyl alcohol	--	800							0.55 U	0.55 U	0.55 U	0.55 U				
Benzyl butyl phthalate	--	0.013							0.30 U	0.30 U	0.30 U	0.30 U				
Bis(2-chloroethoxy)methane	--	NS							0.24 U	0.24 U	0.24 U	0.24 U				
Bis(2-ethylhexyl)phthalate	--	0.046							2.1 U	2.1 U	2.1 U	2.1 U				
Carbazole	--	NS							0.31 U	0.31 U	0.31 U	0.31 U				
Dibutyl Phthalate	--	8							0.29 U	0.29 U	0.29 U	0.29 U				
Dichloroethyl ether	--	0.04							0.25 U	0.25 U	0.25 U	0.25 U				
Diethyl Phthalate	--	93							0.8 U	0.27 U	0.27 U	0.27 U				
Dimethylphthalate	--	600							0.26 U	0.26 U	0.26 U	0.26 U				
Dinitro-o-cresol	--	7							3.6 U	3.6 U	3.6 U	3.6 U				
Di-n-octyl phthalate	--	0.0039							0.27 U	0.27 U	0.27 U	0.27 U				
Isophorone	--	46							0.42 U	0.42 U	0.42 U	0.42 U				
Nitrobenzene	--	16							0.25 U	0.25 U	0.25 U	0.25 U				
n-Nitrosodi-n-propylamine	--	0.013							0.27 U	0.27 U	0.27 U	0.27 U				
n-Nitrosodiphenylamine	--	0.69							0.30 U	0.30 U	0.30 UJ	0.30 U				
o-Cresol	--	27							0.21 U	0.21 U	0.21 U	0.21 U				
p-Chloroaniline	--	0.22							1.7 U	1.7 U	1.7 U	1.7 U				
p-Cresol	--	800							0.47 U	0.47 U	0.47 U	0.47 U				
p-Nitroaniline	--	NS							2.0 U	2.0 U	2.0 U	2.0 U				
Hexachloroethane	--	0.02							0.30 U	0.30 U	0.30 U	0.30 U				
Hexachlorocyclopentadiene	--	1							1.1 U	1.1 U	1.1 U	1.1 U				
Hexachlorobutadiene	--	0.01				0.11 U		0.07 U	0.34 U	0.34 U	0.34 U	0.34 U				
PAHs																
1-Methylnaphthalene	--	1.5							0.029 U	0.10 U	0.029 U	0.029 U				
2-Methylnaphthalene	--	32							0.030 U	0.10 U	0.030 U	0.030 U				
Acenaphthene	--	5.3							0.030 U	0.10 U	0.030 U	0.030 U				
Acenaphthylene	--	NS							0.038 U	0.10 U	0.038 U	0.038 U				
Anthracene	--	2.1							0.035 U	0.10 U	0.035 U	0.035 U				
Benzo(a)anthracene	0.1	0.00016							0.040 U	0.10 U	0.040 U	0.040 U				
Benzo(a)pyrene	1	0.000016							0.043 U	0.10 U	0.043 U	0.043 U				
Total (B+J+K) Benzofluoranthenes	0.1	NS							0.041 U	0.10 U	0.041 U	0.041 U				
Benzo(g,h,i)perylene	--	NS							0.039 U	0.10 U	0.039 U	0.039 U				
Chrysene	0.01	0.016							0.032 U	0.10 U	0.032 U	0.032 U				
Dibenzo(a,h)anthracene	0.1	0.000016							0.054 U	0.10 U	0.054 U	0.054 U				
Dibenzofuran	--	16							0.028 U	0.10 U	0.028 U	0.028 U				
Fluoranthene	--	1.8							0.035 U	0.10 U	0.035 U	0.035 U				
Fluorene	--	3.7							0.028 U	0.10 U	0.028 U	0.028 U				
Indeno(1,2,3-cd)pyrene	0.1	0.00016							0.042 U	0.10 U	0.042 U	0.042 U				
Naphthalene	--	1.4				0.07 U		0.12 U	0.030 U	0.10 U	0.030 U	0.030 U				
Phenanthrene	--	NS							0.028 U	0.10 U	0.028 U	0.028 U				
Pyrene	--	2							0.043 U	0.10 U	0.043 U	0.043 U				
Carcinogenic PAH TEQ ND=0,	--	0.000016							0 U	0 U	0 U	0 U				
Carcinogenic PAHs TEQ ND=1/2DL, Total ¹		0.000016							0.03051 U	0.0705 U	0.03051 U	0.03051 U				

Table W-13
Groundwater Analytical Results Summary - Semivolatiles
Organic Compounds & Polycyclic Aromatic
Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

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Table W-13
Groundwater Analytical Results Summary - Semivolatile
Organic Compounds & Polycyclic Aromatic
Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location			MW-7S	MW-7S	MW-7S	MW-7S	MW-7S	MW-7S	MW-7S	MW-7S	MW-7S	MW-7S	MW-10S	MW-10S	MW-10S	MW-10S
Sample Date			02 Jun 2010	02 Jun 2010	25 Oct 2010	26 Apr 2011	14 Jul 2011	14 Jul 2011	29 Nov 2011	29 Nov 2011	27 Apr 2012	27 Apr 2012	24 Mar 2009	28 Apr 2010	25 Oct 2010	26 Apr 2011
Sample ID			MW-07S-060210	MW-07S-060210-S	MW-07S-102510	MW-07S-042611	MW-07S-071411	MW-07S-071411R	DUP-112911-2	MW-7S-112911	DUP-042712-1	MW-7S-042712	MW-10-032409	MW-10-042810	MW-10-102610	MW-10-042611
Sample Type			N	N	N	N	N	N	FD	N	FD	N	N	N	N	N
Sample Method			low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow
Analyte	TEF	Screening Level Used														
SVOCs (µg/L)																
Pentachlorophenol	--	0.002	21.2	23	30.1	60	280	234	240	370	58 J	53 J	1.9	0.43 U	6.5	2.4 U
2,3,4,6-Tetrachlorophenol	--	480	3.0 j	3.2	2.5 j	2.7	7.9	0.45 U	11	18	4.1	4.0		0.45 U	0.45 U	0.50 U
2,4,5-Trichlorophenol	--	600	0.41 U	0.51 U	0.43 j	2.2 U	2.2 U	1.0 j	2.2 U	2.2 U	2.2 U	2.2 U	0.43 U	0.41 U	0.41 U	2.2 U
2,4,6-Trichlorophenol	--	0.28	1.4 j	0.3 U	0.19 U	2.4 U	2.4 U	0.19 U	2.4 U	2.4 U	2.4 U	2.4 U	0.3 U	0.19 U	0.19 U	2.4 U
2,4-Dichlorophenol	--	10	0.38 U	0.26 U	0.38 U	2.6 U	2.6 U	0.38 U	2.6 U	2.6 U	2.6 U	2.6 U	0.29 U	0.38 U	0.38 U	2.6 U
2-Chlorophenol	--	17	0.36 U	0.28 U	0.36 U	0.50 U	0.50 U	0.36 U	0.50 U	0.50 U	0.50 U	0.50 U	0.57 U	0.36 U	0.36 U	0.50 U
Phenol	--	365	0.12 U	0.35 U	0.12 U	0.50 U	0.50 U	0.12 U	0.50 U	0.50 U	0.50 U	0.50 U	0.53 U	0.12 U	0.12 U	0.50 U
Hexachlorobenzene	--	0.000005														
1,2,4-Trichlorobenzene	--	0.037														
1,2-Dichlorobenzene	--	4.6														
1,3-Dichlorobenzene	--	2														
1,4-Dichlorobenzene	--	4.9														
2,2-Oxybis(1-chloropropane)	--	320														
2,4-Dimethylphenol	--	6.3														
2,4-Dinitrophenol	--	32														
2,4-Dinitrotoluene	--	0.18														
2,6-Dinitrotoluene	--	0.058														
2-Chloronaphthalene	--	100														
2-Nitroaniline	--	160														
2-Nitrophenol	--	NS														
3,3'-Dichlorobenzidine	--	0.0033														
3-Nitroaniline	--	NS														
4-Bromophenyl phenyl ether	--	NS														
4-Chloro-3-methylphenol	--	36														
4-Chlorophenyl phenyl ether	--	NS														
4-Nitrophenol	--	NS														
Benzoic acid	--	590														
Benzyl alcohol	--	800														
Benzyl butyl phthalate	--	0.013														
Bis(2-chloroethoxy)methane	--	NS														
Bis(2-ethylhexyl)phthalate	--	0.046														
Carbazole	--	NS														
Dibutyl Phthalate	--	8														
Dichloroethyl ether	--	0.04														
Diethyl Phthalate	--	93														
Dimethylphthalate	--	600														
Dinitro-o-cresol	--	7														
Di-n-octyl phthalate	--	0.0039														
Isophorone	--	46														
Nitrobenzene	--	16														
n-Nitrosodi-n-propylamine	--	0.013														
n-Nitrosodiphenylamine	--	0.69														
o-Cresol	--	27														
p-Chloroaniline	--	0.22														
p-Cresol	--	800														
p-Nitroaniline	--	NS														
Hexachloroethane	--	0.02														
Hexachlorocyclopentadiene	--	1														
Hexachlorobutadiene	--	0.01														
PAHs																
1-Methylnaphthalene	--	1.5														
2-Methylnaphthalene	--	32														
Acenaphthene	--	5.3														
Acenaphthylene	--	NS														
Anthracene	--	2.1														
Benzo(a)anthracene	0.1	0.00016														
Benzo(a)pyrene	1	0.000016														
Total (B+J+K) Benzofluoranthenes	0.1	NS														
Benzo(g,h,i)perylene	--	NS														
Chrysene	0.01	0.016														
Dibenzo(a,h)anthracene	0.1	0.000016														
Dibenzofuran	--	16														
Fluoranthene	--	1.8														
Fluorene	--	3.7														
Indeno(1,2,3-cd)pyrene	0.1	0.00016														
Naphthalene	--	1.4														
Phenanthrene	--	NS														
Pyrene	--	2														
Carcinogenic PAH TEQ ND=0,	--	0.000016														
Carcinogenic PAHs TEQ ND=1/2DL, Total ¹		0.000016														

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Table W-13
Groundwater Analytical Results Summary - Semivolatile
Organic Compounds & Polycyclic Aromatic
Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location			MW-10S	MW-10S	MW-11S	MW-11S	MW-11S	MW-11S	MW-11S	MW-11S	MW-12S	MW-12S	MW-12S	MW-12S	MW-12S	MW-12S
Sample Date			29 Nov 2011	27 Apr 2012	25 Mar 2009	30 Apr 2010	28 Oct 2010	28 Apr 2011	01 Dec 2011	01 May 2012	25 Mar 2009	30 Apr 2010	28 Oct 2010	28 Apr 2011	01 Dec 2011	01 May 2012
Sample ID			MW-10-112911	MW-10-042712	MW-11-032509	MW-11-043010	MW-11-102810	MW-11-042811	MW-11-120111	MW-11-050112	MW-12-032509	MW-12-043010	MW-12-102810	MW-12-042811	MW-12-120111	MW-12-050112
Sample Type			N	N	N	N	N	N	N	N	N	N	N	N	N	N
Sample Method			low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow
Analyte	TEF	Screening Level Used														
SVOCs (µg/L)																
Pentachlorophenol	--	0.002	15	1.4	0.67 U	0.44 U	0.44 U	2.4 UJ	2.4 U	50	0.68 U	0.44 U	0.44 U	2.4 UJ	2.4 U	0.085 U
2,3,4,6-Tetrachlorophenol	--	480	1.2	0.50 U		0.46 U	0.46 U	0.50 U	0.50 U	0.50 U		0.46 U	0.46 U	0.50 U	0.50 U	0.50 U
2,4,5-Trichlorophenol	--	600	2.2 U	2.2 U	0.43 UJ	0.41 U	0.41 U	2.2 UJ	2.2 U	2.2 U	0.44 UJ	0.41 U	0.41 U	2.2 UJ	2.2 U	2.2 U
2,4,6-Trichlorophenol	--	0.28	2.4 U	2.4 U	0.3 U	0.19 U	0.19 U	2.4 UJ	2.4 U	2.4 U	0.31 U	0.19 U	0.19 U	2.4 UJ	2.4 U	2.4 U
2,4-Dichlorophenol	--	10	2.6 U	2.6 U	0.29 U	0.38 U	0.38 U	2.6 UJ	2.6 U	2.6 U	0.3 U	0.38 U	0.38 U	2.6 UJ	2.6 U	2.6 U
2-Chlorophenol	--	17	0.50 U	0.50 U	0.56 U	0.36 U	0.37 U	0.50 U	0.50 U	0.50 U	0.57 U	0.36 U	0.36 U	0.50 U	0.50 U	0.50 U
Phenol	--	365	0.50 U	0.50 U	0.52 U	0.12 U	0.12 U	0.50 U	0.50 U	0.50 U	0.53 U	0.12 U	0.12 U	0.50 U	0.50 U	0.50 U
Hexachlorobenzene	--	0.000005														
1,2,4-Trichlorobenzene	--	0.037														
1,2-Dichlorobenzene	--	4.6														
1,3-Dichlorobenzene	--	2														
1,4-Dichlorobenzene	--	4.9														
2,2-Oxybis(1-chloropropane)	--	320														
2,4-Dimethylphenol	--	6.3														
2,4-Dinitrophenol	--	32														
2,4-Dinitrotoluene	--	0.18														
2,6-Dinitrotoluene	--	0.058														
2-Chloronaphthalene	--	100														
2-Nitroaniline	--	160														
2-Nitrophenol	--	NS														
3,3'-Dichlorobenzidine	--	0.0033														
3-Nitroaniline	--	NS														
4-Bromophenyl phenyl ether	--	NS														
4-Chloro-3-methylphenol	--	36														
4-Chlorophenyl phenyl ether	--	NS														
4-Nitrophenol	--	NS														
Benzoic acid	--	590														
Benzyl alcohol	--	800														
Benzyl butyl phthalate	--	0.013														
Bis(2-chloroethoxy)methane	--	NS														
Bis(2-ethylhexyl)phthalate	--	0.046														
Carbazole	--	NS														
Dibutyl Phthalate	--	8														
Dichloroethyl ether	--	0.04														
Diethyl Phthalate	--	93														
Dimethylphthalate	--	600														
Dinitro-o-cresol	--	7														
Di-n-octyl phthalate	--	0.0039														
Isophorone	--	46														
Nitrobenzene	--	16														
n-Nitrosodi-n-propylamine	--	0.013														
n-Nitrosodiphenylamine	--	0.69														
o-Cresol	--	27														
p-Chloroaniline	--	0.22														
p-Cresol	--	800														
p-Nitroaniline	--	NS														
Hexachloroethane	--	0.02														
Hexachlorocyclopentadiene	--	1														
Hexachlorobutadiene	--	0.01														
PAHs																
1-Methylnaphthalene	--	1.5														
2-Methylnaphthalene	--	32														
Acenaphthene	--	5.3														
Acenaphthylene	--	NS														
Anthracene	--	2.1														
Benzo(a)anthracene	0.1	0.00016														
Benzo(a)pyrene	1	0.000016														
Total (B+J+K) Benzofluoranthenes	0.1	NS														
Benzo(g,h,i)perylene	--	NS														
Chrysene	0.01	0.016														
Dibenzo(a,h)anthracene	0.1	0.000016														
Dibenzofuran	--	16														
Fluoranthene	--	1.8														
Fluorene	--	3.7														
Indeno(1,2,3-cd)pyrene	0.1	0.00016														
Naphthalene	--	1.4														
Phenanthrene	--	NS														
Pyrene	--	2														
Carcinogenic PAH TEQ ND=0,	--	0.000016														
Carcinogenic PAHs TEQ ND=1/2DL, Total ¹		0.000016														

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Table W-13
Groundwater Analytical Results Summary - Semivolatile
Organic Compounds & Polycyclic Aromatic
Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location			MW-12S	MW-12S	MW-12S	MW-12S	MW-13S	MW-13S	MW-13S	MW-13S	MW-13S	MW-13S	MW-13S	MW-13S	MW-13S	MW-13S
Sample Date			03 Mar 2014	25 Aug 2014	30 Mar 2015	31 Aug 2015	24 Mar 2009	28 Apr 2010	02 Jun 2010	02 Jun 2010	25 Oct 2010	26 Apr 2011	14 Jul 2011	14 Jul 2011	29 Nov 2011	29 Nov 2011
Sample ID			MW-12S-030314	MW-12S-082514	MW-12S-033015	MW-12S-083115	MW-13-032409	MW-13-042810	MW-13-060210	MW-13-060210-S	MW-13-102610	MW-13-042611	MW-13-071411	MW-13-071411R	DUP-112911-3	MW-13-112911
Sample Type			N	N	N	N	N	N	N	N	N	N	N	N	FD	N
Sample Method			low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow
Analyte	TEF	Screening Level Used														
SVOCs (µg/L)																
Pentachlorophenol	--	0.002	0.085 U	1.4	0.085 U	0.31 U	41	88.6	53.2	46	3.6 j	1100	380	307	98	100
2,3,4,6-Tetrachlorophenol	--	480	0.24 U	0.24 U	0.24 U	0.24 U		2.7 j	1.4 j	0.35 U	0.45 U	32	28	21.7	11	9.6
2,4,5-Trichlorophenol	--	600	1.1 U	1.1 U	1.1 U	1.1 U	0.43 U	0.41 U	0.41 U	0.51 U	0.41 U	22 U	2.2 U	0.41 U	2.2 U	2.2 U
2,4,6-Trichlorophenol	--	0.28	1.0 U	1.0 U	1.0 U	1.0 U	0.3 U	0.19 U	0.19 U	0.3 U	0.19 U	24 U	2.4 U	0.19 U	2.4 U	2.4 U
2,4-Dichlorophenol	--	10	1.1 U	1.1 U	1.1 U	1.1 U	0.29 U	0.38 U	0.38 U	0.26 U	0.38 U	26 U	2.6 U	0.38 U	2.6 U	2.6 U
2-Chlorophenol	--	17	0.22 U	0.22 U	0.22 U	0.22 U	0.57 U	0.36 U	0.36 U	0.28 U	0.36 U	5.3 U	0.50 U	0.36 U	0.50 U	0.50 U
Phenol	--	365	0.27 U	0.27 U	0.27 U	0.27 U	0.53 U	0.12 U	0.12 U	0.35 U	0.12 U	5.2 U	0.50 U	0.12 U	0.50 U	0.50 U
Hexachlorobenzene	--	0.000005	0.28 U	0.28 U	0.28 U	0.28 U										
1,2,4-Trichlorobenzene	--	0.037	0.25 U	0.25 U	0.25 U	0.25 U										0.10 U
1,2-Dichlorobenzene	--	4.6	0.25 U	0.25 U	0.25 U	0.25 U										0.06 U
1,3-Dichlorobenzene	--	2	0.27 U	0.27 U	0.27 U	0.27 U										0.04 U
1,4-Dichlorobenzene	--	4.9	0.27 U	0.27 U	0.27 U	0.27 U										0.06 U
2,2-Oxybis(1-chloropropane)	--	320	0.24 U	0.24 U	0.24 U	0.24 U										
2,4-Dimethylphenol	--	6.3	1.1 U	1.1 U	1.1 U	1.1 U										
2,4-Dinitrophenol	--	32	3.4 U	3.4 U	3.4 U	20 U										
2,4-Dinitrotoluene	--	0.18	1.1 U	1.1 U	1.1 U	1.1 U										
2,6-Dinitrotoluene	--	0.058	1.1 U	1.1 U	1.1 U	1.1 U										
2-Chloronaphthalene	--	100	0.25 U	0.25 U	0.25 U	0.25 U										
2-Nitroaniline	--	160	1.5 U	1.5 U	1.5 U	1.5 U										
2-Nitrophenol	--	NS	0.26 U	0.26 U	0.26 U	0.26 U										
3,3'-Dichlorobenzidine	--	0.0033	1.8 U	1.8 U	1.8 U	1.8 U										
3-Nitroaniline	--	NS	1.5 U	1.5 U	1.5 U	1.5 U										
4-Bromophenyl phenyl ether	--	NS	0.24 U	0.24 U	0.24 U	0.24 U										
4-Chloro-3-methylphenol	--	36	1.1 U	1.1 U	1.1 U	1.1 U										
4-Chlorophenyl phenyl ether	--	NS	0.27 U	0.27 U	0.27 U	0.27 U										
4-Nitrophenol	--	NS	1.8 U	1.8 U	1.8 U	1.8 U										
Benzoic acid	--	590	3.9 U	3.9 U	3.9 U	20 U										
Benzyl alcohol	--	800	0.55 U	0.55 U	0.55 U	0.55 U										
Benzyl butyl phthalate	--	0.013	0.30 U	0.30 U	0.30 U	0.30 U										
Bis(2-chloroethoxy)methane	--	NS	0.24 U	0.24 U	0.24 U	0.24 U										
Bis(2-ethylhexyl)phthalate	--	0.046	2.1 U	2.1 U	2.1 U	2.1 U										
Carbazole	--	NS	0.31 U	0.31 U	0.31 U	0.31 U										
Dibutyl Phthalate	--	8	0.29 U	0.29 U	0.29 U	0.29 U										
Dichloroethyl ether	--	0.04	0.25 U	0.25 U	0.25 U	0.25 U										
Diethyl Phthalate	--	93	0.27 U	0.27 U	0.27 U	0.27 U										
Dimethylphthalate	--	600	0.26 U	0.26 U	0.26 U	0.26 U										
Dinitro-o-cresol	--	7	3.6 U	3.6 U	3.6 U	10 U										
Di-n-octyl phthalate	--	0.0039	0.27 U	0.27 U	0.27 U	0.27 U										
Isophorone	--	46	0.42 U	0.42 U	0.42 U	0.42 U										
Nitrobenzene	--	16	0.25 U	0.25 U	0.25 U	0.25 U										
n-Nitrosodi-n-propylamine	--	0.013	0.27 U	0.27 U	0.27 U	0.27 U										
n-Nitrosodiphenylamine	--	0.69	0.30 U	0.30 U	0.30 U	0.30 U										
o-Cresol	--	27	0.21 U	0.21 U	0.21 U	0.21 U										
p-Chloroaniline	--	0.22	1.7 U	1.7 U	1.7 U	1.7 U										
p-Cresol	--	800	0.47 U	0.47 U	0.47 U	0.47 U										
p-Nitroaniline	--	NS	2.0 U	2.0 U	2.0 U	2.0 U										
Hexachloroethane	--	0.02	0.30 U	0.30 U	0.30 U	0.30 U										
Hexachlorocyclopentadiene	--	1	1.1 U	1.1 U	1.1 U	1.1 U										
Hexachlorobutadiene	--	0.01	0.34 U	0.34 U	0.34 U	0.34 U										0.11 U
PAHs																
1-Methylnaphthalene	--	1.5	0.029 U	0.10 U	0.029 U	0.029 U										
2-Methylnaphthalene	--	32	0.030 U	0.10 U	0.030 U	0.030 U										
Acenaphthene	--	5.3	0.030 U	0.10 U	0.030 U	0.030 U										
Acenaphthylene	--	NS	0.038 U	0.10 U	0.038 U	0.038 U										
Anthracene	--	2.1	0.035 U	0.10 U	0.035 U	0.035 U										
Benzo(a)anthracene	0.1	0.00016	0.040 U	0.10 U	0.040 U	0.040 U										
Benzo(a)pyrene	1	0.000016	0.043 U	0.10 U	0.043 U	0.043 U										
Total (B+J+K) Benzofluoranthenes	0.1	NS	0.041 U	0.10 U	0.041 U	0.041 U										
Benzo(g,h,i)perylene	--	NS	0.039 U	0.10 U	0.039 U	0.039 U										
Chrysene	0.01	0.016	0.032 U	0.10 U	0.032 U	0.032 U										
Dibenzo(a,h)anthracene	0.1	0.000016	0.054 U	0.10 U	0.054 U	0.054 U										
Dibenzofuran	--	16	0.028 U	0.10 U	0.028 U	0.028 U										
Fluoranthene	--	1.8	0.035 U	0.10 U	0.035 U	0.035 U										
Fluorene	--	3.7	0.028 U	0.10 U	0.028 U	0.028 U										
Indeno(1,2,3-cd)pyrene	0.1	0.00016	0.042 U	0.10 U	0.042 U	0.042 U										
Naphthalene	--	1.4	0.030 U	0.10 U	0.030 U	0.030 U										0.07 U
Phenanthrene	--	NS	0.028 U	0.10 U	0.028 U	0.028 U										
Pyrene	--	2	0.043 U	0.10 U	0.043 U	0.043 U										
Carcinogenic PAH TEQ ND=0,	--	0.000016	0 U	0 U	0 U	0 U										
Carcinogenic PAHs TEQ ND=1/2DL, Total ¹		0.000016	0.03051 U	0.0705 U	0.03051 U	0.03051 U										

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Table W-13
Groundwater Analytical Results Summary - Semivolatile
Organic Compounds & Polycyclic Aromatic
Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location			MW-13S	MW-13S	MW-13S	MW-13S	MW-13S	MW-13S	MW-13S	MW-13S	MW-14S	MW-14S	MW-14S
Sample Date			30 Apr 2012	30 Apr 2012	07 Mar 2014	25 Aug 2014	30 Mar 2015	30 Mar 2015	31 Aug 2015	31 Aug 2015	25 Mar 2009	25 Mar 2009	29 Apr 2010
Sample ID			DUP-043012-1	MW-13-043012	MW-13S-030714	MW-13S-082514	DUP-033015-02	MW-13S-033015	MW-13S-083115	DUP-083115-01	DUP032509	MW-14-032509	DUP-042910
Sample Type			FD	N	N	N	FD	N	N	FD	FD	N	FD
Sample Method			low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow
Analyte	TEF	Screening Level Used											
SVOCs (µg/L)													
Pentachlorophenol	--	0.002	72	58	95	7700 J	170	120	120	110	0.68 U	0.67 U	0.44 U
2,3,4,6-Tetrachlorophenol	--	480	4.6	4.1	9.5	48	30	28	10	9.0			0.46 U
2,4,5-Trichlorophenol	--	600	2.2 U	2.2 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0.44 UJ	0.43 UJ	0.41 U
2,4,6-Trichlorophenol	--	0.28	2.4 U	2.4 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.31 U	0.3 U	0.19 U
2,4-Dichlorophenol	--	10	2.6 U	2.6 U	1.1 U	1.9 j	2.2 j	2.9 j	1.2 j	1.1 U	0.3 U	0.29 U	0.38 U
2-Chlorophenol	--	17	0.50 U	0.50 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.57 U	0.56 U	0.37 U
Phenol	--	365	0.50 U	0.50 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.53 U	0.52 U	0.12 U
Hexachlorobenzene	--	0.000005			0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U			
1,2,4-Trichlorobenzene	--	0.037		0.11 U									
1,2-Dichlorobenzene	--	4.6		0.04 U									
1,3-Dichlorobenzene	--	2		0.04 U									
1,4-Dichlorobenzene	--	4.9		0.04 U									
2,2-Oxybis(1-chloropropane)	--	320											
2,4-Dimethylphenol	--	6.3											
2,4-Dinitrophenol	--	32											
2,4-Dinitrotoluene	--	0.18											
2,6-Dinitrotoluene	--	0.058											
2-Chloronaphthalene	--	100											
2-Nitroaniline	--	160											
2-Nitrophenol	--	NS											
3,3'-Dichlorobenzidine	--	0.0033											
3-Nitroaniline	--	NS											
4-Bromophenyl phenyl ether	--	NS											
4-Chloro-3-methylphenol	--	36											
4-Chlorophenyl phenyl ether	--	NS											
4-Nitrophenol	--	NS											
Benzoic acid	--	590											
Benzyl alcohol	--	800											
Benzyl butyl phthalate	--	0.013											
Bis(2-chloroethoxy)methane	--	NS											
Bis(2-ethylhexyl)phthalate	--	0.046											
Carbazole	--	NS											
Dibutyl Phthalate	--	8											
Dichloroethyl ether	--	0.04											
Diethyl Phthalate	--	93											
Dimethylphthalate	--	600											
Dinitro-o-cresol	--	7											
Di-n-octyl phthalate	--	0.0039											
Isophorone	--	46											
Nitrobenzene	--	16											
n-Nitrosodi-n-propylamine	--	0.013											
n-Nitrosodiphenylamine	--	0.69											
o-Cresol	--	27											
p-Chloroaniline	--	0.22											
p-Cresol	--	800											
p-Nitroaniline	--	NS											
Hexachloroethane	--	0.02											
Hexachlorocyclopentadiene	--	1											
Hexachlorobutadiene	--	0.01		0.07 U									
PAHs													
1-Methylnaphthalene	--	1.5											
2-Methylnaphthalene	--	32											
Acenaphthene	--	5.3											
Acenaphthylene	--	NS											
Anthracene	--	2.1											
Benzo(a)anthracene	0.1	0.00016											
Benzo(a)pyrene	1	0.000016											
Total (B+J+K) Benzofluoranthenes	0.1	NS											
Benzo(g,h,i)perylene	--	NS											
Chrysene	0.01	0.016											
Dibenzo(a,h)anthracene	0.1	0.000016											
Dibenzofuran	--	16											
Fluoranthene	--	1.8											
Fluorene	--	3.7											
Indeno(1,2,3-cd)pyrene	0.1	0.00016											
Naphthalene	--	1.4		0.12 U									
Phenanthrene	--	NS											
Pyrene	--	2											
Carcinogenic PAH TEQ ND=0,	--	0.000016											
Carcinogenic PAHs TEQ ND=1/2DL, Total ¹		0.000016											

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Table W-13
Groundwater Analytical Results Summary - Semivolatile
Organic Compounds & Polycyclic Aromatic
Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location			MW-14S	MW-14S	MW-14S	MW-14S	MW-14S	MW-14S	MW-14S	MW-14S	MW-14S	MW-14S	MW-14S	MW-14S	MW-14S
Sample Date			29 Apr 2010	27 Oct 2010	27 Oct 2010	27 Apr 2011	27 Apr 2011	02 Dec 2011	30 Apr 2012	07 Mar 2014	07 Mar 2014	29 Aug 2014	29 Aug 2014	03 Apr 2015	03 Apr 2015
Sample ID			MW-14-042910	DUP-102710-B	MW-14-102710	DUP042711-2	MW-14-042711	MW-14-120211	MW-14-043012	DUP-030714-1	MW-14S-030714	DUP-082914-01	MW-14S-082914	DUP-040315-01	MW-14S-040315
Sample Type			N	FD	N	FD	N	N	N	FD	N	FD	N	FD	N
Sample Method			low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow
Analyte	TEF	Screening Level Used													
SVOCs (µg/L)															
Pentachlorophenol	--	0.002	0.43 U	0.44 U	0.44 U	2.4 UJ	2.4 UJ	2.4 U	0.085 U	0.085 U	0.085 U	0.25 U	0.25 U	0.085 U	0.085 U
2,3,4,6-Tetrachlorophenol	--	480	0.45 U	0.45 U	0.46 U	0.50 U	0.50 U	0.50 U	0.50 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U
2,4,5-Trichlorophenol	--	600	0.41 U	0.41 U	0.41 U	2.2 UJ	2.2 UJ	2.2 U	2.2 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
2,4,6-Trichlorophenol	--	0.28	0.19 U	0.19 U	0.19 U	2.4 UJ	2.4 UJ	2.4 U	2.4 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2,4-Dichlorophenol	--	10	0.38 U	0.38 U	0.38 U	2.6 U	2.6 UJ	2.6 U	2.6 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
2-Chlorophenol	--	17	0.36 U	0.36 U	0.36 U	0.50 U	0.50 U	0.50 U	0.50 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
Phenol	--	365	0.12 U	0.12 U	0.12 U	0.50 U	0.50 U	0.50 U	0.50 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U
Hexachlorobenzene	--	0.000005								0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U
1,2,4-Trichlorobenzene	--	0.037													
1,2-Dichlorobenzene	--	4.6													
1,3-Dichlorobenzene	--	2													
1,4-Dichlorobenzene	--	4.9													
2,2-Oxybis(1-chloropropane)	--	320													
2,4-Dimethylphenol	--	6.3													
2,4-Dinitrophenol	--	32													
2,4-Dinitrotoluene	--	0.18													
2,6-Dinitrotoluene	--	0.058													
2-Chloronaphthalene	--	100													
2-Nitroaniline	--	160													
2-Nitrophenol	--	NS													
3,3'-Dichlorobenzidine	--	0.0033													
3-Nitroaniline	--	NS													
4-Bromophenyl phenyl ether	--	NS													
4-Chloro-3-methylphenol	--	36													
4-Chlorophenyl phenyl ether	--	NS													
4-Nitrophenol	--	NS													
Benzoic acid	--	590													
Benzyl alcohol	--	800													
Benzyl butyl phthalate	--	0.013													
Bis(2-chloroethoxy)methane	--	NS													
Bis(2-ethylhexyl)phthalate	--	0.046													
Carbazole	--	NS													
Dibutyl Phthalate	--	8													
Dichloroethyl ether	--	0.04													
Diethyl Phthalate	--	93													
Dimethylphthalate	--	600													
Dinitro-o-cresol	--	7													
Di-n-octyl phthalate	--	0.0039													
Isophorone	--	46													
Nitrobenzene	--	16													
n-Nitrosodi-n-propylamine	--	0.013													
n-Nitrosodiphenylamine	--	0.69													
o-Cresol	--	27													
p-Chloroaniline	--	0.22													
p-Cresol	--	800													
p-Nitroaniline	--	NS													
Hexachloroethane	--	0.02													
Hexachlorocyclopentadiene	--	1													
Hexachlorobutadiene	--	0.01													
PAHs															
1-Methylnaphthalene	--	1.5													
2-Methylnaphthalene	--	32													
Acenaphthene	--	5.3													
Acenaphthylene	--	NS													
Anthracene	--	2.1													
Benzo(a)anthracene	0.1	0.00016													
Benzo(a)pyrene	1	0.000016													
Total (B+J+K) Benzofluoranthenes	0.1	NS													
Benzo(g,h,i)perylene	--	NS													
Chrysene	0.01	0.016													
Dibenzo(a,h)anthracene	0.1	0.000016													
Dibenzofuran	--	16													
Fluoranthene	--	1.8													
Fluorene	--	3.7													
Indeno(1,2,3-cd)pyrene	0.1	0.00016													
Naphthalene	--	1.4													
Phenanthrene	--	NS													
Pyrene	--	2													
Carcinogenic PAH TEQ ND=0,	--	0.000016													
Carcinogenic PAHs TEQ ND=1/2DL, Total ¹		0.000016													

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Table W-13
Groundwater Analytical Results Summary - Semivolatile
Organic Compounds & Polycyclic Aromatic
Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location			MW-14S	MW-14D	MW-14D	MW-16S	MW-16S	MW-16S	MW-16S	MW-16S	MW-16S	MW-17S	MW-17S	MW-17S	MW-17S	MW-17S
Sample Date			03 Sep 2015	02 Dec 2011	30 Apr 2012	26 Mar 2009	29 Apr 2010	27 Oct 2010	28 Apr 2011	06 Dec 2011	30 Apr 2012	23 Mar 2009	27 Apr 2010	25 Oct 2010	25 Apr 2011	28 Nov 2011
Sample ID			MW-14S-090315	MW-14D-120211	MW-14D-043012	MW-16-032609	MW-16-042910	MW-16-102710	MW-16-042811	MW-16-120611	MW-16-043012	MW-17-032309	MW-17-042710	MW-17-102510	MW-17-042511	MW-17-112811
Sample Type			N	N	N	N	N	N	N	N	N	N	N	N	N	N
Sample Method			low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow
Analyte	TEF	Screening Level Used														
SVOCs (µg/L)																
Pentachlorophenol	--	0.002	0.25 U	2.4 U	0.085 U	10	3.8 j	4.6 j	2.4 UJ	24	340	0.68 U	0.43 U	0.44 U	2.4 U	2.4 UJ
2,3,4,6-Tetrachlorophenol	--	480	0.24 U	0.50 U	0.50 U		11.8	4.3 j	0.50 U	2.2	30 J		0.45 U	0.46 U	0.50 U	0.50 UJ
2,4,5-Trichlorophenol	--	600	1.1 U	2.2 U	2.2 U	0.43 UJ	0.41 U	0.41 U	2.2 UJ	2.2 U	2.2 U	0.43 U	0.41 U	0.41 U	2.2 U	2.2 UJ
2,4,6-Trichlorophenol	--	0.28	1.0 U	2.4 U	2.4 U	0.3 U	0.19 U	1.6 j	2.4 UJ	2.4 U	2.4 U	0.3 U	0.19 U	0.19 U	2.4 U	2.4 UJ
2,4-Dichlorophenol	--	10	1.1 U	2.6 U	2.6 U	0.29 U	2.4 j	0.95 j	2.6 UJ	2.6 U	2.6 U	0.29 U	0.38 U	0.38 U	2.6 U	2.6 UJ
2-Chlorophenol	--	17	0.22 U	0.50 U	0.50 U	0.56 U	0.37 U	0.36 U	0.50 U	0.50 U	0.50 U	0.57 U	0.36 U	0.36 U	0.50 U	0.50 UJ
Phenol	--	365	0.27 U	0.50 U	0.50 U	0.52 U	0.12 U	0.12 U	0.50 U	0.50 U	0.50 U	0.53 U	0.12 U	0.12 U	0.50 U	0.50 UJ
Hexachlorobenzene	--	0.000005	0.28 U	0.50 U	0.50 U											
1,2,4-Trichlorobenzene	--	0.037		0.40 U	0.40 U					0.10 U	0.11 U					
1,2-Dichlorobenzene	--	4.6		0.40 U	0.40 U					0.06 U	0.04 U					
1,3-Dichlorobenzene	--	2		0.40 U	0.40 U					0.04 U	0.04 U					
1,4-Dichlorobenzene	--	4.9		0.40 U	0.40 U					0.06 U	0.04 U					
2,2-Oxybis(1-chloropropane)	--	320		0.60 U	0.60 U											
2,4-Dimethylphenol	--	6.3		0.40 U	0.40 U											
2,4-Dinitrophenol	--	32		3.5 U	3.5 U											
2,4-Dinitrotoluene	--	0.18		2.5 U	2.5 U											
2,6-Dinitrotoluene	--	0.058		2.4 U	2.4 U											
2-Chloronaphthalene	--	100		0.50 U	0.50 U											
2-Nitroaniline	--	160		2.6 U	2.6 U											
2-Nitrophenol	--	NS		2.0 U	2.0 U											
3,3'-Dichlorobenzidine	--	0.0033		1.5 U	1.5 U											
3-Nitroaniline	--	NS		2.3 U	2.3 U											
4-Bromophenyl phenyl ether	--	NS		0.40 U	0.40 U											
4-Chloro-3-methylphenol	--	36		2.4 U	2.4 U											
4-Chlorophenyl phenyl ether	--	NS		0.50 U	0.50 U											
4-Nitrophenol	--	NS		2.6 U	2.6 U											
Benzoic acid	--	590		5.1 U	5.1 U											
Benzyl alcohol	--	800		2.0 U	2.0 U											
Benzyl butyl phthalate	--	0.013		0.60 U	0.60 U											
Bis(2-chloroethoxy)methane	--	NS		0.60 U	0.60 U											
Bis(2-ethylhexyl)phthalate	--	0.046		1.0 U	1.0 U											
Carbazole	--	NS		0.30 U	0.30 U											
Dibutyl Phthalate	--	8		0.50 U	0.50 U											
Dichloroethyl ether	--	0.04		0.60 U	0.60 U											
Diethyl Phthalate	--	93		0.60 U	0.60 U											
Dimethylphthalate	--	600		0.50 U	0.50 U											
Dinitro-o-cresol	--	7		3.1 U	3.1 U											
Di-n-octyl phthalate	--	0.0039		0.50 U	0.50 U											
Isophorone	--	46		0.50 U	0.50 U											
Nitrobenzene	--	16		0.60 U	0.60 U											
n-Nitrosodi-n-propylamine	--	0.013		0.60 U	0.60 U											
n-Nitrosodiphenylamine	--	0.69		0.50 U	0.50 U											
o-Cresol	--	27		0.50 U	0.50 U											
p-Chloroaniline	--	0.22		2.6 U	2.6 U											
p-Cresol	--	800		0.50 U	0.50 U											
p-Nitroaniline	--	NS		2.2 U	2.2 U											
Hexachloroethane	--	0.02		0.40 U	0.40 U											
Hexachlorocyclopentadiene	--	1		1.2 U	1.2 U											
Hexachlorobutadiene	--	0.01		0.30 U	0.30 U					0.11 U	0.07 U					
PAHs																
1-Methylnaphthalene	--	1.5		0.016 U	0.016 U											
2-Methylnaphthalene	--	32		0.020 U	0.020 U											
Acenaphthene	--	5.3		0.015 U	0.015 U											
Acenaphthylene	--	NS		0.024 U	0.024 U											
Anthracene	--	2.1		0.025 U	0.025 U											
Benzo(a)anthracene	0.1	0.00016		0.023 U	0.023 U											
Benzo(a)pyrene	1	0.000016		0.059 U	0.059 U											
Total (B+J+K) Benzofluoranthenes	0.1	NS		0.10 U	0.20 U											
Benzo(g,h,i)perylene	--	NS		0.030 U	0.030 U											
Chrysene	0.01	0.016		0.026 U	0.026 U											
Dibenzo(a,h)anthracene	0.1	0.000016		0.042 U	0.042 U											
Dibenzofuran	--	16		0.016 U	0.016 U											
Fluoranthene	--	1.8		0.021 U	0.021 U											
Fluorene	--	3.7		0.019 U	0.019 U											
Indeno(1,2,3-cd)pyrene	0.1	0.00016		0.029 U	0.029 U											
Naphthalene	--	1.4		0.020 U	0.020 U					0.07 U	0.12 U					
Phenanthrene	--	NS		0.026 U	0.026 U											
Pyrene	--	2		0.028 U	0.028 U											
Carcinogenic PAH TEQ ND=0,	--	0.000016		0 U	0 U											
Carcinogenic PAHs TEQ ND=1/2DL, Total ¹		0.000016		0.03933 U	0.04433 U											

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Table W-13
Groundwater Analytical Results Summary - Semivolatile
Organic Compounds & Polycyclic Aromatic
Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location			MW-17S	MW-17S	MW-17S	MW-17S	MW-17S	MW-17S	MW-18S	MW-18S	MW-18S	MW-18S	MW-18S	MW-18S	MW-18S	MW-18S
Sample Date			25 Apr 2012	04 Mar 2014	04 Mar 2014	26 Aug 2014	31 Mar 2015	01 Sep 2015	26 Mar 2009	29 Apr 2010	27 Oct 2010	27 Apr 2011	30 Nov 2011	26 Apr 2012	10 Mar 2014	26 Aug 2014
Sample ID			MW-17-042512	DUP-030414-1	MW-17S-030414P	MW-17S-082614-P	MW-17S-033115-P	MW-17S-090115-P	MW-18-032609	MW-18-042910	MW-18-102710	MW-18-042711	MW-18-113011	MW-18-042612	MW-18S-031014	MW-18S-082614
Sample Type			N	FD	N	N	N	N	N	N	N	N	N	N	N	N
Sample Method			low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow
Analyte	TEF	Screening Level Used														
SVOCs (µg/L)																
Pentachlorophenol	--	0.002	0.085 U	0.085 U	0.085 U	0.25 U	0.16 j	0.25 U	0.68 U	0.44 U	0.44 U	2.4 UJ	2.4 U	0.085 U	0.085 U	0.25 U
2,3,4,6-Tetrachlorophenol	--	480	0.50 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U		0.45 U	0.45 U	0.50 U	0.50 U	0.50 U	0.24 U	0.24 U
2,4,5-Trichlorophenol	--	600	2.2 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0.44 UJ	0.41 U	0.41 U	2.2 UJ	2.2 U	2.2 U	1.1 U	1.1 U
2,4,6-Trichlorophenol	--	0.28	2.4 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.31 U	0.19 U	0.19 U	2.4 UJ	2.4 U	2.4 U	1.0 U	1.0 U
2,4-Dichlorophenol	--	10	2.6 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0.3 U	0.38 U	0.38 U	2.6 UJ	2.6 U	2.6 U	1.1 U	1.1 U
2-Chlorophenol	--	17	0.50 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.57 U	0.36 U	0.36 U	0.50 U	0.50 U	0.50 U	0.22 U	0.22 U
Phenol	--	365	0.50 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.53 U	0.12 U	0.12 U	0.50 U	0.50 U	0.50 U	0.27 U	0.27 U
Hexachlorobenzene	--	0.000005		0.28 U	0.28 U	0.28 U	0.28 U	0.28 U							0.28 U	0.28 U
1,2,4-Trichlorobenzene	--	0.037		0.11 U	0.11 U											
1,2-Dichlorobenzene	--	4.6		0.04 U	0.04 U											
1,3-Dichlorobenzene	--	2		0.04 U	0.04 U											
1,4-Dichlorobenzene	--	4.9		0.04 U	0.04 U											
2,2-Oxybis(1-chloropropane)	--	320														
2,4-Dimethylphenol	--	6.3														
2,4-Dinitrophenol	--	32														
2,4-Dinitrotoluene	--	0.18														
2,6-Dinitrotoluene	--	0.058														
2-Chloronaphthalene	--	100														
2-Nitroaniline	--	160														
2-Nitrophenol	--	NS														
3,3'-Dichlorobenzidine	--	0.0033														
3-Nitroaniline	--	NS														
4-Bromophenyl phenyl ether	--	NS														
4-Chloro-3-methylphenol	--	36														
4-Chlorophenyl phenyl ether	--	NS														
4-Nitrophenol	--	NS														
Benzoic acid	--	590														
Benzyl alcohol	--	800														
Benzyl butyl phthalate	--	0.013														
Bis(2-chloroethoxy)methane	--	NS														
Bis(2-ethylhexyl)phthalate	--	0.046														
Carbazole	--	NS														
Dibutyl Phthalate	--	8														
Dichloroethyl ether	--	0.04														
Diethyl Phthalate	--	93														
Dimethylphthalate	--	600														
Dinitro-o-cresol	--	7														
Di-n-octyl phthalate	--	0.0039														
Isophorone	--	46														
Nitrobenzene	--	16														
n-Nitrosodi-n-propylamine	--	0.013														
n-Nitrosodiphenylamine	--	0.69														
o-Cresol	--	27														
p-Chloroaniline	--	0.22														
p-Cresol	--	800														
p-Nitroaniline	--	NS														
Hexachloroethane	--	0.02														
Hexachlorocyclopentadiene	--	1														
Hexachlorobutadiene	--	0.01		0.07 U	0.07 U											
PAHs																
1-Methylnaphthalene	--	1.5														
2-Methylnaphthalene	--	32														
Acenaphthene	--	5.3														
Acenaphthylene	--	NS														
Anthracene	--	2.1														
Benzo(a)anthracene	0.1	0.00016														
Benzo(a)pyrene	1	0.000016														
Total (B+J+K) Benzofluoranthenes	0.1	NS														
Benzo(g,h,i)perylene	--	NS														
Chrysene	0.01	0.016														
Dibenzo(a,h)anthracene	0.1	0.000016														
Dibenzofuran	--	16														
Fluoranthene	--	1.8														
Fluorene	--	3.7														
Indeno(1,2,3-cd)pyrene	0.1	0.00016														
Naphthalene	--	1.4		0.12 U	0.12 U											
Phenanthrene	--	NS														
Pyrene	--	2														
Carcinogenic PAH TEQ ND=0,	--	0.000016														
Carcinogenic PAHs TEQ ND=1/2DL, Total ¹		0.000016														

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Table W-13
Groundwater Analytical Results Summary - Semivolatile
Organic Compounds & Polycyclic Aromatic
Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location			MW-18S	MW-18S	MW-19S	MW-19S	MW-19S	MW-19S	MW-19S	MW-19S	MW-19S	MW-19S	MW-19S	MW-19S	MW-19S	MW-19S	MW-19S	MW-20S	MW-20S
Sample Date			31 Mar 2015	01 Sep 2015	26 Mar 2009	30 Apr 2010	28 Oct 2010	28 Apr 2011	01 Dec 2011	01 May 2012	05 Mar 2014	25 Aug 2014	30 Mar 2015	31 Aug 2015	26 Mar 2009	28 Apr 2010			
Sample ID			MW-18S-033115	MW-18S-090115	MW-19-032609	MW-19-043010	MW-19-102810	MW-19-042811	MW-19-120111	MW-19-050112	MW-19S-030514	MW-19S-082514	MW-19S-033015	MW-19S-083115	MW-20-032609	MW-20-042810			
Sample Type			N	N	N	N	N	N	N	N	N	N	N	N	N	N			
Sample Method			low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow			
Analyte	TEF	Screening Level Used																	
SVOCs (µg/L)																			
Pentachlorophenol	--	0.002	1.7	0.25 U	0.68 U	0.44 U	0.44 U	2.4 UJ	2.4 U	0.085 U	0.085 U	0.25 U	0.085 U	0.25 U	0.68 U	0.44 U			
2,3,4,6-Tetrachlorophenol	--	480	0.24 U	0.24 U		0.45 U	0.46 U	0.50 U	0.50 U	0.50 U	0.24 U	0.24 U	0.24 U	0.24 U		0.45 U			
2,4,5-Trichlorophenol	--	600	1.1 U	1.1 U	0.43 UJ	0.41 U	0.41 U	2.2 UJ	2.2 U	2.2 U	1.1 U	1.1 U	1.1 U	1.1 U	0.43 UJ	0.41 U			
2,4,6-Trichlorophenol	--	0.28	1.0 U	1.0 U	0.3 U	0.19 U	0.19 U	2.4 UJ	2.4 U	2.4 U	1.0 U	1.0 U	1.0 U	1.0 U	0.3 U	0.19 U			
2,4-Dichlorophenol	--	10	1.1 U	1.1 U	0.29 U	0.38 U	0.38 U	2.6 UJ	2.6 U	2.6 U	1.1 U	1.1 U	1.1 U	1.1 U	0.29 U	0.38 U			
2-Chlorophenol	--	17	0.22 U	0.22 U	0.57 U	0.36 U	0.36 U	0.50 U	0.50 U	0.50 U	0.22 U	0.22 U	0.22 U	0.22 U	0.57 U	0.36 U			
Phenol	--	365	0.27 U	0.27 UJ	0.53 U	0.12 U	0.12 U	0.50 U	0.50 U	0.50 U	0.27 U	0.27 U	0.27 U	0.27 U	0.53 U	0.12 U			
Hexachlorobenzene	--	0.000005	0.28 U	0.28 U							0.28 U	0.28 U	0.28 U	0.28 U					
1,2,4-Trichlorobenzene	--	0.037																	
1,2-Dichlorobenzene	--	4.6																	
1,3-Dichlorobenzene	--	2																	
1,4-Dichlorobenzene	--	4.9																	
2,2-Oxybis(1-chloropropane)	--	320																	
2,4-Dimethylphenol	--	6.3																	
2,4-Dinitrophenol	--	32																	
2,4-Dinitrotoluene	--	0.18																	
2,6-Dinitrotoluene	--	0.058																	
2-Chloronaphthalene	--	100																	
2-Nitroaniline	--	160																	
2-Nitrophenol	--	NS																	
3,3'-Dichlorobenzidine	--	0.0033																	
3-Nitroaniline	--	NS																	
4-Bromophenyl phenyl ether	--	NS																	
4-Chloro-3-methylphenol	--	36																	
4-Chlorophenyl phenyl ether	--	NS																	
4-Nitrophenol	--	NS																	
Benzoic acid	--	590																	
Benzyl alcohol	--	800																	
Benzyl butyl phthalate	--	0.013																	
Bis(2-chloroethoxy)methane	--	NS																	
Bis(2-ethylhexyl)phthalate	--	0.046																	
Carbazole	--	NS																	
Dibutyl Phthalate	--	8																	
Dichloroethyl ether	--	0.04																	
Diethyl Phthalate	--	93																	
Dimethylphthalate	--	600																	
Dinitro-o-cresol	--	7																	
Di-n-octyl phthalate	--	0.0039																	
Isophorone	--	46																	
Nitrobenzene	--	16																	
n-Nitrosodi-n-propylamine	--	0.013																	
n-Nitrosodiphenylamine	--	0.69																	
o-Cresol	--	27																	
p-Chloroaniline	--	0.22																	
p-Cresol	--	800																	
p-Nitroaniline	--	NS																	
Hexachloroethane	--	0.02																	
Hexachlorocyclopentadiene	--	1																	
Hexachlorobutadiene	--	0.01																	
PAHs																			
1-Methylnaphthalene	--	1.5																	
2-Methylnaphthalene	--	32																	
Acenaphthene	--	5.3																	
Acenaphthylene	--	NS																	
Anthracene	--	2.1																	
Benzo(a)anthracene	0.1	0.00016																	
Benzo(a)pyrene	1	0.000016																	
Total (B+J+K) Benzo(a)fluoranthenes	0.1	NS																	
Benzo(g,h,i)perylene	--	NS																	
Chrysene	0.01	0.016																	
Dibenzo(a,h)anthracene	0.1	0.000016																	
Dibenzofuran	--	16																	
Fluoranthene	--	1.8																	
Fluorene	--	3.7																	
Indeno(1,2,3-cd)pyrene	0.1	0.00016																	
Naphthalene	--	1.4																	
Phenanthrene	--	NS																	
Pyrene	--	2																	
Carcinogenic PAH TEQ ND=0,	--	0.000016																	
Carcinogenic PAHs TEQ ND=1/2DL, Total ¹		0.000016																	

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Table W-13
Groundwater Analytical Results Summary - Semivolatile
Organic Compounds & Polycyclic Aromatic
Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location			MW-20S	MW-20S	MW-20S	MW-20S	MW-21S	MW-21S	MW-21S	MW-21S	MW-21S	MW-21S	MW-21S	MW-21S	MW-21S	MW-21S
Sample Date			25 Oct 2010	27 Apr 2011	30 Nov 2011	26 Apr 2012	24 Mar 2009	24 Mar 2009	28 Apr 2010	28 Apr 2010	26 Oct 2010	26 Oct 2010	27 Apr 2011	27 Apr 2011	30 Nov 2011	26 Apr 2012
Sample ID			MW-20-102510	MW-20-042711	MW-20-113011	MW-20-042612	DUP032409	MW-21-032409	DUP-042810	MW-21-042810	DUP-102610	MW-21-102610	DUP042711-1	MW-21-042711	MW-21-113011	MW-21-042612
Sample Type			N	N	N	N	FD	N	FD	N	FD	N	FD	N	N	N
Sample Method			low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow
Analyte	TEF	Screening Level Used														
SVOCs (µg/L)																
Pentachlorophenol	--	0.002	0.50 U	2.4 UJ	2.4 U	0.085 U	0.68 U	0.68 U	0.44 U	0.44 U	0.44 U	0.44 U	2.4 UJ	2.4 UJ	2.4 U	0.085 U
2,3,4,6-Tetrachlorophenol	--	480	0.52 U	0.50 U	0.50 U	0.50 U			0.45 U	0.45 U	0.45 U	0.46 U	0.50 U	0.50 U	0.50 U	0.50 U
2,4,5-Trichlorophenol	--	600	0.47 U	2.2 UJ	2.2 U	2.2 U	0.43 U	0.43 U	0.41 U	0.41 U	0.41 U	0.41 U	2.2 UJ	2.2 UJ	2.2 U	2.2 U
2,4,6-Trichlorophenol	--	0.28	0.22 U	2.4 UJ	2.4 U	2.4 U	0.3 U	0.3 U	0.19 U	0.19 U	0.19 U	0.19 U	2.4 UJ	2.4 UJ	2.4 U	2.4 U
2,4-Dichlorophenol	--	10	0.43 U	2.6 UJ	2.6 U	2.6 U	0.29 U	0.29 U	0.38 U	0.38 U	0.38 U	0.38 U	2.6 UJ	2.6 UJ	2.6 U	2.6 U
2-Chlorophenol	--	17	0.41 U	0.50 U	0.50 U	0.50 U	0.57 U	0.57 U	0.36 U	0.36 U	0.36 U	0.36 U	0.50 U	0.50 U	0.50 U	0.50 U
Phenol	--	365	0.14 U	0.50 U	0.50 U	0.50 U	0.53 U	0.53 U	0.12 U	0.12 U	0.12 U	0.12 U	0.50 U	0.50 U	0.50 U	0.50 U
Hexachlorobenzene	--	0.000005														
1,2,4-Trichlorobenzene	--	0.037														
1,2-Dichlorobenzene	--	4.6														
1,3-Dichlorobenzene	--	2														
1,4-Dichlorobenzene	--	4.9														
2,2-Oxybis(1-chloropropane)	--	320														
2,4-Dimethylphenol	--	6.3														
2,4-Dinitrophenol	--	32														
2,4-Dinitrotoluene	--	0.18														
2,6-Dinitrotoluene	--	0.058														
2-Chloronaphthalene	--	100														
2-Nitroaniline	--	160														
2-Nitrophenol	--	NS														
3,3'-Dichlorobenzidine	--	0.0033														
3-Nitroaniline	--	NS														
4-Bromophenyl phenyl ether	--	NS														
4-Chloro-3-methylphenol	--	36														
4-Chlorophenyl phenyl ether	--	NS														
4-Nitrophenol	--	NS														
Benzoic acid	--	590														
Benzyl alcohol	--	800														
Benzyl butyl phthalate	--	0.013														
Bis(2-chloroethoxy)methane	--	NS														
Bis(2-ethylhexyl)phthalate	--	0.046														
Carbazole	--	NS														
Dibutyl Phthalate	--	8														
Dichloroethyl ether	--	0.04														
Diethyl Phthalate	--	93														
Dimethylphthalate	--	600														
Dinitro-o-cresol	--	7														
Di-n-octyl phthalate	--	0.0039														
Isophorone	--	46														
Nitrobenzene	--	16														
n-Nitrosodi-n-propylamine	--	0.013														
n-Nitrosodiphenylamine	--	0.69														
o-Cresol	--	27														
p-Chloroaniline	--	0.22														
p-Cresol	--	800														
p-Nitroaniline	--	NS														
Hexachloroethane	--	0.02														
Hexachlorocyclopentadiene	--	1														
Hexachlorobutadiene	--	0.01														
PAHs																
1-Methylnaphthalene	--	1.5														
2-Methylnaphthalene	--	32														
Acenaphthene	--	5.3														
Acenaphthylene	--	NS														
Anthracene	--	2.1														
Benzo(a)anthracene	0.1	0.00016														
Benzo(a)pyrene	1	0.000016														
Total (B+J+K) Benzofluoranthenes	0.1	NS														
Benzo(g,h,i)perylene	--	NS														
Chrysene	0.01	0.016														
Dibenzo(a,h)anthracene	0.1	0.000016														
Dibenzofuran	--	16														
Fluoranthene	--	1.8														
Fluorene	--	3.7														
Indeno(1,2,3-cd)pyrene	0.1	0.00016														
Naphthalene	--	1.4														
Phenanthrene	--	NS														
Pyrene	--	2														
Carcinogenic PAH TEQ ND=0,	--	0.000016														
Carcinogenic PAHs TEQ ND=1/2DL, Total ¹		0.000016														

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Table W-13
Groundwater Analytical Results Summary - Semivolatile
Organic Compounds & Polycyclic Aromatic
Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location			MW-22S	MW-22S	MW-22S	MW-22S	MW-22S	MW-22S	MW-23S	MW-23S	MW-23S	MW-23S	MW-23S	MW-23S	MW-24S	MW-24S
Sample Date			24 Mar 2009	28 Apr 2010	25 Oct 2010	26 Apr 2011	28 Nov 2011	25 Apr 2012	24 Mar 2009	28 Apr 2010	26 Oct 2010	27 Apr 2011	28 Nov 2011	25 Apr 2012	25 Mar 2009	28 Apr 2010
Sample ID			MW-22-032409	MW-22-042810	MW-22-102610	MW-22-042611	MW-22-112811	MW-22-042512	MW-23-032409	MW-23-042810	MW-23-102610	MW-23-042711	MW-23-112811	MW-23-042512	MW-24-032509	MW-24-042810
Sample Type			N	N	N	N	N	N	N	N	N	N	N	N	N	N
Sample Method			low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow
Analyte	TEF	Screening Level Used														
SVOCs (µg/L)																
Pentachlorophenol	--	0.002	0.68 U	0.43 U	0.45 U	2.4 UJ	2.4 U	0.085 U	0.68 U	0.44 U	0.43 U	2.4 UJ	2.4 U	0.085 U	0.67 U	0.43 U
2,3,4,6-Tetrachlorophenol	--	480		0.45 U	0.47 U	0.50 U	0.50 U	0.50 U		0.45 U	0.45 U	0.50 U	0.50 U	0.50 U		0.45 U
2,4,5-Trichlorophenol	--	600	0.43 U	0.41 U	0.42 U	2.2 UJ	2.2 U	2.2 U	0.43 U	0.41 U	0.41 U	2.2 UJ	2.2 U	2.2 U	0.43 UJ	0.41 U
2,4,6-Trichlorophenol	--	0.28	0.3 U	0.19 U	0.20 U	2.4 UJ	2.4 U	2.4 U	0.3 U	0.19 U	0.19 U	2.4 UJ	2.4 U	2.4 U	0.3 U	0.19 U
2,4-Dichlorophenol	--	10	0.29 U	0.38 U	0.39 U	2.6 UJ	2.6 U	2.6 U	0.29 U	0.38 U	0.38 U	2.6 UJ	2.6 U	2.6 U	0.29 U	0.38 U
2-Chlorophenol	--	17	0.57 U	0.36 U	0.37 U	0.50 U	0.50 U	0.50 U	0.57 U	0.36 U	0.36 U	0.50 U	0.50 U	0.50 U	0.56 U	0.36 U
Phenol	--	365	0.53 U	0.12 U	0.13 U	0.50 U	0.50 U	0.50 U	0.53 U	0.12 U	0.12 U	0.50 U	0.50 U	0.50 U	0.52 U	0.12 U
Hexachlorobenzene	--	0.000005														
1,2,4-Trichlorobenzene	--	0.037														
1,2-Dichlorobenzene	--	4.6														
1,3-Dichlorobenzene	--	2														
1,4-Dichlorobenzene	--	4.9														
2,2-Oxybis(1-chloropropane)	--	320														
2,4-Dimethylphenol	--	6.3														
2,4-Dinitrophenol	--	32														
2,4-Dinitrotoluene	--	0.18														
2,6-Dinitrotoluene	--	0.058														
2-Chloronaphthalene	--	100														
2-Nitroaniline	--	160														
2-Nitrophenol	--	NS														
3,3'-Dichlorobenzidine	--	0.0033														
3-Nitroaniline	--	NS														
4-Bromophenyl phenyl ether	--	NS														
4-Chloro-3-methylphenol	--	36														
4-Chlorophenyl phenyl ether	--	NS														
4-Nitrophenol	--	NS														
Benzoic acid	--	590														
Benzyl alcohol	--	800														
Benzyl butyl phthalate	--	0.013														
Bis(2-chloroethoxy)methane	--	NS														
Bis(2-ethylhexyl)phthalate	--	0.046														
Carbazole	--	NS														
Dibutyl Phthalate	--	8														
Dichloroethyl ether	--	0.04														
Diethyl Phthalate	--	93														
Dimethylphthalate	--	600														
Dinitro-o-cresol	--	7														
Di-n-octyl phthalate	--	0.0039														
Isophorone	--	46														
Nitrobenzene	--	16														
n-Nitrosodi-n-propylamine	--	0.013														
n-Nitrosodiphenylamine	--	0.69														
o-Cresol	--	27														
p-Chloroaniline	--	0.22														
p-Cresol	--	800														
p-Nitroaniline	--	NS														
Hexachloroethane	--	0.02														
Hexachlorocyclopentadiene	--	1														
Hexachlorobutadiene	--	0.01														
PAHs																
1-Methylnaphthalene	--	1.5														
2-Methylnaphthalene	--	32														
Acenaphthene	--	5.3														
Acenaphthylene	--	NS														
Anthracene	--	2.1														
Benzo(a)anthracene	0.1	0.00016														
Benzo(a)pyrene	1	0.000016														
Total (B+J+K) Benzofluoranthenes	0.1	NS														
Benzo(g,h,i)perylene	--	NS														
Chrysene	0.01	0.016														
Dibenzo(a,h)anthracene	0.1	0.000016														
Dibenzofuran	--	16														
Fluoranthene	--	1.8														
Fluorene	--	3.7														
Indeno(1,2,3-cd)pyrene	0.1	0.00016														
Naphthalene	--	1.4														
Phenanthrene	--	NS														
Pyrene	--	2														
Carcinogenic PAH TEQ ND=0,	--	0.000016														
Carcinogenic PAHs TEQ ND=1/2DL, Total ¹		0.000016														

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Table W-13
Groundwater Analytical Results Summary - Semivolatile
Organic Compounds & Polycyclic Aromatic
Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location			MW-24S	MW-24S	MW-24S	MW-24S	MW-26S	MW-26S	MW-26S	MW-26S	MW-26S	MW-26S	MW-26S	MW-26S	MW-26S	MW-26S
Sample Date			25 Oct 2010	27 Apr 2011	30 Nov 2011	25 Apr 2012	26 Mar 2009	29 Apr 2010	27 Oct 2010	28 Apr 2011	01 Dec 2011	30 Apr 2012	11 Mar 2014	25 Aug 2014	01 Apr 2015	02 Sep 2015
Sample ID			MW-24-102610	MW-24-042711	MW-24-113011	MW-24-042512	MW-26-032609	MW-26-042910	MW-26-102710	MW-26-042811	MW-26-120111	MW-26-043012	MW-26S-031114	MW-26S-082514-P	MW-26S-040115-P	MW-26S-090215-P
Sample Type			N	N	N	N	N	N	N	N	N	N	N	N	N	N
Sample Method			low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow
Analyte	TEF	Screening Level Used														
SVOCs (µg/L)																
Pentachlorophenol	--	0.002	0.43 U	2.4 UJ	2.4 U	0.085 U	0.68 U	0.44 U	0.44 U	2.4 UJ	96	8.2	0.085 U	0.25 U	0.085 U	0.68
2,3,4,6-Tetrachlorophenol	--	480	0.45 U	0.50 U	0.50 U	0.50 U		0.46 U	0.46 U	0.50 U	21	6.4	0.24 U	0.24 U	0.24 U	0.24 U
2,4,5-Trichlorophenol	--	600	0.41 U	2.2 UJ	2.2 U	2.2 U	0.44 UJ	0.41 U	0.41 U	2.2 UJ	2.2 U	2.2 U	1.1 U	1.1 U	1.1 U	1.1 U
2,4,6-Trichlorophenol	--	0.28	0.19 U	2.4 UJ	2.4 U	2.4 U	0.31 U	0.19 U	0.19 U	2.4 UJ	2.4 U	2.4 U	1.0 U	1.0 U	1.0 U	1.0 U
2,4-Dichlorophenol	--	10	0.38 U	2.6 UJ	2.6 U	2.6 U	0.3 U	0.38 U	0.38 U	2.6 UJ	21	20	1.1 U	12	1.1 U	1.1 U
2-Chlorophenol	--	17	0.36 U	0.50 U	0.50 U	0.50 U	0.57 U	0.37 U	0.36 U	0.50 U	0.50 U	0.50 U	0.22 U	0.6 j	0.22 U	0.22 U
Phenol	--	365	0.12 U	0.50 U	0.50 U	0.50 U	0.53 U	0.12 U	0.12 U	0.50 U	0.50 U	0.50 U	0.27 U	0.27 U	0.27 U	0.27 U
Hexachlorobenzene	--	0.000005											0.28 U	0.28 U	0.28 U	0.28 U
1,2,4-Trichlorobenzene	--	0.037														
1,2-Dichlorobenzene	--	4.6														
1,3-Dichlorobenzene	--	2														
1,4-Dichlorobenzene	--	4.9														
2,2-Oxybis(1-chloropropane)	--	320														
2,4-Dimethylphenol	--	6.3														
2,4-Dinitrophenol	--	32														
2,4-Dinitrotoluene	--	0.18														
2,6-Dinitrotoluene	--	0.058														
2-Chloronaphthalene	--	100														
2-Nitroaniline	--	160														
2-Nitrophenol	--	NS														
3,3'-Dichlorobenzidine	--	0.0033														
3-Nitroaniline	--	NS														
4-Bromophenyl phenyl ether	--	NS														
4-Chloro-3-methylphenol	--	36														
4-Chlorophenyl phenyl ether	--	NS														
4-Nitrophenol	--	NS														
Benzoic acid	--	590														
Benzyl alcohol	--	800														
Benzyl butyl phthalate	--	0.013														
Bis(2-chloroethoxy)methane	--	NS														
Bis(2-ethylhexyl)phthalate	--	0.046														
Carbazole	--	NS														
Dibutyl Phthalate	--	8														
Dichloroethyl ether	--	0.04														
Diethyl Phthalate	--	93														
Dimethylphthalate	--	600														
Dinitro-o-cresol	--	7														
Di-n-octyl phthalate	--	0.0039														
Isophorone	--	46														
Nitrobenzene	--	16														
n-Nitrosodi-n-propylamine	--	0.013														
n-Nitrosodiphenylamine	--	0.69														
o-Cresol	--	27														
p-Chloroaniline	--	0.22														
p-Cresol	--	800														
p-Nitroaniline	--	NS														
Hexachloroethane	--	0.02														
Hexachlorocyclopentadiene	--	1														
Hexachlorobutadiene	--	0.01														
PAHs																
1-Methylnaphthalene	--	1.5														
2-Methylnaphthalene	--	32														
Acenaphthene	--	5.3														
Acenaphthylene	--	NS														
Anthracene	--	2.1														
Benzo(a)anthracene	0.1	0.00016														
Benzo(a)pyrene	1	0.000016														
Total (B+J+K) Benzofluoranthenes	0.1	NS														
Benzo(g,h,i)perylene	--	NS														
Chrysene	0.01	0.016														
Dibenzo(a,h)anthracene	0.1	0.000016														
Dibenzofuran	--	16														
Fluoranthene	--	1.8														
Fluorene	--	3.7														
Indeno(1,2,3-cd)pyrene	0.1	0.00016														
Naphthalene	--	1.4														
Phenanthrene	--	NS														
Pyrene	--	2														
Carcinogenic PAH TEQ ND=0,	--	0.000016														
Carcinogenic PAHs TEQ ND=1/2DL, Total ¹		0.000016														

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Table W-13
Groundwater Analytical Results Summary - Semivolatile
Organic Compounds & Polycyclic Aromatic
Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location			MW-27S	MW-27S	MW-27S	MW-27S	MW-27S	MW-27S	MW-28S	MW-28S	MW-28S	MW-29S	MW-29S	MW-29S	MW-30S	MW-30S
Sample Date			26 Mar 2009	29 Apr 2010	27 Oct 2010	28 Apr 2011	01 Dec 2011	30 Apr 2012	02 Dec 2011	02 Dec 2011	01 May 2012	02 Dec 2011	02 Dec 2011	02 May 2012	05 Dec 2011	02 May 2012
Sample ID			MW-27-032609	MW-27-042910	MW-27-102710	MW-27-042811	MW-27-120111	MW-27-043012	MW-28S-120211	DUP-120211-2	MW-28S-050112	DUP-120211-3	MW-29S-120211	MW-29S-050212	MW-30S-120511	MW-30S-050212
Sample Type			N	N	N	N	N	N	N	FD	N	FD	N	N	N	N
Sample Method			low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow
Analyte	TEF	Screening Level Used														
SVOCs (µg/L)																
Pentachlorophenol	--	0.002	0.69 U	0.45 U	0.44 U	2.4 UJ	2.4 U	0.085 U	2.4 U		0.085 U	2.4 U	2.4 U	0.085 U	2.4 U	0.085 U
2,3,4,6-Tetrachlorophenol	--	480		0.47 U	0.46 U	0.50 U	0.50 U	0.50 U	0.50 U		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
2,4,5-Trichlorophenol	--	600	0.44 UJ	0.42 U	0.41 U	2.2 UJ	2.2 U	2.2 U	2.2 U		2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U
2,4,6-Trichlorophenol	--	0.28	0.31 U	0.19 U	0.19 U	2.4 UJ	2.4 U	2.4 U	2.4 U		2.4 U	2.4 U	2.4 U	2.4 U	2.4 U	2.4 U
2,4-Dichlorophenol	--	10	0.3 U	0.39 U	0.38 U	2.6 UJ	2.6 U	2.6 U	2.6 U		2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U
2-Chlorophenol	--	17	0.57 U	0.37 U	0.36 U	0.50 U	0.50 U	0.50 U	0.50 U		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Phenol	--	365	0.53 U	0.13 U	0.12 U	0.50 U	0.50 U	0.50 U	0.50 U		0.50 U	0.50 U	0.50 U	0.50 U	2.1	0.50 U
Hexachlorobenzene	--	0.000005							0.50 U		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2,4-Trichlorobenzene	--	0.037							0.11 U	0.10 U	0.40 U	0.40 U	0.1 U	0.11 U	0.1 U	0.11 U
1,2-Dichlorobenzene	--	4.6							0.04 U	0.06 U	0.40 U	0.40 U	0.06 U	0.04 U	0.06 U	0.04 U
1,3-Dichlorobenzene	--	2							0.04 U	0.04 U	0.40 U	0.40 U	0.04 U	0.04 U	0.04 U	0.04 U
1,4-Dichlorobenzene	--	4.9							0.04 U	0.06 U	0.40 U	0.40 U	0.06 U	0.04 U	0.06 U	0.04 U
2,2-Oxybis(1-chloropropane)	--	320							0.60 U		0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U
2,4-Dimethylphenol	--	6.3							0.40 U		0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U
2,4-Dinitrophenol	--	32							3.5 U		3.5 U	3.5 U	3.5 U	3.5 U	3.5 U	3.5 U
2,4-Dinitrotoluene	--	0.18							2.5 U		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
2,6-Dinitrotoluene	--	0.058							2.4 U		2.4 U	2.4 U	2.4 U	2.4 U	2.4 U	2.4 U
2-Chloronaphthalene	--	100							0.50 U		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
2-Nitroaniline	--	160							2.6 U		2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U
2-Nitrophenol	--	NS							2.0 U		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
3,3'-Dichlorobenzidine	--	0.0033							1.5 U		1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U
3-Nitroaniline	--	NS							2.3 U		2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U
4-Bromophenyl phenyl ether	--	NS							0.40 U		0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U
4-Chloro-3-methylphenol	--	36							2.4 U		2.4 U	2.4 U	2.4 U	2.4 U	2.4 U	2.4 U
4-Chlorophenyl phenyl ether	--	NS							0.50 U		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
4-Nitrophenol	--	NS							2.6 U		2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U
Benzoic acid	--	590							5.1 U		5.1 U	5.1 U	5.1 U	5.1 U	5.1 U	5.1 U
Benzyl alcohol	--	800							2.0 U		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Benzyl butyl phthalate	--	0.013							0.60 U		0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U
Bis(2-chloroethoxy)methane	--	NS							0.60 U		0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U
Bis(2-ethylhexyl)phthalate	--	0.046							1.0 U		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Carbazole	--	NS							0.30 U		0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U
Dibutyl Phthalate	--	8							0.50 U		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dichloroethyl ether	--	0.04							0.60 U		0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U
Diethyl Phthalate	--	93							0.60 U		0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U
Dimethylphthalate	--	600							0.50 U		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dinitro-o-cresol	--	7							3.1 U		3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U
Di-n-octyl phthalate	--	0.0039							0.50 U		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Isophorone	--	46							0.50 U		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Nitrobenzene	--	16							0.60 U		0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U
n-Nitrosodi-n-propylamine	--	0.013							0.60 U		0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U
n-Nitrosodiphenylamine	--	0.69							0.50 U		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
o-Cresol	--	27							0.50 U		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
p-Chloroaniline	--	0.22							2.6 U		2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U
p-Cresol	--	800							0.50 U		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
p-Nitroaniline	--	NS							2.2 U		2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U
Hexachloroethane	--	0.02							0.40 U		0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U
Hexachlorocyclopentadiene	--	1							1.2 U		1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
Hexachlorobutadiene	--	0.01							0.07 U	0.11 U	0.30 U	0.30 U	0.11 U	0.07 U	0.11 U	0.07 U
PAHs																
1-Methylnaphthalene	--	1.5							0.016 U		0.016 U	0.016 U	0.016 U	0.016 U	0.06 j	0.016 U
2-Methylnaphthalene	--	32							0.020 U		0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Acenaphthene	--	5.3							0.015 U		0.015 U	0.015 U	0.015 U	0.015 U	0.22	0.14
Acenaphthylene	--	NS							0.024 U		0.024 U	0.024 U	0.024 U	0.024 U	0.09 j	0.024 U
Anthracene	--	2.1							0.025 U		0.025 U	0.025 U	0.025 U	0.025 U	0.08 j	0.025 U
Benzo(a)anthracene	0.1	0.00016							0.023 U		0.023 U	0.023 U	0.023 U	0.023 UJ	0.023 U	0.023 UJ
Benzo(a)pyrene	1	0.000016							0.059 U		0.059 U	0.059 U	0.059 U	0.059 U	0.059 U	0.059 U
Total (B+J+K) Benzofluoranthenes	0.1	NS							0.10 U		0.20 U	0.10 U	0.10 U	0.20 U	0.10 U	0.20 U
Benzo(g,h,i)perylene	--	NS							0.030 U		0.030 U	0.030 U	0.030 U	0.030 U	0.030 U	0.030 U
Chrysene	0.01	0.016							0.026 U		0.026 U	0.026 U	0.026 U	0.026 U	0.026 U	0.026 U
Dibenzo(a,h)anthracene	0.1	0.000016							0.042 U		0.042 U	0.042 U	0.042 U	0.042 U	0.042 U	0.042 U
Dibenzofuran	--	16							0.016 U		0.016 U	0.016 U	0.016 U	0.016 U	0.016 U	0.016 U
Fluoranthene	--	1.8							0.021 U		0.021 U	0.021 U	0.021 U	0.021 U	0.24	0.06 j
Fluorene	--	3.7							0.019 U		0.019 U	0.019 U	0.019 U	0.019 U	0.17	0.019 U
Indeno(1,2,3-cd)pyrene	0.1	0.00016							0.029 U		0.029 U	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U
Naphthalene	--	1.4							0.020 U	0.07 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.07 j
Phenanthrene	--	NS							0.026 U		0.026 U	0.026 U	0.026 U	0.026 U	0.44	0.08 j
Pyrene	--	2							0.028 U		0.028 U	0.028 U	0.028 U	0.028 U	0.31	0.09 j
Carcinogenic PAH TEQ ND=0,	--	0.000016							0 U		0 U	0 U	0 U	0 U	0 U	0 U
Carcinogenic PAHs TEQ ND=1/2DL, Total ¹		0.000016							0.03933 U		0.04433 U	0.03933 U	0.03933 U	0.04548 U	0.03933 U	0.04548 U

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Table W-13
Groundwater Analytical Results Summary - Semivolatile
Organic Compounds & Polycyclic Aromatic
Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location		MW-31S	MW-31S	MW-31S	MW-31S	MW-31S	MW-31S	MW-31S	MW-31S	MW-31D	MW-31D	MW-31D	MW-31D	MW-32DR	MW-32S	MW-32S
Sample Date		05 Dec 2011	02 May 2012	02 May 2012	12 Mar 2014	28 Aug 2014	02 Apr 2015	03 Sep 2015	12 Mar 2014	28 Aug 2014	02 Apr 2015	03 Sep 2015	01 May 2012	06 Dec 2011	01 May 2012	
Sample ID		MW-31S-120511	DUP-050212-1	MW-31S-050212	MW-31S-031214	MW-31S-082814	MW-31S-040215	MW-31S-090315	MW-31D-031214	MW-31D-082814	MW-31D-040215	MW-31D-090315	MW-32DR-050112	MW-32S-120611	MW-32S-050112	
Sample Type		N	FD	N	N	N	N	N	N	N	N	N	N	N	N	
Sample Method		low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	
Analyte	TEF	Screening Level Used														
SVOCs (µg/L)																
Pentachlorophenol	--	0.002	2.4 U	0.085 U	0.085 U	0.085 U	0.25 U	0.085 U	0.17 j	0.085 U	0.25 U	0.085 U	0.25 U	0.085 U	2.4 U	0.085 U
2,3,4,6-Tetrachlorophenol	--	480	0.50 U	0.50 U	0.50 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.50 U	0.50 U	0.50 U
2,4,5-Trichlorophenol	--	600	2.2 U	2.2 U	2.2 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	2.2 U	2.2 U	2.2 U
2,4,6-Trichlorophenol	--	0.28	2.4 U	2.4 U	2.4 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.4 U	2.4 U	2.4 U
2,4-Dichlorophenol	--	10	2.6 U	2.6 U	2.6 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	2.6 U	2.6 U	2.6 U
2-Chlorophenol	--	17	0.50 U	0.50 U	0.50 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.50 U	0.50 U	0.50 U
Phenol	--	365	1.1	4.0	4.3	5.9	5.6	4.4	35	0.27 U	0.27 U	0.27 U	0.27 U	0.50 U	0.50 U	0.50 U
Hexachlorobenzene	--	0.000005	0.50 U	0.50 U	0.50 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.50 U	0.50 U	0.50 U
1,2,4-Trichlorobenzene	--	0.037	0.1 U	0.11 U	0.11 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.40 U	0.40 U	0.40 U
1,2-Dichlorobenzene	--	4.6	0.06 U	0.04 U	0.04 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.40 U	0.40 U	0.40 U
1,3-Dichlorobenzene	--	2	0.04 U	0.04 U	0.04 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.40 U	0.40 U	0.40 U
1,4-Dichlorobenzene	--	4.9	0.06 U	0.04 U	0.04 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.40 U	0.40 U	0.40 U
2,2-Oxybis(1-chloropropane)	--	320	0.60 U	0.60 U	0.60 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.60 U	0.60 U	0.60 U
2,4-Dimethylphenol	--	6.3	0.40 U	0.40 U	0.40 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0.40 U	0.40 U	0.40 U
2,4-Dinitrophenol	--	32	3.5 U	3.5 U	3.5 U	3.4 U	3.4 U	3.4 U	20 U	3.4 U	3.4 U	3.4 U	20 U	3.5 U	3.5 U	3.5 U
2,4-Dinitrotoluene	--	0.18	2.5 U	2.5 U	2.5 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	2.5 U	2.5 U	2.5 U
2,6-Dinitrotoluene	--	0.058	2.4 U	2.4 U	2.4 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	2.4 U	2.4 U	2.4 U
2-Chloronaphthalene	--	100	0.50 U	0.50 U	0.50 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.50 U	0.50 U	0.50 U
2-Nitroaniline	--	160	2.6 U	2.6 U	2.6 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	2.6 U	2.6 U	2.6 U
2-Nitrophenol	--	NS	2.0 U	2.0 U	2.0 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	2.0 U	2.0 U	2.0 U
3,3'-Dichlorobenzidine	--	0.0033	1.5 U	1.5 U	1.5 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.5 U	1.5 U	1.5 U
3-Nitroaniline	--	NS	2.3 U	2.3 U	2.3 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	2.3 U	2.3 U	2.3 U
4-Bromophenyl phenyl ether	--	NS	0.40 U	0.40 U	0.40 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.40 U	0.40 U	0.40 U
4-Chloro-3-methylphenol	--	36	2.4 U	2.4 U	2.4 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	2.4 U	2.4 U	2.4 U
4-Chlorophenyl phenyl ether	--	NS	0.50 U	0.50 U	0.50 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.50 U	0.50 U	0.50 U
4-Nitrophenol	--	NS	2.6 U	2.6 U	2.6 U	1.8 U	1.8 U	1.8 U	10 U	1.8 U	1.8 U	1.8 U	10 U	2.6 U	2.6 U	2.6 U
Benzoic acid	--	590	5.1 U	5.1 U	5.1 U	3.9 U	3.9 U	3.9 U	20 U	3.9 U	3.9 U	3.9 U	20 U	5.1 U	5.1 U	5.1 U
Benzyl alcohol	--	800	2.0 U	2.0 U	2.0 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	2.0 U	2.0 U	2.0 U
Benzyl butyl phthalate	--	0.013	0.60 U	0.60 U	0.60 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.60 U	0.60 U	0.60 U
Bis(2-chloroethoxy)methane	--	NS	0.60 U	0.60 U	0.60 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.60 U	0.60 U	0.60 U
Bis(2-ethylhexyl)phthalate	--	0.046	1.0 U	1.0 U	1.0 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	1.0 U	1.0 U	1.1
Carbazole	--	NS	0.30 U	0.30 U	0.30 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.30 U	0.30 U	0.30 U
Dibutyl Phthalate	--	8	0.50 U	0.50 U	0.50 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.50 U	0.50 U	0.50 U
Dichloroethyl ether	--	0.04	0.60 U	0.60 U	0.60 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.60 U	0.60 U	0.60 U
Diethyl Phthalate	--	93	0.60 U	0.60 U	0.60 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.60 U	0.60 U	0.60 U
Dimethylphthalate	--	600	0.50 U	0.50 U	0.50 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.50 U	0.50 U	0.50 U
Dinitro-o-cresol	--	7	3.1 U	3.1 U	3.1 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.1 U	3.1 U	3.1 U
Di-n-octyl phthalate	--	0.0039	0.50 U	0.50 U	0.50 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.50 U	0.50 U	0.50 U
Isophorone	--	46	0.50 U	0.50 U	0.50 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.50 U	0.50 U	0.50 U
Nitrobenzene	--	16	0.60 U	0.60 U	0.60 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.60 U	0.60 U	0.60 U
n-Nitrosodi-n-propylamine	--	0.013	0.60 U	0.60 U	0.60 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.60 U	0.60 U	0.60 U
n-Nitrosodiphenylamine	--	0.69	0.50 U	0.50 U	0.50 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.50 U	0.50 U	0.50 U
o-Cresol	--	27	0.50 U	0.50 U	0.50 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.50 U	0.50 U	0.50 U
p-Chloroaniline	--	0.22	2.6 U	2.6 U	2.6 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	2.6 U	2.6 U	2.6 U
p-Cresol	--	800	0.50 U	0.50 U	0.50 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.50 U	0.50 U	0.50 U
p-Nitroaniline	--	NS	2.2 U	2.2 U	2.2 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.2 U	2.2 U	2.2 U
Hexachloroethane	--	0.02	0.40 U	0.40 U	0.40 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.40 U	0.40 U	0.40 U
Hexachlorocyclopentadiene	--	1	1.2 U	1.2 U	1.2 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.2 U	1.2 U	1.2 U
Hexachlorobutadiene	--	0.01	0.11 U	0.07 U	0.07 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.30 U	0.30 U	0.30 U
PAHs																
1-Methylnaphthalene	--	1.5	0.016 U	0.016 U	0.016 U	0.029 U	0.10 U	0.029 U	0.029 U	0.029 U	0.10 U	0.029 U	0.029 U	0.016 U	0.016 U	0.016 U
2-Methylnaphthalene	--	32	0.020 U	0.020 U	0.020 U	0.030 U	0.10 U	0.030 U	0.030 U	0.030 U	0.10 U	0.030 U	0.030 U	0.020 U	0.020 U	0.020 U
Acenaphthene	--	5.3	0.015 U	0.015 U	0.015 U	0.030 U	0.10 U	0.030 U	0.030 U	0.030 U	0.10 U	0.030 U	0.030 U	0.015 U	0.015 U	0.015 U
Acenaphthylene	--	NS	0.024 U	0.024 U	0.024 U	0.038 U	0.10 U	0.038 U	0.038 U	0.038 U	0.10 U	0.038 U	0.038 U	0.024 U	0.024 U	0.024 U
Anthracene	--	2.1	0.025 U	0.025 U	0.025 U	0.035 U	0.10 U	0.035 U	0.035 U	0.035 U	0.10 U	0.035 U	0.035 U	0.025 U	0.025 U	0.025 U
Benzo(a)anthracene	0.1	0.00016	0.023 U	0.023 U	0.023 U	0.040 U	0.10 U	0.040 U	0.040 U	0.040 U	0.10 U	0.040 U	0.040 U	0.023 U	0.023 U	0.023 U
Benzo(a)pyrene	1	0.000016	0.059 U	0.059 U	0.059 U	0.043 U	0.10 U	0.043 U	0.043 U	0.043 U	0.10 U	0.043 U	0.043 U	0.059 U	0.059 U	0.059 U
Total (B+J+K) Benzofluoranthenes	0.1	NS	0.10 U	0.20 U	0.20 U	0.041 U	0.10 U	0.041 U	0.041 U	0.041 U	0.10 U	0.041 U	0.041 U	0.20 U	0.10 U	0.20 U
Benzo(g,h,i)perylene	--	NS	0.030 U	0.030 U	0.030 U	0.039 U	0.10 U	0.039 U	0.039 U	0.039 U	0.10 U	0.039 U	0.039 U	0.030 U	0.030 U	0.030 U
Chrysene	0.01	0.016	0.026 U	0.026 U	0.026 U	0.032 U	0.10 U	0.032 U	0.032 U	0.032 U	0.10 U	0.032 U	0.032 U	0.026 U	0.026 U	0.026 U
Dibenzo(a,h)anthracene	0.1	0.000016	0.042 U	0.042 U	0.042 U	0.054 U	0.10 U	0.054 U	0.054 U	0.054 U	0.10 U	0.054 U	0.054 U	0.042 U	0.042 U	0.042 U
Dibenzofuran	--	16	0.016 U	0.016 U	0.016 U	0.028 U	0.10 U	0.028 U	0.028 U	0.028 U	0.10 U	0.028 U	0.028 U	0.016 U	0.016 U	0.016 U
Fluoranthene	--	1.8	0.06 j	0.021 U	0.021 U	0.035 U	0.10 U	0.035 U	0.035 U	0.035 U	0.10 U	0.035 U	0.035 U	0.021 U	0.021 U	0.021 U
Fluorene	--	3.7	0.019 U	0.019 U	0.019 U	0.028 U	0.10 U	0.028 U	0.028 U	0.028 U	0.10 U	0.028 U	0.028 U	0.019 U	0.019 U	0.019 U
Indeno(1,2,3-cd)pyrene	0.1	0.00016	0.029 U	0.029 U	0.029 U	0.042 U	0.10 U	0.042 U	0.042 U	0.042 U	0.10 U	0.042 U	0.042 U	0.029 U	0.029 U	0.029 U
Naphthalene	--	1.4	0.020 U	0.020 U	0.020 U	0.030 U	0.10 U	0.030 U	0.030 U	0.030 U	0.10 U	0.030 U	0.030 U	0.020 U	0.020 U	0.020 U
Phenanthrene	--	NS	0.026 U	0.026 U	0.026 U	0.028 U	0.10 U	0.028 U	0.028 U	0.028 U	0.10 U	0.028 U	0.028 U	0.026 U	0.026 U	0.026 U
Pyrene	--	2	0.08 j													

PUBLIC REVIEW DRAFT
Table W-13
Groundwater Analytical Results Summary - Semivolatile
Organic Compounds & Polycyclic Aromatic
Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location			MW-33S	MW-33S	MW-33S	MW-33S	MW-33S	MW-33S	MW-33S	MW-33S	MW-33S	MW-33S	MW-34S	MW-34S	MW-34S	MW-34S
Sample Date			05 Dec 2011	05 Dec 2011	02 May 2012	06 Mar 2014	26 Aug 2014	26 Aug 2014	31 Mar 2015	31 Mar 2015	01 Sep 2015	01 Sep 2015	06 Dec 2011	03 May 2012	07 Mar 2014	27 Aug 2014
Sample ID			DUP-120511-3	MW-33S-120511	MW-33S-050212	MW-33S-030614	DUP-082614-03	MW-33S-082614-P	DUP-033115-P-01	MW-33S-033115-P	DUP-090115-02	MW-33S-090115-P	MW-34S-120611	MW-34S-050312	MW-34S-030714	MW-34S-082714
Sample Type			FD	N	N	N	FD	N	FD	N	FD	N	N	N	N	N
Sample Method			low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow
Analyte	TEF	Screening Level Used														
SVOCs (µg/L)																
Pentachlorophenol	--	0.002	2.4 U	2.4 U	0.65	1.1	0.25 U	0.25 U	0.54	0.60	0.76 U	0.71 U	2.4 U	0.085 U	0.085 U	0.25 U
2,3,4,6-Tetrachlorophenol	--	480	0.50 U	0.50 U	0.50 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.50 U	0.50 U	0.24 U	0.24 U
2,4,5-Trichlorophenol	--	600	2.2 U	2.2 U	2.2 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	2.2 U	2.2 U	1.1 U	1.1 U
2,4,6-Trichlorophenol	--	0.28	2.4 U	2.4 U	2.4 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.4 U	2.4 U	1.0 U	1.0 U
2,4-Dichlorophenol	--	10	2.6 U	2.6 U	2.6 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	2.6 U	2.6 U	1.1 U	1.1 U
2-Chlorophenol	--	17	0.50 U	0.50 U	0.50 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.50 U	0.50 U	0.22 U	0.22 U
Phenol	--	365	2.0	2.3	4.2	1.4	2.1	2.0	0.27 U	0.27 U	0.27 U	0.27 U	0.50 U	0.50 U	0.27 U	0.27 U
Hexachlorobenzene	--	0.000005	0.50 U	0.50 U	0.50 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.50 U	0.50 U	0.28 U	0.28 U
1,2,4-Trichlorobenzene	--	0.037	0.40 U	0.40 U	0.40 U								0.40 U	0.40 U	0.11 U	
1,2-Dichlorobenzene	--	4.6	0.40 U	0.40 U	0.40 U								0.40 U	0.40 U	0.04 U	
1,3-Dichlorobenzene	--	2	0.40 U	0.40 U	0.40 U								0.40 U	0.40 U	0.04 U	
1,4-Dichlorobenzene	--	4.9	0.40 U	0.40 U	0.40 U								0.40 U	0.40 U	0.04 U	
2,2-Oxybis(1-chloropropane)	--	320	0.60 U	0.60 U	0.60 U								0.60 U	0.60 U		
2,4-Dimethylphenol	--	6.3	0.40 U	0.40 U	0.40 U								0.40 U	0.40 U		
2,4-Dinitrophenol	--	32	3.5 U	3.5 U	3.5 U								3.5 U	3.5 U		
2,4-Dinitrotoluene	--	0.18	2.5 U	2.5 U	2.5 U								2.5 U	2.5 U		
2,6-Dinitrotoluene	--	0.058	2.4 U	2.4 U	2.4 U								2.4 U	2.4 U		
2-Chloronaphthalene	--	100	0.50 U	0.50 U	0.50 U								0.50 U	0.50 U		
2-Nitroaniline	--	160	2.6 U	2.6 U	2.6 U								2.6 U	2.6 U		
2-Nitrophenol	--	NS	2.0 U	2.0 U	2.0 U								2.0 U	2.0 U		
3,3'-Dichlorobenzidine	--	0.0033	1.5 U	1.5 U	1.5 U								1.5 U	1.5 U		
3-Nitroaniline	--	NS	2.3 U	2.3 U	2.3 U								2.3 U	2.3 U		
4-Bromophenyl phenyl ether	--	NS	0.40 U	0.40 U	0.40 U								0.40 U	0.40 U		
4-Chloro-3-methylphenol	--	36	2.4 U	2.4 U	2.4 U								2.4 U	2.4 U		
4-Chlorophenyl phenyl ether	--	NS	0.50 U	0.50 U	0.50 U								0.50 U	0.50 U		
4-Nitrophenol	--	NS	2.6 U	2.6 U	2.6 U								2.6 U	2.6 U		
Benzoic acid	--	590	5.1 U	5.1 U	5.1 U								5.1 U	5.1 U		
Benzyl alcohol	--	800	2.0 U	2.0 U	2.0 U								2.0 U	2.0 U		
Benzyl butyl phthalate	--	0.013	0.60 U	0.60 U	0.60 U								0.60 U	0.60 U		
Bis(2-chloroethoxy)methane	--	NS	0.60 U	0.60 U	0.60 U								0.60 U	0.60 U		
Bis(2-ethylhexyl)phthalate	--	0.046	1.4 U	2.4 U	1.0 U								1.0 U	1.0 U		
Carbazole	--	NS	0.30 U	0.30 U	0.30 U								0.30 U	0.30 U		
Dibutyl Phthalate	--	8	0.50 U	0.50 U	0.50 U								0.50 U	0.50 U		
Dichloroethyl ether	--	0.04	0.60 U	0.60 U	0.60 U								0.60 U	0.60 U		
Diethyl Phthalate	--	93	0.60 U	0.60 U	0.60 U								0.60 U	0.60 U		
Dimethylphthalate	--	600	0.50 U	0.50 U	0.50 U								0.50 U	0.50 U		
Dinitro-o-cresol	--	7	3.1 U	3.1 U	3.1 U								3.1 U	3.1 U		
Di-n-octyl phthalate	--	0.0039	0.50 U	0.50 U	0.50 U								0.50 U	0.50 U		
Isophorone	--	46	0.50 U	0.50 U	0.50 U								0.50 U	0.50 U		
Nitrobenzene	--	16	0.60 U	0.60 U	0.60 U								0.60 U	0.60 U		
n-Nitrosodi-n-propylamine	--	0.013	0.60 U	0.60 U	0.60 U								0.60 U	0.60 U		
n-Nitrosodiphenylamine	--	0.69	0.50 U	0.50 U	0.50 U								0.50 U	0.50 U		
o-Cresol	--	27	0.50 U	0.50 U	0.50 U								0.50 U	0.50 U		
p-Chloroaniline	--	0.22	2.6 U	2.6 U	2.6 U								2.6 U	2.6 U		
p-Cresol	--	800	0.50 U	0.50 U	0.50 U								0.50 U	0.50 U		
p-Nitroaniline	--	NS	2.2 U	2.2 U	2.2 U								2.2 U	2.2 U		
Hexachloroethane	--	0.02	0.40 U	0.40 U	0.40 U								0.40 U	0.40 U		
Hexachlorocyclopentadiene	--	1	1.2 U	1.2 U	1.2 U								1.2 U	1.2 U		
Hexachlorobutadiene	--	0.01	0.30 U	0.30 U	0.30 U								0.30 U	0.30 U	0.07 U	
PAHs																
1-Methylnaphthalene	--	1.5	0.016 U	0.016 U	0.016 U								0.016 U	0.016 U		1
2-Methylnaphthalene	--	32	0.020 U	0.020 U	0.020 U								0.020 U	0.020 U		
Acenaphthene	--	5.3	0.06 j	0.05 j	0.015 U								0.015 U	0.015 U		
Acenaphthylene	--	NS	0.024 U	0.024 U	0.024 U								0.024 U	0.024 U		
Anthracene	--	2.1	0.025 U	0.025 U	0.025 U								0.025 U	0.025 U		
Benzo(a)anthracene	0.1	0.00016	0.023 U	0.023 U	0.023 U								0.023 U	0.023 U		
Benzo(a)pyrene	1	0.000016	0.059 U	0.059 U	0.059 U								0.059 U	0.059 U		
Total (B+J+K) Benzofluoranthenes	0.1	NS	0.10 U	0.10 U	0.20 U								0.10 U	0.20 U		
Benzo(g,h,i)perylene	--	NS	0.030 U	0.030 U	0.030 U								0.030 U	0.030 U		
Chrysene	0.01	0.016	0.026 U	0.026 U	0.026 U								0.026 U	0.026 U		
Dibenzo(a,h)anthracene	0.1	0.000016	0.042 U	0.042 U	0.042 U								0.042 U	0.042 U		
Dibenzofuran	--	16	0.016 U	0.016 U	0.016 U								0.016 U	0.016 U		
Fluoranthene	--	1.8	0.021 U	0.021 U	0.021 U								0.021 U	0.021 U		
Fluorene	--	3.7	0.019 U	0.019 U	0.019 U								0.019 U	0.019 U		
Indeno(1,2,3-cd)pyrene	0.1	0.00016	0.029 U	0.029 U	0.029 U								0.029 U	0.029 U		
Naphthalene	--	1.4	0.07 j	0.08 j	0.020 U								0.020 U	0.020 U	0.12 U	
Phenanthrene	--	NS	0.026 U	0.026 U	0.026 U								0.026 U	0.026 U		
Pyrene	--	2	0.028 U	0.028 U	0.028 U								0.028 U	0.028 U		
Carcinogenic PAH TEQ ND=0,	--	0.000016	0 U	0 U	0 U								0 U	0 U		
Carcinogenic PAHs TEQ ND=1/2DL, Total ¹		0.000016	0.03933 U	0.03933 U	0.04433 U								0.03933 U	0.04433 U		

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Table W-13
Groundwater Analytical Results Summary - Semivolatile
Organic Compounds & Polycyclic Aromatic
Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location			MW-34S		MW-34S		MW-35S		MW-35S		MW-35S		MW-35S		MW-35S		MW-35S		MW-35D	
Sample Date			01 Apr 2015		02 Sep 2015		06 Dec 2011		03 May 2012		06 Mar 2014		27 Aug 2014		02 Apr 2015		31 Aug 2015		06 Mar 2014	
Sample ID			MW-34S-040115		MW-34S-090215		MW-35S-120611		MW-35S-050312		MW-35S-030614		MW-35S-082714-P		MW-35S-040215-P		MW-35S-083115-P		MW-35D-030614	
Sample Type			N		N		N		N		N		N		N		N		N	
Sample Method			low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow	
Analyte	TEF	Screening Level Used																		
SVOCs (µg/L)																				
Pentachlorophenol	--	0.002	0.085 U	0.25 U	2.4 U	0.085 U	0.085 U	0.25 U	0.085 U	0.25 U	0.085 U	0.25 U	0.085 U	0.25 U	0.085 U	0.25 U	0.085 U	0.25 U	0.085 U	0.25 U
2,3,4,6-Tetrachlorophenol	--	480	0.24 U	0.24 U	0.50 U	0.50 U	0.24 U	0.24 U	0.50 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U
2,4,5-Trichlorophenol	--	600	1.1 U	1.1 U	2.2 U	2.2 U	1.1 U	1.1 U	2.2 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
2,4,6-Trichlorophenol	--	0.28	1.0 U	1.0 U	2.4 U	2.4 U	1.0 U	1.0 U	2.4 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2,4-Dichlorophenol	--	10	1.1 U	1.1 U	2.6 U	2.6 U	1.1 U	1.1 U	2.6 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
2-Chlorophenol	--	17	0.22 U	0.22 U	0.50 U	0.50 U	0.22 U	0.22 U	0.50 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
Phenol	--	365	0.27 U	0.27 U	8.8	7.6	35	4.6	8.9	3.2	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U
Hexachlorobenzene	--	0.000005	0.28 U	0.28 U	0.50 U	0.50 U	0.28 U	0.28 U	0.50 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U
1,2,4-Trichlorobenzene	--	0.037			0.40 U	0.40 U			0.40 U											
1,2-Dichlorobenzene	--	4.6			0.40 U	0.40 U			0.40 U											
1,3-Dichlorobenzene	--	2			0.40 U	0.40 U			0.40 U											
1,4-Dichlorobenzene	--	4.9			0.40 U	0.40 U			0.40 U											
2,2-Oxybis(1-chloropropane)	--	320			0.60 U	0.60 U			0.60 U											
2,4-Dimethylphenol	--	6.3			0.40 U	0.40 U			0.40 U											
2,4-Dinitrophenol	--	32			3.5 U	3.5 U			3.5 U											
2,4-Dinitrotoluene	--	0.18			2.5 U	2.5 U			2.5 U											
2,6-Dinitrotoluene	--	0.058			2.4 U	2.4 U			2.4 U											
2-Chloronaphthalene	--	100			0.50 U	0.50 U			0.50 U											
2-Nitroaniline	--	160			2.6 U	2.6 U			2.6 U											
2-Nitrophenol	--	NS			2.0 U	2.0 U			2.0 U											
3,3'-Dichlorobenzidine	--	0.0033			1.5 U	1.5 U			1.5 U											
3-Nitroaniline	--	NS			2.3 U	2.3 U			2.3 U											
4-Bromophenyl phenyl ether	--	NS			0.40 U	0.40 U			0.40 U											
4-Chloro-3-methylphenol	--	36			2.4 U	2.4 U			2.4 U											
4-Chlorophenyl phenyl ether	--	NS			0.50 U	0.50 U			0.50 U											
4-Nitrophenol	--	NS			2.6 U	2.6 U			2.6 U											
Benzoic acid	--	590			5.1 U	5.1 U			5.1 U											
Benzyl alcohol	--	800			2.0 U	2.0 U			2.0 U											
Benzyl butyl phthalate	--	0.013			0.60 U	0.60 U			0.60 U											
Bis(2-chloroethoxy)methane	--	NS			0.60 U	0.60 U			0.60 U											
Bis(2-ethylhexyl)phthalate	--	0.046			1.0 U	1.0 U			1.0 U											
Carbazole	--	NS			0.30 U	0.30 U			0.30 U											
Dibutyl Phthalate	--	8			0.50 U	0.50 U			0.50 U											
Dichloroethyl ether	--	0.04			0.60 U	0.60 U			0.60 U											
Diethyl Phthalate	--	93			0.60 U	0.60 U			0.60 U											
Dimethylphthalate	--	600			0.50 U	0.50 U			0.50 U											
Dinitro-o-cresol	--	7			3.1 U	3.1 U			3.1 U											
Di-n-octyl phthalate	--	0.0039			0.50 U	0.50 U			0.50 U											
Isophorone	--	46			0.50 U	0.50 U			0.50 U											
Nitrobenzene	--	16			0.60 U	0.60 U			0.60 U											
n-Nitrosodi-n-propylamine	--	0.013			0.60 U	0.60 U			0.60 U											
n-Nitrosodiphenylamine	--	0.69			0.50 U	0.50 U			0.50 U											
o-Cresol	--	27			0.50 U	0.50 U			0.50 U											
p-Chloroaniline	--	0.22			2.6 U	2.6 U			2.6 U											
p-Cresol	--	800			0.50 U	0.50 U			0.50 U											
p-Nitroaniline	--	NS			2.2 U	2.2 U			2.2 U											
Hexachloroethane	--	0.02			0.40 U	0.40 U			0.40 U											
Hexachlorocyclopentadiene	--	1			1.2 U	1.2 U			1.2 U											
Hexachlorobutadiene	--	0.01			0.30 U	0.30 U			0.30 U											
PAHs																				
1-Methylnaphthalene	--	1.5			0.08	0.22			0.020 U	0.05										
2-Methylnaphthalene	--	32			0.020 U	0.05			0.015 U	0.015 U										
Acenaphthene	--	5.3			0.015 U	0.015 U			0.024 U	0.024 U										
Acenaphthylene	--	NS			0.024 U	0.024 U			0.025 U	0.025 U										
Anthracene	--	2.1			0.025 U	0.025 U			0.023 U	0.023 U										
Benzo(a)anthracene	0.1	0.00016			0.023 U	0.023 U			0.059 U	0.059 U										
Benzo(a)pyrene	1	0.000016			0.059 U	0.059 U			0.10 U	0.20 U										
Total (B+J+K) Benzofluoranthenes	0.1	NS			0.10 U	0.20 U			0.030 U	0.030 U										
Benzo(g,h,i)perylene	--	NS			0.030 U	0.030 U			0.026 U	0.026 U										
Chrysene	0.01	0.016			0.026 U	0.026 U			0.042 U	0.042 U										
Dibenzo(a,h)anthracene	0.1	0.000016			0.042 U	0.042 U			0.36	1.0										
Dibenzofuran	--	16			0.36	1.0			0.021 U	0.021 U										
Fluoranthene	--	1.8			0.021 U	0.021 U			0.019 U	0.019 U										
Fluorene	--	3.7			0.019 U	0.019 U														
Indeno(1,2,3-cd)pyrene	0.1	0.00016			0.029 U	0.029 U			0.028 U	0.028 U										
Naphthalene	--	1.4			0.08	0.21														
Phenanthrene	--	NS			0.026 U	0.026 U			0.028 U	0.028 U										
Pyrene	--	2			0.028 U	0.028 U			0 U	0 U										
Carcinogenic PAH TEQ ND=0,	--	0.000016			0 U	0 U			0.03933 U	0.04433 U										
Carcinogenic PAHs TEQ ND=1/2DL, Total ¹		0.000016			0.03933 U	0.04433 U														

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Table W-13
Groundwater Analytical Results Summary - Semivolatile
Organic Compounds & Polycyclic Aromatic
Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location			MW-35D	MW-35D	MW-35D	MW-38D	MW-38D	MW-38D	MW-38D	MW-38D	MW-43S	MW-43S	MW-43S	MW-43S	MW-43S	MW-43S
Sample Date			27 Aug 2014	01 Apr 2015	31 Aug 2015	14 Mar 2014	29 Aug 2014	03 Apr 2015	02 Sep 2015	04 Mar 2014	04 Mar 2014	25 Aug 2014	25 Aug 2014	30 Mar 2015	30 Mar 2015	03 Sep 2015
Sample ID			MW-35D-082714-P	MW-35D-040115-P	MW-35D-083115-P	MW-38D-031414	MW-38D-082914	MW-38D-040315	MW-38D-090215	DUP-030414-2	MW-43S-030414	DUP-082514-02	MW-43S-082514-P	DUP-033015-01	MW-43S-033015-P	DUP-090315-02
Sample Type			N	N	N	N	N	N	N	FD	N	FD	N	FD	N	FD
Sample Method			low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow
Analyte	TEF	Screening Level Used														
SVOCs (µg/L)																
Pentachlorophenol	--	0.002	0.25 U	0.085 U	0.25 U	0.085 U	0.25 U	0.085 U	0.25 U	0.085 U	0.085 U	0.25 U	0.25 U	0.085 U	0.085 U	0.25 U
2,3,4,6-Tetrachlorophenol	--	480	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U
2,4,5-Trichlorophenol	--	600	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
2,4,6-Trichlorophenol	--	0.28	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2,4-Dichlorophenol	--	10	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
2-Chlorophenol	--	17	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
Phenol	--	365	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U
Hexachlorobenzene	--	0.000005	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U
1,2,4-Trichlorobenzene	--	0.037				0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
1,2-Dichlorobenzene	--	4.6				0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
1,3-Dichlorobenzene	--	2				0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U
1,4-Dichlorobenzene	--	4.9				0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U
2,2-Oxybis(1-chloropropane)	--	320	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 UJ	0.24 UJ	0.24 UJ	0.24 U
2,4-Dimethylphenol	--	6.3				1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
2,4-Dinitrophenol	--	32				3.4 U	3.4 U	3.4 U	20 UJ	3.4 U	3.4 U	3.4 U	3.4 UJ	3.4 UJ	3.4 U	20 UJ
2,4-Dinitrotoluene	--	0.18	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
2,6-Dinitrotoluene	--	0.058				1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
2-Chloronaphthalene	--	100				0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
2-Nitroaniline	--	160				1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U
2-Nitrophenol	--	NS				0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U
3,3'-Dichlorobenzidine	--	0.0033				1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U
3-Nitroaniline	--	NS				1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U
4-Bromophenyl phenyl ether	--	NS				0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U
4-Chloro-3-methylphenol	--	36				1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
4-Chlorophenyl phenyl ether	--	NS				0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U
4-Nitrophenol	--	NS				1.8 U	1.8 U	1.8 U	10 UJ	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	10 UJ
Benzoic acid	--	590				3.9 U	3.9 U	3.9 U	20 UJ	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U	20 UJ
Benzyl alcohol	--	800				0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 UJ	0.55 UJ	0.55 UJ	0.55 U
Benzyl butyl phthalate	--	0.013				0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U
Bis(2-chloroethoxy)methane	--	NS				0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U
Bis(2-ethylhexyl)phthalate	--	0.046				2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.4 j	2.1 U
Carbazole	--	NS				0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U
Dibutyl Phthalate	--	8				0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U
Dichloroethyl ether	--	0.04				0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Diethyl Phthalate	--	93				0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U
Dimethylphthalate	--	600				0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U
Dinitro-o-cresol	--	7				3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U
Di-n-octyl phthalate	--	0.0039				0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U
Isophorone	--	46				0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U
Nitrobenzene	--	16				0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
n-Nitrosodi-n-propylamine	--	0.013				0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U
n-Nitrosodiphenylamine	--	0.69				0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U
o-Cresol	--	27				0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
p-Chloroaniline	--	0.22				1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U
p-Cresol	--	800				0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U
p-Nitroaniline	--	NS				2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Hexachloroethane	--	0.02				0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U
Hexachlorocyclopentadiene	--	1				1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
Hexachlorobutadiene	--	0.01				0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U
PAHs																
1-Methylnaphthalene	--	1.5				0.029 U	0.10 UJ	0.029 U	0.029 U	0.08 j	0.08 j	0.15	0.16	0.07 j	0.09 j	0.10
2-Methylnaphthalene	--	32				0.030 U	0.10 UJ	0.030 U	0.030 U	0.07 j	0.07 j	0.12	0.11	0.06 j	0.06 j	0.08 j

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Table W-13
Groundwater Analytical Results Summary - Semivolatile
Organic Compounds & Polycyclic Aromatic
Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington

Location			MW-43S	MW-43D	MW-43D	MW-43D	MW-43D	MW-45S	MW-45S	MW-45S	MW-45S	MW-45D	MW-45D	MW-45D	MW-45D
Sample Date			03 Sep 2015	04 Mar 2014	25 Aug 2014	30 Mar 2015	03 Sep 2015	11 Mar 2014	26 Aug 2014	31 Mar 2015	01 Sep 2015	11 Mar 2014	26 Aug 2014	31 Mar 2015	01 Sep 2015
Sample ID			MW-43S-090315-P	MW-43D-030414	MW-43D-082514	MW-43D-033015	MW-43D-090315	MW-45S-031114	MW-45S-082614-P	MW-45S-033115-P	MW-45S-090115-P	MW-45D-031114	MW-45D-082614-P	MW-45D-033115-P	MW-45D-090115-P
Sample Type			N	N	N	N	N	N	N	N	N	N	N	N	N
Sample Method			low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow	low-flow
Analyte	TEF	Screening Level Used													
SVOCs (µg/L)															
Pentachlorophenol	--	0.002	0.31	0.085 U	0.18 j	0.085 U	0.25 U	110	230	330	280 J	0.085 U	0.25 U	0.73	1.5 B
2,3,4,6-Tetrachlorophenol	--	480	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	14	19	52	54	0.24 U	0.24 U	0.24 U	0.24 U
2,4,5-Trichlorophenol	--	600	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.6 j	1.7 j	3.7 j	1.1 U	1.1 U	1.1 U	1.1 U
2,4,6-Trichlorophenol	--	0.28	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2,4-Dichlorophenol	--	10	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.7 j	1.1 U	2.6 j	1.1 U	1.1 U	1.1 U	1.1 U
2-Chlorophenol	--	17	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
Phenol	--	365	0.27 U	3.9	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U
Hexachlorobenzene	--	0.000005	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U
1,2,4-Trichlorobenzene	--	0.037	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U								
1,2-Dichlorobenzene	--	4.6	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U								
1,3-Dichlorobenzene	--	2	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U								
1,4-Dichlorobenzene	--	4.9	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U								
2,2-Oxybis(1-chloropropane)	--	320	0.24 U	0.24 U	0.24 U	0.24 UJ	0.24 U								
2,4-Dimethylphenol	--	6.3	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U								
2,4-Dinitrophenol	--	32	20 UJ	3.4 U	3.4 U	3.4 U	20 UJ								
2,4-Dinitrotoluene	--	0.18	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U								
2,6-Dinitrotoluene	--	0.058	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U								
2-Chloronaphthalene	--	100	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U								
2-Nitroaniline	--	160	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U								
2-Nitrophenol	--	NS	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U								
3,3'-Dichlorobenzidine	--	0.0033	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U								
3-Nitroaniline	--	NS	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U								
4-Bromophenyl phenyl ether	--	NS	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U								
4-Chloro-3-methylphenol	--	36	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U								
4-Chlorophenyl phenyl ether	--	NS	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U								
4-Nitrophenol	--	NS	10 UJ	1.8 U	1.8 U	1.8 U	10 UJ								
Benzoic acid	--	590	20 UJ	3.9 U	3.9 U	3.9 U	20 UJ								
Benzyl alcohol	--	800	0.55 U	0.55 U	0.55 U	0.55 UJ	0.55 U								
Benzyl butyl phthalate	--	0.013	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U								
Bis(2-chloroethoxy)methane	--	NS	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U								
Bis(2-ethylhexyl)phthalate	--	0.046	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U								
Carbazole	--	NS	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U								
Dibutyl Phthalate	--	8	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U								
Dichloroethyl ether	--	0.04	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U								
Diethyl Phthalate	--	93	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U								
Dimethylphthalate	--	600	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U								
Dinitro-o-cresol	--	7	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U								
Di-n-octyl phthalate	--	0.0039	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U								
Isophorone	--	46	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U								
Nitrobenzene	--	16	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U								
n-Nitrosodi-n-propylamine	--	0.013	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U								
n-Nitrosodiphenylamine	--	0.69	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U								
o-Cresol	--	27	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U								
p-Chloroaniline	--	0.22	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U								
p-Cresol	--	800	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U								
p-Nitroaniline	--	NS	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U								
Hexachloroethane	--	0.02	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U								
Hexachlorocyclopentadiene	--	1	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U								
Hexachlorobutadiene	--	0.01	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U								
PAHs															
1-Methylnaphthalene	--	1.5	0.11	0.029 U	0.10 U	0.029 U	0.029 U								
2-Methylnaphthalene	--	32	0.08 j	0.030 U	0.10 U	0.030 U	0.030 U								
Acenaphthene	--	5.3	0.030 U	0.030 U	0.10 U	0.030 U	0.030 U								
Acenaphthylene	--	NS	0.038 U	0.038 U	0.10 U	0.038 U	0.038 U								
Anthracene	--	2.1	0.035 U	0.035 U	0.10 U	0.035 U	0.035 U								
Benzo(a)anthracene	0.1	0.00016	0.040 U	0.040 U	0.10 U	0.040 U	0.040 U								
Benzo(a)pyrene	1	0.000016	0.043 U	0.043 U	0.10 U	0.043 U	0.043 U								
Total (B+J+K) Benzofluoranthenes	0.1	NS	0.041 U	0.041 U	0.10 U	0.041 U	0.041 U								
Benzo(g,h,i)perylene	--	NS	0.039 U	0.039 U	0.10 U	0.039 U	0.039 U								
Chrysene	0.01	0.016	0.032 U	0.032 U	0.10 U	0.032 U	0.032 U								
Dibenzo(a,h)anthracene	0.1	0.000016	0.054 U	0.054 U	0.10 U	0.054 U	0.054 U								
Dibenzofuran	--	16	0.028 U	0.028 U	0.10 U	0.028 U	0.028 U								
Fluoranthene	--	1.8	0.035 U	0.035 U	0.10 U	0.035 U	0.035 U								
Fluorene	--	3.7	0.028 U	0.028 U	0.10 U	0.028 U	0.028 U								
Indeno(1,2,3-cd)pyrene	0.1	0.00016	0.042 U	0.042 U	0.10 U	0.042 U	0.042 U								
Naphthalene	--	1.4	0.030 U	0.030 U	0.10 U	0.030 U	0.030 U								
Phenanthrene	--	NS	0.028 U	0.028 U	0.10 U	0.028 U	0.028 U								
Pyrene	--	2	0.043 U	0.043 U	0.10 U	0.043 U	0.043 U								
Carcinogenic PAH TEQ ND=0,	--	0.000016	0	0	0	0	0								
Carcinogenic PAHs TEQ ND=1/2DL, Total ¹		0.000016	0.03051 U	0.03051 U	0.0705 U	0.03051 U	0.03051 U								

PUBLIC REVIEW DRAFT

Table W-13

**Groundwater Analytical Results Summary - Semivolatile
Organic Compounds & Polycyclic Aromatic
Hydrocarbons
5900 West Marginal Way Site
Seattle, Washington**

Notes:

¹ = Toxicity Equivalency Quotient calculations for cPAHs (WAC 173-340-200 and 173-340-900, Table 708-2) using benzo(a)pyrene as the reference chemical. If all compounds non-detect, then detection limit equal to maximum detection limit (modified by chemical's toxicity factor).

Units are in micrograms per liter (µg/L).

Cells are left blank where compound was not analyzed.

"--" = No value available.

low-flow = Sample collected following standard low-flow techniques, as described in RI/FS Work Plan Addendum dated Sept. 2013.

no purge = Sample collected prior to low-flow purge as described in the RI/FS Work Plan Addendum dated Sept. 2013.

Laboratory Detection Limits = Organic compounds are reported to the Method Detection Limit (MDL) and other parameters are reported to the Reporting Limit (RL).

National Functional Guidelines (NFG) = USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, October 1999 or USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004.

Shallow (S) = Refers to shallow groundwater monitoring wells screened at the water table.

Deep (D) = Refers to deeper groundwater at the Site.

Green-shaded, bolded values indicate detected concentration exceeds the selected screening level.

Light gray-shaded values indicate that the method detection limit exceeds the screening level.

Underlined data = Samples analyzed using volatile organic compound methods, not as semi-volatile organic compounds.

Key:

DUP = field duplicate sample

FD = field duplicate sample

MW = monitoring well

N = normal field sample

(ND = 0) = Non-detect values equal to 0.0 µg/l.

NS = no screening level

PAH = polycyclic aromatic hydrocarbons

SVOC = semi-volatile organic compounds

cPAH TEQ = Carcinogenic polycyclic aromatic hydrocarbon toxicity equivalency quotient.

Laboratory Data Qualifiers:

j = The value reported is less than the reporting limit and should be considered an estimate; qualifier reported by the laboratory.

J = The detected results are qualified as estimated in accordance with NFGs.

U = Result is ≤ the laboratory detection limit or qualified as non-detect in accordance with NFGs.

UJ = Non-detected compound qualified as estimated in accordance with NFGs.

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Table W-14
Groundwater Analytical Results Summary - Polychlorinated Biphenyls
5900 West Marginal Way Site
Seattle, Washington

Location		MW-27S		MW-27S		MW-27S		MW-27S		MW-29S		MW-29S		MW-29S		MW-33S		MW-33S		MW-33S		MW-33S		MW-33S		MW-45S		MW-45S		MW-45S	
Sample Date		28 Aug 2014		02 Apr 2015		02 Apr 2015		02 Sep 2015		13 Mar 2014		13 Mar 2014		13 Mar 2014		26 Aug 2014		26 Aug 2014		31 Mar 2015		01 Sep 2015		01 Sep 2015		26 Aug 2014		31 Mar 2015		01 Sep 2015	
Sample ID		MW-27S-082814-NP		DUP-040215-01		MW-27S-040215-NP		MW-27S-090215-NP		DUP-031314-1		MW-29S-031314		MW-29S-031314P		DUP-082614-2		MW-33S-082614-NP		MW-33S-033115-NP		DUP-090115-01		MW-33S-090115-NP		MW-45S-082614-NP		MW-45S-033115-NP		MW-45S-090115-NP	
Sample Type		N		FD		N		N		FD		N		N		FD		N		N		FD		N		N		N		N	
Sample Method		no purge		no purge		no purge		no purge		no purge		no purge		low-flow		low-flow		no purge		no purge		no purge		no purge		no purge		no purge		no purge	
Analyte	Screening Level																														
Aroclor 1016	NS	0.0025	U	0.0025	U	0.0025	U	0.0025	U	0.0025	U	0.0025	U	0.0025	U	0.0025	U	0.0025	U	0.0025	U	0.0025	U	0.0025	U	0.0025	U	0.0025	U	0.0025	U
Aroclor 1221	NS	0.0025	U	0.0025	U	0.0025	U	0.0025	U	0.0028	U	0.0028	U	0.0028	U	0.0025	U	0.0025	U	0.0025	U	0.0025	U	0.0025	U	0.0025	U	0.0025	U	0.0025	U
Aroclor 1232	NS	0.0025	U	0.0025	U	0.0025	U	0.0025	U	0.0028	U	0.0028	U	0.0028	U	0.0025	U	0.0025	U	0.0025	U	0.0025	U	0.0025	U	0.0025	U	0.0025	U	0.0025	U
Aroclor 1242	NS	0.0025	U	0.0025	U	0.0025	U	0.0025	U	0.0028	U	0.0028	U	0.0028	U	0.0025	U	0.0025	U	0.0025	U	0.0025	U	0.0025	U	0.0025	U	0.0025	U	0.0025	U
Aroclor 1248	NS	0.0025	U	0.0025	U	0.0025	U	0.0025	U	0.0028	U	0.0028	U	0.0028	U	0.0025	U	0.0025	U	0.0025	U	0.0025	U	0.0025	U	0.0025	U	0.025	U	0.0025	U
Aroclor 1254	NS	0.0025	U	0.0025	U	0.0025	U	0.0025	U	0.0028	U	0.0028	U	0.0028	U	0.0025	U	0.0025	U	0.0025	U	0.0060	j	0.0060	j	0.0025	U	0.040	U	0.0025	U
Aroclor 1260	NS	0.0028	U	0.0028	U	0.0028	U	0.0028	U	0.0028	U	0.0028	U	0.0028	U	0.0028	U	0.0028	U	0.0028	U	0.0028	U	0.0028	U	0.0028	U	0.0028	U	0.0028	U
Total Aroclors (ND =0)	0.000007	0		0		0		0		0		0		0		0		0		0		0.006		0.006		0		0		0	
Total Aroclors(ND=0/ND=12DL)	0.000007	0.0052		0.0052		0.0052		0.0052		0.0056		0.0056		0.0056		0.0052		0.0052		0.0052		0.0099		0.0099		0.0052		0.035		0.0052	

Notes:
Units are in micrograms per liter (μ g/L).
Shallow (S) = Refers to shallow groundwater monitoring wells screened at the water table.
Deep (D) = Refers to deeper groundwater at the Site.
Green-shaded, bolded values indicate detected concentration exceeds the selected screening level.
Light gray-shaded values indicate that the method detection limit exceeds the screening level.
low flow = Sample collected following standard low-flow techniques, as described in RI/FS Work Plan Addendum dated Sept. 2013.
Laboratory Detection Limits = Organic compounds are reported to the Method Detection Limit (MDL) and other parameters are reported to the Reporting Limit (RL).
National Functional Guidelines (NFG) = USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, October 1999 or USEPA Contract. Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004.
no purge = Sample collected prior to low-flow purge as described in the RI/FS Work Plan Addendum dated Sept. 2013.

Key:
DUP = field duplicate sample
FD = field duplicate sample
MW = monitoring well
(ND = 0) = Non-detect values equal to 0.0 μ g/l.
NS = no screening level
μg/L = micrograms per liter

Laboratory Data Qualifiers:
j = The value reported is less than the reporting limit and should be considered an estimate; qualifier reported by the laboratory.
U = Result is ≤ the laboratory detection limit or qualified as non-detect in accordance with NFGs.

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Table W-15
Groundwater Analytical Results Summary - Dioxins & Furans
5900 West Marginal Way Site
Seattle, Washington

Location			MW-1S		MW-1S		MW-1S		MW-2S		MW-2S		MW-2S		MW-2S		MW-2S		MW-2S		MW-2S		MW-2S		MW-2S	
Sample Date			26 Aug 2014		31 Mar 2015		02 Sep 2015		05 Mar 2014		05 Mar 2014		26 Mar 2014		26 Mar 2014		27 Aug 2014		27 Aug 2014		01 Apr 2015		01 Apr 2015		31 Aug 2015	
Sample ID			MW-1S-082614-NP		MW-1S-033115-NP		MW-1S-090215-NP		MW-2S-030514		MW-2S-030514P		MW-2S-032614		MW-2S-032614P		MW-2S-082714-NP		MW-2S-082714-P		MW-2S-040115-NP		MW-2S-040115-P		MW-2S-083115-NP	
Sample Type			N		N		N		N		N		N		N		N		N		N		N		N	
Sample Method			no purge		no purge		no purge		no purge		low-flow		no purge		low-flow		no purge		low-flow		no purge		low-flow		no purge	
Analyte	TEF	Screening Level																								
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1	0.0051	0.560	U	0.609	U	0.554	U	0.862	U	0.614	U	0.559	U	0.560	U	0.580	U	0.541	U	0.537	U	0.533	U	0.527	U
Tetrachlorodibenzo-p-dioxin homologs (Total TCDD)	--	NS	0.560	U	0.517	U	0.971	U	0.563	U	0.553	U	0.559	U	0.560	U	7.70	U	3.10	U	1.14	U	2.05	U	0.527	U
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	1	NS	0.560	U	0.517	U	0.554	U	0.563	U	0.553	U	0.559	U	0.560	U	0.580	UJ	0.541	UJ	0.537	U	0.533	U	0.527	U
Pentachlorodibenzo-p-dioxin homologs (Total PeCDD)	--	NS	0.560	U	0.517	U	0.554	U	0.755		0.553	U	0.559	U	1.48		4.30	U	2.79	U	0.537	U	2.13	U	0.527	U
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	0.560	U	0.517	U	0.554	U	0.563	U	0.732	j	0.559	U	0.560	U	0.580	U	0.541	U	0.537	U	0.533	U	0.527	U
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	0.560	U	0.517	U	0.554	U	5.86	j	4.94	j	1.30	U	1.98	j	0.580	U	0.541	U	0.537	U	0.533	U	0.527	U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	0.560	U	0.517	U	0.554	U	1.54	j	1.06	U	0.559	U	0.560	U	0.580	U	0.541	U	0.537	U	0.533	U	0.527	U
Hexachlorodibenzo-p-dioxin homologs (Total HxCDD)	--	NS	0.560	U	0.517	U	0.554	U	13.4		10.4		0.740		4.45		1.21		2.28		0.537	U	2.94	U	0.527	U
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	0.01	NS	2.28	j	2.54	j	1.78	j	84.5		72.3		20.9	j	21.8	j	3.00	j	2.20	U	5.65	U	7.60	j	1.84	U
Heptachlorodibenzo-p-dioxin homologs (Total HpCDD)	--	NS	5.11		2.54		3.42		123		96.9		32.3		29.0		7.44		2.47		3.05	U	11.4		0.527	U
Octachlorodibenzo-P-Dioxin (OCDD)	0.0003	NS	46.8	j	53.5	j	14.8	j	1250		768		418		213		12.1	j	16.2	j	68.2	j	63.3	j	10.4	U
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	0.1	NS	0.560	U	0.517	U	0.554	U	0.563	U	0.553	U	0.559	U	0.560	U	0.580	U	0.541	U	0.537	U	0.533	U	0.527	U
Tetrachlorodibenzofuran homologs (Total TCDF)	--	NS	0.560	U	0.517	U	0.554	U	3.87		0.570		0.607		0.563		0.580	U	0.541	U	0.537	U	0.660		0.527	U
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	0.03	NS	0.560	U	0.517	U	0.554	U	0.987	U	0.553	U	0.559	U	0.560	U	0.580	U	0.541	U	0.537	U	0.533	U	0.527	U
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	0.3	NS	0.560	U	0.517	U	0.554	U	2.12	U	1.55	j	0.796	j	0.740	U	0.580	U	0.541	U	0.537	U	0.533	U	0.527	U
Pentachlorodibenzofuran homologs (Total PeCDF)	--	NS	0.560	U	0.517	U	0.554	U	19.7	U	12.3		3.38		2.95		0.580	U	0.541	U	0.537	U	0.850		0.527	U
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.560	U	0.517	U	0.554	U	15.0	j	11.6	j	4.43	j	5.07	j	0.580	U	0.541	U	0.975	U	1.16	j	0.527	U
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.560	U	0.517	U	0.554	U	4.17	j	3.40	j	0.981	j	1.55	j	0.580	U	0.541	U	0.537	U	0.533	U	0.527	U
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.560	U	0.517	U	0.554	U	0.563	U	0.553	U	0.559	U	0.560	U	0.580	U	0.541	U	0.537	U	0.533	U	0.527	U
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.560	U	0.517	U	0.554	U	1.34	j	0.827	j	0.559	U	0.560	U	0.580	U	0.541	U	0.537	U	0.533	U	0.527	U
Hexachlorodibenzofuran homologs (Total HxCDF)	--	NS	0.560	U	0.517	U	0.554	U	49.0		35.8		14.4		11.5		0.580	U	0.541	U	0.537	U	1.97		0.527	U
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	0.01	NS	0.792	U	0.545	U	0.612	U	20.0	j	15.4	j	6.14	j	5.89	j	0.580	U	0.682	U	1.04	j	1.55	j	0.575	j
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	0.01	NS	0.560	U	0.517	U	0.612	U	9.52	j	7.14	j	2.12	j	2.80	j	0.580	U	0.541	U	0.537	U	0.688	U	0.527	U
Heptachlorodibenzofuran homologs (Total HpCDF)	--	NS	0.792	U	0.517	U	0.612	U	67.5		54.2		23.9		19.1		0.580	U	0.541	U	3.07		3.85		1.62	
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	0.0003	NS	1.20	U	1.75	U	0.777	j	30.3	j	18.7	j	8.81	j	5.57	j	0.613	j	0.722	U	1.55	j	1.99	U	0.533	j
Dioxin Furan Calculated TEQ (ND=0)	--	0.0051	0.0368		0.041		0.0225		4.32		3.80		1.20		1.23		0.0338		0.00486		0.031		0.23		0.00591	
Dioxin Furan Calculated TEQ (ND=1/2 DL)	--	0.0051	0.920		0.90		0.896		5.45		4.50		1.97		2.05		0.947		0.869		0.92		1.0		0.844	

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Table W-15
Groundwater Analytical Results Summary - Dioxins & Furans
5900 West Marginal Way Site
Seattle, Washington

Location			MW-2S		MW-2D		MW-2D		MW-2D		MW-2D		MW-2D		MW-2D		MW-2D		MW-2D		MW-3D		MW-3D		MW-3D	
Sample Date			31 Aug 2015		13 Mar 2014		13 Mar 2014		27 Aug 2014		27 Aug 2014		02 Apr 2015		02 Apr 2015		31 Aug 2015		31 Aug 2015		10 Mar 2014		28 Aug 2014		30 Mar 2015	
Sample ID			MW-2S-083115-P		MW-2D-031314		MW-2D-031314 P		MW-2D-082714-NP		MW-2D-082714-P		MW-2D-040215-NP		MW-2D-040215-P		MW-2D-083115-NP		MW-2D-083115-P		MW-03D-031014		MW-3D-082814-NP		MW-3D-033015-NP	
Sample Type			N		N		N		N		N		N		N		N		N		N		N		N	
Sample Method			low-flow		no purge		low-flow		no purge		low-flow		no purge		low-flow		no purge		low-flow		low-flow		no purge		no purge	
Analyte	TEF	Screening Level																								
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1	0.0051	0.516	U	0.556	U	0.571	U	0.562	U	0.549	U	0.531	U	0.571	U	0.501	U	0.512	U	0.565	U	0.546	U	0.578	U
Tetrachlorodibenzo-p-dioxin homologs (Total TCDD)	--	NS	0.758		0.556	U	0.571	U	1.64	U	4.58	U	2.32	U	0.772	U	0.501	U	0.832		0.565	U	0.546	U	0.786	
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	1	NS	0.516	U	0.572	U	0.571	U	0.562	UJ	0.549	UJ	0.531	U	0.526	U	0.501	U	0.512	U	0.565	U	0.546	U	0.578	U
Pentachlorodibenzo-p-dioxin homologs (Total PeCDD)	--	NS	0.516	U	0.572	U	0.571	U	0.562	U	2.64	U	0.892	U	0.526	U	0.501	U	0.512	U	1.60		0.546	U	0.578	U
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	0.516	U	0.556	U	0.571	U	0.562	U	0.549	U	0.531	U	0.526	U	0.501	U	0.512	U	0.565	U	0.546	U	0.578	U
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	0.516	U	0.556	U	0.571	U	0.562	U	0.549	U	0.531	U	0.526	U	0.501	U	0.512	U	1.01	j	0.546	U	0.578	U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	0.516	U	0.556	U	0.571	U	0.586	j	0.549	U	0.531	U	0.526	U	0.501	U	0.512	U	1.50	j	0.546	U	0.578	U
Hexachlorodibenzo-p-dioxin homologs (Total HxCDD)	--	NS	0.516	U	1.90		1.13		1.73		2.40		0.531	U	0.526	U	0.501	U	0.512	U	6.00		0.546	U	0.578	U
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	0.01	NS	2.97	j	3.42	U	2.63	U	1.70	j	1.72	U	1.19	U	1.62	U	1.17	j	2.45	j	7.45	j	1.71	j	1.84	j
Heptachlorodibenzo-p-dioxin homologs (Total HpCDD)	--	NS	4.55		6.72	U	6.06	U	1.70		0.549	U	2.44	U	3.11	U	1.17		2.45		16.9		2.49		1.84	
Octachlorodibenzo-P-Dioxin (OCDD)	0.0003	NS	19.8	U	23.9	j	27.8	j	19.3	j	14.8	j	13.0	U	17.1	j	7.77	U	139		57.3	j	17.2	j	21.4	j
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	0.1	NS	0.516	U	0.556	U	0.571	U	0.562	U	0.549	U	0.531	U	0.526	U	0.501	U	0.512	U	0.565	U	0.546	U	0.578	U
Tetrachlorodibenzofuran homologs (Total TCDF)	--	NS	0.516	U	2.27		4.21		0.562	U	0.549	U	0.531	U	0.526	U	0.501	U	0.512	U	5.01		0.546	U	0.578	U
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	0.03	NS	0.516	U	0.575	U	0.779	U	0.562	U	0.549	U	0.531	U	0.526	U	0.501	U	0.512	U	1.22	U	0.546	U	0.578	U
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	0.3	NS	0.516	U	0.871	U	0.978	U	0.562	j	0.549	U	0.643	j	0.526	U	0.501	U	0.512	U	1.11	U	0.546	U	0.578	U
Pentachlorodibenzofuran homologs (Total PeCDF)	--	NS	0.591		8.01	U	12.0	U	0.562		0.549	U	0.643		0.526	U	0.501	U	0.512	U	13.0	U	0.546	U	0.578	U
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.629	j	2.28	j	3.06	j	0.562	U	0.549	U	0.531	U	0.526	U	0.501	U	0.512	U	3.48	j	0.546	U	0.578	U
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.516	U	0.684	j	1.23	j	0.562	U	0.549	U	0.531	U	0.526	U	0.501	U	0.512	U	1.64	j	0.546	U	0.578	U
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.516	U	0.556	U	0.651	U	0.562	U	0.549	U	0.531	U	0.526	U	0.501	U	0.512	U	0.565	U	0.546	U	0.578	U
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.516	U	0.556	U	0.792	j	0.562	U	0.549	U	0.531	U	0.526	U	0.501	U	0.512	U	1.09	j	0.546	U	0.578	U
Hexachlorodibenzofuran homologs (Total HxCDF)	--	NS	1.67		10.8	U	15.1		0.562	U	0.549	U	0.531	U	0.526	U	0.501	U	0.512	U	21.0		0.546	U	0.578	U
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	0.01	NS	1.29	j	3.85	j	4.81	j	0.943	U	0.549	U	0.531	U	0.526	U	0.501	U	0.512	U	8.83	j	0.546	U	0.578	U
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	0.01	NS	0.516	U	1.55	j	1.57	j	0.562	U	0.549	U	0.531	U	0.526	U	0.501	U	0.512	U	2.64	j	0.546	U	0.578	U
Heptachlorodibenzofuran homologs (Total HpCDF)	--	NS	1.29		10.6		12.7		0.562	U	0.549	U	0.531	U	0.526	U	0.501	U	0.512	U	19.6		0.546	U	0.578	U
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	0.0003	NS	1.20	j	5.10	j	6.73	j	1.27	U	0.549	U	1.22	j	0.564	j	0.502	j	1.52	j	8.69	j	0.546	U	0.608	U
Dioxin Furan Calculated TEQ (ND=0)	--	0.0051	0.106		0.359		0.582		0.250		0.00444		0.19		0.0053		0.0119		0.0667		1.08		0.0223		0.025	
Dioxin Furan Calculated TEQ (ND=1/2 DL)	--	0.0051	0.893		1.25		1.47		1.02		0.878		0.96		0.86		0.802		0.873		1.92		0.882		0.94	

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Table W-15
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Location			MW-3D		MW-7S		MW-7S		MW-7S		MW-7S		MW-10S		MW-10S		MW-13S		MW-13S		MW-17S		MW-17S		MW-17S	
Sample Date			02 Sep 2015		29 Nov 2011		29 Nov 2011		27 Apr 2012		27 Apr 2012		29 Nov 2011		27 Apr 2012		29 Nov 2011		30 Apr 2012		04 Mar 2014		04 Mar 2014		04 Mar 2014	
Sample ID			MW-3D-090215-NP		DUP-112911-2		MW-7S-112911		DUP-042712-1		MW-7S-042712		MW-10-112911		MW-10-042712		MW-13-112911		MW-13-043012		DUP-030414-1		MW-17S-030414		MW-17S-030414P	
Sample Type			N		FD		N		FD		N		N		N		N		N		FD		N		N	
Sample Method			no purge		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		low-flow		no purge		low-flow	
Analyte	TEF	Screening Level																								
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1	0.0051	0.519	U	0.554	U	0.598	U	0.549	U	0.547	U	0.879	U	0.528	U	0.633	U	0.54	U	0.572	U	0.595	U	0.537	U
Tetrachlorodibenzo-p-dioxin homologs (Total TCDD)	--	NS	0.519	U	7.68		4.69		0.549	U	0.547	U	0.567	U	0.528	U	0.634		0.54	U	0.572	U	0.595	U	0.537	U
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	1	NS	0.519	U	0.554	U	0.598	U	0.549	U	0.547	U	0.567	U	0.528	U	0.561	U	0.54	U	0.572	U	0.595	U	0.537	U
Pentachlorodibenzo-p-dioxin homologs (Total PeCDD)	--	NS	0.519	U	0.554	U	0.598	U	0.549	U	0.547	U	0.567	U	0.987		0.561	U	0.54	U	0.572	U	0.595	U	0.890	
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	0.519	U	0.554	U	0.598	U	0.600	U	0.547	U	0.567	U	1.68	j	0.561	U	0.54	U	0.572	U	0.595	U	0.537	U
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	0.519	U	0.554	U	0.598	U	0.724	j	0.621	U	1.14	U	1.52	j	0.716	U	0.766	U	0.572	U	0.595	U	0.664	j
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	0.519	U	0.554	U	0.598	U	0.549	U	0.740	U	0.704	U	0.72	U	0.561	U	0.579	j	0.572	U	0.595	U	0.853	j
Hexachlorodibenzo-p-dioxin homologs (Total HxCDD)	--	NS	0.519	U	2.52		0.598	U	3.05		1.57		2.74		17.1		1.15		4.17		0.572	U	0.595	U	3.28	
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	0.01	NS	1.30	U	17.7	j	5.28	U	23.7	J	16.6	J	16.9	j	84.8	J	20.2	j	46.5	J	2.50	U	2.52	U	4.36	U
Heptachlorodibenzo-p-dioxin homologs (Total HpCDD)	--	NS	0.931	U	39.1		4.5		36.1		25		28.2		151		40.2		76.6		4.30	U	2.52	U	8.39	
Octachlorodibenzo-P-Dioxin (OCDD)	0.0003	NS	14.8	j	1100		140		332	J	92.8	J	369		1530	J	3110		5000	J	18.3	j	120		26.9	j
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	0.1	NS	0.519	U	0.554	U	0.598	U	0.549	U	0.547	U	0.567	U	0.528	U	0.561	U	0.54	U	0.572	U	0.595	U	0.537	U
Tetrachlorodibenzofuran homologs (Total TCDF)	--	NS	0.519	U	7.49		5.15		0.549	U	0.547	U	1.29		15.2		0.561	U	0.54	U	0.572	U	0.595	U	3.16	
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	0.03	NS	0.519	U	0.554	U	0.598	U	0.549	U	0.547	U	0.567	U	0.528	U	0.561	U	0.54	U	0.572	U	0.595	U	0.715	U
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	0.3	NS	0.519	U	0.554	U	0.598	U	0.549	U	0.547	U	0.624	U	0.608	U	0.561	U	0.54	U	0.572	U	0.595	U	0.901	U
Pentachlorodibenzofuran homologs (Total PeCDF)	--	NS	0.519	U	0.554	U	0.598	U	0.549	U	0.547	U	1.7		15.2		0.561	U	0.54	U	0.572	U	0.595	U	10.1	U
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.519	U	0.554	U	0.598	U	0.549	U	0.547	U	3.88	U	5.33	j	0.561	U	0.692	j	0.572	U	0.595	U	2.73	j
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.519	U	0.554	U	0.598	U	0.549	U	0.547	U	0.719	j	0.655	U	0.561	U	0.54	U	0.572	U	0.595	U	1.09	j
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.519	U	0.554	U	0.598	U	0.549	U	0.547	U	0.567	U	0.528	U	0.561	U	0.54	U	0.572	U	0.595	U	0.537	U
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.519	U	0.554	U	0.598	U	0.549	U	0.547	U	0.567	U	0.528	U	0.561	U	0.54	U	0.572	U	0.595	U	0.779	j
Hexachlorodibenzofuran homologs (Total HxCDF)	--	NS	0.519	U	0.554	U	0.882		0.549	U	0.547	U	12.6		41.5		2.77		2.53		0.572	U	0.595	U	13.7	
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	0.01	NS	0.519	U	1.56	U	1.79	U	0.791	U	0.835	U	11.1	j	13.5	j	6.37	j	10.2	j	1.06	j	0.859	j	5.24	j
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	0.01	NS	0.519	U	0.917	U	0.703	U	0.654	j	0.547	U	1.68	U	0.916	j	1.21	U	1.2	j	0.572	U	0.595	U	1.76	j
Heptachlorodibenzofuran homologs (Total HpCDF)	--	NS	0.519	U	0.917	U	3.89		0.654		0.547	U	33		27.4		16		11.4		1.06		1.63		12.9	
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	0.0003	NS	0.754	U	7.36	U	5.80	U	2.25	j	3.08	j	17.0	U	13.7	j	81	j	115		0.780	U	1.51	U	6.54	j
Dioxin Furan Calculated TEQ (ND=0)	--	0.0051	0.00444		0.507		0.042		0.42		0.19		0.463		2.31		1.22		2.24		0.0161		0.0446		0.692	
Dioxin Furan Calculated TEQ (ND=1/2 DL)	--	0.0051	0.828		1.39		1.02		1.25		1.07		1.70		3.08		2.15		3.04		0.927		0.992		1.48	

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Table W-15
Groundwater Analytical Results Summary - Dioxins & Furans
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Seattle, Washington

Location			MW-17S		MW-17S		MW-17S		MW-17S		MW-17S		MW-17S		MW-22S		MW-22S		MW-22S		MW-26S		MW-26S		MW-26S	
Sample Date			26 Aug 2014		26 Aug 2014		31 Mar 2015		31 Mar 2015		01 Sep 2015		01 Sep 2015		27 Aug 2014		01 Apr 2015		03 Sep 2015		26 Mar 2014		25 Aug 2014		01 Apr 2015	
Sample ID			MW-17S-082614-NP		MW-17S-082614-P		MW-17S-033115-NP		MW-17S-033115-P		MW-17S-090115-NP		MW-17S-090115-P		MW-22S-082714-NP		MW-22S-040115-NP		MW-22S-090315-NP		MW-26S-032614		MW-26S-082514-NP		MW-26S-040115-NP	
Sample Type			N		N		N		N		N		N		N		N		N		N		N		N	
Sample Method			no purge		low-flow		no purge		low-flow		no purge		low-flow		no purge		no purge		no purge		low-flow		no purge		no purge	
Analyte	TEF	Screening Level																								
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1	0.0051	0.552	U	0.546	U	0.547	U	0.542	U	0.533	U	0.515	U	0.569	U	0.621	U	0.517	U	0.560	U	0.571	U	0.534	U
Tetrachlorodibenzo-p-dioxin homologs (Total TCDD)	--	NS	10.7	U	7.31	U	0.643		0.542	U	0.533	U	0.515	U	0.569	U	0.621	U	1.04	U	0.560	U	0.571	U	1.29	U
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	1	NS	0.552	UJ	0.546	UJ	0.547	U	0.542	U	0.533	U	0.515	U	0.569	U	0.621	U	0.517	U	0.560	U	0.571	U	0.534	U
Pentachlorodibenzo-p-dioxin homologs (Total PeCDD)	--	NS	7.93	U	0.546	U	0.547	U	0.542	U	0.533	U	0.515	U	0.569	U	0.621	U	0.532	U	0.560	U	0.571	U	2.05	U
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	0.552	U	0.546	U	0.547	U	0.542	U	0.533	U	0.515	U	0.569	U	0.621	U	0.517	U	0.560	U	0.571	U	0.534	U
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	0.552	U	0.546	U	0.547	U	0.542	U	0.533	U	0.515	U	0.569	U	0.672	j	0.517	U	0.560	U	0.571	U	0.534	U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	0.552	U	0.546	U	0.547	U	0.542	U	0.533	U	0.515	U	0.569	U	0.689	U	0.517	U	0.560	U	0.571	U	0.534	U
Hexachlorodibenzo-p-dioxin homologs (Total HxCDD)	--	NS	0.552	U	1.01		0.547	U	0.542	U	0.533	U	0.515	U	0.569	U	0.672	U	0.532	U	0.583		0.669	U	0.534	U
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	0.01	NS	1.32	U	3.44	U	1.08	U	0.995	U	2.30	j	1.65	U	0.803	U	15.4	j	0.866	j	5.24	j	1.75	j	2.05	U
Heptachlorodibenzo-p-dioxin homologs (Total HpCDD)	--	NS	0.587	U	1.19	U	0.547	U	0.542	U	5.69		2.25		1.53		28.1		0.891		8.85		1.75		3.96	U
Octachlorodibenzo-P-Dioxin (OCDD)	0.0003	NS	14.2	j	14.0	U	11.4	j	20.5	j	172		14.8	U	5.64	j	179		4.86	U	54.9	j	19.0	j	20.1	j
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	0.1	NS	0.552	U	0.546	U	0.547	U	0.542	U	0.533	U	0.515	U	0.569	U	0.621	U	0.517	U	0.560	U	0.571	U	0.534	U
Tetrachlorodibenzofuran homologs (Total TCDF)	--	NS	0.552	U	0.546	U	0.792		0.542	U	0.533	U	0.515	U	0.569	U	0.621	U	0.532	U	0.560	U	0.868		0.534	U
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	0.03	NS	0.552	U	0.546	U	0.547	U	0.542	U	0.533	U	0.515	U	0.569	U	0.621	U	0.517	U	0.560	U	0.571	U	0.534	U
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	0.3	NS	0.552	U	0.546	U	0.547	U	0.542	U	0.533	U	0.515	U	0.569	U	3.73	j	0.517	U	0.560	U	0.571	U	0.534	U
Pentachlorodibenzofuran homologs (Total PeCDF)	--	NS	0.552	U	0.546	U	0.547	U	0.542	U	0.533	U	0.515	U	0.569	U	3.73		0.532	U	0.560	U	0.571	U	0.534	U
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.552	U	0.546	U	0.547	U	0.542	U	0.533	U	0.515	U	0.569	U	8.42	j	0.517	U	0.560	U	0.571	U	0.534	U
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.552	U	0.546	U	0.547	U	0.542	U	0.533	U	0.515	U	0.569	U	0.621	U	0.517	U	0.560	U	0.571	U	0.534	U
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.552	U	0.546	U	0.547	U	0.542	U	0.533	U	0.515	U	0.569	U	0.621	U	0.517	U	0.560	U	0.571	U	0.534	U
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.552	U	0.546	U	0.547	U	0.542	U	0.533	U	0.515	U	0.569	U	0.621	U	0.517	U	0.560	U	0.571	U	0.534	U
Hexachlorodibenzofuran homologs (Total HxCDF)	--	NS	0.552	U	0.840		0.547	U	0.542	U	0.533	U	0.515	U	0.569	U	9.06		0.595		1.55		0.571	U	0.534	U
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	0.01	NS	0.552	U	0.922	U	0.547	U	0.542	U	0.533	U	0.515	U	0.569	U	3.01	U	0.574	U	1.68	U	0.648	U	0.562	j
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	0.01	NS	0.552	U	0.922	U	0.547	U	0.542	U	0.533	U	0.515	U	0.569	U	0.634	j	0.574	U	0.560	U	0.571	U	0.534	U
Heptachlorodibenzofuran homologs (Total HpCDF)	--	NS	0.552	U	0.922	U	0.547	U	0.542	U	0.533	U	0.515	U	0.569	U	9.70		0.590	U	1.97		0.571	U	1.32	
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	0.0003	NS	0.948	j	1.22	U	0.547	U	0.542	U	1.38	U	0.687	j	0.569	U	6.23	U	0.517	U	2.68	j	0.938	j	0.928	U
Dioxin Furan Calculated TEQ (ND=0)			--	0.0051	0.00454		0	U	0.0034		0.0062		0.0746		0.000206		0.00169		2.2		0.00866		0.0697		0.0235	
Dioxin Furan Calculated TEQ (ND=1/2 DL)			--	0.0051	0.881		0.883	U	0.87		0.86		0.914		0.822		0.902		3.1		0.824		0.957		0.923	

PUBLIC REVIEW DRAFT
Table W-15
Groundwater Analytical Results Summary - Dioxins & Furans
5900 West Marginal Way Site
Seattle, Washington

Location			MW-26S		MW-27S		MW-27S		MW-27S		MW-27S		MW-33S		MW-33S		MW-33S		MW-33S		MW-33S		MW-33S		MW-35S	
Sample Date			02 Sep 2015		28 Aug 2014		02 Apr 2015		02 Apr 2015		02 Sep 2015		06 Mar 2014		26 Aug 2014		26 Aug 2014		31 Mar 2015		01 Sep 2015		01 Sep 2015		06 Mar 2014	
Sample ID			MW-26S-090215-NP		MW-27S-082814-NP		DUP-040215-01		MW-27S-040215-NP		MW-27S-090215-NP		MW-33S-030614		DUP-082614-2		MW-33S-082614-NP		MW-33S-033115-NP		DUP-090115-01		MW-33S-090115-NP		MW-35S-030614	
Sample Type			N		N		FD		N		N		N		FD		N		N		FD		N		N	
Sample Method			no purge		no purge		no purge		no purge		no purge		low-flow		low-flow		no purge		no purge		no purge		no purge		low-flow	
Analyte	TEF	Screening Level																								
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1	0.0051	0.525	U	0.549	U	0.623	U	0.618	U	0.542	U	0.582	U	0.560	U	0.569	U	0.544	U	0.586	U	0.517	U	0.573	U
Tetrachlorodibenzo-p-dioxin homologs (Total TCDD)	--	NS	0.641	U	0.764		1.23	U	3.01	U	0.881	U	0.582	U	4.53	U	0.569	U	12.6		0.870		0.944		0.573	U
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	1	NS	0.525	U	0.549	U	0.623	U	0.618	U	0.542	U	0.582	U	0.560	UJ	0.569	U	0.544	U	0.586	U	0.517	U	0.573	U
Pentachlorodibenzo-p-dioxin homologs (Total PeCDD)	--	NS	0.525	U	0.549	U	2.00	U	2.45	U	0.542	U	0.582	U	0.685	U	1.08		27.4		0.586	U	0.517	U	0.995	
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	0.525	U	0.549	U	0.623	U	0.618	U	0.542	U	2.92	j	2.90	U	2.53	j	3.53	j	0.804	j	0.517	U	2.20	j
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	0.525	U	0.549	U	0.623	U	0.618	U	0.542	U	2.95	j	4.36	U	2.96	j	4.22	U	1.52	U	0.886	U	1.58	j
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	0.525	U	0.549	U	0.623	U	0.618	U	0.542	U	1.85	j	5.65	j	2.24	U	0.613	U	0.740	U	0.811	U	0.777	j
Hexachlorodibenzo-p-dioxin homologs (Total HxCDD)	--	NS	0.525	U	0.549	U	0.735	U	0.618	U	0.542	U	28.8		28.7		32.4		41.9		0.804		1.91		9.66	
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	0.01	NS	1.21	j	2.08	U	3.76	U	2.42	U	0.761	U	424		256		241		137		96.1		68.5		103	
Heptachlorodibenzo-p-dioxin homologs (Total HpCDD)	--	NS	1.21		1.76		6.36		1.92	U	0.761	U	842		495		412		310		193		147		242	
Octachlorodibenzo-P-Dioxin (OCDD)	0.0003	NS	12.9	j	12.4	j	25.5	j	17.2	U	2.62	U	5630		2490		1870		3370		1870		1370		695	
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	0.1	NS	0.525	U	0.549	U	0.858	U	0.618	U	0.542	U	0.585	j	0.560	U	0.569	U	6.31	U	0.586	U	0.517	U	0.573	U
Tetrachlorodibenzofuran homologs (Total TCDF)	--	NS	0.525	U	0.549	U	6.90		1.09		0.542	U	3.47		35.0		70.6		202		0.586	U	0.517	U	36.2	
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	0.03	NS	0.525	U	0.549	U	0.623	U	0.618	U	0.542	U	0.582	U	0.625	U	0.637	U	1.89	U	0.586	U	0.517	U	0.573	U
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	0.3	NS	0.525	U	0.549	U	0.623	U	0.622	j	0.542	U	1.09	j	1.12	j	0.637	U	5.69	U	0.803	j	0.610	U	0.573	U
Pentachlorodibenzofuran homologs (Total PeCDF)	--	NS	0.525	U	0.549	U	0.623	U	0.622		0.542	U	4.94		10.6		39.3		104		2.57		2.00		34.2	
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.525	U	0.549	U	0.623	U	0.618	U	0.542	U	3.68	j	3.66	j	4.17	U	10.7	j	2.42	j	2.71	j	0.954	j
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.525	U	0.549	U	0.623	U	0.618	U	0.542	U	0.687	U	0.795	U	0.904	U	0.544	U	0.586	U	0.745	U	0.573	U
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.525	U	0.549	U	0.623	U	0.618	U	0.542	U	0.582	U	0.768	U	0.569	U	0.544	U	0.586	U	0.517	U	0.573	U
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.525	U	0.549	U	0.623	U	0.618	U	0.542	U	0.960	j	0.768	U	0.569	U	0.777	U	0.586	U	0.517	U	0.573	U
Hexachlorodibenzofuran homologs (Total HxCDF)	--	NS	0.525	U	0.549	U	0.623	U	0.618	U	0.542	U	24.3		20.7		18.0		79.6		7.71		16.1		8.72	
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	0.01	NS	0.525	U	0.549	U	0.623	U	0.690	j	0.542	U	12.2	j	6.62	j	7.87	U	6.55	U	4.74	U	6.85	j	2.97	j
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	0.01	NS	0.525	U	0.549	U	0.623	U	0.618	U	0.542	U	1.51	U	0.898	U	1.20	j	0.721	U	0.939	U	1.16	U	0.573	U
Heptachlorodibenzofuran homologs (Total HpCDF)	--	NS	0.525	U	0.549	U	0.623	U	0.690		0.542	U	37.6		6.62		15.0		21.0		9.55		24.9		2.97	
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	0.0003	NS	0.525	U	0.549	U	1.06	U	0.960	j	0.542	U	32.7	j	10.7	U	10.1	U	4.72	U	7.01	U	8.70	j	8.71	j
Dioxin Furan Calculated TEQ (ND=0)	--	0.0051	0.0160		0.00372		0.0077		0.19		0	U	7.68		4.64		3.53		3.8		2.09		1.44		1.82	
Dioxin Furan Calculated TEQ (ND=1/2 DL)	--	0.0051	0.843		0.879		1.0		1.1		0.858	U	8.34		5.72		4.70		5.9		2.94		2.29		2.61	

PUBLIC REVIEW DRAFT
Table W-15
Groundwater Analytical Results Summary - Dioxins & Furans
5900 West Marginal Way Site
Seattle, Washington

Location			MW-35S		MW-35S		MW-35S		MW-35D		MW-35D		MW-35D		MW-35D		MW-43S		MW-43S		MW-43S		MW-43S	
Sample Date			27 Aug 2014		02 Apr 2015		31 Aug 2015		26 Mar 2014		27 Aug 2014		01 Apr 2015		31 Aug 2015		04 Mar 2014		04 Mar 2014		25 Aug 2014		25 Aug 2014	
Sample ID			MW-35S-082714-NP		MW-35S-040215-NP		MW-35S-083115-NP		MW-35D-032614		MW-35D-082714-NP		MW-35D-040115-NP		MW-35D-083115-NP		DUP-030414-2		MW-43S-030414		DUP-082514-01		MW-43S-082514-NP	
Sample Type			N		N		N		N		N		N		N		FD		N		FD		N	
Sample Method			no purge		no purge		no purge		low-flow		no purge		no purge		no purge		low-flow		low-flow		no purge		no purge	
Analyte	TEF	Screening Level																						
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1	0.0051	0.587	U	1.28	U	0.526	U	0.525	U	0.604	U	0.589	U	0.533	U	0.581	U	0.707	U	0.567	U	0.557	U
Tetrachlorodibenzo-p-dioxin homologs (Total TCDD)	--	NS	1.30		6.78		0.526	U	0.525	U	0.604	U	0.711		0.533	U	0.581	U	0.612	U	0.662		0.827	
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	1	NS	0.587	U	4.42	j	0.526	U	0.525	U	0.604	U	0.589	U	0.533	U	0.581	U	0.621	U	0.567	U	0.557	U
Pentachlorodibenzo-p-dioxin homologs (Total PeCDD)	--	NS	4.34		75.3		0.526	U	0.525	U	0.604	U	0.589	U	0.533	U	0.581	U	0.612	U	0.567	U	0.557	U
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	4.40	U	15.2	j	1.17	U	0.525	U	0.604	U	0.589	U	0.533	U	0.581	U	0.814	U	0.567	U	0.557	U
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	1.94	U	16.4	j	0.607	U	0.525	U	0.604	U	0.589	U	0.533	U	0.652	j	1.15	j	0.567	U	0.557	U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	1.53	U	14.6	j	1.01	j	0.525	U	0.604	U	0.589	U	0.533	U	0.594	j	1.08	j	0.627	U	0.557	U
Hexachlorodibenzo-p-dioxin homologs (Total HxCDD)	--	NS	35.8		317		10.5		0.525	U	1.62	U	0.589	U	0.533	U	1.25		2.23		1.93	U	0.726	U
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	0.01	NS	132		421		55.6		4.84	j	8.26	j	6.58	j	2.61	j	8.01	U	9.89	j	4.79	j	6.30	j
Heptachlorodibenzo-p-dioxin homologs (Total HpCDD)	--	NS	299		994		143		8.84		16.3		11.7		5.60		5.77	U	9.89		9.96		6.30	
Octachlorodibenzo-P-Dioxin (OCDD)	0.0003	NS	617		1840		784		48.9	j	82.0	j	98.0	j	33.0	j	177		196		85.3	j	81.2	j
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	0.1	NS	0.587	U	0.576	U	0.526	U	0.525	U	0.604	U	0.589	U	0.533	U	1.32	U	0.612	U	0.567	U	0.557	U
Tetrachlorodibenzofuran homologs (Total TCDF)	--	NS	81.0		730		20.4		0.525	U	0.604	U	0.589	U	0.533	U	2.23		0.612	U	1.85		0.557	U
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	0.03	NS	0.587	U	0.576	U	0.526	U	0.525	U	0.604	U	0.589	U	0.533	U	1.02	U	0.612	U	0.567	U	0.557	U
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	0.3	NS	0.619	U	0.576	U	0.526	U	0.525	U	0.604	U	0.589	U	0.533	U	1.16	j	0.926	U	0.567	U	0.557	U
Pentachlorodibenzofuran homologs (Total PeCDF)	--	NS	61.9		741		18.0		0.525	U	0.604	U	0.589	U	0.533	U	1.16		0.612	U	0.880		0.557	U
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.764	U	39.3	j	0.526	U	0.525	U	0.604	U	0.589	U	0.533	U	1.13	U	1.49	j	0.567	U	0.575	U
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.587	U	1.81	U	0.526	U	0.525	U	0.604	U	0.589	U	0.533	U	0.581	U	0.755	j	0.567	U	0.557	U
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.587	U	0.576	U	0.526	U	0.525	U	0.604	U	0.589	U	0.533	U	0.741	U	1.10	j	0.567	U	0.557	U
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.587	U	0.576	U	0.526	U	0.525	U	0.604	U	0.589	U	0.533	U	0.581	U	1.10	U	0.567	U	0.557	U
Hexachlorodibenzofuran homologs (Total HxCDF)	--	NS	19.9		586		6.83		0.608		0.604	U	0.589	U	0.533	U	0.581	U	4.26		0.567	U	0.557	U
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	0.01	NS	2.47	U	9.07	j	0.999	j	2.21	U	1.17	U	2.03	j	0.704	U	2.10	U	3.85	j	0.833	U	1.44	U
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	0.01	NS	0.587	U	1.19	U	0.526	U	0.525	U	0.604	U	0.589	U	0.533	U	0.706	U	1.94	j	0.567	U	0.557	U
Heptachlorodibenzofuran homologs (Total HpCDF)	--	NS	0.587	U	103		0.999		2.73		2.54	U	4.78		0.533	U	0.581	U	5.78		1.22	U	0.557	U
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	0.0003	NS	2.37	j	2.82	j	2.22	j	1.83	j	1.71	U	3.33	U	1.69	j	3.36	U	8.54	j	1.49	U	1.70	U
Dioxin Furan Calculated TEQ (ND=0)	--	0.0051	1.51		18		0.903		0.0636		0.107		0.12		0.0365		0.526		0.776		0.0735		0.0874	
Dioxin Furan Calculated TEQ (ND=1/2 DL)	--	0.0051	2.76		19		1.74		0.899		1.06		1.0		0.877		1.42		1.71		0.971		0.970	

PUBLIC REVIEW DRAFT
Table W-15
Groundwater Analytical Results Summary - Dioxins & Furans
5900 West Marginal Way Site
Seattle, Washington

Location			MW-43S		MW-43S		MW-43S		MW-45S		MW-45S		MW-45S		MW-45S		MW-45D		MW-45D		MW-45D		MW-45D	
Sample Date			30 Mar 2015		03 Sep 2015		03 Sep 2015		11 Mar 2014		26 Aug 2014		31 Mar 2015		01 Sep 2015		26 Mar 2014		26 Aug 2014		31 Mar 2015		01 Sep 2015	
Sample ID			MW-43S-033015-NP		DUP-090315-01		MW-43S-090315-NP		MW-45S-031114		MW-45S-082614-NP		MW-45S-033115-NP		MW-45S-090115-NP		MW-45D-032614		MW-45D-082614-NP		MW-45D-033115-NP		MW-45D-090115-NP	
Sample Type			N		FD		N		N		N		N		N		N		N		N		N	
Sample Method			no purge		no purge		no purge		low-flow		no purge		no purge		no purge		low-flow		no purge		no purge		no purge	
Analyte	TEF	Screening Level																						
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1	0.0051	0.586	U	0.512	U	0.523	U	0.566	U	0.565	U	0.558	U	0.529	U	0.568	U	0.543	U	0.541	U	0.532	U
Tetrachlorodibenzo-p-dioxin homologs (Total TCDD)	--	NS	0.725		0.512	U	0.565	U	0.566	U	4.65	U	0.558	U	0.529	U	0.568	U	4.84	U	0.768	U	0.532	U
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	1	NS	0.586	U	0.512	U	0.523	U	0.566	U	0.565	UJ	0.558	U	0.529	U	0.568	U	0.543	UJ	0.541	U	0.532	U
Pentachlorodibenzo-p-dioxin homologs (Total PeCDD)	--	NS	0.586	U	0.512	U	0.523	U	0.566	U	0.565	U	0.558	U	0.529	U	0.568	U	0.977	U	0.541	U	0.532	U
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	0.586	U	0.512	U	0.523	U	0.595	U	0.565	U	0.558	U	0.529	U	0.568	U	0.543	U	0.541	U	0.532	U
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	0.586	U	0.512	U	0.523	U	0.595	U	0.565	U	0.558	U	0.529	U	0.568	U	0.543	U	0.541	U	0.532	U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	NS	0.586	U	0.512	U	0.523	U	0.595	U	0.565	U	0.558	U	0.529	U	0.568	U	0.543	U	0.541	U	0.532	U
Hexachlorodibenzo-p-dioxin homologs (Total HxCDD)	--	NS	0.690		0.512	U	0.523	U	0.595	U	4.33		0.558	U	0.529	U	0.568	U	2.79		0.541	U	0.532	U
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	0.01	NS	8.79	j	1.74	j	2.11	U	4.47	U	4.44	U	5.38	j	2.26	j	2.14	U	0.594	j	1.33	U	1.68	U
Heptachlorodibenzo-p-dioxin homologs (Total HpCDD)	--	NS	14.8		1.74		1.29		7.71		3.94		9.39		4.12		1.50	U	0.594		0.541	U	1.11	
Octachlorodibenzo-P-Dioxin (OCDD)	0.0003	NS	226		13.3	j	23.7	j	68.3	j	39.9	j	29.3	j	24.8	j	8.66	U	2.43	U	5.09	U	7.49	U
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	0.1	NS	0.586	U	0.512	U	0.523	U	0.566	U	0.565	U	0.558	U	0.529	U	0.568	U	0.543	U	0.541	U	0.532	U
Tetrachlorodibenzofuran homologs (Total TCDF)	--	NS	0.586	U	0.973		0.523	U	2.74		1.08		0.558	U	0.529	U	0.568	U	0.788		0.541	U	0.532	U
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	0.03	NS	0.586	U	0.512	U	0.523	U	0.744	U	0.565	U	0.558	U	0.529	U	0.568	U	0.543	U	0.541	U	0.532	U
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	0.3	NS	0.586	U	0.512	U	0.523	U	1.07	U	0.565	U	0.558	U	0.529	U	0.568	U	0.543	U	0.541	U	0.532	U
Pentachlorodibenzofuran homologs (Total PeCDF)	--	NS	0.586	U	0.512	U	0.523	U	10.2	U	0.565	U	0.558	U	0.529	U	0.568	U	0.543	U	0.541	U	0.532	U
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.586	U	0.512	U	0.523	U	3.67	j	5.69	j	2.01	U	3.14	j	0.568	U	0.543	U	0.541	U	0.532	U
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.586	U	0.512	U	0.523	U	0.842	j	0.696	U	0.558	U	0.529	U	0.568	U	0.543	U	0.541	U	0.532	U
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.586	U	0.512	U	0.523	U	0.672	U	0.571	U	0.558	U	0.529	U	0.568	U	0.543	U	0.541	U	0.532	U
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	NS	0.586	U	0.512	U	0.523	U	0.672	U	0.571	U	0.558	U	0.529	U	0.568	U	0.543	U	0.541	U	0.532	U
Hexachlorodibenzofuran homologs (Total HxCDF)	--	NS	1.62		0.512	U	0.523	U	13.0		5.69		0.558	U	3.14		0.568	U	0.543	U	0.541	U	0.532	U
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	0.01	NS	2.28	U	0.512	U	0.523	U	4.81	j	0.565	U	0.578	j	0.529	U	0.743	U	0.543	U	0.541	U	0.532	U
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	0.01	NS	0.586	U	0.512	U	0.523	U	2.05	j	0.805	U	1.11	U	0.529	U	0.568	U	0.543	U	0.541	U	0.532	U
Heptachlorodibenzofuran homologs (Total HpCDF)	--	NS	5.12		0.512	U	0.523	U	13.1		0.565	U	0.578		0.529	U	0.568	U	0.543	U	0.541	U	0.532	U
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	0.0003	NS	3.87	j	0.512	U	0.665	U	6.69	j	0.898	U	1.80	U	0.529	U	0.836	U	0.543	U	0.541	U	0.822	U
Dioxin Furan Calculated TEQ (ND=0)	--	0.0051	0.16		0.0214		0.00711		0.542		0.581		0.068		0.344		0	U	0.00594		0	U	0	U
Dioxin Furan Calculated TEQ (ND=1/2 DL)	--	0.0051	1.1		0.828		0.841		1.49		1.47		1.0		1.15		0.908	U	0.862		0.86	U	0.848	U

PUBLIC REVIEW DRAFT

Table W-15

Groundwater Analytical Results Summary - Dioxins & Furans

5900 West Marginal Way Site

Seattle, Washington

Notes:

Units are in picograms per liter (pg/l).

low-flow = Sample collected following standard low-flow techniques, as described in RI/FS Work Plan Addendum dated Sept. 2013.

no purge = Sample collected prior to low-flow purge as described in the RI/FS Work Plan Addendum dated Sept. 2013.

"--" = No value available.

Laboratory Detection Limits = Organic compounds are reported to the Method Detection Limit (MDL) and other parameters are reported to the Reporting Limit (RL).

National Functional Guidelines (NFG) = USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, October 1999 or USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004.

TEQ = Toxicity Equivalency Quotient to 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD). Only positively identified compounds are included in TEQ calculation, EMPCs are calculated as nondetect values.

Shallow (S) = Refers to shallow groundwater monitoring wells screened at the water table.

Deep (D) = Refers to deeper groundwater at the Site.

Green-shaded, bolded values indicate detected concentration exceeds the selected screening level.

Light gray-shaded values indicate that the method detection limit exceeds the screening level.

Key:

DUP = field duplicate sample

FD = field duplicate sample

MW = monitoring well

(ND = 1/2 DL) = non-detect values calculated as one-half the reporting limit.

NS = no screening level

pg/l = picograms per liter (equivalent to parts per quadrillion)

TEF = toxicity equivalency factor

Laboratory Data Qualifiers:

j = The value reported is less than the reporting limit and should be considered an estimate; qualifier reported by the laboratory.

J = The detected results are qualified as estimated in accordance with NFGs.

U = Result is ≤ the laboratory detection limit or qualified as non-detect in accordance with NFGs.

UU = Non-detected compound qualified as estimated in accordance with NFGs.



APPENDIX X DATA VALIDATION MEMORANDA

Memorandum

Environmental Resources Management

To: Laura Tesch

From: Irene Lavigne

Date: 24 April 2009

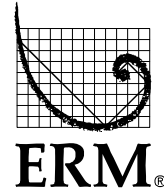
Subject: Data Review of Reichhold-Glacier Site Groundwater Samples

Project Number: 0091535.05

Data Package: Brooks Rand Laboratories Data Packages 0913018, 0913024, 0913036 and 0913038

Pace Analytical Services Data Packages ERG0901, ERG0902, ERG0903 and ERG0904 (includes subcontracted analyses from Columbia Analytical Services and Bodycote Testing Group)

2875 Michelle Drive
Suite 200
Irvine, CA 92606
(949) 623-4700
(949) 623-2940 (fax)



The quality of the data was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999 and *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004.

HOLDING TIME AND PRESERVATION EVALUATION

The samples were prepared and analyzed within the method-prescribed time period from the date of collection. None of the sample data were qualified on the basis of holding-time exceedances.

The sample shipments were received at the laboratory within the method-prescribed temperature and preservation requirements with limited exceptions. The temperature of one sample delivery group (SDG) was recorded below the acceptable temperature range of 2-6°C upon receipt at the laboratory. None of the associated data required qualification because the low temperature was not expected to affect the sample results. Two SDGs were received at the laboratory within three hours of sampling, not allowing for sufficient cooling time of the samples; therefore, the samples in these SDGs were not qualified on the basis of temperature exceedance. All samples with temperature exceedances are listed in Table 1.

BLANK EVALUATION

The method blank sample results were nondetected for each of the target analytes with limited exceptions. Detections for aluminum, zinc, copper, and/or total organic carbons in various method blanks required that 22 associated sample results be qualified as nondetected (U) for these compounds. Nondetected samples or samples with detections of compounds exceeding 10 times an associated blank detection did not require qualification. The method blank detections and affected data are presented in Table 2.

BLANK SPIKE EVALUATION

The laboratory control sample (LCS)/laboratory control sample duplicate (LCSD) recoveries were within the laboratory's limits of acceptance with one exception. A high aluminum recovery resulted in qualification of eight detected sample results as estimated (J) for this compound. An additional LCS outlier did not result in qualification of data because there were no sample data associated with this spike sample. The LCS outliers are shown in Table 3.

MATRIX SPIKE EVALUATION

The matrix spike (MS)/matrix spike duplicate (MSD) recoveries were within the laboratory's limits of acceptance with several exceptions. Detected compounds associated with spike recoveries below the minimum or above the maximum acceptable limits were qualified as estimated (J) for 52 sample results. Additionally, 44 nondetected sample results required qualification as estimated (UJ) due to spike recoveries that were below the minimum acceptable limit. Data were not qualified if the sample used to prepare the spike sample was not a client sample, if only the relative percent difference (RPD) was outside acceptable limits, or if only one recovery in a MS/MSD pair was outside control limits. Outlying MS recoveries and resulting qualified data are presented in Table 4.

SURROGATE SPIKE EVALUATION

The surrogate recoveries were within acceptable limits with few exceptions. Three samples submitted for semivolatile organic compound (SVOC) analyses had outlying recoveries; however, no associated data were qualified as a result of these recoveries because only one surrogate in either the acid or base/neutral fractions was out for each analysis. The outlying surrogate recoveries are listed in Table 5.

FIELD DUPLICATE EVALUATION

Four samples were collected and analyzed in duplicate. ERM calculated the RPD between detected results. The USEPA has not established control criteria for field duplicate samples; therefore, sample data are not qualified on the basis of field duplicate imprecision. Detected duplicate results and calculated RPDs are shown in Table 6.

ANALYTICAL DUPLICATE EVALUATION

The laboratory prepared and analyzed 24 samples as analytical duplicates. ERM calculated the RPD between detected results. All RPDs were less than 20 percent, indicating acceptable precision. The duplicate sample results and calculated RPDs are presented in Table 7.

OVERALL ASSESSMENT

No data required rejection. All of the data, including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation is acceptable for the preparation of technically defensible documents.

Table 1
Samples with Exceeded Preservation Requirements
Groundwater Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Analysis Method	Sample Temperature (°C)	Limits (°C)	ERM Qualifier
ERG0902	All	All	6.5	2 - 6	NA
ERG0903	All	Halides, total organic	-0.3	2 - 6	Low
ERG0904	All	All	10.7	2 - 6	NA

Key:

°C = Degrees Celsius

Low = Low temperature not expected to affect sample results

NA = Not applicable; samples received at laboratory within three hours of collection

Table 2
Blank and Associated Suspect Sample Detections
Groundwater Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
0913036	FB 032509	NA	Arsenic	0.059	0.103	µg/L	--
ERG0901	MB 032409	See below	Aluminum	72.6	250	µg/L	--
ERG0901	MB 032409	See below	Aluminum, dissolved	72.6	250	µg/L	--
ERG0901	MB 032409	NA	Iron	14.0	50	µg/L	--
ERG0901	MB 032409	NA	Iron, dissolved	14.0	50	µg/L	--
ERG0901	MB 032409	NA	Manganese	1.0	7.5	µg/L	--
ERG0901	MB 032409	NA	Manganese, dissolved	1.0	7.5	µg/L	--
ERG0901	MB 032409	NA	Potassium	126	2500	µg/L	--
ERG0901	MB 032409	MW-03S	Aluminum	42.8	500	µg/L	500 U
ERG0901	MB 032409	MW-03S	Aluminum, dissolved	44.1	500	µg/L	500 U
ERG0901	MB 032409	MW-01S	Aluminum	196	500	µg/L	500 U
ERG0901	MB 032409	MW-01S	Aluminum, dissolved	179	500	µg/L	500 U
ERG0901	MB 032409	MW-17	Aluminum	24.7	500	µg/L	500 U
ERG0901	MB 032809	See below	Zinc	2.11	5.0	µg/L	--
ERG0901	MB 032809	NA	Zinc	2.1	5.0	µg/L	--
ERG0901	MB 032809	See below	Copper, dissolved	0.11	1.0	µg/L	--
ERG0901	MB 032809	See below	Zinc, dissolved	2.1	5.0	µg/L	--
ERG0901	MB 032809	MW-03S	Zinc	2.85	10.0	µg/L	10.0 U
ERG0901	MB 032809	MW-03S	Copper, dissolved	0.13	2.0	µg/L	2.0 U
ERG0901	MB 032809	MW-03S	Zinc, dissolved	2.9	10.0	µg/L	10.0 U
ERG0901	MB 032809	MW-01S	Copper, dissolved	0.50	2.0	µg/L	2.0 U
ERG0901	MB 032809	DUP032309	Copper, dissolved	0.58	2.0	µg/L	2.0 U
ERG0901	MB 032809	MW-17	Zinc	2.33	10.0	µg/L	10.0 U
ERG0901	MB 032809	MW-17	Zinc, dissolved	2.8	10.0	µg/L	10.0 U
ERG0902	MB 032509	NA	Iron	29.6	50	µg/L	--
ERG0902	MB 032509	NA	Manganese	1.4	7.5	µg/L	--

Table 2
Blank and Associated Suspect Sample Detections
Groundwater Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
ERG0902	MB 032509	NA	Potassium	149	2500	µg/L	--
ERG0902	MB 032809	See below	Zinc	2.1	5.0	µg/L	--
ERG0902	MB 032809	NA	Copper, dissolved	0.11	1.0	µg/L	--
ERG0902	MB 032809	See below	Zinc, dissolved	2.1	5.0	µg/L	--
ERG0902	MB 032809	MW-02S	Zinc	3.7	10.0	µg/L	10.0 U
ERG0902	MB 032809	MW-02S	Zinc, dissolved	2.5	10.0	µg/L	10.0 U
ERG0902	MB 032809	MW-10	Zinc, dissolved	2.3	10.0	µg/L	10.0 U
ERG0902	MB 032809	NA	Sodium	72.6	50	µg/L	--
ERG0902	MB 032809	NA	Copper, dissolved	0.19	1.0	µg/L	--
ERG0902	MB 032809	See below	Zinc, dissolved	6.8	5.0	µg/L	--
ERG0902	MB 032809	MW-02D	Zinc, dissolved	11.9	10.0	µg/L	10.0 U
ERG0902	MB 040109	NA	Chloride	0.14	0.5	mg/L	--
ERG0903	MB 032809	NA	Sodium	72.6	50	µg/L	--
ERG0903	MB 032809	See below	Zinc	6.8	5.0	µg/L	--
ERG0903	MB 032809	See below	Copper, dissolved	0.19	1.0	µg/L	--
ERG0903	MB 032809	See below	Zinc, dissolved	6.8	5.0	µg/L	--
ERG0903	MB 032809	MW-04S	Zinc	27.4	10.0	µg/L	27.4 U
ERG0903	MB 032809	MW-04S	Copper, dissolved	1.2	2.0	µg/L	2.0 U
ERG0903	MB 032809	MW-04S	Zinc, dissolved	16.9	10.0	µg/L	16.9 U
ERG0903	MB 032809	MW-07S	Zinc	12.3	10.0	µg/L	12.3 U
ERG0903	MB 032809	MW-07S	Zinc, dissolved	6.7	10.0	µg/L	10.0 U
ERG0903	MB 040209	NA	Iron	26.5	50	µg/L	--
ERG0903	MB 040209	NA	Manganese	1.2	7.5	µg/L	--
ERG0904	MB 032809	NA	Sodium	72.6	50	µg/L	--
ERG0904	MB 040209	NA	Iron	26.5	50	µg/L	--
ERG0904	MB 040209	NA	Manganese	1.2	7.5	µg/L	--

Table 2
Blank and Associated Suspect Sample Detections
Groundwater Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
ERG0904	MB 040709	NA	DOC	0.32	0.5	mg/L	--
ERG0904	MB 040709	See below	TOC	0.32	0.5	mg/L	--
ERG0904	MB 040709	MW-19	TOC	2.3	1.0	mg/L	2.3 U

Key:

FB = Field blank

MB = Method blank

NA = Not applicable; associated data were not affected

µg/L = Micrograms per liter

U = Nondetected

mg/L = Milligrams per liter

DOC = Dissolved organic carbon

TOC = Total organic carbon

Table 3
Laboratory Control Sample (Blank Spike) Recoveries Outside of Acceptable Limits
Groundwater Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
ERG0903	LCS 040109	See below	Aluminum	132	80-120	--	--	NA	--
ERG0903	LCS 040109	MW-04S	Aluminum	--	--	--	--	46.4	J
ERG0903	LCS 040109	MW-07S	Aluminum	--	--	--	--	65.8	J
ERG0903	LCS 040109	MW-06S	Aluminum	--	--	--	--	43.2	J
ERG0903	LCS 040109	MW-05S	Aluminum	--	--	--	--	60.3	J
ERG0903	LCS 040109	MW-14	Aluminum	--	--	--	--	113	J
ERG0903	LCS 040109	MW-11	Aluminum	--	--	--	--	84.5	J
ERG0903	LCS 040109	MW-12	Aluminum	--	--	--	--	94.8	J
ERG0903	LCS 040109	MW-24	Aluminum	--	--	--	--	61.4	J
ERG0903	LCS 040209	NA	Aluminum	140	80-120	--	--	NA	--

Key:

LCS = Laboratory control sample

RPD = Relative percent difference

NA = Not applicable

J = Detected results qualified as estimated

Table 4
Matrix Spike Recoveries Outside of Acceptable Limits
Groundwater Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
ERG0901	MW-17 MS/MSD	NA	Chloride	119/110	90-110	3	11	NA	--
ERG0901	MW-17 MS/MSD	NA	Nitrite	124/128	90-110	3	10	NA	--
ERG0901	MW-17 MS/MSD	See below	Orthophosphate	38/45	90-110	18	10	NA	--
ERG0901	MW-17 MS/MSD	NA	Sulfate	108/111	90-110	1	10	NA	--
ERG0901	MW-17 MS/MSD	MW-03S	Orthophosphate	--	--	--	--	< 1.0	UJ
ERG0901	MW-17 MS/MSD	MW-01S	Orthophosphate	--	--	--	--	< 1.0	UJ
ERG0901	MW-17 MS/MSD	MW-17	Orthophosphate	--	--	--	--	< 1.0	UJ
ERG0901	MW-17 MS/MSD	See below	Calcium	127/127	75-125	0	20	NA	--
ERG0901	MW-17 MS/MSD	See below	Iron	62/66	75-125	1	20	NA	--
ERG0901	MW-17 MS/MSD	MW-03S	Calcium	--	--	--	--	31600	J
ERG0901	MW-17 MS/MSD	MW-01S	Calcium	--	--	--	--	97000	J
ERG0901	MW-17 MS/MSD	MW-17	Calcium	--	--	--	--	54000	J
ERG0901	MW-17 MS/MSD	MW-03S	Iron	--	--	--	--	17000	J
ERG0901	MW-17 MS/MSD	MW-01S	Iron	--	--	--	--	3790	J
ERG0901	MW-17 MS/MSD	MW-17	Iron	--	--	--	--	4070	J
ERG0901	MW-22 MS/MSD	See below	Sodium	35/34	75-125	0	20	NA	--
ERG0901	MW-22 MS/MSD	MW-03S	Sodium	--	--	--	--	26900	J
ERG0901	MW-22 MS/MSD	MW-01S	Sodium	--	--	--	--	26900	J
ERG0901	MW-22 MS/MSD	MW-17	Sodium	--	--	--	--	15000	J
ERG0902	MW-02S MS/MSD	See below	Chloride	85/80	90-110	1	11	NA	--
ERG0902	MW-02S MS/MSD	See below	Nitrite	142/134	90-110	6	10	NA	--
ERG0902	MW-02S MS/MSD	NA	Orthophosphate	90/86	90-110	4	10	NA	--
ERG0902	MW-02S MS/MSD	NA	Sulfate	108/116	90-110	2	10	NA	--
ERG0902	MW-02S MS/MSD	MW-02S	Chloride	--	--	--	--	8.6	J
ERG0902	MW-02S MS/MSD	MW-13	Chloride	--	--	--	--	10	J
ERG0902	MW-02S MS/MSD	MW-10	Chloride	--	--	--	--	8.1	J
ERG0902	MW-02S MS/MSD	MW-22	Chloride	--	--	--	--	12	J

Table 4
Matrix Spike Recoveries Outside of Acceptable Limits
Groundwater Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
ERG0902	MW-02S MS/MSD	MW-23	Chloride	--	--	--	--	8.1	J
ERG0902	MW-02S MS/MSD	MW-21	Chloride	--	--	--	--	9.7	J
ERG0902	MW-02S MS/MSD	MW-02S	Nitrite	--	--	--	--	< 0.10	UJ
ERG0902	MW-02S MS/MSD	MW-13	Nitrite	--	--	--	--	< 0.10	UJ
ERG0902	MW-02S MS/MSD	MW-10	Nitrite	--	--	--	--	< 0.10	UJ
ERG0902	MW-02S MS/MSD	MW-22	Nitrite	--	--	--	--	< 0.10	UJ
ERG0902	MW-02S MS/MSD	MW-23	Nitrite	--	--	--	--	< 0.10	UJ
ERG0902	MW-02S MS/MSD	MW-21	Nitrite	--	--	--	--	< 0.10	UJ
ERG0902	MW-22 MS/MSD	NA	Nitrite	109/139	90-110	24	10	NA	--
ERG0902	MW-22 MS/MSD	NA	Iron	94/48	75-125	3	20	NA	--
ERG0902	MW-22 MS/MSD	See below	Sodium	35/34	75-125	0	20	NA	--
ERG0902	MW-22 MS/MSD	MW-02S	Sodium	--	--	--	--	35800	J
ERG0902	MW-22 MS/MSD	MW-13	Sodium	--	--	--	--	36600	J
ERG0902	MW-22 MS/MSD	MW-22	Sodium	--	--	--	--	34300	J
ERG0902	MW-22 MS/MSD	MW-23	Sodium	--	--	--	--	23800	J
ERG0902	MW-22 MS/MSD	MW-21	Sodium	--	--	--	--	28500	J
ERG0902	MW-14 MS/MSD	NA	Magnesium	80/54	75-125	12	20	NA	--
ERG0902	MW-14 MS/MSD	NA	Sodium	124/213	75-125	9	20	NA	--
ERG0902	Batch MS/MSD	NA	Sulfate as SO4	57/52	90-110	4	20	NA	--
ERG0903	MW-14 MS/MSD	NA	Nitrate	70/95	90-110	9	10	NA	--
ERG0903	MW-14 MS/MSD	See below	Nitrite	131/117	90-110	33	10	NA	--
ERG0903	MW-14 MS/MSD	See below	Orthophosphate	12/26	90-110	57	10	NA	--
ERG0903	MW-14 MS/MSD	MW-12	Nitrite	--	--	--	--	0.52	J
ERG0903	MW-14 MS/MSD	MW-24	Nitrite	--	--	--	--	0.18	J
ERG0903	MW-14 MS/MSD	MW-04S	Orthophosphate	--	--	--	--	< 1.0	UJ
ERG0903	MW-14 MS/MSD	MW-07S	Orthophosphate	--	--	--	--	< 1.0	UJ
ERG0903	MW-14 MS/MSD	MW-06S	Orthophosphate	--	--	--	--	< 1.0	UJ

Table 4
Matrix Spike Recoveries Outside of Acceptable Limits
Groundwater Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
ERG0903	MW-14 MS/MSD	MW-05S	Orthophosphate	--	--	--	--	< 1.0	UJ
ERG0903	MW-14 MS/MSD	MW-14	Orthophosphate	--	--	--	--	< 1.0	UJ
ERG0903	MW-14 MS/MSD	MW-11	Orthophosphate	--	--	--	--	< 1.0	UJ
ERG0903	MW-14 MS/MSD	MW-12	Orthophosphate	--	--	--	--	< 1.0	UJ
ERG0903	MW-14 MS/MSD	MW-24	Orthophosphate	--	--	--	--	< 1.0	UJ
ERG0903	MW-14 MS/MSD	NA	Magnesium	80/54	75-125	12	20	NA	--
ERG0903	MW-14 MS/MSD	NA	Sodium	124/213	75-125	9	20	NA	--
ERG0903	MW-14 MS/MSD	NA	2-Chlorophenol	55/16	10-120	110	30	NA	--
ERG0903	MW-14 MS/MSD	NA	2,4-Dichlorophenol	60/16	29-120	116	30	NA	--
ERG0903	MW-14 MS/MSD	NA	Pentachlorophenol	68/21	22-140	104	30	NA	--
ERG0903	MW-14 MS/MSD	NA	Phenol	21/6	0-115	109	30	NA	--
ERG0903	MW-14 MS/MSD	NA	2,4,6-Trichlorophenol	50/13	48-113	120	30	NA	--
ERG0903	MW-14 MS/MSD	See below	2,4,5-Trichlorophenol	48/12	50-110	121	30	NA	--
ERG0903	MW-14 MS/MSD	MW-06S	2,4,5-Trichlorophenol	--	--	--	--	< 5.2	UJ
ERG0903	MW-14 MS/MSD	MW-05S	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ
ERG0903	MW-14 MS/MSD	MW-14	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ
ERG0903	MW-14 MS/MSD	DUP032509	2,4,5-Trichlorophenol	--	--	--	--	< 5.1	UJ
ERG0903	MW-14 MS/MSD	MW-11	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ
ERG0903	MW-14 MS/MSD	MW-12	2,4,5-Trichlorophenol	--	--	--	--	< 5.1	UJ
ERG0903	MW-14 MS/MSD	MW-24	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ
ERG0903	MW-14 MS/MSD	NA	Iron	169/122	75-125	4	20	NA	--
ERG0903	MW-20 MS/MSD	NA	Aluminum, dissolved	123/137	75-125	10	20	NA	--
ERG0903	MW-20 MS/MSD	See below	Iron, dissolved	0/45	75-125	3	20	NA	--
ERG0903	MW-20 MS/MSD	MW-04S	Iron, dissolved	--	--	--	--	65.1	J
ERG0903	MW-20 MS/MSD	MW-07S	Iron, dissolved	--	--	--	--	5370	J
ERG0903	MW-20 MS/MSD	MW-06S	Iron, dissolved	--	--	--	--	767	J
ERG0903	MW-20 MS/MSD	MW-05S	Iron, dissolved	--	--	--	--	17.1	J
ERG0903	MW-20 MS/MSD	MW-14	Iron, dissolved	--	--	--	--	9680	J

Table 4
Matrix Spike Recoveries Outside of Acceptable Limits
Groundwater Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
ERG0903	MW-20 MS/MSD	MW-11	Iron, dissolved	--	--	--	--	51.5	J
ERG0903	MW-20 MS/MSD	MW-12	Iron, dissolved	--	--	--	--	3710	J
ERG0903	MW-20 MS/MSD	MW-24	Iron, dissolved	--	--	--	--	14500	J
ERG0904	MW-20 MS/MSD	See below	Chloride	77/80	90-110	1	11	NA	--
ERG0904	MW-20 MS/MSD	See below	Nitrate	62/63	90-110	1	10	NA	--
ERG0904	MW-20 MS/MSD	See below	Nitrite	52/59	90-110	7	10	NA	--
ERG0904	MW-20 MS/MSD	See below	Orthophosphate	2/1	90-110	107	10	NA	--
ERG0904	MW-20 MS/MSD	See below	Sulfate	86/83	90-110	2	10	NA	--
ERG0904	MW-20 MS/MSD	MW-26	Chloride	--	--	--	--	7.9	J
ERG0904	MW-20 MS/MSD	MW-27	Chloride	--	--	--	--	2.2	J
ERG0904	MW-20 MS/MSD	MW-16	Chloride	--	--	--	--	9.5	J
ERG0904	MW-20 MS/MSD	MW-19	Chloride	--	--	--	--	5.6	J
ERG0904	MW-20 MS/MSD	MW-18	Chloride	--	--	--	--	9.4	J
ERG0904	MW-20 MS/MSD	MW-20	Chloride	--	--	--	--	8.4	J
ERG0904	MW-20 MS/MSD	MW-26	Nitrate	--	--	--	--	< 0.20	UJ
ERG0904	MW-20 MS/MSD	MW-27	Nitrate	--	--	--	--	< 0.20	UJ
ERG0904	MW-20 MS/MSD	MW-16	Nitrate	--	--	--	--	< 0.20	UJ
ERG0904	MW-20 MS/MSD	MW-19	Nitrate	--	--	--	--	< 0.20	UJ
ERG0904	MW-20 MS/MSD	MW-18	Nitrate	--	--	--	--	< 0.20	UJ
ERG0904	MW-20 MS/MSD	MW-20	Nitrate	--	--	--	--	< 0.20	UJ
ERG0904	MW-20 MS/MSD	MW-26	Nitrite	--	--	--	--	0.14	J
ERG0904	MW-20 MS/MSD	MW-27	Nitrite	--	--	--	--	< 0.10	UJ
ERG0904	MW-20 MS/MSD	MW-16	Nitrite	--	--	--	--	< 0.10	UJ
ERG0904	MW-20 MS/MSD	MW-19	Nitrite	--	--	--	--	0.16	J
ERG0904	MW-20 MS/MSD	MW-18	Nitrite	--	--	--	--	0.26	J
ERG0904	MW-20 MS/MSD	MW-20	Nitrite	--	--	--	--	0.26	J
ERG0904	MW-20 MS/MSD	MW-26	Orthophosphate	--	--	--	--	< 1.0	UJ

Table 4
Matrix Spike Recoveries Outside of Acceptable Limits
Groundwater Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
ERG0904	MW-20 MS/MSD	MW-27	Orthophosphate	--	--	--	--	< 1.0	UJ
ERG0904	MW-20 MS/MSD	MW-16	Orthophosphate	--	--	--	--	< 1.0	UJ
ERG0904	MW-20 MS/MSD	MW-19	Orthophosphate	--	--	--	--	< 1.0	UJ
ERG0904	MW-20 MS/MSD	MW-18	Orthophosphate	--	--	--	--	< 1.0	UJ
ERG0904	MW-20 MS/MSD	MW-20	Orthophosphate	--	--	--	--	< 1.0	UJ
ERG0904	MW-20 MS/MSD	MW-26	Sulfate	--	--	--	--	14	J
ERG0904	MW-20 MS/MSD	MW-27	Sulfate	--	--	--	--	2.8	J
ERG0904	MW-20 MS/MSD	MW-16	Sulfate	--	--	--	--	10	J
ERG0904	MW-20 MS/MSD	MW-19	Sulfate	--	--	--	--	8.8	J
ERG0904	MW-20 MS/MSD	MW-18	Sulfate	--	--	--	--	35	J
ERG0904	MW-20 MS/MSD	MW-20	Sulfate	--	--	--	--	4.4	J
ERG0904	MW-18 MS/MSD	NA	Magnesium	80/54	75-125	12	20	NA	--
ERG0904	MW-18 MS/MSD	NA	Sodium	124/213	75-125	9	20	NA	--
ERG0904	MW-18 MS/MSD	NA	2-Chlorophenol	55/16	10-120	110	30	NA	--
ERG0904	MW-18 MS/MSD	NA	2,4-Dichlorophenol	60/16	29-120	116	30	NA	--
ERG0904	MW-18 MS/MSD	NA	Pentachlorophenol	68/21	22-140	104	30	NA	--
ERG0904	MW-18 MS/MSD	NA	Phenol	21/6	0-115	109	30	NA	--
ERG0904	MW-18 MS/MSD	NA	2,4,6-Trichlorophenol	50/13	48-113	120	30	NA	--
ERG0904	MW-18 MS/MSD	See below	2,4,5-Trichlorophenol	48/12	50-110	121	30	NA	--
ERG0904	MW-18 MS/MSD	MW-26	2,4,5-Trichlorophenol	--	--	--	--	< 5.1	UJ
ERG0904	MW-18 MS/MSD	MW-27	2,4,5-Trichlorophenol	--	--	--	--	< 5.1	UJ
ERG0904	MW-18 MS/MSD	MW-16	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ
ERG0904	MW-18 MS/MSD	MW-19	2,4,5-Trichlorophenol	--	--	--	--	< 5.1	UJ
ERG0904	MW-18 MS/MSD	MW-18	2,4,5-Trichlorophenol	--	--	--	--	< 5.1	UJ
ERG0904	MW-18 MS/MSD	MW-20	2,4,5-Trichlorophenol	--	--	--	--	< 5.1	UJ
ERG0904	MW-20 MS/MSD	NA	Aluminum, dissolved	123/137	75-125	10	20	NA	--
ERG0904	MW-20 MS/MSD	See below	Iron, dissolved	0/45	75-125	3	20	NA	--
ERG0904	MW-20 MS/MSD	MW-26	Iron, dissolved	--	--	--	--	31000	J

Table 4
Matrix Spike Recoveries Outside of Acceptable Limits
Groundwater Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
ERG0904	MW-20 MS/MSD	MW-27	Iron, dissolved	--	--	--	--	1340	J
ERG0904	MW-20 MS/MSD	MW-16	Iron, dissolved	--	--	--	--	4010	J
ERG0904	MW-20 MS/MSD	MW-19	Iron, dissolved	--	--	--	--	7750	J
ERG0904	MW-20 MS/MSD	MW-18	Iron, dissolved	--	--	--	--	247	J
ERG0904	MW-20 MS/MSD	MW-20	Iron, dissolved	--	--	--	--	19900	J
ERG0904	Batch MS/MSD	NA	DOC	59/59	70-119	0	11	NA	--
ERG0904	Batch MS/MSD	NA	DOC	59/60	70-119	1	11	NA	--

Key:

MS/MSD = Matrix spike/matrix spike duplicate

RPD = Relative percent difference

Batch = Spike sample was prepared using a non-client sample

NR = Not reported

NA = Not applicable

UJ = Nondetected results qualified as estimated

DOC = Dissolved organic carbon

Table 5
Surrogate Recovery Results out of Acceptable Limits
Groundwater Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Method	Surrogate	Recovery (%)	Limit (%)	ERM Qualifier
ERG0901	MW-03D	SVOC	Nitrobenzene-d5	117	46-113	NA
ERG0903	DUP032509	SVOC	2,4,6-Tribromophenol	43	46-128	NA
ERG0903	MW-11	SVOC	2,4,6-Tribromophenol	37	46-128	NA

Key:

SVOC = Semivolatile organic compounds

NA = Not applicable

Table 6
Field Duplicate Results and Calculated Relative Percent Differences
Groundwater Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Compound	Concentration		Report Limit	Units	RPD
			Sample	Duplicate			
0913018	MW-01S/Dup 032309	Arsenic, total	10.7	10.8	0.103	µg/L	0.9
0913018	MW-01S/Dup 032309	Arsenic, dissolved	8.89	8.88	0.103	µg/L	0.1
0913018	MW-01S/Dup 032309	Arsenic (III)	4.15	3.98	0.500	µg/L	4.2
0913018	MW-01S/Dup 032309	Arsenic (inorg)	6.88	6.99	5.00	µg/L	1.6
0913018	MW-01S/Dup 032309	Arsenic (V)	2.73	3.01	5.00	µg/L	10
0913024	MW-21/Dup 032409	Arsenic, total	3080	3090	0.103	µg/L	0.3
0913024	MW-21/Dup 032409	Arsenic, dissolved	2770	2870	0.103	µg/L	3.5
0913036	MW-14/Dup 032509	Arsenic, total	2630	2570	0.103	µg/L	2.3
0913036	MW-14/Dup 032509	Arsenic, dissolved	2600	2500	0.103	µg/L	3.9
0913036	MW-14/Dup 032509	Arsenic (III)	2420	2720	500	µg/L	12
0913036	MW-14/Dup 032509	Arsenic (inorg)	2590	2930	1000	µg/L	12
0913036	MW-14/Dup 032509	Arsenic (V)	320	320	1000	µg/L	0
ERG0901	MW-01S/DUP032309	Copper	0.608	1.0	2.0	µg/L	49
ERG0901	MW-01S/DUP032309	Zinc	50.5	47.3	10.0	µg/L	6.5
ERG0901	MW-01S/DUP032309	Copper, dissolved	0.50	0.58	2.0	µg/L	15
ERG0901	MW-01S/DUP032309	Zinc, dissolved	53.4	52.4	10.0	µg/L	1.9

Key:

RPD = Relative percent difference

µg/L = Micrograms per liter

Table 7
Analytical Duplicate Results and Calculated Relative Percent Differences
Groundwater Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Concentration		Report Limit	Units	RPD
			Sample	Duplicate			
ERG0901	MW-21	Alkalinity, bicarbonate	240	230	8.0	mg/L	4.3
ERG0901	MW-21	Alkalinity, total	240	230	8.0	mg/L	4.3
ERG0901	Batch duplicate	Alkalinity, total	150	150	8.0	mg/L	0
ERG0901	MW-22	TSS	12	11	2	mg/L	8.7
ERG0901	Batch duplicate	TSS	35	33	2	mg/L	5.9
ERG0901	MW-14	Hardness	120	120	4.0	mg/L	0
ERG0901	Batch duplicate	Hardness	140	140	4.0	mg/L	0
ERG0902	MW-22	Hardness	170	170	4.0	mg/L	0
ERG0902	MW-22	TSS	12	11	2	mg/L	8.7
ERG0902	MW-14	Hardness	120	120	4.0	mg/L	0
ERG0902	Batch duplicate	Hardness	140	140	4.0	mg/L	0
ERG0903	Batch duplicate	Hardness	5.0	5.0	4.0	mg/L	0
ERG0903	MW-22	Hardness	170	170	4.0	mg/L	0
ERG0903	MW-14	TSS	15	16	2	mg/L	6.5
ERG0903	MW-14	TSS	120	120	2	mg/L	0
ERG0903	Batch duplicate	TSS	57	53	2	mg/L	7.3
ERG0903	MW-14	Alkalinity, bicarbonate	190	190	8.0	mg/L	0
ERG0903	MW-14	Alkalinity, total	190	190	8.0	mg/L	0
ERG0904	Batch duplicate	Hardness	5.0	5.0	4.0	mg/L	0
ERG0904	MW-22	Hardness	170	170	4.0	mg/L	0
ERG0904	Batch duplicate	TSS	57	53	2	mg/L	7.3
ERG0904	MW-14	Alkalinity, bicarbonate	190	190	8.0	mg/L	0
ERG0904	MW-14	Alkalinity, total	190	190	8.0	mg/L	0
ERG0904	Batch duplicate	Alkalinity, total	300	290	8.0	mg/L	3.4

Key:

RPD = Relative percent difference

Batch = Spike sample was prepared using a non-client sample

mg/L = Milligrams per liter

TSS = Total suspended solids

Memorandum

Environmental Resources Management

To: Mike Mendes

From: Irene Lavigne

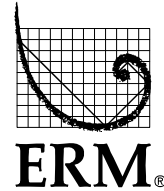
Date: 27 May 2009

Subject: Data Review of Reichhold-Glacier Site Groundwater Samples Collected April 2010

Project Number: 0112489

Data Package: Pace Analytical Services Data Packages 253584, 253587, 253596, 253600, 253606, 253608, 253611, 253614, 253619, 253631 and 253632 (includes subcontracted analyses from Columbia Analytical Services)

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The quality of the data was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999 and *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004.

HOLDING TIME AND PRESERVATION EVALUATION

The samples were prepared and analyzed within the method-prescribed time period from the date of collection. None of the sample data were qualified on the basis of holding-time exceedances.

The sample shipments were received at the laboratory within the method-prescribed temperature requirements with limited exceptions. The laboratory noted that samples from two sample delivery groups (SDG) were received at the laboratory outside of the required temperature range of 2-6°C. Sample results for total organic carbon were qualified as estimated (J) due to this temperature exceedance. Sample results for volatile organic compound analyses were not qualified on the basis of temperature exceedances because the samples were analyzed within the 7-day holding time for unpreserved samples. The samples affected by the temperature exceedances are listed in Table 1.

BLANK EVALUATION

The method blank sample results were nondetected for each of the target analytes with limited exceptions. Detections of total organic halides and zinc in various method blanks required that 11 associated sample results be qualified as nondetected (U) at the report limit for these compounds. Nondetected samples results or samples with detections that exceeded 10 times an associated blank detection did not require qualification. The method blank detections and affected data are presented in Table 2.

BLANK SPIKE EVALUATION

The laboratory control sample (LCS) recoveries were within the laboratory's limits of acceptance. No sample data were qualified as a result of the LCS recoveries. The LCS recoveries indicate acceptable laboratory accuracy and precision.

MATRIX SPIKE EVALUATION

The matrix spike (MS)/matrix spike duplicate (MSD) recoveries were within the laboratory's limits of acceptance with several exceptions. Four MS recoveries for silver were below the minimum acceptable limits for this compound. Detected and nondetected results for silver were qualified as estimated, J or UJ, respectively, for 14 samples. Additional MS outliers did not require qualification of sample data. Data were not qualified if the data could be verified using an associated, in-control LCS recovery, if the sample used to prepare the spike sample was a non-client sample, if only one recovery in a MS/MSD pair was outside control limits, or if the concentration of the unspiked sample was greater than four times the amount spiked. Outlying MS recoveries and resulting qualified data are presented in Table 3.

SURROGATE SPIKE EVALUATION

The surrogate recoveries were within acceptable limits. No qualifications to the data were made based on the surrogate evaluation. The surrogate recoveries indicate minimal matrix interference in the samples.

FIELD DUPLICATE EVALUATION

Two samples were collected and analyzed in duplicate. ERM calculated the relative percent difference (RPD) between detected results. The USEPA has not established control criteria for field duplicate samples; therefore, sample data are not qualified on the basis of field duplicate imprecision. Detected duplicate results and calculated RPDs are shown in Table 4.

ANALYTICAL DUPLICATE EVALUATION

The laboratory prepared and analyzed 11 samples as analytical duplicates. ERM calculated the RPD between detected results. All RPDs were less than 20 percent with one exception. The sample results for a duplicate analyzed for total suspended solids were less than five times the report limit for this analysis. Therefore, the sample results were not qualified on the basis of the RPD exceedance. The duplicate sample results and calculated RPDs are presented in Table 5.

CALIBRATION EVALUATION

The laboratory noted that the continuing calibration verification (CCV) recoveries associated with seven analyses for silver exceeded acceptable control limits. No data were qualified as a result of these exceedances because the CCV recoveries were biased high and the samples were nondetected for this compound. The CCV outliers are listed in Table 6.

OVERALL ASSESSMENT

No data were determined to be unusable. All of the data, including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents.

Table 1
Samples with Exceeded Preservation Requirements
Groundwater Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Analysis Method	Sample Temperature (°C)	Limits (°C)	ERM Qualifier
253587	MW-01S-042710	TOC	NR	2 - 6	J
253587	MW-02S-042710	TOC	NR	2 - 6	J
253587	MW-07S-042710	TOC	NR	2 - 6	J
253587	MW-17-042710	TOC	NR	2 - 6	J
253587	MW-04S-042710	TOC	NR	2 - 6	J
253608	MW-24-042810	TOC	11.9	2 - 6	J
253608	MW-21-042810	TOC	11.9	2 - 6	J
253608	MW-20-042810	TOC	11.9	2 - 6	J

Data packages reviewed: 253584, 253587, 253596, 253600, 253606, 253608, 253611, 253614, 253619, 253631, 253632

Key:

°C = Degrees Celsius

TOC = Total organic carbon

NR = Value not reported; lab noted "samples were received outside of required temperature range"

Table 2
Blank and Associated Suspect Sample Detections
Groundwater Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
253587	MB 26890	NA	Iron	13	100	µg/L	--
253587	MB 27069	NA	Manganese, dissolved	0.19	15	µg/L	--
253587	K1004298-MB	See below	Halides, total organic	5	10	µg/L	--
253587	K1004298-MB	MW-01S-042710	Halides, total organic	8	10	µg/L	10 U
253587	K1004298-MB	MW-02S-042710	Halides, total organic	6	10	µg/L	10 U
253587	K1004298-MB	MW-17-042710	Halides, total organic	5	10	µg/L	10 U
253600	MB 26890	NA	Iron	13	100	µg/L	--
253600	MB 27069	NA	Manganese, dissolved	0.19	15	µg/L	--
253600	MB 784149	See below	Zinc	1.4	5.0	µg/L	--
253600	MB 784149	MW-10-042810	Zinc	3.9	5.0	µg/L	5.0 U
253600	MB 784149	MW-22-042810	Zinc	2.8	5.0	µg/L	5.0 U
253600	MB 784149	MW-23-042810	Zinc	3.1	5.0	µg/L	5.0 U
253600	MB 784149	MW-03S-042810	Zinc	2.9	5.0	µg/L	5.0 U
253602	MB 784149	See below	Zinc	1.4	5.0	µg/L	--
253602	MB 784149	MW-01D-042710	Zinc	9.1	25	µg/L	25 U
253602	MB 784149	MW-02D-042710	Zinc	4.0	5.0	µg/L	5.0 U
253606	MB 784144	See below	Zinc	1.4	5.0	µg/L	--
253606	MB 784144	MW-03D-042810	Zinc	4.7	5.0	µg/L	5.0 U
253606	MB 783539	See below	Zinc, dissolved	1.4	5.0	µg/L	--
253606	MB 783539	MW-03D-042810	Zinc, dissolved	3.0	5.0	µg/L	5.0 U

Table 2
Blank and Associated Suspect Sample Detections
Groundwater Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
253608	K1004296-MB	NA	Halides, total organic	5	10	µg/L	--

Data packages reviewed: 253584, 253587, 253596, 253600, 253606, 253608, 253611, 253614, 253619, 253631, 253632

Key:

MB = Method blank

NA = Not applicable; associated data were not affected

µg/L = Micrograms per liter

U = Nondetected

Table 3
Matrix Spike Recoveries Outside of Acceptable Limits
Groundwater Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
253587	MW-07S-042710 MS	See below	Silver	62	70-130	--	--	--	--
253587	MW-07S-042710 MS	MW-01S-042710	Silver	--	--	--	--	0.072	J
253587	MW-07S-042710 MS	MW-02S-042710	Silver	--	--	--	--	< 0.50	UJ
253587	MW-07S-042710 MS	MW-07S-042710	Silver	--	--	--	--	< 0.50	UJ
253587	MW-07S-042710 MS	MW-17-042710	Silver	--	--	--	--	< 0.50	UJ
253587	MW-07S-042710 MS	DUP-042710	Silver	--	--	--	--	0.15	J
253587	MW-07S-042710 MS	MW-04S-042710	Silver	--	--	--	--	< 0.50	UJ
253587	MW-22-042810 MS/MSD	NA	Phosphorus	49/32	80-120	8	30	--	--
253600	Batch MS	NA	Silver	32	70-130	--	--	--	--
253600	MW-22-042810 MS	See below	Silver	37	70-130	--	--	--	--
253600	MW-22-042810 MS	MW-10-042810	Silver	--	--	--	--	< 0.50	UJ
253600	MW-22-042810 MS	MW-22-042810	Silver	--	--	--	--	< 0.50	UJ
253600	MW-22-042810 MS	MW-23-042810	Silver	--	--	--	--	< 0.50	UJ
253600	MW-22-042810 MS	MW-03S-042810	Silver	--	--	--	--	< 0.50	UJ
253600	MW-22-042810 MS	MW-13-042810	Silver	--	--	--	--	0.39	J
253600	MW-10-042810 MS/MSD	NA	Nitrate as N	88/99	90-110	12	10	--	--
253600	MW-10-042810 MS/MSD	NA	Chloride	86/96	90-110	8	11	--	--
253600	MW-22-042810 MS/MSD	NA	Phosphorus	49/32	80-120	8	30	--	--
253600	MW-10-042810 MS	NA	TOC	149	59-144	--	--	--	--
253602	Batch MS	NA	Silver	32	70-130	--	--	--	--
253602	MW-22-042810 MS	See below	Silver	37	70-130	--	--	--	--
253602	MW-22-042810 MS	MW-01D-042710	Silver	--	--	--	--	< 2.5	UJ
253602	MW-22-042810 MS	MW-02D-042710	Silver	--	--	--	--	< 0.50	UJ
253606	Batch MS/MSD	NA	Arsenic	42/-13	70-130	79	20	--	--
253606	Batch MS/MSD	NA	Chromium	70/45	70-130	44	20	--	--

Table 3
Matrix Spike Recoveries Outside of Acceptable Limits
Groundwater Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
253606	MW-03D-042810 MS	See below	Silver	52	70-130	--	--	--	--
253606	MW-03D-042810 MS	MW-03D-042810	Silver	--	--	--	--	< 0.50	UJ
253606	Batch MS/MSD	NA	Silver, dissolved	60/56	70-130	7	20	--	--
253606	Batch MS	NA	Silver, dissolved	57	70-130	--	--	--	--
253608	Batch MS/MSD	NA	Arsenic	42/-13	70-130	79	20	--	--
253608	MW-21-042810 MS/MSD	NA	Arsenic	539/109	75-125	10	20	--	--
253608	MW-21-042810 MS/MSD	NA	Arsenic, dissolved	199/208	70-130	0	20	4X	--
253608	MW-10-042810 MS/MSD	NA	Nitrate as N	88/99	90-110	12	10	--	--
253608	MW-10-042810 MS/MSD	NA	Chloride	86/96	90-110	8	11	--	--
253608	MW-14-042910 MS/MSD	NA	Phosphorus	85/225	80-120	38	30	--	--
253611	MW-14-042910 MS/MSD	NA	Arsenic	688/905	70-130	4	20	4X	--
253611	MW-14-042910 MS/MSD	NA	Arsenic, dissolved	-985/-996	70-130	2	20	4X	--
253611	MW-14-042910 MS/MSD	NA	Nitrate as N	52/65	90-110	23	10	--	--
253611	MW-14-042910 MS/MSD	NA	Chloride	43/46	90-110	5	11	--	--
253611	MW-14-042910 MS/MSD	NA	Sulfate	46/51	90-110	6	10	--	--
253611	MW-14-042910 MS/MSD	NA	Phosphorus	85/225	80-120	38	30	--	--
253614	MW-14-042910 MS/MSD	NA	Arsenic	688/905	70-130	4	20	4X	--
253614	MW-14-042910 MS/MSD	NA	Nitrate as N	52/65	90-110	23	10	--	--
253614	MW-14-042910 MS/MSD	NA	Chloride	43/46	90-110	5	11	--	--
253614	MW-14-042910 MS/MSD	NA	Sulfate	46/51	90-110	6	10	--	--
253614	MW-14-042910 MS/MSD	NA	Phosphorus	85/225	80-120	38	30	--	--
253619	MW-14-042910 MS/MSD	NA	Arsenic	688/905	70-130	4	20	4X	--
253619	MW-14-042910 MS/MSD	NA	Arsenic, dissolved	-985/-996	70-130	2	20	4X	--
253619	MW-14-042910 MS/MSD	NA	Nitrate as N	52/65	90-110	23	10	--	--

Table 3
Matrix Spike Recoveries Outside of Acceptable Limits
Groundwater Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
253619	MW-14-042910 MS/MSD	NA	Chloride	43/46	90-110	5	11	--	--
253619	MW-14-042910 MS/MSD	NA	Sulfate	46/51	90-110	6	10	--	--
253619	MW-14-042910 MS/MSD	NA	Phosphorus	85/225	80-120	38	30	--	--

Data packages reviewed: 253584, 253587, 253596, 253600, 253606, 253608, 253611, 253614, 253619, 253631, 253632

Key:

MS/MSD = Matrix spike/matrix spike duplicate

RPD = Relative percent difference

Batch = Spike sample was prepared using a non-client sample

NA = Not applicable

J = Detected result qualified as estimated

UJ = Nondetected result qualified as estimated

TOC = Total organic carbon

4X = Concentration of unspiked sample was greater than 4 times the amount spiked; no qualification required

Table 4
Field Duplicate Results and Calculated Relative Percent Differences
Groundwater Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Compound	Concentration		Report Limit	Units	RPD
			Sample	Duplicate			
253587	MW-01S-042710/Dup-042710	Arsenic	15.7	17.9	0.50	µg/L	13
253587	MW-01S-042710/Dup-042710	Chromium	0.47	0.75	0.50	µg/L	46
253587	MW-01S-042710/Dup-042710	Copper	2.1	3.0	0.50	µg/L	35
253587	MW-01S-042710/Dup-042710	Silver	0.072	0.15	0.50	µg/L	70
253587	MW-01S-042710/Dup-042710	Zinc	37.1	37.5	5.0	µg/L	1.1
253587	MW-01S-042710/Dup-042710	Arsenic, dissolved	8.9	9.1	0.50	µg/L	2.2
253587	MW-01S-042710/Dup-042710	Copper, dissolved	0.70	0.60	0.50	µg/L	15
253587	MW-01S-042710/Dup-042710	Zinc, dissolved	26.9	26.7	5.0	µg/L	0.7
253611	MW-14-042910/Dup-042910	Arsenic	3640	3290	5.0	µg/L	10
253611	MW-14-042910/Dup-042910	Arsenic, dissolved	1300	2700	5.0	µg/L	70

Data packages reviewed: 253584, 253587, 253596, 253600, 253606, 253608, 253611, 253614, 253619, 253631, 253632

Key:

RPD = Relative percent difference

µg/L = Micrograms per liter

Table 5
Analytical Duplicate Results and Calculated Relative Percent Differences
Groundwater Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Concentration		Report Limit	Units	RPD
			Sample	Duplicate			
253587	MW-01S-042710	Alkalinity, bicarbonate	264	264	2.0	mg/L	0
253587	MW-04S-042710	TOC	3.0	3.0	1.0	mg/L	0
253600	MW-22-042810	Alkalinity, bicarbonate	204	202	2.0	mg/L	1.0
253600	MW-14-042910	Alkalinity, bicarbonate	226	232	2.0	mg/L	2.6
253600	MW-22-042810	TSS	18.0	20.0	2.0	mg/L	11
253600	MW-14-042910	TSS	9.0	7.0	2.0	mg/L	25
253600	MW-13-042810	TOC	13.9	13.8	2.0	mg/L	0.7
253602	MW-22-042810	TSS	18.0	20.0	2.0	mg/L	11
253602	MW-14-042910	TSS	9.0	7.0	2.0	mg/L	25
253606	MW-22-042810	TSS	18.0	20.0	2.0	mg/L	11
253606	MW-14-042910	TSS	9.0	7.0	2.0	mg/L	25
253608	MW-27-042910	Alkalinity, bicarbonate	392	396	2.0	mg/L	1.0
253608	MW-22-042810	TSS	18.0	20.0	2.0	mg/L	11
253608	MW-14-042910	TSS	9.0	7.0	2.0	mg/L	25
253608	MW-20-042810	TOC	3.8	3.5	1.0	mg/L	8.2
253611	MW-22-042810	Alkalinity, bicarbonate	204	202	2.0	mg/L	1.0
253611	MW-14-042910	Alkalinity, bicarbonate	226	232	2.0	mg/L	2.6
253611	MW-22-042810	TSS	18.0	20.0	2.0	mg/L	11
253611	MW-14-042910	TSS	9.0	7.0	2.0	mg/L	25
253611	MW-19-043010	TOC	2.8	2.5	1.0	mg/L	11
253614	MW-27-042910	Alkalinity, bicarbonate	392	396	2.0	mg/L	1.0
253614	MW-22-042810	TSS	18.0	20.0	2.0	mg/L	11
253614	MW-14-042910	TSS	9.0	7.0	2.0	mg/L	25
253614	MW-19-043010	TOC	2.8	2.5	1.0	mg/L	11
253619	MW-27-042910	Alkalinity, bicarbonate	392	396	2.0	mg/L	1.0
253619	Batch Duplicate	TSS	7.0	9.0	2.0	mg/L	25
253619	MW-19-043010	TOC	2.8	2.5	1.0	mg/L	11

Data packages reviewed: 253584, 253587, 253596, 253600, 253606, 253608, 253611, 253614, 253619, 253631, 253632

Key:

RPD = Relative percent difference

Batch = Spike sample was prepared using a non-client sample

mg/L = Milligrams per liter

TSS = Total suspended solids

TOC = Total organic carbon

Table 6
Calibration Verification Recoveries Outside of Acceptable Limits
Groundwater Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	CCV Recovery	Reported Concentration	Units	ERM Qualifier
253600	MW-10-042810	Silver, dissolved	High	< 0.50	µg/L	--
253600	MW-22-042810	Silver, dissolved	High	< 0.50	µg/L	--
253600	MW-23-042810	Silver, dissolved	High	< 0.50	µg/L	--
253600	MW-03S-042810	Silver, dissolved	High	< 0.50	µg/L	--
253600	MW-13-042810	Silver, dissolved	High	< 0.50	µg/L	--
253602	MW-01D-042710	Silver, dissolved	High	< 0.50	µg/L	--
253602	MW-02D-042710	Silver, dissolved	High	< 0.50	µg/L	--

Data packages reviewed: 253584, 253587, 253596, 253600, 253606, 253608, 253611, 253614, 253619, 253631, 253632

Key:

CCV = Continuing calibration verification

High = CCV exceeded maximum acceptable limit

µg/L = Micrograms per liter

Memorandum

Environmental Resources Management

To: Shira DeGrood

From: Irene Lavigne

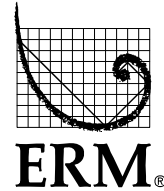
Date: 14 June 2010

Subject: Data Review of Reichhold-Glacier, Groundwater
Samples Collected June 2010

Project Number: 0112489.05

Data Package: ALS Laboratory Group Data Package 1006024
Pace Analytical Data Package 253580

2875 Michelle Drive
Suite 200
Irvine, CA 92606
(949) 623-4700
(949) 623-4711 (fax)



The quality of the data was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999 and *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004.

HOLDING TIME AND PRESERVATION EVALUATION

The samples were prepared and analyzed within the method-prescribed time period from the date of collection. The sample shipments were received at the laboratory within the method-prescribed temperature preservation requirements. None of the data were qualified based on holding time or temperature preservation exceedances.

BLANK EVALUATION

The method blank sample results were nondetected for each of the target analytes. None of the data were qualified based on blank results.

BLANK SPIKE EVALUATION

The laboratory control sample (LCS)/laboratory control sample duplicate (LCSD) recoveries were within the laboratory's limits of acceptance. No sample data were qualified as a result of the LCS recoveries. The LCS recoveries indicate acceptable laboratory accuracy and precision.

MATRIX SPIKE EVALUATION

There were no matrix spike samples presented in the laboratory reports.

SURROGATE SPIKE EVALUATION

The surrogate recoveries were within acceptable limits. No qualifications to the data were made. The surrogate recoveries indicate minimal matrix interference in the samples.

OVERALL ASSESSMENT

No data required qualification or were determined to be unusable. All of the data can be used for decision-making purposes. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents.

Memorandum

Environmental Resources Management

To: Mike Mendes

From: Irene Lavigne

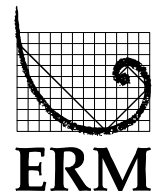
Date: 30 June 2010

Subject: Data Review of Reichhold-Glacier Site Groundwater Samples Collected April 2010

Project Number: 0112489

Data Package: Pace Analytical Services Data Packages 253584, 253587, 253596, 253600, 253602, 253606, 253608, 253611, 253614, 253619, 253631 and 253632 (includes subcontracted analyses from Columbia Analytical Services)

2875 Michelle Drive
Suite 200
Irvine, CA 92606
(949) 623-4700
(949) 623-2940 (fax)



The quality of the data was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999 and *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004.

HOLDING TIME AND PRESERVATION EVALUATION

The samples were prepared and analyzed within the method-prescribed time period from the date of collection. None of the sample data were qualified on the basis of holding-time exceedances.

The sample shipments were received at the laboratory within the method-prescribed temperature requirements with limited exceptions. The laboratory noted that samples from two sample delivery groups (SDG) were received at the laboratory outside of the required temperature range of 2-6°C. Sample results for total organic carbon were qualified as estimated (J) due to this temperature exceedance. Sample results for volatile organic compound analyses were not qualified on the basis of temperature exceedances because the samples were analyzed within the 7-day holding time for unpreserved samples. The samples affected by the temperature exceedances are listed in Table 1.

BLANK EVALUATION

The method blank sample results were nondetected for each of the target analytes with limited exceptions. Detections of total organic halides and zinc in various method blanks required that 11 associated sample results be qualified as nondetected (U) at the report limit for these compounds. Nondetected samples results or samples with detections that exceeded 10 times an associated blank detection did not require qualification. The method blank detections and affected data are presented in Table 2.

BLANK SPIKE EVALUATION

The laboratory control sample (LCS) recoveries were within the laboratory's limits of acceptance. No sample data were qualified as a result of the LCS recoveries. The LCS recoveries indicate acceptable laboratory accuracy and precision.

MATRIX SPIKE EVALUATION

The matrix spike (MS)/matrix spike duplicate (MSD) recoveries were within the laboratory's limits of acceptance with several exceptions. Four MS recoveries for silver were below the minimum acceptable limits for this compound. Detected and nondetected results for silver were qualified as estimated, J or UJ, respectively, for 14 samples. Additional MS outliers did not require qualification of sample data. Data were not qualified if the data could be verified using an associated, in-control LCS recovery, if the sample used to prepare the spike sample was a non-client sample, if only one recovery in a MS/MSD pair was outside control limits, or if the concentration of the unspiked sample was greater than four times the amount spiked. Outlying MS recoveries and resulting qualified data are presented in Table 3.

SURROGATE SPIKE EVALUATION

The surrogate recoveries were within acceptable limits. No qualifications to the data were made based on the surrogate evaluation. The surrogate recoveries indicate minimal matrix interference in the samples.

FIELD DUPLICATE EVALUATION

Three samples were collected and analyzed in duplicate. ERM calculated the relative percent difference (RPD) between detected results. The USEPA has not established control criteria for field duplicate samples; therefore, sample data are not qualified on the basis of field duplicate imprecision. Detected duplicate results and calculated RPDs are shown in Table 4.

ANALYTICAL DUPLICATE EVALUATION

The laboratory prepared and analyzed 11 samples as analytical duplicates. ERM calculated the RPD between detected results. All RPDs were less than 20 percent with one exception. The sample results for a duplicate analyzed for total suspended solids were less than five times the report limit for this analysis. Therefore, the sample results were not qualified on the basis of the RPD exceedance. The duplicate sample results and calculated RPDs are presented in Table 5.

CALIBRATION EVALUATION

The laboratory noted that the continuing calibration verification (CCV) recoveries associated with seven analyses for silver exceeded acceptable control limits. No data were qualified as a result of these exceedances because the CCV recoveries were biased high and the samples were nondetected for this compound. The CCV outliers are listed in Table 6.

OVERALL ASSESSMENT

No data were determined to be unusable. All of the data, including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents.

Table 1
Samples with Exceeded Preservation Requirements
Groundwater Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Analysis Method	Sample Temperature (°C)	Limits (°C)	ERM Qualifier
253587	MW-01S-042710	TOC	NR	2 - 6	J
253587	MW-02S-042710	TOC	NR	2 - 6	J
253587	MW-07S-042710	TOC	NR	2 - 6	J
253587	MW-17-042710	TOC	NR	2 - 6	J
253587	MW-04S-042710	TOC	NR	2 - 6	J
253608	MW-24-042810	TOC	11.9	2 - 6	J
253608	MW-21-042810	TOC	11.9	2 - 6	J
253608	MW-20-042810	TOC	11.9	2 - 6	J

Data packages reviewed: 253584, 253587, 253596, 253600, 253602, 253606, 253608, 253611, 253614, 253619, 253631, 253632

Key:

°C = Degrees Celsius

TOC = Total organic carbon

NR = Value not reported; lab noted "samples were received outside of required temperature range"

Table 2
Blank and Associated Suspect Sample Detections
Groundwater Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
253587	MB 26890	NA	Iron	13	100	µg/L	--
253587	MB 27069	NA	Manganese, dissolved	0.19	15	µg/L	--
253587	K1004298-MB	See below	Halides, total organic	5	10	µg/L	--
253587	K1004298-MB	MW-01S-042710	Halides, total organic	8	10	µg/L	10 U
253587	K1004298-MB	MW-02S-042710	Halides, total organic	6	10	µg/L	10 U
253587	K1004298-MB	MW-17-042710	Halides, total organic	5	10	µg/L	10 U
253600	MB 26890	NA	Iron	13	100	µg/L	--
253600	MB 27069	NA	Manganese, dissolved	0.19	15	µg/L	--
253600	MB 784149	See below	Zinc	1.4	5.0	µg/L	--
253600	MB 784149	MW-10-042810	Zinc	3.9	5.0	µg/L	5.0 U
253600	MB 784149	MW-22-042810	Zinc	2.8	5.0	µg/L	5.0 U
253600	MB 784149	MW-23-042810	Zinc	3.1	5.0	µg/L	5.0 U
253600	MB 784149	MW-03S-042810	Zinc	2.9	5.0	µg/L	5.0 U
253602	MB 784149	See below	Zinc	1.4	5.0	µg/L	--
253602	MB 784149	MW-01D-042710	Zinc	9.1	25	µg/L	25 U
253602	MB 784149	MW-02D-042710	Zinc	4.0	5.0	µg/L	5.0 U
253606	MB 784144	See below	Zinc	1.4	5.0	µg/L	--
253606	MB 784144	MW-03D-042810	Zinc	4.7	5.0	µg/L	5.0 U
253606	MB 783539	See below	Zinc, dissolved	1.4	5.0	µg/L	--
253606	MB 783539	MW-03D-042810	Zinc, dissolved	3.0	5.0	µg/L	5.0 U

Table 2
Blank and Associated Suspect Sample Detections
Groundwater Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
253608	K1004296-MB	NA	Halides, total organic	5	10	µg/L	--

Data packages reviewed: 253584, 253587, 253596, 253600, 253602, 253606, 253608, 253611, 253614, 253619, 253631, 253632

Key:

MB = Method blank

NA = Not applicable; associated data were not affected

µg/L = Micrograms per liter

U = Nondetected

Table 3
Matrix Spike Recoveries Outside of Acceptable Limits
Groundwater Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
253587	MW-07S-042710 MS	See below	Silver	62	70-130	--	--	--	--
253587	MW-07S-042710 MS	MW-01S-042710	Silver	--	--	--	--	0.072	J
253587	MW-07S-042710 MS	MW-02S-042710	Silver	--	--	--	--	< 0.50	UJ
253587	MW-07S-042710 MS	MW-07S-042710	Silver	--	--	--	--	< 0.50	UJ
253587	MW-07S-042710 MS	MW-17-042710	Silver	--	--	--	--	< 0.50	UJ
253587	MW-07S-042710 MS	DUP-042710	Silver	--	--	--	--	0.15	J
253587	MW-07S-042710 MS	MW-04S-042710	Silver	--	--	--	--	< 0.50	UJ
253587	MW-22-042810 MS/MSD	NA	Phosphorus	49/32	80-120	8	30	--	--
253600	Batch MS	NA	Silver	32	70-130	--	--	--	--
253600	MW-22-042810 MS	See below	Silver	37	70-130	--	--	--	--
253600	MW-22-042810 MS	MW-10-042810	Silver	--	--	--	--	< 0.50	UJ
253600	MW-22-042810 MS	MW-22-042810	Silver	--	--	--	--	< 0.50	UJ
253600	MW-22-042810 MS	MW-23-042810	Silver	--	--	--	--	< 0.50	UJ
253600	MW-22-042810 MS	MW-03S-042810	Silver	--	--	--	--	< 0.50	UJ
253600	MW-22-042810 MS	MW-13-042810	Silver	--	--	--	--	0.39	J
253600	MW-10-042810 MS/MSD	NA	Nitrate as N	88/99	90-110	12	10	--	--
253600	MW-10-042810 MS/MSD	NA	Chloride	86/96	90-110	8	11	--	--
253600	MW-22-042810 MS/MSD	NA	Phosphorus	49/32	80-120	8	30	--	--
253600	MW-10-042810 MS	NA	TOC	149	59-144	--	--	--	--
253602	Batch MS	NA	Silver	32	70-130	--	--	--	--
253602	MW-22-042810 MS	See below	Silver	37	70-130	--	--	--	--
253602	MW-22-042810 MS	MW-01D-042710	Silver	--	--	--	--	< 2.5	UJ
253602	MW-22-042810 MS	MW-02D-042710	Silver	--	--	--	--	< 0.50	UJ
253606	Batch MS/MSD	NA	Arsenic	42/-13	70-130	79	20	--	--
253606	Batch MS/MSD	NA	Chromium	70/45	70-130	44	20	--	--

Table 3
Matrix Spike Recoveries Outside of Acceptable Limits
Groundwater Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
253606	MW-03D-042810 MS	See below	Silver	52	70-130	--	--	--	--
253606	MW-03D-042810 MS	MW-03D-042810	Silver	--	--	--	--	< 0.50	UJ
253606	Batch MS/MSD	NA	Silver, dissolved	60/56	70-130	7	20	--	--
253606	Batch MS	NA	Silver, dissolved	57	70-130	--	--	--	--
253608	Batch MS/MSD	NA	Arsenic	42/-13	70-130	79	20	--	--
253608	MW-21-042810 MS/MSD	NA	Arsenic	539/109	75-125	10	20	--	--
253608	MW-21-042810 MS/MSD	NA	Arsenic, dissolved	199/208	70-130	0	20	4X	--
253608	MW-10-042810 MS/MSD	NA	Nitrate as N	88/99	90-110	12	10	--	--
253608	MW-10-042810 MS/MSD	NA	Chloride	86/96	90-110	8	11	--	--
253608	MW-14-042910 MS/MSD	NA	Phosphorus	85/225	80-120	38	30	--	--
253611	MW-14-042910 MS/MSD	NA	Arsenic	688/905	70-130	4	20	4X	--
253611	MW-14-042910 MS/MSD	NA	Arsenic, dissolved	-985/-996	70-130	2	20	4X	--
253611	MW-14-042910 MS/MSD	NA	Nitrate as N	52/65	90-110	23	10	--	--
253611	MW-14-042910 MS/MSD	NA	Chloride	43/46	90-110	5	11	--	--
253611	MW-14-042910 MS/MSD	NA	Sulfate	46/51	90-110	6	10	--	--
253611	MW-14-042910 MS/MSD	NA	Phosphorus	85/225	80-120	38	30	--	--
253614	MW-14-042910 MS/MSD	NA	Arsenic	688/905	70-130	4	20	4X	--
253614	MW-14-042910 MS/MSD	NA	Nitrate as N	52/65	90-110	23	10	--	--
253614	MW-14-042910 MS/MSD	NA	Chloride	43/46	90-110	5	11	--	--
253614	MW-14-042910 MS/MSD	NA	Sulfate	46/51	90-110	6	10	--	--
253614	MW-14-042910 MS/MSD	NA	Phosphorus	85/225	80-120	38	30	--	--
253619	MW-14-042910 MS/MSD	NA	Arsenic	688/905	70-130	4	20	4X	--
253619	MW-14-042910 MS/MSD	NA	Arsenic, dissolved	-985/-996	70-130	2	20	4X	--
253619	MW-14-042910 MS/MSD	NA	Nitrate as N	52/65	90-110	23	10	--	--

Table 3
Matrix Spike Recoveries Outside of Acceptable Limits
Groundwater Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
253619	MW-14-042910 MS/MSD	NA	Chloride	43/46	90-110	5	11	--	--
253619	MW-14-042910 MS/MSD	NA	Sulfate	46/51	90-110	6	10	--	--
253619	MW-14-042910 MS/MSD	NA	Phosphorus	85/225	80-120	38	30	--	--

Data packages reviewed: 253584, 253587, 253596, 253600, 253602, 253606, 253608, 253611, 253614, 253619, 253631, 253632

Key:

MS/MSD = Matrix spike/matrix spike duplicate

RPD = Relative percent difference

Batch = Spike sample was prepared using a non-client sample

NA = Not applicable

J = Detected result qualified as estimated

UJ = Nondetected result qualified as estimated

TOC = Total organic carbon

4X = Concentration of unspiked sample was greater than 4 times the amount spiked; no qualification required

Table 4
Field Duplicate Results and Calculated Relative Percent Differences
Groundwater Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Compound	Concentration		Report Limit	Units	RPD
			Sample	Duplicate			
253587	MW-01S-042710/Dup-042710	Arsenic	15.7	17.9	0.50	µg/L	13
253587	MW-01S-042710/Dup-042710	Chromium	0.47	0.75	0.50	µg/L	46
253587	MW-01S-042710/Dup-042710	Copper	2.1	3.0	0.50	µg/L	35
253587	MW-01S-042710/Dup-042710	Silver	0.072	0.15	0.50	µg/L	70
253587	MW-01S-042710/Dup-042710	Zinc	37.1	37.5	5.0	µg/L	1.1
253587	MW-01S-042710/Dup-042710	Arsenic, dissolved	8.9	9.1	0.50	µg/L	2.2
253587	MW-01S-042710/Dup-042710	Copper, dissolved	0.70	0.60	0.50	µg/L	15
253587	MW-01S-042710/Dup-042710	Zinc, dissolved	26.9	26.7	5.0	µg/L	0.7
253608	MW-24-042810/DUP 042810	Arsenic	408	3280	2.5/25	µg/L	156
253608	MW-24-042810/DUP 042810	Arsenic, dissolved	3320	3380	50.0	µg/L	1.8
253608	MW-24-042810 RE/DUP 042810 RE	Arsenic	3280	3280	50.0/25.0	µg/L	0
253608	MW-24-042810 RE/DUP 042810 RE	Arsenic, dissolved	3370	3380	50.0	µg/L	0.3
253611	MW-14-042910/Dup-042910	Arsenic	3640	3290	5.0	µg/L	10
253611	MW-14-042910/Dup-042910	Arsenic, dissolved	1300	2700	5.0	µg/L	70

Data packages reviewed: 253584, 253587, 253596, 253600, 253602, 253606, 253608, 253611, 253614, 253619, 253631, 253632

Key:

RPD = Relative percent difference

RE = Reanalyzed sample

µg/L = Micrograms per liter

Table 5
Analytical Duplicate Results and Calculated Relative Percent Differences
Groundwater Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Concentration		Report Limit	Units	RPD
			Sample	Duplicate			
253587	MW-01S-042710	Alkalinity, bicarbonate	264	264	2.0	mg/L	0
253587	MW-04S-042710	TOC	3.0	3.0	1.0	mg/L	0
253600	MW-22-042810	Alkalinity, bicarbonate	204	202	2.0	mg/L	1.0
253600	MW-14-042910	Alkalinity, bicarbonate	226	232	2.0	mg/L	2.6
253600	MW-22-042810	TSS	18.0	20.0	2.0	mg/L	11
253600	MW-14-042910	TSS	9.0	7.0	2.0	mg/L	25
253600	MW-13-042810	TOC	13.9	13.8	2.0	mg/L	0.7
253602	MW-22-042810	TSS	18.0	20.0	2.0	mg/L	11
253602	MW-14-042910	TSS	9.0	7.0	2.0	mg/L	25
253606	MW-22-042810	TSS	18.0	20.0	2.0	mg/L	11
253606	MW-14-042910	TSS	9.0	7.0	2.0	mg/L	25
253608	MW-27-042910	Alkalinity, bicarbonate	392	396	2.0	mg/L	1.0
253608	MW-22-042810	TSS	18.0	20.0	2.0	mg/L	11
253608	MW-14-042910	TSS	9.0	7.0	2.0	mg/L	25
253608	MW-20-042810	TOC	3.8	3.5	1.0	mg/L	8.2
253611	MW-22-042810	Alkalinity, bicarbonate	204	202	2.0	mg/L	1.0
253611	MW-14-042910	Alkalinity, bicarbonate	226	232	2.0	mg/L	2.6
253611	MW-22-042810	TSS	18.0	20.0	2.0	mg/L	11
253611	MW-14-042910	TSS	9.0	7.0	2.0	mg/L	25
253611	MW-19-043010	TOC	2.8	2.5	1.0	mg/L	11
253614	MW-27-042910	Alkalinity, bicarbonate	392	396	2.0	mg/L	1.0
253614	MW-22-042810	TSS	18.0	20.0	2.0	mg/L	11
253614	MW-14-042910	TSS	9.0	7.0	2.0	mg/L	25
253614	MW-19-043010	TOC	2.8	2.5	1.0	mg/L	11
253619	MW-27-042910	Alkalinity, bicarbonate	392	396	2.0	mg/L	1.0
253619	Batch Duplicate	TSS	7.0	9.0	2.0	mg/L	25
253619	MW-19-043010	TOC	2.8	2.5	1.0	mg/L	11

Data packages reviewed: 253584, 253587, 253596, 253600, 253602, 253606, 253608, 253611, 253614, 253619, 253631, 253632

Key:

RPD = Relative percent difference

Batch = Spike sample was prepared using a non-client sample

mg/L = Milligrams per liter

TSS = Total suspended solids

TOC = Total organic carbon

Table 6
Calibration Verification Recoveries Outside of Acceptable Limits
Groundwater Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	CCV Recovery	Reported Concentration	Units	ERM Qualifier
253600	MW-10-042810	Silver, dissolved	High	< 0.50	µg/L	--
253600	MW-22-042810	Silver, dissolved	High	< 0.50	µg/L	--
253600	MW-23-042810	Silver, dissolved	High	< 0.50	µg/L	--
253600	MW-03S-042810	Silver, dissolved	High	< 0.50	µg/L	--
253600	MW-13-042810	Silver, dissolved	High	< 0.50	µg/L	--
253602	MW-01D-042710	Silver, dissolved	High	< 0.50	µg/L	--
253602	MW-02D-042710	Silver, dissolved	High	< 0.50	µg/L	--

Data packages reviewed: 253584, 253587, 253596, 253600, 253602, 253606, 253608, 253611, 253614, 253619, 253631, 253632

Key:

CCV = Continuing calibration verification

High = CCV exceeded maximum acceptable limit

µg/L = Micrograms per liter

Memorandum

Environmental Resources Management

To: Mike Mendes

From: Irene Lavigne

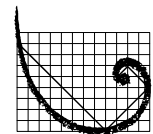
Date: 23 December 2010

Subject: Data Review of Reichhold-Glacier Site Groundwater Monitoring Samples Collected October 2010

Project Number: 0112489.06

Data Package: Pace Analytical Services Data Packages 255461, 255473, 255497, 255488 and 255498 (includes subcontracted analyses from Columbia Analytical Services)

2875 Michelle Drive
Suite 200
Irvine, CA 92606
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ERM®

The quality of the data was assessed and any necessary qualifiers were applied following the United States Environmental Protection Agency (USEPA) *Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999 and USEPA *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004.

HOLDING TIME AND PRESERVATION EVALUATION

The samples were prepared and analyzed within the method-prescribed time period from the date of collection. The sample shipments were received at the laboratory within the method-prescribed preservation requirements. None of the data were qualified based on holding time or temperature preservation exceedances.

BLANK EVALUATION

The method blank sample results were nondetected for each of the target analytes with a number of exceptions. Detections of several compounds in nine method blanks required that 15 associated sample results be qualified as nondetected (U) for these compounds. Nondetected sample results, or samples with detections that exceeded 10 times an associated blank detection, did not require qualification. The method blank detections and affected data are presented in Table 1.

BLANK SPIKE EVALUATION

The laboratory control sample (LCS) recoveries were within the laboratory's limits of acceptance. No sample data were qualified as a result of the LCS recoveries. The LCS recoveries indicate acceptable laboratory accuracy and precision.

MATRIX SPIKE EVALUATION

The matrix spike (MS)/matrix spike duplicate recoveries were within the laboratory's limits of acceptance with several exceptions. Four MS recoveries for chromium were below the minimum acceptable limits for this compound. Nondetected sample results for chromium were qualified as estimated (UJ) for eight samples. Low MS recoveries for silver in three spike samples resulted in qualification of nine samples as estimated (J or UJ). Recoveries that exceeded the maximum acceptable limits for zinc and phosphorus resulted in qualification of 10 sample results as estimated (J). Additional MS outliers did not require qualification of sample data. Data were not qualified if the sample used to prepare the spike sample was a non-client sample, or if the concentration of the unspiked sample was greater than four times the amount spiked. Outlying MS recoveries and resulting qualified data are presented in Table 2.

SURROGATE SPIKE EVALUATION

The surrogate recoveries were within acceptable limits with limited exceptions. Nondetected sample results for one sample submitted for semivolatile organic compounds analysis were qualified as estimated (UJ) due to low recoveries for this sample's surrogate compounds. The outlying surrogate recoveries are shown in Table 3.

FIELD DUPLICATE EVALUATION

Three samples were collected and analyzed in duplicate. ERM calculated the relative percent difference (RPD) between detected results. The USEPA has not established control criteria for field duplicate samples; therefore, sample data are not qualified on the basis of field duplicate imprecision. Detected duplicate results and calculated RPDs are shown in Table 4.

ANALYTICAL DUPLICATE EVALUATION

The laboratory prepared and analyzed 10 samples as analytical duplicates. ERM calculated the RPD between detected results. The RPDs were less than 20 percent, indicating acceptable precision. The duplicate sample results and calculated RPDs are shown in Table 5.

OVERALL ASSESSMENT

No data were determined to be unusable. All of the data, including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents.

Tables

Table 1
Blank and Associated Suspect Sample Detections
October 2010 Groundwater Monitoring Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
255461	MB 47744	NA	Magnesium	33.2	5000	µg/L	--
255461	MB 47754	NA	Manganese, dissolved	1.6	15	µg/L	--
255461	MB 881868	See below	Silver	0.16	0.50	µg/L	--
255461	MB 881868	MW-17-102510	Silver	1.2	0.50	µg/L	1.2 U
255461	MB 881868	MW-07S-102510	Silver	0.37	0.50	µg/L	0.50 U
255461	MB 881868	MW-04S-102510	Silver	0.094	0.50	µg/L	0.50 U
255461	MB 881852	See below	Silver, dissolved	0.087	0.50	µg/L	--
255461	MB 881852	MW-07S-102510	Silver, dissolved	0.30	0.50	µg/L	0.50 U
255461	MB 881852	MW-04S-102510	Silver, dissolved	0.079	0.50	µg/L	0.50 U
255461	MB 47249	See below	TSS	1.0	2.0	mg/L	--
255461	MB 47249	MW-17-102510	TSS	4.0	2.0	mg/L	4.0 U
255461	MB 47249	MW-07S-102510	TSS	3.0	2.0	mg/L	3.0 U
255461	MB 47249	MW-04S-102510	TSS	1.0	2.0	mg/L	2.0 U
255461	MB 47415	NA	Chloride	0.030	1.0	mg/L	--
255461	MB 47415	See below	Sulfate	0.18	1.0	mg/L	--
255461	MB 47415	MW-17-102510	Sulfate	0.22	1.0	mg/L	1.0 U
255461	MB 47594	NA	Phosphorus	0.0042	0.010	mg/L	--
255461	MB 46802	NA	TOC	0.37	1.0	mg/L	--
255473	MB 47744	NA	Magnesium	33.2	5000	µg/L	--
255473	MB 47754	NA	Manganese, dissolved	1.6	15	µg/L	--
255473	MB 47419	NA	Sulfate	0.18	1.0	mg/L	--
255473	MB 47594	See below	Phosphorus	0.0042	0.010	mg/L	--
255473	MB 47594	MW-10-102610	Phosphorus	0.017	0.010	mg/L	0.017 U
255473	MB 47385	NA	TOC	0.27	1.0	mg/L	--
255497	MB 47444	See below	Sulfate	0.20	1.0	mg/L	--
255497	MB 47444	MW-19-102810	Sulfate	0.12	1.0	mg/L	1.0 U
255497	MB 47594	NA	Phosphorus	0.0042	0.0010	mg/L	--
255497	MB 48378	NA	TOC	0.095	1.0	mg/L	--
255488	MB 47744	NA	Magnesium	33.2	5000	µg/L	--
255488	MB 47754	See below	Manganese, dissolved	1.6	15	µg/L	--
255488	MB 47754	MW-18-102710	Manganese, dissolved	14.2	15	µg/L	15 U
255488	MB 882361	NA	Arsenic	0.11	0.50	µg/L	--
255488	MB 47444	NA	Sulfate	0.20	1.0	mg/L	--
255488	MB 47594	See below	Phosphorus	0.0042	0.0010	mg/L	--
255488	MB 47594	MW-18-102710	Phosphorus	0.024	0.0010	mg/L	0.024 U
255488	MB 48378	NA	TOC	0.095	1.0	mg/L	--
255498	MB 896917	NA	Zinc, dissolved	1.8	5.0	µg/L	--
255498	MB 47409	See below	Sulfate	0.20	1.0	mg/L	--
255498	MB 47409	MW-16-102710	Sulfate	1.8	1.0	mg/L	1.8 U
255498	MB 47409	MW-03S-102810	Sulfate	0.19	1.0	mg/L	1.0 U
255498	MB 48385	NA	TOC	0.27	1.0	mg/L	--

Key:

MB = Method blank

NA = Not applicable; associated data were not affected

TSS = Total suspended solids

TOC = Total organic carbon

µg/L = Micrograms per liter

mg/L = Milligrams per liter

U = Nondetected

Table 2
Matrix Spike Recoveries Outside of Acceptable Limits
October 2010 Groundwater Monitoring Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
255461	MW-17-102510 MS/MSD	See below	Chromium	0/0	75-125	NR	20	--	--
255461	MW-17-102510 MS/MSD	MW-17-102510	Chromium	--	--	--	--	< 0.50	UJ
255461	MW-17-102510 MS/MSD	MW-07S-102510	Chromium	--	--	--	--	< 0.50	UJ
255461	MW-17-102510 MS/MSD	MW-04S-102510	Chromium	--	--	--	--	< 0.50	UJ
255461	MW-17-102510 MS/MSD	NA	Silver	47/54	75-125	12	20	4X	--
255461	MW-17-102510 MS/MSD	See below	Chromium, dissolved	0/0	70-130	NR	20	--	--
255461	MW-17-102510 MS/MSD	MW-17-102510	Chromium, dissolved	--	--	--	--	< 0.50	UJ
255461	MW-17-102510 MS/MSD	MW-07S-102510	Chromium, dissolved	--	--	--	--	< 0.50	UJ
255461	MW-17-102510 MS/MSD	MW-04S-102510	Chromium, dissolved	--	--	--	--	< 0.50	UJ
255461	MW-17-102510 MS/MSD	NA	Silver, dissolved	43/45	70-130	5	20	4X	--
255461	MW-22-102610 MS	NA	Phosphorus	53	80-120	--	--	4X	--
255473	Batch MS/MSD	NA	Arsenic	190/172	75-125	3	20	--	--
255473	Batch MS/MSD	NA	Zinc	128/121	75-125	5	20	--	--
255473	MW-22-102610 MS/MSD	See below	Chromium, dissolved	0/0	70-130	NR	20	--	--
255473	MW-22-102610 MS/MSD	MW-10-102610	Chromium, dissolved	--	--	--	--	< 0.50	UJ
255473	MW-22-102610 MS/MSD	MW-13-102610	Chromium, dissolved	--	--	--	--	< 0.50	UJ
255473	Batch MS/MSD	NA	Arsenic, dissolved	132/11	70-130	17	20	--	--
255473	Batch MS/MSD	NA	Zinc, dissolved	132/103	70-130	20	20	--	--
255473	MW-22-102610 MS	NA	Phosphorus	53	80-120	--	--	4X	--
255497	MW-14-102710 MS/MSD	NA	Arsenic	62/82	75-125	2	20	--	--
255497	MW-14-102710 MS/MSD	NA	Arsenic, dissolved	74/64	70-130	0.8	20	--	--
255497	DUP-102710-B MS	NA	Arsenic, dissolved	-34	70-130	--	--	4X	--
255497	MW-22-102610 MS	NA	Phosphorus	53	80-120	--	--	4X	--
255488	DUP-102710 MS/MSD	See below	Silver	69/62	75-125	11	20	--	--
255488	DUP-102710 MS/MSD	MW-02S-102710	Silver	--	--	--	--	< 0.50	UJ
255488	DUP-102710 MS/MSD	MW-01S-102710	Silver	--	--	--	--	< 0.50	UJ
255488	DUP-102710 MS/MSD	MW-01D-102710	Silver	--	--	--	--	< 0.50	UJ
255488	DUP-102710 MS/MSD	DUP-102710	Silver	--	--	--	--	< 0.50	UJ
255488	DUP-102710 MS/MSD	See below	Zinc, dissolved	138/141	70-130	1	20	--	--
255488	DUP-102710 MS/MSD	MW-01S-102710	Zinc, dissolved	--	--	--	--	45.3	J
255488	DUP-102710 MS/MSD	DUP-102710	Zinc, dissolved	--	--	--	--	43.1	J
255488	MW-22-102610 MS	NA	Phosphorus	53	80-120	--	--	4X	--
255498	MW-14-102710 MS/MSD	NA	Arsenic	62/82	75-125	2	20	--	--
255498	MW-14-102710 MS/MSD	See below	Silver	52/52	75-125	1	20	--	--
255498	MW-14-102710 MS/MSD	MW-03S-102810	Silver	--	--	--	--	< 0.50	UJ
255498	MW-14-102710 MS/MSD	MW-03D-102810	Silver	--	--	--	--	< 0.50	UJ
255498	Batch MS/MSD	NA	Zinc	128/121	75-125	5	20	--	--
255498	MW-14-102710 MS/MSD	NA	Arsenic, dissolved	74/64	70-130	0.8	20	--	--
255498	MW-14-102710 MS/MSD	See below	Silver, dissolved	55/54	70-130	1	20	--	--
255498	MW-14-102710 MS/MSD	MW-03S-102810	Silver, dissolved	--	--	--	--	< 0.50	UJ
255498	MW-14-102710 MS/MSD	MW-03D-102810	Silver, dissolved	--	--	--	--	< 0.50	UJ
255498	DUP-102710-B MS	NA	Arsenic, dissolved	-34	70-130	--	--	--	--
255498	DUP-102710-B MS	NA	Silver, dissolved	51	70-130	--	--	--	--
255498	Batch MS/MSD	NA	Zinc, dissolved	132/103	70-130	20	20	--	--

Table 2
Matrix Spike Recoveries Outside of Acceptable Limits
October 2010 Groundwater Monitoring Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
255498	MW-14-102710 MS	See below	Phosphorus	155	80-120	--	--	--	--
255498	MW-14-102710 MS	MW-14-102710	Phosphorus	--	--	--	--	0.99	J
255498	MW-14-102710 MS	MW-06S-102710	Phosphorus	--	--	--	--	0.11	J
255498	MW-14-102710 MS	MW-26-102710	Phosphorus	--	--	--	--	1.2	J
255498	MW-14-102710 MS	MW-27-102710	Phosphorus	--	--	--	--	0.51	J
255498	MW-14-102710 MS	MW-16-102710	Phosphorus	--	--	--	--	0.49	J
255498	MW-14-102710 MS	MW-05S-102710	Phosphorus	--	--	--	--	0.024	J
255498	MW-14-102710 MS	MW-11-102810	Phosphorus	--	--	--	--	0.068	J
255498	MW-14-102710 MS	MW-03S-102810	Phosphorus	--	--	--	--	0.98	J
255498	Batch MS/MSD	NA	Phosphorus	76/79	80-120	2	20	--	--

Data packages reviewed: 255461, 255473, 255497, 255488, 255498

Key:

MS/MSD = Matrix spike/matrix spike duplicate

RPD = Relative percent difference

NR = Not reported

NA = Not applicable

Batch = Spike sample was prepared using a non-client sample

4X = Concentration of unspiked sample was greater than 4 times the amount spiked; no qualification required

UJ = Nondetected result qualified as estimated

J = Detected result qualified as estimated

Table 3

***Surrogate Recovery Results out of Acceptable Limits
October 2010 Groundwater Monitoring Samples
Reichhold-Glacier Site
Seattle, Washington***

Lab Package	Sample ID	Method	Surrogate	Recovery (%)	Limit (%)	ERM Qualifier
255488	MW-18-102710	SVOC	2-Fluorophenol	16	20-120	--
255498	MW-03D-102810	SVOC	Nitrobenzene-d5	37	38-121	UJ
255498	MW-03D-102810	SVOC	2-Fluorobiphenyl	33	40-110	UJ
255498	MW-03D-102810	SVOC	Phenol-d6	10	11-120	UJ
255498	MW-03D-102810	SVOC	2-Fluorophenol	17	20-120	UJ
255498	MW-03D-102810	SVOC	2,4,6-Tribromophenol	35	37-120	UJ

Data packages reviewed: 255461, 255473, 255497, 255488, 255498

Key:

SVOC = Semivolatile organic compounds

UJ = Nondetected result qualified as estimated

Table 4

***Field Duplicate Results and Calculated Relative Percent Differences
October 2010 Groundwater Monitoring Samples
Reichhold-Glacier Site
Seattle, Washington***

Lab Package	Sample/Duplicate ID	Compound	Concentration		Report Limit	Units	RPD
			Sample	Duplicate			
255488	MW-21-102610/DUP-102610	Arsenic	2350	2530	5.0	µg/L	7.4
255488	MW-21-102610/DUP-102610	Arsenic, dissolved	2300	2310	5.0	µg/L	0.4
255488	MW-01S-102710/DUP-102710	Arsenic	11.0	11.2	0.50	µg/L	1.8
255488	MW-01S-102710/DUP-102710	Chromium	0.94	1.0	0.50	µg/L	6.2
255488	MW-01S-102710/DUP-102710	Copper	2.4	2.5	0.50	µg/L	4.1
255488	MW-01S-102710/DUP-102710	Silver	0.16	0.17	0.50	µg/L	6.1
255488	MW-01S-102710/DUP-102710	Zinc	45.9	48.9	5.0	µg/L	6.3
255488	MW-01S-102710/DUP-102710	Arsenic, dissolved	10.2	9.9	0.50	µg/L	3.0
255488	MW-01S-102710/DUP-102710	Chromium, dissolved	0.75	0.79	0.50	µg/L	5.2
255488	MW-01S-102710/DUP-102710	Copper, dissolved	1.1	1.1	0.50	µg/L	0
255488	MW-01S-102710/DUP-102710	Zinc, dissolved	45.3	43.1	5.0	µg/L	5.0
255498	MW-14-102710/DUP-102710-B	Arsenic	824	912	0.50	µg/L	10
255498	MW-14-102710/DUP-102710-B	Arsenic, dissolved	870	1010	0.50	µg/L	15

Data packages reviewed: 255461, 255473, 255497, 255488, 255498

Key:

RPD = Relative percent difference

µg/L = Micrograms per liter

Table 5

Analytical Duplicate Results and Calculated Relative Percent Differences
October 2010 Groundwater Monitoring Samples
Reichhold-Glacier Site
Seattle, Washington

Lab			Concentration		Report		
Package	Sample ID	Compound	Sample	Duplicate	Limit	Units	RPD
255461	Batch Duplicate	Alkalinity, bicarbonate	110	109	2.0	mg/L	0.9
255461	MW-22-102610	Alkalinity, bicarbonate	208	210	2.0	mg/L	1.0
255461	Batch Duplicate	TSS	7.0	7.0	2.0	mg/L	0
255461	Batch Duplicate	TSS	9.0	9.0	2.0	mg/L	0
255473	Batch Duplicate	Alkalinity, bicarbonate	110	109	2.0	mg/L	0.9
255473	MW-22-102610	Alkalinity, bicarbonate	208	210	2.0	mg/L	1.0
255473	MW-22-102610	TSS	13.0	15.0	2.0	mg/L	14
255497	MW-23-102610	Alkalinity, bicarbonate	333	334	2.0	mg/L	0.3
255497	MW-14-102710	Alkalinity, bicarbonate	222	224	2.0	mg/L	0.9
255497	MW-22-102610	TSS	13.0	15.0	2.0	mg/L	14
255488	MW-23-102610	Alkalinity, bicarbonate	333	334	2.0	mg/L	0.3
255488	MW-14-102710	Alkalinity, bicarbonate	222	224	2.0	mg/L	0.9
255488	MW-22-102610	TSS	13.0	15.0	2.0	mg/L	14
255498	MW-23-102610	Alkalinity, bicarbonate	333	334	2.0	mg/L	0.3
255498	MW-14-102710	Alkalinity, bicarbonate	222	224	2.0	mg/L	0.9
255498	MW-06S-102710	Alkalinity, bicarbonate	217	222	2.0	mg/L	2.3
255498	MW-14-102710	TSS	20.0	21.0	2.0	mg/L	4.9
255498	Batch Duplicate	TSS	70.0	72.0	2.0	mg/L	2.8

Data packages reviewed: 255461, 255473, 255497, 255488, 255498

Key:

RPD = Relative percent difference

Batch = Spike sample was prepared using a non-client sample

mg/L = Milligrams per liter

TSS = Total suspended solids

Memorandum

Environmental Resources Management

To: Mike Mendes

From: Irene Lavigne

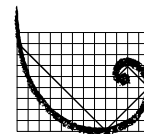
Date: 05 August 2011

Subject: Data Review of Reichhold-Glacier Groundwater
Samples Collected July 2011

Project Number: 0128296.05

Data Packages: Analytical Resources Inc. Data Package TE33
Pace Analytical Services Data Package 258499

2875 Michelle Drive
Suite 200
Irvine, CA 92606
(949) 623-4700
(949) 623-2940 (fax)



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The quality of the data was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999 and *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004.

HOLDING TIME AND PRESERVATION EVALUATION

The samples were prepared and analyzed within the method-prescribed time period from the date of collection. The sample shipments were received at the laboratory within the method-prescribed preservation requirements. None of the data were qualified based on holding time or temperature preservation exceedances.

BLANK EVALUATION

The method blank sample results were nondetected for each of the target analytes. None of the data were qualified on the basis of blank detections.

BLANK SPIKE EVALUATION

The laboratory control sample (LCS) recoveries were within the laboratory's limits of acceptance. None of the data were qualified on the basis of LCS recoveries. The LCS recoveries indicate acceptable laboratory accuracy and precision.

MATRIX SPIKE EVALUATION

The matrix spike (MS)/matrix spike duplicate (MSD) recoveries were within the laboratory's limits of acceptance. No sample data were qualified on the basis of MS recoveries.

SURROGATE SPIKE EVALUATION

The surrogate recoveries were within acceptable limits with one exception; however no data were qualified based on this surrogate outlier. Data were not qualified if only one recovery in either the acid or base/neutral surrogate group exceeded control limits. The surrogate recovery outlier is shown in Table 1.

ANALYTICAL DUPLICATE EVALUATION

The laboratory prepared and analyzed one sample as an analytical duplicate. ERM calculated the relative percent difference (RPD) between detected results. The RPD was less than 20 percent, indicating acceptable precision. The analytical duplicate results and calculated RPD are shown in Table 2.

CALIBRATION RANGE EVALUATION

The laboratory noted two instances where the results of undiluted samples exceeded the calibration range of the equipment. The affected samples were diluted and reanalyzed. The sample data resulting from the reanalyses were within the calibration range and should be used for decision-making purposes. The sample results which exceeded the calibration range were qualified as estimated (J), and are shown in Table 3.

OVERALL ASSESSMENT

No data were determined to be unusable. All of the data, including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents.

Table 1
Surrogate Recovery Results out of Acceptable Limits
July 2011 Groundwater Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Method	Surrogate	Recovery (%)	Limit (%)	ERM Qualifier
258499	MW-07S-071411	SVOC	Terphenyl-d14	135	45-130	--

Key:

SVOC = Semivolatile organic compounds

Table 2
Analytical Duplicate Results and Calculated Relative Percent Differences
July 2011 Groundwater Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Concentration		Report Limit	Units	RPD	ERM Qualifier
			Sample	Duplicate				
TE33	MW-14-071411	Arsenic	116	121	0.2	µg/L	4.2	--

Key:

RPD = Relative percent difference

µg/L = Micrograms per liter

Table 3
Calibration Range Exceedances
July 2011 Groundwater Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Reported Concentration	Units	ERM Qualifier	Notes
TE33	MW-07S-071411	Pentachlorophenol	340 E	µg/L	J	Result exceeded instrument calibration range
TE33	MW-13-071411	Pentachlorophenol	540 E	µg/L	J	Result exceeded instrument calibration range

Key:

E = Undiluted sample concentration exceeded calibration range; use result of dilution reanalysis for decision-making purposes

µg/L = Micrograms per liter

J = Detected sample result qualified as estimated

Memorandum

Environmental Resources Management

To: Mike Mendes

From: Irene Lavigne

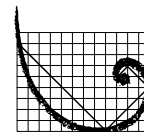
Date: 06 June 2011

Subject: Data Review of Reichhold-Glacier Spring 2011
Groundwater Monitoring Samples Collected
25-28 April 2011

Project Number: 0128296.05

Data Packages: Analytical Resources Incorporated Data Packages
ST65, SU13, SU15, SU57, SU60, and SY05

2875 Michelle Drive
Suite 200
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(949) 623-4700
(949) 623-2940 (fax)



ERM®

The quality of the data was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999 and *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004.

HOLDING TIME AND PRESERVATION EVALUATION

The samples were prepared and analyzed within the method-prescribed time period from the date of collection with several exceptions. Five samples were extracted or reextracted outside of the 7-day holding time for semivolatile organic compound (SVOC) analysis. Detected sample results for two samples were qualified as estimated (J), and nondetected sample results for two samples were qualified as estimated (UJ). Additionally, the nondetected sample results for three samples were qualified as rejected, as shown in Table 1. Rejected sample results can not be used for decision-making purposes.

The sample shipments were received at the laboratory within the method-prescribed preservation requirements. None of the data were qualified based on temperature preservation exceedances.

BLANK EVALUATION

The method blank and field blank sample results were nondetected for each of the target analytes. None of the data were qualified on the basis of blank detections.

BLANK SPIKE EVALUATION

The laboratory control sample (LCS)/laboratory control sample duplicate (LCSD) recoveries were within the laboratory's limits of acceptance with a number of exceptions. Eighty-four sample results were qualified as estimated (UJ or J) due to LCS recoveries that exceeded acceptable limits. The outlying LCS recoveries and qualified sample data are presented in Table 2.

MATRIX SPIKE EVALUATION

The matrix spike (MS)/matrix spike duplicate (MSD) recoveries were within the laboratory's limits of acceptance with a number of exceptions. Eighty-four sample results were qualified as estimated (UJ or J) due to MS recoveries that exceeded acceptable limits. Two MS outliers for arsenic did not require qualification of associated data because, in both cases, the concentration of the unspiked samples were greater than four times the amount spiked. The outlying MS recoveries and qualified sample data are presented in Table 3.

SURROGATE SPIKE EVALUATION

The surrogate recoveries were within acceptable limits with limited exceptions. Nondetected sample results for 11 samples submitted for SVOC analysis were qualified as estimated (UJ) due surrogate recoveries that were below the acceptable limits. The outlying surrogate recoveries are shown in Table 4.

FIELD DUPLICATE EVALUATION

Four samples were collected and analyzed in duplicate. ERM calculated the relative percent difference (RPD) between detected results. The USEPA has not established control criteria for field duplicate samples; therefore, sample data are not qualified on the basis of field duplicate imprecision. Detected duplicate results and calculated RPDs are shown in Table 5.

ANALYTICAL DUPLICATE EVALUATION

The laboratory prepared and analyzed 10 samples as analytical duplicates. ERM calculated the RPD between detected results. The RPDs were less than 20 percent, with one exception. The sample results for that one sample was qualified as estimated (J). The analytical duplicate sample results and calculated RPDs are shown in Table 6.

CALIBRATION RANGE EVALUATION

The laboratory noted two instances where the results of undiluted samples exceeded the calibration range of the equipment. The affected samples were diluted and reanalyzed. The sample data resulting from the reanalyses were within the calibration range; and should be used for decision-making purposes. The sample results which exceeded the calibration range were qualified as estimated (J), and are shown in Table 7.

OVERALL ASSESSMENT

The nondetected results of three samples were determined to be unusable due to exceeded holding times. These results can not be used for decision-making purposes.

The remaining data generated as a result of this sampling event can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents.

Table 1
Samples with Exceeded Holding Times
Spring 2011 Groundwater Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Method	Holding Time (days)	# of Days Exceeded	ERM Qualifier
ST65	MW-1D-042511 RE	SVOC	7/40	7 extraction	UJ
ST65	MW-1S-042511 RE	SVOC	7/40	7 extraction	UJ
SU57	MW-3D-042711 RE	SVOC	7/40	20 extraction	R
SY05	MW-13-042611	SVOC	7/40	21 extraction	J/R
SY05	MW-13-042611 RE	SVOC	7/40	21 extraction	J/R

Key:

RE = Reanalyzed sample

SVOC = Semivolatile organic compounds (Phenol compounds)

7/40 = 7 days to extraction/40 days to analysis

UJ = Nondetected sample result qualified as estimated

R = Nondetected sample result qualified as rejected

J = Detected sample result qualified as estimated

Table 2
Laboratory Control Spike Recoveries Outside of Acceptable Limits
Spring 2011 Groundwater Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
SU15	LCS-050211	See below	2,4-Dichlorophenol	27.1	56-104	--	--	--	--
SU15	LCS-050211	See below	2,4,6-Trichlorophenol	25.3	58-108	--	--	--	--
SU15	LCS-050211	See below	2,4,5-Trichlorophenol	24.9	58-107	--	--	--	--
SU15	LCS-050211	See below	Pentachlorophenol	28.4	46-114	--	--	--	--
SU15	LCS-050211	MW-04S-042611	2,4-Dichlorophenol	--	--	--	--	< 5.0	UJ
SU15	LCS-050211	MW-04S-042611	2,4,6-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU15	LCS-050211	MW-04S-042611	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU15	LCS-050211	MW-04S-042611	Pentachlorophenol	--	--	--	--	88	J
SU15	LCS-050211	MW-04S-042611 RE	2,4-Dichlorophenol	--	--	--	--	< 15	UJ
SU15	LCS-050211	MW-04S-042611 RE	2,4,6-Trichlorophenol	--	--	--	--	< 15	UJ
SU15	LCS-050211	MW-04S-042611 RE	2,4,5-Trichlorophenol	--	--	--	--	< 15	UJ
SU15	LCS-050211	MW-04S-042611 RE	Pentachlorophenol	--	--	--	--	120	J
SU15	LCS-050211	MW-22-042611	2,4-Dichlorophenol	--	--	--	--	< 5.0	UJ
SU15	LCS-050211	MW-22-042611	2,4,6-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU15	LCS-050211	MW-22-042611	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU15	LCS-050211	MW-22-042611	Pentachlorophenol	--	--	--	--	< 5.0	UJ
SU15	LCS-050211	MW-23-042711	2,4-Dichlorophenol	--	--	--	--	< 5.0	UJ
SU15	LCS-050211	MW-23-042711	2,4,6-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU15	LCS-050211	MW-23-042711	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU15	LCS-050211	MW-23-042711	Pentachlorophenol	--	--	--	--	< 5.0	UJ
SU15	LCS-050211	MW-24-042711	2,4-Dichlorophenol	--	--	--	--	< 5.0	UJ
SU15	LCS-050211	MW-24-042711	2,4,6-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU15	LCS-050211	MW-24-042711	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU15	LCS-050211	MW-24-042711	Pentachlorophenol	--	--	--	--	< 5.0	UJ
SU15	LCS-050211	MW-21-042711	2,4-Dichlorophenol	--	--	--	--	< 5.0	UJ
SU15	LCS-050211	MW-21-042711	2,4,6-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU15	LCS-050211	MW-21-042711	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU15	LCS-050211	MW-21-042711	Pentachlorophenol	--	--	--	--	< 5.0	UJ

Table 2
Laboratory Control Spike Recoveries Outside of Acceptable Limits
Spring 2011 Groundwater Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
SU15	LCS-050211	DUP042711-1	2,4-Dichlorophenol	--	--	--	--	< 5.0	UJ
SU15	LCS-050211	DUP042711-1	2,4,6-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU15	LCS-050211	DUP042711-1	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU15	LCS-050211	DUP042711-1	Pentachlorophenol	--	--	--	--	< 5.0	UJ
SU15	LCS-050211	MW-20-042711	2,4-Dichlorophenol	--	--	--	--	< 5.0	UJ
SU15	LCS-050211	MW-20-042711	2,4,6-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU15	LCS-050211	MW-20-042711	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU15	LCS-050211	MW-20-042711	Pentachlorophenol	--	--	--	--	< 5.0	UJ
SU15	LCS-050211	MW-18-042711	2,4-Dichlorophenol	--	--	--	--	< 5.0	UJ
SU15	LCS-050211	MW-18-042711	2,4,6-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU15	LCS-050211	MW-18-042711	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU15	LCS-050211	MW-18-042711	Pentachlorophenol	--	--	--	--	< 5.0	UJ
SU57	LCS-050311	See below	2,4-Dichlorophenol	24.9	56-104	--	--	--	--
SU57	LCS-050311	See below	2,4,6-Trichlorophenol	23.2	58-108	--	--	--	--
SU57	LCS-050311	See below	2,4,5-Trichlorophenol	22.5	58-107	--	--	--	--
SU57	LCS-050311	See below	Pentachlorophenol	24.3	46-114	--	--	--	--
SU57	LCS-050311	MW-14-042711	2,4-Dichlorophenol	--	--	--	--	< 5.0	UJ
SU57	LCS-050311	MW-14-042711	2,4,6-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU57	LCS-050311	MW-14-042711	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU57	LCS-050311	MW-14-042711	Pentachlorophenol	--	--	--	--	< 5.0	UJ
SU57	LCS-050311	DUP042711-2	2,4-Dichlorophenol	--	--	--	--	< 5.0	UJ
SU57	LCS-050311	DUP042711-2	2,4,6-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU57	LCS-050311	DUP042711-2	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU57	LCS-050311	DUP042711-2	Pentachlorophenol	--	--	--	--	< 5.0	UJ
SU57	LCS-050311	MW-6S-042711	2,4-Dichlorophenol	--	--	--	--	< 5.0	UJ
SU57	LCS-050311	MW-6S-042711	2,4,6-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU57	LCS-050311	MW-6S-042711	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ

Table 2
Laboratory Control Spike Recoveries Outside of Acceptable Limits
Spring 2011 Groundwater Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
SU57	LCS-050311	MW-6S-042711	Pentachlorophenol	--	--	--	--	< 5.0	UJ
SU57	LCS-050311	MW-3S-042711	2,4-Dichlorophenol	--	--	--	--	< 5.0	UJ
SU57	LCS-050311	MW-3S-042711	2,4,6-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU57	LCS-050311	MW-3S-042711	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU57	LCS-050311	MW-3S-042711	Pentachlorophenol	--	--	--	--	< 5.0	UJ
SU57	LCS-050311	MW-3D-042711	2,4-Dichlorophenol	--	--	--	--	< 5.0	UJ
SU57	LCS-050311	MW-3D-042711	2,4,6-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU57	LCS-050311	MW-3D-042711	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU57	LCS-050311	MW-3D-042711	Pentachlorophenol	--	--	--	--	< 5.0	UJ
SU57	LCS-050311	MW-27-042811	2,4-Dichlorophenol	--	--	--	--	< 5.0	UJ
SU57	LCS-050311	MW-27-042811	2,4,6-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU57	LCS-050311	MW-27-042811	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU57	LCS-050311	MW-27-042811	Pentachlorophenol	--	--	--	--	< 5.0	UJ
SU57	LCS-050311	MW-26-042811	2,4-Dichlorophenol	--	--	--	--	< 5.0	UJ
SU57	LCS-050311	MW-26-042811	2,4,6-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU57	LCS-050311	MW-26-042811	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU57	LCS-050311	MW-26-042811	Pentachlorophenol	--	--	--	--	< 5.0	UJ
SU57	LCS-050311	MW-16-042811	2,4-Dichlorophenol	--	--	--	--	< 5.0	UJ
SU57	LCS-050311	MW-16-042811	2,4,6-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU57	LCS-050311	MW-16-042811	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU57	LCS-050311	MW-16-042811	Pentachlorophenol	--	--	--	--	< 5.0	UJ
SU57	LCS-050311	MW-5S-042811	2,4-Dichlorophenol	--	--	--	--	< 5.0	UJ
SU57	LCS-050311	MW-5S-042811	2,4,6-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU57	LCS-050311	MW-5S-042811	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU57	LCS-050311	MW-5S-042811	Pentachlorophenol	--	--	--	--	< 5.0	UJ
SU57	LCS-052411	NA	Pentachlorophenol	118/124	46-114	5.0	20	--	--
SU60	LCS-050311	See below	2,4-Dichlorophenol	24.9	56-104	--	--	--	--

Table 2
Laboratory Control Spike Recoveries Outside of Acceptable Limits
Spring 2011 Groundwater Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
SU60	LCS-050311	See below	2,4,6-Trichlorophenol	23.2	58-108	--	--	--	--
SU60	LCS-050311	See below	2,4,5-Trichlorophenol	22.5	58-107	--	--	--	--
SU60	LCS-050311	See below	Pentachlorophenol	24.3	46-114	--	--	--	--
SU60	LCS-050311	MW-11-042811	2,4-Dichlorophenol	--	--	--	--	< 5.0	UJ
SU60	LCS-050311	MW-11-042811	2,4,6-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU60	LCS-050311	MW-11-042811	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU60	LCS-050311	MW-11-042811	Pentachlorophenol	--	--	--	--	< 5.0	UJ
SU60	LCS-050311	MW_12-042811	2,4-Dichlorophenol	--	--	--	--	< 5.0	UJ
SU60	LCS-050311	MW_12-042811	2,4,6-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU60	LCS-050311	MW_12-042811	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU60	LCS-050311	MW_12-042811	Pentachlorophenol	--	--	--	--	< 5.0	UJ
SU60	LCS-050311	MW-19-042811	2,4-Dichlorophenol	--	--	--	--	< 5.0	UJ
SU60	LCS-050311	MW-19-042811	2,4,6-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU60	LCS-050311	MW-19-042811	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU60	LCS-050311	MW-19-042811	Pentachlorophenol	--	--	--	--	< 5.0	UJ

Key:

LCS/LCSD = Laboratory control sample/laboratory control sample duplicate

RPD = Relative percent difference

UJ = Nondetected result qualified as estimated

J = Detected result qualified as estimated

Table 3
Matrix Spike Recoveries Outside of Acceptable Limits
Spring 2011 Groundwater Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
SU15	MW-22-042611 MS/MSD	See below	2,4-Dichlorophenol	26.0/22.9	56-104	12.5	20	--	--
SU15	MW-22-042611 MS/MSD	See below	2,4,6-Trichlorophenol	28.0/25.1	58-108	11.1	20	--	--
SU15	MW-22-042611 MS/MSD	See below	2,4,5-Trichlorophenol	26.9/25.1	58-107	7.2	20	--	--
SU15	MW-22-042611 MS/MSD	See below	Pentachlorophenol	31.2/28.9	46-114	7.5	20	--	--
SU15	MW-22-042611 MS/MSD	MW-04S-042611	2,4-Dichlorophenol	--	--	--	--	< 5.0	UJ
SU15	MW-22-042611 MS/MSD	MW-04S-042611	2,4,6-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU15	MW-22-042611 MS/MSD	MW-04S-042611	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU15	MW-22-042611 MS/MSD	MW-04S-042611	Pentachlorophenol	--	--	--	--	88	J
SU15	MW-22-042611 MS/MSD	MW-04S-042611 RE	2,4-Dichlorophenol	--	--	--	--	< 15	UJ
SU15	MW-22-042611 MS/MSD	MW-04S-042611 RE	2,4,6-Trichlorophenol	--	--	--	--	< 15	UJ
SU15	MW-22-042611 MS/MSD	MW-04S-042611 RE	2,4,5-Trichlorophenol	--	--	--	--	< 15	UJ
SU15	MW-22-042611 MS/MSD	MW-04S-042611 RE	Pentachlorophenol	--	--	--	--	120	J
SU15	MW-22-042611 MS/MSD	MW-22-042611	2,4-Dichlorophenol	--	--	--	--	< 5.0	UJ
SU15	MW-22-042611 MS/MSD	MW-22-042611	2,4,6-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU15	MW-22-042611 MS/MSD	MW-22-042611	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU15	MW-22-042611 MS/MSD	MW-22-042611	Pentachlorophenol	--	--	--	--	< 5.0	UJ
SU15	MW-22-042611 MS/MSD	MW-23-042711	2,4-Dichlorophenol	--	--	--	--	< 5.0	UJ
SU15	MW-22-042611 MS/MSD	MW-23-042711	2,4,6-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU15	MW-22-042611 MS/MSD	MW-23-042711	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU15	MW-22-042611 MS/MSD	MW-23-042711	Pentachlorophenol	--	--	--	--	< 5.0	UJ
SU15	MW-22-042611 MS/MSD	MW-24-042711	2,4-Dichlorophenol	--	--	--	--	< 5.0	UJ
SU15	MW-22-042611 MS/MSD	MW-24-042711	2,4,6-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU15	MW-22-042611 MS/MSD	MW-24-042711	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU15	MW-22-042611 MS/MSD	MW-24-042711	Pentachlorophenol	--	--	--	--	< 5.0	UJ
SU15	MW-22-042611 MS/MSD	MW-21-042711	2,4-Dichlorophenol	--	--	--	--	< 5.0	UJ
SU15	MW-22-042611 MS/MSD	MW-21-042711	2,4,6-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU15	MW-22-042611 MS/MSD	MW-21-042711	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU15	MW-22-042611 MS/MSD	MW-21-042711	Pentachlorophenol	--	--	--	--	< 5.0	UJ

Table 3
Matrix Spike Recoveries Outside of Acceptable Limits
Spring 2011 Groundwater Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
SU15	MW-22-042611 MS/MSD	DUP042711-1	2,4-Dichlorophenol	--	--	--	--	< 5.0	UJ
SU15	MW-22-042611 MS/MSD	DUP042711-1	2,4,6-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU15	MW-22-042611 MS/MSD	DUP042711-1	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU15	MW-22-042611 MS/MSD	DUP042711-1	Pentachlorophenol	--	--	--	--	< 5.0	UJ
SU15	MW-22-042611 MS/MSD	MW-20-042711	2,4-Dichlorophenol	--	--	--	--	< 5.0	UJ
SU15	MW-22-042611 MS/MSD	MW-20-042711	2,4,6-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU15	MW-22-042611 MS/MSD	MW-20-042711	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU15	MW-22-042611 MS/MSD	MW-20-042711	Pentachlorophenol	--	--	--	--	< 5.0	UJ
SU15	MW-22-042611 MS/MSD	MW-18-042711	2,4-Dichlorophenol	--	--	--	--	< 5.0	UJ
SU15	MW-22-042611 MS/MSD	MW-18-042711	2,4,6-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU15	MW-22-042611 MS/MSD	MW-18-042711	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU15	MW-22-042611 MS/MSD	MW-18-042711	Pentachlorophenol	--	--	--	--	< 5.0	UJ
SU57	MW-14-042711 MS/MSD	See below	2,4-Dichlorophenol	22.5/26.8	56-104	17.3	20	--	--
SU57	MW-14-042711 MS/MSD	See below	2,4,6-Trichlorophenol	22.7/26.0	58-108	13.7	20	--	--
SU57	MW-14-042711 MS/MSD	See below	2,4,5-Trichlorophenol	22.4/24.9	58-107	10.7	20	--	--
SU57	MW-14-042711 MS/MSD	See below	Pentachlorophenol	24.7/27.7	46-114	11.7	20	--	--
SU57	MW-14-042711 MS/MSD	MW-14-042711	2,4-Dichlorophenol	--	--	--	--	< 5.0	UJ
SU57	MW-14-042711 MS/MSD	MW-14-042711	2,4,6-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU57	MW-14-042711 MS/MSD	MW-14-042711	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU57	MW-14-042711 MS/MSD	MW-14-042711	Pentachlorophenol	--	--	--	--	< 5.0	UJ
SU57	MW-14-042711 MS/MSD	DUP042711-2	2,4-Dichlorophenol	--	--	--	--	< 5.0	UJ
SU57	MW-14-042711 MS/MSD	DUP042711-2	2,4,6-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU57	MW-14-042711 MS/MSD	DUP042711-2	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU57	MW-14-042711 MS/MSD	DUP042711-2	Pentachlorophenol	--	--	--	--	< 5.0	UJ
SU57	MW-14-042711 MS/MSD	MW-6S-042711	2,4-Dichlorophenol	--	--	--	--	< 5.0	UJ
SU57	MW-14-042711 MS/MSD	MW-6S-042711	2,4,6-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU57	MW-14-042711 MS/MSD	MW-6S-042711	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ

Table 3
Matrix Spike Recoveries Outside of Acceptable Limits
Spring 2011 Groundwater Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
SU57	MW-14-042711 MS/MSD	MW-6S-042711	Pentachlorophenol	--	--	--	--	< 5.0	UJ
SU57	MW-14-042711 MS/MSD	MW-3S-042711	2,4-Dichlorophenol	--	--	--	--	< 5.0	UJ
SU57	MW-14-042711 MS/MSD	MW-3S-042711	2,4,6-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU57	MW-14-042711 MS/MSD	MW-3S-042711	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU57	MW-14-042711 MS/MSD	MW-3S-042711	Pentachlorophenol	--	--	--	--	< 5.0	UJ
SU57	MW-14-042711 MS/MSD	MW-3D-042711	2,4-Dichlorophenol	--	--	--	--	< 5.0	UJ
SU57	MW-14-042711 MS/MSD	MW-3D-042711	2,4,6-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU57	MW-14-042711 MS/MSD	MW-3D-042711	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU57	MW-14-042711 MS/MSD	MW-3D-042711	Pentachlorophenol	--	--	--	--	< 5.0	UJ
SU57	MW-14-042711 MS/MSD	MW-27-042811	2,4-Dichlorophenol	--	--	--	--	< 5.0	UJ
SU57	MW-14-042711 MS/MSD	MW-27-042811	2,4,6-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU57	MW-14-042711 MS/MSD	MW-27-042811	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU57	MW-14-042711 MS/MSD	MW-27-042811	Pentachlorophenol	--	--	--	--	< 5.0	UJ
SU57	MW-14-042711 MS/MSD	MW-26-042811	2,4-Dichlorophenol	--	--	--	--	< 5.0	UJ
SU57	MW-14-042711 MS/MSD	MW-26-042811	2,4,6-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU57	MW-14-042711 MS/MSD	MW-26-042811	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU57	MW-14-042711 MS/MSD	MW-26-042811	Pentachlorophenol	--	--	--	--	< 5.0	UJ
SU57	MW-14-042711 MS/MSD	MW-16-042811	2,4-Dichlorophenol	--	--	--	--	< 5.0	UJ
SU57	MW-14-042711 MS/MSD	MW-16-042811	2,4,6-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU57	MW-14-042711 MS/MSD	MW-16-042811	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU57	MW-14-042711 MS/MSD	MW-16-042811	Pentachlorophenol	--	--	--	--	< 5.0	UJ
SU57	MW-14-042711 MS/MSD	MW-5S-042811	2,4-Dichlorophenol	--	--	--	--	< 5.0	UJ
SU57	MW-14-042711 MS/MSD	MW-5S-042811	2,4,6-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU57	MW-14-042711 MS/MSD	MW-5S-042811	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU57	MW-14-042711 MS/MSD	MW-5S-042811	Pentachlorophenol	--	--	--	--	< 5.0	UJ
SU57	MW-14-042711 MS	NA	Arsenic, total	680	75-125			4X	--
SU57	MW-14-042711 MS	NA	Arsenic, dissolved	640	75-125			4X	--

Table 3
Matrix Spike Recoveries Outside of Acceptable Limits
Spring 2011 Groundwater Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
SU60	MW-14-042711 MS/MSD	See below	2,4-Dichlorophenol	22.5/26.8	56-104	17.3	20	--	--
SU60	MW-14-042711 MS/MSD	See below	2,4,6-Trichlorophenol	22.7/26.0	58-108	13.7	20	--	--
SU60	MW-14-042711 MS/MSD	See below	2,4,5-Trichlorophenol	22.4/24.9	58-107	10.7	20	--	--
SU60	MW-14-042711 MS/MSD	See below	Pentachlorophenol	24.7/27.7	46-114	11.7	20	--	--
SU60	MW-14-042711 MS/MSD	MW-11-042811	2,4-Dichlorophenol	--	--	--	--	< 5.0	UJ
SU60	MW-14-042711 MS/MSD	MW-11-042811	2,4,6-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU60	MW-14-042711 MS/MSD	MW-11-042811	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU60	MW-14-042711 MS/MSD	MW-11-042811	Pentachlorophenol	--	--	--	--	< 5.0	UJ
SU60	MW-14-042711 MS/MSD	MW_12-042811	2,4-Dichlorophenol	--	--	--	--	< 5.0	UJ
SU60	MW-14-042711 MS/MSD	MW_12-042811	2,4,6-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU60	MW-14-042711 MS/MSD	MW_12-042811	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU60	MW-14-042711 MS/MSD	MW_12-042811	Pentachlorophenol	--	--	--	--	< 5.0	UJ
SU60	MW-14-042711 MS/MSD	MW-19-042811	2,4-Dichlorophenol	--	--	--	--	< 5.0	UJ
SU60	MW-14-042711 MS/MSD	MW-19-042811	2,4,6-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU60	MW-14-042711 MS/MSD	MW-19-042811	2,4,5-Trichlorophenol	--	--	--	--	< 5.0	UJ
SU60	MW-14-042711 MS/MSD	MW-19-042811	Pentachlorophenol	--	--	--	--	< 5.0	UJ

Key:

MS/MSD = Matrix spike/matrix spike duplicate

UJ = Nondetected result qualified as estimated

J = Detected result qualified as estimated

NA = Not applicable

4X = Concentration of unspiked sample was greater than 4 times the amount spiked; no qualification required

Table 4
Surrogate Recovery Results out of Acceptable Limits
Spring 2011 Groundwater Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Method	Surrogate	Recovery (%)	Limit (%)	ERM Qualifier
ST65	MW-1D-042511	SVOC	2-Fluorophenol	37.2	38-100	UJ
ST65	MW-1D-042511	SVOC	d4-2-Chlorophenol	42.1	44-100	UJ
ST65	MW-1S-042511	SVOC	d4-2-Chlorophenol	42.7	44-100	--
SU15	MW-20-042711	SVOC	d5-Phenol	29.1	41-100	--
SU57	MW-3D-042711	SVOC	d5-Phenol	38.9	41-100	UJ
SU57	MW-3D-042711	SVOC	2-Fluorophenol	34.4	38-100	UJ
SU57	MW-3D-042711	SVOC	d4-2-Chlorophenol	37.9	44-100	UJ
SU60	MW-11-042811	SVOC	d5-Phenol	37.3	41-100	UJ
SU60	MW-11-042811	SVOC	2,4,6-Tribromophenol	39.2	48-118	UJ
SU60	MW-12-042811	SVOC	2,4,6-Tribromophenol	47.2	48-118	--
SU60	MW-19-042811	SVOC	d5-Phenol	36.0	41-100	UJ
SU60	MW-19-042811	SVOC	2-Fluorophenol	37.9	38-100	UJ
SU60	MW-19-042811	SVOC	2,4,6-Tribromophenol	43.5	48-118	UJ
SU60	MW-19-042811	SVOC	d4-2-Chlorophenol	40.5	44-100	UJ

Key:

SVOC = Semivolatile organic compounds (Phenol compounds)

UJ = Nondetected result qualified as estimated

Table 5
Field Duplicate Results and Calculated Relative Percent Differences
Spring 2011 Groundwater Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Compound	Concentration		Report Limit	Units	RPD
			Sample	Duplicate			
ST65	MW-1S-042511/DUP042511-1	Arsenic, total	9.2	8.9	0.2	µg/L	3.3
ST65	MW-1S-042511/DUP042511-1	Arsenic, dissolved	8.4	8.4	0.2	µg/L	0
SU15	MW-21-042711/DUP042711-1	Arsenic, total	3310	3320	5	µg/L	0.3
SU15	MW-21-042711/DUP042711-1	Arsenic, dissolved	3540	3250	5	µg/L	8.5
SU57	MW-14-042711/DUP042711-2	Arsenic, total	4140	4300	5	µg/L	3.8
SU57	MW-3S-042711/DUP042711-3	Copper, total	2.0	2.0	0.5	µg/L	0
SU57	MW-14-042711/DUP042711-2	Arsenic, dissolved	3790	4490	5	µg/L	17
SU57	MW-3S-042711/DUP042711-3	Nickel, dissolved	0.8	1.2	0.5	µg/L	40

Key:

RPD = Relative percent difference

µg/L = Micrograms per liter

Table 6
Analytical Duplicate Results and Calculated Relative Percent Differences
Spring 2011 Groundwater Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Concentration		Report Limit	Units	RPD	ERM Qualifier
			Sample	Duplicate				
ST65	MW-1S-042511	Arsenic, total	9.2	8.9	0.2	µg/L	3.3	--
ST65	MW-1S-042511	Copper, total	1.5	1.7	0.5	µg/L	13	--
ST65	MW-1S-042511	Zinc, total	20	21	4.0	µg/L	4.9	--
ST65	MW-1S-042511	Arsenic, dissolved	8.4	8.5	0.2	µg/L	1.2	--
ST65	MW-1S-042511	Copper, dissolved	0.7	0.7	0.5	µg/L	0	--
ST65	MW-1S-042511	Zinc, dissolved	20	20	4.0	µg/L	0	--
SU15	MW-18-042711	Arsenic, total	11.4	11.1	0.2	µg/L	2.7	--
SU15	MW-18-042711	Chromium, total	0.9	0.9	0.5	µg/L	0	--
SU15	MW-18-042711	Copper, total	1.7	1.6	0.5	µg/L	6.1	--
SU15	MW-18-042711	Nickel, total	1.2	1.3	0.5	µg/L	8.0	--
SU15	MW-18-042711	Arsenic, dissolved	13.1	12.9	0.2	µg/L	1.5	--
SU15	MW-18-042711	Chromium, dissolved	0.8	0.8	0.5	µg/L	0	--
SU15	MW-18-042711	Copper, dissolved	1.0	1.0	0.5	µg/L	0	--
SU15	MW-18-042711	Nickel, dissolved	2.7	1.7	0.5	µg/L	45	J
SU57	MW-14-042711	Arsenic, total	4140	4190	5	µg/L	1.2	--
SU57	MW-14-042711	Arsenic, dissolved	3790	3910	5	µg/L	3.1	--

Key:

RPD = Relative percent difference

µg/L = Micrograms per liter

J = Detected sample result qualified as estimated

Table 7
Calibration Range Exceedances
Spring 2011 Groundwater Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Reported Concentration	Units	ERM Qualifier	Notes
SU15	MW-04S-042611	Pentachlorophenol	88 E	µg/L	J	Result exceeded instrument calibration range
SY05	MW-13-042611	Pentachlorophenol	1300 E	µg/L	J	Result exceeded instrument calibration range

Key:

E = Undiluted sample concentration exceeded calibration range; use result of reanalysis for decision-making purposes

µg/L = Micrograms per liter

J = Detected sample result qualified as estimated

Memorandum

Environmental Resources Management

To: Shira DeGrood

From: Irene Lavigne

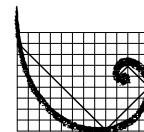
Date: 27 January 2012

Subject: Data Review of Reichhold-Glacier Fall 2011
Groundwater Monitoring Samples Collected
November – December 2011

Project Number: 0128296.07

Data Packages: Analytical Resources Incorporated Data Packages
TZ21, TZ32, TZ50, TZ73, TZ83, TZ84, TZ86, TZ97,
UA17, UA20, and UA33
Axys Analytical Service Data Package DPWG38865

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ERM®

The quality of the data was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999, *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004, and the *EPA Region 10 SOP for the Validation of Polychlorinated Dibenzodioxin (PCDD) and Polychlorinated Dibenzofuran (PCDF) Data*, January 1996.

HOLDING TIME AND PRESERVATION EVALUATION

The sample shipments were received at the laboratory within the method-prescribed preservation requirements. None of the data were qualified based on temperature preservation exceedances.

The samples were prepared and analyzed within the method-prescribed time period from the date of collection with limited exceptions. One sample was re-extracted outside of the 7-day holding time for semivolatile organic compound (SVOC) analysis. Nondetected sample results for this sample were qualified as estimated (UJ), as shown in Table 1.

BLANK EVALUATION

The method blank, trip blank and field blank sample results were nondetected for each of the target analytes with a number of exceptions. Detections of total chromium in two method blanks required qualification

of four sample results as nondetected (U) for this compound. Detections of bis(2-ethylhexyl)phthalate in a method blank resulted in qualification of two associated sample results as nondetected (U). Detections of common laboratory contaminants, acetone and methylene chloride, required qualification of six sample results as nondetected (U) for these compounds. Additionally, detections of dioxin and furan compounds in a lab blank required qualification of seven dioxin and furan results as nondetected (U). Not all blank detections required qualification of associated sample data. Data were not qualified if the sample were nondetected for the associated compounds, or if the sample results exceeded five times the blank concentrations of organic compounds or 10 times the blank concentrations of inorganic compounds and common laboratory contaminants. The blank detections and associated, qualified data are presented in Table 2.

BLANK SPIKE EVALUATION

The laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) recoveries were within the laboratory's limits of acceptance with limited exceptions; however, no sample data were qualified on the basis of the LCS outliers. Sample data are not qualified if only one recovery in a LCS/LCSD pair exceeds acceptable control limits, if only the relative percent difference (RPD) exceeds control limits, or if the recovery is biased high and the associated samples are nondetected for the corresponding compound. The outlying LCS recoveries are shown in Table 3.

MATRIX SPIKE EVALUATION

The matrix spike (MS) and matrix spike duplicate (MSD) recoveries were within the laboratory's limits of acceptance with a number of exceptions. Seventeen sample results were qualified as estimated (UJ or J) due to six MS recoveries that exceeded acceptable limits for various compounds. Additional outlying compounds did not require qualification of sample data. Data are not qualified if the concentration of the unspiked samples is greater than four times the amount spiked, if the data could be verified using and associated, in-control LCS recovery, or if the recovery is biased high and the associated samples are nondetected for the corresponding compound. The outlying MS recoveries and qualified sample data are listed in Table 4.

ESTIMATED MAXIMUM POSSIBLE CONCENTRATION

The laboratory identified a number of dioxin and furan results as estimated maximum possible concentrations (EMPC). An EMPC value is the maximum possible concentration of a compound that could be present in the sample. This classification is used when all of the identification criteria for a given dioxin or furan compound are not met. Sample data identified as EMPC by the laboratory were qualified as nondetected (U), as shown in Table 5.

SURROGATE SPIKE EVALUATION

The surrogate recoveries were within acceptable limits with limited exceptions. Nondetected sample results for one sample submitted for SVOC analysis were qualified as estimated (U) due surrogate recoveries that were below the acceptable limits. The outlying surrogate recoveries are presented in Table 6.

FIELD DUPLICATE EVALUATION

Ten samples were collected and analyzed in duplicate. ERM calculated the RPD between detected results. The USEPA has not established control criteria for field duplicate samples; therefore, sample data are not qualified on the basis of field duplicate imprecision. Detected duplicate results and calculated RPDs are listed in Table 7.

ANALYTICAL DUPLICATE & REPLICATE EVALUATION

The laboratory prepared and analyzed a number of samples as analytical duplicates and replicates. ERM calculated the RPD between detected results. The RPDs were less than 20 percent, with one exception. The detected sample results for total copper for the outlying sample was qualified as estimated (J). The analytical duplicate and replicate sample results and calculated RPDs are shown in Table 8.

CONTINUING CALIBRATION EVALUATION

The laboratory noted that nine continuing calibration verification (CCV) recoveries for volatile organic compounds exceeded acceptable control limits for various compounds. Nondetected sample results for one sample associated with outlying compounds were qualified as estimated (UJ). Additional sample data were not qualified because either the CCV recoveries were biased high and the associated samples were nondetected for the corresponding compounds, or the samples associated with the outlying CCV were not field samples. The CCV outliers and qualified data are listed in Table 9.

CALIBRATION RANGE EVALUATION

The laboratory noted five instances where the results of undiluted samples exceeded the calibration range of the equipment. The affected samples were diluted and reanalyzed. The sample data resulting from the reanalyses were within the calibration range; and should be used for decision-making purposes. The sample results which exceeded the calibration range were qualified as estimated (J), and are listed in Table 10.

TPH EVALUATION

The laboratory noted that the chromatograms for five samples analyzed for total petroleum hydrocarbons did not resemble the standard chromatographic pattern, or contained additional, unidentifiable hydrocarbons. The results for these samples were qualified as tentatively identified and estimated (NJ) as presented in Table 11.

OVERALL ASSESSMENT

No data were determined to be unusable. All of the data, including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents.

Table 1
Samples with Exceeded Holding Times
Fall 2011 Groundwater Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Method	Holding Time (days)	# of Days Exceeded	ERM Qualifier
TZ21	MW-17-112811 RE	SVOC	7/40	3 extraction	UJ

Data packages reviewed: Analytical Resources TZ21, TZ32, TZ50, TZ73, TZ83, TZ84, TZ86, TZ97, UA17, UA20, UA33; Axys DPWG38865

Key:

RE = Reextracted/reanalyzed sample

SVOC = Semivolatile organic compounds (Phenol compounds)

7/40 = 7 days to extraction/40 days to analysis

UJ = Nondetected sample result qualified as estimated

Table 2
Blank and Associated Suspect Sample Detections
Fall 2011 Groundwater Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
TZ21	TB-112811-1	NA	Styrene	0.2	0.2	µg/L	--
TZ32	TB-112911-1	NA	Methylene chloride	0.5	0.5	µg/L	--
TZ32	TB-112911-1	NA	Styrene	0.2	0.2	µg/L	--
TZ32	MB-120611	See below	Chromium, total	0.8	0.5	µg/L	--
TZ32	MB-120611	MW-1S-112911	Chromium, total	1.9	0.5	µg/L	1.9 U
TZ73	MB-122011	See below	Chromium, total	0.7	0.5	µg/L	--
TZ73	MB-122011	MW-27-120111	Chromium, total	2	1	µg/L	2 U
TZ73	MB-122011	MW-26-120111	Chromium, total	2	1	µg/L	2 U
TZ73	MB-122011	MW-3D-120111	Chromium, total	5	1	µg/L	5 U
TZ84	TB-120211-1	See below	Methylene choride	0.4	0.5	µg/L	--
TZ84	TB-120211-1	MW-29S-120211	Methylene choride	0.4	0.5	µg/L	0.5 U
TZ84	TB-120211-1	See below	Acetone	1.6	5.0	µg/L	--
TZ84	TB-120211-1	MW-28S-120211	Acetone	2.0	5.0	µg/L	5.0 U
TZ84	TB-120211-1	MW-29S-120211	Acetone	5.1	5.0	µg/L	5.1 U
TZ84	TB-120211-1	DUP-120211-2	Acetone	1.8	5.0	µg/L	5.0 U
TZ86	MB-122111	NA	Chromium, dissolved	0.6	0.5	µg/L	--
TZ97	FB-120511-1	NA	Methylene chloride	1.6	0.5	µg/L	--
TZ97	FB-120511-1	NA	Toluene	0.2	0.2	µg/L	--
TZ97	MB-120811	See below	bis(2-Ethylhexyl)phthalate	0.9	1.0	µg/L	--
TZ97	MB-120811	MW-33S-120511	bis(2-Ethylhexyl)phthalate	2.4	1.0	µg/L	2.4 U
TZ97	MB-120811	DUP-120511-3	bis(2-Ethylhexyl)phthalate	1.4	1.0	µg/L	1.4 U
UA17	MB-120911	NA	bis(2-Ethylhexyl)phthalate	1.0	1.0	µg/L	--
UA17	MB-122011	NA	Chromium	0.5	0.5	µg/L	--

Table 2
Blank and Associated Suspect Sample Detections
Fall 2011 Groundwater Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
UA17	MB-120811	NA	Chloride	0.1	0.5	mg/L	--
UA33	TB-120611-1	See below	Methylene chloride	0.3	0.5	µg/L	--
UA33	TB-120611-1	MW-16-120611	Methylene chloride	0.2	0.5	µg/L	0.5 U
UA33	TB-120611-1	See below	Acetone	2.1	5.0	µg/L	--
UA33	TB-120611-1	MW-16-120611	Acetone	5.1	5.0	µg/L	5.1 U
DPWG38865	Lab Blank	See below	2,3,7,8-TCDD	0.504	0.500	pg/L	--
DPWG38865	Lab Blank	MW-10-112911	2,3,7,8-TCDD	0.879	0.567	pg/L	0.879 U
DPWG38865	Lab Blank	MW-13-112911	2,3,7,8-TCDD	0.633	0.561	pg/L	0.633 U
DPWG38865	Lab Blank	See below	1,2,3,7,8,9-HxCDD	0.533	0.500	pg/L	--
DPWG38865	Lab Blank	MW-10-112911	1,2,3,7,8,9-HxCDD	0.704	0.567	pg/L	0.704 U
DPWG38865	Lab Blank	NA	1,2,3,4,6,7,8-HPCDD	0.975	0.500	pg/L	--
DPWG38865	Lab Blank	NA	OCDD	2.73	0.500	pg/L	--
DPWG38865	Lab Blank	See below	1,2,3,4,6,7,8-HPCDF	0.637	0.500	pg/L	--
DPWG38865	Lab Blank	MW-7S-112911	1,2,3,4,6,7,8-HPCDF	1.79	0.598	pg/L	1.79 U
DPWG38865	Lab Blank	DUP-112911-2	1,2,3,4,6,7,8-HPCDF	1.56	0.917	pg/L	1.56 U
DPWG38865	Lab Blank	See below	OCDF	1.62	0.500	pg/L	--
DPWG38865	Lab Blank	MW-7S-112911	OCDF	5.80	0.598	pg/L	5.80 U
DPWG38865	Lab Blank	DUP-112911-2	OCDF	7.36	0.554	pg/L	7.36 U

Data packages reviewed: Analytical Resources TZ21, TZ32, TZ50, TZ73, TZ83, TZ84, TZ86, TZ97, UA17, UA20, UA33; Axys DPWG38865

Key:

TB = Trip blank

MB = Method blank

FB = Field blank

µg/L = Micrograms per liter

mg/L = Milligrams per liter

pg/L = Picograms per liter

U = Nondetected

TCDD = Tetrachlorodibenzo-p-dioxin

HxCDD = Hexachlorodibenzo-p-dioxin

NA = Not applicable; qualification of sample data not required

HPCDD = Heptachlorodibenzo-p-dioxin

OCDD = Octochlorodibenzo-p-dioxin

HPCDF = Heptachlorodibenzofuran

OCDF = Octochlorodibenzofuran

Table 3
Laboratory Control Spike Recoveries Outside of Acceptable Limits
Fall 2011 Groundwater Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
TZ21	LCS/LCSD-120611	NA	Hexachlorobutadiene	100/122	77-120	19.8	30	--	--
TZ21	LCS/LCSD-120611	NA	1,2,4-Trichlorobenzene	101/121	77-120	18.0	30	--	--
TZ21	LCS/LCSD-120611	NA	Naphthalene	102/123	76-120	18.7	30	--	--
TZ21	LCS/LCSD-120611	NA	1,2,3-Trichlorobenzene	99.0/124	79-120	22.4	30	--	--
TZ83	LCS/LCSD-120711	NA	Benzoic acid	26.1/92.0	10-131	112	30	--	--
TZ83	LCS/LCSD-120711	NA	4-Nitrophenol	121/121	35-119	0.1	30	--	--
TZ83	LCS/LCSD-120711	NA	N-Nitrosodiphenylamine	72.8/52.4	60-136	32.6	30	--	--
TZ84	LCS/LCSD-120711	NA	Bromomethane	114/131	71-120	13.9	30	--	--
TZ84	LCS/LCSD-120711	NA	Chloroethane	103/133	80-120	25.4	30	--	--
TZ84	LCS/LCSD-120711	NA	Trichlorofluoromethane	98.0/126	80-120	25.0	30	--	--
TZ84	LCS/LCSD-120711	NA	2,2-Dichloropropane	115/122	80-120	5.9	30	--	--
TZ97	LCS/LCSD-121211	NA	Acrolein	64.2/69.8	69-126	8.4	30	--	--
TZ97	LCS-120811	NA	4-Nitrophenol	122	35-119	--	--	--	--
TZ97	LCS-120811	NA	Butylbenzylphthalate	118	51-114	--	--	--	--
TZ97	LCS-120811	NA	Benzo(a)anthracene	108	55-100	--	--	--	--
UA17	LCS/LCSD-120911	NA	4-Nitrophenol	115/125	35-119	8.1	30	--	--
UA33	LCS/LCSD-121211	NA	Acrolein	64.2/69.8	69-126	8.4	30	--	--

Data packages reviewed: Analytical Resources TZ21, TZ32, TZ50, TZ73, TZ83, TZ84, TZ86, TZ97, UA17, UA20, UA33; Axys DPWG38865

Key:

LCS/LCSD = Laboratory control sample/laboratory control sample duplicate

RPD = Relative percent difference

NA = Not applicable; qualification of sample data not required

Table 4
Matrix Spike Recoveries Outside of Acceptable Limits
Fall 2011 Groundwater Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
TZ21	MW-22-112811 MS/MSD	See below	Arsenic, dissolved	134	75-125	--	--	--	--
TZ21	MW-22-112811 MS/MSD	MW-17-112811	Arsenic, dissolved	--	--	--	--	47.5	J
TZ21	MW-22-112811 MS/MSD	MW-04S-112811	Arsenic, dissolved	--	--	--	--	42.7	J
TZ21	MW-22-112811 MS/MSD	MW-22-112811	Arsenic, dissolved	--	--	--	--	7.9	J
TZ21	MW-22-112811 MS/MSD	MW-23-112811	Arsenic, dissolved	--	--	--	--	2.9	J
TZ32	MW-1S-112911 MS	See below	Hexavalent chromium	55.7	75-125	--	--	--	--
TZ32	MW-1S-112911 MS	MW-1S-112911	Hexavalent chromium	--	--	--	--	< 0.010	UJ
TZ50	MW-24-113011 MS	See below	Silver, dissolved	67	75-125	--	--	--	--
TZ50	MW-24-113011 MS	MW-24-113011	Silver, dissolved	--	--	--	--	< 3	UJ
TZ50	MW-24-113011 MS	MW-20-113011	Silver, dissolved	--	--	--	--	< 3	UJ
TZ50	MW-24-113011 MS	MW-18-113011	Silver, dissolved	--	--	--	--	< 3	UJ
TZ50	MW-24-113011 MS	DUP-113011-2	Silver, dissolved	--	--	--	--	< 3	UJ
TZ73	MW-3S-120111 MS	NA	Arsenic, total	72	75-125	--	--	4X	--
TZ73	MW-3S-120111 MS	NA	Arsenic, dissolved	36	75-125	--	--	4X	--
TZ73	MW-3S-120111 MS	See below	Silver, dissolved	69.4	75-125	--	--	--	--
TZ73	MW-3S-120111 MS	MW-3S-120111	Silver, dissolved	--	--	--	--	< 3	UJ
TZ73	MW-3S-120111 MS	MW-27-120111	Silver, dissolved	--	--	--	--	< 3	UJ
TZ73	MW-3S-120111 MS	MW-26-120111	Silver, dissolved	--	--	--	--	< 3	UJ
TZ73	MW-3S-120111 MS	MW-3D-120111	Silver, dissolved	--	--	--	--	< 3	UJ
TZ83	MW-14D-120211 MS	NA	Arsenic, total	176	75-125	--	--	4X	--
TZ83	MW-14D-120211 MS	NA	Arsenic, dissolved	192	75-125	--	--	4X	--
TZ86	MW-14-120211 MS	NA	Arsenic, total	308	75-125	--	--	4X	--
TZ86	MW-14-120211 MS	NA	Arsenic, dissolved	128	75-125	--	--	4X	--

Table 4
Matrix Spike Recoveries Outside of Acceptable Limits
Fall 2011 Groundwater Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
TZ97	MW-31S-120511 MS/MSD	NA	2-Chloroethylvinylether	NR	80-120	NR	30	--	--
TZ97	MW-31S-120511 MS/MSD	NA	trans-1,4-Dichloro-2-butene	63/73	80-120	14.7	30	--	--
TZ97	MW-30S-120511 MS/MSD	NA	4-Nitrophenol	133/128	35-119	3.6	30	--	--
TZ97	MW-30S-120511 MS	NA	Iron, total	126	75-125	--	--	4X	--
TZ97	MW-30S-120511 MS	See below	Total Phosphorus	130	75-125	--	--	--	--
TZ97	MW-30S-120511 MS	MW-30S-120511	Total Phosphorus	--	--	--	--	1.22	J
TZ97	MW-30S-120511 MS	MW-31S-120511	Total Phosphorus	--	--	--	--	0.384	J
TZ97	MW-30S-120511 MS	MW-33S-120511	Total Phosphorus	--	--	--	--	2.60	J
TZ97	MW-31S-120511 MS	See below	Hexavalent chromium	47.6	75-125	--	--	--	--
TZ97	MW-31S-120511 MS	See below	Hexavalent chromium	30.2	75-125	--	--	--	--
TZ97	MW-31S-120511 MS	MW-31S-120511	Hexavalent chromium	--	--	--	--	< 0.010	UJ
DPWG38865	MW-13-112911 MS/MSD	NA	OCDD	124/615	70-130	133	20	--	--

Data packages reviewed: Analytical Resources TZ21, TZ32, TZ50, TZ73, TZ83, TZ84, TZ86, TZ97, UA17, UA20, UA33; Axys DPWG38865

Key:

MS/MSD = Matrix spike/matrix spike duplicate

NA = Not applicable; qualification of sample data not required

J = Detected sample result qualified as estimated

UJ = Nondetected sample result qualified as estimated

4X = Concentration of unspiked sample was greater than 4 times the amount spiked; no qualification required

OCDD = Octochlorodibenzo-p-dioxin

Table 5
Estimated Maximum Possible Concentration
Fall 2011 Groundwater Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG38865	MW-7S-112911	1,2,3,4,6,7,8-HPCDD	5.28	0.598	pg/L	5.28 U
DPWG38865	MW-7S-112911	1,2,3,4,6,7,8-HPCDF	1.79	0.598	pg/L	1.79 U
DPWG38865	MW-7S-112911	1,2,3,4,7,8,9-HPCDF	0.703	0.598	pg/L	0.703 U
DPWG38865	DUP-112911-2	1,2,3,4,6,7,8-HPCDF	1.56	0.917	pg/L	1.56 U
DPWG38865	DUP-112911-2	OCDF	7.36	0.554	pg/L	7.36 U
DPWG38865	MW-10-112911	2,3,7,8-TCDD	0.879	0.567	pg/L	0.879 U
DPWG38865	MW-10-112911	1,2,3,6,7,8-HXCDD	1.14	0.567	pg/L	1.14 U
DPWG38865	MW-10-112911	2,3,4,7,8-PECDF	0.624	0.57	pg/L	0.624 U
DPWG38865	MW-10-112911	1,2,3,4,7,8-HXCDF	3.88	0.567	pg/L	3.88 U
DPWG38865	MW-10-112911	1,2,3,4,7,8,9-HPCDF	1.68	0.567	pg/L	1.68 U
DPWG38865	MW-10-112911	OCDF	17.0	0.567	pg/L	17.0 U
DPWG38865	MW-13-112911	2,3,7,8-TCDD	0.633	0.561	pg/L	0.633 U
DPWG38865	MW-13-112911	1,2,3,6,7,8-HXCDD	0.716	0.561	pg/L	0.716 U
DPWG38865	MW-13-112911	1,2,3,4,7,8,9-HPCDF	1.21	0.561	pg/L	1.21 U

Data packages reviewed: Analytical Resources TZ21, TZ32, TZ50, TZ73, TZ83, TZ84, TZ86, TZ97, UA17, UA20, UA33; Axys DPWG38865

Key:

pg/L = Picograms per liter

U = Nondetected

HPCDD = Heptachlorodibenzo-p-dioxin

HPCDF = Heptachlorodibenzofuran

OCDF = Octochlorodibenzofuran

TCDD = Tetrachlorodibenzo-p-dioxin

HXCDD = Hexachlorodibenzo-p-dioxin

PECDF = Pentachlorodibenzofuran

HXCDF = Hexachlorodibenzofuran

Table 6
Surrogate Recovery Results out of Acceptable Limits
Fall 2011 Groundwater Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Method	Surrogate	Recovery (%)	Limit (%)	ERM Qualifier
TZ21	MW-17-112811	SVOC	d5-Phenol	35.2	41-100	UJ
TZ21	MW-17-112811	SVOC	2-Fluorophenol	30.4	38-100	UJ
TZ21	MW-17-112811	SVOC	d4-2-Chlorophenol	33.6	44-100	UJ
TZ21	MW-22-112811	SVOC	d4-2-Chlorophenol	42.9	44-100	--

Data packages reviewed: Analytical Resources TZ21, TZ32, TZ50, TZ73, TZ83, TZ84, TZ86, TZ97, UA17, UA20, UA33; Axy's DPWG38865

Key:

SVOC = Semivolatile organic compounds (Phenol compounds)

UJ = Nondetected result qualified as estimated

Table 7
Field Duplicate Results and Calculated Relative Percent Differences
Fall 2011 Groundwater Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Compound	Concentration		Report Limit	Units	RPD
			Sample	Duplicate			
TZ32	MW-7S-112911/DUP-112911-2	Pentachlorophenol	480	330	5.0	µg/L	37
TZ32	MW-7S-112911/DUP-112911-2	2,3,4,6-Tetrachlorophenol	18	11	1.0	µg/L	48
TZ32	MW-7S-112911 DL/DUP-112911-2 DL	Pentachlorophenol	370	240	100	µg/L	43
TZ32	MW-7S-112911 DL/DUP-112911-2 DL	2,3,4,6-Tetrachlorophenol	16	12	20	µg/L	29
TZ32	MW-13-112911/DUP-112911-3	Pentachlorophenol	130	130	5.0	µg/L	0
TZ32	MW-13-112911/DUP-112911-3	2,3,4,6-Tetrachlorophenol	9.6	11	1.0	µg/L	14
TZ32	MW-13-112911 DL/DUP-112911-3 DL	Pentachlorophenol	100	98	25	µg/L	2.0
TZ32	MW-13-112911 DL/DUP-112911-3 DL	2,3,4,6-Tetrachlorophenol	8.5	8.4	5.0	µg/L	1.2
TZ32	MW-1S-112911/DUP-112911-1	Arsenic, total	16.1	15.4	0.2	µg/L	4.4
TZ32	MW-1S-112911/DUP-112911-1	Arsenic, dissolved	14.9	13.0	0.2	µg/L	14
TZ50	MW-21-113011/DUP-113011-1	Arsenic, total	1870	1820	2	µg/L	2.7
TZ50	MW-18-113011/DUP-113011-2	Nickel, total	0.7	0.7	0.5	µg/L	0
TZ50	MW-21-113011/DUP-113011-1	Arsenic, dissolved	1850	1800	2	µg/L	2.7
TZ84	MW-28S-120211/DUP-120211-2	Acetone	2.0	1.8	5.0	µg/L	11
TZ84	MW-28S-120211/DUP-120211-2	Tetrachloroethene	0.2	0.2	0.2	µg/L	0
TZ84	MW-29S-120211/DUP-120211-3	Arsenic, total	2.5	2.6	0.2	µg/L	3.9
TZ84	MW-29S-120211/DUP-120211-3	Arsenic, dissolved	2.4	2.5	0.2	µg/L	4.1
TZ86	MW-14-120211/DUP-120211-1	Arsenic, total	933	858	2/1	µg/L	8.4
TZ86	MW-14-120211/DUP-120211-1	Arsenic, dissolved	935	892	2/1	µg/L	4.7
TZ97	MW-33S-120511/DUP-120511-3	Phenol	2.3	2.0	1.0	µg/L	14
TZ97	MW-33S-120511/DUP-120511-3	bis(2-Ethylhexyl)phthalate	2.4	1.4	1.0	µg/L	53
TZ97	MW-33S-120511/DUP-120511-3	Naphthalene	0.08	0.07	0.1	µg/L	13
TZ97	MW-33S-120511/DUP-120511-3	Acenaphthene	0.05	0.06	0.1	µg/L	18
TZ97	MW-31S-120511/DUP-120511-2	Aluminum, total	50	60	50	µg/L	18

Table 7
Field Duplicate Results and Calculated Relative Percent Differences
Fall 2011 Groundwater Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Compound	Concentration		Report Limit	Units	RPD
			Sample	Duplicate			
TZ97	MW-31S-120511/DUP-120511-2	Calcium, total	53800	55600	50	µg/L	3.3
TZ97	MW-31S-120511/DUP-120511-2	Iron, total	2440	2420	50	µg/L	0.8
TZ97	MW-31S-120511/DUP-120511-2	Magnesium, total	4020	4180	50	µg/L	3.9
TZ97	MW-31S-120511/DUP-120511-2	Manganese, total	112	113	1	µg/L	0.9
TZ97	MW-31S-120511/DUP-120511-2	Potassium, total	4440	4590	500	µg/L	3.3
TZ97	MW-31S-120511/DUP-120511-2	Sodium, total	4360	4410	500	µg/L	1.1
TZ97	MW-31S-120511/DUP-120511-2	Iron, dissolved	2500	2500	50	µg/L	0
TZ97	MW-31S-120511/DUP-120511-2	Manganese, dissolved	114	117	1	µg/L	2.6
DPWG38865	MW-7S-112911/DUP-112911-2	1,2,3,4,6,7,8-HPCDD	5.28	17.7	0.598/0.628	µg/L	108
DPWG38865	MW-7S-112911/DUP-112911-2	OCDD	140	1100	0.598/2.10	µg/L	155
DPWG38865	MW-7S-112911/DUP-112911-2	1,2,3,4,6,7,8-HPCDF	1.79	1.56	0.598/0.917	µg/L	14
DPWG38865	MW-7S-112911/DUP-112911-2	OCDF	5.80	7.36	0.598/0.554	µg/L	24
DPWG38865	MW-7S-112911/DUP-112911-2	Total Tetra-Dioxins	4.69	7.68	0.598/0.554	µg/L	48
DPWG38865	MW-7S-112911/DUP-112911-2	Total Hepta-Dioxins	4.50	39.1	0.598/0.628	µg/L	159
DPWG38865	MW-7S-112911/DUP-112911-2	Total Tetra-Furans	5.15	7.49	0.598/0.554	µg/L	37

Data packages reviewed: Analytical Resources TZ21, TZ32, TZ50, TZ73, TZ83, TZ84, TZ86, TZ97, UA17, UA20, UA33; Axys DPWG38865

Key:

RPD = Relative percent difference

µg/L = Micrograms per liter

DL = Sample dilution and reanalysis

Table 8
Analytical Duplicate & Replicate Results and Calculated Relative Percent Differences
Fall 2011 Groundwater Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Concentration		Report Limit	Units	RPD	ERM Qualifier
			Sample	Duplicate				
Analytical Duplicates								
TZ21	MW-22-112811	Arsenic, total	7.9	8.3	0.2	µg/L	4.9	--
TZ21	MW-22-112811	Arsenic, dissolved	7.9	8.4	0.2	µg/L	6.1	--
TZ32	MW-1S-112911	Arsenic, total	16.1	16.3	0.2	µg/L	1.2	--
TZ32	MW-1S-112911	Chromium, total	1.9	2.0	0.5	µg/L	5.1	--
TZ32	MW-1S-112911	Copper, total	7	7	2	µg/L	0	--
TZ32	MW-1S-112911	Zinc, total	70	70	10	µg/L	0	--
TZ32	MW-1S-112911	Arsenic, dissolved	14.9	14.7	0.2	µg/L	1.4	--
TZ32	MW-1S-112911	Chromium, total	1.0	1.0	0.5	µg/L	0	--
TZ32	MW-1S-112911	Copper, total	2	2	2	µg/L	0	--
TZ32	MW-1S-112911	Zinc, total	70	70	10	µg/L	0	--
TZ50	MW-24-113011	Nickel, total	1.1	1.1	0.5	µg/L	0	--
TZ50	MW-24-113011	Arsenic, dissolved	0.2	0.2	0.2	µg/L	0	--
TZ50	MW-24-113011	Nickel, dissolved	0.7	0.6	0.5	µg/L	15	--
TZ73	MW-3S-120111	Arsenic, total	414	414	1	µg/L	0	--
TZ73	MW-3S-120111	Copper, total	2	2	2	µg/L	0	--
TZ73	MW-3S-120111	Nickel, total	1.0	1.0	0.5	µg/L	0	--
TZ73	MW-3S-120111	Arsenic, dissolved	412	412	1	µg/L	0	--
TZ73	MW-3S-120111	Nickel, dissolved	0.9	0.9	0.5	µg/L	0	--
TZ83	MW-14D-120211	Aluminum, total	560	570	50	µg/L	1.8	--
TZ83	MW-14D-120211	Arsenic, total	427	426	1	µg/L	0.2	--
TZ83	MW-14D-120211	Calcium, total	20400	20200	50	µg/L	1.0	--
TZ83	MW-14D-120211	Chromium, total	13	12	1	µg/L	8.0	--

Table 8
Analytical Duplicate & Replicate Results and Calculated Relative Percent Differences
Fall 2011 Groundwater Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Concentration		Report Limit	Units	RPD	ERM Qualifier
			Sample	Duplicate				
TZ83	MW-14D-120211	Copper, total	4	3	2	µg/L	29	J
TZ83	MW-14D-120211	Iron, total	9600	9470	50	µg/L	1.4	--
TZ83	MW-14D-120211	Magnesium, total	12500	12500	50	µg/L	0	--
TZ83	MW-14D-120211	Manganese, total	413	412	1	µg/L	0.2	--
TZ83	MW-14D-120211	Potassium, total	14800	14700	500	µg/L	0.7	--
TZ83	MW-14D-120211	Sodium, total	161000	161000	500	µg/L	0	--
TZ83	MW-14D-120211	Aluminum, dissolved	240	230	50	µg/L	4.3	--
TZ83	MW-14D-120211	Arsenic, dissolved	390	416	1	µg/L	6.5	--
TZ83	MW-14D-120211	Chromium, dissolved	9	9	1	µg/L	0	--
TZ83	MW-14D-120211	Iron, dissolved	9230	9320	50	µg/L	1.0	--
TZ83	MW-14D-120211	Manganese, dissolved	412	415	1	µg/L	0.7	--
TZ84	MW-28S-120211	Arsenic, total	11.2	10.8	0.2	µg/L	3.6	--
TZ84	MW-28S-120211	Calcium, total	76500	76600	50	µg/L	0.1	--
TZ84	MW-28S-120211	Iron, total	6940	6850	50	µg/L	1.3	--
TZ84	MW-28S-120211	Magnesium, total	7230	7140	50	µg/L	1.3	--
TZ84	MW-28S-120211	Manganese, total	583	580	1	µg/L	0.5	--
TZ84	MW-28S-120211	Nickel, total	1.8	1.7	0.5	µg/L	5.7	--
TZ84	MW-28S-120211	Potassium, total	6640	6530	500	µg/L	1.7	--
TZ84	MW-28S-120211	Sodium, total	21500	21400	500	µg/L	0.5	--
TZ84	MW-28S-120211	Arsenic, dissolved	11.9	11.4	0.2	µg/L	4.3	--
TZ84	MW-28S-120211	Iron, dissolved	7020	6990	50	µg/L	0	--
TZ84	MW-28S-120211	Manganese, dissolved	587	584	1	µg/L	1	--
TZ84	MW-28S-120211	Nckel, dissolved	1.9	1.7	0.5	µg/L	11	--
TZ86	MW-14-120211	Arsenic, total	933	936	2	µg/L	0.3	--
TZ86	MW-14-120211	Copper, total	9	9	2	µg/L	0	--

Table 8
Analytical Duplicate & Replicate Results and Calculated Relative Percent Differences
Fall 2011 Groundwater Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Concentration		Report Limit	Units	RPD	ERM Qualifier
			Sample	Duplicate				
TZ86	MW-14-120211	Arsenic, dissolved	935	917	2	µg/L	1.9	--
TZ97	MW-30S-120511	Arsenic, total	8.5	8.8	0.2	µg/L	3.5	--
TZ97	MW-30S-120511	Calcium, total	56000	53800	50	µg/L	4.0	--
TZ97	MW-30S-120511	Iron, total	8280	7930	50	µg/L	4.3	--
TZ97	MW-30S-120511	Magnesium, total	11100	10600	50	µg/L	4.6	--
TZ97	MW-30S-120511	Manganese, total	441	421	1	µg/L	4.6	--
TZ97	MW-30S-120511	Nickel, total	0.9	1.0	0.5	µg/L	11	--
TZ97	MW-30S-120511	Potassium, total	7930	7550	500	µg/L	4.9	--
TZ97	MW-30S-120511	Sodium, total	13800	13200	500	µg/L	4.4	--
TZ97	MW-30S-120511	Arsenic, dissolved	9.2	9.7	0.2	µg/L	5.3	--
TZ97	MW-30S-120511	Iron, dissolved	8300	8210	50	µg/L	1.1	--
TZ97	MW-30S-120511	Manganese, dissolved	448	442	1	µg/L	1.3	--
TZ97	MW-30S-120511	Nickel, dissolved	1.1	1.2	0.5	µg/L	8.7	--
UA17	MW-32S-120611	Arsenic, total	2.2	2.1	0.2	µg/L	4.7	--
UA17	MW-32S-120611	Calcium, total	33000	33100	50	µg/L	0.3	--
UA17	MW-32S-120611	Iron, total	19100	19400	50	µg/L	1.6	--
UA17	MW-32S-120611	Magnesium, total	26600	26900	50	µg/L	1.1	--
UA17	MW-32S-120611	Manganese, total	819	832	1	µg/L	1.6	--
UA17	MW-32S-120611	Potassium, total	20500	20600	500	µg/L	0.5	--
UA17	MW-32S-120611	Sodium, total	32300	32500	500	µg/L	0.6	--
UA17	MW-32S-120611	Arsenic, dissolved	2.1	2.2	0.2	µg/L	4.7	--
UA17	MW-32S-120611	Iron, dissolved	19400	19400	50	µg/L	0	--
UA17	MW-32S-120611	Manganese, dissolved	821	820	1	µg/L	0.1	--
UA33	MW-16-120611	Arsenic, total	13.3	13.3	0.2	µg/L	0	--

Table 8
Analytical Duplicate & Replicate Results and Calculated Relative Percent Differences
Fall 2011 Groundwater Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Concentration		Report Limit	Units	RPD	ERM Qualifier
			Sample	Duplicate				
Replicates								
TZ84	MW-28S-120211	Alkalinity	253	254	1.0	mg/L	0.4	--
TZ84	MW-28S-120211	Bicarbonate	253	254	1.0	mg/L	0.4	--
TZ84	MW-28S-120211	Chloride	10.6	10.6	0.5	mg/L	0	--
TZ84	MW-28S-120211	N-Ammonia	0.360	0.374	0.010	mg/L	3.8	--
TZ84	MW-28S-120211	Total Phosphorus	0.234	0.232	0.008	mg/L	0.9	--
TZ84	MW-28S-120211	Sulfate	13.4	13.2	0.5	mg/L	1.5	--
TZ84	MW-28S-120211	TOC	7.59	7.08	1.5	mg/L	7.0	--
TZ97	MW-30S-120511	Total Phosphorus	1.22	1.25	0.060	mg/L	2.4	--
TZ97	MW-30S-120511	TOC	4.74	5.07	1.50	mg/L	6.7	--
TZ97	MW-31S-120511	Alkalinity	141	141	1.0	mg/L	0	--
TZ97	MW-31S-120511	Bicarbonate	141	141	1.0	mg/L	0	--
TZ97	MW-31S-120511	Chloride	3.5	3.5	0.1	mg/L	0	--
TZ97	MW-31S-120511	N-Nitrate	0.2	0.2	0.1	mg/L	0	--
TZ97	MW-31S-120511	Sulfate	19.4	19.3	0.5	mg/L	0.5	--
UA17	MW-32S-120611	Chloride	7.8	7.8	0.5	mg/L	0	--
UA17	MW-32S-120611	Sulfate	0.7	0.6	0.1	mg/L	15	--
UA17	MW-32S-120611	TOC	8.79	9.00	1.5	mg/L	2.4	--

Data packages reviewed: Analytical Resources TZ21, TZ32, TZ50, TZ73, TZ83, TZ84, TZ86, TZ97, UA17, UA20, UA33; Axys DPWG38865

Key:

RPD = Relative percent difference

µg/L = Micrograms per liter

J = Detected sample result qualified as estimated

mg/L = Milligrams per liter

TOC = Total organic carbon

Table 9
Calibration Verification Recoveries Outside of Acceptable Limits
Fall 2011 Groundwater Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	CCV ID	Compound	CCV Recovery	CCV Limit	Associated Samples	Reported Concentration	Units	ERM Qualifier
TZ21	CCV-113011	1,2-Dibromo-3-chloropropane	24	20	NA	--	--	--
TZ83	CCV-120911	4-Nitrophenol	45.9	20	NA	--	--	--
TZ83	CCV-120911	Benzo(g,h,i)perylene	-22.7	20	NA	--	--	--
TZ83	CCV-121211	4-Nitrophenol	36.9	20	NA	--	--	--
TZ84	CCV-120711	Bromomethane	23.3	20	NA	--	--	--
TZ84	CCV-120711	Chloroethane	29.7	20	NA	--	--	--
TZ84	CCV-120711	Trichlorofluoromethane	21.2	20	NA	--	--	--
TZ84	CCV-121411	4-Nitrophenol	27.0	20	NA	--	--	--
TZ84	CCV-121411	Butylbenzylphthalate	20.4	20	NA	--	--	--
TZ97	CCV-121211	Bromomethane	21.4	20	NA	--	--	--
TZ97	CCV-121211	Trichlorofluoromethane	26.2	20	NA	--	--	--
TZ97	CCV-121211	Acrolein	-23.7	20	NA	--	--	--
TZ97	CCV-121211	trans-1,4-Dichloro-2-butene	-22.3	20	NA	--	--	--
TZ97	CCV-121211	1,2-Dibromo-3-chloropropane	-20.4	20	NA	--	--	--
UA20	CCV-121311	Benzoic acid	-20.3	20	NA	--	--	--
UA20	CCV-121311	4-Nitrophenol	27.0	20	NA	--	--	--
UA20	CCV-121411	4-Nitrophenol	27.0	20	NA	--	--	--
UA20	CCV-121411	Butylbenzylphthalate	20.4	20	NA	--	--	--
UA33	CCV-121211	Bromomethane	21.4	20	NA	--	--	--
UA33	CCV-121211	Trichlorofluoromethane	26.2	20	NA	--	--	--
UA33	CCV-121211	Acrolein	-23.7	20	MW-16-120611	< 5.0	µg/L	UJ
UA33	CCV-121211	trans-1,4-Dichloro-2-butene	-22.3	20	MW-16-120611	< 1.0	µg/L	UJ

Table 9
Calibration Verification Recoveries Outside of Acceptable Limits
Fall 2011 Groundwater Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	CCV ID	Compound	CCV Recovery	CCV Limit	Associated Samples	Reported Concentration	Units	ERM Qualifier
UA33	CCV-121211	1,2-Dibromo-3-chloropropane	-20.4	20	MW-16-120611	< 5.0	µg/L	UJ

Data packages reviewed: Analytical Resources TZ21, TZ32, TZ50, TZ73, TZ83, TZ84, TZ86, TZ97, UA17, UA20, UA33; Axys DPWG38865

Key:

CCV = Continuing calibration verification

NA = Not applicable; qualification of sample data not required

µg/L = Micrograms per liter

UJ = Nondetected sample result qualified as estimated

Table 10
Calibration Range Exceedances
Fall 2011 Groundwater Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Reported Concentration	Units	ERM Qualifier	Notes
TZ32	MW-7S-112911	Pentachlorophenol	480 E	µg/L	J	Result exceeded instrument calibration range
TZ32	DUP-112911-2	Pentachlorophenol	330 E	µg/L	J	Result exceeded instrument calibration range
TZ32	MW-13-112911	Pentachlorophenol	130 E	µg/L	J	Result exceeded instrument calibration range
TZ32	DUP-112911-3	Pentachlorophenol	130 E	µg/L	J	Result exceeded instrument calibration range
TZ73	MW-26-120111	Pentachlorophenol	99 E	µg/L	J	Result exceeded instrument calibration range

Data packages reviewed: Analytical Resources TZ21, TZ32, TZ50, TZ73, TZ83, TZ84, TZ86, TZ97, UA17, UA20, UA33; Alys DPWG38865

Key:

E = Undiluted sample concentration exceeded calibration range; use result of reanalysis for decision-making purposes

µg/L = Micrograms per liter

J = Detected sample result qualified as estimated

Table 11
TPH Results
Fall 2011 Groundwater Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Reported Concentration	Units	ERM Qualifier	Notes
TZ32	MW-1S-112911	TPH-g	0.03	mg/L	NJ	Positive result does not match an identifiable gasoline pattern
TZ84	MW-29S-120211	TPH-d	0.11	mg/L	NJ	Results of organics or additional hydrocarbons are not identifiable
TZ97	MW-30S-120511	TPH-d	0.23	mg/L	NJ	Results of organics or additional hydrocarbons are not identifiable
TZ97	MW-31S-120511	TPH-d	0.27	mg/L	NJ	Results of organics or additional hydrocarbons are not identifiable
TZ97	DUP-120511-1	TPH-d	0.23	mg/L	NJ	Results of organics or additional hydrocarbons are not identifiable

Data packages reviewed: TZ21, TZ32, TZ50, TZ73, TZ83, TZ84, TZ86, TZ97, UA17, UA20, UA33

Key:

TPH-g = Total petroleum hydrocarbons as gasoline

TPH-d = Total petroleum hydrocarbons as diesel

mg/L = Milligrams per liter

NJ = Estimated value

Table 1
Samples with Exceeded Preservation Requirements
Spring 2012 Groundwater Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Analysis Method	Sample Temperature (°C)	Limits (°C)	Note	ERM Qualifier
US27	MW-13-043012	VOC	8.2	2 - 6	NA	--

Data packages reviewed: ARI UR78, US02, US82, US15, US27, US52, US61, UT31: Axys DPWG40271

Key:

°C = Degrees Celsius

VOC = Volatile organic compounds (Method 8260C)

NA = Data not affected; samples received at the laboratory within two hours of collection

Table 2
Blank and Associated Suspect Sample Detections
Spring 2012 Groundwater Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
US27	TB-043012-1	NA	Methylene chloride	0.6	1.0	µg/L	--
US27	MB-050112A	NA	Tetrachloroethene	0.1	0.2	µg/L	--
US27	MB-050112A	NA	Hexachlorobutadiene	0.2	0.5	µg/L	--
US27	MB-050112A	NA	1,2,4-Trichlorobenzene	0.1	0.5	µg/L	--
US27	MB-050112A	NA	1,2,3-Trichlorobenzene	0.2	0.5	µg/L	--
US52	TB-043012-2	NA	Methylene chloride	0.6	1.0	µg/L	--
US61	FB-050212-1	NA	Methylene chloride	1.9	1.0	µg/L	--
US61	FB-050212-1	See below	Acetone	11	5.0	µg/L	--
US61	FB-050212-1	MW-30S-050212	Acetone	7.0	5.0	µg/L	7.0 U
US61	FB-050212-1	MW-29S-050212	Acetone	15	5.0	µg/L	15 U
US61	FB-050212-1	NA	Chloroform	0.1	0.2	µg/L	--
US61	FB-050212-1	NA	Toluene	0.6	0.2	µg/L	--
US61	TB-050212-1	NA	Methylene chloride	0.6	1.0	µg/L	--
US61	MB-050712A	NA	Hexachlorobutadiene	0.1	0.5	µg/L	--
US61	MB-050712A	NA	1,2,4-Trichlorobenzene	0.1	0.5	µg/L	--
US61	MB-050712A	NA	Naphthalene	0.2	0.5	µg/L	--
US61	MB-050712A	NA	1,2,3-Trichlorobenzene	0.2	0.5	µg/L	--
UR78	TB-042512-1	NA	Methylene chloride	0.6	1.0	µg/L	--
UR78	MB-043012A	NA	Tetrachloroethene	0.1	0.2	µg/L	--
UR78	MB-043012A	NA	Hexachlorobutadiene	0.2	0.5	µg/L	--
UR78	MB-043012A	NA	1,2,4-Trichlorobenzene	0.1	0.5	µg/L	--
UR78	MB-043012A	NA	1,2,3-Trichlorobenzene	0.2	0.5	µg/L	--
UR78	MB-050312	NA	Arsenic, total	0.6	0.2	µg/L	--
UR78	MB-050312	NA	Arsenic, dissolved	0.3	0.2	µg/L	--
DPWG40271	Lab Blank	NA	1,2,3,4,6,7,8-HPCDD	0.751	0.500	pg/L	EMPC
DPWG40271	Lab Blank	NA	OCDD	1.95	0.500	pg/L	EMPC
DPWG40271	Lab Blank	NA	OCDF	1.21	0.500	pg/L	EMPC

Data packages reviewed: ARI UR78, US02, US82, US15, US27, US52, US61, UT31: Axys DPWG40271

Key:

TB = Trip blank

MB = Method blank

FB = Field blank

µg/L = Micrograms per liter

pg/L = Picograms per liter

NA = Not applicable; qualification of sample data not required

U = Nondetected

HPCDD = Heptachlorodibenzo-p-dioxin

OCDD = Octochlorodibenzo-p-dioxin

OCDF = Octochlorodibenzofuran

EMPC = Blank result identified as Estimated Maximum Possible Concentration; qualification of sample data not required

Table 3
Laboratory Control Spike Recoveries Outside of Acceptable Limits
Spring 2012 Groundwater Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	Sample Result	ERM Qualifier
US52	LCS-050312	NA	Carbaxole	6.8	36-123	--	--

Data packages reviewed: ARI UR78, US02, US82, US15, US27, US52, US61, UT31: Alys DPWG40271

Key:

LCS = Laboratory control sample

NA = Not applicable; qualification of sample data not required

Table 4
Matrix Spike Recoveries Outside of Acceptable Limits
Spring 2012 Groundwater Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
US15	MW-18-042612 MS	See below	Nickel, total	71.5	75-125	--	--	--	--
US15	MW-18-042612 MS	MW-18-042612	Nickel, total	--	--	--	--	9.2	J
US15	MW-18-042612 MS	MW-3S-042712	Nickel, total	--	--	--	--	0.5	J
US27	MW-14D-043012 MS	NA	Arsenic, total	128	75-125	--	--	4X	--
US27	MW-14D-043012 MS	See below	Silver, total	68.4	75-125	--	--	--	--
US27	MW-14D-043012 MS	MW-27-043012	Silver, total	--	--	--	--	< 0.2	UJ
US27	MW-14D-043012 MS	MW-26-043012	Silver, total	--	--	--	--	< 0.2	UJ
US27	MW-14D-043012 MS	MW-14D-043012	Silver, total	--	--	--	--	< 0.2	UJ
US27	MW-14D-043012 MS	NA	Sodium, total	50.0	75-125	--	--	4X	--
US27	MW-14D-043012 MS	NA	Arsenic, dissolved	48.0	75-125	--	--	4X	--
US27	MW-14D-043012 MS	See below	Silver, dissolved	52.0	75-125	--	--	--	--
US27	MW-14D-043012 MS	MW-27-043012	Silver, dissolved	--	--	--	--	< 0.2	UJ
US27	MW-14D-043012 MS	MW-26-043012	Silver, dissolved	--	--	--	--	< 0.2	UJ
US27	MW-14D-043012 MS	MW-14D-043012	Silver, dissolved	--	--	--	--	< 0.2	UJ
US52	MW-32S-050112 MS/MSD	NA	3,3'-Dichlorobenzidine	14.0/25.3	10-151	57.6	40	--	--
US52	MW-14-043012 MS	NA	Arsenic, total	1680	75-125	--	--	4X	--
US52	MW-14-043012 MS	NA	Arsenic, dissolved	760	75-125	--	--	4X	--
DPWG40271	MW-13-043012 MS/MSD	See below	1,2,3,4,6,7,8-HPCDD	178/258	70-130	36.7	20	--	--
DPWG40271	MW-13-043012 MS/MSD	MW-7S-042712	1,2,3,4,6,7,8-HPCDD	--	--	--	--	16.6	J
DPWG40271	MW-13-043012 MS/MSD	DUP-042712-1	1,2,3,4,6,7,8-HPCDD	--	--	--	--	23.7	J
DPWG40271	MW-13-043012 MS/MSD	MW-10-042712	1,2,3,4,6,7,8-HPCDD	--	--	--	--	84.8	J
DPWG40271	MW-13-043012 MS/MSD	MW-13-043012	1,2,3,4,6,7,8-HPCDD	--	--	--	--	46.5	J
DPWG40271	MW-13-043012 MS/MSD	See below	OCDD	973/1270	70-130	26.8	20	--	--
DPWG40271	MW-13-043012 MS/MSD	MW-7S-042712	OCDD	--	--	--	--	92.8	J
DPWG40271	MW-13-043012 MS/MSD	DUP-042712-1	OCDD	--	--	--	--	332	J
DPWG40271	MW-13-043012 MS/MSD	MW-10-042712	OCDD	--	--	--	--	1530	J
DPWG40271	MW-13-043012 MS/MSD	MW-13-043012	OCDD	--	--	--	--	5000	J

Data packages reviewed: ARI UR78, US02, US82, US15, US27, US52, US61, UT31: Axys DPWG40271

Key:

MS/MSD = Matrix spike/matrix spike duplicate

RPD = Relative percent difference

NA = Not applicable; qualification of sample data not required

J = Detected sample result qualified as estimated

UJ = Nondetected sample result qualified as estimated

4X = Concentration of unspiked sample was greater than 4 times the amount spiked; no qualification required

Table 5
Estimated Maximum Possible Concentration
Spring 2012 Groundwater Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG40271	MW-7S-042712	1,2,3,6,7,8-HXCDD	0.621	0.547	pg/L	U
DPWG40271	MW-7S-042712	1,2,3,7,8,9-HXCDD	0.740	0.547	pg/L	U
DPWG40271	MW-7S-042712	1,2,3,4,6,7,8-HPCDF	0.835	0.547	pg/L	U
DPWG40271	DUP-042712-1	1,2,3,4,7,8-HXCDD	0.600	0.549	pg/L	U
DPWG40271	DUP-042712-1	1,2,3,4,6,7,8-HPCDF	0.791	0.549	pg/L	U
DPWG40271	MW-10-042712	1,2,3,7,8,9-HXCDD	0.720	0.528	pg/L	U
DPWG40271	MW-10-042712	2,3,4,7,8-PECDF	0.608	0.528	pg/L	U
DPWG40271	MW-10-042712	1,2,3,6,7,8-HXCDF	0.655	0.528	pg/L	U
DPWG40271	MW-13-043012	1,2,3,6,7,8-HXCDD	0.766	0.540	pg/L	U

Data packages reviewed: ARI UR78, US02, US82, US15, US27, US52, US61, UT31: Axys DPWG40271

Key:

pg/L = Picograms per liter

U = Nondetected

HXCDD = Hexachlorodibenzo-p-dioxin

HPCDF = Heptachlorodibenzofuran

PECDF = Pentachlorodibenzofuran

HXCDF = Hexachlorodibenzofuran

Table 6
Field Duplicate Results and Calculated Relative Percent Differences
Spring 2012 Groundwater Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Compound	Concentration Sample	Duplicate	Report Limit	Units	RPD
US15	MW-7S-042712/DUP-042712-1	2,3,4,6-Tetrachlorophenol	4.0	4.1	1.0	µg/L	2.5
US15	MW-7S-042712/DUP-042712-1	Pentachlorophenol	53	58	5.0	µg/L	9.0
US27	MW-13-043012/DUP-043012-1	2,3,4,6-Tetrachlorophenol	4.1	4.6	1.0	µg/L	11
US27	MW-13-043012/DUP-043012-1	Pentachlorophenol	58	72	5.0/12	µg/L	22
US61	MW-31S-050212/DUP-050212-1	Phenol	4.0	4.3	1.0	µg/L	7.2
US61	MW-31S-050212/DUP-050212-1	DRO	0.23	0.28	0.20	mg/L	20
US61	MW-31S-050212/DUP-050212-1	Arsenic, total	1.5	1.3	0.2	µg/L	14
US61	MW-31S-050212/DUP-050212-1	Copper, total	0.9	8.1	0.5	µg/L	160
US61	MW-31S-050212/DUP-050212-1	Nickel, total	2.0	15.6	0.5	µg/L	155
US61	MW-31S-050212/DUP-050212-1	Antimony, dissolved	0.2	0.2	0.2	µg/L	0
US61	MW-31S-050212/DUP-050212-1	Arsenic, dissolved	1.3	1.2	0.2	µg/L	8.0
US61	MW-31S-050212/DUP-050212-1	Copper, dissolved	0.5	0.9	0.5	µg/L	57
US61	MW-31S-050212/DUP-050212-1	Nickel, dissolved	1.0	1.0	0.5	µg/L	0
UR78	MW-21-042612/DUP-042612-1	Arsenic, total	1930	1820	4.0	µg/L	5.9
UR78	MW-20-042612/DUP-042612-2	Arsenic, total	957	1020	2.0	µg/L	6.4
UR78	MW-21-042612/DUP-042612-1	Arsenic, dissolved	1920	1850	4.0	µg/L	3.7
UR78	MW-20-042612/DUP-042612-2	Arsenic, dissolved	869	896	2.0	µg/L	3.1
US82	MW-36S-050312/DUP-050312-1	Arsenic, total	0.5	0.5	0.2	µg/L	0
US82	MW-36S-050312/DUP-050312-1	Copper, total	0.7	0.8	0.5	µg/L	13
US82	MW-36S-050312/DUP-050312-1	Arsenic, dissolved	0.5	0.5	0.2	µg/L	0
US82	MW-36S-050312/DUP-050312-1	Copper, dissolved	0.5	0.5	0.5	µg/L	0
DPWG40271	MW-7S-042712/DUP-042712-1	1,2,3,6,7,8-HxCDD	0.621	0.724	0.547/0.549	pg/L	15
DPWG40271	MW-7S-042712/DUP-042712-1	1,2,3,4,6,7,8-HPcDD	16.6	23.7	0.547/0.549	pg/L	35
DPWG40271	MW-7S-042712/DUP-042712-1	OCDD	92.8	332	0.547/0.549	pg/L	113
DPWG40271	MW-7S-042712/DUP-042712-1	1,2,3,4,6,7,8-HPcDF	0.835	0.791	0.547/0.549	pg/L	5.4
DPWG40271	MW-7S-042712/DUP-042712-1	OCDF	3.08	2.25	0.547/0.549	pg/L	31
DPWG40271	MW-7S-042712/DUP-042712-1	Total Hexa-Dioxins	1.57	3.05	0.547/0.549	pg/L	64
DPWG40271	MW-7S-042712/DUP-042712-1	Total Hepta-Dioxins	25.0	36.1	0.547/0.549	pg/L	36

Data packages reviewed: ARI UR78, US02, US82, US15, US27, US52, US61, UT31: Axys DPWG40271

Key:

RPD = Relative percent difference

µg/L = Micrograms per liter

mg/L = Milligrams per liter

pg/L = Picograms per liter

DRO = Diesel range organics

HxCDD = Hexachlorodibenzo-p-dioxin

HPcDD = Heptachlorodibenzo-p-dioxin

OCDD = Octochlorodibenzo-p-dioxin

HPcDF = Heptachlorodibenzofuran

OCDF = Octochlorodibenzofuran

Table 7
Analytical Duplicate Results and Calculated Relative Percent Differences
Spring 2012 Groundwater Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Concentration Sample	Concentration Duplicate	Report Limit	Units	RPD	ERM Qualifier
US15	MW-18-042612	Antimony, total	0.2	0.2	0.2	µg/L	0	--
US15	MW-18-042612	Arsenic, total	6.2	6.1	0.2	µg/L	1.6	--
US15	MW-18-042612	Chromium, total	0.6	0.5	0.5	µg/L	18	--
US15	MW-18-042612	Copper, total	1.9	1.9	0.5	µg/L	0	--
US15	MW-18-042612	Nickel, total	9.2	2.5	0.5	µg/L	115	J
US15	MW-18-042612	Antimony, dissolved	0.3	0.3	0.2	µg/L	0	--
US15	MW-18-042612	Arsenic, dissolved	5.9	6.0	0.2	µg/L	1.7	--
US15	MW-18-042612	Copper, dissolved	1.7	1.8	0.5	µg/L	5.7	--
US27	MW-27-043012	Arsenic, total	9.1	9.0	0.2	µg/L	1.1	--
US27	MW-27-043012	Chromium, total	0.7	0.7	0.5	µg/L	0	--
US27	MW-27-043012	Copper, total	1.0	0.9	0.5	µg/L	11	--
US27	MW-27-043012	Nickel, total	2.8	2.8	0.5	µg/L	0	--
US27	MW-14D-043012	Aluminum, total	460	460	50	µg/L	0	--
US27	MW-14D-043012	Arsenic, total	361	368	2	µg/L	1.9	--
US27	MW-14D-043012	Calcium, total	18100	17900	50	µg/L	1.1	--
US27	MW-14D-043012	Chromium, total	11.5	11.6	0.5	µg/L	0.9	--
US27	MW-14D-043012	Copper, total	3.1	3.2	0.5	µg/L	3.2	--
US27	MW-14D-043012	Iron, total	10100	10000	50	µg/L	1.0	--
US27	MW-14D-043012	Magnesium, total	12600	12500	50	µg/L	0.8	--
US27	MW-14D-043012	Manganese, total	318	313	1	µg/L	1.6	--
US27	MW-14D-043012	Potassium, total	14800	14700	500	µg/L	0.7	--
US27	MW-14D-043012	Sodium, total	170000	168000	500	µg/L	1.2	--
US27	MW-27-043012	Arsenic, dissolved	9.3	9.0	0.2	µg/L	3	--
US27	MW-27-043012	Copper, dissolved	0.6	0.6	0.2	µg/L	0	--
US27	MW-27-043012	Nickel, dissolved	2.2	2.2	0.5	µg/L	0	--
US27	MW-14D-043012	Aluminum, dissolved	250	260	50	µg/L	3.9	--
US27	MW-14D-043012	Arsenic, dissolved	361	355	2	µg/L	1.7	--
US27	MW-14D-043012	Chromium, dissolved	9.4	9.2	0.5	µg/L	2.2	--
US27	MW-14D-043012	Copper, dissolved	1.1	1.2	0.5	µg/L	8.7	--
US27	MW-14D-043012	Iron, dissolved	9840	9860	50	µg/L	0.2	--
US27	MW-14D-043012	Manganese, dissolved	316	316	1	µg/L	0	--
US52	MW-14-043012	Arsenic, total	6130	6420.0	10	µg/L	4.6	--
US52	MW-14-043012	Chromium, total	0.7	0.7	0.5	µg/L	0	--
US52	MW-14-043012	Copper, total	24.2	25.2	0.5	µg/L	4.0	--
US52	MW-14-043012	Zinc, total	35	37	4.0	µg/L	5.6	--
US52	MW-28S-050112	Arsenic, total	14.0	14.0	0.2	µg/L	0	--
US52	MW-28S-050112	Calcium, total	67100	65900	50	µg/L	1.8	--
US52	MW-28S-050112	Copper, total	0.8	0.9	0.5	µg/L	12	--
US52	MW-28S-050112	Iron, total	11900	11900	50	µg/L	0	--
US52	MW-28S-050112	Magnesium, total	6500	6430	50	µg/L	1.1	--
US52	MW-28S-050112	Manganese, total	367	365	1	µg/L	0.5	--
US52	MW-28S-050112	Nickel, total	4.0	4.0	0.5	µg/L	0	--
US52	MW-28S-050112	Potassium, total	5210	5160	500	µg/L	1.0	--
US52	MW-28S-050112	Sodium, total	11500	11300	500	µg/L	1.8	--
US52	MW-14-043012	Arsenic, dissolved	5810	6060	10	µg/L	4.2	--
US52	MW-14-043012	Chromium, dissolved	0.7	0.7	0.5	µg/L	0	--
US52	MW-14-043012	Copper, dissolved	2.3	3.0	0.5	µg/L	26	--
US52	MW-14-043012	Zinc, dissolved	35	36	4	µg/L	2.8	--
US52	MW-28S-050112	Arsenic, dissolved	13.8	14.2	0.2	µg/L	2.9	--
US52	MW-28S-050112	Copper, dissolved	0.8	1.1	0.5	µg/L	32	--
US52	MW-28S-050112	Iron, dissolved	12100	11900	50	µg/L	1.7	--
US52	MW-28S-050112	Manganese, dissolved	350	346	1	µg/L	1.1	--
US52	MW-28S-050112	Nickel, dissolved	0.9	0.9	0.5	µg/L	0	--
US61	DUP-050212-1	Antimony, total	0.2	0.2	0.2	µg/L	0	--
US61	DUP-050212-1	Arsenic, total	1.3	1.4	0.2	µg/L	7.4	--
US61	DUP-050212-1	Copper, total	8.1	6.5	0.5	µg/L	22	J
US61	DUP-050212-1	Nickel, total	15.6	12.7	0.5	µg/L	20	--
US61	MW-30S-050212	Arsenic, dissolved	9.6	9.6	0.2	µg/L	0	--
US61	MW-30S-050212	Iron, dissolved	6800	6710	50	µg/L	1.3	--
US61	MW-30S-050212	Manganese, dissolved	366	363	1	µg/L	0.8	--
US61	MW-30S-050212	Nickel, dissolved	0.5	0.5	0.5	µg/L	0	--
UR78	MW-22-042512	Arsenic, total	68.3	66.6	0.2	µg/L	2.5	--
UR78	MW-22-042512	Arsenic, dissolved	61.6	62.8	0.2	µg/L	1.9	--
UR78	MW-24-042512	Arsenic, total	0.4	0.4	0.2	µg/L	0	--
UR78	MW-24-042512	Nickel, total	1.1	0.7	0.5	µg/L	44	J
UR78	MW-24-042512	Arsenic, dissolved	0.3	0.4	0.2	µg/L	29	J
UR78	MW-24-042512	Nickel, dissolved	0.7	0.6	0.5	µg/L	15	--
US82	MW-34S-050312	Arsenic, total	2.0	2.0	0.5	µg/L	0	--
US82	MW-34S-050312	Calcium, total	39200	39100	50	µg/L	0.3	--
US82	MW-34S-050312	Copper, total	3.4	3.6	0.5	µg/L	5.7	--
US82	MW-34S-050312	Magnesium, total	1640	1640	50	µg/L	0	--
US82	MW-34S-050312	Manganese, total	1.0	1.0	1.0	µg/L	0	--
US82	MW-34S-050312	Potassium, total	1610	1590	500	µg/L	1.3	--
US82	MW-34S-050312	Sodium, total	11600	11600	500	µg/L	0	--
US82	MW-34S-050312	Arsenic, dissolved	2.0	2.0	0.2	µg/L	0	--
US82	MW-34S-050312	Copper, dissolved	3.5	3.5	0.5	µg/L	0	--
US82	MW-34S-050312	Alkalinity	121	122	1.0	mg/L	0.8	--
US82	MW-34S-050312	Bicarbonate	121	122	1.0	mg/L	0.8	--
US82	MW-34S-050312	Chloride	4.2	4.2	0.1	mg/L	0	--
US82	MW-34S-050312	N-Nitrate	0.2	0.1	0.1	mg/L	67	J
US82	MW-34S-050312	Sulfate	6.4	6.4	0.2	mg/L	0	--
US82	MW-35S-050312	Alkalinity	20.1	20.2	1.0	mg/L	0.5	--
US82	MW-35S-050312	Bicarbonate	20.1	20.2	1.0	mg/L	0.5	--
US82	MW-35S-050312	N-Ammonia	0.091	0.091	0.01	mg/L	0	--
US82	IDW-050312	pH	5.91	5.91	0.01	pH units	0	--
US82	MW-33S-050212	TSS	36.4	37.7	1.1	mg/L	3.5	--

Data packages reviewed: ARI UR78, US02, US82, US15, US27, US52, US61, UT31; Axyys DPWG40271

Key:
 RPD = Relative percent difference
 µg/L = Micrograms per liter
 mg/L = Milligrams per liter
 J = Detected sample result qualified as estimated
 TSS = Total suspended solids

Table 8
Calibration Verification Recoveries Outside of Acceptable Limits
Spring 2012 Groundwater Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	CCV ID	Compound	CCV Recovery	CCV Limit	Associated Samples	Reported Concentration	Units	ERM Qualifier
US15	CCV-050812	Pentachlorophenol	26.1	20	See below	--	--	--
US15	CCV-050812	--	--	--	MW-7S-042712	53	µg/L	J
US15	CCV-050812	--	--	--	DUP-042712-1	58	µg/L	J
US15	CCV-050812	Pentachlorophenol	24.9	20	NA	--	--	--
US27	CCV-050112	Bromoform	21.3	20	NA	--	--	--
US52	CCV-050312	Trichlorofluoromethane	20.3	20	NA	--	--	--
US52	CCV-050312	Acrolein	-23.6	20	See below	--	--	--
US52	CCV-050312	--	--	--	MW-16-043012	< 5.0	µg/L	UJ
US52	CCV-050312	--	--	--	MW-28S-050112	< 5.0	µg/L	UJ
US52	CCV-050312	Carbon tetrachloride	20.6	20	NA	--	--	--
US52	CCV-050412	2,3,4,6-Tetrachlorophenol	23.5	20	See below	--	--	--
US52	CCV-050412	--	--	--	MW-16-043012	30	µg/L	J
US52	CCV-050412	2,4,6-Tribromophenol	32.7	20	NA	--	--	--
US61	CCV-051012	Benzo(a)anthracene	-23.9	20	See below	--	--	--
US61	CCV-051012	--	--	--	MW-30S-050212	< 0.10	µg/L	UJ
US61	CCV-051012	--	--	--	MW-29S-050212	< 0.10	µg/L	UJ
US61	CCV-051012	--	--	--	MW-31S-050212	< 0.10	µg/L	UJ
US61	CCV-051012	--	--	--	DUP-050212-1	< 0.10	µg/L	UJ
UR78	CCV-043012	Chloroethane	-24.0	20	MW-4S-042512	< 0.2	µg/L	UJ
UR78	CCV-043012	Acrolein	-20.4	20	MW-4S-042512	< 5.0	µg/L	UJ
UR78	CCV-043012	Acetone	28.4	20	MW-4S-042512	16	µg/L	J
UR78	CCV-043012	Hexachloro-1,3-butadiene	29.9	20	NA	--	--	--
UR78	CCV-050212	2,3,4,6-Tetrachlorophenol	23.9	20	NA	--	--	--
UR78	CCV-050212	2,4,6-Tribromophenol	32.7	20	NA	--	--	--
UR78	CCV-050112	C25 - C36	28.5	20	NA	--	--	--
UR78	CCV-050212	n-Triacontane	38.6	20	NA	--	--	--
US82	CCV-051012	Benzo(a)anthracene	-23.9	20	See below	--	--	--
US82	CCV-051012	--	--	--	MW-34S-050312	< 0.10	µg/L	UJ
US82	CCV-051012	--	--	--	MW-35S-050312	< 0.10	µg/L	UJ
US82	CCV-051012	--	--	--	MW-33S-050312	< 0.10	µg/L	UJ
US82	CCV-050912	C25 - C36	31.4	20	--	--	--	--
US82	CCV-050912	C25 - C36	26.2	20	--	--	--	--

Data packages reviewed: ARI UR78, US02, US82, US15, US27, US52, US61, UT31: Axys DPWG40271

Key:

CCV = Continuing calibration verification

µg/L = Micrograms per liter

NA = Not applicable; qualification of sample data not required

J = Detected sample result qualified as estimated

UJ = Nondetected sample result qualified as estimated

Table 9
TPH Results
Spring 2012 Groundwater Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Reported Concentration	Units	ERM Qualifier	Notes
US82	MW-35S-050312	DRO	3.2	mg/L	NJ	Results of organics or additional hydrocarbons are not identifiable
US61	MW-31S-050212	DRO	0.23	mg/L	NJ	Results of organics or additional hydrocarbons are not identifiable
US61	DUP-050212-1	DRO	0.28	mg/L	NJ	Results of organics or additional hydrocarbons are not identifiable

Data packages reviewed: ARI UR78, US02, US82, US15, US27, US52, US61, UT31: Axys DPWG40271

Key:

DRO = Diesel range organics

mg/L = Milligrams per liter

NJ = Estimated value

Memorandum

Environmental Resources Management

To: Shira DeGrood

From: Irene Lavigne

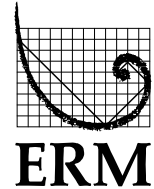
Date: 10 October 2012

Subject: Data Review of Reichhold-Glacier Spring 2012
Groundwater Monitoring Samples Collected
April – May 2012

Project Number: 0155129

Data Packages: Analytical Resources Incorporated Data Packages
UR78, US02, US82, US15, US27, US52, US61, and
UT31
Axys Analytical Services Data Package DPWG40271

2875 Michelle Drive
Suite 200
Irvine, CA 92606
(949) 623-4700
(949) 623-2940 (fax)



The data quality was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999, *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004, and the *EPA Region 10 SOP for the Validation of Polychlorinated Dibenzodioxin (PCDD) and Polychlorinated Dibenzofuran (PCDF) Data*, January 1996.

HOLDING TIME AND PRESERVATION EVALUATION

The samples were prepared and analyzed within the method-prescribed time period from the date of collection. No sample data were qualified based on the holding time evaluation.

The sample shipments were received at the laboratory within the method-prescribed preservation requirements with one exception. The temperature of one sample delivery group was recorded above the acceptable range of 2-6 degrees Celsius upon receipt at the laboratory. No data were qualified on the basis of this temperature exceedance because the samples were delivered to the laboratory within two hours of collection of the last sample; therefore, the samples did not have sufficient cooling time to reach an acceptable temperature. The sample associated with the temperature exceedance is listed in Table 1.

BLANK EVALUATION

The method blank, trip blank and field blank sample results were nondetected for each of the target analytes with a number of exceptions. Detections of acetone in a field blank required qualification of two sample results as nondetected (U) for this compound. Additional blank detections did not result in qualification of associated data. Data were not qualified if the samples were nondetected for the associated compounds, if the sample results exceeded five times the blank concentrations of organic compounds or 10 times the blank concentrations of inorganic compounds and common laboratory contaminants, or if the blank results were identified as estimated maximum possible concentrations for dioxin/furan analyses. The blank detections and associated, qualified data are presented in Table 2.

BLANK SPIKE EVALUATION

The laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) recoveries were within the laboratory's limits of acceptance with one exception; however, no sample data were qualified on the basis of the LCS outlier. Sample data were not qualified because the data could be verified using an associated, in-control matrix spike recovery. The outlying LCS recovery is shown in Table 3.

MATRIX SPIKE EVALUATION

The matrix spike (MS) and matrix spike duplicate (MSD) recoveries were within the laboratory's limits of acceptance with a number of exceptions. Two detected sample results for nickel were qualified as estimated (J) due to a low MS recovery for this compound. Six nondetected sample results for silver were qualified as estimated (UJ) based on two MS recoveries that were below the minimum acceptable limits for this compound. Additional outlying recoveries did not require qualification of sample data. Data were not qualified if the concentration of the unspiked samples was greater than four times the amount spiked, or if only the relative percent difference (RPD) exceeded control limits. The outlying MS recoveries and qualified sample data are listed in Table 4.

ESTIMATED MAXIMUM POSSIBLE CONCENTRATION

The laboratory identified a number of dioxin and furan results as estimated maximum possible concentrations (EMPC). An EMPC value is the maximum possible concentration of a compound that could be present in the sample. This classification is used when all of the identification criteria for a given dioxin or furan compound are not met. Sample data identified as EMPC by the laboratory were qualified as nondetected (U), as shown in Table 5.

SURROGATE SPIKE EVALUATION

The surrogate recoveries were within acceptable limits. No qualifications to the data were made. The surrogate recoveries indicate minimal matrix interference in the samples.

FIELD DUPLICATE EVALUATION

Seven samples were collected and analyzed in duplicate. ERM calculated the RPD between detected results. The USEPA has not established control criteria for field duplicate samples; therefore, sample data are not qualified on the basis of field duplicate imprecision. Detected duplicate results and calculated RPDs are presented in Table 6.

ANALYTICAL DUPLICATE EVALUATION

The laboratory prepared and analyzed a number of samples as analytical duplicates. ERM calculated the RPD between detected results. The RPDs were less than 20 percent, with few exceptions. Sample results for five duplicates were qualified as estimated (J). The analytical duplicate sample results and calculated RPDs are shown in Table 7.

CONTINUING CALIBRATION EVALUATION

The laboratory noted that 20 continuing calibration verification (CCV) recoveries exceeded acceptable control limits for various compounds. Detected and nondetected sample results were qualified as estimated, "J" or "UJ", respectively, as listed in Table 8. Not all CCV outliers resulted in qualified data. Data were not qualified if the CCV recoveries were biased high and the associated samples were nondetected for the corresponding compounds.

TPH EVALUATION

The laboratory noted that the chromatograms for three samples analyzed for diesel range organics contained additional, unidentifiable hydrocarbons. The results for these samples were qualified as tentatively identified and estimated (NJ) as presented in Table 9.

OVERALL ASSESSMENT

No data were determined to be unusable. All of the data, including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents.

Memorandum

**Environmental
Resources
Management**

To: Mike Mendes

From: Irene Lavigne

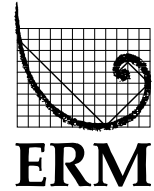
Date: 15 April 2014
Revised to include additional data package.

Subject: Data Review of Reichhold-Glacier Spring 2014
Groundwater Samples Collected 03-14 March 2014

Project Number: 0232280.06

Data Packages: Analytical Resources, Incorporated Data Packages
YB16, YB34, YB44, YB56, YB90, YC07, YC37, YC52,
YC77, and YC92

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The data quality was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999, *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004.

HOLDING TIME AND PRESERVATION EVALUATION

The sample shipments were received at the laboratory within the method-prescribed preservation requirements. The samples were prepared and analyzed within the method-prescribed time period from the date of collection. No sample data were qualified based on sample preservation or holding-time exceedances.

BLANK EVALUATION

The method blank, field blank, and trip blank sample results were nondetected for each of the target analytes with limited exceptions. No sample data were qualified based on the blank detections because either the associated sample results were nondetected, or the field sample concentration exceeded 10 times the blank detection. The blank detections are listed in Table 1.

BLANK SPIKE EVALUATION

The laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) recoveries were within the laboratory's limits of acceptance with several exceptions. One sample results for acetone was qualified as estimated (J) due to high LCS/LCSD recoveries for this compound. Additional sample data were not qualified because the spike recoveries were biased high and the associated sample data were nondetected for the corresponding compounds. The outlying LCS recoveries and associated, qualified sample data are presented in Table 2.

MATRIX SPIKE EVALUATION

The matrix spike (MS) and matrix spike duplicate (MSD) recoveries were within the laboratory's limits of acceptance with a number of exceptions. Three recoveries for hexavalent chromium (CrVI) were reported by the laboratory as 0% recovery, less than the lower control limit. These MS/MSD results suggest matrix interference is impacting CrVI results in associated samples. There was no indication that the laboratory performed post spikes to verify the low recoveries. The associated field sample results where CrVI was not detected were qualified as rejected (R), and may not be used for decision-making purposes. Historically, CrVI concentrations in groundwater at MW-1S are non-detect.

An additional detected sample result for acetone was qualified as estimated (J) based on a high recovery for this compound in an associated MS/MSD pair. The outlying MS recoveries and qualified sample data are presented in Table 2.

SURROGATE EVALUATION

The surrogate recoveries were within acceptable limits, and no sample data required qualification as a result of the surrogate evaluation. The surrogate recoveries indicate minimal matrix interference in the samples.

FIELD DUPLICATE EVALUATION

Several samples were collected and analyzed in duplicate. ERM calculated the relative percent difference (RPD) between detected results. The USEPA has not established control criteria for field duplicate samples; therefore, sample data are not qualified on the basis of field duplicate imprecision. Detected duplicate results and calculated RPDs are presented in Table 3.

REPLICATE EVALUATION

The laboratory prepared and analyzed several samples as replicates. The RPD for the replicate results was within acceptable limits (<20%). Sample data were not qualified based on the replicate results.

CONTINUING CALIBRATION EVALUATION

The laboratory noted that several continuing calibration verification (CCV) recoveries for various compounds did not meet acceptable control limits. The nondetected and detected sample results associated with these recovery outliers were qualified as estimated, UJ or J, respectively. Additional outlying CCV recoveries did not warrant qualification of sample data because the recoveries were biased high and the results were nondetected. Outlying recoveries for compounds that were not target analytes were not included in the table. The CCV outliers and associated, qualified data are shown in Table 4.

CALIBRATION RANGE EVALUATION

The laboratory noted two instances where the sample results exceeded the calibration range of the equipment for pentachlorophenol. These two sample results were qualified as estimated (J). The laboratory diluted and reanalyzed the affected samples. The sample results from the dilutions should be used for decision-making purposes. The samples with calibration range exceedances are presented in Table 5.

OVERALL ASSESSMENT

Six nondetected hexavalent chromium results were rejected due to significant matrix interferences. These hexavalent chromium results cannot be used for decision-making purposes.

The remaining data; including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation, with the exception of the rejected data, is acceptable for the preparation of technically-defensible documents.

Table 1
Blank and Associated Suspect Sample Detections
Spring 2014 Groundwater Samples, Collected 03-14 March 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
YB34	FB-030414-1	VOC	NA	Toluene	0.12	0.20	µg/L	--
YB34	TB-030414-1	VOC	NA	Acetone	2.3	5.0	µg/L	--
YB34	MB-031214A	VOC	NA	Hexachlorobutadiene	0.38	0.50	µg/L	--
YB34	MB-031214A	VOC	NA	n-Butylbenzene	0.14	0.20	µg/L	--
YB34	MB-031214A	VOC	NA	1,2,4-Trichlorobenzene	0.15	0.50	µg/L	--
YB34	MB-031214A	VOC	NA	1,2,3-Trichlorobenzene	0.13	0.50	µg/L	--
YB56	MB-031114	Total Metals	NA	Manganese	2	1	µg/L	--
YB90	MB-031114A	VOC	NA	1,2-Dichlorobenzene	0.10	0.20	µg/L	--
YB90	MB-031114A	VOC	NA	1,3-Dichlorobenzene	0.10	0.20	µg/L	--
YB90	MB-031114A	VOC	NA	1,4-Dichlorobenzene	0.12	0.20	µg/L	--
YB90	MB-031114A	VOC	NA	1,2-Dibromo-3-chloropropane	0.18	0.50	µg/L	--
YB90	MB-031114A	VOC	NA	Hexachlorobutadiene	0.43	0.50	µg/L	--
YB90	MB-031114A	VOC	NA	1,2,4-Trichlorobenzene	0.14	0.50	µg/L	--
YB90	MB-031114A	VOC	NA	Naphthalene	0.28	0.50	µg/L	--
YB90	MB-031114A	VOC	NA	1,2,3-Trichlorobenzene	0.27	0.50	µg/L	--

Data packages reviewed: YB16, YB34, YB44, YB56, YB90, YC07, YC37, YC52, YC77, YC92

Key:

FB = Field blank

TB = Trip blank

MB = Method blank

VOC = Volatile organic compounds; Method 8260C

Total metals = Method 6010C

NA = Not applicable; qualification of sample data not required

µg/L = Micrograms per liter

Table 2
Spike Recoveries Outside of Acceptable Limits
Spring 2014 Groundwater Samples, Collected 03-14 March 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
LCS/LCSD										
YB16	LCS-030614	SVOC	NA	4-Nitrophenol	139/143	10-103	2.8	40	--	--
YB34	LCS-031014	SVOC	NA	4-Nitrophenol	128/133	10-103	4.2	40	--	--
YB90	LCS-031114A	VOC	See below	Acetone	130/126	64-125	2.8	40	--	--
YB90	LCS-031114A	VOC	MW-34S-030414	Acetone	--	--	--	--	2.8	J
YB90	LCS-031114A	VOC	NA	2-Butanone	124/123	73-123	0.6	40	--	--
YC77	LCS-031814	SVOC	NA	4-Nitrophenol	133/135	10-103	1.1	40	--	--
YC92	LCS-031914	SVOC	NA	4-Nitrophenol	129/128	10-103	0.1	40	--	--
MS/MSD										
YB16	MW-12S-030314 MS/MSD	SVOC	NA	4-Nitrophenol	136/136	10-103	0	40	--	--
YB34	MW-43D-030414 MS	Total Metals	NA	Arsenic	212	75-125	--	--	4X	--
YB34	MW-43D-030414 MS	Dissolved Metals	NA	Arsenic	184	75-125	--	--	4X	--
YB44	MW-21S-030514 MS	Total Metals	NA	Arsenic	164	75-125	--	--	4X	--

Table 2
Spike Recoveries Outside of Acceptable Limits
Spring 2014 Groundwater Samples, Collected 03-14 March 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
YB56	MW-35S-030614 MS	Cr VI	See below	Chromium, hexavalent	0	75-125	--	--	--	--
YB56	MW-35S-030614 MS	Cr VI	MW-35S-030614	Chromium, hexavalent	--	--	--	--	< 0.10	R
YB56	MW-35S-030614 MS	Cr VI	MW-35D-030614	Chromium, hexavalent	--	--	--	--	< 0.10	R
YB90	MW-34S-030714 MS/MSD	VOC	See below	Acetone	132/126	64-125	4.6	40	--	--
YB90	MW-34S-030714 MS/MSD	VOC	MW-34S-030414	Acetone	--	--	--	--	2.8	J
YB90	MW-34S-030714 MS/MSD	VOC	NA	2-Butanone	126/124	73-123	1.6	40	--	--
YB90	MW-34S-030714 MS/MSD	VOC	NA	2-Chloroethylvinyl ether	NR/NR	62-130	NR	40	--	--
YB90	MW-34S-030714 MS/MSD	VOC	NA	Naphthalene	126/129	80-128	2.4	40	--	--
YB90	MW-14D-030714 MS	Total Metals	NA	Arsenic	168	75-125	--	--	4X	--
YB90	MW-14D-030714 MS	Total Metals	NA	Sodium	140	75-125	--	--	4X	--
YB90	MW-14D-030714 MS	Dissolved Metals	NA	Arsenic	-80	75-125	--	--	4X	--
YC07	MW-03D-031014 MS	Total Metals	NA	Sodium	60	75-125	--	--	4X	--
YC37	MW-45D-031114	Total Metals	NA	Sodium	150	75-125	--	--	4X	--
YC37	MW-26S-03114	Cr VI	See below	Chromium, hexavalent	0	75-125	--	--	--	--
YC37	MW-26S-03114	Cr VI	MW-26S-031114	Chromium, hexavalent	--	--	--	--	< 0.010	R

Table 2
Spike Recoveries Outside of Acceptable Limits
Spring 2014 Groundwater Samples, Collected 03-14 March 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
YC92	MW-1S-031414	Cr VI	See below	Chromium, hexavalent	0	75-125	--	--	--	--
YC92	MW-1S-031414	Cr VI	MW-1S-031414	Chromium, hexavalent	--	--	--	--	< 0.010	R
YC92	MW-1S-031414	Cr VI	MW-1D-031414	Chromium, hexavalent	--	--	--	--	< 0.010	R
YC92	MW-1S-031414	Cr VI	MW-38D-031414	Chromium, hexavalent	--	--	--	--	< 0.010	R

Data packages reviewed: YB16, YB34, YB44, YB56, YB90, YC07, YC37, YC52, YC77, YC92

Key:

RPD = Relative percent difference

LCS/LCSD = Laboratory control sample/laboratory control sample duplicate

MS/MSD = Matrix spike/matrix spike duplicate

SVOC = Semivolatile organic compounds; Method 8270D

VOC = Volatile organic compounds; Method 8260C

Total metals = Method 6010C

Dissolved metals = Method 6010 C

Cr VI = Hexavalent chromium analysis; Method 3500Cr

NA = Not applicable; qualification of sample data not required

NR = Value not reported

4X = Sample concentration exceeded four times amount spiked; no qualification required

J = Detected sample result qualified as estimated

R = Rejected

Table 3
Field Duplicate Results and Calculated Relative Percent Differences
Spring 2014 Groundwater Samples, Collected 03-14 March 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
YB34	MW-43S-0310414/DUP-030414-2	SVOC-SIM	2-Methylnaphthalene	0.07	0.07	0.10	µg/L	0
YB34	MW-43S-0310414/DUP-030414-2	SVOC-SIM	1-Methylnaphthalene	0.08	0.08	0.10	µg/L	0
YB34	MW-43S-0310414/DUP-030414-2	SVOC-SIM	Phenanthrene	0.07	0.07	0.10	µg/L	0
YB34	MW-43S-0310414/DUP-030414-2	Total Metals	Arsenic	70	76	96/98	µg/L	8.2
YB34	MW-43S-0310414/DUP-030414-2	Total Metals	Copper	3	3	1	µg/L	0
YB34	MW-17S-030414/DUP-030414-1	Total Metals	Arsenic	70	62	1	µg/L	12
YB34	MW-43S-0310414/DUP-030414-2	Dissolved Metals	Arsenic	68	68	1	µg/L	0
YB34	MW-17S-030414/DUP-030414-1	Dissolved Metals	Arsenic	64	61	1	µg/L	4.8
YB90	MW-14S-030714/DUP-030714-1	Total Metals	Arsenic	949	1020	2	µg/L	7.2
YB90	MW-14S-030714/DUP-030714-1	Total Metals	Copper	14	15	2	µg/L	6.9
YB90	MW-14S-030714/DUP-030714-1	Total Metals	Zinc	10	20	10	µg/L	67
YB90	MW-14S-030714/DUP-030714-1	Dissolved Metals	Arsenic	1220	1420	2	µg/L	15

Data packages reviewed: YB16, YB34, YB44, YB56, YB90, YC07, YC37, YC52, YC77, YC92

Key:

RPD = Relative percent difference

SVOC-SIM = Semivolatile organic compounds - Selected Ion Monitoring; Method 8270D

Total metals = Method 6010C

Dissolved metals = Method 6010 C

µg/L = Micrograms per liter

Table 4
Calibration Verification Recoveries Outside of Acceptable Limits
Spring 2014 Groundwater Samples, Collected 03-14 March 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	CCV ID	Analysis	Compound	CCV Recovery	CCV Limit	Associated Samples	Reported Concentration	Units	ERM Qualifier
YB16	CCV-030714	SVOC	4-Nitrophenol	27.0	20	NA	--	--	--
YB34	CCV-031214	VOC	Chloromethane	-29.2	20	See below	--	--	--
YB34	CCV-031214	--	--	--	--	MW-17S-030414	< 0.50	µg/L	UJ
YB34	CCV-031214	--	--	--	--	DUP-030414-1	< 0.50	µg/L	UJ
YB34	CCV-031214	VOC	Acrolein	-21.4	20	See below	--	--	--
YB34	CCV-031214	--	--	--	--	MW-17S-030414	< 5.0	µg/L	UJ
YB34	CCV-031214	--	--	--	--	DUP-030414-1	< 5.0	µg/L	UJ
YB34	CCV-031214	VOC	Acrylonitrile	-22.6	20	See below	--	--	--
YB34	CCV-031214	--	--	--	--	MW-17S-030414	< 1.0	µg/L	UJ
YB34	CCV-031214	--	--	--	--	DUP-030414-1	< 1.0	µg/L	UJ
YB34	CCV-031214	VOC	Vinyl Acetate	-23.0	20	See below	--	--	--
YB34	CCV-031214	--	--	--	--	MW-17S-030414	< 0.20	µg/L	UJ
YB34	CCV-031214	--	--	--	--	DUP-030414-1	< 0.20	µg/L	UJ
YB34	CCV-031214	VOC	1,1,1-Trichloroethane	-21.6	20	See below	--	--	--
YB34	CCV-031214	--	--	--	--	MW-17S-030414	< 0.20	µg/L	UJ
YB34	CCV-031214	--	--	--	--	DUP-030414-1	< 0.20	µg/L	UJ
YB34	CCV-031214	VOC	Carbon tetrachloride	-21.6	20	See below	--	--	--
YB34	CCV-031214	--	--	--	--	MW-17S-030414	< 0.20	µg/L	UJ
YB34	CCV-031214	--	--	--	--	DUP-030414-1	< 0.20	µg/L	UJ
YB34	CCV-031114	SVOC	4-Nitrophenol	34.4	20	NA	--	--	--
YB90	CCV-031114	VOC	Acetone	25.3	20	See below	--	--	--
YB90	CCV-031114	--	--	--	--	MW-34S-030714	2.8	µg/L	J
YB90	CCV-031114	VOC	Naphthalene	21.1	20	NA	--	--	--
YC77	CCV-032514	SVOC	2,4-Dinitrophenol	31.3	20	NA	--	--	--

Table 4
Calibration Verification Recoveries Outside of Acceptable Limits
Spring 2014 Groundwater Samples, Collected 03-14 March 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	CCV ID	Analysis	Compound	CCV Recovery	CCV Limit	Associated Samples	Reported Concentration	Units	ERM Qualifier
YC77	CCV-032514	SVOC	4-Nitrophenol	39.3	20	NA	--	--	--
YC92	CCV-032414	SVOC	4-Chloroaniline	23.1	20	NA	--	--	--
YC92	CCV-032414	SVOC	2-Nitroaniline	20.2	20	NA	--	--	--
YC92	CCV-032414	SVOC	3-Nitroaniline	35.1	20	NA	--	--	--
YC92	CCV-032414	SVOC	4-Nitrophenol	45.3	20	NA	--	--	--
YC92	CCV-032414	SVOC	4-Nitroaniline	42.4	20	NA	--	--	--
YC92	CCV-032414	SVOC	3,3'-Dichlorobenzidine	26.7	20	NA	--	--	--

Data packages reviewed: YB16, YB34, YB44, YB56, YB90, YC07, YC37, YC52, YC77, YC92

Key:

CCV = Continuing calibration verification

SVOC = Semivolatile organic compounds; Method 8270D

VOC = Volatile organic compounds; Method 8260C

UJ = Nondetected sample result qualified as estimated

J = Detected sample result qualified as estimated

µg/L = Micrograms per liter

Table 5
Calibration Range Exceedances
Spring 2014 Groundwater Samples, Collected 03-14 March 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Method	Compound	Reported Concentration	Units	ERM Qualifier	Notes
YB90	MW-13S-030714	PCP	Pentachlorophenol	320 E	µg/L	J	Exceeds calibration range; see dilution data
YC37	MW-45S-031114	PCP	Pentachlorophenol	530 E	µg/L	J	Exceeds calibration range; see dilution data

Data packages reviewed: YB16, YB34, YB44, YB56, YB90, YC07, YC37, YC52, YC77, YC92

Key:

PCP = Pentachlorophenol; Method SW8041

E = Undiluted sample concentration exceeded calibration range; use result of dilution/reanalysis for decision-making purposes

µg/L = Micrograms per liter

J = Detected sample result qualified as estimated

Memorandum

Environmental Resources Management

To: Mike Mendes

From: Irene Lavigne

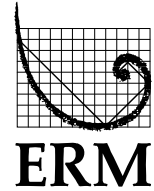
Date: 01 May 2014
Revised 06 May 2014 to include additional sample

Subject: Data Review of Reichhold-Glacier Groundwater
Samples Collected March 2014

Project Number: 0232280

Data Packages: AXYS Analytical Services Data Packages
DPWG47076, Analysis WG46793
DPWG47125, Analysis WG46890
DPWG47252, Analysis WG47003

2875 Michelle Drive
Suite 200
Irvine, CA 92606
(949) 623-4700
(949) 623-2940 (fax)



The data quality was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999 and the *EPA Region 10 SOP for the Validation of Polychlorinated Dibenzodioxin (PCDD) and Polychlorinated Dibenzofuran (PCDF) Data*, January 1996.

HOLDING TIME AND PRESERVATION EVALUATION

The sample shipments were received at the laboratory within the method-prescribed preservation requirements. The samples were prepared and analyzed within the method-prescribed time period from the date of collection. No sample data were qualified based on sample preservation or holding-time exceedances.

BLANK EVALUATION

The lab blank sample results were nondetected for each of the target analytes with limited exceptions. Detections of dioxin/furan compounds in three lab blanks resulted in the qualification of 31 associated sample results as nondetected (U). Additional blank detections did not result in qualified data because either the field sample concentrations exceeded five times the blank concentrations for the corresponding compounds, the associated samples were nondetected, or the detected dioxin/furan compounds had been identified as estimated maximum possible concentrations. The blank detections are presented in Table 1.

MATRIX SPIKE EVALUATION

The matrix spike (MS) and matrix spike duplicate recoveries were within the laboratory's limits of acceptance. No sample data were qualified based on the MS evaluation.

LABELED COMPOUND EVALUATION

Carbon-13 labeled isotope recoveries were reported for each sample submitted for dioxin/furan analysis. The recoveries of labeled PCDD and PCDF compounds is a measure of the effectiveness of the laboratory and method to extract the compounds of interest. All of the labeled compounds were within acceptable limits. No qualifiers were applied to the data as a result of the labeled compound evaluation.

ESTIMATED MAXIMUM POSSIBLE CONCENTRATION

The laboratory identified several dioxin/furan results as estimated maximum possible concentrations (EMPC). An EMPC value is the maximum possible concentration of a compound that could be present in the sample. This classification is used when all of the identification criteria for a given dioxin or furan compound are not met. The sample data identified as EMPC by the laboratory were qualified as nondetected (U), and are listed in Table 2.

FIELD DUPLICATE EVALUATION

One sample was collected and analyzed in duplicate. ERM calculated the relative percent difference (RPD) between detected results. The USEPA has not established control criteria for field duplicate samples; therefore, sample data are not qualified on the basis of field duplicate imprecision. Detected duplicate results and calculated RPDs are listed in Table 3.

OVERALL ASSESSMENT

No data were determined to be unusable. All of the data, including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents.

Table 1
Blank and Associated Suspect Sample Detections
January - March 2014 Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG47076	Lab Blank 032414	PCDD/PCDF	See below	1,2,3,4,6,7,8-HPCDD	0.949	0.500	pg/L	--
DPWG47076	--	--	MW-17S-030414	1,2,3,4,6,7,8-HPCDD	2.52	0.595	pg/L	2.52 U
DPWG47076	--	--	DUP-030414-1	1,2,3,4,6,7,8-HPCDD	2.50	0.572	pg/L	2.50 U
DPWG47076	Lab Blank 032414	PCDD/PCDF	NA	OCDD	2.14	0.500	pg/L	--
DPWG47076	Lab Blank 032414	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDF	0.665	0.500	pg/L	EMPC
DPWG47076	Lab Blank 032414	PCDD/PCDF	See below	OCDF	0.770	0.500	pg/L	--
DPWG47076	--	--	MW-17S-030414	OCDF	1.51	0.595	pg/L	1.51 U
DPWG47076	Lab Blank 032414	PCDD/PCDF	See below	TOTAL HEPTA-DIOXINS	1.57	0.500	pg/L	--
DPWG47076	--	--	MW-17S-030414	TOTAL HEPTA-DIOXINS	2.52	0.595	pg/L	2.52 U
DPWG47076	--	--	DUP-030414-1	TOTAL HEPTA-DIOXINS	4.30	0.572	pg/L	4.30 U
DPWG47076	--	--	DUP-030414-2	TOTAL HEPTA-DIOXINS	5.77	0.581	pg/L	5.77 U
DPWG47125	Lab Blank 032714	PCDD/PCDF	See below	1,2,3,4,6,7,8-HPCDD	1.45	0.658	pg/L	--
DPWG47125	--	--	MW-17S-030414P	1,2,3,4,6,7,8-HPCDD	4.36	0.537	pg/L	4.36 U
DPWG47125	--	--	MW-45S-031114	1,2,3,4,6,7,8-HPCDD	4.47	0.566	pg/L	4.47 U
DPWG47125	--	--	MW-2D-031314	1,2,3,4,6,7,8-HPCDD	3.42	0.577	pg/L	3.42 U
DPWG47125	--	--	MW-2D-031314 P	1,2,3,4,6,7,8-HPCDD	2.63	0.571	pg/L	2.63 U
DPWG47125	Lab Blank 032714	PCDD/PCDF	NA	OCDD	3.30	1.08	pg/L	EMPC
DPWG47125	Lab Blank 032714	PCDD/PCDF	NA	2,3,7,8-TCDF	1.06	0.500	pg/L	EMPC
DPWG47125	Lab Blank 032714	PCDD/PCDF	NA	2,3,7,8-TCDF	0.508	0.500	pg/L	--

Table 1
Blank and Associated Suspect Sample Detections
January - March 2014 Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG47125	Lab Blank 032714	PCDD/PCDF	See below	1,2,3,7,8-PECDF	0.720	0.500	pg/L	--
DPWG47125	--	--	MW-17S-030414P	1,2,3,7,8-PECDF	0.715	0.537	pg/L	0.715 U
DPWG47125	--	--	MW-2S-030514	1,2,3,7,8-PECDF	0.987	0.563	pg/L	0.987 U
DPWG47125	--	--	MW-3D-031014	1,2,3,7,8-PECDF	1.22	0.584	pg/L	1.22 U
DPWG47125	--	--	MW-2D-031314 P	1,2,3,7,8-PECDF	0.779	0.571	pg/L	0.779 U
DPWG47125	Lab Blank 032714	PCDD/PCDF	See below	2,3,4,7,8-PECDF	0.786	0.500	pg/L	--
DPWG47125	--	--	MW-17S-030414P	2,3,4,7,8-PECDF	0.901	0.537	pg/L	0.901 U
DPWG47125	--	--	MW-2S-030514	2,3,4,7,8-PECDF	2.12	0.563	pg/L	2.12 U
DPWG47125	--	--	MW-3D-031014	2,3,4,7,8-PECDF	1.11	0.584	pg/L	1.11 U
DPWG47125	--	--	MW-45S-031114	2,3,4,7,8-PECDF	1.07	0.744	pg/L	1.07 U
DPWG47125	--	--	MW-2D-031314	2,3,4,7,8-PECDF	0.871	0.575	pg/L	0.871 U
DPWG47125	--	--	MW-2D-031314 P	2,3,4,7,8-PECDF	0.978	0.571	pg/L	0.978 U
DPWG47125	Lab Blank 032714	PCDD/PCDF	NA	1,2,3,4,7,8-HXCDF	1.33	0.624	pg/L	EMPC
DPWG47125	Lab Blank 032714	PCDD/PCDF	NA	1,2,3,6,7,8-HXCDF	0.630	0.624	pg/L	EMPC
DPWG47125	Lab Blank 032714	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDF	2.91	0.615	pg/L	EMPC
DPWG47125	Lab Blank 032714	PCDD/PCDF	NA	1,2,3,4,7,8,9-HPCDF	1.10	0.615	pg/L	EMPC
DPWG47125	Lab Blank 032714	PCDD/PCDF	NA	OCDF	4.15	0.889	pg/L	EMPC
DPWG47125	Lab Blank 032714	PCDD/PCDF	See below	TOTAL HEPTA-DIOXINS	1.45	0.658	pg/L	--
DPWG47125	--	--	MW-2D-031314	TOTAL HEPTA-DIOXINS	6.72	0.577	pg/L	6.72 U
DPWG47125	--	--	MW-2D-031314 P	TOTAL HEPTA-DIOXINS	6.06	0.571	pg/L	6.06 U
DPWG47125	Lab Blank 032714	PCDD/PCDF	See below	TOTAL PENTA-FURANS	7.46	0.500	pg/L	--

Table 1
Blank and Associated Suspect Sample Detections
January - March 2014 Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG47125	--	--	MW-17S-030414P	TOTAL PENTA-FURANS	10.1	0.537	pg/L	10.1 U
DPWG47125	--	--	MW-2S-030514	TOTAL PENTA-FURANS	19.7	0.563	pg/L	19.7 U
DPWG47125	--	--	MW-3D-031014	TOTAL PENTA-FURANS	13.0	0.584	pg/L	13.0 U
DPWG47125	--	--	MW-45S-031114	TOTAL PENTA-FURANS	10.2	0.744	pg/L	10.2 U
DPWG47125	--	--	MW-2D-031314	TOTAL PENTA-FURANS	8.01	0.575	pg/L	8.01 U
DPWG47125	--	--	MW-2D-031314 P	TOTAL PENTA-FURANS	12.0	0.571	pg/L	12.0 U
DPWG47125	Lab Blank 032714	PCDD/PCDF	See below	TOTAL HEXA-FURANS	2.21	0.624	pg/L	--
DPWG47125	--	--	MW-2D-031314	TOTAL HEXA-FURANS	10.8	0.556	pg/L	10.8 U
DPWG47252	Lab Blank 040314	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDD	0.904	0.500	pg/L	--
DPWG47252	Lab Blank 040314	PCDD/PCDF	See below	OCDD	2.94	0.500	pg/L	--
DPWG47252	--	--	MW-45D-032614	OCDD	8.66	0.568	pg/L	8.66 U
DPWG47252	Lab Blank 040314	PCDD/PCDF	NA	OCDF	0.687	0.500	pg/L	EMPC
DPWG47252	Lab Blank 040314	PCDD/PCDF	See below	TOTAL HEPTA-DIOXINS	0.904	0.500	pg/L	--
DPWG47252	--	--	MW-45D-032614	TOTAL HEPTA-DIOXINS	1.50	0.568	pg/L	1.50 U

Data packages reviewed: DPWG47076/WG46793, DPWG47125/WG46890, DPWG47252/WG47003

Key:

NA = Not applicable; qualification of sample data not required

HPCDD = Heptachlorodibenzo-p-dioxin

OCDD = Octochlorodibenzo-p-dioxin

HXCDF = Hexachlorodibenzofuran

HPCDF = Heptachlorodibenzofuran

PCDD/PCDF = Polychlorinated dibenzo-p-dioxins/Polychlorinated dibenzofurans; Method 1613B

EMPC = Blank result identified as Estimated Maximum Possible Concentration; qualification of sample data not required

OCDF = Octochlorodibenzofuran

TCDD = Tetrachlorodibenzo-p-dioxin

PECDF = Pentachlorodibenzofuran

PECDD = Pentachlorodibenzo-p-dioxin

pg/g = Picograms per gram

U = Nondetected

Table 2
Estimated Maximum Possible Concentration
January - March 2014 Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG47076	DUP-030414-1	OCDF	0.780	0.572	pg/L	0.780 U
DPWG47076	MW-43S-030414	2,3,7,8-TCDD	0.707	0.612	pg/L	0.707 U
DPWG47076	MW-43S-030414	1,2,3,7,8-PECDD	0.621	0.612	pg/L	0.621 U
DPWG47076	MW-43S-030414	1,2,3,4,7,8-HXCDD	0.814	0.612	pg/L	0.814 U
DPWG47076	MW-43S-030414	2,3,4,7,8-PECDF	0.926	0.612	pg/L	0.926 U
DPWG47076	MW-43S-030414	2,3,4,6,7,8-HXCDF	1.10	0.612	pg/L	1.10 U
DPWG47076	DUP-030414-2	1,2,3,4,6,7,8-HPCDD	8.01	0.584	pg/L	8.01 U
DPWG47076	DUP-030414-2	2,3,7,8-TCDF	0.747	0.584	pg/L	0.747 U
DPWG47076	DUP-030414-2	1,2,3,7,8-PECDF	1.02	0.654	pg/L	1.02 U
DPWG47076	DUP-030414-2	1,2,3,4,7,8-HXCDF	1.13	0.581	pg/L	1.13 U
DPWG47076	DUP-030414-2	1,2,3,7,8,9-HXCDF	0.741	0.581	pg/L	0.741 U
DPWG47076	DUP-030414-2	1,2,3,4,6,7,8-HPCDF	2.10	0.581	pg/L	2.10 U
DPWG47076	DUP-030414-2	1,2,3,4,7,8,9-HPCDF	0.706	0.581	pg/L	0.706 U
DPWG47076	DUP-030414-2	OCDF	3.36	0.581	pg/L	3.36 U
DPWG47076	MW-2S-030514P	2,3,7,8-TCDD	0.614	0.553	pg/L	0.614 U
DPWG47076	MW-2S-030514P	1,2,3,7,8,9-HXCDD	1.06	0.553	pg/L	1.06 U
DPWG47076	MW-33S-030614	1,2,3,6,7,8-HXCDF	0.687	0.582	pg/L	0.687 U
DPWG47076	MW-33S-030614	1,2,3,4,7,8,9-HPCDF	1.51	0.582	pg/L	1.51 U
DPWG47125	MW-2S-030514	2,3,7,8-TCDD	0.862	0.563	pg/L	0.862 U
DPWG47125	MW-3D-031014	2,3,7,8-TCDF	1.33	0.565	pg/L	1.33 U
DPWG47125	MW-45S-031114	2,3,7,8-TCDF	1.01	0.566	pg/L	1.01 U
DPWG47125	MW-2D-031314	2,3,7,8-TCDF	0.843	0.556	pg/L	0.843 U
DPWG47125	MW-2D-031314P	2,3,7,8-TCDF	1.19	0.571	pg/L	1.19 U
DPWG47252	MW-35D-032614	1,2,3,4,6,7,8-HPCDF	2.21	0.525	pg/L	2.21 U
DPWG47252	MW-45D-032614	1,2,3,4,6,7,8-HPCDD	2.14	0.568	pg/L	2.14 U
DPWG47252	MW-45D-032614	1,2,3,4,6,7,8-HPCDF	0.743	0.568	pg/L	0.743 U
DPWG47252	MW-45D-032614	OCDF	0.836	0.568	pg/L	0.836 U
DPWG47252	MW-26S-032614	1,2,3,4,6,7,8-HPCDF	1.68	0.560	pg/L	1.68 U
DPWG47252	MW-2S-032614	1,2,3,6,7,8-HXCDD	1.30	0.559	pg/L	1.30 U
DPWG47252	MW-2S-032614 P	2,3,4,7,8-PECDF	0.740	0.560	pg/L	0.740 U

Data packages reviewed: DPWG47076/WG46793, DPWG47125/WG46890, DPWG47252/WG47003

Key:

TCDD = Tetrachlorodibenzo-p-dioxin
 HXCDF = Hexachlorodibenzofuran
 PECDF = Pentachlorodibenzofuran
 HPCDF = Heptachlorodibenzofuran
 PECDD = Pentachlorodibenzo-p-dioxin
 HXCDD = Hexachlorodibenzo-p-dioxin

OCDF = Octochlorodibenzofuran
 HPCDD = Heptachlorodibenzo-p-dioxin
 TCDF = Tetrachlorodibenzofuran
 pg/g = Picograms per gram
 U = Nondetected

Table 3
Field Duplicate Results and Calculated Relative Percent Differences
January - March 2014 Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/ Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
DPWG47076	MW-17S-030414/ DUP-030414-1	PCDD/PCDF	1,2,3,4,6,7,8-HPCDD	2.52	2.50	0.595/0.572	pg/g	0.8
DPWG47076	MW-17S-030414/ DUP-030414-1	PCDD/PCDF	OCDD	120	18.3	0.595/0.572	pg/g	147
DPWG47076	MW-17S-030414/ DUP-030414-1	PCDD/PCDF	1,2,3,4,6,7,8-HPCDF	0.859	1.06	0.595/0.572	pg/g	21
DPWG47076	MW-17S-030414/ DUP-030414-1	PCDD/PCDF	TOTAL HEPTA-DIOXINS	2.52	4.30	0.595/0.572	pg/g	52
DPWG47076	MW-17S-030414/ DUP-030414-1	PCDD/PCDF	TOTAL HEPTA-FURANS	1.63	1.06	0.595/0.572	pg/g	42
DPWG47076	MW-43S-030414/ DUP-030414-2	PCDD/PCDF	1,2,3,6,7,8-HXCDD	1.15	0.652	0.612/0.581	pg/g	55
DPWG47076	MW-43S-030414/ DUP-030414-2	PCDD/PCDF	1,2,3,7,8,9-HXCDD	1.08	0.594	0.612/0.581	pg/g	58
DPWG47076	MW-43S-030414/ DUP-030414-2	PCDD/PCDF	OCDD	196	177	0.612/0.645	pg/g	10
DPWG47076	MW-43S-030414/ DUP-030414-2	PCDD/PCDF	TOTAL HEXA-DIOXINS	2.23	1.25	0.612/0.581	pg/g	56
DPWG47076	MW-43S-030414/ DUP-030414-2	PCDD/PCDF	TOTAL HEPTA-DIOXINS	9.89	5.77	0.612/0.581	pg/g	53

Data packages reviewed: DPWG47076/WG46793, DPWG47125/WG46890, DPWG47252/WG47003

Key:

RPD = Relative percent difference

PECDD = Pentachlorodibenzo-p-dioxin

HXCDD = Hexachlorodibenzo-p-dioxin

HPCDD = Heptachlorodibenzo-p-dioxin

OCDD = Octochlorodibenzo-p-dioxin

TCDF = Tetrachlorodibenzofuran

PCDD/PCDF = Polychlorinated dibenzo-p-dioxins/Polychlorinated dibenzofurans; Method 1613B

PECDF = Pentachlorodibenzofuran

HXCDF = Hexachlorodibenzofuran

HPCDF = Heptachlorodibenzofuran

OCDF = Octochlorodibenzofuran

pg/g = Picograms per gram

Memorandum

**Environmental
Resources
Management**

To: Mike Mendes

From: Irene Lavigne

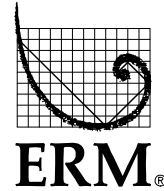
Date: 17 April 2014

Subject: Data Review of Reichhold-Glacier Spring 2014
Groundwater Samples Collected 26 March 2014

Project Number: 0232280

Data Package: Analytical Resources, Incorporated Data Package
YE46

2875 Michelle Drive
Suite 200
Irvine, CA 92606
(949) 623-4700
(949) 623-2940 (fax)



The data quality was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999, *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004.

HOLDING TIME AND PRESERVATION EVALUATION

The sample shipment was received at the laboratory within the method-prescribed preservation requirements. The samples were prepared and analyzed within the method-prescribed time period from the date of collection. No sample data were qualified based on sample preservation or holding-time exceedances.

BLANK EVALUATION

The method blank sample results were nondetected for each of the target analytes. No sample data were qualified based on the blank evaluation. The blank results indicate that no contaminants were introduced to the samples during the laboratory preparation and analysis procedures.

BLANK SPIKE EVALUATION

The laboratory control sample (LCS) and laboratory control sample duplicate recoveries were within the laboratory's limits of acceptance. No sample data were qualified on the basis of LCS recoveries. The LCS results indicate acceptable laboratory accuracy and precision.

MATRIX SPIKE EVALUATION

The matrix spike (MS) and f matrix spike duplicate recoveries were within the laboratory's limits of acceptance. Sample data were not qualified based on the MS evaluation.

SURROGATE EVALUATION

The surrogate recoveries were within acceptable limits with one exception. No sample data were qualified based on the surrogate recovery outlier because only one surrogate for the acid compounds exceeded control limits, while all other acid-compound surrogates were within control limits. The outlying surrogate recover is shown in Table 1.

REPLICATE EVALUATION

The laboratory prepared and analyzed several samples as replicates. The RPD for the replicate results was within acceptable limits (<20%). Sample data were not qualified based on the replicate results.

CONTINUING CALIBRATION EVALUATION

The laboratory noted that a continuing calibration verification (CCV) recovery for 2,3,4,6-tetrachlorophenol did not meet acceptable control limits. This CCV outlier did not warrant qualification of associated sample data because the recovery was biased high and the samples were nondetected for this compound. Outlying recoveries for compounds that were not target analytes were not included in the table. The CCV outlier is presented in Table 2.

OVERALL ASSESSMENT

No data were determined to be unusable or required qualification. All of the data can be used for decision-making purposes. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents.

Table 1
Surrogate Recovery Results Outside of Acceptable Limits
Spring 2014 Groundwater Samples, Collected 26 March 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Method	Surrogate	Recovery (%)	Limit (%)	ERM Qualifier
YE46	MW-2S-032612	SVOC	d4-2-Chlorophenol	40.5	41-20	--

Data package reviewed: YE46

Key:

SVOC = Semivolatile organic compounds; Method 8270D

Table 2
Calibration Verification Recoveries Outside of Acceptable Limits
Spring 2014 Groundwater Samples, Collected 26 March 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	CCV ID	Analysis	Compound	CCV Recovery	CCV Limit	Associated Samples	Reported Concentration	Units	ERM Qualifier
YE46	CCV-040414	SVOC	2,3,4,6-Tetrachlorophenol	20.1	20	NA	--	--	--

Data package reviewed: YE46

Key:

CCV = Continuing calibration verification

SVOC = Semivolatile organic compounds; Method 8270D

Memorandum

Environmental Resources Management

To: Mike Mendes

From: Irene Lavigne

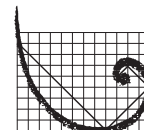
Date: 11 November 2014

Subject: Data Review of Glacier Northwest, Inc. - Reichhold, Inc.
Site Groundwater Samples Collected August 2014

Project Number: 0232280.12

Data Packages: Analytical Resources, Incorporated Data Packages
YX74, YX88, YX90, YX98, YY05, YY17, YY39, ZA64

2875 Michelle Drive
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(949) 623-2940 (fax)



ERM®

The data quality was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999, *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004.

HOLDING TIME AND PRESERVATION EVALUATION

The sample shipments were received at the laboratory within the method-prescribed preservation requirements. Sample data were not qualified based on the preservation evaluation.

The samples were prepared and analyzed within the method-prescribed time period from the date of collection with one exception. The laboratory noted that a sample login error resulted in the extraction of one sample submitted for polynuclear aromatic hydrocarbon (PAH) analysis outside of the 7-day extraction time for this analysis. The nondetected sample results were qualified as estimated (UJ) for this analysis, as shown in Table 1.

BLANK EVALUATION

The method blank sample results were nondetected for each of the target analytes with one exception. A detection of 1-methylnaphthalene was found in a method blank; however, associated sample data were not qualified based on this blank detection because the associated sample results were nondetected. The blank detection is presented in Table 2.

BLANK SPIKE EVALUATION

The laboratory control sample (LCS) and laboratory control sample duplicate recoveries were within the laboratory's limits of acceptance. No sample data were qualified based on the LCS evaluation. The LCS recoveries indicate acceptable laboratory accuracy and precision.

MATRIX SPIKE EVALUATION

The matrix spike (MS) and matrix spike duplicate (MSD) recoveries were within the laboratory's limits of acceptance with a number of exceptions. Recoveries for hexavalent chromium in three MS samples were reported at 0%. These recoveries suggest matrix interference in associated samples. There was no indication that the laboratory performed post spikes to verify the low recoveries. Nine of ten field sample results associated with these low spike recoveries were nondetected for Cr VI; however, due to the MS/MSD recoveries and possible matrix interference, these nondetected data were qualified as rejected (R), and may not be used for decision-making purposes. The one detected Cr VI result was qualified as estimated (J). Historical data for sample MW-1S, previously sampled in 2011 and 2012, were nondetected for Cr VI, with no indication of matrix interference and no qualifiers applied to the data.

An additional MS outliers for phosphorus, arsenic, and Cr VI resulted in qualification of sample data as estimated, "J" or "UJ", for detected or nondetected sample results, respectively. The outlying MS recoveries and qualified sample data are presented in Table 3.

SURROGATE EVALUATION

The surrogate recoveries were within acceptable limits, and no sample data required qualification as a result of the surrogate evaluation. The surrogate recoveries indicate minimal matrix interference in the samples.

FIELD DUPLICATE EVALUATION

Several samples were collected and analyzed in duplicate. ERM calculated the relative percent difference (RPD) between detected results. The USEPA has not established control criteria for field duplicate samples; therefore, sample data are not qualified on the basis of field duplicate imprecision. Detected duplicate results and calculated RPDs are presented in Table 4.

REPLICATE EVALUATION

The laboratory prepared and analyzed several samples as replicates. The RPD for the replicate results was within acceptable limits (<20%). Sample data were not qualified based on the replicate results.

CONTINUING CALIBRATION EVALUATION

The laboratory noted that several continuing calibration verification (CCV) recoveries for various compounds did not meet acceptable control limits. Nondetected sample results for benzoic acid and 2,4-dinitrophenol were qualified as estimated (UJ) due to low CCV recoveries for these compounds. Additional outlying CCV recoveries did not warrant qualification of sample data because the recoveries were biased high and the results were nondetected. Outlying recoveries for compounds that were not target analytes were not included in the table. The CCV outliers and associated, qualified data are shown in Table 5.

CALIBRATION RANGE EVALUATION

The laboratory noted two instances where the sample results exceeded the calibration range of the equipment for pentachlorophenol. These two sample results were qualified as estimated (J). The laboratory diluted and reanalyzed the affected samples. The sample results from the dilutions should be used for decision-making purposes. The samples with calibration range exceedances are presented in Table 6.

OVERALL ASSESSMENT

Nine nondetected hexavalent chromium results were rejected due to significant matrix interferences. These hexavalent chromium results cannot be used for decision-making purposes.

The remaining data; including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation, with the exception of the rejected data, is acceptable for the preparation of technically-defensible documents.

Table 1
Samples with Exceeded Holding Times
Groundwater Samples Collected August 2014
Glacier Northwest, Inc. - Reichhold, Inc. Site
Seattle, Washington

Lab Package	Sample ID	Method	Holding Time (days)	Days Exceeded	ERM Qualifier
ZA64	MW-38D-082914	PAH-SIM	7/40	13 (extraction)	UJ

Data packages reviewed: YX74, YX88, YX90, YX98, YY05, YY17, YY39, ZA64

Key:

7/40 = 7 days to extraction/40 days to analysis

PAH-SIM = Polynuclear aromatic hydrocarbon - selected ion monitoring; Method 8270

UJ = Nondetected sample result qualified as estimated

Table 2
Blank and Associated Suspect Sample Detections
Groundwater Samples Collected August 2014
Glacier Northwest, Inc. - Reichhold, Inc. Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
YY17	MB-090314	PAH-SIM	NA	1-Methylnaphthalene	0.07	0.10	µg/L	--

Data packages reviewed: YX74, YX88, YX90, YX98, YY05, YY17, YY39, ZA64

Key:

MB = Method blank

PAH-SIM = Polynuclear aromatic hydrocarbon - selected ion monitoring; Method 8270

NA = Not applicable; qualification of sample data not required

µg/L = Micrograms per liter

Table 3
Matrix Spike Recoveries Outside of Acceptable Limits
Groundwater Samples Collected August 2014
Glacier Northwest, Inc. - Reichhold, Inc. Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
YX74	MW-3S-082514 MS/MSD	Cr VI	See below	Chromium, hexavalent	19.0	75-125	--	--	--	--
YX74	--	--	MW-3S-082514	Chromium, hexavalent	--	--	--	--	< 0.010	UJ
YX74	--	--	MW-26S-082514-P	Chromium, hexavalent	--	--	--	--	< 0.010	UJ
YX74	--	--	MW-5S-082514	Chromium, hexavalent	--	--	--	--	< 0.010	UJ
YX74	--	--	MW-12S-082514	Chromium, hexavalent	--	--	--	--	< 0.010	UJ
YX74	MW-3S-082514 MS/MSD	General Chemistry	See below	Phosphorus, total	65.0	75-125	--	--	--	--
YX74	--	--	MW-3S-082514	Phosphorus, total	--	--	--	--	2.49	J
YX74	--	--	MW-43S-082514-P	Phosphorus, total	--	--	--	--	1.29	J
YX74	--	--	MW-43D-082514	Phosphorus, total	--	--	--	--	1.02	J
YX88	MW-1S-082614-P MS/MSD	Dissolved Metals	See below	Arsenic	141	75-125	--	--	--	--
YX88	--	--	MW-1S-082614-P	Arsenic	--	--	--	--	3.6	J
YX88	--	--	MW-1D-082614	Arsenic	--	--	--	--	6.4	J
YX88	--	--	MW-21S-082614	Arsenic	--	--	--	--	3660	J
YX88	--	--	MW-33S-082614-P	Arsenic	--	--	--	--	22.0	J
YX88	--	--	DUP-082614-03	Arsenic	--	--	--	--	20.8	J
YX88	--	--	MW-45D-082614-P	Arsenic	--	--	--	--	55.1	J
YX88	--	--	MW-17S-082614-P	Arsenic	--	--	--	--	96.0	J
YX88	MW-1S-082614-P MS/MSD	Cr VI	See below	Chromium, hexavalent	0	75-125	--	--	--	--
YX88	--	--	MW-1S-082614-P	Chromium, hexavalent	--	--	--	--	< 0.010	R
YX88	--	--	MW-1D-082614	Chromium, hexavalent	--	--	--	--	< 0.010	R
YX88	--	--	MW-30S-082614	Chromium, hexavalent	--	--	--	--	0.011	J
YX88	--	--	DUP-082614-01	Chromium, hexavalent	--	--	--	--	< 0.010	R

Table 3
Matrix Spike Recoveries Outside of Acceptable Limits
Groundwater Samples Collected August 2014
Glacier Northwest, Inc. - Reichhold, Inc. Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
YX90	MW-45S-082614-P MS	Total Metals	NA	Arsenic	145	75-125	--	--	4X	--
YX90	MW-45S-082614-P MS	Dissolved Metals	NA	Sodium	134	75-125	--	--	4X	--
YX98	MW-2S-082714-P MS	Dissolved Metals	NA	Arsenic	224	75-125	--	--	4X	--
YY05	MW-35S-082714-P MS	Cr VI	See below	Chromium, hexavalent	0	75-125	--	--	--	--
YY05	--	--	MW-35S-082714-P	Chromium, hexavalent	--	--	--	--	< 0.10	R
YY05	--	--	MW-35D-082714-P	Chromium, hexavalent	--	--	--	--	< 0.10	R
YY05	--	--	MW-34S-082714	Chromium, hexavalent	--	--	--	--	< 0.10	R
YY17	MW-4S-082814 MS/MSD	SVOC	NA	3,3'-Dichlorobenzidine	29.3/28.9	44-120	1.4	30	--	--
YY17	MW-4S-082814 MS	Cr VI	See below	Chromium, hexavalent	39.7	75-125	--	--	--	--
YY17	--	--	MW-31S-082814	Chromium, hexavalent	--	--	--	--	< 0.10	UJ
YY17	--	--	MW-4S-082814	Chromium, hexavalent	--	--	--	--	< 0.10	UJ
YY17	--	--	MW-31D-082814	Chromium, hexavalent	--	--	--	--	< 0.10	UJ
YY17	--	--	MW-3D-082814-P	Chromium, hexavalent	--	--	--	--	< 0.10	UJ
YY39	MW-14S-092914 MS	Cr VI	See below	Chromium, hexavalent	0	75-125	--	--	--	--
YY39	--	--	MW-14S-082914	Chromium, hexavalent	--	--	--	--	< 0.10	R
YY39	--	--	DUP-082914-01	Chromium, hexavalent	--	--	--	--	< 0.10	R

Table 3
Matrix Spike Recoveries Outside of Acceptable Limits
Groundwater Samples Collected August 2014
Glacier Northwest, Inc. - Reichhold, Inc. Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
YY39	--	--	MW-38D-082914	Chromium, hexavalent	--	--	--	--	< 0.10	R

Data packages reviewed: YX74, YX88, YX90, YX98, YY05, YY17, YY39, ZA64

Key:

RPD = Relative percent difference

MS/MSD = Matrix spike/matrix spike duplicate

Cr VI = Hexavalent chromium analysis; Method 3500Cr

Dissolved metals = Method 6010 C

Total metals = Method 6010C

SVOC = Semivolatile organic compounds; Method 8270D

NA = Not applicable; qualification of sample data not required

4X = Sample concentration exceeded four times amount spiked; no qualification required

J = Detected sample result qualified as estimated

UJ = Nondetected sample result qualified as estimated

R = Rejected

Table 4
Field Duplicate Results and Calculated Relative Percent Differences
Groundwater Samples Collected August 2014
Glacier Northwest, Inc. - Reichhold, Inc. Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
YX74	MW-43S-082514-P/DUP-082514-02	PAH-SIM	2-Methylnaphthalene	0.11	0.12	0.10	µg/L	8.7
YX74	MW-43S-082514-P/DUP-082514-02	PAH-SIM	1-Methylnaphthalene	0.16	0.15	0.10	µg/L	6.5
YX74	MW-43S-082514-P/DUP-082514-02	PAH-SIM	Phenanthrene	0.08	0.07	0.10	µg/L	13
YX74	MW-43S-082514-P/DUP-082514-02	Total Metals	Arsenic	72.1	73.2	0.2	µg/L	1.5
YX74	MW-43S-082514-P/DUP-082514-02	Dissolved Metals	Arsenic	72.0	75.0	0.2	µg/L	4.1
YX88	MW-33S-082614-P/DUP-082614-03	SVOC	Phenol	2.0	2.1	1.0	µg/L	4.9
YX88	MW-33S-082614-P/DUP-082614-03	Total Metals	Arsenic	21.1	21.2	0.2	µg/L	0.5
YX88	MW-33S-082614-P/DUP-082614-03	Total Metals	Copper	2	2	2	µg/L	0
YX88	MW-33S-082614-P/DUP-082614-03	Dissolved Metals	Arsenic	22.0	20.8	0.2	µg/L	5.6
YY39	MW-14S-082914/DUP-082914-01	Total Metals	Arsenic	84.8	79.6	0.2	µg/L	6.3
YY39	MW-14S-082914/DUP-082914-01	Dissolved Metals	Arsenic	81.4	79.6	0.2	µg/L	2.2

Data packages reviewed: YX74, YX88, YX90, YX98, YY05, YY17, YY39, ZA64

Key:

RPD = Relative percent difference

PAH-SIM = Polynuclear aromatic hydrocarbon - selected ion monitoring; Method 8270D

Total metals = Method 6010C

Dissolved metals = Method 6010 C

SVOC = Semivolatile organic compounds; Method 8270D

µg/L = Micrograms per liter

Table 5
Calibration Verification Recoveries Outside of Acceptable Limits
Groundwater Samples Collected August 2014
Glacier Northwest, Inc. - Reichhold, Inc. Site
Seattle, Washington

Lab Package	CCV ID	Analysis	Compound	CCV Recovery	CCV Limit	Associated Samples	Reported Concentration	Units	ERM Qualifier
YX98	CCV-090514	SVOC	4-Nitrophenol	21.7	20	NA	--	--	--
YY17	CCV-090514	SVOC	4-Nitrophenol	21.7	20	NA	--	--	--
YY17	CCV-090814	SVOC	Benzoic acid	-19.9	20	See below	--	--	--
YY17	--	--	Benzoic acid	--	--	MW-31S-082814	< 20	µg/L	UJ
YY17	--	--	Benzoic acid	--	--	MW-4S-082814	< 20	µg/L	UJ
YY17	--	--	Benzoic acid	--	--	MW-31D-082814	< 20	µg/L	UJ
YY17	CCV-090814	SVOC	2,4-Dinitrophenol	-24.1	20	See below	--	--	--
YY17	--	--	2,4-Dinitrophenol	--	--	MW-31S-082814	< 20	µg/L	UJ
YY17	--	--	2,4-Dinitrophenol	--	--	MW-4S-082814	< 20	µg/L	UJ
YY17	--	--	2,4-Dinitrophenol	--	--	MW-31D-082814	< 20	µg/L	UJ
YY39	CCV-090514	SVOC	4-Nitrophenol	21.7	20	NA	--	--	--

Data packages reviewed: YX74, YX88, YX90, YX98, YY05, YY17, YY39, ZA64

Key:

CCV = Continuing calibration verification

SVOC = Semivolatile organic compounds; Method 8270D

UJ = Nondetected sample result qualified as estimated

µg/L = Micrograms per liter

Table 6
Calibration Range Exceedances
Groundwater Samples Collected August 2014
Glacier Northwest, Inc. - Reichhold, Inc. Site
Seattle, Washington

Lab Package	Sample ID	Method	Compound	Reported Concentration	Units	ERM Qualifier	Notes
YX74	MW-13S-082514	PCP	Pentachlorophenol	7700	µg/L	J	Exceeds valid instrument calibration range; see dilution data
YX90	MW-45S-082614-P	PCP	Pentachlorophenol	1400	µg/L	J	Exceeds valid instrument calibration range; see dilution data

Data packages reviewed: YX74, YX88, YX90, YX98, YY05, YY17, YY39, ZA64

Key:

PCP = Pentachlorophenol; Method SW8041

E = Undiluted sample concentration exceeded calibration range; use result of dilution/reanalysis for decision-making purposes

µg/L = Micrograms per liter

J = Detected sample result qualified as estimated

Memorandum

**Environmental
Resources
Management**
2211 Rimland Drive
Suite 210
Bellingham, WA 98226
(360) 647-3900
(360) 647-3901 (fax)

To: Shira DeGrood

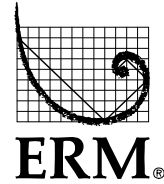
From: Keturah Witter

Date: 11 November 2014

Subject: Data Review of Glacier Northwest, Inc. - Reichhold, Inc.
Site Groundwater Samples Collected August 26, 2014
through August 28, 2014

Project Number: 0232280.12

Data Packages: AXYS Analytical Data Packages DPWG49040 and
DPWG49231



The quality of the data was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Chlorinated Dibenzo-p-Dioxins (CDDs) and Chlorinated Dibenzofurans (CDFs) Data Review*, September 2011.

HOLDING TIME AND PRESERVATION EVALUATION

The sample shipments were received at the laboratory within the method prescribed preservation requirements. The samples were prepared and analyzed within the method-prescribed time period from the date of collection. Two coolers arrived at the lab with temperatures of less than 2 degrees Celsius; however, no sample data were qualified due to lower sample temperatures. No sample data were qualified based on sample preservation or holding-time exceedances.

The lab noted one discrepancy between a sample ID on the chain-of-custody (COC) and the ID on the sample bottle. Sample DUP-082614-2-NP was recorded as DUP-082614-02 on the sample vial. The sample ID on the COC was used in the sample narrative and analysis results.

BLANK EVALUATION

The lab blank sample results were nondetected for each of the target analytes with limited exceptions. Detections of dioxin/furan compounds in three lab blanks resulted in the qualification of 25 associated sample results as nondetected (U). Additional blank detections did not result in qualified data because the field sample concentrations exceeded five times the blank

concentrations for the corresponding compounds, the associated samples were nondetected, or the detected dioxin/furan compounds had been identified as estimated maximum possible concentrations. The blank detections are presented in Table 1.

MATRIX SPIKE EVALUATION

The matrix spike (MS) and matrix spike duplicate recoveries were within the laboratory's limits of acceptance. No sample data were qualified based on the MS evaluation.

LABELLED COMPOUND EVALUATION

Carbon-13 labeled isotope recoveries were reported for each sample submitted for dioxin/furan analysis. The percent recoveries of labeled PCDD and PCDF compounds are a measure of the effectiveness of the laboratory and method to extract the compounds of interest. All of the labeled compounds were within acceptable limits with limited exceptions. Percent recoveries for one dioxin and furan surrogate were greater than their upper control limits. Sample data were non-detected for the associated compound and did not require qualification. The labelled compound outliers are presented in Table 2.

ONGOING PRECISION AND RECOVERY EVALUATION

The ongoing precision and recovery (OPR) recoveries were within the laboratory's limits of acceptance with limited exceptions. One OPR exceeded method control limits and associated sample data were qualified as estimated non-detect (UJ). The outlier and qualified sample data are presented in Table 3.

FIELD DUPLICATE EVALUATION

Two samples were submitted in duplicate. ERM calculated the relative percent difference (RPD) between detected results. The USEPA has not established control criteria for field duplicate samples; therefore, sample data are not qualified on the basis of field duplicate imprecision. The RPDs for detected results are presented in Table 4.

ESTIMATED MAXIMUM POSSIBLE CONCENTRATION

The laboratory identified a number of dioxin and furan results as estimated maximum possible concentrations (EMPC). An EMPC value is the maximum possible concentration of a compound that could be present in the sample. This classification is used when all of the identification criteria for a given dioxin or furan compound are not met. Sample data identified as EMPC by the laboratory were qualified as nondetected (U), as shown in Table 5.

2,3,7,8- TETRACHLORODIBENZOFURAN ELUTION RESULTS

One sample reported a detected concentration of 2,3,7,8-Tetrachlorodibenzofuran (TCDF) on the DB-5 gas chromatography (GC) column. Due to the toxicological concern with 2,3,7,8-TCDF and problems with separation from other closely eluting isomers on the DB-5 column, a second analysis was run on a DB-225 GC column for improved resolution. The 2,3,7,8-TCDF isomer on the DB-225 column was nondetected (U), as shown in Table 6.

OVERALL ASSESSMENT

No data required rejection. All of the data, including qualified data, can be used for decision-making purposes. The quality of the data generated during this investigation is acceptable for the preparation of technically defensible documents.

Table 1
Blank and Associated Suspect Sample Detections
August 2014 Groundwater Samples
Glacier Northwest, Inc. - Reichhold, Inc. Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG49040	Lab Blank WG48596-101	PCDD/PCDF	NA	2,3,7,8-TCDD	0.502	0.500	pg/L	EMPC
DPWG49040	Lab Blank WG48596-101	PCDD/PCDF	NA	1,2,3,6,7,8-HxCDD	0.555	0.500	pg/L	EMPC
DPWG49040	Lab Blank WG48596-101	PCDD/PCDF	NA	1,2,3,7,8,9-HxCDD	0.797	0.500	pg/L	--
DPWG49040	Lab Blank WG48596-101	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDD	0.944	0.500	pg/L	EMPC
DPWG49040	Lab Blank WG48596-101	PCDD/PCDF	NA	OCDD	3.09	0.500	pg/L	EMPC
DPWG49040	Lab Blank WG48596-101	PCDD/PCDF	NA	1,2,3,7,8,9-HxCDF	0.687	0.500	pg/L	--
DPWG49040	Lab Blank WG48596-101	PCDD/PCDF	See below	1,2,3,4,6,7,8-HPCDF	0.55	0.500	pg/L	--
DPWG49040	--	--	MW-35D-082714-NP	1,2,3,4,6,7,8-HPCDF	1.17	0.604	pg/L	1.17 U
DPWG49040	--	--	MW-1S-082614-NP	1,2,3,4,6,7,8-HPCDF	0.792	0.560	pg/L	0.792 U
DPWG49040	Lab Blank WG48596-101	PCDD/PCDF	NA	1,2,3,4,7,8,9-HPCDF	0.62	0.500	pg/L	EMPC
DPWG49040	Lab Blank WG48596-101	PCDD/PCDF	NA	OCDF	1.62	0.500	pg/L	EMPC
DPWG49040	Lab Blank WG48596-101	PCDD/PCDF	See below	TOTAL HEXA-DIOXINS	0.797	0.500	pg/L	--
DPWG49040	--	--	MW-43S-082514-NP	TOTAL HEXA-DIOXINS	0.726	0.557		0.726 U
DPWG49040	--	--	DUP-082514-01	TOTAL HEXA-DIOXINS	1.93	0.567		1.93 U
DPWG49040	--	--	MW-26S-082514-NP	TOTAL HEXA-DIOXINS	0.669	0.571		0.669 U
DPWG49040	--	--	MW-35D-082714-NP	TOTAL HEXA-DIOXINS	1.62	0.604		1.62 U
DPWG49040	Lab Blank WG48596-101	PCDD/PCDF	NA	TOTAL HEXA-FURANS	0.687	0.500	pg/L	--
DPWG49040	Lab Blank WG48596-101	PCDD/PCDF	See below	TOTAL HEPTA-FURANS	0.55	0.500	pg/L	--
DPWG49040	--	--	DUP-082514-01	TOTAL HEPTA-FURANS	1.22	0.567		1.22 U
DPWG49040	--	--	MW-35D-082714-NP	TOTAL HEPTA-FURANS	2.54	0.604		2.54 U
DPWG49040	--	--	MW-1S-082614-NP	TOTAL HEPTA-FURANS	0.792	0.560		0.792 U

Table 1
Blank and Associated Suspect Sample Detections
August 2014 Groundwater Samples
Glacier Northwest, Inc. - Reichhold, Inc. Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG49231	Lab Blank WG48637-101 i	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDD	0.633	0.500	pg/L	EMPC
DPWG49231	Lab Blank WG48637-101 i	PCDD/PCDF	See below	OCDD	1.14	0.500	pg/L	--
DPWG49231	--	--	MW-45D-082614-NP	OCDD	2.43	0.543	pg/L	2.43 U
DPWG49231	Lab Blank WG48637-101 i	PCDD/PCDF	See below	TOTAL TETRA-DIOXINS	4.25	0.500	pg/L	--
DPWG49231	--	--	DUP-082614-2-NP	TOTAL TETRA-DIOXINS	4.53	0.560	pg/L	4.53 U
DPWG49231	--	--	MW-17S-082614-NP	TOTAL TETRA-DIOXINS	10.7	0.552	pg/L	10.7 U
DPWG49231	--	--	MW-17S-082614-P	TOTAL TETRA-DIOXINS	7.31	0.546	pg/L	7.31 U
DPWG49231	--	--	MW-45D-082614-NP	TOTAL TETRA-DIOXINS	4.84	0.543	pg/L	4.84 U
DPWG49231	--	--	MW-45S-082614-NP	TOTAL TETRA-DIOXINS	4.65	0.565	pg/L	4.65 U
DPWG49231	--	--	MW-2S-082714-P	TOTAL TETRA-DIOXINS	3.1	0.541	pg/L	3.1 U
DPWG49231	--	--	MW-2S-082714-NP	TOTAL TETRA-DIOXINS	7.7	0.580	pg/L	7.7 U
DPWG49231	--	--	MW-2D-082714-NP	TOTAL TETRA-DIOXINS	1.64	0.562	pg/L	1.64 U
DPWG49231	--	--	MW-2D-082714-P	TOTAL TETRA-DIOXINS	4.58	0.549	pg/L	4.58 U
DPWG49231	Lab Blank WG48637-101 i	PCDD/PCDF	See below	TOTAL PENTA-DIOXINS	3.55	0.500	pg/L	--
DPWG49231	--	--	DUP-082614-2-NP	TOTAL PENTA-DIOXINS	0.685	0.560	pg/L	0.685 U
DPWG49231	--	--	MW-17S-082614-NP	TOTAL PENTA-DIOXINS	7.93	0.552	pg/L	7.93 U
DPWG49231	--	--	MW-45D-082614-NP	TOTAL PENTA-DIOXINS	0.977	0.543	pg/L	0.977 U
DPWG49231	--	--	MW-2S-082714-P	TOTAL PENTA-DIOXINS	2.79	0.541	pg/L	2.79 U
DPWG49231	--	--	MW-2S-082714-NP	TOTAL PENTA-DIOXINS	4.3	0.580	pg/L	4.3 U
DPWG49231	--	--	MW-2D-082714-P	TOTAL PENTA-DIOXINS	2.64	0.549	pg/L	2.64 U

Data packages reviewed: DPWG49040, DPWG49231

Key:

EMPC = Estimated Maximum Possible Concentration

HpCDD = heptachlorinated dibenzo-p-dioxin

HpCDF = heptachlorinated dibenzofuran

HxCDD = hexachlorinated dibenzo-p-dioxin

HxCDF = hexachlorinated dibenzofuran

OCDD = octachlorinated dibenzo-p-dioxin

OCDF = octachlorinated dibenzofuran

PCDD = Polychlorinated dibenzodioxin

PCDF = Polychlorinated dibenzofuran

pg/L = Picograms per Liter

TCDD = tetrachlorinated dibenzo-p-dioxin

U= Non-detected

Table 2
Labeled Compound Recoveries Outside of Acceptable Limits
August 2014 Groundwater Samples
Glacier Northwest, Inc. - Reichhold, Inc. Site
Seattle, Washington

Lab Package	Sample ID	Method	Surrogate	Compound	Recovery (%)	Limit (%)	Result (pg/L)	ERM Qualifier
DPWG49231	MW-2S-082714-P	1613	13C-1,2,3,7,8-PECDD	1,2,3,7,8-PECDD	153	25-150	< 0.541	--
DPWG49231	MW-2D-082714-NP	1613	13C-1,2,3,7,8-PECDD	1,2,3,7,8-PECDD	151	25-150	< 0.562	--
DPWG49231	MW-2D-082714-P	1613	13C-1,2,3,7,8-PECDD	1,2,3,7,8-PECDD	152	25-150	< 0.549	--

Data package reviewed: K1407637

Key:

PeCDD = pentachlorinated dibenzo-p-dioxin

pg/L = Picograms per Liter

Table 3
Ongoing Precision and Recovery (OPR) Outside of Acceptable Limits
August - September Groundwater Samples
Glacier Northwest, Inc. - Reichhold, Inc. Site
Seattle, Washington

Lab Package	Lab Sample ID	Associated Samples	Compound	Recovery	Limit	Result	ERM
				(%)	(%)	(pg/L)	Qualifier
DPWG49231	WG48637-102 i	See Below	13C-1,2,3,7,8-PECDD	151	70-130	--	--
DPWG49231	--	DUP-082614-2-NP	1,2,3,7,8-PECDD	--	--	< 0.56	0.56 UJ
DPWG49231	--	MW-17S-082614-NP	1,2,3,7,8-PECDD	--	--	< 0.552	0.552 UJ
DPWG49231	--	MW-17S-082614-P	1,2,3,7,8-PECDD	--	--	< 0.546	0.546 UJ
DPWG49231	--	MW-45D-082614-NP	1,2,3,7,8-PECDD	--	--	< 0.543	0.543 UJ
DPWG49231	--	MW-45S-082614-NP	1,2,3,7,8-PECDD	--	--	< 0.565	0.565 UJ
DPWG49231	--	MW-2S-082714-P	1,2,3,7,8-PECDD	--	--	< 0.541	0.541 UJ
DPWG49231	--	MW-2S-082714-NP	1,2,3,7,8-PECDD	--	--	< 0.58	0.58 UJ
DPWG49231	--	MW-2D-082714-NP	1,2,3,7,8-PECDD	--	--	< 0.562	0.562 UJ
DPWG49231	--	MW-2D-082714-P	1,2,3,7,8-PECDD	--	--	< 0.549	0.549 UJ

Data packages reviewed: DPWG49040, DPWG49231

Key:

pg/L = Picograms per Liter

PECDD = Pentachlorodibenzo-p-dioxin

UJ = Estimated nondetected

Table 4
Field Duplicate Results and Calculated Relative Percent Differences
August 2014 Groundwater Samples
Glacier Northwest, Inc. - Reichhold, Inc. Site
Seattle, Washington

Lab Package	Sample ID	Compound	Concentration		Report Limit		Units	RPD (%)
			Sample	Duplicate	Sample	Duplicate		
DPWG49040 DPWG49231	MW-33S-082614-NP	TOTAL PENTA-DIOXINS	1.1	0.685	0.569	0.56	pg/L	45
DPWG49040 DPWG49231	MW-33S-082614-NP	TOTAL HEXA-DIOXINS	32.4	28.7	0.569	1.35	pg/L	12
DPWG49040 DPWG49231	MW-33S-082614-NP	TOTAL HEPTA-DIOXINS	412	495	0.837	2.63	pg/L	18
DPWG49040 DPWG49231	MW-33S-082614-NP	TOTAL TETRA-FURANS	70.6	35	0.569	0.56	pg/L	67.4
DPWG49040 DPWG49231	MW-33S-082614-NP	TOTAL PENTA-FURANS	39.3	10.6	0.637	0.625	pg/L	115.0
DPWG49040 DPWG49231	MW-33S-082614-NP	TOTAL HEXA-FURANS	18	20.7	0.569	0.768	pg/L	14.0
DPWG49040 DPWG49231	MW-33S-082614-NP	TOTAL HEPTA-FURANS	15	6.62	0.569	0.861	pg/L	77.5
DPWG49040 DPWG49040	MW-43S-082514-NP MW-43S-082514-NP	1,2,3,4,6,7,8-HPCDD OCDD	6.3 81.2	4.79 85.3	0.557 1.06	0.567 0.567	pg/L pg/L	27 5
DPWG49040	MW-43S-082514-NP	TOTAL TETRA-DIOXINS	0.827	0.66	0.557	0.567	pg/L	22
DPWG49040	MW-43S-082514-NP	TOTAL HEXA-DIOXINS	0.726	1.93	0.557	0.567	pg/L	91
DPWG49040	MW-43S-082514-NP	TOTAL HEPTA-DIOXINS	6.3	9.96	0.557	0.567	pg/L	45

Data packages reviewed: DPWG49040, DPWG49231

Key:

HPCDD = Heptachlorodibenzodioxin
 OCDD = Octachlorodibenzo-p-dioxin
 pg/L = Picograms per Liter
 RPD = Relative percent difference

Table 5
Estimated Maximum Possible Concentration
August 2014 Groundwater Samples
Glacier Northwest, Inc. - Reichhold, Inc. Site
Seattle, Washington

Lab Package	Sample ID	Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG49040	MW-43S-082514-NP	1,2,3,4,7,8-HXCDF	0.575	0.557	pg/L	0.575 U
DPWG49040	MW-43S-082514-NP	1,2,3,4,6,7,8-HPCDF	1.440	0.557	pg/L	1.44 U
DPWG49040	MW-43S-082514-NP	OCDF	1.700	0.557	pg/L	1.7 U
DPWG49040	DUP-082514-01	1,2,3,7,8,9-HXCDD	0.627	0.567	pg/L	0.627 U
DPWG49040	DUP-082514-01	1,2,3,4,6,7,8-HPCDF	0.833	0.567	pg/L	0.833 U
DPWG49040	DUP-082514-01	OCDF	1.490	0.567	pg/L	1.49 U
DPWG49040	MW-26S-082514-NP	1,2,3,4,6,7,8-HPCDF	0.648	0.571	pg/L	0.648 U
DPWG49040	MW-22S-082714-NP	1,2,3,4,6,7,8-HPCDD	0.803	0.569	pg/L	0.803 U
DPWG49040	MW-35S-082714-NP	1,2,3,4,7,8-HXCDD	4.400	0.587	pg/L	4.4 U
DPWG49040	MW-35S-082714-NP	1,2,3,6,7,8-HXCDD	1.940	0.587	pg/L	1.94 U
DPWG49040	MW-35S-082714-NP	1,2,3,7,8,9-HXCDD	1.530	0.587	pg/L	1.53 U
DPWG49040	MW-35S-082714-NP	2,3,4,7,8-PECDF	0.619	0.587	pg/L	0.619 U
DPWG49040	MW-35S-082714-NP	1,2,3,4,7,8-HXCDF	0.764	0.587	pg/L	0.764 U
DPWG49040	MW-35S-082714-NP	1,2,3,4,6,7,8-HPCDF	2.470	0.587	pg/L	2.47 U
DPWG49040	MW-35D-082714-NP	OCDF	1.710	0.604	pg/L	1.71 U
DPWG49040	MW-1S-082614-NP	OCDF	1.200	0.560	pg/L	1.2 U
DPWG49040	MW-33S-082614-NP	1,2,3,7,8,9-HXCDD	2.240	0.569	pg/L	2.24 U
DPWG49040	MW-33S-082614-NP	1,2,3,4,7,8-HXCDF	4.170	0.569	pg/L	4.17 U
DPWG49040	MW-33S-082614-NP	1,2,3,6,7,8-HXCDF	0.904	0.569	pg/L	0.904 U
DPWG49040	MW-33S-082614-NP	1,2,3,4,6,7,8-HPCDF	7.870	0.569	pg/L	7.87 U
DPWG49040	MW-33S-082614-NP	OCDF	10.100	0.569	pg/L	10.1 U

Table 5
Estimated Maximum Possible Concentration
August 2014 Groundwater Samples
Glacier Northwest, Inc. - Reichhold, Inc. Site
Seattle, Washington

Lab Package	Sample ID	Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG49231	DUP-082614-2-NP	1,2,3,4,7,8-HXCDD	2.900	1.350	pg/L	2.9 U
DPWG49231	DUP-082614-2-NP	1,2,3,6,7,8-HXCDD	4.360	1.350	pg/L	4.36 U
DPWG49231	DUP-082614-2-NP	1,2,3,6,7,8-HXCDF	0.795	0.768	pg/L	0.795 U
DPWG49231	DUP-082614-2-NP	1,2,3,4,7,8,9-HPCDF	0.898	0.861	pg/L	0.898 U
DPWG49231	DUP-082614-2-NP	OCDF	10.700	0.560	pg/L	10.7 U
DPWG49231	MW-17S-082614-NP	1,2,3,4,6,7,8-HPCDD	1.320	0.587	pg/L	1.32 U
DPWG49231	MW-17S-082614-P	1,2,3,4,6,7,8-HPCDD	3.440	1.190	pg/L	3.44 U
DPWG49231	MW-17S-082614-P	OCDD	14.000	2.380	pg/L	14 U
DPWG49231	MW-17S-082614-P	OCDF	1.220	0.546	pg/L	1.22 U
DPWG49231	MW-45S-082614-NP	1,2,3,4,6,7,8-HPCDD	4.440	1.170	pg/L	4.44 U
DPWG49231	MW-45S-082614-NP	1,2,3,6,7,8-HXCDF	0.696	0.571	pg/L	0.696 U
DPWG49231	MW-45S-082614-NP	1,2,3,4,7,8,9-HPCDF	0.805	0.565	pg/L	0.805 U
DPWG49231	MW-2S-082714-P	1,2,3,4,6,7,8-HPCDD	2.200	0.541	pg/L	2.2 U
DPWG49231	MW-2S-082714-P	1,2,3,4,6,7,8-HPCDF	0.682	0.682	pg/L	0.682 U
DPWG49231	MW-2S-082714-P	OCDF	0.722	0.722	pg/L	0.722 U
DPWG49231	MW-2D-082714-NP	1,2,3,4,6,7,8-HPCDF	0.943	0.562	pg/L	0.943 U
DPWG49231	MW-2D-082714-NP	OCDF	1.270	0.562	pg/L	1.27 U
DPWG49231	MW-2D-082714-P	1,2,3,4,6,7,8-HPCDD	1.720	0.549	pg/L	1.72 U

Data packages reviewed: DPWG49040, DPWG49231

Key:

HPCDF = Heptachlorodibenzofuran
 HXCDD = Hexachlorodibenzo-p-dioxin
 HXCDF = Hexachlorodibenzofuran
 HXCDF= Hexachlorodibenzofuran
 OCDD = Octachlorodibenzo-p-dioxin
 OCDF = Octachlorodibenzofuran
 PECDF = Pentachlorodibenzofuran
 pg/L = Picograms per Liter
 U = Nondetected

Table 6
2,3,7,8-TCDF DB5/DB225 Elution Results
August 2014 Groundwater Samples
Glacier Northwest, Inc. - Reichhold, Inc. Site
Seattle, Washington

Lab Package	Sample ID	Compound	DB5 Column Concentration	Report Limit	DB225 Column Concentration	Report Limit	ERM Qualifier
DPWG49040	MW-33S-082614-NP	2,3,7,8-TCDF	0.709	0.569	<0.569	0.569	0.569 U

Data packages reviewed: DPWG49040, DPWG49231

Key:

pg/L = Picograms per Liter

U = Nondetected

TCDF = Tetrachlorodibenzofuran

Memorandum

Environmental Resources Management

To: Mike Mendes

From: Irene Lavigne

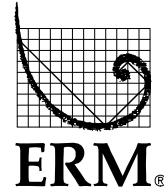
Date: 11 November 2014

Subject: Data Review of Glacier Northwest, Inc. - Reichhold, Inc. Site Historical Stormwater Pipe Abandonment and Subsurface Image Investigation and Evaluation Samples Collected August 2014

Project Number: 0232280.11

Data Packages: Analytical Resources, Incorporated Data Packages YV02, YV33, YV77, YV98, YX67, YY15, YY63

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The data quality was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999, *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004.

HOLDING TIME AND PRESERVATION EVALUATION

The samples were prepared and analyzed within the method-prescribed time period from the date of collection. The sample shipment was received at the laboratory within the method-prescribed temperature and preservation requirements. None of the data were qualified based on holding time or preservation exceedances.

BLANK EVALUATION

The method blank sample results were nondetected for each of the target analytes. Sample data were not qualified based on the blank evaluation. The blank results indicate that no contaminants were introduced to the samples during laboratory preparation or analyses.

ELEVATED REPORTING LIMITS

The laboratory noted that the sample results for a few samples analyzed for polychlorinated biphenyls (PCBs) had elevated reporting limits (RL)

due to chromatographic interference. Since dilution and reanalysis of the sample would not resolve the interference, the laboratory reported the values as not detected at the reported concentrations. The sample results were qualified as nondetected (U) at their respective, elevated RLs as presented in Table 1.

BLANK SPIKE EVALUATION

The laboratory control sample (LCS) and laboratory control sample duplicate recoveries were within the laboratory's limits of acceptance. No sample data were qualified based on the LCS evaluation. The LCS recoveries indicate acceptable laboratory accuracy and precision.

MATRIX SPIKE EVALUATION

The matrix spike (MS) and matrix spike duplicate (MSD) recoveries were within the laboratory's limits of acceptance with a number of exceptions. Detected sample results for total organic carbon and arsenic were qualified as estimated (J) due to a low MS recovery for each of these compounds. Additional MS outliers did not require qualification of sample data. Data were not qualified if the data could be verified using an associated, in-control LCS recovery, or if the concentration of the unspiked sample exceeded four times the amount of compound added to create the spike sample. Furthermore, in the case of hexavalent chromium, the low MS recoveries did not warrant qualification of sample data because the associated standard reference recoveries were within control limits. The outlying MS recoveries and qualified sample data are listed in Table 2.

SURROGATE EVALUATION

The surrogate recoveries were within acceptable limits. The surrogate recoveries indicate minimal matrix interference in the samples.

FIELD DUPLICATE EVALUATION

One sample was collected and analyzed in duplicate as part of the storm sewer sampling event. ERM calculated the relative percent difference (RPD) between detected results. The USEPA has not established control criteria for field duplicate samples; therefore, sample data are not qualified on the basis of field duplicate imprecision. Detected duplicate results and calculated RPDs are presented in Table 3.

REPLICATE EVALUATION

The laboratory prepared and analyzed several samples as replicates. The RPD for the replicate results was within acceptable limits (<20%). Sample data were not qualified based on the replicate results.

CONTINUING CALIBRATION EVALUATION

The continuing calibration verification (CCV) recoveries were included in the data packages and reviewed. The CCV recoveries for all target compounds were within acceptable limits.

OVERALL ASSESSMENT

No data were determined to be unusable. All of the data, including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents.

Table 1
Elevated Reporting Limits
Historical Stormwater Pipe Abandonment and
Subsurface Image Investigation and Evaluation Samples
Glacier Northwest, Inc. - Reichhold, Inc. Site
Seattle, Washington

Lab Package	Sample ID	Analysis	Compound	Reported Concentration	Elevated RL	MDL	Units	ERM Qualifier
YV02	SWP-01-080414	PCB	Aroclor 1232	< 10	10	1.6	µg/kg	< 10 U
YV02	SWP-02-080614	PCB	Aroclor 1232	< 14	14	1.5	µg/kg	< 14 U
YV02	DUP-080614-1	PCB	Aroclor 1232	< 9.7	9.7	1.5	µg/kg	< 9.7 U

Data packages reviewed: YV02, YV33, YV77, YV98, YX67, YY15, YY63

Key:

RL = Reporting Limit; elevated due to interference

MDL = Minimum detection limit

PCB = Polychlorinated biphenyls; Method 8082A

µg/kg = Micrograms per kilogram

U = Nondetected

Table 2
Matrix Spike Recoveries Outside of Acceptable Limits
Historical Stormwater Pipe Abandonment and
Subsurface Image Investigation and Evaluation Samples
Glacier Northwest, Inc. - Reichhold, Inc. Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
YV02	SWP-02-080614 MS/MSD	PCB	NA	Aroclor 1016	49.3/49.6	56-120	0.6	30	--	--
YV02	SWP-02-080614 MS/MSD	PCB	NA	Aroclor 1260	51.1/51.7	58-120	0.9	30	--	--
YV02	SWP-01-080414 MS/MSD	Total Metals	NA	Arsenic	-323	75-125	--	--	4X	--
YV02	SWP-01-080414 MS/MSD	Total Metals	NA	Zinc	18.6	75-125	--	--	4X	--
YV02	SWP-02-080614 MS/MSD	Total Metals	NA	Arsenic	213	75-125	--	--	4X	--
YV02	SWP-01-080414 MS/MSD	TOC	See below	TOC	70.6	75-125	--	--	--	--
YV02	--	--	SWP-01-080414	TOC	--	--	--	--	2.17	J
YV77	SIIE-01-080814 MS/MSD	Total Metals	See below	Arsenic	66.0	75-125	--	--	--	--
YV77	--	--	SIIE-01-080814	Arsenic	--	--	--	--	20.1	J
YV77	--	--	SIIE-02-080814	Arsenic	--	--	--	--	22.4	J
YV77	--	--	SIIE-03-080814	Arsenic	--	--	--	--	33.5	J
YV77	--	--	SIIE-04-080814	Arsenic	--	--	--	--	91.0	J
YV77	SIIE-01-080814 MS/MSD	Total Metals	NA	Copper	-301	75-125	--	--	4X	--
YX67	SIIE-01-080814 MS/MSD	Cr VI	NA	Chromium, hexavalent	4.4	75-125	--	--	--	--

Table 2
Matrix Spike Recoveries Outside of Acceptable Limits
Historical Stormwater Pipe Abandonment and
Subsurface Image Investigation and Evaluation Samples
Glacier Northwest, Inc. - Reichhold, Inc. Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
YX67	SIIE-01-080814 MS/MSD	Cr VI	NA	Chromium, hexavalent	50.9	75-125	--	--	--	--

Data packages reviewed: YV02, YV33, YV77, YV98, YX67, YY15, YY63

Key:

RPD = Relative percent difference

MS/MSD = Matrix spike/matrix spike duplicate

PCB = Polychlorinated biphenyls; Method 8082A

Total metals = Method 6010C

TOC = Total organic carbon

Cr VI = Hexavalent chromium analysis; Method 3500Cr

NA = Not applicable; qualification of sample data not required

4X = Sample concentration exceeded four times amount spiked; no qualification required

J = Detected sample result qualified as estimated

Table 3
Field Duplicate Results and Calculated Relative Percent Differences
Historical Stormwater Pipe Abandonment and
Subsurface Image Investigation and Evaluation Samples
Glacier Northwest, Inc. - Reichhold, Inc. Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
YV02	SWP-02-080614/DUP-080614-1	PCB	Aroclor 1254	12	18	4.0/3.9	µg/kg	40
YV02	SWP-02-080614/DUP-080614-1	PCB	Aroclor 1260	15	15	4.0/3.9	µg/kg	0
YV02	SWP-02-080614/DUP-080614-1	Total Metals	Arsenic	1900	1740	3	mg/kg	8.8
YV02	SWP-02-080614/DUP-080614-1	Total Metals	Chromium	52	59	4	mg/kg	13
YV02	SWP-02-080614/DUP-080614-1	Total Metals	Copper	515	485	1/2	mg/kg	6
YV02	SWP-02-080614/DUP-080614-1	Total Metals	Zinc	262	262	7/8	mg/kg	0

Data packages reviewed: YV02, YV33, YV77, YV98, YX67, YY15, YY63

Key:

RPD = Relative percent difference

PCB = Polychlorinated biphenyls; Method 8082A

Total metals = Method 6010C

µg/kg = Micrograms per kilogram

mg/kg = Milligrams per kilogram

Memorandum

**Environmental
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Management**
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To: Shira DeGrood

From: Keturah Witter

Date: 12 November 2014

Subject: Data Review of Glacier Northwest, Inc. - Reichhold, Inc.
Site Historical Stormwater Pipe Abandonment and
Subsurface Image Investigation and Evaluation Samples
Collected August 6, 2014 through August 12, 2014

Project Number: 0232280.11

Data Packages: AXYS Analytical Data Package DPWG48767



The quality of the data was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Chlorinated Dibenzo-p-Dioxins (CDDs) and Chlorinated Dibenzofurans (CDFs) Data Review*, September 2011.

HOLDING TIME AND PRESERVATION EVALUATION

The sample shipments were received at the laboratory within the method prescribed preservation requirements. The samples were prepared and analyzed within the method-prescribed time period from the date of collection. Two coolers arrived at the lab with temperatures of 6.7 degrees Celsius (°C) and 0.9 °C; however, no sample data were qualified due to sample temperatures above 6 °C or below 2 °C. No sample data were qualified based on sample preservation or holding-time exceedances.

BLANK EVALUATION

The lab blank sample results were nondetected for each of the target analytes with limited exceptions. Detections of dioxin/furan compounds in the lab blank resulted in the qualification of 7 associated sample results as nondetected (U). Additional blank detections did not result in qualified data because the field sample concentrations exceeded five times the blank concentrations for the corresponding compounds, the associated samples were nondetected, or the detected dioxin/furan compounds had been identified as estimated maximum possible concentrations. The blank detections are presented in Table 1.

MATRIX SPIKE EVALUATION

The matrix spike (MS) and matrix spike duplicate recoveries were within the laboratory's limits of acceptance with limited exceptions. No sample data were qualified based on the MS/MSD evaluation. The outliers are presented in Table 2.

LABELED COMPOUND EVALUATION

Carbon-13 labeled isotope recoveries were reported for each sample submitted for dioxin/furan analysis. The percent recoveries of labeled PCDD and PCDF compounds are a measure of the effectiveness of the laboratory and method to extract the compounds of interest. All of the labeled compounds were within acceptable limits with limited exceptions. No qualifiers were applied to the data as a result of the labeled compound evaluation.

ONGOING PRECISION AND RECOVERY EVALUATION

The ongoing precision and recovery (OPR) recoveries were within the laboratory's limits of acceptance with limited exceptions. No qualifiers were applied to the data as a result of the OPR evaluation.

FIELD DUPLICATE EVALUATION

One sample was submitted in duplicate. ERM calculated the relative percent difference (RPD) between detected results. The USEPA has not established control criteria for field duplicate samples; therefore, sample data are not qualified on the basis of field duplicate imprecision. The RPDs for detected results are presented in Table 3.

ESTIMATED MAXIMUM POSSIBLE CONCENTRATION

The laboratory identified a number of dioxin and furan results as estimated maximum possible concentrations (EMPC). An EMPC value is the maximum possible concentration of a compound that could be present in the sample. This classification is used when all of the identification criteria for a given dioxin or

furan compound are not met. Sample data identified as EMPC by the laboratory were qualified as nondetected (U), as shown in Table 4.

2,3,7,8- TETRACHLORODIBENZOFURAN ELUTION RESULTS

Eight samples reported a detected concentration of 2,3,7,8-Tetrachlorodibenzofuran (TCDF) on the DB-5 gas chromatography (GC) column. Due to the toxicological concern with of 2,3,7,8-TCDF and problems with separation from other closely eluting isomers on the DB-5 column, a second analysis was run on a DB-225 GC column for improved resolution. Six 2,3,7,8-TCDF elutions on the DB-225 column were confirmed, and two were nondetected (U), as shown in Table 5.

OVERALL ASSESSMENT

No data required rejection. All of the data, including qualified data, can be used for decision-making purposes. The quality of the data generated during this investigation is acceptable for the preparation of technically defensible documents.

Table 1
Blank and Associated Suspect Sample Detections
Historical Stormwater Pipe Abandonment and
Subsurface Image Investigation and Evaluation Samples
Glacier Northwest, Inc. - Reichhold, Inc. Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG48767	Lab Blank WG48307-101	PCDD/PCDF	NA	2,3,7,8-TCDD	0.293	0.100	pg/g	EMPC
DPWG48767	Lab Blank WG48307-101	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDD	0.426	0.100	pg/g	--
DPWG48767	Lab Blank WG48307-101	PCDD/PCDF	NA	OCDD	1.48	0.100	pg/g	--
DPWG48767	Lab Blank WG48307-101	PCDD/PCDF	See below	2,3,4,7,8-PECDF	0.302	0.100	pg/g	--
DPWG48767	--	--	SIIE-05-080814	2,3,4,7,8-PECDF	0.572	0.093	pg/g	0.572 U
DPWG48767	--	--	SIIE-06-081214	2,3,4,7,8-PECDF	0.310	0.095	pg/g	0.310 U
DPWG48767	Lab Blank WG48307-101	PCDD/PCDF	NA	1,2,3,4,7,8-HxCDF	0.115	0.100	pg/g	--
DPWG48767	Lab Blank WG48307-101	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDF	0.26	0.100	pg/g	--
DPWG48767	Lab Blank WG48307-101	PCDD/PCDF	NA	OCDF	0.271	0.100	pg/g	--
DPWG48767	Lab Blank WG48307-101	PCDD/PCDF	See below	TOTAL TETRA-DIOXINS	0.447	0.100	pg/g	--
DPWG48767	--	--	SIIE-05-080814	TOTAL TETRA-DIOXINS	0.614	0.093	pg/g	0.614 U
DPWG48767	--	--	SIIE-06-081214	TOTAL TETRA-DIOXINS	0.615	0.095	pg/g	0.615 U
DPWG48767	Lab Blank WG48307-101	PCDD/PCDF	See below	TOTAL PENTA-DIOXINS	0.438	0.100	pg/g	--
DPWG48767	--	--	SIIE-05-080814	TOTAL PENTA-DIOXINS	0.634	0.093	pg/g	0.634 U
DPWG48767	--	--	SIIE-06-081214	TOTAL PENTA-DIOXINS	1.06	0.095	pg/g	1.06 U
DPWG48767	Lab Blank WG48307-101	PCDD/PCDF	NA	TOTAL HEPTA-DIOXINS	0.426	0.100	pg/g	--
DPWG48767	Lab Blank WG48307-101	PCDD/PCDF	See below	TOTAL PENTA-FURANS	0.302	0.100	pg/g	--
DPWG48767	--	--	SIIE-06-081214	TOTAL PENTA-FURANS	1.41	0.095	pg/g	1.41 U
DPWG48767	Lab Blank WG48307-101	PCDD/PCDF	NA	TOTAL HEXA-FURANS	0.115	0.100	pg/g	--
DPWG48767	Lab Blank WG48307-101	PCDD/PCDF	NA	TOTAL HEPTA-FURANS	0.26	0.100	pg/g	--

Data packages reviewed: DPWG48767

Key:

EMPC = Estimated Maximum Possible Concentration

HpCDF = heptachlorinated dibenzofuran

HxCDD = hexachlorinated dibenzo-p-dioxin

HxCDF = hexachlorinated dibenzofuran

OCDD = octachlorinated dibenzo-p-dioxin

OCDF = octachlorinated dibenzofuran

PCDD = Polychlorinated dibenzodioxin

PCDF = Polychlorinated dibenzofuran

PeCDF = pentachlorinated dibenzofuran

pg/L = Picograms per Liter

TCDD = tetrachlorinated dibenzo-p-dioxin

U= Non-detected

Table 2
Spike Recoveries Outside of Acceptable Limits
Historical Stormwater Pipe Abandonment and
Subsurface Image Investigation and Evaluation Samples
Glacier Northwest, Inc. - Reichhold, Inc. Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Result	Units	ERM Qualifier
MS/MSD										
DPWG49040	SWP-02-080614 (MS)	--	1,2,3,4,6,7,8-HPcDD	146/155	NP	6.41	20	--	--	--
DPWG49040	SWP-02-080614 (MS)	--	OCDD	1720/767	NP	76.6	20	--	--	--

Data packages reviewed: DPWG48767

Key:

HpCDD = heptachlorinated dibenzo-p-dioxin
MS/MSD = Matrix spike/matrix spike duplicate
NP = Not provided
OCDD = octachlorinated dibenzo-p-dioxin
RPD = Relative percent difference

Table 3
Field Duplicate Results and Calculated Relative Percent Differences
Historical Stormwater Pipe Abandonment and
Subsurface Image Investigation and Evaluation Samples
Glacier Northwest, Inc. - Reichhold, Inc. Site
Seattle, Washington

Lab Package	Sample ID	Compound	Concentration		Report Limit		Units	RPD (%)
			Sample	Duplicate	Sample	Duplicate		
DPWG48767	SWP-02-080614	2,3,7,8-TCDD	1.7	1.9	0.093	0.099	pg/g	9
DPWG48767	SWP-02-080614	1,2,3,7,8-PECDD	4.0	16.4	15	0.113	pg/g	122
DPWG48767	SWP-02-080614	1,2,3,4,7,8-HXCDD	28.9	32.5	0.192	0.216	pg/g	12
DPWG48767	SWP-02-080614	1,2,3,6,7,8-HXCDD	76.8	95.3	0.192	0.216	pg/g	21
DPWG48767	SWP-02-080614	1,2,3,7,8,9-HXCDD	68.0	80.1	0.192	0.216	pg/g	16
DPWG48767	SWP-02-080614	1,2,3,4,6,7,8-HPCDD	2350.0	2980.0	0.585	0.489	pg/g	24
DPWG48767	SWP-02-080614	OCDD	82700.0	108000.0	1.29	12.2	pg/g	27
DPWG48767	SWP-02-080614	2,3,7,8-TCDF	3.4	3.9	0.093	0.099	pg/g	13
DPWG48767	SWP-02-080614	1,2,3,7,8-PECDF	4.9	5.4	0.125	0.099	pg/g	10
DPWG48767	SWP-02-080614	2,3,4,7,8-PECDF	13.9	16.2	0.125	0.099	pg/g	15
DPWG48767	SWP-02-080614	1,2,3,4,7,8-HXCDF	184.0	233.0	0.181	0.183	pg/g	24
DPWG48767	SWP-02-080614	1,2,3,6,7,8-HXCDF	34.6	40.2	0.181	0.183	pg/g	15
DPWG48767	SWP-02-080614	1,2,3,7,8,9-HXCDF	2.31	2.81	0.181	0.183	pg/g	20
DPWG48767	SWP-02-080614	2,3,4,6,7,8-HXCDF	16.1	18.3	0.181	0.183	pg/g	12.8
DPWG48767	SWP-02-080614	1,2,3,4,6,7,8-HPCDF	587	757	0.296	0.254	pg/g	25.3
DPWG48767	SWP-02-080614	1,2,3,4,7,8,9-HPCDF	98.3	143	0.296	0.254	pg/g	37.0
DPWG48767	SWP-02-080614	OCDF	1500	1940	0.093	0.099	pg/g	25.6
DPWG48767	SWP-02-080614	TOTAL TETRA-DIOXINS	18.6	18.4	0.093	0.099	pg/g	1.1
DPWG48767	SWP-02-080614	TOTAL PENTA-DIOXINS	81.7	99.4	0.093	0.113	pg/g	20
DPWG48767	SWP-02-080614	TOTAL HEXA-DIOXINS	573	681	0.192	0.216	pg/g	17
DPWG48767	SWP-02-080614	TOTAL HEPTA-DIOXINS	4670	6060	0.585	0.489	pg/g	26
DPWG48767	SWP-02-080614	TOTAL TETRA-FURANS	33.9	37.9	0.093	0.099	pg/g	11
DPWG48767	SWP-02-080614	TOTAL PENTA-FURANS	220	243	0.125	0.099	pg/g	10
DPWG48767	SWP-02-080614	TOTAL HEXA-FURANS	979	1340	0.181	0.183	pg/g	31
DPWG48767	SWP-02-080614	TOTAL HEPTA-FURANS	2130	2860	0.296	0.254	pg/g	29

Data packages reviewed: DPWG48767

Key:

HpCDD = Heptachlorinated dibenzo-p-dioxin
 HpCDF = Heptachlorinated dibenzofuran
 HxCDD = Hexachlorinated dibenzo-p-dioxin
 HxCDF = Hexachlorinated dibenzofuran
 OCDD = Octachlorinated dibenzo-p-dioxin
 OCDF = Octachlorinated dibenzofuran
 PeCDD = Pentachlorinated dibenzo-p-dioxin
 PeCDF = Pentachlorinated dibenzofuran
 pg/L = Picograms per Liter
 RPD = Relative percent difference
 TCDD = Tetrachlorinated dibenzo-p-dioxin
 TCDF = Tetrachlorinated dibenzofuran

Table 4
Estimated Maximum Possible Concentration
Historical Stormwater Pipe Abandonment and
Subsurface Image Investigation and Evaluation Samples
Glacier Northwest, Inc. - Reichhold, Inc. Site
Seattle, Washington

Lab Package	Sample ID	Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG48767	SWP-02-080614	2,3,7,8-TCDD	1.740	0.093	pg/g	1.74 U
DPWG48767	DUP-080614-1	2,3,7,8-TCDD	1.910	0.099	pg/g	1.91 U
DPWG48767	SIIE-01-080814	2,3,4,7,8-PECDF	1.310	0.092	pg/g	1.31 U
DPWG48767	SIIE-01-080814	2,3,7,8-TCDD	0.514	0.092	pg/g	0.514 U
DPWG48767	SIIE-01-080814	1,2,3,7,8-PECDD	0.533	0.092	pg/g	0.533 U
DPWG48767	SIIE-02-080814	2,3,7,8-TCDD	0.507	0.093	pg/g	0.507 U
DPWG48767	SIIE-03-080814	2,3,7,8-TCDD	0.627	0.092	pg/g	0.627 U
DPWG48767	SIIE-03-080814	1,2,3,7,8-PECDD	0.691	0.100	pg/g	0.691 U
DPWG48767	SIIE-03-080814	1,2,3,4,7,8-HXCDD	0.643	0.106	pg/g	0.643 U
DPWG48767	SIIE-05-080814	2,3,7,8-TCDD	0.368	0.093	pg/g	0.368 U
DPWG48767	SIIE-05-080814	1,2,3,4,7,8-HXCDD	0.345	0.127	pg/g	0.345 U
DPWG48767	SIIE-05-080814	1,2,3,7,8,9-HXCDD	0.691	0.127	pg/g	0.691 U
DPWG48767	SIIE-05-080814	2,3,7,8-TCDF	0.301	0.093	pg/g	0.301 U
DPWG48767	SIIE-06-081214	2,3,7,8-TCDD	0.361	0.095	pg/g	0.361 U
DPWG48767	SIIE-06-081214	1,2,3,4,7,8-HXCDD	0.319	0.095	pg/g	0.319 U
DPWG48767	SIIE-06-081214	1,2,3,4,7,8,9-HPCDF	0.446	0.161	pg/g	0.446 U

Data packages reviewed: DPWG48767

Key:

HpCDF = heptachlorinated dibenzofuran

HxCDD = hexachlorinated dibenzo-p-dioxin

PeCDD = pentachlorinated dibenzo-p-dioxin

PeCDF = pentachlorinated dibenzofuran

pg/L = Picograms per Liter

TCDD = tetrachlorinated dibenzo-p-dioxin

TCDF = tetrachlorinated dibenzofuran

U = Nondetected

Table 5
2,3,7,8-TCDF DB5/DB225 Elution Results
Historical Stormwater Pipe Abandonment and
Subsurface Image Investigation and Evaluation Samples
Glacier Northwest, Inc. - Reichhold, Inc. Site
Seattle, Washington

Lab Package	Sample ID	Compound	DB5 Column Conc. (pg/g)	Report Limit	DB225 Column Conc. (pg/g)	Report Limit	ERM Qualifier
DPWG48767	SWP-01-080414	2,3,7,8-TCDF	7.74	0.102	4.11	0.189	--
DPWG48767	SWP-02-080614	2,3,7,8-TCDF	3.41	0.093	1.67 J	0.35	--
DPWG48767	DUP-080614-1	2,3,7,8-TCDF	3.87	0.099	1.72 J	0.385	--
DPWG48767	SIIE-01-080814	2,3,7,8-TCDF	2.97	0.092	1.88	0.122	--
DPWG48767	SIIE-02-080814	2,3,7,8-TCDF	2.14	0.093	.940 J	0.093	--
DPWG48767	SIIE-03-080814	2,3,7,8-TCDF	8.61	0.092	1.73	0.27	--
DPWG48767	SIIE-05-080814	2,3,7,8-TCDF	0.301 K J	0.093	0.237 K J	0.222	0.237 U
DPWG48767	SIIE-06-081214	2,3,7,8-TCDF	0.263 J	0.095	< 0.421	0.421	0.263 U

Data packages reviewed: DPWG48767

Key:

pg/L = Picograms per Liter

TCDF = Tetrachlorodibenzofuran

U = Nondetected

Memorandum

Environmental Resources Management

To: Mike Mendes

From: Irene Lavigne

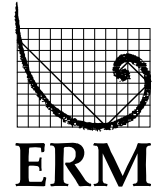
Date: 20 December 2012

Subject: Data Review of Reichhold-Glacier Sediment Samples
Collected May – June 2012

Project Number: 0155129

Data Packages: Analytical Resources Incorporated Data Packages
UV63, UV97, UW01, UW23, UW18, UW49, UW27,
UW43, UW61, UW60, UW62, UW75, UW97, UW99,
and UY06
Axys Analytical Services Data Packages DPWG40565,
DPWG40583, DPWG40592, DPWG40641,
DPWG40694, DPWG40795, DPWG40821, and
DPWG40271

2875 Michelle Drive
Suite 200
Irvine, CA 92606
(949) 623-4700
(949) 623-2940 (fax)



The data quality was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999, *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004, and the *EPA Region 10 SOP for the Validation of Polychlorinated Dibenzodioxin (PCDD) and Polychlorinated Dibenzofuran (PCDF) Data*, January 1996.

HOLDING TIME AND PRESERVATION EVALUATION

The samples were prepared and analyzed within the method-prescribed time period from the date of collection. The sample shipments were received at the laboratory within the method-prescribed preservation requirements. No sample data were qualified based on the holding time or preservation evaluations.

BLANK EVALUATION

The method blank, and rinsate blank sample results were nondetected for each of the target analytes with a number of exceptions. Detections above the reporting limit of various organic and dioxin/furan compounds in the blank samples resulted in qualification of samples as nondetected (U) for in the associated samples. Not all blank detections resulted in qualification of associated data. Data were not qualified if the samples were nondetected for the associated compounds, if the sample results exceeded the five times the blank concentrations of organic compounds or 10 times the blank concentrations of inorganic compounds, or if the blank results were identified as estimated maximum possible concentrations for dioxin/furan analyses. The blank detections and associated, qualified data are presented in Table 1.

BLANK SPIKE EVALUATION

The laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) recoveries were within the laboratory's limits of acceptance with two exceptions; however, no sample data were qualified on the basis of the LCS outliers. Sample data were not qualified because only one recovery in each LCS/LCSD pair exceeded the acceptable control limits. The outlying LCS recoveries are shown in Table 2.

MATRIX SPIKE EVALUATION

The matrix spike (MS) and matrix spike duplicate (MSD) recoveries were within the laboratory's limits of acceptance with several exceptions. A number of inorganic compounds and five sample results for dioxin/furans were qualified as estimated and biased high (J+) or biased low (J-) due to MS recoveries that either exceeded the maximum acceptable limits or were below the minimum acceptable limits, respectively. Additional outlying recoveries did not require qualification of sample data. Data were not qualified if the only the relative percent difference (RPD) exceeded control limits, if only one recovery in a LCS/LCSD pair exceeded control limits, if the data could be verified using an associated, in-control LCS recovery, or if the concentration of the unspiked samples was greater than four times the amount spiked. The outlying MS recoveries and qualified sample data are listed in Table 3.

SURROGATE SPIKE EVALUATION

The surrogate recoveries were within acceptable limits with limited exceptions. Detected and nondetected sample results for polychlorinated biphenyls and tributyltin ion were qualified as estimated (J or UJ) due to surrogate recoveries that were outside of the acceptable limits. Associated samples were not qualified if the surrogate recovery was biased high and the sample result was nondetected. The outlying surrogate recoveries are presented in Table 4.

ESTIMATED MAXIMUM POSSIBLE CONCENTRATION

The laboratory identified a number of dioxin and furan results as estimated maximum possible concentrations (EMPC). An EMPC value is the maximum possible concentration of a compound that could be present in the sample. This classification is used when all of the identification criteria for a given dioxin or furan compound are not met. Sample data identified as EMPC by the laboratory were qualified as nondetected (U), as shown in Table 5.

FIELD DUPLICATE EVALUATION

Ten samples were collected and analyzed in duplicate. ERM calculated the RPD between detected results. The USEPA has not established control criteria for field duplicate samples; therefore, sample data are not qualified on the basis of field duplicate imprecision. Detected duplicate results and calculated RPDs are presented in Table 6.

ANALYTICAL DUPLICATE EVALUATION

The laboratory prepared and analyzed a number of samples as analytical duplicates. ERM calculated the RPD between detected results. The RPDs were less than 20 percent, with a number of exceptions. The primary sample results for 23 duplicates were qualified as estimated (J). The analytical duplicate sample results and calculated RPDs are shown in Table 7.

CONTINUING CALIBRATION EVALUATION

The laboratory noted that two continuing calibration verification (CCV) recoveries for pentachlorophenol and two CCV recoveries for benzyl alcohol did not meet acceptable control limits. Detected sample results were qualified as estimated and biased low (J-) or estimated and biased high (J+), and nondetected sample results were qualified as estimated (UJ), as shown in Table 8. A number of the CCV outliers were associated with compounds that were not constituents of concern; these compounds are not included in Table 8. Not all CCV outliers resulted in qualified data. Data were not qualified if the CCV recoveries were biased high and the associated samples were nondetected for the corresponding compounds.

CALIBRATION RANGE EVALUATION

The laboratory noted 10 instances where the results of undiluted samples exceeded the calibration range of the equipment. The affected samples were diluted and reanalyzed. The sample data resulting from the reanalyses were within the calibration range; and should be used for decision-making purposes. The sample results which exceeded the calibration range were qualified as estimated (J), and are listed in Table 9.

OVERALL ASSESSMENT

No data were determined to be unusable. All of the data, including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents.

Table 1
Blank and Associated Suspect Sample Detections
Sediment Samples Collected May-June 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
UW18	MB-060112	NA	bis(2-Ethylhexyl) phthalate	15	25	µg/kg	--
UW18	MB-060112	See below	Diethylphthalate	5.1	5.0	µg/kg	--
UW18	MB-060112	SED-SS-12-052412	Diethylphthalate	9.7	4.8	µg/kg	9.7 U
UW18	UW18MB	NA	Lead	0.1	0.1	µg/L	--
UW27	MB-060412	See below	bis(2-Ethylhexyl)phthalate	62	25	µg/kg	--
UW27	MB-060412	SED-SC-21-6-8-052512	bis(2-Ethylhexyl)phthalate	280	24	µg/kg	280 U
UW27	MB-060412	SED-SC-21-2-4-052512	bis(2-Ethylhexyl)phthalate	120	25	µg/kg	120 U
UW27	MB-060412	DUP-052512-1	bis(2-Ethylhexyl)phthalate	160	24	µg/kg	160 U
UW43	MB-060612	See below	Diethylphthalate	22	5.0	µg/kg	--
UW43	MB-060612	SED-SC-06-0-1-052912	Diethylphthalate	9.9	4.8	µg/kg	9.9 U
UW43	MB-060612	SED-SC-06-2-4-052912	Diethylphthalate	6.2	4.8	µg/kg	6.2 U
UW43	MB-060612	SED-SC-06-6-8-052912	Diethylphthalate	16	4.9	µg/kg	16 U
UW43	MB-060612	SED-SC-14-0-1-052912	Diethylphthalate	6.6	4.8	µg/kg	6.6 U
UW43	MB-060612	SED-SC-14-2-4-052912	Diethylphthalate	6.4	4.7	µg/kg	6.4 U
UW43	MB-060612	DUP-052912-2	Diethylphthalate	14	4.8	µg/kg	14 U
UV63	MB-053012	See below	Diethylphthalate	16	5.0	µg/kg	--
UV63	MB-053012	SED-SS-03-052212	Diethylphthalate	28	4.8	µg/kg	28 U
UV63	MB-053012	SED-SS-16-052212	Diethylphthalate	50	4.7	µg/kg	50 U
UV63	MB-053012	SED-SS-01-052212	Diethylphthalate	14	4.9	µg/kg	14 U
UV63	MB-053012	SED-SS-08-052212	Diethylphthalate	9.3	4.9	µg/kg	9.3 U
UV63	MB-053012	DUP-052212-1	Diethylphthalate	7.4	4.8	µg/kg	7.4 U
UV63	MB-053012	SED-SS-07-052212	Diethylphthalate	35	4.9	µg/kg	35 U
UV63	MB-053012	SED-SS-04-052212	Diethylphthalate	51	4.9	µg/kg	51 U
UV63	MB-053012	SED-SS-15-052212	Diethylphthalate	8.9	4.7	µg/kg	8.9 U
UV97	MB-053012	SED-SS-17-052312	Diethylphthalate	9.6	5.0	µg/kg	9.6 U

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Sediment Samples Collected May-June 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
UV97	MB-053012	SED-SS-09-052312	Diethylphthalate	8.8	4.9	µg/kg	8.8 U
UV97	MB-053012	SED-SS-19-052312	Diethylphthalate	44	4.8	µg/kg	44 U
UV97	MB-053012	SED-SS-02-052312	Diethylphthalate	16	4.9	µg/kg	16 U
UV97	MB-053012	SED-SS-06-052312	Diethylphthalate	13	4.9	µg/kg	13 U
UV97	MB-053012	DUP-052312-1	Diethylphthalate	12	4.8	µg/kg	12 U
UV97	MB-053012	SED-SS-13-052312	Diethylphthalate	10	4.9	µg/kg	10 U
UV97	MB-053012	SED-SS-14-052312	Diethylphthalate	9.7	4.7	µg/kg	9.7 U
UV97	MB-053012	SED-SS-05-052312	Diethylphthalate	44	4.9	µg/kg	44 U
UV97	MB-053012	SED-SS-18-052312	Diethylphthalate	16	4.8	µg/kg	16 U
UW60	MB-060412	See below	bis(2-Ethylhexyl)phthalate	62	25	µg/kg	--
UW60	MB-060412	SED-SC-04-6-7.1-053012	bis(2-Ethylhexyl)phthalate	45	23	µg/kg	45 U
UW60	MB-060412	SED-SC-07-0-1-053012	bis(2-Ethylhexyl)phthalate	160	24	µg/kg	160 U
UW60	MB-060412	SED-SC-07-2-4-053012	bis(2-Ethylhexyl)phthalate	97	24	µg/kg	97 U
UW62	MB-060412	SED-SC-09-0-1-052912	bis(2-Ethylhexyl)phthalate	42	24	µg/kg	42 U
UW62	MB-060412	SED-SC-09-2-4-052912	bis(2-Ethylhexyl)phthalate	45	24	µg/kg	45 U
UW62	MB-060612	See below	Diethylphthalate	22	5.0	µg/kg	--
UW62	MB-060612	SED-SC-09-0-1-052912	Diethylphthalate	22	4.8	µg/kg	22 U
UW62	MB-060612	SED-SC-09-2-4-052912	Diethylphthalate	9.4	4.7	µg/kg	9.4 U
UW62	MB-060612	SED-SC-09-6-8-052912	Diethylphthalate	9.6	4.8	µg/kg	9.6 U
UW61	MB-060412	See below	bis(2-Ethylhexyl)phthalate	62	25	µg/kg	--
UW61	MB-060412	SED-SC-02-0-1-052912	bis(2-Ethylhexyl)phthalate	180	24	µg/kg	180 U
UW61	MB-060412	SED-SC-02-2-4-052912	bis(2-Ethylhexyl)phthalate	44	23	µg/kg	44 U
UW61	MB-060412	SED-SC-02-6-8-052912	bis(2-Ethylhexyl)phthalate	79	24	µg/kg	79 U
UW61	MB-061212	NA	Lead, total	0.6	0.1	mg/kg	--
UW75	RB-053012-1	NA	bis(2-Ethylhexyl)phthalate	14	1.0	µg/L	--

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Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
UW75	MB-060812	See below	bis(2-Ethylhexyl)phthalate	29	25	µg/kg	--
UW75	MB-060812	SED-SC-08-6-8-053012	bis(2-Ethylhexyl)phthalate	46	24	µg/kg	46 U
UW75	MB-060812	SED-SC-03-0-1-053012	bis(2-Ethylhexyl)phthalate	98	24	µg/kg	98 U
UW75	MB-060812	SED-SC-03-2-4-053012	bis(2-Ethylhexyl)phthalate	50	24	µg/kg	50 U
UW75	MB-060812	SED-SC-01-2-4-053012	bis(2-Ethylhexyl)phthalate	88	23	µg/kg	88 U
UW75	MB-060812	DUP-053012-4	bis(2-Ethylhexyl)phthalate	150	22	µg/kg	150 U
UW75	MB-060812	SED-SC-17-0-1-053012	bis(2-Ethylhexyl)phthalate	260	24	µg/kg	260 U
UW75	MB-060812	SED-SC-17-2-4-053012	bis(2-Ethylhexyl)phthalate	75	23	µg/kg	75 U
UW75	MB-060812	SED-SC-13-2-4-053112	bis(2-Ethylhexyl)phthalate	110	24	µg/kg	110 U
UW75	MB-060812	See below	Diethylphthalate	19	5.0	µg/kg	--
UW75	MB-060812	SED-SC-08-0-1-053012	Diethylphthalate	26	4.8	µg/kg	26 U
UW75	MB-060812	SED-SC-08-2-4-053012	Diethylphthalate	21	4.8	µg/kg	21 U
UW75	MB-060812	SED-SC-08-6-8-053012	Diethylphthalate	62	4.7	µg/kg	62 U
UW75	MB-060812	DUP-053012-2	Diethylphthalate	14	4.7	µg/kg	14 U
UW75	MB-060812	SED-SC-03-0-1-053112	Diethylphthalate	53	4.8	µg/kg	53 U
UW75	MB-060812	SED-SC-03-2-4-053112	Diethylphthalate	18	4.9	µg/kg	18 U
UW75	MB-060812	SED-SC-03-6-8-053112	Diethylphthalate	34	4.7	µg/kg	34 U
UW75	MB-060812	DUP-053012-3	Diethylphthalate	18	4.8	µg/kg	18 U
UW75	MB-060812	SED-SC-01-0-1-053012	Diethylphthalate	51	4.6	µg/kg	51 U
UW75	MB-060812	SED-SC-01-2-4-053012	Diethylphthalate	13	4.6	µg/kg	13 U
UW75	MB-060812	DUP-053012-4	Diethylphthalate	12	4.5	µg/kg	12 U
UW75	MB-060812	SED-SC-17-0-1-053012	Diethylphthalate	15	4.8	µg/kg	15 U
UW75	MB-060812	SED-SC-17-2-4-053012	Diethylphthalate	32	4.6	µg/kg	32 U
UW75	MB-060812	SED-SC-13-0-1-053112	Diethylphthalate	42	4.8	µg/kg	42 U
UW75	MB-060812	SED-SC-13-2-4-053112	Diethylphthalate	40	4.9	µg/kg	40 U
UW75	MB-060812	SED-SC-13-6-7-053112	Diethylphthalate	17	4.6	µg/kg	17 U
UW97	MB-061112	See below	Diethylphthalate	8.3	5.0	µg/kg	--
UW97	MB-061112	SED-SC-15-0-1-053112	Diethylphthalate	15	4.6	µg/kg	15 U

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Lab Package	Blank ID	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
UW97	MB-061112	SED-SC-15-2-4-053112	Diethylphthalate	36	4.6	µg/kg	36 U
UW97	MB-061112	SED-SC-16-0-1-053112	Diethylphthalate	8.7	4.8	µg/kg	8.7 U
UW97	MB-061112	SED-SC-16-2-3.5-053112	Diethylphthalate	14	4.8	µg/kg	14 U
UW97	MB-061112	DUP-053112-2	Diethylphthalate	8.9	4.6	µg/kg	8.9 U
UW99	MB-061112	See below	Diethylphthalate	8.3	5.0	µg/kg	--
UW99	MB-061112	SED-SC-18-0-1-060112	Diethylphthalate	13	4.7	µg/kg	13 U
UW99	MB-061112	SED-SC-05-0-1-060112	Diethylphthalate	12	4.9	µg/kg	12 U
UW99	MB-061112	SED-SC-05-2-4-060112	Diethylphthalate	25	4.8	µg/kg	25 U
UW99	MB-061112	SED-SC-05-6-8-060112	Diethylphthalate	19	4.7	µg/kg	19 U
UW99	MB-061112	SED-SC-20-0-1-060112	Diethylphthalate	7.6	4.6	µg/kg	7.6 U
UW99	MB-061112	SED-SC-18-2-2.25-060112	Diethylphthalate	11	4.9	µg/kg	11 U
UW99	MB-061212	See below	Diethylphthalate	7.2	5.0	µg/kg	--
UW99	MB-061212	SED-SC-20-2-2.5-060112	Diethylphthalate	10	4.6	µg/kg	10 U
DPWG40583	RB-060112-1	NA	1,2,3,4,6,7,8-HPCDD	1.06	0.589	pg/L	--
DPWG40583	RB-060112-1	NA	OCDD	7.35	0.645	pg/L	EMPC
DPWG40583	RB-060112-1	NA	TOTAL HEPTA-DIOXINS	2.41	0.589	pg/L	--
DPWG40583	RB-053112-1	NA	1,2,3,4,6,7,8-HPCDD	1.17	0.608	pg/L	--
DPWG40583	RB-053112-1	NA	OCDD	5.26	0.608	pg/L	EMPC
DPWG40583	RB-053112-1	NA	OCDF	0.934	0.608	pg/L	--
DPWG40583	RB-053112-1	See below	TOTAL TETRA-DIOXINS	0.659	0.608	pg/L	--
DPWG40583	RB-053112-1	SED-SC-13-6-7-053112	TOTAL TETRA-DIOXINS	0.734	0.051	pg/g	0.734 U
DPWG40583	RB-053112-1	NA	TOTAL HEPTA-DIOXINS	1.17	0.608	pg/L	--
DPWG40583	RB-052912-1	See below	1,2,3,4,6,7,8-HPCDD	6.70	0.522	pg/L	--
DPWG40583	RB-052912-1	DUP-052912-2	1,2,3,4,6,7,8-HPCDD	18.2	0.047	pg/g	18.2 U

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Lab Package	Blank ID	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG40583	RB-052912-1	SED-SC-14-6-8-052912	1,2,3,4,6,7,8-HPCDD	18.4	0.119	pg/g	18.4 U
DPWG40583	RB-052912-1	See below	OCDD	77.5	0.522	pg/L	--
DPWG40583	RB-052912-1	DUP-052912-2	OCDD	519	0.046	pg/g	519 U
DPWG40583	RB-052912-1	SED-SC-14-6-8-052912	OCDD	290	0.134	pg/g	290 U
DPWG40583	RB-052912-1	See below	1,2,3,4,6,7,8-HPCDF	1.89	0.522	pg/L	--
DPWG40583	RB-052912-1	DUP-052912-2	1,2,3,4,6,7,8-HPCDF	6.96	0.046	pg/g	6.96 U
DPWG40583	RB-052912-1	SED-SC-14-6-8-052912	1,2,3,4,6,7,8-HPCDF	6.66	0.085	pg/g	6.66 U
DPWG40583	RB-052912-1	See below	OCDF	13.1	0.522	pg/L	--
DPWG40583	RB-052912-1	DUP-052912-2	OCDF	14.8	0.046	pg/g	14.8 U
DPWG40583	RB-052912-1	SED-SC-14-6-8-052912	OCDF	18.8	0.064	pg/g	18.8 U
DPWG40583	RB-052912-1	See below	TOTAL TETRA-DIOXINS	0.579	0.522	pg/L	--
DPWG40583	RB-052912-1	DUP-052912-2	TOTAL TETRA-DIOXINS	0.218	0.046	pg/g	0.218 U
DPWG40583	RB-052912-1	SED-SC-14-6-8-052912	TOTAL TETRA-DIOXINS	0.348	0.052	pg/g	0.348 U
DPWG40583	RB-052912-1	See below	TOTAL HEPTA-DIOXINS	11.8	0.522	pg/L	--
DPWG40583	RB-052912-1	DUP-052912-2	TOTAL HEPTA-DIOXINS	34.4	0.047	pg/g	34.4 U
DPWG40583	RB-052912-1	SED-SC-14-6-8-052912	TOTAL HEPTA-DIOXINS	33.8	0.119	pg/g	33.8 U
DPWG40583	RB-052912-1	NA	TOTAL HEXA-FURANS	1.82	0.522	pg/L	--
DPWG40583	RB-052912-1	See below	TOTAL HEPTA-FURANS	9.13	0.522	pg/L	--
DPWG40583	RB-052912-1	DUP-052912-2	TOTAL HEPTA-FURANS	26.0	0.046	pg/g	26.0 U
DPWG40583	RB-052912-1	SED-SC-14-6-8-052912	TOTAL HEPTA-FURANS	25.3	0.085	pg/g	25.3 U
DPWG40583	RB-053012-1	See below	1,2,3,4,6,7,8-HPCDD	2.33	0.553	pg/L	--
DPWG40583	RB-053012-1	SED-SC-04-6-7.1-053012	1,2,3,4,6,7,8-HPCDD	1.41	0.045	pg/g	1.41 U
DPWG40583	RB-053012-1	See below	OCDD	30.2	0.553	pg/L	--
DPWG40583	RB-053012-1	SED-SC-04-6-7.1-053012	OCDD	57.3	0.051	pg/g	57.3 U
DPWG40583	RB-053012-1	See below	1,2,3,4,6,7,8-HPCDF	0.677	0.553	pg/L	--
DPWG40583	RB-053012-1	SED-SC-04-6-7.1-053012	1,2,3,4,6,7,8-HPCDF	0.605	0.045	pg/g	0.605 U
DPWG40583	RB-053012-1	See below	OCDF	1.86	0.553	pg/L	--
DPWG40583	RB-053012-1	SED-SC-04-6-7.1-053012	OCDF	1.76	0.045	pg/g	1.76 U

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Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG40583	RB-053012-1	See below	TOTAL HEPTA-DIOXINS	4.77	0.553	pg/L	--
DPWG40583	RB-053012-1	SED-SC-04-6-7.1-053012	TOTAL HEPTA-DIOXINS	3.04	0.045	pg/g	3.04 U
DPWG40583	RB-053012-1	See below	TOTAL HEPTA-FURANS	0.677	0.553	pg/L	--
DPWG40583	RB-053012-1	SED-SC-04-6-7.1-053012	TOTAL HEPTA-FURANS	2.23	0.045	pg/g	2.23 U
DPWG40583	RB-052412-1	NA	1,2,3,4,6,7,8-HPCDD	1.64	0.525	pg/L	EMPC
DPWG40583	RB-052412-1	NA	OCDD	8.74	0.525	pg/L	--
DPWG40583	RB-052412-1	NA	1,2,3,4,6,7,8-HPCDF	0.537	0.525	pg/L	EMPC
DPWG40583	RB-052412-1	NA	OCDF	1.59	0.525	pg/L	EMPC
DPWG40583	RB-052412-1	NA	TOTAL HEPTA-DIOXINS	0.808	0.525	pg/L	--
DPWG40583	Lab Blank	NA	1,2,3,7,8,9-HXCDD	0.521	0.500	pg/L	EMPC
DPWG40583	Lab Blank	NA	1,2,3,4,6,7,8-HPCDD	1.40	0.500	pg/L	--
DPWG40583	Lab Blank	NA	OCDD	58.5	1.89	pg/L	--
DPWG40583	Lab Blank	NA	OCDF	1.74	0.500	pg/L	--
DPWG40583	Lab Blank	NA	TOTAL TETRA-DIOXINS	0.810	0.500	pg/L	--
DPWG40583	Lab Blank	NA	TOTAL HEPTA-DIOXINS	1.40	0.500	pg/L	--
DPWG40592	Lab Blank	NA	1,2,3,4,6,7,8-HPCDD	0.066	0.050	pg/g	--
DPWG40592	Lab Blank	NA	OCDD	0.334	0.050	pg/g	EMPC
DPWG40592	Lab Blank	NA	TOTAL HEPTA-DIOXINS	0.066	0.050	pg/g	--
DPWG40641	Lab Blank	NA	1,2,3,4,6,7,8-HPCDD	0.493	0.066	pg/g	--
DPWG40641	Lab Blank	NA	OCDD	9.78	0.052	pg/g	--
DPWG40641	Lab Blank	NA	1,2,3,4,6,7,8-HPCDF	0.255	0.054	pg/g	--
DPWG40641	Lab Blank	NA	1,2,3,4,7,8,9-HPCDF	0.087	0.054	pg/g	--
DPWG40641	Lab Blank	NA	OCDF	0.693	0.050	pg/g	--
DPWG40641	Lab Blank	NA	TOTAL HEPTA-DIOXINS	0.493	0.066	pg/g	--

Table 1
Blank and Associated Suspect Sample Detections
Sediment Samples Collected May-June 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG40641	Lab Blank	NA	TOTAL HEXA-FURANS	0.213	0.050	pg/g	--
DPWG40641	Lab Blank	NA	TOTAL HEPTA-FURANS	0.919	0.054	pg/g	--
DPWG40694	Lab Blank	NA	1,2,3,7,8,9-HXCDD	0.051	0.050	pg/g	--
DPWG40694	Lab Blank	NA	1,2,3,4,6,7,8-HPCDD	0.476	0.070	pg/g	--
DPWG40694	Lab Blank	NA	OCDD	11.7	0.274	pg/g	--
DPWG40694	Lab Blank	NA	1,2,3,4,7,8-HXCDF	0.130	0.050	pg/g	--
DPWG40694	Lab Blank	NA	1,2,3,4,6,7,8-HPCDF	0.184	0.050	pg/g	--
DPWG40694	Lab Blank	NA	1,2,3,4,7,8,9-HPCDF	0.085	0.050	pg/g	EMPC
DPWG40694	Lab Blank	NA	OCDF	0.654	0.184	pg/g	--
DPWG40694	Lab Blank	NA	TOTAL HEXA-DIOXINS	0.138	0.050	pg/g	--
DPWG40694	Lab Blank	NA	TOTAL HEPTA-DIOXINS	0.476	0.070	pg/g	--
DPWG40694	Lab Blank	NA	TOTAL HEXA-FURANS	0.559	0.050	pg/g	--
DPWG40694	Lab Blank	NA	TOTAL HEPTA-FURANS	0.594	0.050	pg/g	--
DPWG40795	Lab Blank	NA	1,2,3,4,6,7,8-HPCDD	0.073	0.050	pg/g	EMPC
DPWG40795	Lab Blank	NA	OCDD	0.279	0.050	pg/g	EMPC
DPWG40821	Lab Blank	NA	1,2,3,4,7,8-HPCDD	0.096	0.050	pg/g	--
DPWG40821	Lab Blank	NA	OCDD	0.611	0.050	pg/g	--
DPWG40821	Lab Blank	NA	OCDF	0.061	0.050	pg/g	EMPC
DPWG40821	Lab Blank	NA	TOTAL HEPTA-DIOXINS	0.096	0.050	pg/g	--
DPWG40821	Lab Blank	NA	TOTAL HEPTA-FURANS	0.077	0.050	pg/g	--
DPWG40991	Lab Blank	NA	1,2,3,4,6,7,8-HPCDD	0.060	0.050	pg/g	--
DPWG40991	Lab Blank	NA	OCDD	0.400	0.050	pg/g	--
DPWG40991	Lab Blank	NA	TOTAL HEPTA-DIOXINS	0.060	0.050	pg/g	--

Table 1
Blank and Associated Suspect Sample Detections
Sediment Samples Collected May-June 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG40991	Lab Blank	NA	TOTAL TETRA-FURANS	0.357	0.050	pg/g	--

Data packages reviewed: ARI UV63, UV97, UW01, UW23, UW18, UW49, UW27, UW43, UW61, UW60, UW62, UW75, UW97, UW99, UY06; AXYS DPWG40565, DPWG40583, DPWG40592, DPWG40641, DPWG40694, DPWG40795, DPWG40821, DPWG40991

Key:

MB = Method blank

RB = Rinsate blank

µg/kg = Micrograms per kilogram

µg/L = Micrograms per liter

pg/L = Picograms per liter

pg/g = Picograms per gram

NA = Not applicable; qualification of sample data not required

U = Nondetected

HPCDD = Heptachlorodibenzo-p-dioxin

OCDD = Octochlorodibenzo-p-dioxin

OCDF = Octochlorodibenzofuran

HPCDF = Heptachlorodibenzofuran

HXCDD = Hexachlorodibenzo-p-dioxin

HXCDF = Hexachlorodibenzofuran

EMPC = Blank result identified as Estimated Maximum Possible Concentration; qualification of sample data not required

Table 2
Laboratory Control Spike Recoveries Outside of Acceptable Limits
Sediment Samples Collected May-June 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
UW18	LCS-060112	NA	2,4-Dimethylphenol	43.9/27.1	30-160	47.4	30	--	--
UW18	LCS-060112	NA	2,4-Dimethylphenol	39.1/24.1	30-160	47.3	30	--	--

Data packages reviewed: ARI UV63, UV97, UW01, UW23, UW18, UW49, UW27, UW43, UW61, UW60, UW62, UW75, UW97, UW99, UY06; AXYS DPWG40565, DPWG40583, DPWG40592, DPWG40641, DPWG40694,

Key:

LCS = Laboratory control sample

NA = Not applicable; qualification of sample data not required

Table 3
Matrix Spike Recoveries Outside of Acceptable Limits
Sediment Samples Collected May-June 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
UW18	SED-SS-12-052412 MS/MSD	NA	Benzyl alcohol	48.1/91.5	30-160	31.9	30	--	--
UW18	SED-SS-12-052412 MS/MSD	NA	N-Nitrosodiphenylamine	42.3/14.0	30-160	101	30	--	--
UW18	SED-SS-12-052412 MS/MSD	NA	N-Nitrosodiphenylamine	41.5/22.9	30-160	57.6	30	--	--
UW18	SED-SS-12-052412 MS/MSD	NA	Benzyl alcohol	43.1/84.0	30-160	33.5	30	--	--
UW18	SED-SS-12-052412 MS	See below	Mercury, total	129	75-125	--	--	--	--
UW18	SED-SS-12-052412 MS	SED-SS-10-052412	Mercury, total	--	--	--	--	0.16	J+
UW18	SED-SS-12-052412 MS	SED-SS-12-052412	Mercury, total	--	--	--	--	0.21	J+
UW27	SED-SS-11-052512 MS/MSD	NA	bis(2-Ethylhexyl)phthalate	21.9/27.9	30-160	7.1	30	--	--
UW27	SED-SS-11-052512 MS	NA	Mercury, total	108	75-125	48.9	30	--	--
UW43	SED-SC-06-2-4-052912 MS/MSD	NA	2-Methylphenol	47.3/33.5	30-160	33.9	30	--	--
UW43	SED-SC-06-2-4-052912 MS/MSD	NA	Anthracene	166/454	30-160	55.8	30	--	--
UW43	SED-SC-06-2-4-052912 MS/MSD	NA	Benzo(g,h,i)perylene	36.1/13.3	30-160	12.1	30	--	--
UW43	SED-SC-06-2-4-052912 MS/MSD	See below	Arsenic, total	65.1	75-125	14.8	30	--	--
UW43	SED-SC-06-2-4-052912 MS/MSD	SED-SC-06-0-1-052912	Arsenic, total	--	--	--	--	20.2	J-
UW43	SED-SC-06-2-4-052912 MS/MSD	SED-SC-06-2-4-052912	Arsenic, total	--	--	--	--	10	J-

Table 3
Matrix Spike Recoveries Outside of Acceptable Limits
Sediment Samples Collected May-June 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
UW43	SED-SC-06-2-4-052912 MS/MSD	SED-SC-06-6-8-052912	Arsenic, total	--	--	--	--	13.2	J-
UW43	SED-SC-06-2-4-052912 MS/MSD	SED-SC-14-0-1-052912	Arsenic, total	--	--	--	--	29.9	J-
UW43	SED-SC-06-2-4-052912 MS/MSD	SED-SC-14-2-4-052912	Arsenic, total	--	--	--	--	18.7	J-
UW43	SED-SC-06-2-4-052912 MS/MSD	SED-SC-14-6-8-052912	Arsenic, total	--	--	--	--	4.9	J-
UW43	SED-SC-06-2-4-052912 MS/MSD	DUP-052912-2	Arsenic, total	--	--	--	--	4.8	J-
UW43	SED-SC-06-2-4-052912 MS/MSD	NA	Lead, total	149	75-125	8.3	30	4X	--
UW43	SED-SC-06-2-4-052912 MS/MSD	NA	Mercury, total	109	75-125	76.7	30	--	--
UV63	SED-SS-07-052212 MS/MSD	NA	Benzyl alcohol	86.4/133	30-160	30.4	30	--	--
UV63	SED-SS-07-052212 MS/MSD	NA	Benzoic acid	51.8/81.1	30-160	39.0	30	--	--
UV63	SED-SS-07-052212 MS/MSD	NA	N-Nitrosodiphenylamine	59.1/20.8	30-160	95.7	30	--	--
UV63	SED-SS-07-052212 MS/MSD	NA	N-Nitrosodiphenylamine	64.8/38.7	30-160	50.5	30	--	--
UV63	SED-SS-07-052212 MS/MSD	NA	Benzyl alcohol	75.3/125	30-160	35.0	30	--	--
UV63	SED-SS-07-052212 MS/MSD	NA	Aroclor 1260	46.7/51.0	47-124	5.2	30	--	--

Table 3
Matrix Spike Recoveries Outside of Acceptable Limits
Sediment Samples Collected May-June 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
UV97	SED-SS-22-052312 MS/MSD	NA	Aroclor 1260	46.5/47.7	47-124	0.9	30	--	--
UV97	SED-SS-17-052312 MS/MSD	See below	Mercury, total	33.6	75-125	--	--	--	--
UV97	SED-SS-17-052312 MS/MSD	SED-SS-17-052312	Mercury, total	--	--	--	--	0.50	J-
UV97	SED-SS-17-052312 MS/MSD	SED-SS-09-052312	Mercury, total	--	--	--	--	0.26	J-
UV97	SED-SS-17-052312 MS/MSD	SED-SS-19-052312	Mercury, total	--	--	--	--	0.18	J-
UV97	SED-SS-17-052312 MS/MSD	SED-SS-02-052312	Mercury, total	--	--	--	--	0.19	J-
UV97	SED-SS-17-052312 MS/MSD	SED-SS-06-052312	Mercury, total	--	--	--	--	0.17	J-
UV97	SED-SS-17-052312 MS/MSD	DUP-052312-1	Mercury, total	--	--	--	--	0.19	J-
UV97	SED-SS-17-052312 MS/MSD	SED-SS-13-052312	Mercury, total	--	--	--	--	0.21	J-
UV97	SED-SS-17-052312 MS/MSD	SED-SS-14-052312	Mercury, total	--	--	--	--	0.07	J-
UV97	SED-SS-17-052312 MS/MSD	SED-SS-05-052312	Mercury, total	--	--	--	--	0.42	J-
UV97	SED-SS-17-052312 MS/MSD	SED-SS-18-052312	Mercury, total	--	--	--	--	0.33	J-
UV97	SED-SS-17-052312 MS/MSD	SED-SS-22-052312	Mercury, total	--	--	--	--	0.17	J-
				--	--	--	--		
UW60	SED-SC-04-0-1-053012 MS/MSD	See below	Copper, total	130	75-125	--	--	--	--

Table 3
Matrix Spike Recoveries Outside of Acceptable Limits
Sediment Samples Collected May-June 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
UW60	SED-SC-04-0-1-053012 MS/MSD	SED-SC-04-0-1-053012	Copper, total	--	--	--	--	114	J+
UW60	SED-SC-04-0-1-053012 MS/MSD	SED-SC-04-2-4-053012	Copper, total	--	--	--	--	33.9	J+
UW60	SED-SC-04-0-1-053012 MS/MSD	SED-SC-04-6-7.1-053012	Copper, total	--	--	--	--	9.7	J+
UW60	SED-SC-04-0-1-053012 MS/MSD	SED-SC-07-0-1-053012	Copper, total	--	--	--	--	118	J+
UW60	SED-SC-04-0-1-053012 MS/MSD	SED-SC-07-2-4-053012	Copper, total	--	--	--	--	67.5	J+
UW60	SED-SC-04-0-1-053012 MS/MSD	SED-SC-07-6-8-053012	Copper, total	--	--	--	--	47.8	J+
UW62	SED-SC-04-0-1-053012 MS/MSD	SED-SC-09-0-1-052912	Copper, total	--	--	--	--	69.5	J+
UW62	SED-SC-04-0-1-053012 MS/MSD	SED-SC-09-2-4-052912	Copper, total	--	--	--	--	65.2	J+
UW62	SED-SC-04-0-1-053012 MS/MSD	SED-SC-09-6-8-052912	Copper, total	--	--	--	--	62.2	J+
UW61	SED-SC-02-0-1-052912 MS/MSD	See below	Zinc, total	-3.8	75-125	--	--	--	--
UW61	SED-SC-02-0-1-052912 MS/MSD	SED-SC-02-0-1-052912	Zinc, total	--	--	--	--	368	J-
UW61	SED-SC-02-0-1-052912 MS/MSD	SED-SC-02-2-4-052912	Zinc, total	--	--	--	--	52	J-
UW61	SED-SC-02-0-1-052912 MS/MSD	SED-SC-02-6-8-052912	Zinc, total	--	--	--	--	152	J-

Table 3
Matrix Spike Recoveries Outside of Acceptable Limits
Sediment Samples Collected May-June 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
UW97	SED-SC-15-2-4-053112 MS/MSD	NA	Naphthalene	86.0/141	30-160	39.6	30	--	--
UW97	SED-SC-15-2-4-053112 MS/MSD	NA	2-Methylnaphthalene	75.5/106	30-160	33.5	30	--	--
UW97	SED-SC-15-2-4-053112 MS/MSD	NA	Fluoranthene	146/334	30-160	70.5	30	--	--
UW97	SED-SC-15-2-4-053112 MS/MSD	NA	Pyrene	166/421	30-160	77.0	30	--	--
UW97	SED-SC-15-2-4-053112 MS/MSD	NA	Benzo(a)anthracene	111/207	30-160	56.8	30	--	--
UW97	SED-SC-15-2-4-053112 MS/MSD	NA	Chrysene	119/250	30-160	65.1	30	--	--
UW97	SED-SC-15-2-4-053112 MS/MSD	NA	Benzo(a)pyrene	102/191	30-160	55.9	30	--	--
UW97	SED-SC-15-2-4-053112 MS/MSD	NA	Indeno(1,2,3-cd)pyrene	82.1/116	30-160	32.8	30	--	--
UW97	SED-SC-15-2-4-053112 MS/MSD	NA	Benzo(g,h,i)perylene	77.3/114	30-160	35.7	30	--	--
UW97	SED-SC-15-2-4-053112 MS/MSD	NA	total Benzofluoranthenes	92.6/144	30-160	40.5	30	--	--
UW97	SED-SC-15-2-4-053112 MS/MSD	See below	Arsenic, total	153	75-125	--	--	--	--
UW97	SED-SC-15-2-4-053112 MS/MSD	SED-SC-15-0-1-053112	Arsenic, total	--	--	--	--	29.3	J+
UW97	SED-SC-15-2-4-053112 MS/MSD	SED-SC-15-2-4-053112	Arsenic, total	--	--	--	--	60.6	J+
UW97	SED-SC-15-2-4-053112 MS/MSD	SED-SC-16-0-1-053112	Arsenic, total	--	--	--	--	207	J+

Table 3
Matrix Spike Recoveries Outside of Acceptable Limits
Sediment Samples Collected May-June 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
UW97	SED-SC-15-2-4-053112 MS/MSD	SED-SC-16-2-3.5-053112	Arsenic, total	--	--	--	--	119	J+
UW97	SED-SC-15-2-4-053112 MS/MSD	DUP-053112-2	Arsenic, total	--	--	--	--	134	J+
UW97	SED-SC-15-2-4-053112 MS/MSD	See below	Copper, total	349	75-125	--	--	--	--
UW97	SED-SC-15-2-4-053112 MS/MSD	SED-SC-15-0-1-053112	Copper, total	--	--	--	--	181	J+
UW97	SED-SC-15-2-4-053112 MS/MSD	SED-SC-15-2-4-053112	Copper, total	--	--	--	--	141	J+
UW97	SED-SC-15-2-4-053112 MS/MSD	SED-SC-16-0-1-053112	Copper, total	--	--	--	--	159	J+
UW97	SED-SC-15-2-4-053112 MS/MSD	SED-SC-16-2-3.5-053112	Copper, total	--	--	--	--	100	J+
UW97	SED-SC-15-2-4-053112 MS/MSD	DUP-053112-2	Copper, total	--	--	--	--	75	J+
UW97	SED-SC-15-2-4-053112 MS/MSD	See below	Lead, total	1670	75-125	--	--	--	--
UW97	SED-SC-15-2-4-053112 MS/MSD	SED-SC-15-0-1-053112	Lead, total	--	--	--	--	114	J+
UW97	SED-SC-15-2-4-053112 MS/MSD	SED-SC-15-2-4-053112	Lead, total	--	--	--	--	49.5	J+
UW97	SED-SC-15-2-4-053112 MS/MSD	SED-SC-16-0-1-053112	Lead, total	--	--	--	--	82.3	J+
UW97	SED-SC-15-2-4-053112 MS/MSD	SED-SC-16-2-3.5-053112	Lead, total	--	--	--	--	20.8	J+
UW97	SED-SC-15-2-4-053112 MS/MSD	DUP-053112-2	Lead, total	--	--	--	--	16.9	J+

Table 3
Matrix Spike Recoveries Outside of Acceptable Limits
Sediment Samples Collected May-June 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
UW97	SED-SC-15-2-4-053112 MS/MSD	See below	Zinc, total	277	75-125	--	--	--	--
UW97	SED-SC-15-2-4-053112 MS/MSD	SED-SC-15-0-1-053112	Zinc, total	--	--	--	--	149	J+
UW97	SED-SC-15-2-4-053112 MS/MSD	SED-SC-15-2-4-053112	Zinc, total	--	--	--	--	133	J+
UW97	SED-SC-15-2-4-053112 MS/MSD	SED-SC-16-0-1-053112	Zinc, total	--	--	--	--	214	J+
UW97	SED-SC-15-2-4-053112 MS/MSD	SED-SC-16-2-3.5-053112	Zinc, total	--	--	--	--	76	J+
UW97	SED-SC-15-2-4-053112 MS/MSD	DUP-053112-2	Zinc, total	--	--	--	--	70	J+
UW75	SED-SC-13-2-4-053112 MS/MSD	NA	Aroclor 1016	208/154	47-124	32.4	30	--	--
UW75	SED-SC-13-2-4-053112 MS/MSD	NA	Aroclor 1260	35.1	47-124	--	--	--	--
UW75	SED-SC-13-2-4-053112 MS/MSD	See below	Arsenic, total	55.1	75-125	--	--	--	--
UW75	SED-SC-13-2-4-053112 MS/MSD	SED-SC-08-0-1-053012	Arsenic, total	--	--	--	--	18.7	J-
UW75	SED-SC-13-2-4-053112 MS/MSD	SED-SC-08-2-4-053012	Arsenic, total	--	--	--	--	18.0	J-
UW75	SED-SC-13-2-4-053112 MS/MSD	SED-SC-08-6-8-053012	Arsenic, total	--	--	--	--	5.2	J-
UW75	SED-SC-13-2-4-053112 MS/MSD	DUP-053012-2	Arsenic, total	--	--	--	--	20.9	J-
UW75	SED-SC-13-2-4-053112 MS/MSD	SED-SC-03-0-1-053012	Arsenic, total	--	--	--	--	10.9	J-

Table 3
Matrix Spike Recoveries Outside of Acceptable Limits
Sediment Samples Collected May-June 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
UW75	SED-SC-13-2-4-053112 MS/MSD	SED-SC-03-2-4-053012	Arsenic, total	--	--	--	--	44.8	J-
UW75	SED-SC-13-2-4-053112 MS/MSD	SED-SC-03-6-8-053012	Arsenic, total	--	--	--	--	13.3	J-
UW75	SED-SC-13-2-4-053112 MS/MSD	DUP-053012-3	Arsenic, total	--	--	--	--	97.5	J-
UW75	SED-SC-13-2-4-053112 MS/MSD	SED-SC-01-0-1-053012	Arsenic, total	--	--	--	--	22.9	J-
UW75	SED-SC-13-2-4-053112 MS/MSD	SED-SC-01-2-4-053012	Arsenic, total	--	--	--	--	23.1	J-
UW75	SED-SC-13-2-4-053112 MS/MSD	DUP-053012-4	Arsenic, total	--	--	--	--	39.4	J-
UW75	SED-SC-13-2-4-053112 MS/MSD	SED-SC-17-0-1-053012	Arsenic, total	--	--	--	--	26.6	J-
UW75	SED-SC-13-2-4-053112 MS/MSD	SED-SC-17-2-4-053012	Arsenic, total	--	--	--	--	1.4	J-
UW75	SED-SC-13-2-4-053112 MS/MSD	SED-SC-13-0-1-053112	Arsenic, total	--	--	--	--	19.1	J-
UW75	SED-SC-13-2-4-053112 MS/MSD	SED-SC-13-2-4-053112	Arsenic, total	--	--	--	--	7.9	J-
UW75	SED-SC-13-2-4-053112 MS/MSD	SED-SC-13-6-7-053112	Arsenic, total	--	--	--	--	4.3	J-
UW75	SED-SC-13-2-4-053112 MS/MSD	NA	Lead, total	58.8	75-125	--	--	4X	--
UW75	SED-SC-13-2-4-053112 MS/MSD	See below	Mercury, total	126	75-125	--	--	--	--
UW75	SED-SC-13-2-4-053112 MS/MSD	SED-SC-08-0-1-053012	Mercury, total	--	--	--	--	0.24	J+

Table 3
Matrix Spike Recoveries Outside of Acceptable Limits
Sediment Samples Collected May-June 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
UW75	SED-SC-13-2-4-053112 MS/MSD	SED-SC-08-2-4-053012	Mercury, total	--	--	--	--	0.27	J+
UW75	SED-SC-13-2-4-053112 MS/MSD	SED-SC-08-6-8-053012	Mercury, total	--	--	--	--	0.08	J+
UW75	SED-SC-13-2-4-053112 MS/MSD	DUP-053012-2	Mercury, total	--	--	--	--	0.34	J+
UW75	SED-SC-13-2-4-053112 MS/MSD	SED-SC-03-0-1-053012	Mercury, total	--	--	--	--	0.30	J+
UW75	SED-SC-13-2-4-053112 MS/MSD	SED-SC-03-2-4-053012	Mercury, total	--	--	--	--	0.26	J+
UW75	SED-SC-13-2-4-053112 MS/MSD	DUP-053012-3	Mercury, total	--	--	--	--	0.25	J+
UW75	SED-SC-13-2-4-053112 MS/MSD	SED-SC-01-0-1-053012	Mercury, total	--	--	--	--	0.40	J+
UW75	SED-SC-13-2-4-053112 MS/MSD	SED-SC-01-2-4-053012	Mercury, total	--	--	--	--	0.04	J+
UW75	SED-SC-13-2-4-053112 MS/MSD	DUP-053012-4	Mercury, total	--	--	--	--	0.04	J+
UW75	SED-SC-13-2-4-053112 MS/MSD	SED-SC-17-0-1-053012	Mercury, total	--	--	--	--	0.30	J+
UW75	SED-SC-13-2-4-053112 MS/MSD	SED-SC-17-2-4-053012	Mercury, total	--	--	--	--	0.09	J+
UW75	SED-SC-13-2-4-053112 MS/MSD	SED-SC-13-0-1-053112	Mercury, total	--	--	--	--	0.20	J+
UW75	SED-SC-13-2-4-053112 MS/MSD	SED-SC-13-2-4-053112	Mercury, total	--	--	--	--	0.19	J+
UW75	SED-SC-13-2-4-053112 MS/MSD	SED-SC-13-6-7-053112	Mercury, total	--	--	--	--	0.03	J+

Table 3
Matrix Spike Recoveries Outside of Acceptable Limits
Sediment Samples Collected May-June 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
DPWG40565	SED-SC-06-2-4-052912 MS/MSD	See below	2,3,7,8-TCDF	145/140	70-130	3.04	20	--	--
DPWG40565	SED-SC-06-2-4-052912 MS/MSD	SED-SC-06-2-4-052912	2,3,7,8-TCDF	--	--	--	--	41.8	J+
DPWG40565	SED-SC-06-2-4-052912 MS/MSD	NA	1,2,3,4,7,8-HXCDF	62.6/122	70-130	64.7	20	--	--
DPWG40565	SED-SC-06-2-4-052912 MS/MSD	NA	OCDF	75.7/103	70-130	30.1	20	--	--
DPWG40565	SED-SS-11-052512 MS/MSD	NA	1,2,3,4,6,7,8-HPCDD	72.1/160	70-130	75.7	20		
DPWG40565	SED-SS-11-052512 MS/MSD	See below	OCDD	18.4/346	70-130	180	20		
DPWG40565	SED-SS-11-052512 MS/MSD	SED-SC-14-6-8-052912	OCDD	--	--	--	--	290	J
DPWG40565	SED-SS-11-052512 MS/MSD	SED-SS-11-052512	OCDD	--	--	--	--	2170	J
DPWG40565	SED-SS-11-052512 MS/MSD	DUP-052512-1	OCDD	--	--	--	--	2120	J
DPWG40565	SED-SS-11-052512 MS/MSD	SED-SC-21-0-1-052512	OCDD	--	--	--	--	1860	J
DPWG40565	SED-SS-11-052512 MS/MSD	SED-SC-21-2-4-052512	OCDD	--	--	--	--	1430	J
DPWG40592	SED-SS-07-052212 MS/MSD	NA	1,2,3,4,6,7,8-HPCDF	109/89.0	70-130	20.2	20	--	--
DPWG40592	SED-SS-07-052212 MS/MSD	NA	OCDF	106/144	70-130	30.6	20	--	--

Table 3
Matrix Spike Recoveries Outside of Acceptable Limits
Sediment Samples Collected May-June 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
DPWG40821	SED-SC-15-2-4-053112 MS/MSD	NA	2,3,7,8-TCDF	5670/5040	70-130	11.7	20	4X	--
DPWG40821	SED-SC-15-2-4-053112 MS/MSD	NA	1,2,3,6,7,8-HXCDF	45.6/192	70-130	123	20	4X	--
DPWG40821	SED-SC-15-2-4-053112 MS/MSD	NA	1,2,3,7,8,9-HXCDF	61.7/58.1	70-130	5.92	20	--	--
DPWG40821	SED-SC-15-2-4-053112 MS/MSD	NA	1,2,3,4,6,7,8-HPCDF	18.7/268	70-130	174	20	4X	--
DPWG40821	SED-SC-15-2-4-053112 MS/MSD	NA	1,2,3,4,7,8,9-HPCDF	91.9/118	70-130	24.8	20	--	--
DPWG40821	SED-SC-15-2-4-053112 MS/MSD	NA	OCDF	86.5/371	70-130	124	20	--	--

Data packages reviewed: ARI UV63, UV97, UW01, UW23, UW18, UW49, UW27, UW43, UW61, UW60, UW62, UW75, UW97, UW99, UY06; AXYS DPWG40565, DPWG40583, DPWG40592, DPWG40641, DPWG40694, DPWG40795, DPWG40821, DPWG40991

Key:

MS/MSD = Matrix spike/matrix spike duplicate

RPD = Relative percent difference

NA = Not applicable; qualification of sample data not required

J- = Detected sample result qualified as estimated and biased low

J+ = Detected sample result qualified as estimated and biased high

J = Detected sample result qualified as estimated

4X = Concentration of unspiked sample was greater than 4 times the amount spiked; no qualification required

TCDF = Tetrachlorodibenzofuran

HXCDF = Hexachlorodibenzofuran

OCDF = Octochlorodibenzofuran

HPCDD = Heptachlorodibenzo-p-dioxin

OCDD = Octochlorodibenzo-p-dioxin

HPCDF = Heptachlorodibenzofuran

Table 4
Surrogate Recovery Results out of Acceptable Limits
Sediment Samples Collected May-June 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Method	Surrogate	Recovery (%)	Limit (%)	ERM Qualifier
UV63	SED-SS-16-052212	PCB	Tetrachlorometaxylene	20.4	34-109	J/UJ
UV97	SED-SS-09-052312	PCB	Decachlorobiphenyl	137	24-127	J
UV97	SED-SS-14-052312	PCB	Decachlorobiphenyl	140	24-127	J
UW60	SED-SC-04-6-7.1-053012	TBT	Tripropyl tin chloride	104	32-104	--
UW60	SED-SC-07-2-4-053012	TBT	Tripropyl tin chloride	113	32-104	J
UW61	SED-SC-02-0-1-052912	TBT	Tripropyl tin chloride	106	32-104	J
UW75	SED-SC-03-2-4-053012	PCB	Decachlorobiphenyl	165	24-127	J
UW97	SED-SC-15-0-1-053112	PCB	Decachlorobiphenyl	165	24-127	J

Data packages reviewed: ARI UV63, UV97, UW01, UW23, UW18, UW49, UW27, UW43, UW61, UW60, UW62, UW75, UW97, UW99, UY06; AXYS DPWG40565, DPWG40583, DPWG40592, DPWG40641, DPWG40694, DPWG40795, DPWG40821, DPWG40991

Key:

PCB = Polychlorinated biphenyls; Method 8082A

TBT = Tributyl Tins; Krone 1988 SIM

J = Detected sample result qualified as estimated

UJ = Nondetected sample result qualified as estimated

Table 5
Estimated Maximum Possible Concentration
Sediment Samples Collected May-June 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG40565	SED-SC-14-6-8-052912	1,2,3,4,7,8-HXCDD	0.103	0.052	pg/g	0.103 U
DPWG40565	SED-SC-14-6-8-052912	2,3,7,8-TCDF	0.088	0.052	pg/g	0.088 U
DPWG40565	SED-SC-14-6-8-052912	1,2,3,7,8-PECDF	0.101	0.052	pg/g	0.101 U
DPWG40565	SED-SC-14-6-8-052912	2,3,4,7,8-PECDF	0.275	0.052	pg/g	0.275 U
DPWG40565	SED-SS-11-052512	1,2,3,7,8,9-HXCDF	0.225	0.063	pg/g	0.225 U
DPWG40565	SED-SS-11-052512	2,3,7,8-TCDF	0.864	0.137	pg/g	0.864 U
DPWG40565	DUP-052512-1	1,2,3,7,8,9-HXCDF	0.179	0.089	pg/g	0.179 U
DPWG40565	SED-SC-21-0-1-052512	1,2,3,7,8,9-HXCDF	0.129	0.058	pg/g	0.129 U
DPWG40565	SED-SC-21-2-4-052512	2,3,7,8-TCDF	0.374	0.049	pg/g	0.374 U
DPWG40565	SED-SC-21-2-4-052512	1,2,3,7,8,9-HXCDF	0.126	0.056	pg/g	0.126 U
DPWG40565	SED-SC-21-6-8-052512	1,2,3,7,8,9-HXCDF	0.359	0.177	pg/g	0.359 U
DPWG40583	RB-060112-1	OCDD	7.35	0.645	pg/L	7.135 U
DPWG40583	RB-053112-1	OCDD	5.26	0.608	pg/L	5.26 U
DPWG40583	RB-052412-1	1,2,3,4,6,7,8-HPCDD	1.64	0.525	pg/L	1.64 U
DPWG40583	RB-052412-1	1,2,3,4,6,7,8-HPCDF	0.537	0.525	pg/L	0.537 U
DPWG40583	RB-052412-1	OCDF	1.59	0.525	pg/L	1.59 U
DPWG40583	Lab Blank	1,2,3,7,8,9-HXCDD	0.521	0.500	pg/L	0.521 U
DPWG40592	DUP-052312-1	2,3,7,8-TCDD	0.793	0.047	pg/g	0.793 U
DPWG40592	SED-SS-01-052212	1,2,3,7,8-PECDD	1.41	0.088	pg/g	1.41 U
DPWG40592	Lab Blank	OCDD	0.334	0.050	pg/g	0.334 U
DPWG40694	SED-SC-03-6-8-053012	1,2,3,7,8-PECDD	0.099	0.049	pg/g	0.099 U
DPWG40694	SED-SC-03-6-8-053012	1,2,3,7,8,9-HXCDF	0.077	0.049	pg/g	0.077 U
DPWG40694	SED-SC-01-0-1-053012	1,2,3,7,8,9-HXCDF	0.260	0.049	pg/g	0.260 U
DPWG40694	SED-SC-01-2-4-053012	2,3,7,8-TCDD	0.250	0.050	pg/g	0.250 U
DPWG40694	SED-SC-01-2-4-053012	1,2,3,7,8-PECDF	0.379	0.050	pg/g	0.379 U
DPWG40694	SED-SC-01-2-4-053012	1,2,3,6,7,8-HXCDF	1.24	0.050	pg/g	1.24 U
DPWG40694	SED-SC-01-2-4-053012	1,2,3,7,8,9-HXCDF	0.086	0.050	pg/g	0.086 U
DPWG40694	SED-SC-01-2-4-053012	2,3,4,6,7,8-HXCDF	0.701	0.050	pg/g	0.701 U
DPWG40694	DUP-053012-4	2,3,7,8-TCDD	0.191	0.050	pg/g	0.191 U
DPWG40694	SED-SC-13-6-7-053112	2,3,7,8-TCDD	0.060	0.051	pg/g	0.060 U
DPWG40694	SED-SC-13-6-7-053112	2,3,7,8-TCDF	0.080	0.051	pg/g	0.080 U
DPWG40694	Lab Blank	1,2,3,4,7,8,9-HPCDF	0.085	0.050	pg/g	0.085 U
DPWG40795	SED-SC-04-2-4-053012	2,3,7,8-TCDD	0.101	0.048	pg/g	0.101 U
DPWG40795	SED-SC-18-2-2.25-060112	2,3,7,8-TCDD	0.501	0.089	pg/g	0.501 U
DPWG40795	Lab Blank	1,2,3,4,6,7,8-HPCDD	0.073	0.050	pg/g	0.073 U
DPWG40795	Lab Blank	OCDD	0.279	0.050	pg/g	0.279 U
DPWS40821	SED-SC-04-6-7.1-053012	1,2,3,6,7,8-HXCDD	0.052	0.045	pg/g	0.052 U
DPWS40821	SED-SC-07-6-8-053012	1,2,3,7,8-PECDD	1.25	0.171	pg/g	1.25 U

Table 5
Estimated Maximum Possible Concentration
Sediment Samples Collected May-June 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG40821	Lab Blank	OCDF	0.061	0.050	pg/g	0.061 U

Data packages reviewed: ARI UV63, UV97, UW01, UW23, UW18, UW49, UW27, UW43, UW61, UW60, UW62, UW75, UW97, UW99, UY06; AXYS DPWG40565, DPWG40583, DPWG40592, DPWG40641, DPWG40694, DPWG40795, DPWG40821, DPWG40991

Key:

pg/g = Picograms per gram

U = Nondetected

HXCDD = Hexachlorodibenzo-p-dioxin

TCDF = Tetrachlorodibenzofuran

OCDD = Octochlorodibenzo-p-dioxin

HPCDF = Heptachlorodibenzofuran

PECDF = Pentachlorodibenzofuran

HXCDF = Hexachlorodibenzofuran

TCDD = Tetrachlorodibenzo-p-dioxin

PECDD = Pentachlorodibenzo-p-dioxin

HPCDD = Heptachlorodibenzo-p-dioxin

OCDF = Octochlorodibenzofuran

Table 6
Field Duplicate Results and Calculated Relative Percent Differences
Sediment Samples Collected May-June 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Compound	Concentration		Report Limit	Units	RPD
			Sample	Duplicate			
UW27	SED-SS-11-052512/DUP-052512-1	Benzyl alcohol	410	210	20/19	µg/kg	65
UW27	SED-SS-11-052512/DUP-052512-1	Fluorene	28	22	20/19	µg/kg	24
UW27	SED-SS-11-052512/DUP-052512-1	Phenanthrene	120	92	20/19	µg/kg	26
UW27	SED-SS-11-052512/DUP-052512-1	Anthracene	51	33	20/19	µg/kg	43
UW27	SED-SS-11-052512/DUP-052512-1	Fluoranthene	290	210	20/19	µg/kg	32
UW27	SED-SS-11-052512/DUP-052512-1	Pyrene	250	170	20/19	µg/kg	38
UW27	SED-SS-11-052512/DUP-052512-1	Benzo(a)anthracene	120	86	20/19	µg/kg	33
UW27	SED-SS-11-052512/DUP-052512-1	bis(2-Ethylhexyl)phthalate	320	160	25/24	µg/kg	67
UW27	SED-SS-11-052512/DUP-052512-1	Chrysene	210	140	20/19	µg/kg	40
UW27	SED-SS-11-052512/DUP-052512-1	Benzo(a)pyrene	120	84	20/19	µg/kg	35
UW27	SED-SS-11-052512/DUP-052512-1	Indeno(1,2,3-cd)pyrene	77	49	20/19	µg/kg	44
UW27	SED-SS-11-052512/DUP-052512-1	Benzo(g,h,i)perylene	97	59	20/19	µg/kg	49
UW27	SED-SS-11-052512/DUP-052512-1	Total Benzofluoranthenes	320	210	20/19	µg/kg	42
UW27	SED-SS-11-052512/DUP-052512-1	Dibenz(a,h)anthracene	26	20	4.9/4.8	µg/kg	26
UW27	SED-SS-11-052512/DUP-052512-1	Butylbenzylphthalate	15	13	4.9/4.8	µg/kg	14
UW27	SED-SS-11-052512/DUP-052512-1	Benzyl alcohol	330	180	20/19	µg/kg	59
UW27	SED-SS-11-052512/DUP-052512-1	Aroclor 1248	27	28	3.8/3.9	µg/kg	3.6
UW27	SED-SS-11-052512/DUP-052512-1	Aroclor 1254	42	46	3.8/3.9	µg/kg	9.1
UW27	SED-SS-11-052512/DUP-052512-1	Aroclor 1260	24	27	3.8/3.9	µg/kg	12
UW27	SED-SS-11-052512/DUP-052512-1	Arsenic, total	14.1	15.3	0.4	mg/kg	8.2
UW27	SED-SS-11-052512/DUP-052512-1	Cadmium, total	0.3	0.3	0.2	mg/kg	0
UW27	SED-SS-11-052512/DUP-052512-1	Chromium, total	34	34	1.0	mg/kg	0
UW27	SED-SS-11-052512/DUP-052512-1	Copper, total	67.7	66.6	0.5/0.4	mg/kg	1.6
UW27	SED-SS-11-052512/DUP-052512-1	Lead, total	24.9	26.7	0.2	mg/kg	7.0
UW27	SED-SS-11-052512/DUP-052512-1	Mercury, total	0.17	0.26	0.04	mg/kg	42
UW27	SED-SS-11-052512/DUP-052512-1	Zinc, total	129	126	2.0	mg/kg	2.4
UW27	SED-SS-11-052512/DUP-052512-1	Total Solids	44.70	46.00	0.01	%	2.9
UW27	SED-SS-11-052512/DUP-052512-1	TOC	6.53	10.6	0.196/0.200	%	48

Table 6
Field Duplicate Results and Calculated Relative Percent Differences
Sediment Samples Collected May-June 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Compound	Concentration		Report Limit	Units	RPD
			Sample	Duplicate			
UW43	SED-SC-14-6-8-052912/DUP-052912-2	Pyrene	30	36	19	µg/kg	18
UW43	SED-SC-14-6-8-052912/DUP-052912-2	Arsenic, total	4.9	4.8	0.3/0.2	mg/kg	2.1
UW43	SED-SC-14-6-8-052912/DUP-052912-2	Chromium, total	10.5	12.7	0.6	mg/kg	19
UW43	SED-SC-14-6-8-052912/DUP-052912-2	Copper, total	11.3	10.9	0.2	mg/kg	3.6
UW43	SED-SC-14-6-8-052912/DUP-052912-2	Lead, total	2.9	2.8	0.1	mg/kg	3.5
UW43	SED-SC-14-6-8-052912/DUP-052912-2	Zinc, total	30	29	1.0	mg/kg	3.4
UW43	SED-SC-14-6-8-052912/DUP-052912-2	Total solids	83.60	84.80	0.01	%	1.4
UW43	SED-SC-14-6-8-052912/DUP-052912-2	TOC	3.75	2.90	0.020	%	26
UV63	SED-SS-08-052212/DUP-052212-1	Benzyl alcohol	71	130	20/19	µg/kg	59
UV63	SED-SS-08-052212/DUP-052212-1	Benzoic acid	100	170	390/380	µg/kg	52
UV63	SED-SS-08-052212/DUP-052212-1	Phenanthrene	57	76	20/19	µg/kg	29
UV63	SED-SS-08-052212/DUP-052212-1	Anthracene	23	67	20/19	µg/kg	98
UV63	SED-SS-08-052212/DUP-052212-1	Fluoranthene	120	180	20/19	µg/kg	40
UV63	SED-SS-08-052212/DUP-052212-1	Pyrene	110	150	20/19	µg/kg	31
UV63	SED-SS-08-052212/DUP-052212-1	Benzo(a)anthracene	62	78	20/19	µg/kg	23
UV63	SED-SS-08-052212/DUP-052212-1	bis(2-Ethylhexyl)phthalate	93	93	24	µg/kg	0
UV63	SED-SS-08-052212/DUP-052212-1	Chrysene	100	140	20/19	µg/kg	33
UV63	SED-SS-08-052212/DUP-052212-1	Benzo(a)pyrene	57	72	20/19	µg/kg	23
UV63	SED-SS-08-052212/DUP-052212-1	total Benzofluoranthenes	140	180	20/19	µg/kg	25
UV63	SED-SS-08-052212/DUP-052212-1	Dibenz(a,h)anthracene	11	14	4.9/4.8	µg/kg	24
UV63	SED-SS-08-052212/DUP-052212-1	Diethylphthalate	9.3	7.4	4.9/4.8	µg/kg	23
UV63	SED-SS-08-052212/DUP-052212-1	Butylbenzylphthalate	14	14	4.9/4.8	µg/kg	0
UV63	SED-SS-08-052212/DUP-052212-1	Benzyl alcohol	70	110	20/19	µg/kg	44
UV63	SED-SS-08-052212/DUP-052212-1	Aroclor 1248	20	21	20/21	µg/kg	4.9
UV63	SED-SS-08-052212/DUP-052212-1	Aroclor 1254	40	41	40/41	µg/kg	2.5
UV63	SED-SS-08-052212/DUP-052212-1	Aroclor 1260	26	28	26/28	µg/kg	7.4
UV63	SED-SS-08-052212/DUP-052212-1	Arsenic, total	14.0	15.0	0.4	mg/kg	6.9

Table 6
Field Duplicate Results and Calculated Relative Percent Differences
Sediment Samples Collected May-June 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Compound	Concentration		Report Limit	Units	RPD
			Sample	Duplicate			
UV63	SED-SS-08-052212/DUP-052212-1	Cadmium, total	0.3	0.3	0.2	mg/kg	0
UV63	SED-SS-08-052212/DUP-052212-1	Chromium, total	34	37	1.0	mg/kg	8.5
UV63	SED-SS-08-052212/DUP-052212-1	Copper, total	67.9	73.2	0.4	mg/kg	7.5
UV63	SED-SS-08-052212/DUP-052212-1	Lead, total	25.6	28.9	0.2	mg/kg	12
UV63	SED-SS-08-052212/DUP-052212-1	Mercury, total	0.21	0.17	0.05	mg/kg	21
UV63	SED-SS-08-052212/DUP-052212-1	Zinc, total	137	144	2.0	mg/kg	5.0
UV63	SED-SS-08-052212/DUP-052212-1	Total Solids	43.60	44.20	0.01	%	1.4
UV63	SED-SS-08-052212/DUP-052212-1	TOC	2.88	2.90	0.020	%	0.7
UV97	SED-SS-06-052312/DUP-052312-1	Phenol	16	21	20/19	µg/kg	27
UV97	SED-SS-06-052312/DUP-052312-1	Benzyl alcohol	45	78	20/19	µg/kg	54
UV97	SED-SS-06-052312/DUP-052312-1	Phenanthrene	60	110	20/19	µg/kg	59
UV97	SED-SS-06-052312/DUP-052312-1	Anthracene	18	36	20/19	µg/kg	67
UV97	SED-SS-06-052312/DUP-052312-1	Fluoranthene	140	240	20/19	µg/kg	53
UV97	SED-SS-06-052312/DUP-052312-1	Pyrene	150	240	20/19	µg/kg	46
UV97	SED-SS-06-052312/DUP-052312-1	Butylbenzylphthalate	20	34	20/19	µg/kg	52
UV97	SED-SS-06-052312/DUP-052312-1	Benzo(a)anthracene	74	120	20/19	µg/kg	47
UV97	SED-SS-06-052312/DUP-052312-1	bis(2-Ethylhexyl)phthalate	120	210	24	µg/kg	55
UV97	SED-SS-06-052312/DUP-052312-1	Chrysene	120	220	20/19	µg/kg	59
UV97	SED-SS-06-052312/DUP-052312-1	Benzo(a)pyrene	82	120	20/19	µg/kg	38
UV97	SED-SS-06-052312/DUP-052312-1	Indeno(1,2,3-cd)pyrene	52	76	20/19	µg/kg	38
UV97	SED-SS-06-052312/DUP-052312-1	Dibenz(a,h)anthracene	21	26	20/19	µg/kg	21
UV97	SED-SS-06-052312/DUP-052312-1	Benzo(g,h,i)perylene	60	90	20/19	µg/kg	40
UV97	SED-SS-06-052312/DUP-052312-1	total Benzofluoranthenes	200	300	20/19	µg/kg	40
UV97	SED-SS-06-052312/DUP-052312-1	Dibenz(a,h)anthracene	22	32	4.9/4.8	µg/kg	37
UV97	SED-SS-06-052312/DUP-052312-1	Diethylphthalate	13	12	4.9/4.8	µg/kg	8.0
UV97	SED-SS-06-052312/DUP-052312-1	Butylbenzylphthalate	18	34	4.9/4.8	µg/kg	62
UV97	SED-SS-06-052312/DUP-052312-1	Benzyl alcohol	40	72	20/19	µg/kg	57

Table 6
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Reichhold-Glacier Site
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Lab Package	Sample/Duplicate ID	Compound	Concentration		Report Limit	Units	RPD
			Sample	Duplicate			
UV97	SED-SS-06-052312/DUP-052312-1	Aroclor 1248	29	35	3.8/4.0	µg/kg	19
UV97	SED-SS-06-052312/DUP-052312-1	Aroclor 1254	66	86	3.8/4.0	µg/kg	26
UV97	SED-SS-06-052312/DUP-052312-1	Aroclor 1260	39	42	3.8/4.0	µg/kg	7.4
UV97	SED-SS-06-052312/DUP-052312-1	Arsenic, total	15.3	14.6	0.4/0.5	mg/kg	4.7
UV97	SED-SS-06-052312/DUP-052312-1	Cadmium, total	0.4	0.4	0.2	mg/kg	0
UV97	SED-SS-06-052312/DUP-052312-1	Chromium, total	38	40	1.0	mg/kg	5.1
UV97	SED-SS-06-052312/DUP-052312-1	Copper, total	77.7	81.7	0.5	mg/kg	5.0
UV97	SED-SS-06-052312/DUP-052312-1	Lead, total	35.7	35.0	0.2	mg/kg	2.0
UV97	SED-SS-06-052312/DUP-052312-1	Mercury, total	0.17	0.19	0.05/0.06	mg/kg	11
UV97	SED-SS-06-052312/DUP-052312-1	Zinc, total	147	155	2.0	mg/kg	5.3
UV97	SED-SS-06-052312/DUP-052312-1	Total Solids	43.40	43.00	0.01	%	0.9
UV97	SED-SS-06-052312/DUP-052312-1	TOC	2.04	2.88	0.020	%	34
UW75	SED-SC-08-2-4-053012/DUP-053012-2	Phenol	57	50	19	µg/kg	13
UW75	SED-SC-08-2-4-053012/DUP-053012-2	Naphthalene	33	21	19	µg/kg	44
UW75	SED-SC-08-2-4-053012/DUP-053012-2	Phenanthrene	140	140	19	µg/kg	0
UW75	SED-SC-08-2-4-053012/DUP-053012-2	Anthracene	42	38	19	µg/kg	10
UW75	SED-SC-08-2-4-053012/DUP-053012-2	Fluoranthene	240	270	19	µg/kg	12
UW75	SED-SC-08-2-4-053012/DUP-053012-2	Pyrene	570	540	19	µg/kg	5.4
UW75	SED-SC-08-2-4-053012/DUP-053012-2	Benzo(a)anthracene	110	120	19	µg/kg	8.7
UW75	SED-SC-08-2-4-053012/DUP-053012-2	bis(2-Ethylhexyl)phthalate	290	290	24/23	µg/kg	0
UW75	SED-SC-08-2-4-053012/DUP-053012-2	Chrysene	150	160	19	µg/kg	6.5
UW75	SED-SC-08-2-4-053012/DUP-053012-2	Benzo(a)pyrene	180	180	19	µg/kg	0
UW75	SED-SC-08-2-4-053012/DUP-053012-2	Indeno(1,2,3-cd)pyrene	94	98	19	µg/kg	4.2
UW75	SED-SC-08-2-4-053012/DUP-053012-2	Dibenz(a,h)anthracene	46	50	19	µg/kg	8.3
UW75	SED-SC-08-2-4-053012/DUP-053012-2	Benzo(g,h,i)perylene	110	110	19	µg/kg	0
UW75	SED-SC-08-2-4-053012/DUP-053012-2	total Benzofluoranthenes	430	390	19	µg/kg	9.8
UW75	SED-SC-08-2-4-053012/DUP-053012-2	Dibenz(a,h)anthracene	40	40	4.8/4.7	µg/kg	0

Table 6
Field Duplicate Results and Calculated Relative Percent Differences
Sediment Samples Collected May-June 2012
Reichhold-Glacier Site
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Lab Package	Sample/Duplicate ID	Compound	Concentration		Report Limit	Units	RPD
			Sample	Duplicate			
UW75	SED-SC-08-2-4-053012/DUP-053012-2	Diethylphthalate	21	14	4.8/4.7	µg/kg	40
UW75	SED-SC-08-2-4-053012/DUP-053012-2	Butylbenzylphthalate	21	20	4.8/4.7	µg/kg	4.9
UW75	SED-SC-08-2-4-053012/DUP-053012-2	Benzyl alcohol	42	23	19	µg/kg	58
UW75	SED-SC-08-2-4-053012/DUP-053012-2	Tributyltin ion	130	160	3.5	µg/kg	21
UW75	SED-SC-08-2-4-053012/DUP-053012-2	Aroclor 1248	440	440	38	µg/kg	0
UW75	SED-SC-08-2-4-053012/DUP-053012-2	Aroclor 1254	680	710	38	µg/kg	4.3
UW75	SED-SC-08-2-4-053012/DUP-053012-2	Aroclor 1260	250	270	38	µg/kg	7.7
UW75	SED-SC-08-2-4-053012/DUP-053012-2	Arsenic, total	18.0	20.9	0.3/0.4	mg/kg	15
UW75	SED-SC-08-2-4-053012/DUP-053012-2	Cadmium, total	0.7	0.8	0.2	mg/kg	13
UW75	SED-SC-08-2-4-053012/DUP-053012-2	Chromium, total	53.6	51.5	0.8/0.9	mg/kg	4.0
UW75	SED-SC-08-2-4-053012/DUP-053012-2	Copper, total	86.5	98.6	0.3/0.4	mg/kg	13
UW75	SED-SC-08-2-4-053012/DUP-053012-2	Lead, total	71.6	88.4	0.2	mg/kg	21
UW75	SED-SC-08-2-4-053012/DUP-053012-2	Mercury, total	0.27	0.34	0.04	mg/kg	23
UW75	SED-SC-08-2-4-053012/DUP-053012-2	Silver, total	0.7	0.9	0.5	mg/kg	25
UW75	SED-SC-08-2-4-053012/DUP-053012-2	Zinc, total	153	194	2.0	mg/kg	24
UW75	SED-SC-08-2-4-053012/DUP-053012-2	Total Solids	54.70	52.70	0.01	%	3.7
UW75	SED-SC-08-2-4-053012/DUP-053012-2	TOC	1.64	1.92	0.020	%	16
UW75	SED-SC-03-2-4-053012/DUP-053012-3	Phenol	450	220	20/19	µg/kg	69
UW75	SED-SC-03-2-4-053012/DUP-053012-3	Benzyl alcohol	35	24	20/19	µg/kg	37
UW75	SED-SC-03-2-4-053012/DUP-053012-3	4-Methylphenol	110	64	39/38	µg/kg	53
UW75	SED-SC-03-2-4-053012/DUP-053012-3	Naphthalene	170	97	20/19	µg/kg	55
UW75	SED-SC-03-2-4-053012/DUP-053012-3	2-Methylnaphthalene	52	28	20/19	µg/kg	60
UW75	SED-SC-03-2-4-053012/DUP-053012-3	Acenaphthylene	41	28	20/19	µg/kg	38
UW75	SED-SC-03-2-4-053012/DUP-053012-3	Dibenzofuran	34	19	20/19	µg/kg	57
UW75	SED-SC-03-2-4-053012/DUP-053012-3	Fluorene	39	25	20/19	µg/kg	44
UW75	SED-SC-03-2-4-053012/DUP-053012-3	Phenanthrene	130	80	20/19	µg/kg	48
UW75	SED-SC-03-2-4-053012/DUP-053012-3	Anthracene	40	27	20/19	µg/kg	39

Table 6
Field Duplicate Results and Calculated Relative Percent Differences
Sediment Samples Collected May-June 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Compound	Concentration		Report Limit	Units	RPD
			Sample	Duplicate			
UW75	SED-SC-03-2-4-053012/DUP-053012-3	Di-n-butylphthalate	34	46	20/19	µg/kg	30
UW75	SED-SC-03-2-4-053012/DUP-053012-3	Fluoranthene	170	110	20/19	µg/kg	43
UW75	SED-SC-03-2-4-053012/DUP-053012-3	Pyrene	220	150	20/19	µg/kg	38
UW75	SED-SC-03-2-4-053012/DUP-053012-3	Benzo(a)anthracene	53	36	20/19	µg/kg	38
UW75	SED-SC-03-2-4-053012/DUP-053012-3	Chrysene	66	47	20/19	µg/kg	34
UW75	SED-SC-03-2-4-053012/DUP-053012-3	Benzo(a)pyrene	47	33	20/19	µg/kg	35
UW75	SED-SC-03-2-4-053012/DUP-053012-3	Indeno(1,2,3-cd)pyrene	25	20	20/19	µg/kg	22
UW75	SED-SC-03-2-4-053012/DUP-053012-3	Benzo(g,h,i)perylene	36	27	20/19	µg/kg	29
UW75	SED-SC-03-2-4-053012/DUP-053012-3	total Benzofluoranthenes	98	74	20/19	µg/kg	28
UW75	SED-SC-03-2-4-053012/DUP-053012-3	Dibenz(a,h)anthracene	7.2	9.0	4.9/4.8	µg/kg	22
UW75	SED-SC-03-2-4-053012/DUP-053012-3	Diethylphthalate	18	18	4.9/4.8	µg/kg	0
UW75	SED-SC-03-2-4-053012/DUP-053012-3	2-Methylphenol	11	6.6	4.9/4.8	µg/kg	50
UW75	SED-SC-03-2-4-053012/DUP-053012-3	Benzyl alcohol	38	30	20/19	µg/kg	24
UW75	SED-SC-03-2-4-053012/DUP-053012-3	Pentachlorophenol	200	86	4.9/48	µg/kg	80
UW75	SED-SC-03-2-4-053012/DUP-053012-3	Aroclor 1248	61	43	3.8/3.9	µg/kg	35
UW75	SED-SC-03-2-4-053012/DUP-053012-3	Aroclor 1254	120	88	3.8/3.9	µg/kg	31
UW75	SED-SC-03-2-4-053012/DUP-053012-3	Aroclor 1260	100	71	3.8/3.9	µg/kg	34
UW75	SED-SC-03-2-4-053012/DUP-053012-3	Arsenic, total	44.8	97.5	0.3	mg/kg	74
UW75	SED-SC-03-2-4-053012/DUP-053012-3	Cadmium, total	0.6	1.7	0.2	mg/kg	96
UW75	SED-SC-03-2-4-053012/DUP-053012-3	Chromium, total	49.1	54.0	0.8	mg/kg	9.5
UW75	SED-SC-03-2-4-053012/DUP-053012-3	Copper, total	101	102	0.3	mg/kg	1.0
UW75	SED-SC-03-2-4-053012/DUP-053012-3	Lead, total	56.4	53.1	0.2	mg/kg	6.0
UW75	SED-SC-03-2-4-053012/DUP-053012-3	Mercury, total	0.26	0.25	0.03	mg/kg	3.9
UW75	SED-SC-03-2-4-053012/DUP-053012-3	Silver, total	0.7	0.7	0.5	mg/kg	0
UW75	SED-SC-03-2-4-053012/DUP-053012-3	Zinc, total	122	122	2.0	mg/kg	0
UW75	SED-SC-03-2-4-053012/DUP-053012-3	Total Solids	60.90	61.30	0.01	%	0.7
UW75	SED-SC-03-2-4-053012/DUP-053012-3	TOC	1.53	2.20	0.020	%	36
UW75	SED-SC-01-2-4-053012/DUP-053012-4	Phenanthrene	44	38	18	µg/kg	15

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Lab Package	Sample/Duplicate ID	Compound	Concentration		Report Limit	Units	RPD
			Sample	Duplicate			
UW75	SED-SC-01-2-4-053012/DUP-053012-4	Fluoranthene	91	95	18	µg/kg	4.3
UW75	SED-SC-01-2-4-053012/DUP-053012-4	Pyrene	95	100	18	µg/kg	5.1
UW75	SED-SC-01-2-4-053012/DUP-053012-4	Butylbenzylphthalate	28	22	18	µg/kg	24
UW75	SED-SC-01-2-4-053012/DUP-053012-4	Benzo(a)anthracene	44	47	18	µg/kg	6.6
UW75	SED-SC-01-2-4-053012/DUP-053012-4	bis(2-Ethylhexyl)phthalate	88	150	23/22	µg/kg	52
UW75	SED-SC-01-2-4-053012/DUP-053012-4	Chrysene	68	80	18	µg/kg	16
UW75	SED-SC-01-2-4-053012/DUP-053012-4	Benzo(a)pyrene	60	65	18	µg/kg	8.0
UW75	SED-SC-01-2-4-053012/DUP-053012-4	Indeno(1,2,3-cd)pyrene	47	57	18	µg/kg	19
UW75	SED-SC-01-2-4-053012/DUP-053012-4	Dibenz(a,h)anthracene	19	20	18	µg/kg	5.1
UW75	SED-SC-01-2-4-053012/DUP-053012-4	Benzo(g,h,i)perylene	56	68	18	µg/kg	19
UW75	SED-SC-01-2-4-053012/DUP-053012-4	total Benzofluoranthenes	140	190	18	µg/kg	30
UW75	SED-SC-01-2-4-053012/DUP-053012-4	Dibenz(a,h)anthracene	21	21	4.6/4.5	µg/kg	0
UW75	SED-SC-01-2-4-053012/DUP-053012-4	Diethylphthalate	13	12	4.6/4.5	µg/kg	8.0
UW75	SED-SC-01-2-4-053012/DUP-053012-4	Butylbenzylphthalate	27	21	4.6/4.5	µg/kg	25
UW75	SED-SC-01-2-4-053012/DUP-053012-4	Tributyltin ion	4.7	8.8	3.4/3.2	µg/kg	61
UW75	SED-SC-01-2-4-053012/DUP-053012-4	Aroclor 1248	5.8	5.8	3.8/3.7	µg/kg	0
UW75	SED-SC-01-2-4-053012/DUP-053012-4	Aroclor 1254	14	14	3.8/3.7	µg/kg	0
UW75	SED-SC-01-2-4-053012/DUP-053012-4	Aroclor 1260	11	14	3.8/3.7	µg/kg	24
UW75	SED-SC-01-2-4-053012/DUP-053012-4	Arsenic, total	23.1	39.4	0.2	mg/kg	52
UW75	SED-SC-01-2-4-053012/DUP-053012-4	Cadmium, total	0.2	0.2	0.1	mg/kg	0
UW75	SED-SC-01-2-4-053012/DUP-053012-4	Chromium, total	41.4	36.0	0.6	mg/kg	14
UW75	SED-SC-01-2-4-053012/DUP-053012-4	Copper, total	76	71	0.3/0.2	mg/kg	7.9
UW75	SED-SC-01-2-4-053012/DUP-053012-4	Lead, total	24.2	42.0	0.1	mg/kg	54
UW75	SED-SC-01-2-4-053012/DUP-053012-4	Mercury, total	0.04	0.04	0.02/0.03	mg/kg	0
UW75	SED-SC-01-2-4-053012/DUP-053012-4	Zinc, total	131	145	1.0	mg/kg	10
UW75	SED-SC-01-2-4-053012/DUP-053012-4	Total Solids	79.60	78.80	0.01	%	1.0
UW75	SED-SC-01-2-4-053012/DUP-053012-4	TOC	0.893	1.06	0.020	%	17
UW97	SED-SC-16-2-3.5-053112/DUP-053112-2	Phenol	200	110	19	µg/kg	58

Table 6
Field Duplicate Results and Calculated Relative Percent Differences
Sediment Samples Collected May-June 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Compound	Concentration		Report Limit	Units	RPD
			Sample	Duplicate			
UW97	SED-SC-16-2-3.5-053112/DUP-053112-2	Benzyl alcohol	29	23	19	µg/kg	23
UW97	SED-SC-16-2-3.5-053112/DUP-053112-2	4-Methylphenol	130	74	38/37	µg/kg	55
UW97	SED-SC-16-2-3.5-053112/DUP-053112-2	Naphthalene	250	180	19	µg/kg	33
UW97	SED-SC-16-2-3.5-053112/DUP-053112-2	2-Methylnaphthalene	59	46	19	µg/kg	25
UW97	SED-SC-16-2-3.5-053112/DUP-053112-2	Acenaphthylene	58	49	19	µg/kg	17
UW97	SED-SC-16-2-3.5-053112/DUP-053112-2	Acenaphthene	47	42	19	µg/kg	11
UW97	SED-SC-16-2-3.5-053112/DUP-053112-2	Dibenzofuran	39	34	19	µg/kg	14
UW97	SED-SC-16-2-3.5-053112/DUP-053112-2	Fluorene	49	42	19	µg/kg	15
UW97	SED-SC-16-2-3.5-053112/DUP-053112-2	Phenanthrene	170	150	19	µg/kg	13
UW97	SED-SC-16-2-3.5-053112/DUP-053112-2	Anthracene	37	37	19	µg/kg	0
UW97	SED-SC-16-2-3.5-053112/DUP-053112-2	Di-n-butylphthalate	52	42	19	µg/kg	21
UW97	SED-SC-16-2-3.5-053112/DUP-053112-2	Fluoranthene	190	220	19	µg/kg	15
UW97	SED-SC-16-2-3.5-053112/DUP-053112-2	Pyrene	190	210	19	µg/kg	10
UW97	SED-SC-16-2-3.5-053112/DUP-053112-2	Benzo(a)anthracene	47	73	19	µg/kg	43
UW97	SED-SC-16-2-3.5-053112/DUP-053112-2	bis(2-Ethylhexyl)phthalate	32	27	24/23	µg/kg	17
UW97	SED-SC-16-2-3.5-053112/DUP-053112-2	Chrysene	62	87	19	µg/kg	34
UW97	SED-SC-16-2-3.5-053112/DUP-053112-2	Benzo(a)pyrene	48	65	19	µg/kg	30
UW97	SED-SC-16-2-3.5-053112/DUP-053112-2	Indeno(1,2,3-cd)pyrene	30	37	19	µg/kg	21
UW97	SED-SC-16-2-3.5-053112/DUP-053112-2	Benzo(g,h,i)perylene	33	45	19	µg/kg	31
UW97	SED-SC-16-2-3.5-053112/DUP-053112-2	total Benzofluoranthenes	96	140	19	µg/kg	37
UW97	SED-SC-16-2-3.5-053112/DUP-053112-2	Dibenz(a,h)anthracene	13	16	4.8/4.6	µg/kg	21
UW97	SED-SC-16-2-3.5-053112/DUP-053112-2	Dimethylphthalate	6.6	8.8	4.8/4.6	µg/kg	29
UW97	SED-SC-16-2-3.5-053112/DUP-053112-2	Diethylphthalate	14	8.9	4.8/4.6	µg/kg	45
UW97	SED-SC-16-2-3.5-053112/DUP-053112-2	2-Methylphenol	24	12	4.8/4.6	µg/kg	67
UW97	SED-SC-16-2-3.5-053112/DUP-053112-2	Benzyl alcohol	38	22	19	µg/kg	53
UW97	SED-SC-16-2-3.5-053112/DUP-053112-2	Tributyltin ion	5.8	6.5	3.6/3.4	µg/kg	11
UW97	SED-SC-16-2-3.5-053112/DUP-053112-2	Aroclor 1248	12	8.6	3.8	µg/kg	33
UW97	SED-SC-16-2-3.5-053112/DUP-053112-2	Aroclor 1254	30	20	3.8	µg/kg	40

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Lab Package	Sample/Duplicate ID	Compound	Concentration		Report Limit	Units	RPD
			Sample	Duplicate			
UW97	SED-SC-16-2-3.5-053112/DUP-053112-2	Aroclor 1260	50	29	3.8	µg/kg	53
UW97	SED-SC-16-2-3.5-053112/DUP-053112-2	Arsenic, total	119	134	0.3	mg/kg	12
UW97	SED-SC-16-2-3.5-053112/DUP-053112-2	Cadmium, total	0.4	0.3	0.1	mg/kg	29
UW97	SED-SC-16-2-3.5-053112/DUP-053112-2	Chromium, total	26.1	26.2	0.7	mg/kg	0
UW97	SED-SC-16-2-3.5-053112/DUP-053112-2	Copper, total	100	75.9	0.3	mg/kg	27
UW97	SED-SC-16-2-3.5-053112/DUP-053112-2	Lead, total	20.8	16.9	0.1	mg/kg	21
UW97	SED-SC-16-2-3.5-053112/DUP-053112-2	Mercury, total	0.08	0.10	0.03/0.04	mg/kg	22
UW97	SED-SC-16-2-3.5-053112/DUP-053112-2	Zinc, total	76	70	1.0	mg/kg	8.2
UW97	SED-SC-16-2-3.5-053112/DUP-053112-2	Total Solids	69.80	71.10	0.01	%	1.8
UW97	SED-SC-16-2-3.5-053112/DUP-053112-2	TOC	2.170	2.32	0.020	%	6.7
DPWG40565	SED-SS-11-052512/DUP-052512-1	2,3,7,8-TCDD	0.419	0.402	0.050/0.053	pg/g	4.1
DPWG40565	SED-SS-11-052512/DUP-052512-1	1,2,3,7,8-PECDD	1.28	1.45	0.069/0.053	pg/g	12
DPWG40565	SED-SS-11-052512/DUP-052512-1	1,2,3,4,7,8-HXCDD	2.69	2.62	0.074/0.062	pg/g	2.6
DPWG40565	SED-SS-11-052512/DUP-052512-1	1,2,3,6,7,8-HXCDD	9.00	11.3	0.074/0.062	pg/g	23
DPWG40565	SED-SS-11-052512/DUP-052512-1	1,2,3,7,8,9-HXCDD	7.79	7.98	0.074/0.062	pg/g	2.4
DPWG40565	SED-SS-11-052512/DUP-052512-1	1,2,3,4,6,7,8-HPCDD	259	294	0.217/0.198	pg/g	13
DPWG40565	SED-SS-11-052512/DUP-052512-1	OCDD	2170	2120	0.246/0.179	pg/g	2.3
DPWG40565	SED-SS-11-052512/DUP-052512-1	2,3,7,8-TCDF	4.00	3.68	0.050/0.053	pg/g	8.3
DPWG40565	SED-SS-11-052512/DUP-052512-1	1,2,3,7,8-PECDF	0.796	0.811	0.065/0.053	pg/g	1.9
DPWG40565	SED-SS-11-052512/DUP-052512-1	2,3,4,7,8-PECDF	1.77	1.70	0.065/0.053	pg/g	4.0
DPWG40565	SED-SS-11-052512/DUP-052512-1	1,2,3,4,7,8-HXCDF	7.44	8.70	0.063/0.089	pg/g	16
DPWG40565	SED-SS-11-052512/DUP-052512-1	1,2,3,6,7,8-HXCDF	2.39	2.59	0.063/0.089	pg/g	8.0
DPWG40565	SED-SS-11-052512/DUP-052512-1	1,2,3,7,8,9-HXCDF	0.225	0.179	0.063/0.089	pg/g	23
DPWG40565	SED-SS-11-052512/DUP-052512-1	2,3,4,6,7,8-HXCDF	1.46	1.39	0.063/0.089	pg/g	4.9
DPWG40565	SED-SS-11-052512/DUP-052512-1	1,2,3,4,6,7,8-HPCDF	65.6	55.0	0.112/0.088	pg/g	18
DPWG40565	SED-SS-11-052512/DUP-052512-1	1,2,3,4,7,8,9-HPCDF	4.91	6.23	0.112/0.088	pg/g	24
DPWG40565	SED-SS-11-052512/DUP-052512-1	OCDF	141	173	0.079/0.053	pg/g	20

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Lab Package	Sample/Duplicate ID	Compound	Concentration		Report Limit	Units	RPD
			Sample	Duplicate			
DPWG40565	SED-SS-11-052512/DUP-052512-1	TOTAL TETRA-DIOXINS	5.15	4.55	0.050/0.053	pg/g	12
DPWG40565	SED-SS-11-052512/DUP-052512-1	TOTAL PENTA-DIOXINS	8.70	8.81	0.069/0.053	pg/g	1.3
DPWG40565	SED-SS-11-052512/DUP-052512-1	TOTAL HEXA-DIOXINS	78.3	80.6	0.074/0.062	pg/g	2.9
DPWG40565	SED-SS-11-052512/DUP-052512-1	TOTAL HEPTA-DIOXINS	692	741	0.217/0.198	pg/g	6.8
DPWG40565	SED-SS-11-052512/DUP-052512-1	TOTAL TETRA-FURANS	22.3	20.3	0.050/0.053	pg/g	9.4
DPWG40565	SED-SS-11-052512/DUP-052512-1	TOTAL PENTA-FURANS	37.4	30.2	0.065/0.053	pg/g	21
DPWG40565	SED-SS-11-052512/DUP-052512-1	TOTAL HEXA-FURANS	90.9	81.0	0.063/0.089	pg/g	12
DPWG40565	SED-SS-11-052512/DUP-052512-1	TOTAL HEPTA-FURANS	189	201	0.112/0.088	pg/g	6.2
DPWG40565	SED-SS-11-052512/DUP-052512-1	2,3,7,8-TCDF	0.864	0.760	0.137/0.053	pg/g	13
DPWG40592	SED-SS-06-052312/DUP-052312-1	2,3,7,8-TCDD	0.898	0.793	0.050/0.047	pg/g	12
DPWG40592	SED-SS-06-052312/DUP-052312-1	1,2,3,7,8-PECDD	3.28	2.81	0.051/0.074	pg/g	15
DPWG40592	SED-SS-06-052312/DUP-052312-1	1,2,3,4,7,8-HXCDD	5.39	5.34	0.086/0.095	pg/g	0.9
DPWG40592	SED-SS-06-052312/DUP-052312-1	1,2,3,6,7,8-HXCDD	40.6	38.2	0.086/0.095	pg/g	6.1
DPWG40592	SED-SS-06-052312/DUP-052312-1	1,2,3,7,8,9-HXCDD	17.9	17.0	0.086/0.095	pg/g	5.2
DPWG40592	SED-SS-06-052312/DUP-052312-1	1,2,3,4,6,7,8-HPCDD	1210	1300	0.354/0.293	pg/g	7.2
DPWG40592	SED-SS-06-052312/DUP-052312-1	2,3,7,8-TCDF	5.77	5.74	0.050/0.047	pg/g	0.5
DPWG40592	SED-SS-06-052312/DUP-052312-1	1,2,3,7,8-PECDF	3.94	3.43	0.106/0.103	pg/g	14
DPWG40592	SED-SS-06-052312/DUP-052312-1	2,3,4,7,8-PECDF	11.7	9.5	0.106/0.103	pg/g	21
DPWG40592	SED-SS-06-052312/DUP-052312-1	1,2,3,4,7,8-HXCDF	111	83.2	0.112/0.114	pg/g	29
DPWG40592	SED-SS-06-052312/DUP-052312-1	1,2,3,6,7,8-HXCDF	19.1	15.3	0.112/0.114	pg/g	22
DPWG40592	SED-SS-06-052312/DUP-052312-1	1,2,3,7,8,9-HXCDF	1.32	1.09	0.112/0.114	pg/g	19
DPWG40592	SED-SS-06-052312/DUP-052312-1	2,3,4,6,7,8-HXCDF	8.05	6.82	0.112/0.114	pg/g	17
DPWG40592	SED-SS-06-052312/DUP-052312-1	1,2,3,4,6,7,8-HPCDF	397	390	0.136/0.206	pg/g	1.8
DPWG40592	SED-SS-06-052312/DUP-052312-1	1,2,3,4,7,8,9-HPCDF	54.0	49.8	0.136/0.206	pg/g	8.1
DPWG40592	SED-SS-06-052312/DUP-052312-1	TOTAL TETRA-DIOXINS	12.7	20.0	0.050/0.047	pg/g	45
DPWG40592	SED-SS-06-052312/DUP-052312-1	TOTAL PENTA-DIOXINS	33.0	42.8	0.051/0.074	pg/g	26
DPWG40592	SED-SS-06-052312/DUP-052312-1	TOTAL HEXA-DIOXINS	245	230	0.086/0.095	pg/g	6.3

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Lab Package	Sample/Duplicate ID	Compound	Concentration		Report Limit	Units	RPD
			Sample	Duplicate			
DPWG40592	SED-SS-06-052312/DUP-052312-1	TOTAL HEPTA-DIOXINS	2490	2670	0.354/0.293	pg/g	7.0
DPWG40592	SED-SS-06-052312/DUP-052312-1	TOTAL TETRA-FURANS	39.9	42.1	0.050/0.047	pg/g	5.4
DPWG40592	SED-SS-06-052312/DUP-052312-1	TOTAL PENTA-FURANS	182	161	0.106/0.103	pg/g	12
DPWG40592	SED-SS-06-052312/DUP-052312-1	TOTAL HEXA-FURANS	786	658	0.112/0.114	pg/g	18
DPWG40592	SED-SS-06-052312/DUP-052312-1	TOTAL HEPTA-FURANS	1720	1710	0.136/0.206	pg/g	0.6
DPWG40592	SED-SS-06-052312/DUP-052312-1	OCDD	22500	48500	2.06/8.86	pg/g	73
DPWG40592	SED-SS-06-052312/DUP-052312-1	OCDF	1190	1750	1.17/5.16	pg/g	38
DPWG40592	SED-SS-06-052312/DUP-052312-1	2,3,7,8-TCDF	1.44	1.26	0.050/0.047	pg/g	13
DPWG40592	SED-SS-08-052212/DUP-052212-1	2,3,7,8-TCDD	0.472	0.464	0.049/0.048	pg/g	1.7
DPWG40592	SED-SS-08-052212/DUP-052212-1	1,2,3,7,8-PECDD	1.32	1.60	0.049/0.048	pg/g	19
DPWG40592	SED-SS-08-052212/DUP-052212-1	1,2,3,4,7,8-HXCDD	2.30	2.61	0.141/0.094	pg/g	13
DPWG40592	SED-SS-08-052212/DUP-052212-1	1,2,3,6,7,8-HXCDD	11.90	12.60	0.141/0.094	pg/g	5.7
DPWG40592	SED-SS-08-052212/DUP-052212-1	1,2,3,7,8,9-HXCDD	7.96	8.46	0.141/0.094	pg/g	6.1
DPWG40592	SED-SS-08-052212/DUP-052212-1	1,2,3,4,6,7,8-HPCDD	381	402	0.166/0.180	pg/g	5.4
DPWG40592	SED-SS-08-052212/DUP-052212-1	2,3,7,8-TCDF	3.85	3.86	0.049/0.048	pg/g	0.3
DPWG40592	SED-SS-08-052212/DUP-052212-1	1,2,3,7,8-PECDF	1.220	1.280	0.079/0.048	pg/g	4.8
DPWG40592	SED-SS-08-052212/DUP-052212-1	2,3,4,7,8-PECDF	2.65	2.88	0.079/0.048	pg/g	8.3
DPWG40592	SED-SS-08-052212/DUP-052212-1	1,2,3,4,7,8-HXCDF	16.6	19.2	0.116/0.056	pg/g	15
DPWG40592	SED-SS-08-052212/DUP-052212-1	1,2,3,6,7,8-HXCDF	3.63	4.18	0.116/0.056	pg/g	14
DPWG40592	SED-SS-08-052212/DUP-052212-1	1,2,3,7,8,9-HXCDF	0.343	0.303	0.116/0.056	pg/g	12
DPWG40592	SED-SS-08-052212/DUP-052212-1	2,3,4,6,7,8-HXCDF	1.85	2.20	0.116/0.056	pg/g	17
DPWG40592	SED-SS-08-052212/DUP-052212-1	1,2,3,4,6,7,8-HPCDF	79.4	79.6	0.219/0.139	pg/g	0.3
DPWG40592	SED-SS-08-052212/DUP-052212-1	1,2,3,4,7,8,9-HPCDF	8.76	9.73	0.219/0.139	pg/g	10
DPWG40592	SED-SS-08-052212/DUP-052212-1	OCDF	251	249	0.111/0.065	pg/g	0.8
DPWG40592	SED-SS-08-052212/DUP-052212-1	TOTAL TETRA-DIOXINS	6.23	5.77	0.049/0.048	pg/g	7.7
DPWG40592	SED-SS-08-052212/DUP-052212-1	TOTAL PENTA-DIOXINS	11.1	12.9	0.049/0.048	pg/g	15
DPWG40592	SED-SS-08-052212/DUP-052212-1	TOTAL HEXA-DIOXINS	106	107	0.141/0.094	pg/g	0.9
DPWG40592	SED-SS-08-052212/DUP-052212-1	TOTAL HEPTA-DIOXINS	1150	1130	0.166/0.180	pg/g	1.8

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			Sample	Duplicate			
DPWG40592	SED-SS-08-052212/DUP-052212-1	TOTAL TETRA-FURANS	25.0	23.0	0.049/0.048	pg/g	8.3
DPWG40592	SED-SS-08-052212/DUP-052212-1	TOTAL PENTA-FURANS	45.6	49.7	0.079/0.048	pg/g	8.6
DPWG40592	SED-SS-08-052212/DUP-052212-1	TOTAL HEXA-FURANS	141	156	0.116/0.056	pg/g	10
DPWG40592	SED-SS-08-052212/DUP-052212-1	TOTAL HEPTA-FURANS	338	342	0.219/0.139	pg/g	1.2
DPWG40592	SED-SS-08-052212/DUP-052212-1	2,3,7,8-TCDF	0.834	0.766	0.049/0.048	pg/g	8.5
DPWG40641	SED-SC-14-0-1-052912/DUP-052912-1	2,3,7,8-TCDD	8.94	2.44	0.065/0.047	pg/g	114
DPWG40641	SED-SC-14-0-1-052912/DUP-052912-1	1,2,3,7,8-PECDD	53.5	18.4	0.136/0.075	pg/g	98
DPWG40641	SED-SC-14-0-1-052912/DUP-052912-1	2,3,7,8-TCDF	68.8	22.5	0.106/0.045	pg/g	101
DPWG40641	SED-SC-14-0-1-052912/DUP-052912-1	1,2,3,7,8-PECDF	132	45.5	0.245/0.130	pg/g	97
DPWG40641	SED-SC-14-0-1-052912/DUP-052912-1	2,3,4,7,8-PECDF	447	129	0.245/0.130	pg/g	110
DPWG40641	SED-SC-14-0-1-052912/DUP-052912-1	TOTAL TETRA-DIOXINS	220	49.9	0.065/0.047	pg/g	126
DPWG40641	SED-SC-14-0-1-052912/DUP-052912-1	TOTAL PENTA-DIOXINS	1230	338	0.136/0.075	pg/g	114
DPWG40641	SED-SC-14-0-1-052912/DUP-052912-1	TOTAL TETRA-FURANS	513	223	0.106/0.045	pg/g	79
DPWG40641	SED-SC-14-0-1-052912/DUP-052912-1	TOTAL PENTA-FURANS	6110	1370	0.245/0.130	pg/g	127
DPWG40641	SED-SC-14-0-1-052912/DUP-052912-1	1,2,3,4,7,8-HXCDD	113	44.2	6.05/1.62	pg/g	88
DPWG40641	SED-SC-14-0-1-052912/DUP-052912-1	1,2,3,6,7,8-HXCDD	1390	428	6.05/1.62	pg/g	106
DPWG40641	SED-SC-14-0-1-052912/DUP-052912-1	1,2,3,7,8,9-HXCDD	356	138	6.05/1.62	pg/g	88
DPWG40641	SED-SC-14-0-1-052912/DUP-052912-1	1,2,3,4,6,7,8-HPCDD	51200	13300	14.0/5.35	pg/g	118
DPWG40641	SED-SC-14-0-1-052912/DUP-052912-1	1,2,3,4,6,7,8-HPCDF	17700	6140	17.8/4.19	pg/g	97
DPWG40641	SED-SC-14-0-1-052912/DUP-052912-1	1,2,3,4,7,8,9-HPCDF	2480	1110	17.8/4.19	pg/g	76
DPWG40641	SED-SC-14-0-1-052912/DUP-052912-1	TOTAL HEXA-DIOXINS	8020	2540	6.05/1.62	pg/g	104
DPWG40641	SED-SC-14-0-1-052912/DUP-052912-1	TOTAL HEPTA-DIOXINS	87200	24600	14.0/5.35	pg/g	112
DPWG40641	SED-SC-14-0-1-052912/DUP-052912-1	TOTAL HEPTA-FURANS	97800	26400	17.8/4.19	pg/g	115
DPWG40641	SED-SC-14-0-1-052912/DUP-052912-1	OCDD	420000	126000	33.8/3.98	pg/g	108
DPWG40641	SED-SC-14-0-1-052912/DUP-052912-1	2,3,7,8-TCDF	33.6	9.59	0.102/0.045	pg/g	111
DPWG40641	SED-SC-16-2-3.5-053112/DUP-053112-2	2,3,7,8-TCDD	1.02	0.455	0.284/0.059	pg/g	77
DPWG40641	SED-SC-16-2-3.5-053112/DUP-053112-2	1,2,3,7,8-PECDD	8.22	2.02	0.472/0.058	pg/g	121

Table 6
Field Duplicate Results and Calculated Relative Percent Differences
Sediment Samples Collected May-June 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Compound	Concentration		Report Limit	Units	RPD
			Sample	Duplicate			
DPWG40641	SED-SC-16-2-3.5-053112/DUP-053112-2	1,2,3,4,7,8-HXCDD	16.4	4.47	1.87/0.133	pg/g	114
DPWG40641	SED-SC-16-2-3.5-053112/DUP-053112-2	1,2,3,6,7,8-HXCDD	86.7	33.2	1.87/0.133	pg/g	89
DPWG40641	SED-SC-16-2-3.5-053112/DUP-053112-2	1,2,3,7,8,9-HXCDD	44.9	12.5	1.87/0.133	pg/g	113
DPWG40641	SED-SC-16-2-3.5-053112/DUP-053112-2	1,2,3,4,6,7,8-HPCDD	2640	1210	1.31/0.786	pg/g	74
DPWG40641	SED-SC-16-2-3.5-053112/DUP-053112-2	2,3,7,8-TCDF	6.13	4.42	0.237/0.041	pg/g	32
DPWG40641	SED-SC-16-2-3.5-053112/DUP-053112-2	1,2,3,7,8-PECDF	8.63	2.81	1.02/0.101	pg/g	102
DPWG40641	SED-SC-16-2-3.5-053112/DUP-053112-2	2,3,4,7,8-PECDF	26.7	8.98	1.02/0.101	pg/g	99
DPWG40641	SED-SC-16-2-3.5-053112/DUP-053112-2	1,2,3,4,7,8-HXCDF	316	91.1	1.63/0.224	pg/g	110
DPWG40641	SED-SC-16-2-3.5-053112/DUP-053112-2	1,2,3,6,7,8-HXCDF	56.9	16.6	1.63/0.224	pg/g	110
DPWG40641	SED-SC-16-2-3.5-053112/DUP-053112-2	1,2,3,7,8,9-HXCDF	23.2	1.04	1.63/0.224	pg/g	183
DPWG40641	SED-SC-16-2-3.5-053112/DUP-053112-2	2,3,4,6,7,8-HXCDF	22.5	7.12	1.63/0.224	pg/g	104
DPWG40641	SED-SC-16-2-3.5-053112/DUP-053112-2	1,2,3,4,6,7,8-HPCDF	805	454	1.39/0.877	pg/g	56
DPWG40641	SED-SC-16-2-3.5-053112/DUP-053112-2	1,2,3,4,7,8,9-HPCDF	156	61.5	1.39/0.877	pg/g	87
DPWG40641	SED-SC-16-2-3.5-053112/DUP-053112-2	TOTAL TETRA-DIOXINS	19.5	14.4	0.284/0.059	pg/g	30
DPWG40641	SED-SC-16-2-3.5-053112/DUP-053112-2	TOTAL PENTA-DIOXINS	49.2	23.2	0.472/0.058	pg/g	72
DPWG40641	SED-SC-16-2-3.5-053112/DUP-053112-2	TOTAL HEXA-DIOXINS	490	149	1.87/0.133	pg/g	107
DPWG40641	SED-SC-16-2-3.5-053112/DUP-053112-2	TOTAL HEPTA-DIOXINS	5560	2210	1.31/0.786	pg/g	86
DPWG40641	SED-SC-16-2-3.5-053112/DUP-053112-2	TOTAL TETRA-FURANS	77.4	35.5	0.237/0.041	pg/g	74
DPWG40641	SED-SC-16-2-3.5-053112/DUP-053112-2	TOTAL PENTA-FURANS	424	107	1.02/0.101	pg/g	119
DPWG40641	SED-SC-16-2-3.5-053112/DUP-053112-2	TOTAL HEXA-FURANS	2080	726	1.63/0.224	pg/g	97
DPWG40641	SED-SC-16-2-3.5-053112/DUP-053112-2	TOTAL HEPTA-FURANS	3760	2500	1.39/0.877	pg/g	40
DPWG40641	SED-SC-16-2-3.5-053112/DUP-053112-2	OCDD	67700	52900	0.785/5.63	pg/g	25
DPWG40641	SED-SC-16-2-3.5-053112/DUP-053112-2	2,3,7,8-TCDF	2.55	1.33	0.734/0.041	pg/g	63
DPWG40641	SED-SC-08-2-4-053012/DUP-053012-2	2,3,7,8-TCDD	2.07	1.84	0.024/0.022	pg/g	12
DPWG40641	SED-SC-08-2-4-053012/DUP-053012-2	1,2,3,7,8-PECDD	5.33	5.28	0.024/0.022	pg/g	0.9
DPWG40641	SED-SC-08-2-4-053012/DUP-053012-2	1,2,3,4,7,8-HXCDD	8.01	8.17	0.073/0.080	pg/g	2.0
DPWG40641	SED-SC-08-2-4-053012/DUP-053012-2	1,2,3,6,7,8-HXCDD	66.4	67.6	0.073/0.080	pg/g	1.8
DPWG40641	SED-SC-08-2-4-053012/DUP-053012-2	1,2,3,7,8,9-HXCDD	28.2	29.1	0.073/0.080	pg/g	3.1

Table 6
Field Duplicate Results and Calculated Relative Percent Differences
Sediment Samples Collected May-June 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Compound	Concentration		Report Limit	Units	RPD
			Sample	Duplicate			
DPWG40641	SED-SC-08-2-4-053012/DUP-053012-2	2,3,7,8-TCDF	21.6	19.5	0.024/0.029	pg/g	10
DPWG40641	SED-SC-08-2-4-053012/DUP-053012-2	1,2,3,7,8-PECDF	5.49	5.32	0.040/0.039	pg/g	3.1
DPWG40641	SED-SC-08-2-4-053012/DUP-053012-2	2,3,4,7,8-PECDF	15.9	14.6	0.040/0.039	pg/g	8.5
DPWG40641	SED-SC-08-2-4-053012/DUP-053012-2	1,2,3,4,7,8-HXCDF	131	175	0.088/0.081	pg/g	29
DPWG40641	SED-SC-08-2-4-053012/DUP-053012-2	1,2,3,6,7,8-HXCDF	24.1	29.7	0.088/0.081	pg/g	21
DPWG40641	SED-SC-08-2-4-053012/DUP-053012-2	1,2,3,7,8,9-HXCDF	1.76	2.03	0.088/0.081	pg/g	14
DPWG40641	SED-SC-08-2-4-053012/DUP-053012-2	2,3,4,6,7,8-HXCDF	9.67	10.2	0.088/0.081	pg/g	5.3
DPWG40641	SED-SC-08-2-4-053012/DUP-053012-2	1,2,3,4,6,7,8-HPCDF	598	691	0.253/0.263	pg/g	14
DPWG40641	SED-SC-08-2-4-053012/DUP-053012-2	1,2,3,4,7,8,9-HPCDF	80.2	90.8	0.253/0.263	pg/g	12
DPWG40641	SED-SC-08-2-4-053012/DUP-053012-2	TOTAL TETRA-DIOXINS	2280	2080	0.067/0.077	pg/g	9.2
DPWG40641	SED-SC-08-2-4-053012/DUP-053012-2	TOTAL PENTA-DIOXINS	14.8	14.1	0.024/0.022	pg/g	4.8
DPWG40641	SED-SC-08-2-4-053012/DUP-053012-2	TOTAL HEXA-DIOXINS	40.0	40.6	0.024/0.022	pg/g	1.5
DPWG40641	SED-SC-08-2-4-053012/DUP-053012-2	TOTAL HEPTA-DIOXINS	399	398	0.073/0.080	pg/g	0.3
DPWG40641	SED-SC-08-2-4-053012/DUP-053012-2	TOTAL PENTA-FURANS	71.1	98.7	0.024/0.029	pg/g	33
DPWG40641	SED-SC-08-2-4-053012/DUP-053012-2	TOTAL HEXA-FURANS	156	167	0.040/0.039	pg/g	6.8
DPWG40641	SED-SC-08-2-4-053012/DUP-053012-2	TOTAL HEPTA-FURANS	1010	1100	0.088/0.081	pg/g	8.5
DPWG40641	SED-SC-08-2-4-053012/DUP-053012-2	OCDD	3500	3330	0.253/0.263	pg/g	5.0
DPWG40641	SED-SC-08-2-4-053012/DUP-053012-2	OCDD	24400	26300	1.40/2.48	pg/g	7.5
DPWG40641	SED-SC-08-2-4-053012/DUP-053012-2	2,3,7,8-TCDF	2.79	2.49	0.039/0.022	pg/g	11
DPWG40694	SED-SC-03-2-4-053012/DUP-053012-3	2,3,7,8-TCDD	5.64	4.74	0.117/0.048	pg/g	17
DPWG40694	SED-SC-03-2-4-053012/DUP-053012-3	1,2,3,7,8-PECDD	18.5	8.82	0.143/0.048	pg/g	71
DPWG40694	SED-SC-03-2-4-053012/DUP-053012-3	1,2,3,4,7,8-HXCDD	40.1	18.0	0.215/0.092	pg/g	76
DPWG40694	SED-SC-03-2-4-053012/DUP-053012-3	1,2,3,6,7,8-HXCDD	753	343	0.215/0.092	pg/g	75
DPWG40694	SED-SC-03-2-4-053012/DUP-053012-3	1,2,3,7,8,9-HXCDD	140	67.8	0.215/0.092	pg/g	69
DPWG40694	SED-SC-03-2-4-053012/DUP-053012-3	2,3,7,8-TCDF	47.1	24.3	0.205/0.048	pg/g	64
DPWG40694	SED-SC-03-2-4-053012/DUP-053012-3	1,2,3,7,8-PECDF	122	48.5	1.15/0.115	pg/g	86
DPWG40694	SED-SC-03-2-4-053012/DUP-053012-3	2,3,4,7,8-PECDF	331	153	1.15/0.115	pg/g	74

Table 6
Field Duplicate Results and Calculated Relative Percent Differences
Sediment Samples Collected May-June 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Compound	Concentration		Report Limit	Units	RPD
			Sample	Duplicate			
DPWG40694	SED-SC-03-2-4-053012/DUP-053012-3	1,2,3,4,7,8-HXCDF	4680	1990	0.055/0.306	pg/g	81
DPWG40694	SED-SC-03-2-4-053012/DUP-053012-3	1,2,3,6,7,8-HXCDF	627	286	0.055/0.306	pg/g	75
DPWG40694	SED-SC-03-2-4-053012/DUP-053012-3	1,2,3,7,8,9-HXCDF	366	19.9	0.055/0.306	pg/g	179
DPWG40694	SED-SC-03-2-4-053012/DUP-053012-3	2,3,4,6,7,8-HXCDF	206	92.5	0.055/0.306	pg/g	76
DPWG40694	SED-SC-03-2-4-053012/DUP-053012-3	TOTAL TETRA-DIOXINS	188	116	0.117/0.048	pg/g	47
DPWG40694	SED-SC-03-2-4-053012/DUP-053012-3	TOTAL PENTA-DIOXINS	263	148	0.143/0.048	pg/g	56
DPWG40694	SED-SC-03-2-4-053012/DUP-053012-3	TOTAL HEXA-DIOXINS	3290	1540	0.215/0.092	pg/g	72
DPWG40694	SED-SC-03-2-4-053012/DUP-053012-3	TOTAL TETRA-FURANS	766	362	0.205/0.048	pg/g	72
DPWG40694	SED-SC-03-2-4-053012/DUP-053012-3	TOTAL PENTA-FURANS	5380	2470	1.15/0.115	pg/g	74
DPWG40694	SED-SC-03-2-4-053012/DUP-053012-3	TOTAL HEXA-FURANS	30200	12100	0.055/0.306	pg/g	86
DPWG40694	SED-SC-03-2-4-053012/DUP-053012-3	1,2,3,4,6,7,8-HPCDD	19800	9820	1.55/10.3	pg/g	67
DPWG40694	SED-SC-03-2-4-053012/DUP-053012-3	1,2,3,4,6,7,8-HPCDF	10900	4970	2.57/10.4	pg/g	75
DPWG40694	SED-SC-03-2-4-053012/DUP-053012-3	TOTAL HEPTA-DIOXINS	36600	17800	1.55/10.3	pg/g	69
DPWG40694	SED-SC-03-2-4-053012/DUP-053012-3	TOTAL HEPTA-FURANS	57200	25100	2.57/10.4	pg/g	78
DPWG40694	SED-SC-03-2-4-053012/DUP-053012-3	OCDD	124000	125000	4.53/5.77	pg/g	0.8
DPWG40694	SED-SC-03-2-4-053012/DUP-053012-3	OCDF	11600	11400	0.867/2.74	pg/g	1.7
DPWG40694	SED-SC-03-2-4-053012/DUP-053012-3	2,3,7,8-TCDF	23.1	11.2	0.125/0.074	pg/g	69
DPWG40694	SED-SC-01-2-4-053012/DUP-053012-4	2,3,7,8-TCDD	0.250	0.191	0.050	pg/g	27
DPWG40694	SED-SC-01-2-4-053012/DUP-053012-4	1,2,3,7,8-PECDD	0.715	0.823	0.052/0.055	pg/g	14
DPWG40694	SED-SC-01-2-4-053012/DUP-053012-4	1,2,3,4,7,8-HXCDD	1.21	1.11	0.050	pg/g	8.6
DPWG40694	SED-SC-01-2-4-053012/DUP-053012-4	1,2,3,6,7,8-HXCDD	5.06	4.56	0.050	pg/g	10
DPWG40694	SED-SC-01-2-4-053012/DUP-053012-4	1,2,3,7,8,9-HXCDD	3.51	3.55	0.050	pg/g	1.1
DPWG40694	SED-SC-01-2-4-053012/DUP-053012-4	1,2,3,4,6,7,8-HPCDD	132	122	0.123/0.133	pg/g	7.9
DPWG40694	SED-SC-01-2-4-053012/DUP-053012-4	OCDD	2080	1270	0.196/0.117	pg/g	48
DPWG40694	SED-SC-01-2-4-053012/DUP-053012-4	2,3,7,8-TCDF	1.15	1.01	0.050	pg/g	13
DPWG40694	SED-SC-01-2-4-053012/DUP-053012-4	1,2,3,7,8-PECDF	0.379	0.334	0.050/0.051	pg/g	13
DPWG40694	SED-SC-01-2-4-053012/DUP-053012-4	2,3,4,7,8-PECDF	0.786	0.796	0.050/0.051	pg/g	1.3
DPWG40694	SED-SC-01-2-4-053012/DUP-053012-4	1,2,3,4,7,8-HXCDF	5.10	4.44	0.050/0.056	pg/g	14

Table 6
Field Duplicate Results and Calculated Relative Percent Differences
Sediment Samples Collected May-June 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Compound	Concentration		Report Limit	Units	RPD
			Sample	Duplicate			
DPWG40694	SED-SC-01-2-4-053012/DUP-053012-4	1,2,3,6,7,8-HXCDF	1.24	1.06	0.050/0.056	pg/g	16
DPWG40694	SED-SC-01-2-4-053012/DUP-053012-4	1,2,3,7,8,9-HXCDF	0.086	0.116	0.050/0.056	pg/g	30
DPWG40694	SED-SC-01-2-4-053012/DUP-053012-4	2,3,4,6,7,8-HXCDF	0.701	0.667	0.050/0.056	pg/g	5.0
DPWG40694	SED-SC-01-2-4-053012/DUP-053012-4	1,2,3,4,6,7,8-HPCDF	26.0	23.4	0.087/0.091	pg/g	11
DPWG40694	SED-SC-01-2-4-053012/DUP-053012-4	1,2,3,4,7,8,9-HPCDF	2.80	2.45	0.087/0.091	pg/g	13
DPWG40694	SED-SC-01-2-4-053012/DUP-053012-4	OCDF	80.9	62.0	0.050/0.060	pg/g	26
DPWG40694	SED-SC-01-2-4-053012/DUP-053012-4	TOTAL TETRA-DIOXINS	2.14	2.19	0.050	pg/g	2.3
DPWG40694	SED-SC-01-2-4-053012/DUP-053012-4	TOTAL PENTA-DIOXINS	4.42	4.02	0.052/0.055	pg/g	9.5
DPWG40694	SED-SC-01-2-4-053012/DUP-053012-4	TOTAL HEXA-DIOXINS	36.8	35.1	0.050	pg/g	4.7
DPWG40694	SED-SC-01-2-4-053012/DUP-053012-4	TOTAL HEPTA-DIOXINS	312	295	0.123/0.133	pg/g	5.6
DPWG40694	SED-SC-01-2-4-053012/DUP-053012-4	TOTAL TETRA-FURANS	6.45	6.83	0.050	pg/g	5.7
DPWG40694	SED-SC-01-2-4-053012/DUP-053012-4	TOTAL PENTA-FURANS	15.8	13.2	0.050/0.051	pg/g	18
DPWG40694	SED-SC-01-2-4-053012/DUP-053012-4	TOTAL HEXA-FURANS	43.3	42.0	0.050/0.056	pg/g	3.0
DPWG40694	SED-SC-01-2-4-053012/DUP-053012-4	TOTAL HEPTA-FURANS	96.5	81.8	0.087/0.091	pg/g	16
DPWG40694	SED-SC-01-2-4-053012/DUP-053012-4	2,3,7,8-TCDF	0.307	0.280	0.051/0.072	pg/g	9.2
DPWG40694	SED-SC-17-2-4-053012/DUP-053012-5	2,3,7,8-TCDD	15.1	15.0	0.063/0.069	pg/g	0.7
DPWG40694	SED-SC-17-2-4-053012/DUP-053012-5	1,2,3,7,8-PECDD	26.5	23.0	0.094/0.230	pg/g	14
DPWG40694	SED-SC-17-2-4-053012/DUP-053012-5	1,2,3,4,7,8-HXCDD	23.6	31.1	0.166/1.17	pg/g	27
DPWG40694	SED-SC-17-2-4-053012/DUP-053012-5	1,2,3,6,7,8-HXCDD	366	320	0.166/1.17	pg/g	13
DPWG40694	SED-SC-17-2-4-053012/DUP-053012-5	1,2,3,7,8,9-HXCDD	68.2	149.0	0.166/1.17	pg/g	74
DPWG40694	SED-SC-17-2-4-053012/DUP-053012-5	2,3,7,8-TCDF	93.8	36.1	0.059/0.062	pg/g	89
DPWG40694	SED-SC-17-2-4-053012/DUP-053012-5	1,2,3,7,8-PECDF	31.5	26.7	0.198/0.345	pg/g	16
DPWG40694	SED-SC-17-2-4-053012/DUP-053012-5	2,3,4,7,8-PECDF	120	98	0.198/0.345	pg/g	21
DPWG40694	SED-SC-17-2-4-053012/DUP-053012-5	1,2,3,4,7,8-HXCDF	875	997	0.339/1.46	pg/g	13
DPWG40694	SED-SC-17-2-4-053012/DUP-053012-5	1,2,3,6,7,8-HXCDF	149	143	0.339/1.46	pg/g	4.1
DPWG40694	SED-SC-17-2-4-053012/DUP-053012-5	1,2,3,7,8,9-HXCDF	10.2	9.5	0.339/1.46	pg/g	7.3
DPWG40694	SED-SC-17-2-4-053012/DUP-053012-5	2,3,4,6,7,8-HXCDF	91.4	63.0	0.339/1.46	pg/g	37
DPWG40694	SED-SC-17-2-4-053012/DUP-053012-5	TOTAL TETRA-DIOXINS	97.8	113	0.063/0.069	pg/g	14

Table 6
Field Duplicate Results and Calculated Relative Percent Differences
Sediment Samples Collected May-June 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Compound	Concentration Sample	Duplicate	Report Limit	Units	RPD
DPWG40694	SED-SC-17-2-4-053012/DUP-053012-5	TOTAL PENTA-DIOXINS	306	294	0.094/0.230	pg/g	4.0
DPWG40694	SED-SC-17-2-4-053012/DUP-053012-5	TOTAL HEXA-DIOXINS	1620	1770	0.166/1.17	pg/g	8.8
DPWG40694	SED-SC-17-2-4-053012/DUP-053012-5	TOTAL TETRA-FURANS	358	261	0.059/0.062	pg/g	31
DPWG40694	SED-SC-17-2-4-053012/DUP-053012-5	TOTAL PENTA-FURANS	1340	1510	0.198/0.345	pg/g	12
DPWG40694	SED-SC-17-2-4-053012/DUP-053012-5	TOTAL HEXA-FURANS	6770	6670	0.597/1.46	pg/g	1.5
DPWG40694	SED-SC-17-2-4-053012/DUP-053012-5	1,2,3,4,6,7,8-HPCDD	7330	20600	4.18/156	pg/g	95
DPWG40694	SED-SC-17-2-4-053012/DUP-053012-5	OCDF	7190	61800	0.644/15.8	pg/g	158
DPWG40694	SED-SC-17-2-4-053012/DUP-053012-5	TOTAL HEPTA-DIOXINS	14500	43900	4.18/156	pg/g	101
DPWG40694	SED-SC-17-2-4-053012/DUP-053012-5	OCDD	159000	8070000	3.95/80.3	pg/g	192
DPWG40694	SED-SC-17-2-4-053012/DUP-053012-5	2,3,7,8-TCDF	28.1	8.83	0.037/0.89	pg/g	104
DPWG40821	SED-SC-14-6-8-052912/DUP-052912-2	1,2,3,4,7,8-HXCDD	0.103	0.113	0.052/0.046	pg/g	9.3
DPWG40821	SED-SC-14-6-8-052912/DUP-052912-2	1,2,3,6,7,8-HXCDD	0.817	0.644	0.052/0.046	pg/g	24
DPWG40821	SED-SC-14-6-8-052912/DUP-052912-2	1,2,3,7,8,9-HXCDD	0.340	0.284	0.052/0.046	pg/g	18
DPWG40821	SED-SC-14-6-8-052912/DUP-052912-2	1,2,3,4,6,7,8-HPCDD	18.4	18.2	0.119/0.047	pg/g	1.1
DPWG40821	SED-SC-14-6-8-052912/DUP-052912-2	OCDD	290	519	0.134/0.046	pg/g	57
DPWG40821	SED-SC-14-6-8-052912/DUP-052912-2	2,3,7,8-TCDF	0.088	0.059	0.052/0.046	pg/g	39
DPWG40821	SED-SC-14-6-8-052912/DUP-052912-2	2,3,4,7,8-PECDF	0.275	0.183	0.052/0.046	pg/g	40
DPWG40821	SED-SC-14-6-8-052912/DUP-052912-2	1,2,3,4,7,8-HXCDF	2.16	2.17	0.052/0.046	pg/g	0.5
DPWG40821	SED-SC-14-6-8-052912/DUP-052912-2	1,2,3,6,7,8-HXCDF	0.381	0.363	0.052/0.046	pg/g	4.8
DPWG40821	SED-SC-14-6-8-052912/DUP-052912-2	2,3,4,6,7,8-HXCDF	0.208	0.168	0.052/0.046	pg/g	21
DPWG40821	SED-SC-14-6-8-052912/DUP-052912-2	1,2,3,4,6,7,8-HPCDF	6.66	6.96	0.085/0.046	pg/g	4.4
DPWG40821	SED-SC-14-6-8-052912/DUP-052912-2	1,2,3,4,7,8,9-HPCDF	1.15	1.21	0.085/0.046	pg/g	5.1
DPWG40821	SED-SC-14-6-8-052912/DUP-052912-2	OCDF	18.8	14.8	0.064/0.046	pg/g	24
DPWG40821	SED-SC-14-6-8-052912/DUP-052912-2	TOTAL TETRA-DIOXINS	0.348	0.218	0.052/0.046	pg/g	46
DPWG40821	SED-SC-14-6-8-052912/DUP-052912-2	TOTAL PENTA-DIOXINS	0.600	0.243	0.052/0.046	pg/g	85
DPWG40821	SED-SC-14-6-8-052912/DUP-052912-2	TOTAL HEXA-DIOXINS	4.50	3.57	0.052/0.046	pg/g	23
DPWG40821	SED-SC-14-6-8-052912/DUP-052912-2	TOTAL HEPTA-DIOXINS	33.8	34.4	0.119/0.047	pg/g	1.8
DPWG40821	SED-SC-14-6-8-052912/DUP-052912-2	TOTAL TETRA-FURANS	0.299	0.266	0.052/0.046	pg/g	12

Table 6
Field Duplicate Results and Calculated Relative Percent Differences
Sediment Samples Collected May-June 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Compound	Concentration		Report Limit	Units	RPD
			Sample	Duplicate			
DPWG40821	SED-SC-14-6-8-052912/DUP-052912-2	TOTAL PENTA-FURANS	3.42	2.36	0.052/0.046	pg/g	37
DPWG40821	SED-SC-14-6-8-052912/DUP-052912-2	TOTAL HEXA-FURANS	15.6	12.8	0.052/0.046	pg/g	20
DPWG40821	SED-SC-14-6-8-052912/DUP-052912-2	TOTAL HEPTA-FURANS	25.3	26.0	0.085/0.046	pg/g	2.7

Data packages reviewed: ARI UV63, UV97, UW01, UW23, UW18, UW49, UW27, UW43, UW61, UW60, UW62, UW75, UW97, UW99, UY06; AXYS DPWG40565, DPWG40583, DPWG40592, DPWG40641, DPWG40694, DPWG40795, DPWG40821, DPWG40991

Key:

RPD = Relative percent difference

µg/kg = Micrograms per kilogram

mg/kg = Milligrams per kilogram

pg/g = Picograms per gram

TOC = Total organic carbon

TCDD = Tetrachlorodibenzo-p-dioxin

PECDD = Pentachlorodibenzo-p-dioxin

HXCDD = Hexachlorodibenzo-p-dioxin

HPCDD = Heptachlorodibenzo-p-dioxin

OCDD = Octochlorodibenzo-p-dioxin

TCDF = Tetrachlorodibenzofuran

PECDF = Pentachlorodibenzofuran

HXCDF = Hexachlorodibenzofuran

HPCDF = Heptachlorodibenzofuran

OCDF = Octochlorodibenzofuran

Table 7
Analytical Duplicate Results and Calculated Relative Percent Differences
Sediment Samples Collected May-June 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Concentration Sample	Duplicate	Report Limit	Units	RPD	ERM Qualifier
UW18	SED-SS-10-052412	Mercury, total	0.16	0.20	0.05	mg/kg	22.2	J
UW43	SED-SC-06-2-4-052912	Mercury, total	0.37	0.83	0.04	mg/kg	76.7	J
UV63	SED-SS-07-052212	Cadmium, total	0.4	0.3	0.2	mg/kg	28.6	J
UV97	SED-SS-17-052312	Cadmium, total	0.4	0.5	0.2	mg/kg	22.2	J
UV97	SED-SS-17-052312	Lead, total	66.9	107	0.2	mg/kg	46.1	J
UV97	SED-SS-17-052312	Mercury, total	0.50	0.21	0.04	mg/kg	81.7	J
UW60	SED-SC-04-0-1-053012	Zinc, total	278	208	1.0	mg/kg	28.8	J
UW61	SED-SC-02-0-1-052912	Arsenic, total	20.8	25.7	0.5	mg/kg	21.1	J
UW61	SED-SC-02-0-1-052912	Copper, total	159	130	0.4	mg/kg	20.1	J
UW61	SED-SC-02-0-1-052912	Mercury, total	0.19	0.25	0.05	mg/kg	27.3	J
UW61	SED-SC-02-0-1-052912	Zinc, total	368	283	2.0	mg/kg	26.1	J
UW97	SED-SC-15-2-4-053112	Copper, total	141	182	0.7	mg/kg	25.4	J
UW97	SED-SC-15-2-4-053112	Lead, total	49.5	90.0	0.1	mg/kg	58.1	J
UW99	SED-SC-20-0-1-060112	Chromium, total	26.3	36.4	0.9	mg/kg	32.2	J
UW99	SED-SC-20-0-1-060112	Copper, total	66.3	97.0	0.3	mg/kg	37.6	J
UW99	SED-SC-20-0-1-060112	Zinc, total	125	177	2.0	mg/kg	34.4	J
DPWG40641	SED-SC-08-6-8-053012	2,3,7,8-TCDD	0.229	0.217	0.023/0.022	pg/g	5.4	--
DPWG40641	SED-SC-08-6-8-053012	1,2,3,7,8-PECDD	0.950	0.891	0.024/0.029	pg/g	6.4	--

Table 7
Analytical Duplicate Results and Calculated Relative Percent Differences
Sediment Samples Collected May-June 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Concentration Sample	Duplicate	Report Limit	Units	RPD	ERM Qualifier
DPWG40641	SED-SC-08-6-8-053012	1,2,3,4,7,8-HXCDD	1.87	1.64	0.040/0.046	pg/g	13	--
DPWG40641	SED-SC-08-6-8-053012	1,2,3,6,7,8-HXCDD	29.0	29.8	0.040/0.046	pg/g	2.7	--
DPWG40641	SED-SC-08-6-8-053012	1,2,3,7,8,9-HXCDD	5.83	6.17	0.040/0.046	pg/g	5.7	--
DPWG40641	SED-SC-08-6-8-053012	1,2,3,4,6,7,8-HPCDD	1100	873	0.130/0.109	pg/g	23	J
DPWG40641	SED-SC-08-6-8-053012	2,3,7,8-TCDF	2.94	3.07	0.023/0.022	pg/g	4.3	--
DPWG40641	SED-SC-08-6-8-053012	1,2,3,7,8-PECDF	3.70	4.62	0.035/0.060	pg/g	22	J
DPWG40641	SED-SC-08-6-8-053012	2,3,4,7,8-PECDF	10.9	15.5	0.035/0.060	pg/g	35	J
DPWG40641	SED-SC-08-6-8-053012	1,2,3,4,7,8-HXCDF	110	133	0.073/0.063	pg/g	19	--
DPWG40641	SED-SC-08-6-8-053012	1,2,3,6,7,8-HXCDF	16.8	20.0	0.073/0.063	pg/g	17	--
DPWG40641	SED-SC-08-6-8-053012	1,2,3,7,8,9-HXCDF	1.31	1.60	0.073/0.063	pg/g	20	--
DPWG40641	SED-SC-08-6-8-053012	2,3,4,6,7,8-HXCDF	6.06	6.66	0.073/0.063	pg/g	9.4	--
DPWG40641	SED-SC-08-6-8-053012	1,2,3,4,6,7,8-HPCDF	407	401	0.098/0.152	pg/g	1.5	--
DPWG40641	SED-SC-08-6-8-053012	1,2,3,4,7,8,9-HPCDF	51.0	51.0	0.098/0.152	pg/g	0	--
DPWG40641	SED-SC-08-6-8-053012	OCDF	1240	1140	0.035/0.022	pg/g	8.4	--
DPWG40641	SED-SC-08-6-8-053012	TOTAL TETRA-DIOXINS	3.21	3.73	0.023/0.022	pg/g	15	--
DPWG40641	SED-SC-08-6-8-053012	TOTAL PENTA-DIOXINS	9.45	8.31	0.024/0.029	pg/g	13	--
DPWG40641	SED-SC-08-6-8-053012	TOTAL HEXA-DIOXINS	122	120	0.040/0.046	pg/g	1.7	--
DPWG40641	SED-SC-08-6-8-053012	TOTAL HEPTA-DIOXINS	1970	1680	0.130/0.109	pg/g	16	--
DPWG40641	SED-SC-08-6-8-053012	TOTAL TETRA-FURANS	11.6	13.4	0.023/0.022	pg/g	14	--
DPWG40641	SED-SC-08-6-8-053012	TOTAL PENTA-FURANS	72.2	106	0.035/0.060	pg/g	38	J
DPWG40641	SED-SC-08-6-8-053012	TOTAL HEXA-FURANS	649	720	0.073/0.063	pg/g	10	--
DPWG40641	SED-SC-08-6-8-053012	TOTAL HEPTA-FURANS	2000	1960	0.098/0.152	pg/g	2.0	--
DPWG40641	SED-SC-08-6-8-053012	OCDD	10000	10700	1.10/1.31	pg/g	6.8	--
DPWG40641	SED-SC-08-6-8-053012	2,3,7,8-TCDF	0.800	0.997	0.023/0.022	pg/g	22	J
DPWG40694	SED-SC-13-2-4-053112	2,3,7,8-TCDD	8.34	7.67	0.066/0.051	pg/g	8.4	--

Table 7
Analytical Duplicate Results and Calculated Relative Percent Differences
Sediment Samples Collected May-June 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Concentration		Report Limit	Units	RPD	ERM Qualifier
			Sample	Duplicate				
DPWG40694	SED-SC-13-2-4-053112	1,2,3,7,8-PECDD	9.55	8.87	0.081/0.094	pg/g	7.4	--
DPWG40694	SED-SC-13-2-4-053112	1,2,3,4,7,8-HXCDD	17.4	12.5	0.179/0.176	pg/g	33	J
DPWG40694	SED-SC-13-2-4-053112	1,2,3,6,7,8-HXCDD	94.9	90.5	0.179/0.176	pg/g	4.7	--
DPWG40694	SED-SC-13-2-4-053112	1,2,3,7,8,9-HXCDD	56.9	43.7	0.179/0.176	pg/g	26	J
DPWG40694	SED-SC-13-2-4-053112	2,3,7,8-TCDF	31.5	28.9	0.052/0.051	pg/g	8.6	--
DPWG40694	SED-SC-13-2-4-053112	1,2,3,7,8-PECDF	9.03	9.35	0.109/0.112	pg/g	3.5	--
DPWG40694	SED-SC-13-2-4-053112	2,3,4,7,8-PECDF	28.6	31.9	0.109/0.112	pg/g	11	--
DPWG40694	SED-SC-13-2-4-053112	1,2,3,4,7,8-HXCDF	227	271	0.151/0.165	pg/g	18	--
DPWG40694	SED-SC-13-2-4-053112	1,2,3,6,7,8-HXCDF	40.3	44.6	0.151/0.165	pg/g	10	--
DPWG40694	SED-SC-13-2-4-053112	1,2,3,7,8,9-HXCDF	2.93	3.15	0.151/0.165	pg/g	7.2	--
DPWG40694	SED-SC-13-2-4-053112	2,3,4,6,7,8-HXCDF	16.7	17.3	0.151/0.165	pg/g	3.5	--
DPWG40694	SED-SC-13-2-4-053112	1,2,3,4,6,7,8-HPCDF	805	864	0.277/0.262	pg/g	7.1	--
DPWG40694	SED-SC-13-2-4-053112	1,2,3,4,7,8,9-HPCDF	110	120	0.277/0.262	pg/g	8.7	--
DPWG40694	SED-SC-13-2-4-053112	TOTAL TETRA-DIOXINS	56.1	57.1	0.066/0.051	pg/g	1.8	--
DPWG40694	SED-SC-13-2-4-053112	TOTAL PENTA-DIOXINS	78.5	81.7	0.081/0.094	pg/g	4.0	--
DPWG40694	SED-SC-13-2-4-053112	TOTAL HEXA-DIOXINS	618	554	0.179/0.176	pg/g	11	--
DPWG40694	SED-SC-13-2-4-053112	TOTAL TETRA-FURANS	153	144	0.052/0.051	pg/g	6.1	--
DPWG40694	SED-SC-13-2-4-053112	TOTAL PENTA-FURANS	405	455	0.109/0.112	pg/g	12	--
DPWG40694	SED-SC-13-2-4-053112	TOTAL HEXA-FURANS	1590	1800	0.151/0.165	pg/g	12	--
DPWG40694	SED-SC-13-2-4-053112	TOTAL HEPTA-FURANS	3310	3770	0.277/0.262	pg/g	13	--
DPWG40694	SED-SC-13-2-4-053112	OCDD	2180	2440	6.27/4.13	pg/g	11	--
DPWG40694	SED-SC-13-2-4-053112	2,3,7,8-TCDF	56500	49900	3.76/2.28	pg/g	12	--
DPWG40694	SED-SC-13-2-4-053112	OCDF	2040	2340	1.95/2.88	pg/g	14	--
DPWG40694	SED-SC-13-2-4-053112	TOTAL HEPTA-DIOXINS	4190	4720	6.27/4.13	pg/g	12	--

Table 7
Analytical Duplicate Results and Calculated Relative Percent Differences
Sediment Samples Collected May-June 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Concentration		Report Limit	Units	RPD	ERM Qualifier
			Sample	Duplicate				
DPWG40694	SED-SC-13-2-4-053112	2,3,7,8-TCDF	3.53	3.39	0.062/0.063	pg/g	4.0	--

Data packages reviewed: ARI UV63, UV97, UW01, UW23, UW18, UW49, UW27, UW43, UW61, UW60, UW62, UW75, UW97, UW99, UY06; AXYS DPWG40565, DPWG40583, DPWG40592, DPWG40641, DPWG40694, DPWG40795, DPWG40821, DPWG40991

Key:

RPD = Relative percent difference

mg/kg = Milligrams per kilogram

pg/g = Picograms per gram

J = Detected primary sample result qualified as estimated

TCDD = Tetrachlorodibenzo-p-dioxin

PECDD = Pentachlorodibenzo-p-dioxin

HXCDD = Hexachlorodibenzo-p-dioxin

HPCDD = Heptachlorodibenzo-p-dioxin

TCDF = Tetrachlorodibenzofuran

PECDF = Pentachlorodibenzofuran

HXCDF = Hexachlorodibenzofuran

HPCDF = Heptachlorodibenzofuran

OCDF = Octochlorodibenzofuran

OCDD = Octochlorodibenzo-p-dioxin

Table 8
Calibration Verification Recoveries Outside of Acceptable Limits
Sediment Samples Collected May-June 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	CCV ID	Compound	CCV Recovery	CCV Limit	Associated Samples	Reported Concentration	Units	ERM Qualifier
UW43	CCV-061812	Pentachlorophenol	-30.2	20	See below	--	--	--
UW43	CCV-061812	--	--	--	SED-SC-06-0-1-052912	51	µg/kg	J-
UW43	CCV-061812	--	--	--	SED-SC-06-2-4-052912	71	µg/kg	J-
UW43	CCV-061812	--	--	--	SED-SC-06-6-8-052912	14	µg/kg	J-
UW43	CCV-061812	--	--	--	SED-SC-14-0-1-052912	940	µg/kg	J-
UW43	CCV-061812	--	--	--	SED-SC-14-2-4-052912	97	µg/kg	J-
UW43	CCV-061812	--	--	--	SED-SC-14-6-8-052912	< 47	µg/kg	UJ
UW43	CCV-061812	--	--	--	DUP-052912-2	< 48	µg/kg	UJ
UW62	CCV-061812	Pentachlorophenol	-30.2	20	See below	--	--	--
UW62	CCV-061812	--	--	--	SED-SC-09-0-1-052912	< 48	µg/kg	UJ
UW62	CCV-061812	--	--	--	SED-SC-09-2-4-052912	35	µg/kg	J-
UW62	CCV-061812	--	--	--	SED-SC-09-6-8-052912	< 48	µg/kg	UJ
UW75	CCV-061512	Benzyl alcohol	23.8	20	See below	--	--	--
UW75	CCV-061512	--	--	--	SED-SC-16-0-1-053112	150	µg/kg	J+
UW75	CCV-061512	--	--	--	SED-SC-16-2-3.5-053112	29	µg/kg	J+
UW75	CCV-061512	--	--	--	DUP-053112-2	23	µg/kg	J+
UW99	CCV-061512	Benzyl alcohol	23.8	20	See below	--	--	--
UW99	CCV-061512	--	--	--	SED-SC-18-0-1-060112	300	µg/kg	J+
UW99	CCV-061512	--	--	--	SED-SC-05-0-1-060112	140	µg/kg	J+
UW99	CCV-061512	--	--	--	SED-SC-05-2-4-060112	70	µg/kg	J+
UW99	CCV-061512	--	--	--	SED-SC-05-2-4-060112 RE	70	µg/kg	J+
UW99	CCV-061512	--	--	--	SED-SC-20-0-1-060112	110	µg/kg	J+
UW99	CCV-061512	--	--	--	SED-SC-18-2-2.25-060112	330	µg/kg	J+

Table 8
Calibration Verification Recoveries Outside of Acceptable Limits
Sediment Samples Collected May-June 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	CCV ID	Compound	CCV Recovery	CCV Limit	Associated Samples	Reported Concentration	Units	ERM Qualifier
UW99	CCV-061512	--	--	--	SED-SC-20-2-2.5-060112	63	µg/kg	J+

Data packages reviewed: ARI UV63, UV97, UW01, UW23, UW18, UW49, UW27, UW43, UW61, UW60, UW62, UW75, UW97, UW99, UY06; AXYS DPWG40565, DPWG40583, DPWG40592, DPWG40641, DPWG40694, DPWG40795, DPWG40821, DPWG40991

Key:

CCV = Continuing calibration verification

µg/kg = Micrograms per kilogram

J- = Detected sample result qualified as estimated and biased low

J+ = Detected sample result qualified as estimated and biased high

UJ = Nondetected sample result qualified as estimated

RE = Reanalyzed sample

Table 9
Calibration Range Exceedances
Sediment Samples Collected May-June 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Reported Concentration	Units	ERM Qualifier	Notes
UV97	SED-SS-18-052312	Fluorene	2400 E	µg/kg	J	Result exceeded instrument calibration range
UV97	SED-SS-18-052312	Phenanthrene	6900 E	µg/kg	J	Result exceeded instrument calibration range
UV97	SED-SS-18-052312	Fluoranthene	3600 E	µg/kg	J	Result exceeded instrument calibration range
UV97	SED-SS-18-052312	Pyrene	2400 E	µg/kg	J	Result exceeded instrument calibration range
UW75	SED-SC-03-0-1-053012	Hexachlorobenzene	4300 E	µg/kg	J	Result exceeded instrument calibration range
UW75	SED-SC-03-0-1-053012	Pentachlorophenol	7700 E	µg/kg	J	Result exceeded instrument calibration range
UW75	SED-SC-03-0-1-053012	Hexachlorobenzene	4200 E	µg/kg	J	Result exceeded instrument calibration range
UW99	SED-SC-05-2-4-060112	Fluoranthene	2300 E	µg/kg	J	Result exceeded instrument calibration range
UW99	SED-SC-05-2-4-060112	Pyrene	3300 E	µg/kg	J	Result exceeded instrument calibration range
UW99	SED-SC-05-2-4-060112	Tributyltin ion	520 E	µg/kg	J	Result exceeded instrument calibration range

Data packages reviewed: ARI UV63, UV97, UW01, UW23, UW18, UW49, UW27, UW43, UW61, UW60, UW62, UW75, UW97, UW99, UY06; AXYS DPWG40565, DPWG40583, DPWG40592, DPWG40641, DPWG40694, DPWG40795, DPWG40821, DPWG40991

Key:

E = Undiluted sample concentration exceeded calibration range; use result of reanalysis for decision-making purposes

µg/kg = Micrograms per kilogram

J = Detected sample result qualified as estimated

Memorandum

Environmental Resources Management

To: Dylan Stankus

From: Irene Lavigne

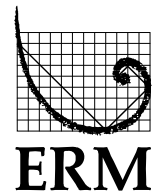
Date: 28 June 2013

Subject: Data Review of Reichhold-Glacier Archived
Sediment Samples Collected May 2012

Project Number: 0155129

Data Packages: Axys Analytical Services Data Package DPWG43832
Analytical Resources Incorporated Data Packages
WP16 and WU91

2875 Michelle Drive
Suite 200
Irvine, CA 92606
(949) 623-4700
(949) 623-2940 (fax)



The data quality was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999, *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004, and the *EPA Region 10 SOP for the Validation of Polychlorinated Dibenzodioxin (PCDD) and Polychlorinated Dibenzofuran (PCDF) Data*, January 1996.

HOLDING TIME AND PRESERVATION EVALUATION

The sample shipments were received at each laboratory within the method-prescribed preservation requirements. All samples were frozen in May 2012 and held for possible analyses, which were subsequently requested in April 2013. No sample data were qualified based on the preservation evaluation.

The samples were prepared and analyzed within the method-prescribed time period from the date of collection with limited exceptions. Two samples submitted for total metals analysis were analyzed outside of the 180-day holding time for this analysis. The detected compounds for these two samples were qualified as estimated and biased low (J-) and the nondetected results for these samples were qualified as estimated (UJ). Fifteen samples were analyzed outside of the 180-day holding time for total organic carbon (TOC) analysis. The detected results for these analyses were qualified as estimated and biased low (J-). The holding-time outliers and associated qualifiers are listed in Table 1.

BLANK EVALUATION

The method blank, lab blank, and field blank sample results were nondetected for each of the target analytes with limited exceptions. Detections of dioxin/furan compounds in a lab blank did not require qualification of associated sample data because the field sample concentrations exceeded five times the blank detections. Additionally, detections of semivolatile organic compounds (SVOCs) in a method blank did not require qualification of sample data because the sample results were nondetected for the corresponding compounds. The blank detections are presented in Table 2.

BLANK SPIKE EVALUATION

The laboratory control sample (LCS) recoveries were within the laboratories' limits of acceptance. No sample data were qualified based on the blank spike evaluation. The LCS recoveries indicate acceptable laboratory accuracy and precision.

MATRIX SPIKE EVALUATION

The matrix spike (MS) and matrix spike duplicate (MSD) recoveries were within the laboratories' limits of acceptance with several exceptions. Detected sample results for lead were qualified as estimated (J) based on an MS recovery that exceeded the maximum acceptable limits. Additionally, detected sample results for TOC were qualified as estimated (J) due to a low MS recovery for this analyte. Not all MS recovery outliers resulted in qualification of associated sample data. Data were not qualified if only one recovery in a MS/MSD pair exceeded control limits or if the concentration of the unspiked sample exceeded four times the spiked amount. The outlying MS recoveries and qualified sample data are shown in Table 3.

LABELED COMPOUND EVALUATION

Carbon-13 labeled isotope recoveries were reported for each sample submitted for dioxin/furan analysis. The recoveries of labeled PCDD and PCDF compounds is a measure of the effectiveness of the laboratory and method to extract the compounds of interest. All of the labeled compounds were within acceptable limits, and no qualifiers were required based on the labeled compound evaluation.

SURROGATE EVALUATION

The surrogate recoveries were within acceptable limits, and no sample data required qualification as a result of the surrogate evaluation. The surrogate recoveries indicate minimal matrix interference in the samples.

ESTIMATED MAXIMUM POSSIBLE CONCENTRATION

The laboratory identified several dioxin/furan results as estimated maximum possible concentrations (EMPC). An EMPC value is the maximum possible concentration of a compound that could be present in the sample. This classification is used when all of the identification criteria for a given dioxin or furan compound are not met. The sample data identified as EMPC by the laboratory were qualified as nondetected (U), as presented in Table 4.

FIELD DUPLICATE EVALUATION

One sample was collected and analyzed in duplicate. ERM calculated the relative percent difference (RPD) between detected results. The USEPA has not established control criteria for field duplicate samples; therefore, sample data are not qualified on the basis of field duplicate imprecision. Detected duplicate results and calculated RPDs are listed in Table 5.

ANALYTICAL DUPLICATE EVALUATION

The laboratory prepared and analyzed several samples as analytical duplicates. ERM calculated the RPD between detected results. The RPDs were within acceptable limits with one exception. The primary sample result for one sample analyzed for lead was qualified as estimated (J), as shown in Table 6.

CONTINUING CALIBRATION EVALUATION

The laboratory noted that continuing calibration verification (CCV) recoveries for a number of SVOCs did not meet acceptable control limits. A low recovery for benzoic acid resulted in qualification of one sample result for this compound as estimated (UJ). High recoveries for acenaphthylene, pyrene, and benzo(a)anthracene required the qualification of several detected sample results for these compounds as estimated (J). A list of outlying CCV recoveries and associated qualified data is provided in Table 7.

CALIBRATION RANGE EVALUATION

The laboratories noted several instances where the sample results exceeded the calibration range of the equipment for dioxin/furan compounds and SVOCs. The dioxin/furan results were not reported by the laboratory. The reported SVOC sample results were qualified as estimated (J). Both laboratories diluted and reanalyzed the affected samples. The sample results from the dilutions should be used for decision-making purposes. The samples with calibration range exceedances are presented in Table 8.

OVERALL ASSESSMENT

No data were determined to be unusable. All of the data, including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents.

Table 1
Samples with Exceeded Holding Times
May 2012 Archived Sediment Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Method	Holding Time (days)	Days Exceeded	ERM Qualifier
WP16	SED-SC-03-4-6-053012	Total Metals	180	164	J-/UJ
WP16	SED-SC-05-4-6-060112	Total Metals	180	162	J-/UJ
WU91	SED-SC-06-4-6-052912	TOC	180	158	J-
WU91	SED-SC-06-8-10-052912	TOC	180	158	J-
WU91	SED-SC-14-1-2-052912	TOC	180	158	J-
WU91	SED-SC-14-4-6-052912	TOC	180	158	J-
WU91	SED-SC-04-1-2-053012	TOC	180	157	J-
WU91	SED-SC-04-4-6-053012	TOC	180	157	J-
WU91	SED-SC-07-1-2-053012	TOC	180	157	J-
WU91	SED-SC-07-4-6-053012	TOC	180	157	J-
WU91	SED-SC-02-8-10-052912	TOC	180	158	J-
WU91	SED-SC-09-1-2-052912	TOC	180	158	J-
WU91	SED-SC-08-4-6-053012	TOC	180	157	J-
WU91	SED-SC-03-4-6-053012	TOC	180	157	J-
WU91	SED-SC-17-4-5-053012	TOC	180	157	J-
WU91	SED-SC-13-4-6-053112	TOC	180	156	J-
WU91	SED-SC-05-4-6-060112	TOC	180	155	J-

Data packages reviewed: Axys DPWG43832; ARI WP16, WU91

Key:

TOC = Total organic carbon

J- = Detected sample result qualified as estimated and biased low

UJ = Nondetected sample result qualified as estimated

Table 2
Blank and Associated Suspect Sample Detections
May 2012 Archived Sediment Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG43832	Lab Blank	PCDD/PCDF	NA	OCDD	4.31	0.999	pg/g	--
DPWG43832	Lab Blank	PCDD/PCDF	NA	OCDF	1.40	0.999	pg/g	--
WP16	MB-051413	SVOC-SIM	NA	1,2-Dichlorobenzene	3.2	5.0	µg/kg	--

Data packages reviewed: Axys DPWG43832; ARI WP16, WU91

Key:

MB = Method blank

PCDD/PCDF = Polychlorinated dibenzo-p-dioxins/Polychlorinated dibenzofurans; Method 1613B

NA = Not applicable; qualification of sample data not required

OCDD = Octochlorodibenzo-p-dioxin

OCDF = Octochlorodibenzofuran

pg/g = Picograms per gram

SVOC-SIM = Semivolatile organic compounds - selected ion monitoring

µg/kg = Micrograms per kilogram

Table 3
Spike Recoveries Outside of Acceptable Limits
May 2012 Archived Sediment Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
DPWG43832	SED-SC-04-1-2-053012 MS/MSD	PCDD/PCDF	NA	1,2,3,6,7,8-HXCDD	138/120	70-130	13.7	30	--	--
DPWG43832	SED-SC-04-1-2-053012 MS/MSD	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDD	1820/1920	70-130	5.56	30	4X	--
DPWG43832	SED-SC-04-1-2-053012 MS/MSD	PCDD/PCDF	NA	OCDD	6540/3210	70-130	68.4	30	4X	--
DPWG43832	SED-SC-04-1-2-053012 MS/MSD	PCDD/PCDF	NA	1,2,3,4,7,8-HXCDF	139/169	70-130	20.1	30	4X	--
DPWG43832	SED-SC-04-1-2-053012 MS/MSD	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDF	51.6	70-130	--	--	4X	--
DPWG43832	SED-SC-04-1-2-053012 MS/MSD	PCDD/PCDF	NA	OCDF	15.0	70-130			4X	--
WP16	SED-SC-17-4-5-053012 MS/MSD	SVOC-SIM	NA	N-Nitrosodiphenylamine	115/109	36-111	4.8	40	--	--
WP16	SED-SC-03-4-6-053012 MS/MSD	Total Metals	See below	Lead	73.7	75-125	--	--	--	--
WP16	SED-SC-03-4-6-053012 MS/MSD	Total Metals	SED-SC-03-4-6-053012	Lead	--	--	--	--	20.6	J
WP16	SED-SC-03-4-6-053012 MS/MSD	Total Metals	SED-SC-05-4-6-060112	Lead	--	--	--	--	28.0	J
WU91	SED-SC-06-4-6-052912 MS/MSD	TOC	See below	TOC	57.2	75-125	--	--	--	--
WU91	SED-SC-06-4-6-052912 MS/MSD	TOC	SED-SC-06-4-6-052912	TOC	--	--	--	--	2.07	J
WU91	SED-SC-06-4-6-052912 MS/MSD	TOC	SED-SC-60-8-10-052912	TOC	--	--	--	--	3.17	J

Table 3
Spike Recoveries Outside of Acceptable Limits
May 2012 Archived Sediment Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
WU91	SED-SC-06-4-6-052912 MS/MSD	TOC	SED-SC-14-1-2-052912	TOC	--	--	--	--	1.79	J
WU91	SED-SC-06-4-6-052912 MS/MSD	TOC	SED-SC-14-4-6-052912	TOC	--	--	--	--	1.55	J
WU91	SED-SC-06-4-6-052912 MS/MSD	TOC	SED-SC-04-1-2-053012	TOC	--	--	--	--	1.84	J
WU91	SED-SC-06-4-6-052912 MS/MSD	TOC	SED-SC-04-4-6-053012	TOC	--	--	--	--	0.552	J
WU91	SED-SC-06-4-6-052912 MS/MSD	TOC	SED-SC-07-1-2-053012	TOC	--	--	--	--	1.73	J
WU91	SED-SC-06-4-6-052912 MS/MSD	TOC	SED-SC-07-4-6-053012	TOC	--	--	--	--	1.90	J
WU91	SED-SC-06-4-6-052912 MS/MSD	TOC	SED-SC-02-8-10-052912	TOC	--	--	--	--	1.24	J
WU91	SED-SC-06-4-6-052912 MS/MSD	TOC	SED-SC-09-1-2-052912	TOC	--	--	--	--	2.18	J
WU91	SED-SC-06-4-6-052912 MS/MSD	TOC	SED-SC-08-4-6-053012	TOC	--	--	--	--	1.54	J
WU91	SED-SC-06-4-6-052912 MS/MSD	TOC	SED-SC-03-4-6-053012	TOC	--	--	--	--	1.73	J
WU91	SED-SC-06-4-6-052912 MS/MSD	TOC	SED-SC-17-4-5-053012	TOC	--	--	--	--	1.00	J
WU91	SED-SC-06-4-6-052912 MS/MSD	TOC	SED-SC-13-4-6-053112	TOC	--	--	--	--	1.42	J

Table 3
Spike Recoveries Outside of Acceptable Limits
May 2012 Archived Sediment Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
WU91	SED-SC-06-4-6-052912 MS/MSD	TOC	SED-SC-05-4-6-060112	TOC	--	--	--	--	0.383	J

Data packages reviewed: Axys DPWG43832; ARI WP16, WU91

Key:

MS/MSD = Matrix spike/matrix spike duplicate

RPD = Relative percent difference

PCDD/PCDF = Polychlorinated dibenzo-p-dioxins/Polychlorinated dibenzofurans; Method 1613B

HXCDD = Hexachlorodibenzo-p-dioxin

HPCDD = Heptachlorodibenzo-p-dioxin

OCDD = Octochlorodibenzo-p-dioxin

HXCDF = Hexachlorodibenzofuran

HPCDF = Heptachlorodibenzofuran

OCDF = Octochlorodibenzofuran

4X = Concentration of unspiked sample was greater than 4 times the amount spiked; no qualification required

SVOC-SIM = Semivolatile organic compounds - selected ion monitoring

TOC = Total organic carbon

NA = Not applicable; qualification of sample data not required

J = Detected sample result qualified as estimated

Table 4
Estimated Maximum Possible Concentration
May 2012 Archived Sediment Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG43832	SED-SC-14-4-6-052912	2,3,7,8-TCDD	0.118	0.048	pg/g	0.118 U
DPWG43832	SED-SC-14-4-6-052912	1,2,3,7,8,9-HXCDF	0.390	0.057	pg/g	0.390 U
DPWG43832	SED-SC-08-8-10-053012	1,2,3,7,8-PECDD	0.930	0.929	pg/g	0.930 U
DPWG43832	SED-SC-08-8-10-053012	1,2,3,4,7,8-HXCDD	1.85	0.929	pg/g	1.85 U
DPWG43832	SED-SC-08-8-10-053012	2,3,7,8-TCDF	1.33	0.929	pg/g	1.33 U
DPWG43832	SED-SC-08-8-10-053012	2,3,4,7,8-PECDF	4.18	1.45	pg/g	4.18 U
DPWG43832	SED-SC-08-8-10-053012	1,2,3,7,8,9-HXCDF	1.51	1.33	pg/g	1.51 U
DPWG43832	SED-SC-08-8-10-053012	2,3,4,6,7,8-HXCDF	2.94	1.33	pg/g	2.94 U
DPWG43832	SED-SC-03-4-6-053012	2,3,7,8-TCDD	1.10	0.886	pg/g	1.10 U

Data packages reviewed: Axys DPWG43832; ARI WP16, WU91

Key:

TCDD = Tetrachlorodibenzo-p-dioxin
 HXCDF = Hexachlorodibenzofuran
 PECDD = Pentachlorodibenzo-p-dioxin
 HXCDD = Hexachlorodibenzo-p-dioxin
 TCDF = Tetrachlorodibenzofuran
 PECDF = Pentachlorodibenzofuran
 pg/g = Picograms per gram
 U = Nondetected

Table 5
Field Duplicate Results and Calculated Relative Percent Differences
May 2012 Archived Sediment Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration Sample	Duplicate	Report Limit	Units	RPD
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	1,2,3,7,8-PECDD	3.02	2.75	0.879/1.15	pg/g	9.4
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	1,2,3,4,7,8-HXCDD	16.9	22.4	0.879/1.63	pg/g	28
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	1,2,3,6,7,8-HXCDD	155	188	0.879/1.63	pg/g	19
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	1,2,3,7,8,9-HXCDD	36.1	39.2	0.879/1.63	pg/g	8.2
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	1,2,3,4,6,7,8-HPCDD	7420	7980	1.68/4.72	pg/g	7.3
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	OCDD	45100	40200	0.879/0.877	pg/g	11
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	2,3,7,8-TCDF	5.10	5.79	0.879/0.877	pg/g	13
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	1,2,3,7,8-PECDF	8.66	10.50	0.879/1.32	pg/g	19
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	2,3,4,7,8-PECDF	26.9	28.1	0.879/1.32	pg/g	4.4
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	1,2,3,4,7,8-HXCDF	277	294	0.933/2.19	pg/g	6.0
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	1,2,3,6,7,8-HXCDF	48.7	51.9	0.933/2.19	pg/g	6.4
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	1,2,3,7,8,9-HXCDF	5.19	4.32	0.933/2.19	pg/g	18
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	2,3,4,6,7,8-HXCDF	17.7	21.0	0.933/2.19	pg/g	17
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	1,2,3,4,6,7,8-HPCDF	2420	2310	1.31/5.28	pg/g	4.7

Table 5
Field Duplicate Results and Calculated Relative Percent Differences
May 2012 Archived Sediment Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	1,2,3,4,7,8,9-HPCDF	270	232	1.31/5.28	pg/g	15
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	OCDF	13400	10000	0.879/0.877	pg/g	29
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	TOTAL TETRA-DIOXINS	66.1	63.8	0.879/0.877	pg/g	3.5
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	TOTAL PENTA-DIOXINS	424	408	0.879/1.15	pg/g	3.8
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	TOTAL HEXA-DIOXINS	1280	1640	0.879/1.63	pg/g	25
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	TOTAL HEPTA-DIOXINS	11800	13100	1.68/4.72	pg/g	10
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	TOTAL TETRA-FURANS	66.2	77.7	0.879/0.877	pg/g	16
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	TOTAL PENTA-FURANS	545	662	0.879/1.32	pg/g	19
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	TOTAL HEXA-FURANS	3280	3480	0.933/2.19	pg/g	5.9
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	TOTAL HEPTA-FURANS	12700	13600	1.31/5.28	pg/g	6.8

Data packages reviewed: AxyS DPWG43832; ARI WP16, WU91

Key:

RPD = Relative percent difference

PECDD = Pentachlorodibenzo-p-dioxin

HXCDD = Hexachlorodibenzo-p-dioxin

HPCDD = Heptachlorodibenzo-p-dioxin

OCDD = Octochlorodibenzo-p-dioxin

PCDD/PCDF = Polychlorinated dibenzo-p-dioxins/Polychlorinated dibenzofurans; Method 1613B

TCDF = Tetrachlorodibenzofuran

PECDF = Pentachlorodibenzofuran

HXCDF = Hexachlorodibenzofuran

HPCDF = Heptachlorodibenzofuran

OCDF = Octochlorodibenzofuran

pg/g = Picograms per gram

Table 6
Analytical Duplicate Results and Calculated Relative Percent Differences
May 2012 Archived Sediment Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Concentration		Report Limit	Units	RPD	RPD Limit	ERM Qualifier
			Sample	Duplicate					
WP16	SED-SC-03-4-6-053012	Lead, total	20.6	15.9	0.1	mg/kg	25.8	20	J

Data packages reviewed: Axys DPWG43832; ARI WP16, WU91

Key:

RPD = Relative percent difference

mg/kg = Milligrams per kilogram

J = Detected sample result qualified as estimated

Table 7
Calibration Verification Recoveries Outside of Acceptable Limits
May 2012 Archived Sediment Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	CCV ID	Analysis	Compound	CCV Recovery	CCV Limit	Associated Samples	Reported Concentration	Units	ERM Qualifier
WP16	CCV-052113	SVOC	Benzoic acid	-21.1	20	See below	--	--	--
WP16	CCV-052113	SVOC	--	--	--	SED-SC-17-4-5-053012	< 400	µg/kg	UJ
WP16	CCV-051813	SVOC-SIM	Acenaphthylene	22.5	20	See below	--	--	--
WP16	CCV-051813	SVOC-SIM	--	--	--	SED-SC-06-4-6-052912	53	µg/kg	J
WP16	CCV-051813	SVOC-SIM	--	--	--	SED-SC-06-8-10-052912	22	µg/kg	J
WP16	CCV-051813	SVOC-SIM	--	--	--	SED-SC-14-4-6-052912	11	µg/kg	J
WP16	CCV-051813	SVOC-SIM	--	--	--	SED-SC-05-4-6-060112	6.9	µg/kg	J
WP16	CCV-051813	SVOC-SIM	Pyrene	20.8	20	See below	--	--	--
WP16	CCV-051813	SVOC-SIM	--	--	--	SED-SC-06-4-6-052912	7300	µg/kg	J
WP16	CCV-051813	SVOC-SIM	--	--	--	SED-SC-06-4-6-052912 DIL	13000	µg/kg	J
WP16	CCV-051813	SVOC-SIM	--	--	--	SED-SC-06-8-10-052912	410	µg/kg	J
WP16	CCV-051813	SVOC-SIM	--	--	--	SED-SC-14-4-6-052912	140	µg/kg	J
WP16	CCV-051813	SVOC-SIM	--	--	--	SED-SC-04-4-6-053012	16	µg/kg	J
WP16	CCV-051813	SVOC-SIM	--	--	--	SED-SC-05-4-6-060112	180	µg/kg	J
WP16	CCV-051813	SVOC-SIM	Benzo(a)anthracene	20.1	20	See below	--	--	--
WP16	CCV-051813	SVOC-SIM	--	--	--	SED-SC-06-4-6-052912	3600	µg/kg	J
WP16	CCV-051813	SVOC-SIM	--	--	--	SED-SC-06-4-6-052912 DIL	4100	µg/kg	J
WP16	CCV-051813	SVOC-SIM	--	--	--	SED-SC-06-8-10-052912	120	µg/kg	J
WP16	CCV-051813	SVOC-SIM	--	--	--	SED-SC-14-4-6-052912	45	µg/kg	J
WP16	CCV-051813	SVOC-SIM	--	--	--	SED-SC-04-4-6-053012	5.8	µg/kg	J
WP16	CCV-051813	SVOC-SIM	--	--	--	SED-SC-05-4-6-060112	75	µg/kg	J

Data packages reviewed: Axys DPWG43832; ARI WP16, WU91

Key:

CCV = Continuing calibration verification

SVOC = Semivolatile organic compounds; Method 8270D

SVOC-SIM = Semivolatile organic compounds - selected ion monitoring

µg/kg = Micrograms per kilogram

UJ = Nondetected sample result qualified as estimated

J = Detected sample result qualified as estimated

Table 8
Calibration Range Exceedances
May 2012 Archived Sediment Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Method	Compound	Reported Concentration	Units	ERM Qualifier	Notes
DPWG43832	SED-SC-06-8-10-052912	PCDD/PCDF	1,2,3,4,6,7,8-HPCDD	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG43832	SED-SC-06-8-10-052912	PCDD/PCDF	OCDD	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG43832	SED-SC-06-8-10-052912	PCDD/PCDF	1,2,3,4,6,7,8-HPCDF	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG43832	SED-SC-06-8-10-052912	PCDD/PCDF	OCDF	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG43832	SED-SC-06-8-10-052912	PCDD/PCDF	TOTAL HEPTA-DIOXINS	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG43832	SED-SC-06-8-10-052912	PCDD/PCDF	TOTAL HEPTA-FURANS	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG43832	SED-SC-17-4-5-053012	PCDD/PCDF	OCDD	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG43832	SED-SC-04-1-2-053012	PCDD/PCDF	OCDD	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
WP16	SED-SC-06-4-6-052912	SVOC-SIM	Acenaphthene	1900 E	µg/kg	J	Result exceeded instrument calibration range
WP16	SED-SC-06-4-6-052912	SVOC-SIM	Fluorene	1500 E	µg/kg	J	Result exceeded instrument calibration range
WP16	SED-SC-06-4-6-052912	SVOC-SIM	Phenanthrene	4100 E	µg/kg	J	Result exceeded instrument calibration range
WP16	SED-SC-06-4-6-052912	SVOC-SIM	Anthracene	5200 E	µg/kg	J	Result exceeded instrument calibration range
WP16	SED-SC-06-4-6-052912	SVOC-SIM	Fluoranthene	7200 E	µg/kg	J	Result exceeded instrument calibration range
WP16	SED-SC-06-4-6-052912	SVOC-SIM	Pyrene	7300 E	µg/kg	J	Result exceeded instrument calibration range

Table 8
Calibration Range Exceedances
May 2012 Archived Sediment Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Method	Compound	Reported Concentration	Units	ERM Qualifier	Notes
WP16	SED-SC-06-4-6-052912	SVOC-SIM	Benzo(a)anthracene	3600 E	µg/kg	J	Result exceeded instrument calibration range
WP16	SED-SC-06-4-6-052912	SVOC-SIM	Chrysene	4800 E	µg/kg	J	Result exceeded instrument calibration range
WP16	SED-SC-06-4-6-052912	SVOC-SIM	Benzo(a)pyrene	1700 E	µg/kg	J	Result exceeded instrument calibration range

Data packages reviewed: Axys DPWG43832; ARI WP16, WU91

Key:

PCDD/PCDF = Polychlorinated dibenzo-p-dioxins/Polychlorinated dibenzofurans; Method 1613B

HPCDD = Heptachlorodibenzo-p-dioxin

OCDD = Octochlorodibenzo-p-dioxin

HPCDF = Heptachlorodibenzofuran

OCDF = Octochlorodibenzofuran

NR = Value not reported

pg/g = Picograms per gram

SVOC-SIM = Semivolatile organic compounds - selected ion monitoring

E = Undiluted sample concentration exceeded calibration range; use result of dilution/reanalysis for decision-making purposes

µg/kg = Micrograms per kilogram

J = Detected sample result qualified as estimated

Memorandum

Environmental Resources Management

To: Shira DeGrood

From: Irene Lavigne

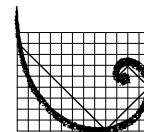
Date: 27 January 2012

Subject: Data Review of Reichhold-Glacier Fall 2011 Soil Samples Collected November – December 2011

Project Number: 0128296.06

Data Packages: Analytical Resources Incorporated Data Packages TW31, TW33, TW46, TW75, and TW88

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ERM®

The quality of the data was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999, and the *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004.

HOLDING TIME AND PRESERVATION EVALUATION

The sample shipments were received at the laboratory within the method-prescribed preservation requirements with one exception. The temperature of one sample delivery group was recorded above the acceptable range of 2-6 degrees Celcius upon receipt at the laboratory. No data were qualified on the basis of this temperature exceedance because the samples were delivered to the laboratory within 2 hours of collection of the last sample; therefore, the samples did not have sufficient cooling time to reach an acceptable temperature. The samples associated with the temperature exceedance are listed in Table 1.

The samples were prepared and analyzed within the method-prescribed time period from the date of collection with limited exceptions. One sample was extracted outside of the 14-day holding time for semivolatile organic compound analysis, and one sample was extracted outside of the 14-day holding time for polychlorinated biphenyl analysis. Detected and nondetected sample results for these samples were qualified as estimated (J and/or UJ), as shown in Table 2.

BLANK EVALUATION

The method blank, rinsate blank, and field blank sample results were nondetected for each of the target analytes with a number of exceptions. Detections of ammonia in a rinsate blank required qualification of three sample results as nondetected (U) for this compound. Detections of the common laboratory contaminants, methylene chloride and acetone, in a field and rinsate blank resulted in qualification of three associated sample results as nondetected (U). The blank detections and associated, qualified data are presented in Table 3.

BLANK SPIKE EVALUATION

The laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) recoveries were within the laboratory's limits of acceptance with few exceptions; however, no sample data were qualified on the basis of the LCS outliers. Sample data are not qualified if only the relative percent difference (RPD) exceeds control limits. The outlying LCS recoveries are shown in Table 4.

MATRIX SPIKE EVALUATION

The matrix spike (MS) and matrix spike duplicate (MSD) recoveries were within the laboratory's limits of acceptance with a number of exceptions. Thirty-one sample results were qualified as estimated (UJ or J) due to seven MS recoveries that exceeded acceptable limits for various compounds. Additional outlying compounds did not require qualification of sample data. Data are not qualified if only the RPD exceeded control limits, if the data could be verified using and associated, in-control LCS recovery, or if only one recovery in a MS/MSD pair exceeded control limits. The outlying MS recoveries and qualified sample data are listed in Table 5.

SURROGATE SPIKE EVALUATION

The surrogate recoveries were within acceptable limits with two exceptions. No sample data were qualified on the basis of the surrogate outliers because these samples were diluted by a factor of 10 times or more, resulting in dilution of the surrogate compounds to a point where they did not provide useful recovery information. The outlying surrogate recoveries are presented in Table 6.

FIELD DUPLICATE EVALUATION

Six samples were collected and analyzed in duplicate. ERM calculated the RPD between detected results. The USEPA has not established control criteria for field duplicate samples; therefore, sample data are not qualified on the basis of field duplicate imprecision. Detected duplicate results and calculated RPDs are listed in Table 7.

ANALYTICAL DUPLICATE & REPLICATE EVALUATION

The laboratory prepared and analyzed a number of samples as analytical duplicates and replicates. ERM calculated the RPD between detected results. The RPDs were less than 20 percent, with several exceptions. The detected sample results for various metals were qualified as estimated (J) on the basis of these RPD exceedances. The analytical duplicate and replicate sample results and calculated RPDs are presented in Table 8.

CALIBRATION VERIFICATION EVALUATION

The laboratory noted that a number of calibration verification (CV) recoveries for volatile organic compounds exceeded acceptable control limits for several compounds. Detected and nondetected sample results for samples associated with the outlying CV recoveries were qualified as estimated (J or UJ), as shown in Table 9.

TPH EVALUATION

The laboratory noted that the chromatograms for two samples analyzed for diesel range organics, and one sample analyzed for motor oil range organics contained additional, unidentifiable hydrocarbons. The results for these samples were qualified as tentatively identified and estimated (NJ) as presented in Table 10.

OVERALL ASSESSMENT

No data were determined to be unusable. All of the data, including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents.

Table 1
Samples with Exceeded Preservation Requirements
Fall 2011 Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Analysis Method	Sample Temperature (°C)	Limits (°C)	Note	ERM Qualifier
TW33	MW-34S-3	VOC, TPH-d	8.3	2 - 6	NA	--
TW33	MW-34S-3.8-4.2	VOC, TPH-d	8.3	2 - 6	NA	--
TW33	DUP-110911-1	VOC, TPH-d	8.3	2 - 6	NA	--

Data packages reviewed: TW31, TW33, TW46, TW75, TW88

Key:

°C = Degrees Celsius

VOC = Volatile organic compounds (Method 8260C)

TPH-d = Total petroleum hydrocarbons as diesel

NA = Data not affected; samples received at the laboratory within two hours of collection

Table 2
Samples with Exceeded Holding Times
Fall 2011 Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Method	Holding Time (days)	# of Days Exceeded	ERM Qualifier
TW31	MW-29S-0-2	SVOC	14/40	7	J/UJ
TW31	MW-31S-1-2	PCB	14/40	1	UJ

Data packages reviewed: TW31, TW33, TW46, TW75, TW88

Key:

SVOC = Semivolatile organic compounds (Phenol compounds)

PCB = Polychlorinated biphenyls

14/40 = 14 days to extraction/40 days to analysis

J = Detected sample result qualified as estimated

UJ = Nondetected sample result qualified as estimated

Table 3
Blank and Associated Suspect Sample Detections
Fall 2011 Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
TW31	RB-110811-1	See below	N-Ammonia	0.060	0.010	mg/L	--
TW31	RB-110811-1	MW-29S-0-2	N-Ammonia	0.17	0.11	mg/kg	0.17 U
TW31	RB-110811-1	MW-31S-1-2	N-Ammonia	0.21	0.10	mg/kg	0.21 U
TW31	RB-110811-1	MW-31S-5-6	N-Ammonia	0.12	0.12	mg/kg	0.12 U
TW33	FB-110911-1	See below	Methylene chloride	1.0	0.5	µg/L	--
TW33	RB-110911-1	See below	Methylene chloride	1.0	0.5	µg/L	--
TW33	FB-110911-1	MW-34S-3.8-4.2	Methylene chloride	3.0	2.2	µg/kg	3.0 U
TW33	FB-110911-1	DUP-110911-3	Methylene chloride	2.9	2.3	µg/kg	2.9 U
TW33	FB-110911-1	See below	Acetone	5.8	5.0	µg/L	--
TW33	RB-110911-1	See below	Acetone	6.0	5.0	µg/L	--
TW33	FB-110911-1	MW-34S-3	Acetone	7.2	4.6	µg/kg	7.2 U

Data packages reviewed: TW31, TW33, TW46, TW75, TW88

Key:

RB = Rinsate blank

FB = Field blank

mg/L = Milligrams per liter

mg/kg = Milligrams per kilogram

µg/L = Micrograms per liter

µg/kg - Micrograms per kilogram

U = Nondetected

Table 4
Laboratory Control Spike Recoveries Outside of Acceptable Limits
Fall 2011 Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
TW31	LCS/LCSD-111411	NA	Benzoic acid	60.4/38.8	30-160	43.4	40	--	--
TW88	LCS/LCSD-112211	NA	Trichlorofluoromethane	87.2/142	30-160	47.6	40	--	--
TW88	LCS/LCSD-112511	NA	Benzoic acid	42.9/67.3	30-160	44.2	40	--	--

Data packages reviewed: TW31, TW33, TW46, TW75, TW88

Key:

LCS/LCSD = Laboratory control sample/laboratory control sample duplicate

RPD = Relative percent difference

NA = Not applicable; qualification of sample data not required

Table 5
Matrix Spike Recoveries Outside of Acceptable Limits
Fall 2011 Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
TW31	MW-28S-3.5-4 MS/MSD	NA	Hexachlorocyclopentadiene	12.6/30.9	30-160	84.9	40	--	--
TW31	MW-28S-3.5-4 MS/MSD	NA	2,4-Dinitrophenol	33.6/53.5	30-160	46.1	40	--	--
TW31	MW-28S-3.5-4 MS/MSD	NA	4,6-Dinitro-2-methylphenol	44.4/70.8	30-160	46.2	40	--	--
TW31	MW-29S-0-2 MS	See below	Copper	137	75-125	--	--	--	--
TW31	MW-29S-0-2 MS	MW-29S-0-2	Copper	--	--	--	--	66.7	J
TW31	MW-29S-0-2 MS	MW-29S-3-3.5	Copper	--	--	--	--	31.6	J
TW31	MW-29S-0-2 MS	MW-30S-0-2	Copper	--	--	--	--	88.3	J
TW31	MW-29S-0-2 MS	MW-30S-3-3.5	Copper	--	--	--	--	16.7	J
TW31	MW-29S-0-2 MS	DUP-110811-2	Copper	--	--	--	--	81.9	J
TW31	MW-29S-0-2 MS	MW-31S-1-2	Copper	--	--	--	--	14.3	J
TW31	MW-29S-0-2 MS	MW-31S-5-6	Copper	--	--	--	--	12.3	J
TW31	MW-29S-0-2 MS	MW-28S-1-2	Copper	--	--	--	--	119	J
TW31	MW-29S-0-2 MS	MW-28S-3.5-4	Copper	--	--	--	--	10.9	J
TW31	MW-30S-0-2 MS	See below	Chromium, hexavalent	9.4	75-25	--	--	--	--
TW31	MW-30S-0-2 MS	See below	Chromium, hexavalent	16.7	75-25	--	--	--	--
TW31	MW-30S-0-2 MS	MW-30S-0-2	Chromium, hexavalent	--	--	--	--	< 0.438	UJ
TW31	MW-30S-0-2 MS	MW-30S-3-3.5	Chromium, hexavalent	--	--	--	--	< 0.478	UJ
TW33	MW-32D-1.6-3.6 MS	See below	Arsenic	53.7	75-125	--	--	--	--
TW33	MW-32D-1.6-3.6 MS	MW-32S-1.7-4	Arsenic	--	--	--	--	21.8	J
TW33	MW-32D-1.6-3.6 MS	MW-32D-1.6-3.6	Arsenic	--	--	--	--	53.3	J
TW33	MW-32D-1.6-3.6 MS	DUP-110911-1	Arsenic	--	--	--	--	35.0	J
TW33	MW-32D-1.6-3.6 MS	MW-34S-1.3-3.2	Arsenic	--	--	--	--	2.7	J
TW33	MW-32D-1.6-3.6 MS	MW-34S-3.8-4.2	Arsenic	--	--	--	--	2.1	J
TW33	MW-32D-1.6-3.6 MS	See below	Chromium	126	75-125	--	--	--	--
TW33	MW-32D-1.6-3.6 MS	MW-32S-1.7-4	Chromium	--	--	--	--	24.6	J
TW33	MW-32D-1.6-3.6 MS	MW-32D-1.6-3.6	Chromium	--	--	--	--	23.7	J
TW33	MW-32D-1.6-3.6 MS	DUP-110911-1	Chromium	--	--	--	--	33.3	J

Table 5
Matrix Spike Recoveries Outside of Acceptable Limits
Fall 2011 Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
TW33	MW-32D-1.6-3.6 MS	MW-34S-1.3-3.2	Chromium	--	--	--	--	19.5	J
TW33	MW-32D-1.6-3.6 MS	MW-34S-3.8-4.2	Chromium	--	--	--	--	13.3	J
TW33	MW-32D-1.6-3.6 MS	See below	Copper	242	75-125	--	--	--	--
TW33	MW-32D-1.6-3.6 MS	MW-32S-1.7-4	Copper	--	--	--	--	69.4	J
TW33	MW-32D-1.6-3.6 MS	MW-32D-1.6-3.6	Copper	--	--	--	--	75.1	J
TW33	MW-32D-1.6-3.6 MS	DUP-110911-1	Copper	--	--	--	--	168	J
TW33	MW-32D-1.6-3.6 MS	MW-34S-1.3-3.2	Copper	--	--	--	--	16.2	J
TW33	MW-32D-1.6-3.6 MS	MW-34S-3.8-4.2	Copper	--	--	--	--	13.0	J
TW75	MW-33S-1.3 MS/MSD	NA	Carbon disulfide	8.7/59.0	30-160	147	40	--	--
TW75	MW-33S-1.3 MS/MSD	NA	1,1-Dichloroethene	3.0/67.0	30-160	182	40	--	--
TW88	DUP-111411-1 MS/MSD	NA	3,3'-Dichlorobenzidine	5.2/5.3	30-160	8.3	40	--	--
TW88	MW-14D-3-6 MS	See below	Antimony	38.2	75-125	--	--	--	--
TW88	MW-14D-3-6 MS	MW-14D-3-6	Antimony	--	--	--	--	< 5	UJ
TW88	MW-14D-3-6 MS	MW-14D-6.5-7.5	Antimony	--	--	--	--	< 5	UJ
TW88	MW-14D-3-6 MS	See below	Arsenic	160	75-125	--	--	--	--
TW88	MW-14D-3-6 MS	MW-14D-3-6	Arsenic	--	--	--	--	88.2	J
TW88	MW-14D-3-6 MS	MW-14D-6.5-7.5	Arsenic	--	--	--	--	129	J
TW88	MW-14D-3-6 MS	MW-33S-4-7	Arsenic	--	--	--	--	13.6	J

Data packages reviewed: TW31, TW33, TW46, TW75, TW88

Key:

MS/MSD = Matrix spike/matrix spike duplicate

RPD = Relative percent difference

NA = Not applicable; qualification of sample data not required

J = Detected sample result qualified as estimated

UJ = Nondetected sample result qualified as estimated

Table 6
Surrogate Recovery Results out of Acceptable Limits
Fall 2011 Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Method	Surrogate	Recovery (%)	Limit (%)	Note	ERM Qualifier
TW46	MW-30S-2.8	DRO	o-Terphenyl	NR	50-150	SDO	--
TW46	MW-30S-2.8	MOR	o-Terphenyl	NR	50-150	SDO	--

Data packages reviewed: TW31, TW33, TW46, TW75, TW88

Key:

DRO = Diesel range organics

MOR = Motor oil range

NR = Value not reported

SDO = Surrogate diluted out of sample, no qualification required; Sample diluted by a factor of 10x or more

Table 7
Field Duplicate Results and Calculated Relative Percent Differences
Fall 2011 Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Compound	Concentration		Report Limit	Units	RPD
			Sample	Duplicate			
TW31	MW-29S-0-2/DUP-110811-1	Aroclor 1248	33	38	4.7/4.8	µg/kg	14
TW31	MW-29S-0-2/DUP-110811-1	Aroclor 1254	100	120	4.7/4.8	µg/kg	18
TW31	MW-29S-0-2 DL/DUP-110811-1 DL	Aroclor 1248	44	53	23/24	µg/kg	19
TW31	MW-29S-0-2 DL/DUP-110811-1 DL	Aroclor 1254	120	170	23/24	µg/kg	34
TW31	MW-30S-0-2/DUP-110811-2	Arsenic	8.5	10.2	0.2	mg/kg	18
TW31	MW-30S-0-2/DUP-110811-2	Chromium	40.9	39.9	0.5	mg/kg	2.5
TW31	MW-30S-0-2/DUP-110811-2	Copper	88.3	81.9	0.2	mg/kg	7.5
TW31	MW-30S-0-2/DUP-110811-2	Zinc	105	108	1.0	mg/kg	2.8
TW31	MW-29S-0-2/DUP-110811-1	Total solids	85.1	79.4	0.01	%	6.9
TW31	MW-29S-0-2/DUP-110811-1	N-Ammonia	0.17	1.17	0.11/0.12	mg/kg	149
TW31	MW-29S-0-2/DUP-110811-1	Total solids	85.4	85.0	0.01	%	0.5
TW31	MW-31S-1-2/DUP-110811-3	Total solids	95.5	95.2	0.01	%	0.3
TW33	MW-34S-3.8-4.2/DUP-110911-3	Methylene chloride	3.0	2.9	2.2/2.3	µg/kg	3.4
TW33	MW-34S-3.8-4.2/DUP-110911-3	Acetone	48	36	5.5/5.8	µg/kg	29
TW33	MW-34S-3.8-4.2/DUP-110911-3	Carbon disulfide	5.7	3.9	1.1/1.2	µg/kg	38
TW33	MW-32D-1.6-3.6/DUP-110911-1	Arsenic	53.3	35.0	0.2	mg/kg	41
TW33	MW-32D-1.6-3.6/DUP-110911-1	Chromium	23.7	33.3	0.6	mg/kg	34
TW33	MW-32D-1.6-3.6/DUP-110911-1	Copper	75.1	168	0.2	mg/kg	76
TW33	MW-32D-1.6-3.6/DUP-110911-1	Zinc	62	62	1.0	mg/kg	0
TW33	MW-34S-3.8-4.2/DUP-110911-3	Total solids	81.1	81.4	0.01	%	0.4
TW88	MW-14D-3-6/DUP-111411-1	4-Methylphenol	28	36	35	µg/kg	25
TW88	MW-14D-3-6/DUP-111411-1	Naphthalene	19	23	18	µg/kg	19
TW88	MW-14D-3-6/DUP-111411-1	2-Methylnaphthalene	12	11	18	µg/kg	8.7
TW88	MW-14D-3-6/DUP-111411-1	Fluorene	9.7	8.8	18	µg/kg	9.7
TW88	MW-14D-3-6/DUP-111411-1	Phenanthrene	35	33	18	µg/kg	5.9
TW88	MW-14D-3-6/DUP-111411-1	Fluoranthene	36	48	18	µg/kg	29

Table 7
Field Duplicate Results and Calculated Relative Percent Differences
Fall 2011 Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Compound	Concentration		Report Limit	Units	RPD
			Sample	Duplicate			
TW88	MW-14D-3-6/DUP-111411-1	Pyrene	34	42	18	µg/kg	21
TW88	MW-14D-3-6/DUP-111411-1	bis(2-Ethylhexyl)phthalate	98	130	22	µg/kg	28
TW88	MW-14D-3-6/DUP-111411-1	Chrysene	13	18	18	µg/kg	32
TW88	MW-14D-3-6/DUP-111411-1	1-Methylnaphthalene	26	23	18	µg/kg	12
TW88	MW-14D-3-6/DUP-111411-1	Total Benzofluoranthenes	16	19	18	µg/kg	17
TW88	MW-14D-3-6/DUP-111411-1	Naphthalene	32	22	4.7/4.4	µg/kg	37
TW88	MW-14D-3-6/DUP-111411-1	2-Methylnaphthalene	23	13	4.7/4.4	µg/kg	56
TW88	MW-14D-3-6/DUP-111411-1	1-Methylnaphthalene	40	24	4.7/4.4	µg/kg	50
TW88	MW-14D-3-6/DUP-111411-1	Acenaphthylene	7.7	3.7	4.7/4.4	µg/kg	70
TW88	MW-14D-3-6/DUP-111411-1	Fluorene	17	6.9	4.7/4.4	µg/kg	85
TW88	MW-14D-3-6/DUP-111411-1	Phenanthrene	33	31	4.7/4.4	µg/kg	6.3
TW88	MW-14D-3-6/DUP-111411-1	Anthracene	5.9	3.0	4.7/4.4	µg/kg	65
TW88	MW-14D-3-6/DUP-111411-1	Fluoranthene	42	46	4.7/4.4	µg/kg	9.1
TW88	MW-14D-3-6/DUP-111411-1	Pyrene	33	37	4.7/4.4	µg/kg	11
TW88	MW-14D-3-6/DUP-111411-1	Benzo(a)anthracene	10	9.3	4.7/4.4	µg/kg	7.3
TW88	MW-14D-3-6/DUP-111411-1	Chrysene	14	14	4.7/4.4	µg/kg	0
TW88	MW-14D-3-6/DUP-111411-1	Benzo(a)pyrene	7.6	6.8	4.7/4.4	µg/kg	11
TW88	MW-14D-3-6/DUP-111411-1	Indeno(1,2,3-cd)pyrene	4.5	4.8	4.7/4.4	µg/kg	6.5
TW88	MW-14D-3-6/DUP-111411-1	Benzo(g,h,i)perylene	5.7	6.7	4.7/4.4	µg/kg	16
TW88	MW-14D-3-6/DUP-111411-1	Dibenzofuran	10	5.4	4.7/4.4	µg/kg	60
TW88	MW-14D-3-6/DUP-111411-1	Total Benzofluoranthenes	19	18	4.7/4.4	µg/kg	5.4
TW88	MW-14D-3-6/DUP-111411-1	Total solids	99.7	88.8	0.01	%	12

Data packages reviewed: TW31, TW33, TW46, TW75, TW88

Key:

RPD = Relative percent difference

DL = Sample dilution and reanalysis

µg/kg = Micrograms per kilogram

mg/kg = Milligrams per kilogram

Table 8
Analytical Duplicate & Replicate Results and Calculated Relative Percent Differences
Fall 2011 Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Concentration		Report Limit	Units	RPD	ERM Qualifier
			Sample	Duplicate				
Analytical Duplicates								
TW31	MW-29S-0-2	Arsenic, total	23.1	20.3	0.2	mg/kg	13	--
TW31	MW-29S-0-2	Chromium, total	23.4	23.0	0.6	mg/kg	1.7	--
TW31	MW-29S-0-2	Copper, total	66.7	89.3	0.3	mg/kg	29	J
TW31	MW-29S-0-2	Zinc, total	47	54	1.0	mg/kg	14	--
								--
TW33	MW-32D-1.6-3.6	Arsenic, total	53.3	35.6	0.2	mg/kg	40	J
TW33	MW-32D-1.6-3.6	Chromium, total	23.7	29.8	0.6	mg/kg	23	J
TW33	MW-32D-1.6-3.6	Copper, total	75.1	124	0.2	mg/kg	49	J
TW33	MW-32D-1.6-3.6	Zinc, total	62	56	1.0	mg/kg	10	--
TW46	MW-35S-1.3-3.3	Arsenic, total	5.9	5.4	0.2	mg/kg	8.8	--
TW46	MW-35S-1.3-3.3	Chromium, total	26.9	31.4	0.6	mg/kg	15	
TW46	MW-35S-1.3-3.3	Copper, total	101	102	0.2	mg/kg	1.0	--
TW46	MW-35S-1.3-3.3	Zinc, total	33	34	1.0	mg/kg	3.0	--
TW75	MW-32S-5-7	Arsenic, total	1.4	2.0	0.2	mg/kg	35	J
TW75	MW-32S-5-7	Chromium, total	11.2	10.0	0.6	mg/kg	11	--
TW75	MW-32S-5-7	Copper, total	11.4	10.0	0.2	mg/kg	13	--
TW75	MW-32S-5-7	Zinc, total	22	20	1.0	mg/kg	10	--
TW88	MW-14D-3-6	Arsenic, total	88.2	89.8	0.2	mg/kg	1.8	--
TW88	MW-14D-3-6	Cadmium, total	0.2	0.2	0.1	mg/kg	0	--
TW88	MW-14D-3-6	Chromium, total	9.5	10.4	0.5	mg/kg	9.0	--
TW88	MW-14D-3-6	Copper, total	387	485	0.2	mg/kg	22	J
TW88	MW-14D-3-6	Lead, total	4.3	3.9	0.1	mg/kg	10	--
TW88	MW-14D-3-6	Mercury, total	0.03	0.03	0.03	mg/kg	0	--

Table 8
Analytical Duplicate & Replicate Results and Calculated Relative Percent Differences
Fall 2011 Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Concentration		Report Limit	Units	RPD	ERM Qualifier
			Sample	Duplicate				
TW88	MW-14D-3-6	Nickel, total	5	6	1	mg/kg	18	--
TW88	MW-14D-3-6	Zinc, total	99	116	1	mg/kg	16	--
Replicates								
TW31	M-29S-0-2	Total solids	85.1	83.2	0.01	%	2.3	--
TW31	M-29S-0-2	N-Ammonia	0.17	0.20	0.11	mg/kg	16	--
TW33	MW-34S-1.3-3.2	Total solids	93.5	94.2	0.01	%	0.7	--
TW46	MW-35S-1.3-3.3	Total solids	95.5	94.2	0.01	%	1.4	--
TW46	MW-35S-1.3-3.3	Total solids	95.5	95.1	0.01	%	0.4	--

Data packages reviewed: TW31, TW33, TW46, TW75, TW88

Key:

RPD = Relative percent difference

mg/kg = Milligrams per kilogram

J = Detected sample result qualified as estimated

Table 9
Calibration Verification Recoveries Outside of Acceptable Limits
Fall 2011 Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	CV ID	Compound	CV Recovery	CV Limit	Associated Samples	Reported Concentration	Units	ERM Qualifier
TW31	CV-112311	Aroclor-1260	23.1	20	NA	--	--	--
TW31	CV-112411	Aroclor-1260	27.9	20	NA	--	--	--
TW33	CV-111711	Bromomethane	-29.0	20	MW-34S-3	< 0.9	µg/kg	UJ
					MW-34S-3.8-4.2	< 1.1	µg/kg	UJ
					DUP-110911-3	< 1.2	µg/kg	UJ
TW33	CV-111711	Acrolein	-22.1	20	MW-34S-3	< 46	µg/kg	UJ
					MW-34S-3.8-4.2	< 55	µg/kg	UJ
					DUP-110911-3	< 58	µg/kg	UJ
TW33	CV-111711	Methyl-tert-butyl ether	-22.1	20	MW-34S-3	< 0.9	µg/kg	UJ
TW75	CV-111811	Chloromethane	-23.8	20	MW-33S-1.3	< 1.0	µg/kg	UJ
TW75	CV-111811	Bromomethane	-35.4	20	MW-33S-1.3	< 1.0	µg/kg	UJ
TW75	CV-111811	Chloroethane	-25.9	20	MW-33S-1.3	< 1.0	µg/kg	UJ
TW88	CV-112211	Chloromethane	-25.6	20	MW-33S-5.5	< 1.0	µg/kg	UJ
TW88	CV-112211	Bromomethane	-49.4	20	MW-33S-5.5	< 1.0	µg/kg	UJ
TW88	CV-112211	Chloroethane	-23.9	20	MW-33S-5.5	< 1.0	µg/kg	UJ
TW88	CV-112211	Acrolein	-21.7	20	MW-33S-5.5	< 48	µg/kg	UJ
TW88	CV-112211	Methylene chloride	-20.5	20	MW-33S-5.5	1.5	µg/kg	J
TW88	CV-112211	1,1-Dichloroethane	-22.0	20	MW-33S-5.5	< 1.0	µg/kg	UJ
TW88	CV-112211	Methyl-tert-butyl ether	-23.5	20	MW-33S-5.5	< 1.0	µg/kg	UJ
TW88	CV-120711	Benzyl alcohol	-29.0	20	MW-14D-3-6	< 18	µg/kg	UJ
					MW-14D-6.5-7.5	< 19	µg/kg	UJ
					DUP-111411-1	< 18	µg/kg	UJ
TW88	CV-120711	2,4-Dinitrophenol	-31.6	20	MW-14D-3-6	< 750	µg/kg	UJ
					MW-14D-6.5-7.5	< 820	µg/kg	UJ
					DUP-111411-1	< 750	µg/kg	UJ

Table 9
Calibration Verification Recoveries Outside of Acceptable Limits
Fall 2011 Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	CV ID	Compound	CV Recovery	CV Limit	Associated Samples	Reported Concentration	Units	ERM Qualifier
TW88	CV-120711	3,3'-Dichlorobenzidine	-36.4	20	MW-14D-3-6	< 130	µg/kg	UJ
					MW-14D-6.5-7.5	< 140	µg/kg	UJ
					DUP-111411-1	< 130	µg/kg	UJ

Data packages reviewed: TW31, TW33, TW46, TW75, TW88

Key:

CV = Calibration verification

NA = Not applicable; qualification of sample data not required

µg/L = Micrograms per liter

UJ = Nondetected sample result qualified as estimated

J = Detected sample result qualified as estimated

Table 10
TPH Results
Fall 2011 Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Reported Concentration	Units	ERM Qualifier	Notes
TW46	MW-35S-1.3-3.3	DRO	5.3	mg/kg	NJ	Results of organics or additional hydrocarbons are not identifiable
TW46	MW-30S-2.8	DRO	16000	mg/kg	NJ	Results of organics or additional hydrocarbons are not identifiable
TW46	MW-30S-2.8	MOR	14000	mg/kg	NJ	Results of organics or additional hydrocarbons are not identifiable

Data packages reviewed: TW31, TW33, TW46, TW75, TW88

Key:

DRO = Diesel range organics

MOR = Motor oil range

mg/kg = Milligrams per kilogram

NJ = Estimated value

Memorandum

**Environmental
Resources
Management**

To: Mike Mendes

From: Shira DeGrood

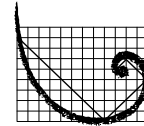
Date: 5 March 2012

Subject: Data Review of Reichhold-Glacier Samples Collected
21 through 22 February 2012

Project Number: 0155129.07

Data Package: Analytical Resources Incorporated Data Package
UJ28

1001 SW 5th Avenue,
Suite 1010
Portland, OR 97204
(503) 488-5282
(503) 488-5124 (fax)



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The quality of the data was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, July 2004.

HOLDING TIME AND PRESERVATION EVALUATION

The samples were prepared and analyzed within the method prescribed time period from the date of collection. The sample shipments were received at the laboratory within the method prescribed temperature preservation requirements. None of the data were qualified based on holding time or temperature preservation exceedances.

BLANK EVALUATION

The method and rinsate blank sample results were nondetected for each of the target analytes. None of the data required qualification based on blank results.

BLANK SPIKE EVALUATION

The laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) recoveries were within the laboratory's limits of acceptance. The LCS recoveries indicate acceptable laboratory accuracy and precision.

MATRIX SPIKE EVALUATION

The matrix spike (MS)/matrix spike duplicate (MSD) recoveries were within the laboratory's limits of acceptance, indicating acceptable laboratory accuracy and precision and minimal matrix interference.

FIELD DUPLICATE EVALUATION

One sample was submitted in duplicate. ERM calculated the relative percent difference (RPD) between detected results. The USEPA has not established control criteria for field duplicate samples; therefore, sample data are not qualified on the basis of field duplicate imprecision. The RPDs are presented in Table 1.

CONTINUING CALIBRATION VERIFICATION EVALUATION

The continuing calibration verification (CCV) recoveries were within the laboratory's limits of acceptance. The CCV recoveries indicate acceptable instrument qualitative and quantitative data.

OVERALL ASSESSMENT

No data required rejection or qualification. All of the data can be used for decision-making purposes. The quality of the data generated during this investigation is acceptable for the preparation of technically defensible documents.

Table 1
Field Duplicate Results and Calculated Relative Percent Differences
MW-36S Well Installation
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Concentration		Report Limit		Units	RPD (%)
			Sample	Duplicate	Sample	Duplicate		
UJ28	MW-36S-4.8-6	Arsenic	3.4	3.10	0.3	0.3	mg/kg	9.2
UJ28	MW-36S-4.8-6	Chromium	13.9	13.00	0.6	0.7	mg/kg	6.7
UJ28	MW-36S-4.8-6	Copper	19	16.8	0.3	0.3	mg/kg	12.3
UJ28	MW-36S-4.8-6	Zinc	31	28.00	1	1	mg/kg	10.2

Lab reports reviewed: UJ28

Key:

RPD = Relative percent difference

mg/kg = Milligrams per kilogram

Memorandum

Environmental Resources Management

To: Mike Mendes

From: Irene Lavigne

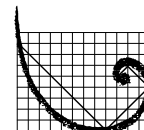
Date: 29 January 2013

Subject: Data Review of Reichhold-Glacier, Uplands Soil Samples

Project Number: 0155129

Data Packages: Axys Analytical Services Data Packages DPWG41596, DPWG41685, and DPWG41834
Analytical Resources Incorporated Data Packages VH79, VH87, VI22, VI27, VI40, VI70, VI85, VJ70, VM44, VM59, VM72, VM91, and VN13

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The data quality was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999, *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004, and the *EPA Region 10 SOP for the Validation of Polychlorinated Dibenzodioxin (PCDD) and Polychlorinated Dibenzofuran (PCDF) Data*, January 1996.

HOLDING TIME AND PRESERVATION EVALUATION

The sample shipments were received at the laboratory within the method-prescribed preservation requirements. The samples were prepared and analyzed within the method-prescribed time period from the date of collection. No sample data were qualified based on sample preservation or holding-time exceedances.

BLANK EVALUATION

The method blank, trip blank, field blank, and rinsate blank sample results were nondetected for each of the target analytes with several exceptions. Detections of various semivolatile, volatile, and dioxin/furan compounds resulted in qualification of associated samples as nondetected (U). Not all blank detections resulted in qualification of associated data. Data were not qualified if the samples were nondetected for the associated compounds, if the sample results exceeded the five times the blank

concentrations of organic compounds or 10 times the blank concentrations of inorganic compounds, or if the blank results were identified as estimated maximum possible concentrations for dioxin/furan analyses. The blank detections and associated, qualified data are listed in Table 1.

BLANK SPIKE EVALUATION

The laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) recoveries were within the laboratory's limits of acceptance with limited exceptions. No sample data were qualified on the basis of the LCS outliers because either only one recovery in the LCS/LCSD pair exceeded the acceptable control limits, the recoveries were biased high and the samples were nondetected, or the data could be verified using an associated, in-control matrix spike recovery. The outlying LCS recoveries are shown in Table 2.

MATRIX SPIKE EVALUATION

The matrix spike (MS) and matrix spike duplicate (MSD) recoveries were within the laboratory's limits of acceptance with a number of exceptions. Various dioxin/furan and metal compound detections were qualified as estimated and biased high (J+) due to MS recoveries that exceeded the maximum acceptable control limits. Several metal detections were qualified as estimated and biased low (J-) or estimated (UJ) due to MS recoveries that were below the minimum acceptable control limits. Data were not qualified if only the relative percent difference (RPD) exceeded control limits, if only one recovery in a MS/MSD pair exceeded control limits, if the concentration of the unspiked samples was greater than four times the amount spiked, or if the data could be verified using an associated, in-control LCS or post spike recovery. Additionally, if the spike sample was diluted by a factor of 10 time or more, the surrogate compounds did not provide useful recovery information, and did not result in qualified data. The outlying MS recoveries and qualified sample data are presented in Table 3.

LABELED COMPOUND EVALUATION

Carbon-13 labeled isotope recoveries were reported for each sample submitted for dioxin/furan analysis. The recoveries of labeled PCDD and PCDF compounds is a measure of the effectiveness of the laboratory and method to extract the compounds of interest. One sample had a recovery of ¹³C-octachlorodibenzo-p-dioxin that exceeded the maximum acceptable limits. No qualifiers were applied to the corresponding compound because the sample had been diluted by a factor of 20, resulting in dilution of the carbon-13 compound to a point where the recovery did not provide useful information. The outlying isotope recovery is shown in Table 4.

ESTIMATED MAXIMUM POSSIBLE CONCENTRATION

The laboratory identified several dioxin/furan results as estimated maximum possible concentration (EMPC). An EMPC value is the maximum possible concentration of a compound that could be present in the sample. This classification is used when all of the identification criteria for a given dioxin or furan compound are not met. The sample data identified as EMPC by the laboratory were qualified as nondetected (U), as listed in Table 5.

SURROGATE EVALUATION

The surrogate recoveries were within acceptable limits with one exception. No sample data required qualification as a result of the surrogate outlier because the recovery was biased high and the sample result was nondetected. The surrogate outlier is presented in Table 6. The surrogate recoveries indicate minimal matrix interference in the samples.

FIELD DUPLICATE EVALUATION

Eighteen samples were collected and analyzed in duplicate. ERM calculated the RPD between detected results. The USEPA has not established control criteria for field duplicate samples; therefore, sample data are not qualified on the basis of field duplicate imprecision. Detected duplicate results and calculated RPDs are presented in Table 7.

ANALYTICAL DUPLICATE EVALUATION

The laboratory prepared and analyzed a number of samples as analytical duplicates. ERM calculated the RPD between detected results. The RPDs were less than 20 percent, with a number of exceptions. The primary sample results for 11 duplicates were qualified as estimated (J). The analytical duplicate sample results and calculated RPDs are shown in Table 8.

CONTINUING CALIBRATION EVALUATION

The laboratory noted that a number of continuing calibration verification (CCV) recoveries for various compounds did not meet acceptable control limits. Detected and nondetected sample results associated with low CCV recoveries were qualified as estimated and biased low (J-) or estimated (UJ), respectively. Detected sample data associated with high CCV recoveries were qualified as estimated and biased high (J+). The CCV outliers and associated, qualified data are shown in Table 9. Not all CCV outliers resulted in qualified data. Data were not qualified if the CCV recoveries were biased high and the associated samples were nondetected for the corresponding compounds. Additionally, a number of the CCV outliers were associated with compounds that were not constituents of concern.

CALIBRATION RANGE EVALUATION

The laboratory noted 29 instances where the results of undiluted samples exceeded the calibration range of the equipment. The affected samples were diluted and reanalyzed. The sample data resulting from the reanalyses were within the calibration range and should be used for decision-making purposes. The sample results which exceeded the calibration range were qualified as estimated (J), and are listed in Table 10.

OVERALL ASSESSMENT

No data were determined to be unusable. All of the data, including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents.

Table 1
Blank and Associated Suspect Sample Detections
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG41596	Lab Blank	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDD	0.062	0.050	pg/g	EMPC
DPWG41596	Lab Blank	PCDD/PCDF	NA	OCDD	0.796	0.050	pg/g	EMPC
DPWG41596	Lab Blank	PCDD/PCDF	NA	OCDF	0.072	0.050	pg/g	EMPC
DPWG41834	EB100912-1	PCDD/PCDF	NA	OCDD	1.48	0.554	pg/L	EMPC
DPWG41834	EB100812-2	PCDD/PCDF	NA	OCDD	1.05	0.583	pg/L	EMPC
DPWG41834	Lab Blank	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDD	0.754	0.500	pg/L	EMPC
DPWG41834	Lab Blank	PCDD/PCDF	NA	OCDD	3.20	0.500	pg/L	--
DPWG41834	Lab Blank	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDF	0.746	0.500	pg/L	EMPC
DPWG41834	Lab Blank	PCDD/PCDF	NA	OCDF	1.29	0.500	pg/L	--
DPWG42036	Lab Blank	PCDD/PCDF	NA	2,3,7,8-TCDD	0.299	0.113	pg/g	EMPC
DPWG42036	Lab Blank	PCDD/PCDF	See below	1,2,3,4,6,7,8-HPCDD	0.395	0.113	pg/g	--
DPWG42036	Lab Blank	PCDD/PCDF	GP-55-6.4-8.4	1,2,3,4,6,7,8-HPCDD	1.46	0.095	pg/g	1.46 U
DPWG42036	Lab Blank	PCDD/PCDF	GP-45-8.5-9.5	1,2,3,4,6,7,8-HPCDD	1.31	0.108	pg/g	1.31 U
DPWG42036	Lab Blank	PCDD/PCDF	GP-34-8.4-9.4	1,2,3,4,6,7,8-HPCDD	1.51	0.100	pg/g	1.51 U
DPWG42036	Lab Blank	PCDD/PCDF	See below	OCDD	10.0	0.113	pg/g	--
DPWG42036	Lab Blank	PCDD/PCDF	GP-55-6.4-8.4	OCDD	46.4	0.095	pg/g	46.4 U
DPWG42036	Lab Blank	PCDD/PCDF	GP-45-8.5-9.5	OCDD	49.2	0.108	pg/g	49.2 U
DPWG42036	Lab Blank	PCDD/PCDF	GP-34-8.4-9.4	OCDD	39.2	0.100	pg/g	39.2 U
DPWG42036	Lab Blank	PCDD/PCDF	See below	2,3,4,7,8-PECDF	0.193	0.113	pg/g	--
DPWG42036	Lab Blank	PCDD/PCDF	GP-55-6.4-8.4	2,3,4,7,8-PECDF	0.173	0.095	pg/g	0.173 U
DPWG42036	Lab Blank	PCDD/PCDF	GP-55-8.4-10.4	2,3,4,7,8-PECDF	0.344	0.099	pg/g	0.344 U
DPWG42036	Lab Blank	PCDD/PCDF	GP-45-6.5-8.5	2,3,4,7,8-PECDF	0.265	0.105	pg/g	0.265 U
DPWG42036	Lab Blank	PCDD/PCDF	DUP100812-1	2,3,4,7,8-PECDF	0.309	0.100	pg/g	0.309 U
DPWG42036	Lab Blank	PCDD/PCDF	GP-45-8.5-9.5	2,3,4,7,8-PECDF	0.229	0.108	pg/g	0.229 U
DPWG42036	Lab Blank	PCDD/PCDF	GP-44-6.8-8.8	2,3,4,7,8-PECDF	0.387	0.102	pg/g	0.387 U
DPWG42036	Lab Blank	PCDD/PCDF	GP-44-8.8-11.1	2,3,4,7,8-PECDF	0.608	0.104	pg/g	0.608 U

Table 1
Blank and Associated Suspect Sample Detections
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG42036	Lab Blank	PCDD/PCDF	GP-46-7.2-8.7	2,3,4,7,8-PECDF	0.291	0.097	pg/g	0.291 U
DPWG42036	Lab Blank	PCDD/PCDF	GP-30-7-9	2,3,4,7,8-PECDF	0.249	0.102	pg/g	0.249 U
DPWG42036	Lab Blank	PCDD/PCDF	GP-34-6.4-8.4	2,3,4,7,8-PECDF	0.550	0.107	pg/g	0.550 U
DPWG42036	Lab Blank	PCDD/PCDF	DUP101012-1	2,3,4,7,8-PECDF	0.833	0.106	pg/g	0.833 U
DPWG42036	Lab Blank	PCDD/PCDF	GP-29-2.9-4.9	2,3,4,7,8-PECDF	0.912	0.096	pg/g	0.912 U
DPWG42036	Lab Blank	PCDD/PCDF	GP-29-4.9-6.9	2,3,4,7,8-PECDF	0.241	0.141	pg/g	0.241 U
DPWG42036	Lab Blank	PCDD/PCDF	GP-29-6.9-8.9	2,3,4,7,8-PECDF	0.320	0.108	pg/g	0.320 U
DPWG42036	Lab Blank	PCDD/PCDF	See below	OCDF	0.193	0.113	pg/g	--
DPWG42036	Lab Blank	PCDD/PCDF	GP-55-6.4-8.4	OCDF	0.912	0.095	pg/g	0.912 U
DPWG42036	Lab Blank	PCDD/PCDF	GP-45-8.5-9.5	OCDF	0.745	0.108	pg/g	0.745 U
DPWG42036	Lab Blank	PCDD/PCDF	GP-34-8.4-9.4	OCDF	0.443	0.100	pg/g	0.443 U
DPWG42036	Lab Blank	PCDD/PCDF	NA	TOTAL HEPTA-DIOXINS	0.395	0.113	pg/g	--
DPWG42036	Lab Blank	PCDD/PCDF	See below	TOTAL PENTA-FURANS	0.193	0.113	pg/g	--
DPWG42036	Lab Blank	PCDD/PCDF	GP-55-6.4-8.4	TOTAL PENTA-FURANS	0.173	0.095	pg/g	0.173 U
DPWG42036	Lab Blank	PCDD/PCDF	DUP100812-1	TOTAL PENTA-FURANS	0.752	0.100	pg/g	0.752 U
DPWG42036	Lab Blank	PCDD/PCDF	GP-45-6.5-8.5	TOTAL PENTA-FURANS	0.700	0.105	pg/g	0.700 U
DPWG42036	Lab Blank	PCDD/PCDF	GP-45-8.5-9.5	TOTAL PENTA-FURANS	0.498	0.108	pg/g	0.498 U
DPWG42036	Lab Blank	PCDD/PCDF	GP-46-7.2-8.7	TOTAL PENTA-FURANS	0.909	0.097	pg/g	0.909 U
DPWG42036	Lab Blank	PCDD/PCDF	GP-30-7-9	TOTAL PENTA-FURANS	0.546	0.102	pg/g	0.546 U
DPWG42036	Lab Blank	PCDD/PCDF	GP-34-8.4-9.4	TOTAL PENTA-FURANS	0.147	0.100	pg/g	0.147 U
VI27	MB-091312A	VOC	See below	Methylene chloride	1.1	2.0	µg/kg	--
VI27	MB-091312A	VOC	GP-62-1	Methylene chloride	0.9	1.3	µg/kg	1.3 U
VI27	MB-091312A	VOC	GP-62-4	Methylene chloride	1.6	1.3	µg/kg	1.6 U
VI27	MB-091312A	VOC	NA	1,2,4-Trichlorobenzene	0.6	5.0	µg/kg	--
VI27	MB-091312A	VOC	See below	Naphthalene	0.7	5.0	µg/kg	--
VI27	MB-091312A	VOC	GP-62-1	Naphthalene	0.6	3.2	µg/kg	3.2 U
VI27	MB-091312A	VOC	NA	1,2,3-Trichlorobenzene	0.6	5.0	µg/kg	--

Table 1
Blank and Associated Suspect Sample Detections
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
VI27	MB-091112A	VOC	NA	Hexachlorobutadiene	0.16	0.5	µg/kg	--
VI85	TB-091012-1	VOC	NA	Styrene	0.22	0.20	µg/L	--
VI85	MB-091312A	VOC	See below	Methylene chloride	1.1	2.0	µg/kg	--
VI85	MB-091312A	VOC	GP-53-4	Methylene chloride	1.9	1.7	µg/kg	1.9 U
VI85	MB-091312A	VOC	GP-53-5	Methylene chloride	2.1	1.7	µg/kg	2.1 U
VI85	MB-091312A	VOC	NA	1,2,4-Trichlorobenzene	0.6	5.0	µg/kg	--
VI85	MB-091312A	VOC	NA	Naphthalene	0.7	5.0	µg/kg	--
VI85	MB-091312A	VOC	NA	1,2,3-Trichlorobenzene	0.6	5.0	µg/kg	--
VI85	MB-091712	SVOC	NA	Diethylphthalate	140	50	µg/kg	--
VI85	MB-091712	SVOC	See below	bis(2-Ethylhexyl)phthalate	25	25	µg/kg	--
VI85	MB-091712	SVOC	GP-53-3-5	bis(2-Ethylhexyl)phthalate	35	25	µg/kg	35 U
VM44	TB100812-1	VOC	NA	Hexachlorobutadiene	0.13	0.50	µg/L	--
VM44	MB-101012A	VOC	NA	Hexachlorobutadiene	0.28	0.50	µg/L	--
VM44	MB-101512A	VOC	See below	Methylene chloride	1.3	2.0	µg/kg	--
VM44	MB-101512A	VOC	GP-39-5.5	Methylene chloride	2.2	1.6	µg/kg	2.2 U
VM44	MB-101512A	VOC	GP-39-7.5	Methylene chloride	1.3	1.3	µg/kg	1.3 U
VM44	MB-101512A	VOC	GP-39-11	Methylene chloride	1.9	1.6	µg/kg	1.9 U
VM44	MB-101512A	VOC	See below	Acetone	3.1	5.0	µg/kg	--
VM44	MB-101512A	VOC	GP-39-5.5	Acetone	6.0	4.0	µg/kg	6.0 U
VM44	MB-101512A	VOC	GP-39-7.5	Acetone	9.0	3.4	µg/kg	9.0 U
VM44	MB-101512	SVOC	See below	bis(2-Ethylhexyl)phthalate	15	25	µg/kg	--
VM44	MB-101512	SVOC	GP-58-8.25-10.5	bis(2-Ethylhexyl)phthalate	25	25	µg/kg	25 U
VM44	MB-101512	SVOC	GP-58-4.25-6.25	bis(2-Ethylhexyl)phthalate	24	23	µg/kg	24 U
VM44	MB-101212	TPH-d	NA	TPH-d	0.15	0.10	mg/L	--
VM59	MB-101212	TPH-d	NA	TPH-d	0.15	0.10	mg/L	--

Table 1
Blank and Associated Suspect Sample Detections
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
VM72	FB101012-1	VOC	NA	Chloromethane	0.23	0.50	µg/L	--
VM72	FB101012-1	VOC	NA	Acetone	2.6	5.0	µg/L	--
VM72	MB-101212A	VOC	NA	Hexachlorobutadiene	0.19	0.50	µg/L	--
VM72	MB-101512A	VOC	See below	Methylene chloride	1.3	2.0	µg/kg	--
VM72	MB-101512A	VOC	GP-53-6.3	Methylene chloride	1.3	1.4	µg/kg	1.4 U
VM72	MB-101512A	VOC	GP-53-8.3	Methylene chloride	2.0	1.5	µg/kg	2.0 U
VM72	MB-101512A	VOC	See below	Acetone	3.1	5.0	µg/kg	--
VM72	MB-101512A	VOC	GP-53-6.3	Acetone	5.2	3.5	µg/kg	5.2 U
VM72	MB-101512A	VOC	GP-53-8.3	Acetone	11	3.7	µg/kg	11 U
VM72	MB-101712	SVOC	See below	Phenanthrene	17	20	µg/kg	--
VM72	MB-101712	SVOC	GP-34-8.4-9.4	Phenanthrene	30	20	µg/kg	30 U
VM72	MB-101712	SVOC	GP-56-7.2-9.5	Phenanthrene	19	18	µg/kg	19 U
VM72	MB-101712	SVOC	GP-59-8.25-10.25	Phenanthrene	22	19	µg/kg	22 U
VM72	MB-101712	SVOC	GP-59-10.25-11.5	Phenanthrene	76	19	µg/kg	76 U
VM72	MB-101712	SVOC	DUP101012-3	Phenanthrene	40	19	µg/kg	40 U
VM72	MB-101712	SVOC	See below	Fluoranthene	23	20	µg/kg	--
VM72	MB-101712	SVOC	GP-34-8.4-9.4	Fluoranthene	33	20	µg/kg	33 U
VM72	MB-101712	SVOC	DUP101012-1	Fluoranthene	26	19	µg/kg	26 U
VM72	MB-101712	SVOC	GP-56-4.2-5.2	Fluoranthene	58	26	µg/kg	58 U
VM72	MB-101712	SVOC	GP-56-7.2-9.5	Fluoranthene	21	18	µg/kg	21 U
VM72	MB-101712	SVOC	GP-59-10.25-11.5	Fluoranthene	60	19	µg/kg	60 U
VM72	MB-101712	SVOC	GP-26-9.1-10.3	Fluoranthene	21	20	µg/kg	21 U
VM72	MB-101712	SVOC	DUP101012-3	Fluoranthene	58	19	µg/kg	58 U
VM72	MB-101712	SVOC	See below	Pyrene	21	20	µg/kg	--
VM72	MB-101712	SVOC	GP-34-8.4-9.4	Pyrene	33	20	µg/kg	33 U
VM72	MB-101712	SVOC	DUP101012-1	Pyrene	40	19	µg/kg	40 U
VM72	MB-101712	SVOC	GP-56-4.2-5.2	Pyrene	66	26	µg/kg	66 U

Table 1
Blank and Associated Suspect Sample Detections
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
VM72	MB-101712	SVOC	GP-59-10.25-11.5	Pyrene	54	19	µg/kg	54 U
VM72	MB-101712	SVOC	DUP101012-3	Pyrene	51	19	µg/kg	51 U
VM72	MB-101712	SVOC	See below	bis(2-Ethylhexyl)phthalate	23	25	µg/kg	--
VM72	MB-101712	SVOC	GP-34-6.4-8.4	bis(2-Ethylhexyl)phthalate	24	24	µg/kg	24 U
VM72	MB-101712	SVOC	GP-56-4.2-5.2	bis(2-Ethylhexyl)phthalate	53	33	µg/kg	53 U
VM72	MB-101712	SVOC	GP-59-4.25-6.25	bis(2-Ethylhexyl)phthalate	25	24	µg/kg	25 U
VM72	MB-101712	SVOC	GP-59-10.25-11.5	bis(2-Ethylhexyl)phthalate	63	24	µg/kg	63 U
VM72	MB-101712	SVOC	GP-26-5.1-7.1	bis(2-Ethylhexyl)phthalate	27	24	µg/kg	27 U
VM72	MB-101712	SVOC	GP-26-9.1-10.3	bis(2-Ethylhexyl)phthalate	28	24	µg/kg	28 U
VM72	MB-101712	SVOC	DUP101012-3	bis(2-Ethylhexyl)phthalate	19	24	µg/kg	24 U
VM91	MB-101812	SVOC	See below	bis(2-Ethylhexyl)phthalate	38	25	µg/kg	--
VM91	MB-101812	SVOC	DUP101112-2	bis(2-Ethylhexyl)phthalate	27	25	µg/kg	27 U
VM91	MB-101812	SVOC	GP-28-4.1-6.1	bis(2-Ethylhexyl)phthalate	24	24	µg/kg	24 U
VM91	MB-101812	SVOC	GP-28-6.1-8.3	bis(2-Ethylhexyl)phthalate	25	23	µg/kg	25 U
VM91	MB-101812	SVOC	GP-50-5.9-7	bis(2-Ethylhexyl)phthalate	24	24	µg/kg	24 U
VM91	MB-101812	SVOC	GP-50-7-7.75	bis(2-Ethylhexyl)phthalate	28	24	µg/kg	28 U
VM91	MB-101812	SVOC	GP-31-5.9-7.9	bis(2-Ethylhexyl)phthalate	33	24	µg/kg	33 U
VN13	MB-101612A	VOC	NA	Hexachlorobutadiene	0.23	0.50	µg/L	--
VN13	MB-101812A	VOC	See below	Methylene chloride	0.9	2.0	µg/kg	--
VN13	MB-101812A	VOC	GP-62-5.8	Methylene chloride	2.6	1.3	µg/kg	2.6 U
VN13	MB-101812A	VOC	GP-62-7.2	Methylene chloride	2.1	1.6	µg/kg	2.1 U
VN13	MB-101812A	VOC	GP-64-5.1	Methylene chloride	1.8	1.4	µg/kg	1.8 U
VN13	MB-101812A	VOC	GP-64-6.5	Methylene chloride	1.6	1.9	µg/kg	1.9 U
VN13	MB-101812A	VOC	GP-63-8.5	Methylene chloride	1.1	1.6	µg/kg	1.6 U
VN13	MB-101812A	VOC	GP-63-7	Methylene chloride	1.8	1.4	µg/kg	1.8 U
VN13	MB-101812A	VOC	GP-63-5	Methylene chloride	1.3	1.2	µg/kg	1.3 U

Table 1
Blank and Associated Suspect Sample Detections
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
VN13	MB-101812A	VOC	GP-65-5	Methylene chloride	1.8	1.6	µg/kg	1.8 U
VN13	MB-101812A	VOC	GP-65-6.5	Methylene chloride	1.1	1.5	µg/kg	1.5 U
VN13	MB-101812A	VOC	GP-61-6	Methylene chloride	1.4	1.3	µg/kg	1.4 U
VN13	MB-101812A	VOC	GP-61-8	Methylene chloride	0.8	1.3	µg/kg	1.3 U
VN13	MB-101812A	VOC	DUP101212-1	Methylene chloride	2.0	1.2	µg/kg	2.0 U
VN13	MB-101812A	VOC	DUP101212-2	Methylene chloride	1.9	1.6	µg/kg	1.9 U
VN13	MB-101812A	VOC	DUP101212-3	Methylene chloride	1.7	1.6	µg/kg	1.7 U
VN13	MB-101812A	VOC	See below	Acetone	2.9	5.0	µg/kg	--
VN13	MB-101812A	VOC	GP-62-5.8	Acetone	5.0	3.3	µg/kg	5.0 U
VN13	MB-101812A	VOC	GP-64-5.1	Acetone	8.1	3.5	µg/kg	8.1 U
VN13	MB-101812A	VOC	GP-63-8.5	Acetone	21	4.1	µg/kg	21 U
VN13	MB-101812A	VOC	GP-63-7	Acetone	6.8	3.5	µg/kg	6.8 U
VN13	MB-101812A	VOC	GP-63-5	Acetone	14	3.0	µg/kg	14 U
VN13	MB-101812A	VOC	GP-65-5	Acetone	17	3.9	µg/kg	17 U
VN13	MB-101812A	VOC	GP-65-6.5	Acetone	15	3.8	µg/kg	15 U
VN13	MB-101812A	VOC	GP-61-6	Acetone	6.5	3.2	µg/kg	6.5 U
VN13	MB-101812A	VOC	GP-61-8	Acetone	11	3.3	µg/kg	11 U
VN13	MB-101812A	VOC	DUP101212-1	Acetone	5.3	2.9	µg/kg	5.3 U
VN13	MB-102012	SVOC	See below	bis(2-Ethylhexyl)phthalate	18	25	µg/kg	--
VN13	MB-102012	SVOC	DUP101212-1	bis(2-Ethylhexyl)phthalate	18	23	µg/kg	23 U
VN13	MB-102012	SVOC	DUP101212-2	bis(2-Ethylhexyl)phthalate	17	25	µg/kg	25 U
VN13	MB-102012	SVOC	GP-62-5-6.7	bis(2-Ethylhexyl)phthalate	17	23	µg/kg	23 U
VN13	MB-102012	SVOC	GP-62-6.7-7.7	bis(2-Ethylhexyl)phthalate	15	23	µg/kg	23 U
VN13	MB-102012	SVOC	GP-61-4.5-7.5	bis(2-Ethylhexyl)phthalate	15	24	µg/kg	24 U
VN13	MB-102012	SVOC	GP-61-7.5-8.5	bis(2-Ethylhexyl)phthalate	23	24	µg/kg	24 U
VN13	MB-102012	SVOC	GP-64-4.3-6	bis(2-Ethylhexyl)phthalate	15	23	µg/kg	23 U
VN13	MB-102012	SVOC	GP-64-6-7	bis(2-Ethylhexyl)phthalate	14	23	µg/kg	23 U
VN13	MB-102012	SVOC	GP-65-4.6	bis(2-Ethylhexyl)phthalate	16	24	µg/kg	24 U

Table 1
Blank and Associated Suspect Sample Detections
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
VN13	MB-102012	SVOC	GP-65-6-7	bis(2-Ethylhexyl)phthalate	15	23	µg/kg	23 U

Data packages reviewed: Axys DPWG41596, DPWG41685, DPWG41834; ARI VH79, VH87, VI22, VI27, VI40, VI70, VI85, VJ70, VM44, VM59, VM72, VM91, VN13

Key:

EB = Equipment blank

MB = Method blank

TB = Trip blank

FB = Field blank

NA = Not applicable; qualification of sample data not required

HPCDD = Heptachlorodibenzo-p-dioxin

OCDD = Octochlorodibenzo-p-dioxin

OCDF = Octochlorodibenzofuran

HPCDF = Heptachlorodibenzofuran

TCDD = Tetrachlorodibenzo-p-dioxin

PECDF = Pentachlorodibenzofuran

PCDD/PCDF = Polychlorinated dibenzo-p-dioxins/Polychlorinated dibenzofurans; Method 1613B

EMPC = Blank result identified as Estimated Maximum Possible Concentration; qualification of sample data not required

VOC = Volatile organic compounds; Method 8260C

SVOC = Semivolatile organic compounds; Method 8270D

TPH-d = Total petroleum hydrocarbons - diesel; Method NWTPH-Dx

pg/g = Picograms per gram

pg/L = Picograms per liter

µg/kg = Micrograms per kilogram

µg/L = Micrograms per liter

mg/L = Milligrams per liter

U = Nondetected

Table 2
Laboratory Control Spike Recoveries Outside of Acceptable Limits
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Analysis	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
VI85	LCS-091312A	NA	VOC	1,1,1,2-Tetrachloroethane	126/120	71-120	4.6	40	--	--
VI85	LCS-091312A	NA	VOC	Acrolein	159/140	60-124	12.3	40	--	--
VI85	LCS-091312A	NA	VOC	Hexachlorobutadiene	80.5/79.6	80-135	1.1	40	--	--
VI85	LCS-091712	NA	SVOC	Benzoic acid	11.1/17.2	30-160	43.1	40	--	--
VM44	LCS-101012A	NA	VOC	2,2-Dichloropropane	118/134	72-133	12.7	40	--	--
VN13	LCS101612A	NA	VOC	Acrolein	148/157	60-124	6.0	40	--	--

Data packages reviewed: Axys DPWG41596, DPWG41685, DPWG41834; ARI VH79, VH87, VI22, VI27, VI40, VI70, VI85, VJ70, VM44, VM59, VM72, VM91, VN13

Key:

LCS = Laboratory control sample

NA = Not applicable; qualification of sample data not required

VOC = Volatile organic compounds; Method 8260C

SVOC = Semivolatile organic compounds; Method 8270D

Table 3
Matrix Spike Recoveries Outside of Acceptable Limits
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
DPWG41596	GP-55_2.5-4 MS/MSD	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDD	1000	70-130	NR	20	SDO	--
DPWG41596	GP-55_2.5-4 MS/MSD	PCDD/PCDF	NA	OCDD	81400	70-130	NR	20	SDO	--
DPWG41596	GP-55_2.5-4 MS/MSD	PCDD/PCDF	NA	2,3,7,8-TCDF	112/83.0	70-130	29.6	20	--	--
DPWG41596	GP-55_2.5-4 MS/MSD	PCDD/PCDF	NA	2,3,4,7,8-PECDF	134/99.3	70-130	29.7	20	--	--
DPWG41596	GP-55_2.5-4 MS/MSD	PCDD/PCDF	NA	1,2,3,4,7,8-HXCDF	185/96.1	70-130	63.0	20	--	--
DPWG41596	GP-55_2.5-4 MS/MSD	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDF	261	70-130	NR	20	SDO	--
DPWG41596	GP-55_2.5-4 MS/MSD	PCDD/PCDF	NA	1,2,3,4,7,8,9-HPCDF	130/75.9	70-130	52.3	20	SDO	--
DPWG41596	GP-55_2.5-4 MS/MSD	PCDD/PCDF	NA	OCDF	1510	70-130	NR	20	SDO	--
DPWG41596	SWD-01 MS/MSD	PCDD/PCDF	NA	1,2,3,7,8,9-HXCDD	85.3/115	70-130	29.3	20	--	--
DPWG41596	SWD-01 MS/MSD	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDD	723/552	70-130	26.8	20	SDO	--
DPWG41596	SWD-01 MS/MSD	PCDD/PCDF	NA	OCDD	4520/11600	70-130	87.5	20	SDO	--
DPWG41596	SWD-01 MS/MSD	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDF	189/97.4	70-130	64.0	20	--	--
DPWG41596	SWD-01 MS/MSD	PCDD/PCDF	NA	OCDF	292/234	70-130	21.8	20	SDO	--
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	See below	2,3,7,8-TCDD	428/433	70-130	1.23	20	--	--
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-55-4.4-6.4	2,3,7,8-TCDD	--	--	--	--	0.943	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-55-6.4-8.4	2,3,7,8-TCDD	--	--	--	--	0.222	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-55-8.4-10.4	2,3,7,8-TCDD	--	--	--	--	0.274	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	DUP100812-1	2,3,7,8-TCDD	--	--	--	--	0.282	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-45-4.5-6.5	2,3,7,8-TCDD	--	--	--	--	10.8	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-45-6.5-8.5	2,3,7,8-TCDD	--	--	--	--	0.272	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-45-8.5-9.5	2,3,7,8-TCDD	--	--	--	--	0.300	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-44-4.8-6.8	2,3,7,8-TCDD	--	--	--	--	11.3	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-44-6.8-8.8	2,3,7,8-TCDD	--	--	--	--	0.245	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-44-8.8-11.1	2,3,7,8-TCDD	--	--	--	--	0.344	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-46-5.2-7.2	2,3,7,8-TCDD	--	--	--	--	3.38	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-46-7.2-8.7	2,3,7,8-TCDD	--	--	--	--	0.279	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-30-7-9	2,3,7,8-TCDD	--	--	--	--	0.285	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-34-6.4-8.4	2,3,7,8-TCDD	--	--	--	--	0.288	J+

Table 3
Matrix Spike Recoveries Outside of Acceptable Limits
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-34-8.4-9.4	2,3,7,8-TCDD	--	--	--	--	0.257	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	DUP101012-1	2,3,7,8-TCDD	--	--	--	--	0.256	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-29-8.9-11.2	2,3,7,8-TCDD	--	--	--	--	0.230	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-29-2.9-4.9	2,3,7,8-TCDD	--	--	--	--	0.219	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-29-6.9-8.9	2,3,7,8-TCDD	--	--	--	--	0.282	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	See below	1,2,3,7,8-PECDD	473/455	70-130	3.81	20	--	--
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-55-4.4-6.4	1,2,3,7,8-PECDD	--	--	--	--	3.51	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-45-4.5-6.5	1,2,3,7,8-PECDD	--	--	--	--	32.3	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-44-4.8-6.8	1,2,3,7,8-PECDD	--	--	--	--	36.7	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-44-8.8-11.1	1,2,3,7,8-PECDD	--	--	--	--	0.180	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-46-5.2-7.2	1,2,3,7,8-PECDD	--	--	--	--	26.7	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-30-7-9	1,2,3,7,8-PECDD	--	--	--	--	0.109	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-34-6.4-8.4	1,2,3,7,8-PECDD	--	--	--	--	0.129	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	See below	1,2,3,4,7,8-HXCDD	424/409	70-130	3.72	20	--	--
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-55-4.4-6.4	1,2,3,4,7,8-HXCDD	--	--	--	--	7.38	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-45-4.5-6.5	1,2,3,4,7,8-HXCDD	--	--	--	--	57.5	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-44-4.8-6.8	1,2,3,4,7,8-HXCDD	--	--	--	--	93.5	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-44-6.8-8.8	1,2,3,4,7,8-HXCDD	--	--	--	--	0.182	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-44-8.8-11.1	1,2,3,4,7,8-HXCDD	--	--	--	--	0.280	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-46-5.2-7.2	1,2,3,4,7,8-HXCDD	--	--	--	--	39.1	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-34-6.4-8.4	1,2,3,4,7,8-HXCDD	--	--	--	--	0.214	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	DUP101012-1	1,2,3,4,7,8-HXCDD	--	--	--	--	0.212	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-29-8.9-11.2	1,2,3,4,7,8-HXCDD	--	--	--	--	0.137	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-29-2.9-4.9	1,2,3,4,7,8-HXCDD	--	--	--	--	0.179	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-29-4.9-6.9	1,2,3,4,7,8-HXCDD	--	--	--	--	0.139	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-29-6.9-8.9	1,2,3,4,7,8-HXCDD	--	--	--	--	0.125	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	See below	1,2,3,6,7,8-HXCDD	834/516	70-130	47.2	20	--	--
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-55-4.4-6.4	1,2,3,6,7,8-HXCDD	--	--	--	--	32.0	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-55-8.4-10.4	1,2,3,6,7,8-HXCDD	--	--	--	--	0.158	J+

Table 3
Matrix Spike Recoveries Outside of Acceptable Limits
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	DUP100812-1	1,2,3,6,7,8-HXCDD	--	--	--	--	0.174	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-45-4.5-6.5	1,2,3,6,7,8-HXCDD	--	--	--	--	786	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-45-6.5-8.5	1,2,3,6,7,8-HXCDD	--	--	--	--	0.195	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-44-4.8-6.8	1,2,3,6,7,8-HXCDD	--	--	--	--	536	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-44-6.8-8.8	1,2,3,6,7,8-HXCDD	--	--	--	--	1.21	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-44-8.8-11.1	1,2,3,6,7,8-HXCDD	--	--	--	--	1.31	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-46-5.2-7.2	1,2,3,6,7,8-HXCDD	--	--	--	--	223	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-46-7.2-8.7	1,2,3,6,7,8-HXCDD	--	--	--	--	0.182	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-30-7-9	1,2,3,6,7,8-HXCDD	--	--	--	--	0.191	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-34-6.4-8.4	1,2,3,6,7,8-HXCDD	--	--	--	--	0.838	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-34-8.4-9.4	1,2,3,6,7,8-HXCDD	--	--	--	--	0.120	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	DUP101012-1	1,2,3,6,7,8-HXCDD	--	--	--	--	1.49	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-29-8.9-11.2	1,2,3,6,7,8-HXCDD	--	--	--	--	0.342	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-29-2.9-4.9	1,2,3,6,7,8-HXCDD	--	--	--	--	1.76	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-29-4.9-6.9	1,2,3,6,7,8-HXCDD	--	--	--	--	0.335	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-29-6.9-8.9	1,2,3,6,7,8-HXCDD	--	--	--	--	0.509	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	See below	1,2,3,7,8,9-HXCDD	511/454	70-130	11.8	20	--	--
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-55-4.4-6.4	1,2,3,7,8,9-HXCDD	--	--	--	--	19.4	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-55-8.4-10.4	1,2,3,7,8,9-HXCDD	--	--	--	--	0.197	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	DUP100812-1	1,2,3,7,8,9-HXCDD	--	--	--	--	0.197	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-45-4.5-6.5	1,2,3,7,8,9-HXCDD	--	--	--	--	149	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-45-6.5-8.5	1,2,3,7,8,9-HXCDD	--	--	--	--	0.129	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-44-4.8-6.8	1,2,3,7,8,9-HXCDD	--	--	--	--	170	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-44-6.8-8.8	1,2,3,7,8,9-HXCDD	--	--	--	--	0.348	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-44-8.8-11.1	1,2,3,7,8,9-HXCDD	--	--	--	--	0.730	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-46-5.2-7.2	1,2,3,7,8,9-HXCDD	--	--	--	--	87.5	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-46-7.2-8.7	1,2,3,7,8,9-HXCDD	--	--	--	--	0.199	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-30-7-9	1,2,3,7,8,9-HXCDD	--	--	--	--	0.197	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-34-6.4-8.4	1,2,3,7,8,9-HXCDD	--	--	--	--	0.565	J+

Table 3
Matrix Spike Recoveries Outside of Acceptable Limits
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-34-8.4-9.4	1,2,3,7,8,9-HXCDD	--	--	--	--	0.192	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	DUP101012-1	1,2,3,7,8,9-HXCDD	--	--	--	--	0.503	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-29-8.9-11.2	1,2,3,7,8,9-HXCDD	--	--	--	--	0.327	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-29-2.9-4.9	1,2,3,7,8,9-HXCDD	--	--	--	--	0.442	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-29-4.9-6.9	1,2,3,7,8,9-HXCDD	--	--	--	--	0.229	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-29-6.9-8.9	1,2,3,7,8,9-HXCDD	--	--	--	--	0.250	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDD	9950/1770	70-130	140	20	4X	--
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	NA	OCDD	145000/14300	70-130	164	20	4X	--
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	See below	2,3,7,8-TCDF	459/458	70-130	0.206	20	--	--
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-55-4.4-6.4	2,3,7,8-TCDF	--	--	--	--	2.07	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-55-8.4-10.4	2,3,7,8-TCDF	--	--	--	--	0.632	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	DUP100812-1	2,3,7,8-TCDF	--	--	--	--	0.464	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-45-4.5-6.5	2,3,7,8-TCDF	--	--	--	--	15.1	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-45-6.5-8.5	2,3,7,8-TCDF	--	--	--	--	0.356	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-45-8.5-9.5	2,3,7,8-TCDF	--	--	--	--	0.326	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-44-4.8-6.8	2,3,7,8-TCDF	--	--	--	--	15.8	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-44-6.8-8.8	2,3,7,8-TCDF	--	--	--	--	0.182	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-44-8.8-11.1	2,3,7,8-TCDF	--	--	--	--	1.23	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-46-5.2-7.2	2,3,7,8-TCDF	--	--	--	--	12.7	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-46-7.2-8.7	2,3,7,8-TCDF	--	--	--	--	0.590	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-30-7-9	2,3,7,8-TCDF	--	--	--	--	0.366	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-34-8.4-9.4	2,3,7,8-TCDF	--	--	--	--	0.604	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	DUP101012-1	2,3,7,8-TCDF	--	--	--	--	0.119	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-29-8.9-11.2	2,3,7,8-TCDF	--	--	--	--	0.110	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-29-2.9-4.9	2,3,7,8-TCDF	--	--	--	--	0.175	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-29-4.9-6.9	2,3,7,8-TCDF	--	--	--	--	0.116	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	See below	1,2,3,7,8-PECDF	494/484	70-130	1.97	20	--	--
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-55-4.4-6.4	1,2,3,7,8-PECDF	--	--	--	--	1.42	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-55-8.4-10.4	1,2,3,7,8-PECDF	--	--	--	--	0.136	J+

Table 3
Matrix Spike Recoveries Outside of Acceptable Limits
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	DUP100812-1	1,2,3,7,8-PECDF	--	--	--	--	0.130	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-45-4.5-6.5	1,2,3,7,8-PECDF	--	--	--	--	37.3	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-44-4.8-6.8	1,2,3,7,8-PECDF	--	--	--	--	35.3	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-44-6.8-8.8	1,2,3,7,8-PECDF	--	--	--	--	0.106	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-44-8.8-11.1	1,2,3,7,8-PECDF	--	--	--	--	0.243	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-46-5.2-7.2	1,2,3,7,8-PECDF	--	--	--	--	19.9	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-46-7.2-8.7	1,2,3,7,8-PECDF	--	--	--	--	0.119	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-34-6.4-8.4	1,2,3,7,8-PECDF	--	--	--	--	0.130	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	DUP101012-1	1,2,3,7,8-PECDF	--	--	--	--	0.139	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-29-2.9-4.9	1,2,3,7,8-PECDF	--	--	--	--	0.302	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	See below	2,3,4,7,8-PECDF	581/491	70-130	16.7	20	--	--
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-55-4.4-6.4	2,3,4,7,8-PECDF	--	--	--	--	5.38	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-55-6.4-8.4	2,3,4,7,8-PECDF	--	--	--	--	0.173	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-55-8.4-10.4	2,3,4,7,8-PECDF	--	--	--	--	0.344	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	DUP100812-1	2,3,4,7,8-PECDF	--	--	--	--	0.309	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-45-4.5-6.5	2,3,4,7,8-PECDF	--	--	--	--	150	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-45-6.5-8.5	2,3,4,7,8-PECDF	--	--	--	--	0.265	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-45-8.5-9.5	2,3,4,7,8-PECDF	--	--	--	--	0.229	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-44-4.8-6.8	2,3,4,7,8-PECDF	--	--	--	--	144	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-44-6.8-8.8	2,3,4,7,8-PECDF	--	--	--	--	0.387	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-44-8.8-11.1	2,3,4,7,8-PECDF	--	--	--	--	0.608	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-46-5.2-7.2	2,3,4,7,8-PECDF	--	--	--	--	61.1	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-46-7.2-8.7	2,3,4,7,8-PECDF	--	--	--	--	0.291	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-30-7-9	2,3,4,7,8-PECDF	--	--	--	--	0.249	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-34-6.4-8.4	2,3,4,7,8-PECDF	--	--	--	--	0.550	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-34-8.4-9.4	2,3,4,7,8-PECDF	--	--	--	--	0.242	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	DUP101012-1	2,3,4,7,8-PECDF	--	--	--	--	0.833	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-29-8.9-11.2	2,3,4,7,8-PECDF	--	--	--	--	0.287	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-29-2.9-4.9	2,3,4,7,8-PECDF	--	--	--	--	0.912	J+

Table 3
Matrix Spike Recoveries Outside of Acceptable Limits
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-29-4.9-6.9	2,3,4,7,8-PECDF	--	--	--	--	0.241	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-29-6.9-8.9	2,3,4,7,8-PECDF	--	--	--	--	0.320	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	NA	1,2,3,4,7,8-HXCDF	2380/760	70-130	103	20	4X	--
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	See below	1,2,3,6,7,8-HXCDF	811/554	70-130	37.6	20	--	--
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-55-4.4-6.4	1,2,3,6,7,8-HXCDF	--	--	--	--	7.49	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-45-4.5-6.5	1,2,3,6,7,8-HXCDF	--	--	--	--	505	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-44-4.8-6.8	1,2,3,6,7,8-HXCDF	--	--	--	--	261	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-44-6.8-8.8	1,2,3,6,7,8-HXCDF	--	--	--	--	0.439	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-44-8.8-11.1	1,2,3,6,7,8-HXCDF	--	--	--	--	0.566	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-46-5.2-7.2	1,2,3,6,7,8-HXCDF	--	--	--	--	158	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-46-7.2-8.7	1,2,3,6,7,8-HXCDF	--	--	--	--	0.144	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-34-6.4-8.4	1,2,3,6,7,8-HXCDF	--	--	--	--	0.568	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	DUP101012-1	1,2,3,6,7,8-HXCDF	--	--	--	--	0.974	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-29-8.9-11.2	1,2,3,6,7,8-HXCDF	--	--	--	--	0.159	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-29-2.9-4.9	1,2,3,6,7,8-HXCDF	--	--	--	--	1.02	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-29-4.9-6.9	1,2,3,6,7,8-HXCDF	--	--	--	--	0.155	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-29-6.9-8.9	1,2,3,6,7,8-HXCDF	--	--	--	--	0.210	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	See below	1,2,3,7,8,9-HXCDF	459/456	70-130	0.59	20	--	--
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-55-4.4-6.4	1,2,3,7,8,9-HXCDF	--	--	--	--	0.542	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-45-4.5-6.5	1,2,3,7,8,9-HXCDF	--	--	--	--	25.5	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-44-4.8-6.8	1,2,3,7,8,9-HXCDF	--	--	--	--	15.4	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-44-6.8-8.8	1,2,3,7,8,9-HXCDF	--	--	--	--	0.105	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-46-5.2-7.2	1,2,3,7,8,9-HXCDF	--	--	--	--	8.42	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-29-2.9-4.9	1,2,3,7,8,9-HXCDF	--	--	--	--	0.106	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-29-6.9-8.9	1,2,3,7,8,9-HXCDF	--	--	--	--	0.125	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	See below	2,3,4,6,7,8-HXCDF	555/452	70-130	20.4	20	--	--
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-55-4.4-6.4	2,3,4,6,7,8-HXCDF	--	--	--	--	3.36	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-45-4.5-6.5	2,3,4,6,7,8-HXCDF	--	--	--	--	174	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-44-4.8-6.8	2,3,4,6,7,8-HXCDF	--	--	--	--	86.5	J+

Table 3
Matrix Spike Recoveries Outside of Acceptable Limits
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-44-6.8-8.8	2,3,4,6,7,8-HXCDF	--	--	--	--	0.181	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-44-8.8-11.1	2,3,4,6,7,8-HXCDF	--	--	--	--	0.234	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-46-5.2-7.2	2,3,4,6,7,8-HXCDF	--	--	--	--	61.9	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-34-6.4-8.4	2,3,4,6,7,8-HXCDF	--	--	--	--	0.224	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	DUP101012-1	2,3,4,6,7,8-HXCDF	--	--	--	--	0.384	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-29-2.9-4.9	2,3,4,6,7,8-HXCDF	--	--	--	--	0.422	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-29-4.9-6.9	2,3,4,6,7,8-HXCDF	--	--	--	--	0.288	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDF	8800/1540	70-130	141	20	4X	--
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	See below	1,2,3,4,7,8,9-HPCDF	1340/550	70-130	83.7	20	--	--
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-55-4.4-6.4	1,2,3,4,7,8,9-HPCDF	--	--	--	--	24.0	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-55-8.4-10.4	1,2,3,4,7,8,9-HPCDF	--	--	--	--	0.119	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-45-4.5-6.5	1,2,3,4,7,8,9-HPCDF	--	--	--	--	1450	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-45-6.5-8.5	1,2,3,4,7,8,9-HPCDF	--	--	--	--	0.183	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-44-4.8-6.8	1,2,3,4,7,8,9-HPCDF	--	--	--	--	840	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-44-6.8-8.8	1,2,3,4,7,8,9-HPCDF	--	--	--	--	1.89	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-44-8.8-11.1	1,2,3,4,7,8,9-HPCDF	--	--	--	--	1.71	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-46-5.2-7.2	1,2,3,4,7,8,9-HPCDF	--	--	--	--	426	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-46-7.2-8.7	1,2,3,4,7,8,9-HPCDF	--	--	--	--	0.210	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-30-7-9	1,2,3,4,7,8,9-HPCDF	--	--	--	--	0.187	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-34-6.4-8.4	1,2,3,4,7,8,9-HPCDF	--	--	--	--	1.33	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	DUP101012-1	1,2,3,4,7,8,9-HPCDF	--	--	--	--	3.40	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-29-8.9-11.2	1,2,3,4,7,8,9-HPCDF	--	--	--	--	0.327	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-29-2.9-4.9	1,2,3,4,7,8,9-HPCDF	--	--	--	--	3.02	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-29-4.9-6.9	1,2,3,4,7,8,9-HPCDF	--	--	--	--	0.225	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	GP-29-6.9-8.9	1,2,3,4,7,8,9-HPCDF	--	--	--	--	0.567	J+
DPWG42036	GP-46-5.2-7.2 MS/MSD	PCDD/PCDF	NA	OCDF	4410/658	70-130	148	20	4X	--
VH79	GP-36-2.6-4.6 MS/MSD	TPH-d	NA	Diesel	NR/NR	50-150	11.1	40	--	--

Table 3
Matrix Spike Recoveries Outside of Acceptable Limits
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
VH79	GP-39-2.5-4.5 MS	Cr VI	NA	Chromium, hexavalent	12.4	75-125	--	--	--	--
VH87	GP-55-2.5-4 MS/MSD	Phenols	NA	Phenol	NR/NR	30-160	28.5	40	4X	--
VH87	GP-55-2.5-4 MS/MSD	Phenols	NA	2-Chlorophenol	NR/NR	30-160	9.2	40	--	--
VH87	GP-55-2.5-4 MS/MSD	Phenols	NA	2,4-Dichlorophenol	27.6/28.6	30-160	2.5	40	--	--
VH87	GP-55-2.5-4 MS/MSD	Phenols	NA	Pentachlorophenol	NR/NR	30-160	62.3	40	4X	--
VH87	GP-55-2.5-4 MS/MSD	Phenols	NA	2,3,4,6-Tetrachlorophenol	NR/NR	30-160	23.5	40	--	--
VI22	MW-23D-2.75-5.25 MS	Total metals	See below	Lead	74.8	75-125	--	--	--	--
VI22	MW-23D-2.75-5.25 MS	Total metals	MW-23D-2.75-5.25	Lead	--	--	--	--	34.3	J-
VI27	GP-47-0-0.25 MS	Total metals	NA	Copper	154	75-125	--	--	4X	--
VI27	GP-47-0-0.25 MS	Total metals	See below	Mercury	134	75-125	--	--	--	--
VI27	GP-47-0-0.25 MS	Total metals	GP-47-0-0.25	Mercury	--	--	--	--	0.05	J+
VI85	GP-53-3-5 MS/MSD	SVOC	NA	Hexachlorocyclopentadiene	7.4/10.8	30-160	37.2	30	--	--
VI85	GP-53-3-5 MS/MSD	SVOC	NA	3,3'-Dichlorobenzidine	NR/NR	30-160	NR	30	--	--
VM44	GP-58-4.25-6.25 MS	Total metals	See below	Antimony	7.8	75-125	--	--	--	--
VM44	GP-58-4.25-6.25 MS	Total metals	GP-36-7-9	Antimony	--	--	--	--	< 0.2	UJ
VM44	GP-58-4.25-6.25 MS	Total metals	GP-36-9-11	Antimony	--	--	--	--	< 0.2	UJ
VM44	GP-58-4.25-6.25 MS	Total metals	GP-36-11-12	Antimony	--	--	--	--	< 0.3	UJ
VM44	GP-58-4.25-6.25 MS	Total metals	GP-39-4.5-6.5	Antimony	--	--	--	--	< 0.2	UJ
VM44	GP-58-4.25-6.25 MS	Total metals	GP-39-6.5-8.5	Antimony	--	--	--	--	< 0.2	UJ
VM44	GP-58-4.25-6.25 MS	Total metals	GP-39-10.5-11.5	Antimony	--	--	--	--	< 0.3	UJ
VM44	GP-58-4.25-6.25 MS	Total metals	GP-58-4.25-6.25	Antimony	--	--	--	--	< 0.2	UJ
VM44	GP-58-4.25-6.25 MS	Total metals	GP-58-8.25-10.5	Antimony	--	--	--	--	< 0.3	UJ
VM44	GP-58-4.25-6.25 MS	Total metals	GP-55-8.4-10.4	Antimony	--	--	--	--	< 0.3	UJ
VM44	GP-58-4.25-6.25 MS	Total metals	DUP100812-1	Antimony	--	--	--	--	< 0.2	UJ

Table 3
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Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
VM44	GP-58-4.25-6.25 MS	Total metals	GP-55-4.4-6.4	Antimony	--	--	--	--	< 0.2	UJ
VM44	GP-58-4.25-6.25 MS	Total metals	GP-55-6.4-8.4	Antimony	--	--	--	--	< 0.2	UJ
VM44	GP-58-4.25-6.25 MS	Total metals	GP-37-7.9	Antimony	--	--	--	--	< 0.2	UJ
VM44	GP-58-4.25-6.25 MS	Total metals	GP-37-9-10	Antimony	--	--	--	--	< 0.3	UJ
VM59	GP-44-8.8-11.1 MS/MSD	SVOC	NA	Naphthalene	12.2/4.3	30-160	10.9	30	--	--
VM59	GP-44-8.8-11.1 MS/MSD	SVOC	NA	4-Chloroaniline	8.1/6.9	30-160	15.0	30	--	--
VM59	GP-44-8.8-11.1 MS/MSD	SVOC	NA	Hexachlorocyclopentadiene	NR/NR	30-160	NR	30	--	--
VM59	GP-44-8.8-11.1 MS/MSD	SVOC	NA	4-Nitroaniline	13.8/12.9	30-160	7.0	30	--	--
VM59	GP-44-8.8-11.1 MS/MSD	SVOC	NA	Pentachlorophenol	197/42.1	30-160	54.6	30	--	--
VM59	GP-44-8.8-11.1 MS/MSD	SVOC	NA	3,3'-Dichlorobenzidine	NR/NR	30-160	NR	30	--	--
VM59	GP-46-5.2-7.2 MS/MSD	SVOC	NA	Hexachlorocyclopentadiene	6.8/4.5	30-160	41.1	30	--	--
VM59	GP-46-5.2-7.2 MS/MSD	SVOC	NA	3,3'-Dichlorobenzidine	3.7/2.3	30-160	49.5	30	--	--
VM59	GP-44-8.8-11.1 MS	Total metals	See below	Antimony	5.5	75-125	--	--	--	--
VM59	GP-44-8.8-11.1 MS	Total metals	GP-38-7-9	Antimony	--	--	--	--	< 0.2	UJ
VM59	GP-44-8.8-11.1 MS	Total metals	GP-38-9-11	Antimony	--	--	--	--	< 0.3	UJ
VM59	GP-44-8.8-11.1 MS	Total metals	GP-30-7-9	Antimony	--	--	--	--	< 0.2	UJ
VM59	GP-44-8.8-11.1 MS	Total metals	GP-45-4.5-6.5	Antimony	--	--	--	--	< 0.2	UJ
VM59	GP-44-8.8-11.1 MS	Total metals	GP-45-6.5-8.5	Antimony	--	--	--	--	< 0.2	UJ
VM59	GP-44-8.8-11.1 MS	Total metals	GP-45-8.5-9.5	Antimony	--	--	--	--	< 0.2	UJ
VM59	GP-44-8.8-11.1 MS	Total metals	GP-44-4.8-6.8	Antimony	--	--	--	--	< 0.2	UJ
VM59	GP-44-8.8-11.1 MS	Total metals	GP-44-6.8-8.8	Antimony	--	--	--	--	< 0.2	UJ
VM59	GP-44-8.8-11.1 MS	Total metals	GP-44-8.8-11.1	Antimony	--	--	--	--	< 0.2	UJ
VM59	GP-44-8.8-11.1 MS	Total metals	GP-46-5.2-7.2	Antimony	--	--	--	--	< 0.2	UJ
VM59	GP-44-8.8-11.1 MS	Total metals	GP-46-7.2-8.7	Antimony	--	--	--	--	< 0.2	UJ
VM59	GP-44-8.8-11.1 MS	Total metals	GP-29-2.9-4.9	Antimony	--	--	--	--	< 0.2	UJ
VM59	GP-44-8.8-11.1 MS	Total metals	GP-29-4.9-6.9	Antimony	--	--	--	--	< 0.2	UJ
VM59	GP-44-8.8-11.1 MS	Total metals	GP-29-6.9-8.9	Antimony	--	--	--	--	< 0.2	UJ
VM59	GP-44-8.8-11.1 MS	Total metals	GP-29-8.9-11.2	Antimony	--	--	--	--	< 0.2	UJ

Table 3
Matrix Spike Recoveries Outside of Acceptable Limits
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
VM59	GP-44-8.8-11.1 MS	Total metals	See below	Arsenic	633	75-125	--	--	--	--
VM59	GP-44-8.8-11.1 MS	Total metals	GP-38-7-9	Arsenic	--	--	--	--	2.2	J+
VM59	GP-44-8.8-11.1 MS	Total metals	GP-38-9-11	Arsenic	--	--	--	--	2.4	J+
VM59	GP-44-8.8-11.1 MS	Total metals	GP-30-7-9	Arsenic	--	--	--	--	3.8	J+
VM59	GP-44-8.8-11.1 MS	Total metals	GP-45-4.5-6.5	Arsenic	--	--	--	--	16.9	J+
VM59	GP-44-8.8-11.1 MS	Total metals	GP-45-6.5-8.5	Arsenic	--	--	--	--	7.9	J+
VM59	GP-44-8.8-11.1 MS	Total metals	GP-45-8.5-9.5	Arsenic	--	--	--	--	4.0	J+
VM59	GP-44-8.8-11.1 MS	Total metals	GP-44-4.8-6.8	Arsenic	--	--	--	--	40.7	J+
VM59	GP-44-8.8-11.1 MS	Total metals	GP-44-6.8-8.8	Arsenic	--	--	--	--	14.4	J+
VM59	GP-44-8.8-11.1 MS	Total metals	GP-44-8.8-11.1	Arsenic	--	--	--	--	32.8	J+
VM59	GP-44-8.8-11.1 MS	Total metals	GP-46-5.2-7.2	Arsenic	--	--	--	--	6.6	J+
VM59	GP-44-8.8-11.1 MS	Total metals	GP-46-7.2-8.7	Arsenic	--	--	--	--	8.9	J+
VM59	GP-44-8.8-11.1 MS	Total metals	GP-29-2.9-4.9	Arsenic	--	--	--	--	2.0	J+
VM59	GP-44-8.8-11.1 MS	Total metals	GP-29-4.9-6.9	Arsenic	--	--	--	--	1.4	J+
VM59	GP-44-8.8-11.1 MS	Total metals	GP-29-6.9-8.9	Arsenic	--	--	--	--	1.8	J+
VM59	GP-44-8.8-11.1 MS	Total metals	GP-29-8.9-11.2	Arsenic	--	--	--	--	2.3	J+
VM59	GP-44-8.8-11.1 MS	Total metals	See below	Copper	145	75-125	--	--	--	--
VM59	GP-44-8.8-11.1 MS	Total metals	GP-38-7-9	Copper	--	--	--	--	8.6	J+
VM59	GP-44-8.8-11.1 MS	Total metals	GP-38-9-11	Copper	--	--	--	--	13.1	J+
VM59	GP-44-8.8-11.1 MS	Total metals	GP-30-7-9	Copper	--	--	--	--	10.9	J+
VM59	GP-44-8.8-11.1 MS	Total metals	GP-45-4.5-6.5	Copper	--	--	--	--	41.8	J+
VM59	GP-44-8.8-11.1 MS	Total metals	GP-45-6.5-8.5	Copper	--	--	--	--	3.4	J+
VM59	GP-44-8.8-11.1 MS	Total metals	GP-45-8.5-9.5	Copper	--	--	--	--	20.3	J+
VM59	GP-44-8.8-11.1 MS	Total metals	GP-44-4.8-6.8	Copper	--	--	--	--	39.4	J+
VM59	GP-44-8.8-11.1 MS	Total metals	GP-44-6.8-8.8	Copper	--	--	--	--	9.7	J+
VM59	GP-44-8.8-11.1 MS	Total metals	GP-44-8.8-11.1	Copper	--	--	--	--	17.5	J+
VM59	GP-44-8.8-11.1 MS	Total metals	GP-46-5.2-7.2	Copper	--	--	--	--	8.8	J+
VM59	GP-44-8.8-11.1 MS	Total metals	GP-46-7.2-8.7	Copper	--	--	--	--	17.3	J+
VM59	GP-44-8.8-11.1 MS	Total metals	GP-29-2.9-4.9	Copper	--	--	--	--	74.2	J+

Table 3
Matrix Spike Recoveries Outside of Acceptable Limits
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
VM59	GP-44-8.8-11.1 MS	Total metals	GP-29-4.9-6.9	Copper	--	--	--	--	7.6	J+
VM59	GP-44-8.8-11.1 MS	Total metals	GP-29-6.9-8.9	Copper	--	--	--	--	21.5	J+
VM59	GP-44-8.8-11.1 MS	Total metals	GP-29-8.9-11.2	Copper	--	--	--	--	8.1	J+
VM59	GP-46-5.2-7.2 MS	Total metals	NA	Antimony	21.9	75-125	--	--	--	--
VM72	GP-56-7.2-9.5 MS/MSD	SVOC	NA	Naphthalene	10.4/13.6	30-160	4.2	30	--	--
VM72	GP-56-7.2-9.5 MS/MSD	SVOC	NA	4-Chloroaniline	NR/NR	30-160	NR	30	--	--
VM72	GP-56-7.2-9.5 MS/MSD	SVOC	NA	Hexachlorocyclopentadiene	12.3/NR	30-160	NR	30	--	--
VM72	GP-56-7.2-9.5 MS/MSD	SVOC	NA	3-Nitroaniline	12.9/11.2	30-160	13.8	30	--	--
VM72	GP-56-7.2-9.5 MS/MSD	SVOC	NA	4-Nitroaniline	8.6/14.9	30-160	54.8	30	--	--
VM72	GP-56-7.2-9.5 MS/MSD	SVOC	NA	Pentachlorophenol	NR/NR	30-160	5.8	30	--	--
VM72	GP-56-7.2-9.5 MS/MSD	SVOC	NA	3,3'-Dichlorobenzidine	NR/NR	30-160	NR	30	--	--
VM72	GP-59-4.25-6.25 MS/MSD	SVOC	NA	Phenol	14.7/13.3	30-160	2.5	30	--	--
VM72	GP-59-4.25-6.25 MS/MSD	SVOC	NA	4-Methylphenol	19.3/18.9	30-160	0.9	30	--	--
VM72	GP-59-4.25-6.25 MS/MSD	SVOC	NA	Hexachlorocyclopentadiene	25.3/31.2	30-160	20.9	30	--	--
VM72	GP-59-4.25-6.25 MS/MSD	SVOC	NA	Phenanthrene	NR/NR	30-160	2.8	30	--	--
VM72	GP-59-4.25-6.25 MS/MSD	SVOC	NA	Fluoranthene	27.4/27.1	30-160	0.5	30	--	--
VM72	GP-59-4.25-6.25 MS/MSD	SVOC	NA	Pyrene	28.0/23.8	30-160	6.2	30	--	--
VM72	GP-59-4.25-6.25 MS/MSD	SVOC	NA	3,3'-Dichlorobenzidine	4.3/6.3	30-160	36.0	30	--	--
VM72	GP-56-7.2-9.5 MS	Total metals	See below	Antimony	13.8	75-125	--	--	--	--
VM72	GP-56-7.2-9.5 MS	Total metals	GP-34-6.4-8.4	Antimony	--	--	--	--	< 0.2	UJ
VM72	GP-56-7.2-9.5 MS	Total metals	GP-34-8.4-9.4	Antimony	--	--	--	--	< 0.3	UJ
VM72	GP-56-7.2-9.5 MS	Total metals	DUP101012-1	Antimony	--	--	--	--	< 0.2	UJ
VM72	GP-56-7.2-9.5 MS	Total metals	GP-56-4.2-5.2	Antimony	--	--	--	--	0.8	J-
VM72	GP-56-7.2-9.5 MS	Total metals	GP-56-5.2-7.2	Antimony	--	--	--	--	< 0.2	UJ
VM72	GP-56-7.2-9.5 MS	Total metals	GP-56-7.2-9.5	Antimony	--	--	--	--	< 0.3	UJ
VM72	GP-56-7.2-9.5 MS	Total metals	GP-57-4-6.25	Antimony	--	--	--	--	< 0.2	UJ
VM72	GP-56-7.2-9.5 MS	Total metals	GP-57-6.25-6.8	Antimony	--	--	--	--	< 0.3	UJ
VM72	GP-56-7.2-9.5 MS	Total metals	GP-57-8.8-10.8	Antimony	--	--	--	--	< 0.2	UJ

Table 3
Matrix Spike Recoveries Outside of Acceptable Limits
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
VM72	GP-56-7.2-9.5 MS	Total metals	GP-59-4.25-6.25	Antimony	--	--	--	--	< 0.2	UJ
VM72	GP-56-7.2-9.5 MS	Total metals	GP-59-8.25-10.25	Antimony	--	--	--	--	< 0.2	UJ
VM72	GP-56-7.2-9.5 MS	Total metals	GP-59-10.25-11.5	Antimony	--	--	--	--	< 0.3	UJ
VM72	GP-56-7.2-9.5 MS	Total metals	GP-26-5.1-7.1	Antimony	--	--	--	--	< 0.2	UJ
VM72	GP-56-7.2-9.5 MS	Total metals	GP-26-9.1-10.3	Antimony	--	--	--	--	< 0.3	UJ
VM72	GP-56-7.2-9.5 MS	Total metals	DUP101012-3	Antimony	--	--	--	--	< 0.2	UJ
VM72	GP-56-7.2-9.5 MS	Total metals	GP-53-5.3-7.3	Antimony	--	--	--	--	< 0.3	UJ
VM72	GP-56-7.2-9.5 MS	Total metals	GP-53-7.3-9.3	Antimony	--	--	--	--	< 0.2	UJ
VM72	GP-56-7.2-9.5 MS	Total metals	GP-33-5.9-8.3	Antimony	--	--	--	--	< 0.2	UJ
VM72	GP-56-7.2-9.5 MS	Total metals	GP-57-10.8-12	Antimony	--	--	--	--	< 0.3	UJ
VM72	GP-56-7.2-9.5 MS	Total metals	NA	Arsenic	-671	75-125	--	--	4X	--
VM72	GP-56-7.2-9.5 MS	Total metals	See below	Copper	1680	75-125	--	--	--	--
VM72	GP-56-7.2-9.5 MS	Total metals	GP-34-6.4-8.4	Copper	--	--	--	--	8.9	J+
VM72	GP-56-7.2-9.5 MS	Total metals	GP-34-8.4-9.4	Copper	--	--	--	--	18.2	J+
VM72	GP-56-7.2-9.5 MS	Total metals	DUP101012-1	Copper	--	--	--	--	7.5	J+
VM72	GP-56-7.2-9.5 MS	Total metals	GP-56-4.2-5.2	Copper	--	--	--	--	571	J+
VM72	GP-56-7.2-9.5 MS	Total metals	GP-56-5.2-7.2	Copper	--	--	--	--	68.4	J+
VM72	GP-56-7.2-9.5 MS	Total metals	GP-56-7.2-9.5	Copper	--	--	--	--	133	J+
VM72	GP-56-7.2-9.5 MS	Total metals	GP-57-4-6.25	Copper	--	--	--	--	22.1	J+
VM72	GP-56-7.2-9.5 MS	Total metals	GP-57-6.25-6.8	Copper	--	--	--	--	37.9	J+
VM72	GP-56-7.2-9.5 MS	Total metals	GP-57-8.8-10.8	Copper	--	--	--	--	9.0	J+
VM72	GP-56-7.2-9.5 MS	Total metals	GP-59-4.25-6.25	Copper	--	--	--	--	158	J+
VM72	GP-56-7.2-9.5 MS	Total metals	GP-59-8.25-10.25	Copper	--	--	--	--	31.9	J+
VM72	GP-56-7.2-9.5 MS	Total metals	GP-59-10.25-11.5	Copper	--	--	--	--	80.3	J+
VM72	GP-56-7.2-9.5 MS	Total metals	GP-26-5.1-7.1	Copper	--	--	--	--	10.4	J+
VM72	GP-56-7.2-9.5 MS	Total metals	GP-26-9.1-10.3	Copper	--	--	--	--	21.9	J+
VM72	GP-56-7.2-9.5 MS	Total metals	DUP101012-3	Copper	--	--	--	--	10.1	J+
VM72	GP-56-7.2-9.5 MS	Total metals	GP-53-5.3-7.3	Copper	--	--	--	--	8.7	J+
VM72	GP-56-7.2-9.5 MS	Total metals	GP-53-7.3-9.3	Copper	--	--	--	--	9.4	J+

Table 3
Matrix Spike Recoveries Outside of Acceptable Limits
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
VM72	GP-56-7.2-9.5 MS	Total metals	GP-33-5.9-8.3	Copper	--	--	--	--	10.4	J+
VM72	GP-56-7.2-9.5 MS	Total metals	GP-57-10.8-12	Copper	--	--	--	--	14.0	J+
VM72	GP-59-4.25-6.25 MS	Total metals	NA	Antimony	14.6	75-125	--	--	--	--
VM72	GP-59-4.25-6.25 MS	Total metals	NA	Copper	-31.9	75-125	--	--	--	--
VM91	GP-66-5.75-7.75 MS/MSD	SVOC	NA	Phenol	57.1/36.8	30-160	43.0	40	--	--
VM91	GP-66-5.75-7.75 MS/MSD	SVOC	NA	2-Chlorophenol	53.7/33.3	30-160	47.0	40	--	--
VM91	GP-66-5.75-7.75 MS/MSD	SVOC	NA	2-Methylphenol	44.4/6.4	30-160	150	40	--	--
VM91	GP-66-5.75-7.75 MS/MSD	SVOC	NA	4-Methylphenol	48.1/15.7	30-160	102	40	--	--
VM91	GP-66-5.75-7.75 MS/MSD	SVOC	NA	2,4-Dimethylphenol	27.5/NR	30-160	NR	40	--	--
VM91	GP-66-5.75-7.75 MS/MSD	SVOC	NA	4-Chloro-3-methylphenol	62.8/34.8	30-160	57.3	40	--	--
VM91	GP-66-5.75-7.75 MS/MSD	SVOC	NA	Hexachlorocyclopentadiene	14.3/17.5	30-160	19.8	40	--	--
VM91	GP-66-5.75-7.75 MS/MSD	SVOC	NA	2,4,6-Trichlorophenol	66.2/42.2	30-160	44.1	40	--	--
VM91	GP-66-5.75-7.75 MS/MSD	SVOC	NA	N-Nitrosodiphenylamine	70.5/38.7	30-160	58.2	40	--	--
VM91	GP-66-5.75-7.75 MS/MSD	SVOC	NA	3,3'-Dichlorobenzidine	44.2/18.0	30-160	84.0	40	--	--
VM91	DUP101112-2 MS	Total metals	See below	Antimony	14.0	75-125	--	--	--	--
VM91	DUP101112-2 MS	Total metals	DUP101112-1	Antimony	--	--	--	--	< 0.2	UJ
VM91	DUP101112-2 MS	Total metals	DUP101112-2	Antimony	--	--	--	--	< 0.3	UJ
VM91	DUP101112-2 MS	Total metals	DUP101112-3	Antimony	--	--	--	--	< 0.2	UJ
VM91	DUP101112-2 MS	Total metals	GP-27-4.3-6.3	Antimony	--	--	--	--	< 0.2	UJ
VM91	DUP101112-2 MS	Total metals	GP-27-6.3-8.3	Antimony	--	--	--	--	< 0.3	UJ
VM91	DUP101112-2 MS	Total metals	GP-28-4.1-6.1	Antimony	--	--	--	--	< 0.2	UJ
VM91	DUP101112-2 MS	Total metals	GP-28-6.1-8.3	Antimony	--	--	--	--	< 0.2	UJ
VM91	DUP101112-2 MS	Total metals	GP-50-5.9-7	Antimony	--	--	--	--	< 0.2	UJ
VM91	DUP101112-2 MS	Total metals	GP-50-7-7.75	Antimony	--	--	--	--	< 0.3	UJ
VM91	DUP101112-2 MS	Total metals	GP-31-5.9-7.9	Antimony	--	--	--	--	< 0.2	UJ
VM91	DUP101112-2 MS	Total metals	GP-31-7.9-9.9	Antimony	--	--	--	--	< 0.2	UJ
VM91	DUP101112-2 MS	Total metals	GP-32-6.1-8.1	Antimony	--	--	--	--	< 0.2	UJ
VM91	DUP101112-2 MS	Total metals	GP-32-8.1-9.1	Antimony	--	--	--	--	< 0.3	UJ

Table 3
Matrix Spike Recoveries Outside of Acceptable Limits
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
VM91	DUP101112-2 MS	Total metals	GP-66-5.75-7.75	Antimony	--	--	--	--	< 0.2	UJ
VM91	DUP101112-2 MS	Total metals	GP-66-7.75-8.4	Antimony	--	--	--	--	< 0.3	UJ
VN13	GP-61-4.5-7.5 MS	Total metals	NA	Antimony	15.9	75-125	--	--	--	--

Data packages reviewed: Axyx DPWG41596, DPWG41685, DPWG41834; ARI VH79, VH87, VI22, VI27, VI40, VI70, VI85, VJ70, VM44, VM59, VM72, VM91, VN13

Key:

MS/MSD = Matrix spike/matrix spike duplicate

HPCDD = Heptachlorodibenzo-p-dioxin

OCDD = Octochlorodibenzo-p-dioxin

TCDF = Tetrachlorodibenzofuran

PECDF = Pentachlorodibenzofuran

HXCDF = Hexachlorodibenzofuran

HPCDF = Heptachlorodibenzofuran

OCDF = Octochlorodibenzofuran

TCDD = Tetrachlorodibenzo-p-dioxin

PECDD = Pentachlorodibenzo-p-dioxin

HXCDD = Hexachlorodibenzo-p-dioxin

SDO = Spike sample diluted by a factor of 20; recovery does not provide useful information

PCDD/PCDF = Polychlorinated dibenzo-p-dioxins/Polychlorinated dibenzofurans; Method 1613B

4X = Concentration of unspiked sample was greater than 4 times the amount spiked; no qualification required

RPD = Relative percent difference

TPH-d = Total petroleum hydrocarbons - diesel; Method NWTPH-Dx

Cr VI = Hexavalent chromium; Method 7196A

Phenols = Chlorinated phenols; Method 8270D

SVOC = Semivolatile organic compounds; Method 8270D

NR = Value not reported

NA = Not applicable; qualification of sample data not required

J+ = Detected sample result qualified as estimated and biased high

J- = Detected sample result qualified as estimated and biased low

UJ = Nondetected sample result qualified as estimated

Table 4
Labeled Compound Recovery Results Outside of Acceptable Limits
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Labeled Compound	Associated Compound	Recovery (%)	Limit (%)	Note	ERM Qualifier
DPWG41596	GP-55_2.5-4	13C-OCDD	OCDD	149	25-130	SDO	--

Data packages reviewed: Axys DPWG41596, DPWG41685, DPWG41834; ARI VH79, VH87, VI22, VI27, VI40, VI70, VI85, VJ70, VM44, VM59, VM72, VM91, VN13

Key:

13C = Carbon-13 labeled isotope

OCDD = Octachlorodibenzo-p-dioxin

SDO = Spike sample diluted by a factor of 20; recovery does not provide useful information

Table 5
Estimated Maximum Possible Concentration
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG41596	DUP090412	2,3,7,8-TCDD	0.240	0.050	pg/g	0.240 U
DPWG41596	Lab Blank	1,2,3,4,6,7,8-HPCDD	0.062	0.050	pg/g	0.062 U
DPWG41596	Lab Blank	OCDD	0.796	0.050	pg/g	0.796 U
DPWG41596	Lab Blank	OCDF	0.072	0.050	pg/g	0.072 U
DPWG41834	EB100912-1	OCDD	1.48	0.554	pg/L	1.48 U
DPWG41834	EB100812-2	OCDD	1.05	0.583	pg/L	1.05 U
DPWG41834	Lab Blank	1,2,3,4,6,7,8-HPCDD	0.754	0.500	pg/L	0.754 U
DPWG41834	Lab Blank	OCDD	3.20	0.500	pg/L	3.20 U
DPWG41834	Lab Blank	1,2,3,4,6,7,8-HPCDF	0.746	0.500	pg/L	0.746 U
DPWG41834	Lab Blank	OCDF	1.29	0.500	pg/L	1.29 U
DPWG42036	GP-55-6.4-8.4	2,3,7,8-TCDD	0.222	0.095	pg/g	0.222 U
DPWG42036	GP-55-6.4-8.4	1,2,3,4,6,7,8-HPCDF	0.179	0.095	pg/g	0.179 U
DPWG42036	GP-55-8.4-10.4	2,3,7,8-TCDD	0.274	0.099	pg/g	0.274 U
DPWG42036	GP-55-8.4-10.4	1,2,3,7,8,9-HXCDD	0.197	0.099	pg/g	0.197 U
DPWG42036	DUP100812-1	2,3,7,8-TCDD	0.282	0.100	pg/g	0.282 U
DPWG42036	DUP100812-1	1,2,3,4,6,7,8-HPCDD	3.59	0.107	pg/g	3.59 U
DPWG42036	DUP100812-1	2,3,7,8-TCDF	0.464	0.100	pg/g	0.464 U
DPWG42036	DUP100812-1	1,2,3,7,8-PECDF	0.130	0.100	pg/g	0.130 U
DPWG42036	DUP100812-1	2,3,7,8-TCDF	0.210	0.100	pg/g	0.210 U
DPWG42036	GP-45-6.5-8.5	2,3,7,8-TCDD	0.272	0.105	pg/g	0.272 U
DPWG42036	GP-45-6.5-8.5	1,2,3,6,7,8-HXCDD	0.195	0.105	pg/g	0.195 U
DPWG42036	GP-45-6.5-8.5	1,2,3,7,8,9-HXCDD	0.129	0.105	pg/g	0.129 U
DPWG42036	GP-45-6.5-8.5	2,3,4,7,8-PECDF	0.265	0.105	pg/g	0.265 U
DPWG42036	GP-45-6.5-8.5	2,3,7,8-TCDF	0.235	0.105	pg/g	0.235 U
DPWG42036	GP-45-8.5-9.5	2,3,7,8-TCDD	0.300	0.108	pg/g	0.300 U
DPWG42036	GP-45-8.5-9.5	1,2,3,4,6,7,8-HPCDF	0.238	0.108	pg/g	0.238 U
DPWG42036	GP-45-8.5-9.5	OCDF	0.745	0.108	pg/g	0.745 U
DPWG42036	GP-44-6.8-8.8	2,3,7,8-TCDD	0.245	0.102	pg/g	0.245 U
DPWG42036	GP-44-6.8-8.8	1,2,3,4,7,8-HXCDD	0.182	0.102	pg/g	0.182 U
DPWG42036	GP-44-6.8-8.8	1,2,3,7,8-PECDF	0.106	0.102	pg/g	0.106 U
DPWG42036	GP-44-6.8-8.8	1,2,3,7,8,9-HXCDF	0.105	0.102	pg/g	0.105 U
DPWG42036	GP-44-6.8-8.8	2,3,4,6,7,8-HXCDF	0.181	0.102	pg/g	0.181 U
DPWG42036	GP-44-6.8-8.8	2,3,7,8-TCDF	0.137	0.102	pg/g	0.137 U
DPWG42036	GP-44-8.8-11.1	2,3,7,8-TCDD	0.344	0.104	pg/g	0.344 U
DPWG42036	GP-44-8.8-11.1	2,3,4,7,8-PECDF	0.608	0.104	pg/g	0.104 U
DPWG42036	GP-46-7.2-8.7	2,3,7,8-TCDD	0.279	0.097	pg/g	0.297 U
DPWG42036	GP-46-7.2-8.7	1,2,3,7,8-PECDF	0.119	0.097	pg/g	0.119 U
DPWG42036	GP-46-7.2-8.7	2,3,4,7,8-PECDF	0.291	0.097	pg/g	0.291 U

Table 5
Estimated Maximum Possible Concentration
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG42036	GP-46-7.2-8.7	1,2,3,6,7,8-HXCDF	0.144	0.097	pg/g	0.144 U
DPWG42036	GP-46-7.2-8.7	OCDF	2.58	0.097	pg/g	2.58 U
DPWG42036	GP-30-7-9	2,3,7,8-TCDD	0.285	0.102	pg/g	0.285 U
DPWG42036	GP-30-7-9	1,2,3,7,8-PECDD	0.109	0.102	pg/g	0.109 U
DPWG42036	GP-30-7-9	1,2,3,7,8,9-HXCDD	0.197	0.102	pg/g	0.197 U
DPWG42036	GP-30-7-9	1,2,3,4,6,7,8-HPCDF	0.815	0.102	pg/g	0.815 U
DPWG42036	GP-34-6.4-8.4	2,3,7,8-TCDD	0.288	0.107	pg/g	0.288 U
DPWG42036	GP-34-6.4-8.4	1,2,3,6,7,8-HXCDD	0.838	0.107	pg/g	0.838 U
DPWG42036	GP-34-6.4-8.4	1,2,3,7,8,9-HXCDD	0.565	0.107	pg/g	0.565 U
DPWG42036	GP-34-6.4-8.4	1,2,3,7,8-PECDF	0.130	0.107	pg/g	0.130 U
DPWG42036	GP-34-8.4-9.4	2,3,7,8-TCDD	0.257	0.100	pg/g	0.257 U
DPWG42036	GP-34-8.4-9.4	1,2,3,6,7,8-HXCDD	0.120	0.100	pg/g	0.120 U
DPWG42036	GP-34-8.4-9.4	1,2,3,7,8,9-HXCDD	0.192	0.100	pg/g	0.192 U
DPWG42036	GP-34-8.4-9.4	2,3,4,7,8-PECDF	0.242	0.100	pg/g	0.242 U
DPWG42036	GP-34-8.4-9.4	1,2,3,4,7,8-HXCDF	0.112	0.100	pg/g	0.112 U
DPWG42036	GP-34-8.4-9.4	1,2,3,4,6,7,8-HPCDF	0.160	0.100	pg/g	0.160 U
DPWG42036	DUP101012-1	2,3,7,8-TCDD	0.256	0.106	pg/g	0.256 U
DPWG42036	DUP101012-1	1,2,3,4,7,8-HXCDD	0.212	0.106	pg/g	0.212 U
DPWG42036	DUP101012-1	1,2,3,7,8,9-HXCDD	0.503	0.106	pg/g	0.503 U
DPWG42036	DUP101012-1	2,3,7,8-TCDF	0.119	0.106	pg/g	0.119 U
DPWG42036	DUP101012-1	1,2,3,6,7,8-HXCDF	0.974	0.106	pg/g	0.974 U
DPWG42036	GP-29-8.9-11.2	2,3,7,8-TCDD	0.230	0.104	pg/g	0.230 U
DPWG42036	GP-29-8.9-11.2	2,3,7,8-TCDF	0.110	0.104	pg/g	0.110 U
DPWG42036	GP-29-8.9-11.2	2,3,4,7,8-PECDF	0.287	0.104	pg/g	0.287 U
DPWG42036	GP-29-8.9-11.2	1,2,3,4,7,8-HXCDF	0.671	0.104	pg/g	0.671 U
DPWG42036	GP-29-8.9-11.2	1,2,3,6,7,8-HXCDF	0.159	0.104	pg/g	0.159 U
DPWG42036	GP-29-8.9-11.2	1,2,3,4,7,8,9-HPCDF	0.327	0.104	pg/g	0.327 U
DPWG42036	GP-29-2.9-4.9	2,3,7,8-TCDD	0.219	0.096	pg/g	0.219 U
DPWG42036	GP-29-2.9-4.9	1,2,3,7,8,9-HXCDF	0.106	0.096	pg/g	0.106 U
DPWG42036	GP-29-2.9-4.9	2,3,4,6,7,8-HXCDF	0.422	0.096	pg/g	0.422 U
DPWG42036	GP-29-2.9-4.9	2,3,7,8-TCDF	0.130	0.115	pg/g	0.130 U
DPWG42036	GP-29-4.9-6.9	1,2,3,4,7,8-HXCDD	0.139	0.118	pg/g	0.139 U
DPWG42036	GP-29-4.9-6.9	1,2,3,6,7,8-HXCDD	0.335	0.118	pg/g	0.335 U
DPWG42036	GP-29-4.9-6.9	1,2,3,7,8,9-HXCDD	0.229	0.118	pg/g	0.229 U
DPWG42036	GP-29-4.9-6.9	2,3,7,8-TCDF	0.116	0.107	pg/g	0.116 U
DPWG42036	GP-29-4.9-6.9	2,3,4,7,8-PECDF	0.241	0.141	pg/g	0.241 U
DPWG42036	GP-29-4.9-6.9	1,2,3,6,7,8-HXCDF	0.155	0.110	pg/g	0.155 U
DPWG42036	GP-29-4.9-6.9	2,3,4,6,7,8-HXCDF	0.288	0.110	pg/g	0.288 U
DPWG42036	GP-29-6.9-8.9	2,3,7,8-TCDD	0.282	0.108	pg/g	0.282 U
DPWG42036	GP-29-6.9-8.9	1,2,3,4,7,8-HXCDD	0.125	0.108	pg/g	0.125 U

Table 5
Estimated Maximum Possible Concentration
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG42036	GP-29-6.9-8.9	1,2,3,7,8,9-HXCDD	0.250	0.108	pg/g	0.250 U
DPWG42036	GP-29-6.9-8.9	1,2,3,6,7,8-HXCDF	0.210	0.108	pg/g	0.210 U
DPWG42036	GP-29-6.9-8.9	1,2,3,7,8,9-HXCDF	0.125	0.108	pg/g	0.125 U
DPWG42036	Lab Blank	2,3,7,8-TCDD	0.299	0.113	pg/g	0.299 U
DPWG42036	Lab Blank	2,3,7,8-TCDD	0.299	0.113	pg/g	0.299 U
DPWG42036	Lab Blank	1,2,3,4,6,7,8-HPCDD	0.395	0.113	pg/g	0.395 U
DPWG42036	Lab Blank	1,2,3,4,6,7,8-HPCDD	1.46	0.095	pg/g	1.46 U
DPWG42036	Lab Blank	1,2,3,4,6,7,8-HPCDD	1.31	0.108	pg/g	1.31 U
DPWG42036	Lab Blank	1,2,3,4,6,7,8-HPCDD	1.51	0.100	pg/g	1.51 U
DPWG42036	Lab Blank	OCDD	10.0	0.113	pg/g	10.0 U
DPWG42036	Lab Blank	OCDD	46.4	0.095	pg/g	46.4 U
DPWG42036	Lab Blank	OCDD	49.2	0.108	pg/g	49.2 U
DPWG42036	Lab Blank	OCDD	39.2	0.100	pg/g	39.2 U
DPWG42036	Lab Blank	2,3,4,7,8-PECDF	0.193	0.113	pg/g	0.193 U
DPWG42036	Lab Blank	2,3,4,7,8-PECDF	0.173	0.095	pg/g	0.173 U
DPWG42036	Lab Blank	2,3,4,7,8-PECDF	0.344	0.099	pg/g	0.344 U
DPWG42036	Lab Blank	2,3,4,7,8-PECDF	0.265	0.105	pg/g	0.265 U
DPWG42036	Lab Blank	2,3,4,7,8-PECDF	0.309	0.100	pg/g	0.309 U
DPWG42036	Lab Blank	2,3,4,7,8-PECDF	0.229	0.108	pg/g	0.229 U
DPWG42036	Lab Blank	2,3,4,7,8-PECDF	0.387	0.102	pg/g	0.387 U
DPWG42036	Lab Blank	2,3,4,7,8-PECDF	0.608	0.104	pg/g	0.608 U
DPWG42036	Lab Blank	2,3,4,7,8-PECDF	0.291	0.097	pg/g	0.291 U
DPWG42036	Lab Blank	2,3,4,7,8-PECDF	0.249	0.102	pg/g	0.249 U
DPWG42036	Lab Blank	2,3,4,7,8-PECDF	0.550	0.107	pg/g	0.550 U
DPWG42036	Lab Blank	2,3,4,7,8-PECDF	0.139	0.106	pg/g	0.139 U
DPWG42036	Lab Blank	2,3,4,7,8-PECDF	0.912	0.096	pg/g	0.912 U
DPWG42036	Lab Blank	2,3,4,7,8-PECDF	0.241	0.141	pg/g	0.241 U
DPWG42036	Lab Blank	2,3,4,7,8-PECDF	0.320	0.108	pg/g	0.320 U
DPWG42036	Lab Blank	OCDF	0.193	0.113	pg/g	0.193 U
DPWG42036	Lab Blank	OCDF	0.912	0.095	pg/g	0.912 U
DPWG42036	Lab Blank	OCDF	0.745	0.108	pg/g	0.745 U
DPWG42036	Lab Blank	OCDF	0.443	0.100	pg/g	0.443 U
DPWG42036	Lab Blank	TOTAL HEPTA-DIOXINS	0.395	0.113	pg/g	0.395 U
DPWG42036	Lab Blank	TOTAL PENTA-FURANS	0.193	0.113	pg/g	0.193 U
DPWG42036	Lab Blank	TOTAL PENTA-FURANS	0.173	0.095	pg/g	0.173 U
DPWG42036	Lab Blank	TOTAL PENTA-FURANS	0.752	0.100	pg/g	0.752 U
DPWG42036	Lab Blank	TOTAL PENTA-FURANS	0.700	0.105	pg/g	0.700 U
DPWG42036	Lab Blank	TOTAL PENTA-FURANS	0.498	0.108	pg/g	0.498 U
DPWG42036	Lab Blank	TOTAL PENTA-FURANS	0.909	0.097	pg/g	0.909 U
DPWG42036	Lab Blank	TOTAL PENTA-FURANS	0.546	0.102	pg/g	0.546 U

Table 5
Estimated Maximum Possible Concentration
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG42036	Lab Blank	TOTAL PENTA-FURANS	0.147	0.100	pg/g	0.147 U

Data packages reviewed: Axys DPWG41596, DPWG41685, DPWG41834; ARI VH79, VH87, VI22, VI27, VI40, VI70, VI85, VJ70, VM44, VM59, VM72, VM91, VN13

Key:

TCDD = Tetrachlorodibenzo-p-dioxin
 HPCDF = Heptachlorodibenzofuran
 HXCDD = Hexachlorodibenzo-p-dioxin
 HPCDD = Heptachlorodibenzo-p-dioxin
 TCDF = Tetrachlorodibenzofuran

PECDF = Pentachlorodibenzofuran
 OCDF = Octochlorodibenzofuran
 HXCDF = Hexachlorodibenzofuran
 PECDD = Pentachlorodibenzo-p-dioxin
 pg/g = Picograms per gram
 U = Nondetected

Table 6
Surrogate Recovery Results out of Acceptable Limits
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Method	Surrogate	Recovery (%)	Limit (%)	ERM Qualifier
VI70	GP-50-0-2	Phenols	Decachlorobiphenyl	150	24-127	--

Data packages reviewed: Axys DPWG41596, DPWG41685, DPWG41834; ARI VH79, VH87, VI22, VI27, VI40, VI70, VI85, VJ70, VM44, VM59, VM72, VM91, VN13

Key:

Phenols = Chlorinated phenols; Method 8270D

Table 7
Field Duplicate Results and Calculated Relative Percent Differences
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	2,3,7,8-TCDD	0.259	0.240	0.050	pg/g	7.6
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	1,2,3,7,8-PECDD	1.89	1.76	0.092/0.055	pg/g	7.1
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	1,2,3,4,7,8-HXCDD	4.31	3.89	0.094/0.079	pg/g	10
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	1,2,3,6,7,8-HXCDD	12.7	13.1	0.094/0.079	pg/g	3.1
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	1,2,3,7,8,9-HXCDD	11.4	11.4	0.094/0.079	pg/g	0
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	1,2,3,4,6,7,8-HPCDD	380	392	0.260/0.397	pg/g	3.1
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	2,3,7,8-TCDF	1.08	1.08	0.050	pg/g	0
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	1,2,3,7,8-PECDF	0.925	0.941	0.050	pg/g	1.7
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	2,3,4,7,8-PECDF	2.62	2.96	0.050	pg/g	12
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	1,2,3,4,7,8-HXCDF	22.6	25.2	0.086/0.135	pg/g	11
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	1,2,3,6,7,8-HXCDF	4.55	4.91	0.086/0.135	pg/g	7.6
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	1,2,3,7,8,9-HXCDF	0.265	0.338	0.086/0.135	pg/g	24
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	2,3,4,6,7,8-HXCDF	2.13	2.31	0.086/0.135	pg/g	8.1
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	1,2,3,4,6,7,8-HPCDF	77.0	91.6	0.175/0.170	pg/g	17
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	1,2,3,4,7,8,9-HPCDF	12.7	14.8	0.175/0.170	pg/g	15
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	OCDF	195	251	0.060/0.067	pg/g	25
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	TOTAL TETRA-DIOXINS	3.93	3.77	0.050	pg/g	4.2
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	TOTAL PENTA-DIOXINS	15.1	14.2	0.092/0.055	pg/g	6.1
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	TOTAL HEXA-DIOXINS	88.1	91.7	0.094/0.079	pg/g	4.0
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	TOTAL HEPTA-DIOXINS	744	777	0.260/0.397	pg/g	4.3
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	TOTAL TETRA-FURANS	8.64	9.61	0.050	pg/g	11
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	TOTAL PENTA-FURANS	31.1	40.4	0.050	pg/g	26
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	TOTAL HEXA-FURANS	145	168	0.086/0.135	pg/g	15
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	TOTAL HEPTA-FURANS	269	332	0.175/0.170	pg/g	21
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	OCDD	11700	15600	0.255/0.363	pg/g	29
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	2,3,7,8-TCDF	0.408	0.495	0.050/0.092	pg/g	19

Table 7
Field Duplicate Results and Calculated Relative Percent Differences
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
DPWG42036	GP-55-8.4-10.4/DUP100812-1	PCDD/PCDF	2,3,7,8-TCDD	0.274	0.282	0.099/0.100	pg/g	2.9
DPWG42036	GP-55-8.4-10.4/DUP100812-1	PCDD/PCDF	1,2,3,6,7,8-HXCDD	0.158	0.174	0.099/0.100	pg/g	10
DPWG42036	GP-55-8.4-10.4/DUP100812-1	PCDD/PCDF	1,2,3,7,8,9-HXCDD	0.197	0.197	0.099/0.100	pg/g	0
DPWG42036	GP-55-8.4-10.4/DUP100812-1	PCDD/PCDF	1,2,3,4,6,7,8-HPCDD	3.50	3.59	0.099/0.107	pg/g	2.5
DPWG42036	GP-55-8.4-10.4/DUP100812-1	PCDD/PCDF	OCDD	273	304	0.255/0.100	pg/g	11
DPWG42036	GP-55-8.4-10.4/DUP100812-1	PCDD/PCDF	2,3,7,8-TCDF	0.632	0.464	0.099/0.100	pg/g	31
DPWG42036	GP-55-8.4-10.4/DUP100812-1	PCDD/PCDF	1,2,3,7,8-PECDF	0.136	0.130	0.099/0.100	pg/g	4.5
DPWG42036	GP-55-8.4-10.4/DUP100812-1	PCDD/PCDF	2,3,4,7,8-PECDF	0.344	0.309	0.099/0.100	pg/g	11
DPWG42036	GP-55-8.4-10.4/DUP100812-1	PCDD/PCDF	1,2,3,4,7,8-HXCDF	0.187	0.285	0.099/0.100	pg/g	42
DPWG42036	GP-55-8.4-10.4/DUP100812-1	PCDD/PCDF	1,2,3,4,6,7,8-HPCDF	0.357	0.530	0.099/0.100	pg/g	39
DPWG42036	GP-55-8.4-10.4/DUP100812-1	PCDD/PCDF	OCDF	2.87	3.68	0.099/0.100	pg/g	25
DPWG42036	GP-55-8.4-10.4/DUP100812-1	PCDD/PCDF	TOTAL TETRA-DIOXINS	1.19	2.18	0.099/0.100	pg/g	59
DPWG42036	GP-55-8.4-10.4/DUP100812-1	PCDD/PCDF	TOTAL HEXA-DIOXINS	0.581	1.22	0.099/0.100	pg/g	71
DPWG42036	GP-55-8.4-10.4/DUP100812-1	PCDD/PCDF	TOTAL HEPTA-DIOXINS	7.64	3.81	0.099/0.107	pg/g	67
DPWG42036	GP-55-8.4-10.4/DUP100812-1	PCDD/PCDF	TOTAL TETRA-FURANS	5.65	2.69	0.099/0.100	pg/g	71
DPWG42036	GP-55-8.4-10.4/DUP100812-1	PCDD/PCDF	TOTAL PENTA-FURANS	1.18	0.752	0.099/0.100	pg/g	44
DPWG42036	GP-55-8.4-10.4/DUP100812-1	PCDD/PCDF	TOTAL HEXA-FURANS	0.575	1.01	0.099/0.100	pg/g	55
DPWG42036	GP-55-8.4-10.4/DUP100812-1	PCDD/PCDF	TOTAL HEPTA-FURANS	1.10	0.530	0.099/0.100	pg/g	70
DPWG42036	GP-55-8.4-10.4/DUP100812-1	PCDD/PCDF	2,3,7,8-TCDF	0.260	0.210	0.104/0.100	pg/g	21
DPWG42036	GP-34-6.4-8.4/DUP101012-1	PCDD/PCDF	2,3,7,8-TCDD	0.288	0.256	0.107/0.106	pg/g	12
DPWG42036	GP-34-6.4-8.4/DUP101012-1	PCDD/PCDF	1,2,3,4,7,8-HXCDD	0.214	0.212	0.107/0.106	pg/g	0.9
DPWG42036	GP-34-6.4-8.4/DUP101012-1	PCDD/PCDF	1,2,3,6,7,8-HXCDD	0.838	1.49	0.107/0.106	pg/g	56
DPWG42036	GP-34-6.4-8.4/DUP101012-1	PCDD/PCDF	1,2,3,7,8,9-HXCDD	0.565	0.503	0.107/0.106	pg/g	12
DPWG42036	GP-34-6.4-8.4/DUP101012-1	PCDD/PCDF	1,2,3,4,6,7,8-HPCDD	22.0	41.7	0.107/0.186	pg/g	62
DPWG42036	GP-34-6.4-8.4/DUP101012-1	PCDD/PCDF	OCDD	323	1230	0.107/0.106	pg/g	117
DPWG42036	GP-34-6.4-8.4/DUP101012-1	PCDD/PCDF	1,2,3,7,8-PECDF	0.130	0.139	0.107/0.106	pg/g	6.7
DPWG42036	GP-34-6.4-8.4/DUP101012-1	PCDD/PCDF	2,3,4,7,8-PECDF	0.550	0.833	0.107/0.106	pg/g	41

Table 7
Field Duplicate Results and Calculated Relative Percent Differences
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
DPWG42036	GP-34-6.4-8.4/DUP101012-1	PCDD/PCDF	1,2,3,4,7,8-HXCDF	2.89	6.56	0.107/0.106	pg/g	78
DPWG42036	GP-34-6.4-8.4/DUP101012-1	PCDD/PCDF	1,2,3,6,7,8-HXCDF	0.568	0.974	0.107/0.106	pg/g	53
DPWG42036	GP-34-6.4-8.4/DUP101012-1	PCDD/PCDF	2,3,4,6,7,8-HXCDF	0.224	0.384	0.107/0.106	pg/g	53
DPWG42036	GP-34-6.4-8.4/DUP101012-1	PCDD/PCDF	1,2,3,4,6,7,8-HPCDF	8.71	18.2	0.107/0.110	pg/g	71
DPWG42036	GP-34-6.4-8.4/DUP101012-1	PCDD/PCDF	1,2,3,4,7,8,9-HPCDF	1.33	3.40	0.107/0.110	pg/g	88
DPWG42036	GP-34-6.4-8.4/DUP101012-1	PCDD/PCDF	OCDF	23.0	42.8	0.107/0.106	pg/g	60
DPWG42036	GP-34-6.4-8.4/DUP101012-1	PCDD/PCDF	TOTAL TETRA-DIOXINS	0.133	0.588	0.107/0.106	pg/g	126
DPWG42036	GP-34-6.4-8.4/DUP101012-1	PCDD/PCDF	TOTAL PENTA-DIOXINS	0.129	0.195	0.107/0.106	pg/g	41
DPWG42036	GP-34-6.4-8.4/DUP101012-1	PCDD/PCDF	TOTAL HEXA-DIOXINS	2.09	2.44	0.107/0.106	pg/g	15
DPWG42036	GP-34-6.4-8.4/DUP101012-1	PCDD/PCDF	TOTAL HEPTA-DIOXINS	38.9	73.3	0.107/0.186	pg/g	61
DPWG42036	GP-34-6.4-8.4/DUP101012-1	PCDD/PCDF	TOTAL PENTA-FURANS	3.88	6.48	0.107/0.106	pg/g	50
DPWG42036	GP-34-6.4-8.4/DUP101012-1	PCDD/PCDF	TOTAL HEXA-FURANS	17.3	32.5	0.107/0.106	pg/g	61
DPWG42036	GP-34-6.4-8.4/DUP101012-1	PCDD/PCDF	TOTAL HEPTA-FURANS	38.4	74.7	0.107/0.110	pg/g	64
VH79	GP-56-3.3-3.75/DUP-083012-1	Phenols	Phenol	210	99	96/19	µg/kg	72
VH79	GP-56-3.3-3.75/DUP-083012-1	Phenols	Pentachlorophenol	7700	320	960/190	µg/kg	184
VH79	GP-56-3.3-3.75/DUP-083012-1	Total metals	Arsenic	53.8	58.7	0.2	mg/kg	8.7
VH79	GP-56-3.3-3.75/DUP-083012-1	Total metals	Barium	27.7	26.3	0.4	mg/kg	5.2
VH79	GP-56-3.3-3.75/DUP-083012-1	Total metals	Cadmium	0.2	0.2	0.1	mg/kg	0
VH79	GP-56-3.3-3.75/DUP-083012-1	Total metals	Chromium	29.6	31.5	0.6	mg/kg	6.2
VH79	GP-56-3.3-3.75/DUP-083012-1	Total metals	Copper	566	573	0.2/0.3	mg/kg	1.2
VH79	GP-56-3.3-3.75/DUP-083012-1	Total metals	Lead	22.1	21.5	0.1	mg/kg	2.8
VH79	GP-56-3.3-3.75/DUP-083012-1	Total metals	Mercury	0.12	0.12	0.03	mg/kg	0
VH79	GP-56-3.3-3.75/DUP-083012-1	Total metals	Nickel	7	8	1	mg/kg	13
VH79	GP-56-3.3-3.75/DUP-083012-1	Total metals	Silver	4.1	4.4	0.4	mg/kg	7.1
VH79	GP-56-3.3-3.75/DUP-083012-1	Total metals	Zinc	72	76	1	mg/kg	5.4

Table 7
Field Duplicate Results and Calculated Relative Percent Differences
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
VH79	GP-56-3.3-3.75/DUP-083012-1	Total solids	Total solids	78.10	77.20	0.01	%	1.2
VI22	MW-23D-2.75-5.25/DUP-090412-1	Total metals	Arsenic	35.8	70.2	0.2	mg/kg	65
VI22	MW-23D-2.75-5.25/DUP-090412-1	Total metals	Barium	33.7	39.0	0.3	mg/kg	15
VI22	MW-23D-2.75-5.25/DUP-090412-1	Total metals	Chromium	22.2	25.5	0.5	mg/kg	14
VI22	MW-23D-2.75-5.25/DUP-090412-1	Total metals	Copper	103	244	0.2	mg/kg	81
VI22	MW-23D-2.75-5.25/DUP-090412-1	Total metals	Lead	34.3	30.1	0.1	mg/kg	13
VI22	MW-23D-2.75-5.25/DUP-090412-1	Total metals	Mercury	0.08	0.10	0.02	mg/kg	22
VI22	MW-23D-2.75-5.25/DUP-090412-1	Total metals	Nickel	9	9	1	mg/kg	0
VI22	MW-23D-2.75-5.25/DUP-090412-1	Total metals	Silver	0.7	1.0	0.3	mg/kg	35
VI22	MW-23D-2.75-5.25/DUP-090412-1	Total metals	Zinc	44	50	1	mg/kg	13
VI40	GP-61-2.5-4.5/DUP-090612-1	Total metals	Arsenic	3.0	2.8	0.2	mg/kg	6.9
VI40	GP-61-2.5-4.5/DUP-090612-1	Total metals	Chromium	11.9	12.6	0.5	mg/kg	5.7
VI40	GP-61-2.5-4.5/DUP-090612-1	Total metals	Copper	15.1	17.0	0.2	mg/kg	12
VI40	GP-61-2.5-4.5/DUP-090612-1	Total metals	Zinc	28	28	1	mg/kg	0
VI40	GP-61-2.5-4.5/DUP-090612-1	Total solids	Total solids	93.00	93.10	0.01	%	0.1
VI40	GP-31-3-5/DUP-090612-2	Total metals	Arsenic	1.6	1.1	0.2	mg/kg	37
VI40	GP-31-3-5/DUP-090612-2	Total metals	Chromium	12.8	11.2	0.5/0.6	mg/kg	13
VI40	GP-31-3-5/DUP-090612-2	Total metals	Copper	10.7	10.5	0.2	mg/kg	1.9
VI40	GP-31-3-5/DUP-090612-2	Total metals	Zinc	23	24	1	mg/kg	4.3
VI40	GP-31-3-5/DUP-090612-2	Total solids	Total solids	91.90	86.20	0.01	%	6.4
VI40	GP-31-3-5/DUP-090612-2	N-Ammonia	N-Ammonia	0.32	0.51	0.10/0.11	mg/kg	46
VI70	GP-50-3-5.9/DUP-090712-1	Phenols	Phenol	25	24	18	µg/kg	4.1
VI70	GP-50-3-5.9/DUP-090712-1	Total metals	Arsenic	5.3	8.3	0.2	mg/kg	44
VI70	GP-50-3-5.9/DUP-090712-1	Total metals	Chromium	9.9	8.9	0.6/0.5	mg/kg	11

Table 7
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Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration Sample	Duplicate	Report Limit	Units	RPD
VI70	GP-50-3-5.9/DUP-090712-1	Total metals	Copper	14.3	14.5	0.2	mg/kg	1.4
VI70	GP-50-3-5.9/DUP-090712-1	Total metals	Zinc	26	25	1	mg/kg	3.9
VJ70	GP-31-3-5/DUP-090612-2	Total solids	Total solids	91.6	91.7	0.01	%	0.1
VM44	GP-55-8.4-10.4/DUP100812-1	SVOC	Phenol	33	30	20/18	µg/kg	9.5
VM44	GP-55-8.4-10.4/DUP100812-1	SVOC	2,4-Dichlorophenol	26	27	200/180	µg/kg	3.8
VM44	GP-55-8.4-10.4/DUP100812-1	SVOC	Naphthalene	12	9.2	20/18	µg/kg	26
VM44	GP-55-8.4-10.4/DUP100812-1	Total metals	Arsenic	4.4	3.6	0.3/0.2	mg/kg	20
VM44	GP-55-8.4-10.4/DUP100812-1	Total metals	Chromium	14.5	12.9	0.6	mg/kg	12
VM44	GP-55-8.4-10.4/DUP100812-1	Total metals	Copper	12.0	9.2	0.3/0.2	mg/kg	26
VM44	GP-55-8.4-10.4/DUP100812-1	Total metals	Lead	3.7	2.7	0.1	mg/kg	31
VM44	GP-55-8.4-10.4/DUP100812-1	Total metals	Nickel	10	9	1	mg/kg	11
VM44	GP-55-8.4-10.4/DUP100812-1	Total metals	Zinc	29	27	1	mg/kg	7.1
VM44	GP-55-8.4-10.4/DUP100812-1	pH	pH	6.00	6.08	0.01	pH	1.3
VM44	GP-55-8.4-10.4/DUP100812-1	Total solids	Total solids	78.2	76.5	0.01	%	2.2
VM72	GP-34-6.4-8.4/DUP101012-1	SVOC	Phenol	13	16	19	µg/kg	21
VM72	GP-34-6.4-8.4/DUP101012-1	SVOC	Pyrene	21	40	19	µg/kg	62
VM72	GP-34-6.4-8.4/DUP101012-1	SVOC	Chrysene	10	19	19	µg/kg	62
VM72	GP-34-6.4-8.4/DUP101012-1	SVOC	Total Benzofluoranthenes	12	23	38/37	µg/kg	63
VM72	GP-34-6.4-8.4/DUP101012-1	SVOC-SIM	Naphthalene	3.8	5.2	4.8/4.7	µg/kg	31
VM72	GP-34-6.4-8.4/DUP101012-1	SVOC-SIM	2-Methylnaphthalene	2.6	2.6	4.8/4.7	µg/kg	0
VM72	GP-34-6.4-8.4/DUP101012-1	SVOC-SIM	Acenaphthylene	2.6	7.2	4.8/4.7	µg/kg	94
VM72	GP-34-6.4-8.4/DUP101012-1	SVOC-SIM	Fluorene	2.9	4.7	4.8/4.7	µg/kg	47
VM72	GP-34-6.4-8.4/DUP101012-1	SVOC-SIM	Phenanthrene	5.7	7.1	4.8/4.7	µg/kg	22
VM72	GP-34-6.4-8.4/DUP101012-1	SVOC-SIM	Anthracene	3.6	7.5	4.8/4.7	µg/kg	70

Table 7
Field Duplicate Results and Calculated Relative Percent Differences
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
VM72	GP-34-6.4-8.4/DUP101012-1	SVOC-SIM	Fluoranthene	14	40	4.8/4.7	µg/kg	96
VM72	GP-34-6.4-8.4/DUP101012-1	SVOC-SIM	Pyrene	19	66	4.8/4.7	µg/kg	111
VM72	GP-34-6.4-8.4/DUP101012-1	SVOC-SIM	Benzo(a)anthracene	7.6	22	4.8/4.7	µg/kg	97
VM72	GP-34-6.4-8.4/DUP101012-1	SVOC-SIM	Chrysene	8.6	28	4.8/4.7	µg/kg	106
VM72	GP-34-6.4-8.4/DUP101012-1	SVOC-SIM	Benzo(a)pyrene	6.4	25	4.8/4.7	µg/kg	118
VM72	GP-34-6.4-8.4/DUP101012-1	SVOC-SIM	Benzo(g,h,i)perylene	3.8	12	4.8/4.7	µg/kg	104
VM72	GP-34-6.4-8.4/DUP101012-1	SVOC-SIM	Total Benzofluoranthenes	11	34	4.8/4.7	µg/kg	102
VM72	GP-34-6.4-8.4/DUP101012-1	Total metals	Arsenic	1.2	1.1	0.2	mg/kg	8.7
VM72	GP-34-6.4-8.4/DUP101012-1	Total metals	Chromium	10.1	9.2	0.6	mg/kg	9.3
VM72	GP-34-6.4-8.4/DUP101012-1	Total metals	Copper	8.9	7.5	0.2	mg/kg	17
VM72	GP-34-6.4-8.4/DUP101012-1	Total metals	Lead	1.0	1.0	0.1	mg/kg	0
VM72	GP-34-6.4-8.4/DUP101012-1	Total metals	Nickel	5	5	1	mg/kg	0
VM72	GP-34-6.4-8.4/DUP101012-1	Total metals	Zinc	18	17	1	mg/kg	5.7
VM72	GP-34-6.4-8.4/DUP101012-1	pH	pH	7.08	7.10	0.01	pH	0.3
VM72	GP-34-6.4-8.4/DUP101012-1	Total solids	Total solids	79.50	80.60	0.01	%	1.4
VM72	GP-26-5.1-7.1/DUP101012-3	SVOC	bis(2-Ethylhexyl) phthalate	27	19	24	µg/kg	35
VM72	GP-26-5.1-7.1/DUP101012-3	SVOC-SIM	Fluoranthene	2.6	5.1	4.7/4.8	µg/kg	65
VM72	GP-26-5.1-7.1/DUP101012-3	SVOC-SIM	Pyrene	3.3	6.0	4.7/4.8	µg/kg	58
VM72	GP-26-5.1-7.1/DUP101012-3	Total metals	Arsenic	1.7	2.1	0.2	µg/kg	21
VM72	GP-26-5.1-7.1/DUP101012-3	Total metals	Chromium	10.3	10.5	0.6	µg/kg	1.9
VM72	GP-26-5.1-7.1/DUP101012-3	Total metals	Copper	10.4	10.1	0.2	µg/kg	2.9
VM72	GP-26-5.1-7.1/DUP101012-3	Total metals	Lead	1.2	1.2	0.1	µg/kg	0
VM72	GP-26-5.1-7.1/DUP101012-3	Total metals	Nickel	8	8	1	µg/kg	0
VM72	GP-26-5.1-7.1/DUP101012-3	Total metals	Zinc	21	21	1	µg/kg	0
VM72	GP-26-5.1-7.1/DUP101012-3	pH	pH	6.22	6.36	0.01	pH	2.2
VM72	GP-26-5.1-7.1/DUP101012-3	Cr VI	Chromium, hexavalent	0.505	0.505	0.505	mg/kg	0
VM72	GP-26-5.1-7.1/DUP101012-3	Total solids	Total solids	77.40	78.90	0.01	%	1.9

Table 7
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Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
VM72	GP-26-5.1-7.1/DUP101012-3	Total solids	Total solids	79.50	79.00	0.01	%	0.6
VM91	GP-27-4.3-6.3/DUP101112-1	SVOC-SIM	Naphthalene	3.3	2.7	4.7	µg/kg	20
VM91	GP-27-4.3-6.3/DUP101112-1	SVOC-SIM	Phenanthrene	4.1	3.9	4.7	µg/kg	5.0
VM91	GP-27-4.3-6.3/DUP101112-1	SVOC-SIM	Pyrene	4.0	2.4	4.7	µg/kg	50
VM91	GP-27-4.3-6.3/DUP101112-1	Total metals	Arsenic	1.5	2.0	0.2	mg/kg	29
VM91	GP-27-4.3-6.3/DUP101112-1	Total metals	Chromium	11.2	11.7	0.6	mg/kg	4.4
VM91	GP-27-4.3-6.3/DUP101112-1	Total metals	Copper	9.3	10.5	0.2	mg/kg	12
VM91	GP-27-4.3-6.3/DUP101112-1	Total metals	Lead	1.3	2.2	0.1	mg/kg	51
VM91	GP-27-4.3-6.3/DUP101112-1	Total metals	Nickel	8	9	1	mg/kg	12
VM91	GP-27-4.3-6.3/DUP101112-1	Total metals	Zinc	21	22	1	mg/kg	4.7
VM91	GP-27-4.3-6.3/DUP101112-1	pH	pH	6.34	6.03	0.01	pH	5.0
VM91	GP-27-4.3-6.3/DUP101112-1	Total solids	Total solids	82.1	69.7	0.01	%	16
VM91	GP-28-5.1/DUP101112-2	BTEX	Benzene	13	12	0.7	µg/kg	8.0
VM91	GP-28-5.1/DUP101112-2	BTEX	Toluene	0.7	0.4	0.7	µg/kg	55
VM91	GP-28-4.1-6.1/DUP101112-2	SVOC	Naphthalene	12	12	19/20	µg/kg	0
VM91	GP-28-4.1-6.1/DUP101112-2	SVOC	bis(2-Ethylhexyl) phthalate	24	27	24/25	µg/kg	12
VM91	GP-28-4.1-6.1/DUP101112-2	SVOC-SIM	Naphthalene	10	9.8	4.6/4.9	µg/kg	2.0
VM91	GP-28-4.1-6.1/DUP101112-2	SVOC-SIM	Acenaphthene	20	7.0	4.6/4.9	µg/kg	96
VM91	GP-28-4.1-6.1/DUP101112-2	SVOC-SIM	Phenanthrene	40	4.6	4.6/4.9	µg/kg	159
VM91	GP-28-4.1-6.1/DUP101112-2	SVOC-SIM	Fluoranthene	24	5.4	4.6/4.9	µg/kg	127
VM91	GP-28-4.1-6.1/DUP101112-2	SVOC-SIM	Pyrene	25	5.6	4.6/4.9	µg/kg	127
VM91	GP-28-4.1-6.1/DUP101112-2	SVOC-SIM	Chrysene	5	2.6	4.6/4.9	µg/kg	70
VM91	GP-28-4.1-6.1/DUP101112-2	PCB	Aroclor 1254	4	6.3	3.8/3.7	µg/kg	38
VM91	GP-28-4.1-6.1/DUP101112-2	Total metals	Arsenic	1.9	2.2	0.2/0.3	mg/kg	15
VM91	GP-28-4.1-6.1/DUP101112-2	Total metals	Barium	17.8	19.8	0.6	mg/kg	11
VM91	GP-28-4.1-6.1/DUP101112-2	Total metals	Chromium	11.2	13.4	0.6/0.7	mg/kg	18

Table 7
Field Duplicate Results and Calculated Relative Percent Differences
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
VM91	GP-28-4.1-6.1/DUP101112-2	Total metals	Copper	10.1	10.8	0.2/0.3	mg/kg	6.7
VM91	GP-28-4.1-6.1/DUP101112-2	Total metals	Lead	1.5	1.9	0.1	mg/kg	24
VM91	GP-28-4.1-6.1/DUP101112-2	Total metals	Nickel	7	7	1	mg/kg	0
VM91	GP-28-4.1-6.1/DUP101112-2	Total metals	Zinc	20	20	1	mg/kg	0
VM91	GP-28-4.1-6.1/DUP101112-2	pH	pH	7.10	6.73	0.01	pH	5.4
VM91	GP-28-4.1-6.1/DUP101112-2	Total solids	Total solids	81.8	77.6	0.01	%	5.3
VM91	GP-28-6.1-8.3/DUP101112-3	SVOC	Naphthalene	11	10	19	µg/kg	9.5
VM91	GP-28-6.1-8.3/DUP101112-3	SVOC-SIM	Naphthalene	8.9	10	4.6	µg/kg	12
VM91	GP-28-6.1-8.3/DUP101112-3	SVOC-SIM	1-Methylnaphthalene	4.1	2.6	4.6	µg/kg	45
VM91	GP-28-6.1-8.3/DUP101112-3	SVOC-SIM	Acenaphthene	4.9	3.6	4.6	µg/kg	31
VM91	GP-28-6.1-8.3/DUP101112-3	SVOC-SIM	Phenanthrene	7.4	4.9	4.6	µg/kg	41
VM91	GP-28-6.1-8.3/DUP101112-3	SVOC-SIM	Fluoranthene	10	5.9	4.6	µg/kg	52
VM91	GP-28-6.1-8.3/DUP101112-3	SVOC-SIM	Pyrene	9.4	6.7	4.6	µg/kg	34
VM91	GP-28-6.1-8.3/DUP101112-3	SVOC-SIM	Chrysene	4.1	2.5	4.6	µg/kg	48
VM91	GP-28-6.1-8.3/DUP101112-3	Total metals	Arsenic	1.9	2.1	0.2	mg/kg	10
VM91	GP-28-6.1-8.3/DUP101112-3	Total metals	Barium	23.4	23.7	0.6	mg/kg	1.3
VM91	GP-28-6.1-8.3/DUP101112-3	Total metals	Chromium	11.2	10.1	0.6	mg/kg	10
VM91	GP-28-6.1-8.3/DUP101112-3	Total metals	Copper	13.2	12.4	0.2	mg/kg	6
VM91	GP-28-6.1-8.3/DUP101112-3	Total metals	Lead	1.6	1.7	0.1	mg/kg	6
VM91	GP-28-6.1-8.3/DUP101112-3	Total metals	Nickel	9	7.0	1	mg/kg	25
VM91	GP-28-6.1-8.3/DUP101112-3	Total metals	Zinc	22	20	1	mg/kg	10
VM91	GP-28-6.1-8.3/DUP101112-3	pH	pH	7.27	6.93	0.01	pH	4.8
VM91	GP-28-6.1-8.3/DUP101112-3	Total solids	Total solids	76.1	76.5	0.01	%	0.5
VN13	GP-62-5.8/DUP101212-1	VOC	Methylene chloride	2.6	2.0	1.3/1.2	µg/kg	26
VN13	GP-62-5.8/DUP101212-1	VOC	Acetone	5.0	5.3	3.3/2.9	µg/kg	5.8
VN13	GP-62-5.6.7/DUP101212-1	SVOC	Naphthalene	17	18	18	µg/kg	5.7

Table 7
Field Duplicate Results and Calculated Relative Percent Differences
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
VN13	GP-62-5-6.7/DUP101212-1	SVOC	Fluoranthene	18	12	18	µg/kg	40
VN13	GP-62-5-6.7/DUP101212-1	SVOC	Pyrene	30	22	18	µg/kg	31
VN13	GP-62-5-6.7/DUP101212-1	SVOC	bis(2-Ethylhexyl)phthalate	17	18	23	µg/kg	5.7
VN13	GP-62-5-6.7/DUP101212-1	SVOC	Chrysene	20	13	18	µg/kg	42
VN13	GP-62-5-6.7/DUP101212-1	SVOC	Benzo(a)pyrene	24	14	18	µg/kg	53
VN13	GP-62-5-6.7/DUP101212-1	SVOC	Benzo(g,h,i)perylene	16	12	18	µg/kg	29
VN13	GP-62-5-6.7/DUP101212-1	SVOC	Total Benzofluoranthenes	28	18	37	µg/kg	43
VN13	GP-62-5-6.7/DUP101212-1	SVOC-SIM	Naphthalene	10	11	4.6	µg/kg	10
VN13	GP-62-5-6.7/DUP101212-1	SVOC-SIM	Fluoranthene	11	9.8	4.6	µg/kg	12
VN13	GP-62-5-6.7/DUP101212-1	SVOC-SIM	Pyrene	24	20	4.6	µg/kg	18
VN13	GP-62-5-6.7/DUP101212-1	SVOC-SIM	Benzo(a)anthracene	8.5	5.9	4.6	µg/kg	36
VN13	GP-62-5-6.7/DUP101212-1	SVOC-SIM	Chrysene	14	11	4.6	µg/kg	24
VN13	GP-62-5-6.7/DUP101212-1	SVOC-SIM	Benzo(a)pyrene	15	8.8	4.6	µg/kg	52
VN13	GP-62-5-6.7/DUP101212-1	SVOC-SIM	Benzo(g,h,i)perylene	11	5.4	4.6	µg/kg	68
VN13	GP-62-5-6.7/DUP101212-1	SVOC-SIM	Total Benzofluoranthenes	20	14	4.6	µg/kg	35
VN13	GP-62-5-6.7/DUP101212-1	Total metals	Arsenic	1.6	1.6	0.2	mg/kg	0
VN13	GP-62-5-6.7/DUP101212-1	Total metals	Chromium	9.9	9.1	0.6	mg/kg	8.4
VN13	GP-62-5-6.7/DUP101212-1	Total metals	Copper	8.8	8.7	0.2	mg/kg	1.1
VN13	GP-62-5-6.7/DUP101212-1	Total metals	Lead	1.2	1.2	0.1	mg/kg	0
VN13	GP-62-5-6.7/DUP101212-1	Total metals	Nickel	6	5	1	mg/kg	18
VN13	GP-62-5-6.7/DUP101212-1	Total metals	Zinc	19	21	1	mg/kg	10
VN13	GP-62-5-6.7/DUP101212-1	pH	pH	6.59	6.64	0.01	pH	0.8
VN13	GP-62-7.2/DUP101212-2	VOC	Methylene chloride	2.1	1.9	1.6	µg/kg	10
VN13	GP-62-7.2/DUP101212-2	VOC	Acetone	69	37	3.9/4.1	µg/kg	60
VN13	GP-62-7.2/DUP101212-2	VOC	Carbon disulfide	4.2	2.4	0.8	µg/kg	55
VN13	GP-62-7.2/DUP101212-2	VOC	2-Butanone	12	6.8	3.9/4.1	µg/kg	55
VN13	GP-62-7.2/DUP101212-2	VOC	m,p-Xylene	2.9	1.1	0.8	µg/kg	90

Table 7
Field Duplicate Results and Calculated Relative Percent Differences
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
VN13	GP-62-6.7-7.7/DUP101212-2	SVOC	Naphthalene	48	44	19/20	µg/kg	8.7
VN13	GP-62-6.7-7.7/DUP101212-2	SVOC	Acenaphthene	22	28	19/20	µg/kg	24
VN13	GP-62-6.7-7.7/DUP101212-2	SVOC	Fluorene	17	28	19/20	µg/kg	49
VN13	GP-62-6.7-7.7/DUP101212-2	SVOC	Phenanthrene	21	140	19/20	µg/kg	148
VN13	GP-62-6.7-7.7/DUP101212-2	SVOC	Fluoranthene	21	220	19/20	µg/kg	165
VN13	GP-62-6.7-7.7/DUP101212-2	SVOC	Pyrene	20	210	19/20	µg/kg	165
VN13	GP-62-6.7-7.7/DUP101212-2	SVOC	bis(2-Ethylhexyl)phthalate	15	17	23/25	µg/kg	13
VN13	GP-62-6.7-7.7/DUP101212-2	SVOC	1-Methylnaphthalene	16	15	19/20	µg/kg	6.5
VN13	GP-62-6.7-7.7/DUP101212-2	SVOC	Total Benzofluoranthenes	11	62	37/39	µg/kg	140
VN13	GP-62-6.7-7.7/DUP101212-2	SVOC-SIM	Naphthalene	48	23	4.6	µg/kg	70
VN13	GP-62-6.7-7.7/DUP101212-2	SVOC-SIM	1-Methylnaphthalene	18	10	4.6	µg/kg	57
VN13	GP-62-6.7-7.7/DUP101212-2	SVOC-SIM	Acenaphthene	20	15	4.6	µg/kg	29
VN13	GP-62-6.7-7.7/DUP101212-2	SVOC-SIM	Fluorene	15	11	4.6	µg/kg	31
VN13	GP-62-6.7-7.7/DUP101212-2	SVOC-SIM	Phenanthrene	26	12	4.6	µg/kg	74
VN13	GP-62-6.7-7.7/DUP101212-2	SVOC-SIM	Fluoranthene	22	9.1	4.6	µg/kg	83
VN13	GP-62-6.7-7.7/DUP101212-2	SVOC-SIM	Pyrene	25	8.9	4.6	µg/kg	95
VN13	GP-62-6.7-7.7/DUP101212-2	Total metals	Arsenic	3.8	4.3	0.3	mg/kg	12
VN13	GP-62-6.7-7.7/DUP101212-2	Total metals	Chromium	11.8	11.5	0.6	mg/kg	2.6
VN13	GP-62-6.7-7.7/DUP101212-2	Total metals	Copper	15.2	16.5	0.2/0.3	mg/kg	8.2
VN13	GP-62-6.7-7.7/DUP101212-2	Total metals	Lead	2.6	3.3	0.1	mg/kg	24
VN13	GP-62-6.7-7.7/DUP101212-2	Total metals	Nickel	9	11	1	mg/kg	20
VN13	GP-62-6.7-7.7/DUP101212-2	Total metals	Zinc	30	24	1	mg/kg	22
VN13	GP-62-6.7-7.7/DUP101212-2	pH	pH	6.34	6.98	0.01	pH	9.6
VN13	GP-63-5/DUP101212-3	VOC	Methylene chloride	1.3	1.7	1.2/1.6	µg/kg	27
VN13	GP-63-4-6/DUP101212-3	SVOC-SIM	Naphthalene	280	310	10	µg/kg	10
VN13	GP-63-4-6/DUP101212-3	SVOC-SIM	2-Methylnaphthalene	220	210	10	µg/kg	4.7
VN13	GP-63-4-6/DUP101212-3	SVOC-SIM	1-Methylnaphthalene	120	140	10	µg/kg	15

Table 7
Field Duplicate Results and Calculated Relative Percent Differences
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
VN13	GP-63-4-6/DUP101212-3	SVOC-SIM	Acenaphthylene	960	1300	10	µg/kg	30
VN13	GP-63-4-6/DUP101212-3	SVOC-SIM	Acenaphthene	60	58	10	µg/kg	3.4
VN13	GP-63-4-6/DUP101212-3	SVOC-SIM	Fluorene	110	140	10	µg/kg	24
VN13	GP-63-4-6/DUP101212-3	SVOC-SIM	Phenanthrene	260	260	10	µg/kg	0
VN13	GP-63-4-6/DUP101212-3	SVOC-SIM	Anthracene	300	340	10	µg/kg	13
VN13	GP-63-4-6/DUP101212-3	SVOC-SIM	Fluoranthene	2200	2400	10	µg/kg	8.7
VN13	GP-63-4-6/DUP101212-3	SVOC-SIM	Pyrene	3000	3000	10	µg/kg	0
VN13	GP-63-4-6/DUP101212-3	SVOC-SIM	Benzo(a)anthracene	1800	2100	10	µg/kg	15
VN13	GP-63-4-6/DUP101212-3	SVOC-SIM	Chrysene	2800	3100	10	µg/kg	10
VN13	GP-63-4-6/DUP101212-3	SVOC-SIM	Benzo(a)pyrene	3400	3800	10	µg/kg	11
VN13	GP-63-4-6/DUP101212-3	SVOC-SIM	Indeno(1,2,3-cd)pyrene	1800	2300	10	µg/kg	24
VN13	GP-63-4-6/DUP101212-3	SVOC-SIM	Dibenz(a,h)anthracene	720	870	10	µg/kg	19
VN13	GP-63-4-6/DUP101212-3	SVOC-SIM	Benzo(g,h,i)perylene	2100	2600	10	µg/kg	21
VN13	GP-63-4-6/DUP101212-3	SVOC-SIM	Dibenzofuran	51	100	10	µg/kg	65
VN13	GP-63-4-6/DUP101212-3	SVOC-SIM	Total Benzofluoranthenes	4600	5800	10	µg/kg	23
VN13	GP-63-4-6/DUP101212-3 DL	SVOC-SIM	Naphthalene	310	380	100	µg/kg	20
VN13	GP-63-4-6/DUP101212-3 DL	SVOC-SIM	2-Methylnaphthalene	230	290	100	µg/kg	23
VN13	GP-63-4-6/DUP101212-3 DL	SVOC-SIM	1-Methylnaphthalene	110	170	100	µg/kg	43
VN13	GP-63-4-6/DUP101212-3 DL	SVOC-SIM	Acenaphthylene	1000	1500	100	µg/kg	40
VN13	GP-63-4-6/DUP101212-3 DL	SVOC-SIM	Fluorene	120	140	100	µg/kg	15
VN13	GP-63-4-6/DUP101212-3 DL	SVOC-SIM	Phenanthrene	270	270	100	µg/kg	0
VN13	GP-63-4-6/DUP101212-3 DL	SVOC-SIM	Anthracene	300	360	100	µg/kg	18
VN13	GP-63-4-6/DUP101212-3 DL	SVOC-SIM	Fluoranthene	2600	3400	100	µg/kg	27
VN13	GP-63-4-6/DUP101212-3 DL	SVOC-SIM	Pyrene	6100	7600	100	µg/kg	22
VN13	GP-63-4-6/DUP101212-3 DL	SVOC-SIM	Benzo(a)anthracene	2300	2800	100	µg/kg	20
VN13	GP-63-4-6/DUP101212-3 DL	SVOC-SIM	Chrysene	3900	5000	100	µg/kg	25
VN13	GP-63-4-6/DUP101212-3 DL	SVOC-SIM	Benzo(a)pyrene	4700	6600	100	µg/kg	34
VN13	GP-63-4-6/DUP101212-3 DL	SVOC-SIM	Indeno(1,2,3-cd)pyrene	2100	3300	100	µg/kg	44

Table 7
Field Duplicate Results and Calculated Relative Percent Differences
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
VN13	GP-63-4-6/DUP101212-3 DL	SVOC-SIM	Dibenz(a,h)anthracene	960	1100	100	µg/kg	14
VN13	GP-63-4-6/DUP101212-3 DL	SVOC-SIM	Benzo(g,h,i)perylene	2700	3900	100	µg/kg	36
VN13	GP-63-4-6/DUP101212-3 DL	SVOC-SIM	Total Benzofluoranthenes	5200	7300	100	µg/kg	34
VN13	GP-63-4-6/DUP101212-3	TPH-d	Diesel Range	240	190	5.6/5.8	mg/kg	23
VN13	GP-63-4-6/DUP101212-3	TPH-d	Motor Oil Range	200	170	11/12	mg/kg	16
VN13	GP-63-4-6/DUP101212-3	pH	pH	7.79	9.28	0.01	pH	17
VN13	GP-63-4-6/DUP101212-3	Total solids	Total solids	76.90	92.90	0.01	%	19

Data packages reviewed: Axys DPWG41596, DPWG41685, DPWG41834; ARI VH79, VH87, VI22, VI27, VI40, VI70, VI85, VJ70, VM44, VM59, VM72, VM91, VN13

Key:

RPD = Relative percent difference

PCDD/PCDF = Polychlorinated dibenzo-p-dioxins/Polychlorinated dibenzofurans; Method 1613B

Phenols = Chlorinated phenols; Method 8270D

Total solids = Method 2540B

SVOC = Semivolatile organic compounds; Method 8270D

SVOC-SIM = Semivolatile organic compounds - selected ion monitoring

VOC = Volatile organic compounds; Method 8260C

Cr VI = Hexavalent chromium; Method 7196A

BTEX = Volatiles; Method 8260C

PCB = Polychlorinated biphenyls; Method 8082B

TPH-d = Total petroleum hydrocarbons - diesel; Method NWTPH-Dx

pg/g = Picograms per gram

µg/kg = Micrograms per kilogram

mg/kg = Milligrams per kilogram

DL = Dilution

TCDD = Tetrachlorodibenzo-p-dioxin

PECDD = Pentachlorodibenzo-p-dioxin

HXCDD = Hexachlorodibenzo-p-dioxin

HPCDD = Heptachlorodibenzo-p-dioxin

TCDF = Tetrachlorodibenzofuran

PECDF = Pentachlorodibenzofuran

HXCDF = Hexachlorodibenzofuran

HPCDF = Heptachlorodibenzofuran

OCDF = Octochlorodibenzofuran

OCDD = Octochlorodibenzo-p-dioxin

Table 8
Analytical Duplicate Results and Calculated Relative Percent Differences
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Concentration		Report Limit	Units	RPD	RPD Limit	ERM Qualifier
			Sample	Duplicate					
VI22	MW-23D-2.75-5.25	Arsenic, total	35.8	26.70	0.2	mg/kg	29.1	20	J
VI22	MW-23D-2.75-5.25	Lead, total	34.3	68.10	0.1	mg/kg	66.0	20	J
VI27	GP-47-0-0.25	Copper, total	276	218	0.5	mg/kg	23.5	20	J
VM59	GP-44-8.8-11.1	Arsenic, total	32.8	52.8	0.2	mg/kg	46.7	20	J
VM59	GP-44-8.8-11.1	Chromium, total	3.6	2.9	0.6	mg/kg	21.5	20	J
VM59	GP-44-8.8-11.1	Copper, total	17.5	12.8	0.3	mg/kg	31.0	20	J
VM59	GP-44-8.8-11.1	Zinc, total	7	5	1.0	mg/kg	33.3	20	J
VM72	GP-56-7.2-9.5	Arsenic, total	634	202	1.0	mg/kg	103	20	J
VM72	GP-56-7.2-9.5	Copper, total	133	206	0.2	mg/kg	43.1	20	J
VM72	GP-59-4.25-6.25	Copper, total	158	89.7	0.2	mg/kg	55.1	20	J
VM72	GP-59-4.25-6.25	Lead, total	11.7	8.3	0.1	mg/kg	34.0	20	J

Data packages reviewed: Axys DPWG41596, DPWG41685, DPWG41834; ARI VH79, VH87, VI22, VI27, VI40, VI70, VI85, VJ70, VM44, VM59, VM72, VM91, VN13

Key:

RPD = Relative percent difference

mg/kg = Milligrams per kilogram

J = Detected sample result qualified as estimated

Table 9
Calibration Verification Recoveries Outside of Acceptable Limits
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	CCV ID	Analysis	Compound	CCV Recovery	CCV Limit	Associated Samples	Reported Concentration	Units	ERM Qualifier
VH79	CCV-091112	PCB	Aroclor-1248	24.1	20	NA	--	--	--
VI27	CCV-091312	VOC	Chloroethane	-24.3	20	See below	--	--	--
VI27	CCV-091312	--	--	--	--	GP-62-1	< 0.6	µg/kg	UJ
VI27	CCV-091312	--	--	--	--	GP-62-4	< 0.7	µg/kg	UJ
VI27	CCV-091312	VOC	Trichlorofluoromethane	-27.4	20	See below	--	--	--
VI27	CCV-091312	--	--	--	--	GP-62-1	< 0.6	µg/kg	UJ
VI27	CCV-091312	--	--	--	--	GP-62-4	< 0.7	µg/kg	UJ
VI27	CCV-091312	VOC	1,1,1,2-Tetrachloroethane	34.3	20	NA	--	--	--
VI27	CCV-091312	VOC	trans-1,4-Dichloro-2-butene	24.2	20	NA	--	--	--
VI27	CCV-091112	VOC	Acrolein	66.9	20	NA	--	--	--
VI27	CCV-091112	VOC	2,2-Dichloropropane	-24.4	20	NA	--	--	--
VI27	CCV-091112	VOC	Bromoform	-21.3	20	NA	--	--	--
VI27	CCV-091112	VOC	N-butyl Benzene	-23.8	20	NA	--	--	--
VI27	CCV-091112	VOC	1,2,4-Trichlorobenzene	-22.4	20	NA	--	--	--
VI27	CCV-091112	VOC	Hexachloro-1,3-butadiene	-29.3	20	NA	--	--	--
VI27	CCV-091112	VOC	Dichlorodifluoromethane	-22.3	20	NA	--	--	--
VI85	CCV-091312	VOC	Chloroethane	-24.3	20	See below	--	--	--
VI85	CCV-091312	VOC	--	--	--	GP-53-4	< 0.8	µg/kg	UJ
VI85	CCV-091312	VOC	--	--	--	GP-53-5	< 0.9	µg/kg	UJ
VI85	CCV-091312	VOC	Trichlorofluoromethane	-27.4	20	See below	--	--	--
VI85	CCV-091312	VOC	--	--	--	GP-53-4	< 0.8	µg/kg	UJ
VI85	CCV-091312	VOC	--	--	--	GP-53-5	< 0.9	µg/kg	UJ
VI85	CCV-091312	VOC	1,1,1,2-Tetrachloroethane	34.3	20	NA	--	--	--
VI85	CCV-091312	VOC	trans-1,4-Dichloro-2-butene	24.2	20	NA	--	--	--
VI85	CCV-091312	VOC	Acrolein	61.0	20	NA	--	--	--
VI85	CCV-091312	VOC	Hexachloro-1,3-butadiene	-22.3	20	See below	--	--	--

Table 9
Calibration Verification Recoveries Outside of Acceptable Limits
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	CCV ID	Analysis	Compound	CCV Recovery	CCV Limit	Associated Samples	Reported Concentration	Units	ERM Qualifier
VI85	CCV-091312	VOC	--	--	--	GP-53-4	< 4.2	µg/kg	UJ
VI85	CCV-091312	VOC	--	--	--	GP-53-5	< 4.3	µg/kg	UJ
VI85	CCV-091312	VOC	1,2,3-Trichlorobenzene	-22.7	20	See below	--	--	--
VI85	CCV-091312	VOC	--	--	--	GP-53-4	< 4.2	µg/kg	UJ
VI85	CCV-091312	VOC	--	--	--	GP-53-5	< 4.3	µg/kg	UJ
VI85	CCV-092012	SVOC	4-Nitrophenol	58.5	20	NA	--	--	--
VI85	CCV-092012	SVOC	Benzidine	-21.2	20	NA	--	--	--
VM44	CCV-101512	VOC	Chloromethane	23.1	20	NA	--	--	--
VM44	CCV-101512	VOC	Trichlorofluoromethane	22.5	20	NA	--	--	--
VM44	CCV-101512	VOC	2,2-Dichloropropane	22.9	20	NA	--	--	--
VM44	CCV-101512	VOC	Naphthalene	-21.4	20	See below	--	--	--
VM44	CCV-101512	VOC	--	--	--	GP-39-5.5	< 4.0	µg/kg	UJ
VM44	CCV-101512	VOC	--	--	--	GP-39-7.5	< 3.4	µg/kg	UJ
VM44	CCV-101512	VOC	--	--	--	GP-39-11	< 4.1	µg/kg	UJ
VM44	CCV-101512	VOC	Dichlorodifluoromethane	-20.2	20	NA	--	--	--
VM44	CCV-101612	SVOC	2,4-Dinitrotoluene	20.6	20	NA	--	--	--
VM44	CCV-101612	SVOC	2,4,6-Tribromophenol	20.6	20	NA	--	--	--
VM44	CCV-101812	SVOC	Fluorene	-47.8	20	See below	--	--	--
VM44	CCV-101812	SVOC	--	--	--	GP-36-7-9	< 19	µg/kg	UJ
VM44	CCV-101812	SVOC	--	--	--	GP-36-9-11	< 19	µg/kg	UJ
VM44	CCV-101812	SVOC	--	--	--	GP-36-11-12	10	µg/kg	J-
VM44	CCV-101812	SVOC	--	--	--	GP-39-4.5-6.5	< 18	µg/kg	UJ
VM44	CCV-101812	SVOC	--	--	--	GP-39-6.5-8.5	< 19	µg/kg	UJ
VM44	CCV-101812	SVOC	--	--	--	GP-39-10.5-11.5	< 19	µg/kg	UJ
VM44	CCV-101812	SVOC	--	--	--	GP-58-4.25-6.25	< 18	µg/kg	UJ
VM44	CCV-101812	SVOC	--	--	--	GP-58-8.25-10.5	< 20	µg/kg	UJ
VM44	CCV-101812	SVOC	--	--	--	GP-55-8.4-10.4	< 20	µg/kg	UJ

Table 9
Calibration Verification Recoveries Outside of Acceptable Limits
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	CCV ID	Analysis	Compound	CCV Recovery	CCV Limit	Associated Samples	Reported Concentration	Units	ERM Qualifier
VM44	CCV-101812	SVOC	--	--	--	DUP100812-1	< 18	µg/kg	UJ
VM44	CCV-101812	SVOC	--	--	--	GP-55-4.4-6.4	< 18	µg/kg	UJ
VM44	CCV-101812	SVOC	--	--	--	GP-55-6.4-8.4	< 18	µg/kg	UJ
VM44	CCV-101812	SVOC	4-Chlorophenyl-phenylether	-39.5	20	See below	--	--	--
VM44	CCV-101812	SVOC	--	--	--	GP-36-7-9	< 19	µg/kg	UJ
VM44	CCV-101812	SVOC	--	--	--	GP-36-9-11	< 19	µg/kg	UJ
VM44	CCV-101812	SVOC	--	--	--	GP-36-11-12	< 18	µg/kg	UJ
VM44	CCV-101812	SVOC	--	--	--	GP-39-4.5-6.5	< 18	µg/kg	UJ
VM44	CCV-101812	SVOC	--	--	--	GP-39-6.5-8.5	< 19	µg/kg	UJ
VM44	CCV-101812	SVOC	--	--	--	GP-39-10.5-11.5	< 19	µg/kg	UJ
VM44	CCV-101812	SVOC	--	--	--	GP-58-4.25-6.25	< 18	µg/kg	UJ
VM44	CCV-101812	SVOC	--	--	--	GP-58-8.25-10.5	< 20	µg/kg	UJ
VM44	CCV-101812	SVOC	--	--	--	GP-55-8.4-10.4	< 20	µg/kg	UJ
VM44	CCV-101812	SVOC	--	--	--	DUP100812-1	< 18	µg/kg	UJ
VM44	CCV-101812	SVOC	--	--	--	GP-55-4.4-6.4	< 18	µg/kg	UJ
VM44	CCV-101812	SVOC	--	--	--	GP-55-6.4-8.4	< 18	µg/kg	UJ
VM59	CCV-101612	SVOC	2,4-Dinitrotoluene	20.6	20	NA	--	--	--
VM59	CCV-101612	SVOC	2,4,6-Tribromophenol	20.6	20	NA	--	--	--
VM59	CCV-102312	SVOC	3,3'-Dichlorobenzidine	20.6	20	NA	--	--	--
VM59	CCV-102312	SVOC	Benzidine	-33.7	20	NA	--	--	--
VM72	CCV-101812	SVOC	4,6-Dinitro-2-methylphenol	20.9	20	NA	--	--	--
VM72	CCV-102012	SVOC	4-Nitrophenol	-28.0	20	See below	--	--	--
VM72	CCV-102012	SVOC	--	--	--	GP-34-6.4-8.4	< 95	µg/kg	UJ
VM72	CCV-102012	SVOC	--	--	--	GP-34-8.4-9.4	< 98	µg/kg	UJ
VM72	CCV-102012	SVOC	--	--	--	DUP101012-1	< 93	µg/kg	UJ
VM72	CCV-102012	SVOC	--	--	--	GP-56-4.2-5.2	< 130	µg/kg	UJ

Table 9
Calibration Verification Recoveries Outside of Acceptable Limits
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	CCV ID	Analysis	Compound	CCV Recovery	CCV Limit	Associated Samples	Reported Concentration	Units	ERM Qualifier
VM72	CCV-102012	SVOC	--	--	--	GP-56-7.2-9.5	< 92	µg/kg	UJ
VM72	CCV-102012	SVOC	--	--	--	GP-59-4.25-6.25	< 98	µg/kg	UJ
VM72	CCV-102012	SVOC	--	--	--	GP-59-8.25-10.25	< 93	µg/kg	UJ
VM72	CCV-102012	SVOC	--	--	--	GP-59-10.25-11.5	< 96	µg/kg	UJ
VM72	CCV-102012	SVOC	--	--	--	GP-26-5.1-7.1	< 94	µg/kg	UJ
VM72	CCV-102012	SVOC	--	--	--	GP-26-9.1-10.3	< 98	µg/kg	UJ
VM72	CCV-102012	SVOC	3,3'-Dichlorobenzidine	22.3	20	NA	--	--	--
VM72	CCV-102312	SVOC	Phenol	-22.1	20	See below	--	--	--
VM72	CCV-102312	SVOC	--	--	--	GP-56-5.2-7.2	< 58	µg/kg	UJ
VM72	CCV-102312	SVOC	--	--	--	GP-53-5.3-7.3	140	µg/kg	J-
VM72	CCV-102312	SVOC	--	--	--	GP-53-7.3-9.3	190	µg/kg	J-
VM72	CCV-102312	SVOC	--	--	--	GP-33-5.9-8.3	15	µg/kg	J-
VM72	CCV-102312	SVOC	Benzyl alcohol	-26.6	20	See below	--	--	--
VM72	CCV-102312	SVOC	--	--	--	GP-56-5.2-7.2	< 58	µg/kg	UJ
VM72	CCV-102312	SVOC	--	--	--	GP-53-5.3-7.3	< 19	µg/kg	UJ
VM72	CCV-102312	SVOC	--	--	--	GP-53-7.3-9.3	< 19	µg/kg	UJ
VM72	CCV-102312	SVOC	--	--	--	GP-33-5.9-8.3	< 19	µg/kg	UJ
VM72	CCV-102312	SVOC	3,3'-Dichlorobenzidine	20.6	20	NA	--	--	--
VM72	CCV-102312	SVOC	Benzidine	-33.7	20	NA	--	--	--
VM72	CCV-102512	SVOC	Benzoic acid	-34.0	20	See below	--	--	--
VM72	CCV-102512	SVOC	--	--	--	DUP101012-3	< 380	µg/kg	UJ
VM72	CCV-102512	SVOC	2,4-Dinitrophenol	-62.8	20	See below	--	--	--
VM72	CCV-102512	SVOC	--	--	--	DUP101012-3	< 820	µg/kg	UJ
VM72	CCV-102512	SVOC	4,6-Dinitro-2-methylphenol	-20.5	20	See below	--	--	--
VM72	CCV-102512	SVOC	--	--	--	DUP101012-3	< 190	µg/kg	UJ
VM72	CCV-102512	SVOC	Pentachlorophenol	-27.0	20	See below	--	--	--
VM72	CCV-102512	SVOC	--	--	--	DUP101012-3	< 190	µg/kg	UJ
VM72	CCV-102512	SVOC	3,3'-Dichlorobenzidine	20.4	20	NA	--	--	--

Table 9
Calibration Verification Recoveries Outside of Acceptable Limits
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	CCV ID	Analysis	Compound	CCV Recovery	CCV Limit	Associated Samples	Reported Concentration	Units	ERM Qualifier
VM72	CCV-102512	SVOC	Benzidine	-36.7	20	NA	--	--	--
VM91	CCV-101812	SVOC	4,6-Dinitro-2-methylphenol	20.9	20	NA	--	--	--
VM91	CCV-102312	SVOC	Phenol	-22.1	20	See below	--	--	--
VM91	CCV-102312	SVOC	--	--	--	DUP101112-1	< 19	µg/kg	UJ
VM91	CCV-102312	SVOC	--	--	--	DUP101112-2	< 20	µg/kg	UJ
VM91	CCV-102312	SVOC	--	--	--	DUP101112-3	< 19	µg/kg	UJ
VM91	CCV-102312	SVOC	--	--	--	GP-27-4.3-6.3	< 19	µg/kg	UJ
VM91	CCV-102312	SVOC	--	--	--	GP-27-6.3-8.3	< 19	µg/kg	UJ
VM91	CCV-102312	SVOC	Benzyl alcohol	-26.6	20	See below	--	--	--
VM91	CCV-102312	SVOC	--	--	--	DUP101112-1	< 19	µg/kg	UJ
VM91	CCV-102312	SVOC	--	--	--	DUP101112-2	< 20	µg/kg	UJ
VM91	CCV-102312	SVOC	--	--	--	DUP101112-3	< 19	µg/kg	UJ
VM91	CCV-102312	SVOC	--	--	--	GP-27-4.3-6.3	< 19	µg/kg	UJ
VM91	CCV-102312	SVOC	--	--	--	GP-27-6.3-8.3	< 19	µg/kg	UJ
VM91	CCV-102312	SVOC	3,3'-Dichlorobenzidine	20.6	20	NA	--	--	--
VM91	CCV-102312	SVOC	Benzidine	-33.7	20	NA	--	--	--
VM91	CCV-102412	SVOC	Carbazole	-31.4	20	See below	--	--	--
VM91	CCV-102412	SVOC	--	--	--	GP-28-4.1-6.1	< 19	µg/kg	UJ
VM91	CCV-102412	SVOC	--	--	--	GP-28-6.1-8.3	< 19	µg/kg	UJ
VM91	CCV-102412	SVOC	--	--	--	GP-50-5.9-7	< 19	µg/kg	UJ
VM91	CCV-102412	SVOC	--	--	--	GP-50-7-7.75	< 19	µg/kg	UJ
VM91	CCV-102412	SVOC	--	--	--	GP-31-5.9-7.9	< 19	µg/kg	UJ
VM91	CCV-102412	SVOC	--	--	--	GP-31-7.9-9.9	< 19	µg/kg	UJ
VM91	CCV-102412	SVOC	--	--	--	GP-32-6.1-8.1	< 19	µg/kg	UJ
VM91	CCV-102412	SVOC	--	--	--	GP-32-8.1-9.1	< 19	µg/kg	UJ
VM91	CCV-102412	SVOC	--	--	--	GP-66-5.75-7.75	< 19	µg/kg	UJ
VM91	CCV-102412	SVOC	--	--	--	GP-66-7.75-8.4	< 19	µg/kg	UJ

Table 9
Calibration Verification Recoveries Outside of Acceptable Limits
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	CCV ID	Analysis	Compound	CCV Recovery	CCV Limit	Associated Samples	Reported Concentration	Units	ERM Qualifier
VM91	CCV-102412	SVOC	3,3'-Dichlorobenzidine	-23.8	20	See below	--	--	--
VM91	CCV-102412	SVOC	--	--	--	GP-28-4.1-6.1	< 140	µg/kg	UJ
VM91	CCV-102412	SVOC	--	--	--	GP-28-6.1-8.3	< 140	µg/kg	UJ
VM91	CCV-102412	SVOC	--	--	--	GP-50-5.9-7	< 140	µg/kg	UJ
VM91	CCV-102412	SVOC	--	--	--	GP-50-7-7.75	< 140	µg/kg	UJ
VM91	CCV-102412	SVOC	--	--	--	GP-31-5.9-7.9	< 140	µg/kg	UJ
VM91	CCV-102412	SVOC	--	--	--	GP-31-7.9-9.9	< 140	µg/kg	UJ
VM91	CCV-102412	SVOC	--	--	--	GP-32-6.1-8.1	< 140	µg/kg	UJ
VM91	CCV-102412	SVOC	--	--	--	GP-32-8.1-9.1	< 140	µg/kg	UJ
VM91	CCV-102412	SVOC	--	--	--	GP-66-5.75-7.75	< 140	µg/kg	UJ
VM91	CCV-102412	SVOC	--	--	--	GP-66-7.75-8.4	< 140	µg/kg	UJ
VM91	CCV-102412	SVOC	Benzidine	-55.4	20	NA	--	--	--
VN13	CCV-101612	VOC	Acrolein	39.4	20	NA	--	--	--
VN13	CCV-101612	VOC	2,2-Dichloropropane	22.5	20	NA	--	--	--
VN13	CCV-101712	SVOC	2,6-Dinitrotoluene	20.3	20	NA	--	--	--
VN13	CCV-101712	SVOC	2,4,6-Tribromophenol	21.5	20	NA	--	--	--
VN13	CCV-102612	SVOC	4-Nitroaniline	-20.9	20	See below	--	--	--
VN13	CCV-102612	SVOC	--	--	--	DUP101212-1	< 92	µg/kg	UJ
VN13	CCV-102612	SVOC	--	--	--	DUP101212-2	< 98	µg/kg	UJ
VN13	CCV-102612	SVOC	--	--	--	GP-62-5-6.7	< 92	µg/kg	UJ
VN13	CCV-102612	SVOC	--	--	--	GP-62-6.7-7.7	< 93	µg/kg	UJ
VN13	CCV-102612	SVOC	--	--	--	GP-61-4.5-7.5	< 95	µg/kg	UJ
VN13	CCV-102612	SVOC	--	--	--	GP-61-7.5-8.5	< 94	µg/kg	UJ
VN13	CCV-102612	SVOC	--	--	--	GP-64-4.3-6	< 94	µg/kg	UJ
VN13	CCV-102612	SVOC	3,3'-Dichlorobenzidine	-22.1	20	See below	--	--	--
VN13	CCV-102612	SVOC	--	--	--	DUP101212-1	<140	µg/kg	UJ
VN13	CCV-102612	SVOC	--	--	--	DUP101212-2	<150	µg/kg	UJ

Table 9
Calibration Verification Recoveries Outside of Acceptable Limits
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	CCV ID	Analysis	Compound	CCV Recovery	CCV Limit	Associated Samples	Reported Concentration	Units	ERM Qualifier
VN13	CCV-102612	SVOC	--	--	--	GP-62-5-6.7	<140	µg/kg	UJ
VN13	CCV-102612	SVOC	--	--	--	GP-62-6.7-7.7	<140	µg/kg	UJ
VN13	CCV-102612	SVOC	--	--	--	GP-61-4.5-7.5	<140	µg/kg	UJ
VN13	CCV-102612	SVOC	--	--	--	GP-61-7.5-8.5	<140	µg/kg	UJ
VN13	CCV-102612	SVOC	--	--	--	GP-64-4.3-6	<140	µg/kg	UJ
VN13	CCV-102612	SVOC	Benzidine	-50.6	20	NA	--	--	--
VN13	CCV-102712	SVOC	Benzidine	-43.3	20	NA	--	--	--
VN13	CCV-101912	SVOC	Pyrene	23.5	20	NA	--	--	--
VN13	CCV-102612	SVOC	Pyrene	20.5	20	See below	--	--	--
VN13	CCV-102612	SVOC	--	--	--	GP-63-6-8 DL	2700	µg/kg	J+
VN13	CCV-102612	SVOC	--	--	--	GP-63-4-6 DL	6100	µg/kg	J+

Data packages reviewed: Axys DPWG41596, DPWG41685, DPWG41834; ARI VH79, VH87, VI22, VI27, VI40, VI70, VI85, VJ70, VM44, VM59, VM72, VM91, VN13

Key:

CCV = Continuing calibration verification

PCB = Polychlorinated biphenyls; Method 8082B

VOC = Volatile organic compounds; Method 8260C

SVOC = Semivolatile organic compounds; Method 8270D

µg/kg = Micrograms per kilogram

DL = Dilution

UJ = Nondetected sample result qualified as estimated

J- = Detected sample result qualified as estimated and biased low

J+ = Detected sample result qualified as estimated and biased high

Table 10
Calibration Range Exceedances
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Method	Compound	Reported Concentration	Units	ERM Qualifier	Notes
VH79	GP-36-2.6-4.6	TPH-d	Diesel	1700 E	mg/kg	J	Result exceeded instrument calibration range
VH87	GP-55-2.5-4	Phenols	Pentachlorophenol	20000 E	µg/kg	J	Result exceeded instrument calibration range
VI22	GP-45-2-4.25	Phenols	Phenol	2800 E	µg/kg	J	Result exceeded instrument calibration range
VI22	GP-45-2-4.25	Phenols	2-Chlorophenol	2000 E	µg/kg	J	Result exceeded instrument calibration range
VI22	GP-45-2-4.25	Phenols	2,3,4,6-Tetrachlorophenol	2600 E	µg/kg	J	Result exceeded instrument calibration range
VM59	GP-44-4.8-6.8	SVOC	Pentachlorophenol	180000 E	µg/kg	J	Result exceeded instrument calibration range
VM59	GP-44-6.8-8.8	SVOC	Pentachlorophenol	99000 E	µg/kg	J	Result exceeded instrument calibration range
VM72	GP-56-7.2-9.5	SVOC	Pentachlorophenol	47000 E	µg/kg	J	Result exceeded instrument calibration range
VN13	DUP101212-3	SVOC-SIM	Acenaphthylene	1300 E	µg/kg	J	Result exceeded instrument calibration range
VN13	DUP101212-3	SVOC-SIM	Fluoranthene	2400 E	µg/kg	J	Result exceeded instrument calibration range
VN13	DUP101212-3	SVOC-SIM	Pyrene	3000 E	µg/kg	J	Result exceeded instrument calibration range
VN13	DUP101212-3	SVOC-SIM	Benzo(a)anthracene	2100 E	µg/kg	J	Result exceeded instrument calibration range
VN13	DUP101212-3	SVOC-SIM	Chrysene	3100 E	µg/kg	J	Result exceeded instrument calibration range
VN13	DUP101212-3	SVOC-SIM	Benzo(a)pyrene	3800 E	µg/kg	J	Result exceeded instrument calibration range
VN13	DUP101212-3	SVOC-SIM	Indeno(1,2,3-cd)pyrene	2300 E	µg/kg	J	Result exceeded instrument calibration range
VN13	DUP101212-3	SVOC-SIM	Benzo(g,h,i)perylene	2600 E	µg/kg	J	Result exceeded instrument calibration range
VN13	DUP101212-3	SVOC-SIM	Total Benzofluoranthenes	5800 E	µg/kg	J	Result exceeded instrument calibration range
VN13	GP-63-6-8	SVOC-SIM	Phenanthrene	1200 E	µg/kg	J	Result exceeded instrument calibration range
VN13	GP-63-6-8	SVOC-SIM	Fluoranthene	1500 E	µg/kg	J	Result exceeded instrument calibration range
VN13	GP-63-6-8	SVOC-SIM	Pyrene	2000 E	µg/kg	J	Result exceeded instrument calibration range
VN13	GP-63-6-8	SVOC-SIM	Chrysene	1100 E	µg/kg	J	Result exceeded instrument calibration range
VN13	GP-63-6-8	SVOC-SIM	Benzo(a)pyrene	1200 E	µg/kg	J	Result exceeded instrument calibration range
VN13	GP-63-4-6	SVOC-SIM	Pyrene	3000 E	µg/kg	J	Result exceeded instrument calibration range

Table 10
Calibration Range Exceedances
Uplands Soil Sampling - 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Method	Compound	Reported Concentration	Units	ERM Qualifier	Notes
VN13	GP-63-4-6	SVOC-SIM	Benzo(a)anthracene	1800 E	µg/kg	J	Result exceeded instrument calibration range
VN13	GP-63-4-6	SVOC-SIM	Chrysene	2800 E	µg/kg	J	Result exceeded instrument calibration range
VN13	GP-63-4-6	SVOC-SIM	Benzo(a)pyrene	3400 E	µg/kg	J	Result exceeded instrument calibration range
VN13	GP-63-4-6	SVOC-SIM	Indeno(1,2,3-cd)pyrene	1800 E	µg/kg	J	Result exceeded instrument calibration range
VN13	GP-63-4-6	SVOC-SIM	Benzo(g,h,i)perylene	2100 E	µg/kg	J	Result exceeded instrument calibration range
VN13	GP-63-4-6	SVOC-SIM	Total Benzofluoranthenes	4600 E	µg/kg	J	Result exceeded instrument calibration range

Data packages reviewed: Axys DPWG41596, DPWG41685, DPWG41834; ARI VH79, VH87, VI22, VI27, VI40, VI70, VI85, VJ70, VM44, VM59, VM72, VM91, VN13

Key:

E = Undiluted sample concentration exceeded calibration range; use result of dilution/reanalysis for decision-making purposes

TPH-d = Total petroleum hydrocarbons - diesel; Method NWTPH-Dx

Phenols = Chlorinated phenols; Method 8270D

SVOC = Semivolatile organic compounds; Method 8270D

SVOC-SIM = Semivolatile organic compounds - selected ion monitoring

mg/kg = Milligrams per kilogram

µg/kg = Micrograms per kilogram

J = Detected sample result qualified as estimated

Memorandum

Environmental Resources Management

To: Dylan Stankus

From: Irene Lavigne

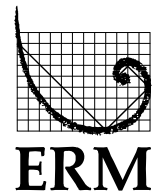
Date: 28 June 2013

Subject: Data Review of Reichhold-Glacier Archived
Sediment Samples Collected May 2012

Project Number: 0155129

Data Packages: Axys Analytical Services Data Package DPWG43832
Analytical Resources Incorporated Data Packages
WP16 and WU91

2875 Michelle Drive
Suite 200
Irvine, CA 92606
(949) 623-4700
(949) 623-2940 (fax)



The data quality was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999, *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004, and the *EPA Region 10 SOP for the Validation of Polychlorinated Dibenzodioxin (PCDD) and Polychlorinated Dibenzofuran (PCDF) Data*, January 1996.

HOLDING TIME AND PRESERVATION EVALUATION

The sample shipments were received at each laboratory within the method-prescribed preservation requirements. All samples were frozen in May 2012 and held for possible analyses, which were subsequently requested in April 2013. No sample data were qualified based on the preservation evaluation.

The samples were prepared and analyzed within the method-prescribed time period from the date of collection with limited exceptions. Two samples submitted for total metals analysis were analyzed outside of the 180-day holding time for this analysis. The detected compounds for these two samples were qualified as estimated and biased low (J-) and the nondetected results for these samples were qualified as estimated (UJ). Fifteen samples were analyzed outside of the 180-day holding time for total organic carbon (TOC) analysis. The detected results for these analyses were qualified as estimated and biased low (J-). The holding-time outliers and associated qualifiers are listed in Table 1.

BLANK EVALUATION

The method blank, lab blank, and field blank sample results were nondetected for each of the target analytes with limited exceptions. Detections of dioxin/furan compounds in a lab blank did not require qualification of associated sample data because the field sample concentrations exceeded five times the blank detections. Additionally, detections of semivolatile organic compounds (SVOCs) in a method blank did not require qualification of sample data because the sample results were nondetected for the corresponding compounds. The blank detections are presented in Table 2.

BLANK SPIKE EVALUATION

The laboratory control sample (LCS) recoveries were within the laboratories' limits of acceptance. No sample data were qualified based on the blank spike evaluation. The LCS recoveries indicate acceptable laboratory accuracy and precision.

MATRIX SPIKE EVALUATION

The matrix spike (MS) and matrix spike duplicate (MSD) recoveries were within the laboratories' limits of acceptance with several exceptions. Detected sample results for lead were qualified as estimated (J) based on an MS recovery that exceeded the maximum acceptable limits. Additionally, detected sample results for TOC were qualified as estimated (J) due to a low MS recovery for this analyte. Not all MS recovery outliers resulted in qualification of associated sample data. Data were not qualified if only one recovery in a MS/MSD pair exceeded control limits or if the concentration of the unspiked sample exceeded four times the spiked amount. The outlying MS recoveries and qualified sample data are shown in Table 3.

LABELED COMPOUND EVALUATION

Carbon-13 labeled isotope recoveries were reported for each sample submitted for dioxin/furan analysis. The recoveries of labeled PCDD and PCDF compounds is a measure of the effectiveness of the laboratory and method to extract the compounds of interest. All of the labeled compounds were within acceptable limits, and no qualifiers were required based on the labeled compound evaluation.

SURROGATE EVALUATION

The surrogate recoveries were within acceptable limits, and no sample data required qualification as a result of the surrogate evaluation. The surrogate recoveries indicate minimal matrix interference in the samples.

ESTIMATED MAXIMUM POSSIBLE CONCENTRATION

The laboratory identified several dioxin/furan results as estimated maximum possible concentrations (EMPC). An EMPC value is the maximum possible concentration of a compound that could be present in the sample. This classification is used when all of the identification criteria for a given dioxin or furan compound are not met. The sample data identified as EMPC by the laboratory were qualified as nondetected (U), as presented in Table 4.

FIELD DUPLICATE EVALUATION

One sample was collected and analyzed in duplicate. ERM calculated the relative percent difference (RPD) between detected results. The USEPA has not established control criteria for field duplicate samples; therefore, sample data are not qualified on the basis of field duplicate imprecision. Detected duplicate results and calculated RPDs are listed in Table 5.

ANALYTICAL DUPLICATE EVALUATION

The laboratory prepared and analyzed several samples as analytical duplicates. ERM calculated the RPD between detected results. The RPDs were within acceptable limits with one exception. The primary sample result for one sample analyzed for lead was qualified as estimated (J), as shown in Table 6.

CONTINUING CALIBRATION EVALUATION

The laboratory noted that continuing calibration verification (CCV) recoveries for a number of SVOCs did not meet acceptable control limits. A low recovery for benzoic acid resulted in qualification of one sample result for this compound as estimated (UJ). High recoveries for acenaphthylene, pyrene, and benzo(a)anthracene required the qualification of several detected sample results for these compounds as estimated (J). A list of outlying CCV recoveries and associated qualified data is provided in Table 7.

CALIBRATION RANGE EVALUATION

The laboratories noted several instances where the sample results exceeded the calibration range of the equipment for dioxin/furan compounds and SVOCs. The dioxin/furan results were not reported by the laboratory. The reported SVOC sample results were qualified as estimated (J). Both laboratories diluted and reanalyzed the affected samples. The sample results from the dilutions should be used for decision-making purposes. The samples with calibration range exceedances are presented in Table 8.

OVERALL ASSESSMENT

No data were determined to be unusable. All of the data, including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents.

Table 1
Samples with Exceeded Holding Times
May 2012 Archived Sediment Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Method	Holding Time (days)	Days Exceeded	ERM Qualifier
WP16	SED-SC-03-4-6-053012	Total Metals	180	164	J-/UJ
WP16	SED-SC-05-4-6-060112	Total Metals	180	162	J-/UJ
WU91	SED-SC-06-4-6-052912	TOC	180	158	J-
WU91	SED-SC-06-8-10-052912	TOC	180	158	J-
WU91	SED-SC-14-1-2-052912	TOC	180	158	J-
WU91	SED-SC-14-4-6-052912	TOC	180	158	J-
WU91	SED-SC-04-1-2-053012	TOC	180	157	J-
WU91	SED-SC-04-4-6-053012	TOC	180	157	J-
WU91	SED-SC-07-1-2-053012	TOC	180	157	J-
WU91	SED-SC-07-4-6-053012	TOC	180	157	J-
WU91	SED-SC-02-8-10-052912	TOC	180	158	J-
WU91	SED-SC-09-1-2-052912	TOC	180	158	J-
WU91	SED-SC-08-4-6-053012	TOC	180	157	J-
WU91	SED-SC-03-4-6-053012	TOC	180	157	J-
WU91	SED-SC-17-4-5-053012	TOC	180	157	J-
WU91	SED-SC-13-4-6-053112	TOC	180	156	J-
WU91	SED-SC-05-4-6-060112	TOC	180	155	J-

Data packages reviewed: Axys DPWG43832; ARI WP16, WU91

Key:

TOC = Total organic carbon

J- = Detected sample result qualified as estimated and biased low

UJ = Nondetected sample result qualified as estimated

Table 2
Blank and Associated Suspect Sample Detections
May 2012 Archived Sediment Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG43832	Lab Blank	PCDD/PCDF	NA	OCDD	4.31	0.999	pg/g	--
DPWG43832	Lab Blank	PCDD/PCDF	NA	OCDF	1.40	0.999	pg/g	--
WP16	MB-051413	SVOC-SIM	NA	1,2-Dichlorobenzene	3.2	5.0	µg/kg	--

Data packages reviewed: Axys DPWG43832; ARI WP16, WU91

Key:

MB = Method blank

PCDD/PCDF = Polychlorinated dibenzo-p-dioxins/Polychlorinated dibenzofurans; Method 1613B

NA = Not applicable; qualification of sample data not required

OCDD = Octochlorodibenzo-p-dioxin

OCDF = Octochlorodibenzofuran

pg/g = Picograms per gram

SVOC-SIM = Semivolatile organic compounds - selected ion monitoring

µg/kg = Micrograms per kilogram

Table 3
Spike Recoveries Outside of Acceptable Limits
May 2012 Archived Sediment Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
DPWG43832	SED-SC-04-1-2-053012 MS/MSD	PCDD/PCDF	NA	1,2,3,6,7,8-HXCDD	138/120	70-130	13.7	30	--	--
DPWG43832	SED-SC-04-1-2-053012 MS/MSD	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDD	1820/1920	70-130	5.56	30	4X	--
DPWG43832	SED-SC-04-1-2-053012 MS/MSD	PCDD/PCDF	NA	OCDD	6540/3210	70-130	68.4	30	4X	--
DPWG43832	SED-SC-04-1-2-053012 MS/MSD	PCDD/PCDF	NA	1,2,3,4,7,8-HXCDF	139/169	70-130	20.1	30	4X	--
DPWG43832	SED-SC-04-1-2-053012 MS/MSD	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDF	51.6	70-130	--	--	4X	--
DPWG43832	SED-SC-04-1-2-053012 MS/MSD	PCDD/PCDF	NA	OCDF	15.0	70-130			4X	--
WP16	SED-SC-17-4-5-053012 MS/MSD	SVOC-SIM	NA	N-Nitrosodiphenylamine	115/109	36-111	4.8	40	--	--
WP16	SED-SC-03-4-6-053012 MS/MSD	Total Metals	See below	Lead	73.7	75-125	--	--	--	--
WP16	SED-SC-03-4-6-053012 MS/MSD	Total Metals	SED-SC-03-4-6-053012	Lead	--	--	--	--	20.6	J
WP16	SED-SC-03-4-6-053012 MS/MSD	Total Metals	SED-SC-05-4-6-060112	Lead	--	--	--	--	28.0	J
WU91	SED-SC-06-4-6-052912 MS/MSD	TOC	See below	TOC	57.2	75-125	--	--	--	--
WU91	SED-SC-06-4-6-052912 MS/MSD	TOC	SED-SC-06-4-6-052912	TOC	--	--	--	--	2.07	J
WU91	SED-SC-06-4-6-052912 MS/MSD	TOC	SED-SC-60-8-10-052912	TOC	--	--	--	--	3.17	J

Table 3
Spike Recoveries Outside of Acceptable Limits
May 2012 Archived Sediment Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
WU91	SED-SC-06-4-6-052912 MS/MSD	TOC	SED-SC-14-1-2-052912	TOC	--	--	--	--	1.79	J
WU91	SED-SC-06-4-6-052912 MS/MSD	TOC	SED-SC-14-4-6-052912	TOC	--	--	--	--	1.55	J
WU91	SED-SC-06-4-6-052912 MS/MSD	TOC	SED-SC-04-1-2-053012	TOC	--	--	--	--	1.84	J
WU91	SED-SC-06-4-6-052912 MS/MSD	TOC	SED-SC-04-4-6-053012	TOC	--	--	--	--	0.552	J
WU91	SED-SC-06-4-6-052912 MS/MSD	TOC	SED-SC-07-1-2-053012	TOC	--	--	--	--	1.73	J
WU91	SED-SC-06-4-6-052912 MS/MSD	TOC	SED-SC-07-4-6-053012	TOC	--	--	--	--	1.90	J
WU91	SED-SC-06-4-6-052912 MS/MSD	TOC	SED-SC-02-8-10-052912	TOC	--	--	--	--	1.24	J
WU91	SED-SC-06-4-6-052912 MS/MSD	TOC	SED-SC-09-1-2-052912	TOC	--	--	--	--	2.18	J
WU91	SED-SC-06-4-6-052912 MS/MSD	TOC	SED-SC-08-4-6-053012	TOC	--	--	--	--	1.54	J
WU91	SED-SC-06-4-6-052912 MS/MSD	TOC	SED-SC-03-4-6-053012	TOC	--	--	--	--	1.73	J
WU91	SED-SC-06-4-6-052912 MS/MSD	TOC	SED-SC-17-4-5-053012	TOC	--	--	--	--	1.00	J
WU91	SED-SC-06-4-6-052912 MS/MSD	TOC	SED-SC-13-4-6-053112	TOC	--	--	--	--	1.42	J

Table 3
Spike Recoveries Outside of Acceptable Limits
May 2012 Archived Sediment Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
WU91	SED-SC-06-4-6-052912 MS/MSD	TOC	SED-SC-05-4-6-060112	TOC	--	--	--	--	0.383	J

Data packages reviewed: Axys DPWG43832; ARI WP16, WU91

Key:

MS/MSD = Matrix spike/matrix spike duplicate

RPD = Relative percent difference

PCDD/PCDF = Polychlorinated dibenzo-p-dioxins/Polychlorinated dibenzofurans; Method 1613B

HXCDD = Hexachlorodibenzo-p-dioxin

HPCDD = Heptachlorodibenzo-p-dioxin

OCDD = Octochlorodibenzo-p-dioxin

HXCDF = Hexachlorodibenzofuran

HPCDF = Heptachlorodibenzofuran

OCDF = Octochlorodibenzofuran

4X = Concentration of unspiked sample was greater than 4 times the amount spiked; no qualification required

SVOC-SIM = Semivolatile organic compounds - selected ion monitoring

TOC = Total organic carbon

NA = Not applicable; qualification of sample data not required

J = Detected sample result qualified as estimated

Table 4
Estimated Maximum Possible Concentration
May 2012 Archived Sediment Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG43832	SED-SC-14-4-6-052912	2,3,7,8-TCDD	0.118	0.048	pg/g	0.118 U
DPWG43832	SED-SC-14-4-6-052912	1,2,3,7,8,9-HXCDF	0.390	0.057	pg/g	0.390 U
DPWG43832	SED-SC-08-8-10-053012	1,2,3,7,8-PECDD	0.930	0.929	pg/g	0.930 U
DPWG43832	SED-SC-08-8-10-053012	1,2,3,4,7,8-HXCDD	1.85	0.929	pg/g	1.85 U
DPWG43832	SED-SC-08-8-10-053012	2,3,7,8-TCDF	1.33	0.929	pg/g	1.33 U
DPWG43832	SED-SC-08-8-10-053012	2,3,4,7,8-PECDF	4.18	1.45	pg/g	4.18 U
DPWG43832	SED-SC-08-8-10-053012	1,2,3,7,8,9-HXCDF	1.51	1.33	pg/g	1.51 U
DPWG43832	SED-SC-08-8-10-053012	2,3,4,6,7,8-HXCDF	2.94	1.33	pg/g	2.94 U
DPWG43832	SED-SC-03-4-6-053012	2,3,7,8-TCDD	1.10	0.886	pg/g	1.10 U

Data packages reviewed: Axys DPWG43832; ARI WP16, WU91

Key:

TCDD = Tetrachlorodibenzo-p-dioxin

HXCDF = Hexachlorodibenzofuran

PECDD = Pentachlorodibenzo-p-dioxin

HXCDD = Hexachlorodibenzo-p-dioxin

TCDF = Tetrachlorodibenzofuran

PECDF = Pentachlorodibenzofuran

pg/g = Picograms per gram

U = Nondetected

Table 5
Field Duplicate Results and Calculated Relative Percent Differences
May 2012 Archived Sediment Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration Sample	Duplicate	Report Limit	Units	RPD
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	1,2,3,7,8-PECDD	3.02	2.75	0.879/1.15	pg/g	9.4
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	1,2,3,4,7,8-HXCDD	16.9	22.4	0.879/1.63	pg/g	28
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	1,2,3,6,7,8-HXCDD	155	188	0.879/1.63	pg/g	19
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	1,2,3,7,8,9-HXCDD	36.1	39.2	0.879/1.63	pg/g	8.2
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	1,2,3,4,6,7,8-HPCDD	7420	7980	1.68/4.72	pg/g	7.3
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	OCDD	45100	40200	0.879/0.877	pg/g	11
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	2,3,7,8-TCDF	5.10	5.79	0.879/0.877	pg/g	13
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	1,2,3,7,8-PECDF	8.66	10.50	0.879/1.32	pg/g	19
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	2,3,4,7,8-PECDF	26.9	28.1	0.879/1.32	pg/g	4.4
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	1,2,3,4,7,8-HXCDF	277	294	0.933/2.19	pg/g	6.0
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	1,2,3,6,7,8-HXCDF	48.7	51.9	0.933/2.19	pg/g	6.4
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	1,2,3,7,8,9-HXCDF	5.19	4.32	0.933/2.19	pg/g	18
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	2,3,4,6,7,8-HXCDF	17.7	21.0	0.933/2.19	pg/g	17
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	1,2,3,4,6,7,8-HPCDF	2420	2310	1.31/5.28	pg/g	4.7

Table 5
Field Duplicate Results and Calculated Relative Percent Differences
May 2012 Archived Sediment Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	1,2,3,4,7,8,9-HPCDF	270	232	1.31/5.28	pg/g	15
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	OCDF	13400	10000	0.879/0.877	pg/g	29
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	TOTAL TETRA-DIOXINS	66.1	63.8	0.879/0.877	pg/g	3.5
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	TOTAL PENTA-DIOXINS	424	408	0.879/1.15	pg/g	3.8
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	TOTAL HEXA-DIOXINS	1280	1640	0.879/1.63	pg/g	25
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	TOTAL HEPTA-DIOXINS	11800	13100	1.68/4.72	pg/g	10
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	TOTAL TETRA-FURANS	66.2	77.7	0.879/0.877	pg/g	16
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	TOTAL PENTA-FURANS	545	662	0.879/1.32	pg/g	19
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	TOTAL HEXA-FURANS	3280	3480	0.933/2.19	pg/g	5.9
DPWG43832	SED-SC-05-4-6-060112/ DUP-060112-2	PCDD/PCDF	TOTAL HEPTA-FURANS	12700	13600	1.31/5.28	pg/g	6.8

Data packages reviewed: Axyx DPWG43832; ARI WP16, WU91

Key:

RPD = Relative percent difference

PECDD = Pentachlorodibenzo-p-dioxin

HXCDD = Hexachlorodibenzo-p-dioxin

HPCDD = Heptachlorodibenzo-p-dioxin

OCDD = Octochlorodibenzo-p-dioxin

PCDD/PCDF = Polychlorinated dibenzo-p-dioxins/Polychlorinated dibenzofurans; Method 1613B

TCDF = Tetrachlorodibenzofuran

PECDF = Pentachlorodibenzofuran

HXCDF = Hexachlorodibenzofuran

HPCDF = Heptachlorodibenzofuran

OCDF = Octochlorodibenzofuran

pg/g = Picograms per gram

Table 6
Analytical Duplicate Results and Calculated Relative Percent Differences
May 2012 Archived Sediment Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Concentration		Report Limit	Units	RPD	RPD Limit	ERM Qualifier
			Sample	Duplicate					
WP16	SED-SC-03-4-6-053012	Lead, total	20.6	15.9	0.1	mg/kg	25.8	20	J

Data packages reviewed: Axys DPWG43832; ARI WP16, WU91

Key:

RPD = Relative percent difference

mg/kg = Milligrams per kilogram

J = Detected sample result qualified as estimated

Table 7
Calibration Verification Recoveries Outside of Acceptable Limits
May 2012 Archived Sediment Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	CCV ID	Analysis	Compound	CCV Recovery	CCV Limit	Associated Samples	Reported Concentration	Units	ERM Qualifier
WP16	CCV-052113	SVOC	Benzoic acid	-21.1	20	See below	--	--	--
WP16	CCV-052113	SVOC	--	--	--	SED-SC-17-4-5-053012	< 400	µg/kg	UJ
WP16	CCV-051813	SVOC-SIM	Acenaphthylene	22.5	20	See below	--	--	--
WP16	CCV-051813	SVOC-SIM	--	--	--	SED-SC-06-4-6-052912	53	µg/kg	J
WP16	CCV-051813	SVOC-SIM	--	--	--	SED-SC-06-8-10-052912	22	µg/kg	J
WP16	CCV-051813	SVOC-SIM	--	--	--	SED-SC-14-4-6-052912	11	µg/kg	J
WP16	CCV-051813	SVOC-SIM	--	--	--	SED-SC-05-4-6-060112	6.9	µg/kg	J
WP16	CCV-051813	SVOC-SIM	Pyrene	20.8	20	See below	--	--	--
WP16	CCV-051813	SVOC-SIM	--	--	--	SED-SC-06-4-6-052912	7300	µg/kg	J
WP16	CCV-051813	SVOC-SIM	--	--	--	SED-SC-06-4-6-052912 DIL	13000	µg/kg	J
WP16	CCV-051813	SVOC-SIM	--	--	--	SED-SC-06-8-10-052912	410	µg/kg	J
WP16	CCV-051813	SVOC-SIM	--	--	--	SED-SC-14-4-6-052912	140	µg/kg	J
WP16	CCV-051813	SVOC-SIM	--	--	--	SED-SC-04-4-6-053012	16	µg/kg	J
WP16	CCV-051813	SVOC-SIM	--	--	--	SED-SC-05-4-6-060112	180	µg/kg	J
WP16	CCV-051813	SVOC-SIM	Benzo(a)anthracene	20.1	20	See below	--	--	--
WP16	CCV-051813	SVOC-SIM	--	--	--	SED-SC-06-4-6-052912	3600	µg/kg	J
WP16	CCV-051813	SVOC-SIM	--	--	--	SED-SC-06-4-6-052912 DIL	4100	µg/kg	J
WP16	CCV-051813	SVOC-SIM	--	--	--	SED-SC-06-8-10-052912	120	µg/kg	J
WP16	CCV-051813	SVOC-SIM	--	--	--	SED-SC-14-4-6-052912	45	µg/kg	J
WP16	CCV-051813	SVOC-SIM	--	--	--	SED-SC-04-4-6-053012	5.8	µg/kg	J
WP16	CCV-051813	SVOC-SIM	--	--	--	SED-SC-05-4-6-060112	75	µg/kg	J

Data packages reviewed: Axys DPWG43832; ARI WP16, WU91

Key:

CCV = Continuing calibration verification

SVOC = Semivolatile organic compounds; Method 8270D

SVOC-SIM = Semivolatile organic compounds - selected ion monitoring

µg/kg = Micrograms per kilogram

UJ = Nondetected sample result qualified as estimated

J = Detected sample result qualified as estimated

Table 8
Calibration Range Exceedances
May 2012 Archived Sediment Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Method	Compound	Reported Concentration	Units	ERM Qualifier	Notes
DPWG43832	SED-SC-06-8-10-052912	PCDD/PCDF	1,2,3,4,6,7,8-HPCDD	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG43832	SED-SC-06-8-10-052912	PCDD/PCDF	OCDD	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG43832	SED-SC-06-8-10-052912	PCDD/PCDF	1,2,3,4,6,7,8-HPCDF	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG43832	SED-SC-06-8-10-052912	PCDD/PCDF	OCDF	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG43832	SED-SC-06-8-10-052912	PCDD/PCDF	TOTAL HEPTA-DIOXINS	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG43832	SED-SC-06-8-10-052912	PCDD/PCDF	TOTAL HEPTA-FURANS	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG43832	SED-SC-17-4-5-053012	PCDD/PCDF	OCDD	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG43832	SED-SC-04-1-2-053012	PCDD/PCDF	OCDD	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
WP16	SED-SC-06-4-6-052912	SVOC-SIM	Acenaphthene	1900 E	µg/kg	J	Result exceeded instrument calibration range
WP16	SED-SC-06-4-6-052912	SVOC-SIM	Fluorene	1500 E	µg/kg	J	Result exceeded instrument calibration range
WP16	SED-SC-06-4-6-052912	SVOC-SIM	Phenanthrene	4100 E	µg/kg	J	Result exceeded instrument calibration range
WP16	SED-SC-06-4-6-052912	SVOC-SIM	Anthracene	5200 E	µg/kg	J	Result exceeded instrument calibration range
WP16	SED-SC-06-4-6-052912	SVOC-SIM	Fluoranthene	7200 E	µg/kg	J	Result exceeded instrument calibration range
WP16	SED-SC-06-4-6-052912	SVOC-SIM	Pyrene	7300 E	µg/kg	J	Result exceeded instrument calibration range

Table 8
Calibration Range Exceedances
May 2012 Archived Sediment Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Method	Compound	Reported Concentration	Units	ERM Qualifier	Notes
WP16	SED-SC-06-4-6-052912	SVOC-SIM	Benzo(a)anthracene	3600 E	µg/kg	J	Result exceeded instrument calibration range
WP16	SED-SC-06-4-6-052912	SVOC-SIM	Chrysene	4800 E	µg/kg	J	Result exceeded instrument calibration range
WP16	SED-SC-06-4-6-052912	SVOC-SIM	Benzo(a)pyrene	1700 E	µg/kg	J	Result exceeded instrument calibration range

Data packages reviewed: Axys DPWG43832; ARI WP16, WU91

Key:

PCDD/PCDF = Polychlorinated dibenzo-p-dioxins/Polychlorinated dibenzofurans; Method 1613B

HPCDD = Heptachlorodibenzo-p-dioxin

OCDD = Octochlorodibenzo-p-dioxin

HPCDF = Heptachlorodibenzofuran

OCDF = Octochlorodibenzofuran

NR = Value not reported

pg/g = Picograms per gram

SVOC-SIM = Semivolatile organic compounds - selected ion monitoring

E = Undiluted sample concentration exceeded calibration range; use result of dilution/reanalysis for decision-making purposes

µg/kg = Micrograms per kilogram

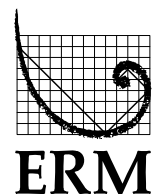
J = Detected sample result qualified as estimated

Memorandum

Environmental
Resources
Management

To: Mike Mendes
From: Sandra Mulhearn
Date: 30 October 2013
Subject: Data Review of Reichold-Glacier, Uplands Soil
Samples Collected 10 October 2013, Chromium VI
Analyses
Project Number: 0185447.12

2525 Natomas Park Drive
Suite 350
Sacramento, CA 95833
(916) 924-9378
(916) 920-9378 (fax)



Data Package: Analytic Resources, Incorporated Data Package XJ52

The quality of the data was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004.

HOLDING TIME AND PRESERVATION EVALUATION

The samples were prepared and analyzed within the method prescribed time period from the date of collection. The sample shipments were received at the laboratory within the method prescribed temperature preservation requirements. None of the data were qualified based on holding time or temperature preservation exceedances.

BLANK EVALUATION

The method blank sample results were nondetected for the target analytes. None of the data required qualification based on blank results.

STANDARD REFERENCE EVALUATION

The standard reference recoveries were within acceptable limits. No sample data were qualified based upon standard reference recoveries.

MATRIX SPIKE EVALUATION

The matrix spike (MS) recoveries were below the laboratory's limits of acceptance for both soluble and insoluble hexavalent chromium. The

laboratory confirmed the results and indicated matrix interferences. Recoveries were 0% and 2%. Due to the low recoveries, a post-digestion spike was analyzed which also had recoveries below the control limit. This confirmed that matrix interferences and associated results were rejected (R) per National Functional Guidelines.

REPLICATE EVALUATION

The laboratory prepared and analyzed one replicate sample. The relative percent difference (RPD) for each replicate was within acceptable limits (<20% RPD). Sample data were not qualified based upon the replicate RPDs.

OVERALL ASSESSMENT

All hexavalent chromium results were rejected due to significant matrix interferences. The hexavalent chromium results cannot be used for decision-making purposes.

Table 1
Matrix Spike Recoveries Outside of Acceptable Limits
Soil Samples Collected 10 October 2013- Chromium VI Data
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	Sample Result	ERM Qualifier
XJ52	MW-31D-8.25-9.25	Cr VI	see below	Chromium, hexavalent	2	75-125	--	--
XJ52	MW-31D-8.25-9.25	Cr VI	see below	Chromium, hexavalent	0	75-125	--	--
XJ52	MW-31D-8.25-9.25 Post Spike	Cr VI	see below	Chromium, hexavalent	32	75-125	--	--
XJ52	--	--	MW-31D-8.25-9.25	Chromium, hexavalent	--	--	<0.627	R
XJ52	--	--	MW-35D-8.5-9.5	Chromium, hexavalent	--	--	<0.552	R
XJ52	--	--	GP-74-7.6-8.6	Chromium, hexavalent	--	--	<0.552	R

Data package reviewed: ARI XJ52

Key:

MS/MSD = Matrix spike/matrix spike duplicate

Cr VI = Hexavalent chromium; Method 7196A

R = Sample result was rejected.

Memorandum

Environmental Resources Management

To: Mike Mendes

From: Irene Lavigne

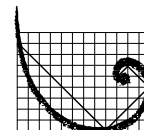
Date: 20 December 2013

Subject: Data Review of Reichhold-Glacier Soil Samples
Collected 7-10 October 2013

Project Number: 0185447

Data Packages: Axys Analytical Services Data Package DPWG45810
and DPWG45857

2875 Michelle Drive
Suite 200
Irvine, CA 92606
(949) 623-4700
(949) 623-2940 (fax)



ERM®

The data quality was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999 and the *EPA Region 10 SOP for the Validation of Polychlorinated Dibenzodioxin (PCDD) and Polychlorinated Dibenzofuran (PCDF) Data*, January 1996.

HOLDING TIME AND PRESERVATION EVALUATION

The sample shipments were received at the laboratory within the method-prescribed preservation requirements with one exception. The temperature of one soil sample, GP-43-6.4-8.4, was recorded at 6.2°C upon receipt at the laboratory. This slightly exceeds the acceptable temperature range of 2-6°C. The slight elevation in temperature was not expected to impact the analysis results; therefore, the resulting data was not qualified based on the temperature exceedance.

The samples were prepared and analyzed within the method-prescribed time period from the date of collection. No sample data were qualified based on the holding time evaluation.

BLANK EVALUATION

The method blank, lab blank, and rinsate blank sample results were nondetected for each of the target analytes with limited exceptions. Detections of dioxin/furan compounds in two lab blanks resulted in the qualification of five associated sample results as nondetected (U). Additional blank detections did not result in qualified data because either the field sample concentrations exceeded five times the blank

concentrations for the corresponding compounds, the associated samples were nondetected, or the detected dioxin/furan compounds had been identified as estimated maximum possible concentrations. The blank detections are presented in Table 1.

MATRIX SPIKE EVALUATION

The matrix spike (MS) and matrix spike duplicate (MSD) recoveries were within the laboratory's limits of acceptance with one exception. Sample data did not require qualification based on the MS/MSD outlier. Data were not qualified because the concentration of the unspiked sample exceeded four times the spiked amount. The outlying MS recovery is shown in Table 2.

LABELED COMPOUND EVALUATION

Carbon-13 labeled isotope recoveries were reported for each sample submitted for dioxin/furan analysis. The recoveries of labeled PCDD and PCDF compounds is a measure of the effectiveness of the laboratory and method to extract the compounds of interest. All of the labeled compounds were within acceptable limits with one exception. However, no qualifiers were applied to the data based on the labeled compound outlier because the sample was diluted by a factor of 15, diluting the labeled compound to the point where it did not provide useful recovery information. The outlying recovery is presented in Table 3.

ESTIMATED MAXIMUM POSSIBLE CONCENTRATION

The laboratory identified several dioxin/furan results as estimated maximum possible concentrations (EMPC). An EMPC value is the maximum possible concentration of a compound that could be present in the sample. This classification is used when all of the identification criteria for a given dioxin or furan compound are not met. The sample data identified as EMPC by the laboratory were qualified as nondetected (U), and are listed in Table 4.

FIELD DUPLICATE EVALUATION

One sample was collected and analyzed in duplicate. ERM calculated the relative percent difference (RPD) between detected results. The USEPA has not established control criteria for field duplicate samples; therefore, sample data are not qualified on the basis of field duplicate imprecision. Detected duplicate results and calculated RPDs are listed in Table 5.

CALIBRATION RANGE EVALUATION

The laboratory noted four instances where the sample results exceeded the calibration range of the equipment for dioxin/furan compounds. The laboratory diluted and reanalyzed the affected samples. The sample results from the dilutions should be used for decision-making purposes. The samples with calibration range exceedances are presented in Table 6.

OVERALL ASSESSMENT

No data were determined to be unusable. All of the data, including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents.

Table 1
Blank and Associated Suspect Sample Detections
October 2013 Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG45810	Lab Blank	PCDD/PCDF	NA	2,3,7,8-TCDD	0.375	0.114	pg/g	EMPC
DPWG45810	Lab Blank	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDD	0.309	0.114	pg/g	EMPC
DPWG45810	Lab Blank	PCDD/PCDF	NA	OCDD	0.527	0.114	pg/g	EMPC
DPWG45810	Lab Blank	PCDD/PCDF	See below	2,3,4,7,8-PECDF	0.264	0.114	pg/g	--
DPWG45810	Lab Blank	PCDD/PCDF	GP-67-4.8-6.8	2,3,4,7,8-PECDF	1.22	0.167	pg/g	1.22 U
DPWG45810	Lab Blank	PCDD/PCDF	GP-43-6.4-8.4	2,3,4,7,8-PECDF	0.289	0.100	pg/g	0.289 U
DPWG45810	Lab Blank	PCDD/PCDF	NA	OCDF	0.133	0.114	pg/g	EMPC
DPWG45810	Lab Blank	PCDD/PCDF	See below	TOTAL PENTA-FURANS	0.264	0.114	pg/g	--
DPWG45810	Lab Blank	PCDD/PCDF	GP-43-6.4-8.4	TOTAL PENTA-FURANS	1.06	0.100	pg/g	1.06 U
DPWG45857	RB-100813-1	PCDD/PCDF	NA	2,3,7,8-TCDD	0.632	0.502	pg/g	EMPC
DPWG45857	RB-100813-1	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDD	0.716	0.535	pg/g	EMPC
DPWG45857	RB-100813-1	PCDD/PCDF	NA	OCDD	4.55	0.502	pg/g	--
DPWG45857	Lab Blank	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDD	1.09	0.500	pg/g	EMPC
DPWG45857	Lab Blank	PCDD/PCDF	See below	OCDD	6.26	0.500	pg/g	--
DPWG45857	Lab Blank	PCDD/PCDF	GP-73-5.8-7.8	OCDD	23.0	0.202	pg/g	23.0 U
DPWG45857	Lab Blank	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDF	0.527	0.500	pg/g	EMPC
DPWG45857	Lab Blank	PCDD/PCDF	NA	OCDF	0.729	0.500	pg/g	EMPC
DPWG45857	Lab Blank	PCDD/PCDF	See below	TOTAL HEPTA-DIOXINS	0.762	0.500	pg/g	--

Table 1
Blank and Associated Suspect Sample Detections
October 2013 Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG45857	Lab Blank	PCDD/PCDF	GP-73-5.8-7.8	TOTAL HEPTA-DIOXINS	2.26	0.115	pg/g	2.26 U

Data packages reviewed: DPWG45810, DPWG45857

Key:

PCDD/PCDF = Polychlorinated dibenzo-p-dioxins/Polychlorinated dibenzofurans; Method 1613B

RB = Rinsate blank

NA = Not applicable; qualification of sample data not required

TCDD = Tetrachlorodibenzo-p-dioxin

HPCDD = Heptachlorodibenzo-p-dioxin

OCDD = Octochlorodibenzo-p-dioxin

PECDF = Pentachlorodibenzofuran

OCDF = Octochlorodibenzofuran

HPCDF = Heptachlorodibenzofuran

pg/g = Picograms per gram

EMPC = Blank result identified as Estimated Maximum Possible Concentration; qualification of sample data not required

U = Nondetected

Table 2
Spike Recoveries Outside of Acceptable Limits
October 2013 Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
DPWG54810	GP-67-4.8-6.8 MS/MSD	PCDD/PCDF	NA	OCDD	652/475	70-130	31.4	30	4X	--

Data packages reviewed: DPWG45810, DPWG45857

Key:

RPD = Relative percent difference

MS/MSD = Matrix spike/matrix spike duplicate

PCDD/PCDF = Polychlorinated dibenzo-p-dioxins/Polychlorinated dibenzofurans; Method 1613B

NA = Not applicable; qualification of sample data not required

OCDD = Octochlorodibenzo-p-dioxin

4X = Concentration of unspiked sample was greater than 4 times the amount spiked; no qualification required

Table 3
Labeled Compound Recovery Results Outside of Acceptable Limits
October 2013 Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Labeled Compound	Associated Compound	Recovery (%)	Limit (%)	Note	ERM Qualifier
DPWG45810	GP-40-3.5-5.5	13C-OCDD	OCDD	194	17-130	SDO	--

Data packages reviewed: DPWG45810, DPWG45857

Key:

13C = Carbon-13 labeled isotope

OCDD = Octachlorodibenzo-p-dioxin

SDO = Spike sample diluted by a factor of 15; recovery does not provide useful information

Table 4
Estimated Maximum Possible Concentration
October 2013 Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG45810	GP-67-4.8-6.8	2,3,7,8-TCDD	0.417	0.117	pg/g	0.417 U
DPWG45810	GP-35-3.5-5.5	2,3,7,8-TCDD	1.31	0.138	pg/g	1.31 U
DPWG45810	DUP-100813-1	2,3,7,8-TCDD	0.859	0.145	pg/g	0.859 U
DPWG45810	GP-71-7.1-9.1	2,3,7,8-TCDD	0.208	0.111	pg/g	0.208 U
DPWG45810	GP-71-7.1-9.1	2,3,4,7,8-PECDF	0.198	0.111	pg/g	0.198 U
DPWG45810	GP-71-7.1-9.1	1,2,3,4,7,8-HXCDF	0.148	0.111	pg/g	0.148 U
DPWG45810	GP-73-5.8-7.8	2,3,7,8-TCDD	0.289	0.115	pg/g	0.289 U
DPWG45810	GP-73-5.8-7.8	2,3,4,7,8-PECDF	0.285	0.115	pg/g	0.285 U
DPWG45810	GP-73-5.8-7.8	OCDF	1.06	0.115	pg/g	1.06 U
DPWG45810	GP-70-6.1-8.1	2,3,7,8-TCDD	0.374	0.111	pg/g	0.374 U
DPWG45810	GP-70-6.1-8.1	1,2,3,4,7,8-HXCDD	0.186	0.111	pg/g	0.186 U
DPWG45810	GP-70-6.1-8.1	2,3,7,8-TCDF	0.188	0.111	pg/g	0.188 U
DPWG45810	GP-70-6.1-8.1	1,2,3,7,8-PECDF	0.206	0.111	pg/g	0.206 U
DPWG45810	GP-70-6.1-8.1	2,3,4,7,8-PECDF	0.464	0.111	pg/g	0.464 U
DPWG45810	GP-43-6.4-8.4	2,3,7,8-TCDD	0.268	0.100	pg/g	0.268 U
DPWG45810	GP-43-6.4-8.4	1,2,3,4,7,8-HXCDD	0.131	0.100	pg/g	0.131 U
DPWG45810	GP-43-6.4-8.4	1,2,3,6,7,8-HXCDD	0.382	0.100	pg/g	0.382 U
DPWG45810	GP-43-6.4-8.4	2,3,7,8-TCDF	0.182	0.100	pg/g	0.182 U
DPWG45810	GP-43-6.4-8.4	1,2,3,6,7,8-HXCDF	0.206	0.100	pg/g	0.206 U
DPWG45810	GP-43-6.4-8.4	2,3,4,6,7,8-HXCDF	0.172	0.100	pg/g	0.172 U
DPWG45810	GP-43-6.4-8.4	1,2,3,4,7,8,9-HPCDF	0.420	0.100	pg/g	0.420 U
DPWG45810	GP-43-6.4-8.4	2,3,7,8-TCDF	0.113	0.089	pg/g	0.113 U
DPWG45810	Lab Blank	2,3,7,8-TCDD	0.375	0.114	pg/g	0.375 U
DPWG45810	Lab Blank	1,2,3,4,6,7,8-HPCDD	0.309	0.114	pg/g	0.309 U
DPWG45810	Lab Blank	OCDD	0.527	0.114	pg/g	0.527 U
DPWG45810	Lab Blank	OCDF	0.133	0.114	pg/g	0.133 U
DPWG45857	RB-100813-1	2,3,7,8-TCDD	0.632	0.502	pg/g	0.632 U
DPWG45857	RB-100813-1	1,2,3,4,6,7,8-HPCDD	0.716	0.535	pg/g	0.716 U
DPWG45857	Lab Blank	1,2,3,4,6,7,8-HPCDD	1.09	0.500	pg/g	1.09 U
DPWG45857	Lab Blank	1,2,3,4,6,7,8-HPCDF	0.527	0.500	pg/g	0.527 U
DPWG45857	Lab Blank	OCDF	0.729	0.500	pg/g	0.729 U

Data packages reviewed: DPWG45810, DPWG45857

Key:

TCDD = Tetrachlorodibenzo-p-dioxin
 PECDF = Pentachlorodibenzofuran
 HXCDF = Hexachlorodibenzofuran
 OCDF = Octochlorodibenzofuran
 HXCDD = Hexachlorodibenzo-p-dioxin
 TCDF = Tetrachlorodibenzofuran

HPCDF = Heptachlorodibenzofuran
 HPCDD = Heptachlorodibenzo-p-dioxin
 OCDD = Octochlorodibenzo-p-dioxin
 pg/g = Picograms per gram
 RB = Rinsate blank
 U = Nondetected

Table 5
Field Duplicate Results and Calculated Relative Percent Differences
October 2013 Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/ Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
DPWG45810	GP-35-3.5-5.5/ DUP-100813-1	PCDD/PCDF	1,2,3,7,8-PECDD	8.52	4.67	0.311/0.199	pg/g	58
DPWG45810	GP-35-3.5-5.5/ DUP-100813-1	PCDD/PCDF	1,2,3,4,7,8-HXCDD	15.3	8.49	0.213/0.158	pg/g	57
DPWG45810	GP-35-3.5-5.5/ DUP-100813-1	PCDD/PCDF	1,2,3,6,7,8-HXCDD	43.6	37.9	0.213/0.158	pg/g	14
DPWG45810	GP-35-3.5-5.5/ DUP-100813-1	PCDD/PCDF	1,2,3,7,8,9-HXCDD	34.4	19.3	0.213/0.158	pg/g	56
DPWG45810	GP-35-3.5-5.5/ DUP-100813-1	PCDD/PCDF	1,2,3,4,6,7,8-HPCDD	922	860	0.587/0.336	pg/g	7.0
DPWG45810	GP-35-3.5-5.5/ DUP-100813-1	PCDD/PCDF	OCDD	20600	23300	3.88/0.930	pg/g	12
DPWG45810	GP-35-3.5-5.5/ DUP-100813-1	PCDD/PCDF	2,3,7,8-TCDF	3.12	2.69	0.096/0.095	pg/g	15
DPWG45810	GP-35-3.5-5.5/ DUP-100813-1	PCDD/PCDF	1,2,3,7,8-PECDF	2.85	3.32	0.257/0.179	pg/g	15
DPWG45810	GP-35-3.5-5.5/ DUP-100813-1	PCDD/PCDF	2,3,4,7,8-PECDF	6.75	7.56	0.257/0.179	pg/g	11
DPWG45810	GP-35-3.5-5.5/ DUP-100813-1	PCDD/PCDF	1,2,3,4,7,8-HXCDF	41.6	48.1	0.200/0.201	pg/g	14
DPWG45810	GP-35-3.5-5.5/ DUP-100813-1	PCDD/PCDF	1,2,3,6,7,8-HXCDF	11.3	13.1	0.200/0.201	pg/g	15
DPWG45810	GP-35-3.5-5.5/ DUP-100813-1	PCDD/PCDF	1,2,3,7,8,9-HXCDF	0.743	0.722	0.200/0.201	pg/g	2.9
DPWG45810	GP-35-3.5-5.5/ DUP-100813-1	PCDD/PCDF	2,3,4,6,7,8-HXCDF	6.07	5.90	0.200/0.201	pg/g	2.8
DPWG45810	GP-35-3.5-5.5/ DUP-100813-1	PCDD/PCDF	1,2,3,4,6,7,8-HPCDF	171	191	0.223/0.190	pg/g	11
DPWG45810	GP-35-3.5-5.5/ DUP-100813-1	PCDD/PCDF	1,2,3,4,7,8,9-HPCDF	24.8	29.7	0.223/0.190	pg/g	18
DPWG45810	GP-35-3.5-5.5/ DUP-100813-1	PCDD/PCDF	OCDF	419	485	0.111	pg/g	15
DPWG45810	GP-35-3.5-5.5/ DUP-100813-1	PCDD/PCDF	TOTAL TETRA-DIOXINS	68.7	58.5	0.138/0.145	pg/g	16
DPWG45810	GP-35-3.5-5.5/ DUP-100813-1	PCDD/PCDF	TOTAL PENTA-DIOXINS	86.9	65.9	0.311/0.199	pg/g	27
DPWG45810	GP-35-3.5-5.5/ DUP-100813-1	PCDD/PCDF	TOTAL HEXA-DIOXINS	269	186	0.213/0.158	pg/g	36
DPWG45810	GP-35-3.5-5.5/ DUP-100813-1	PCDD/PCDF	TOTAL HEPTA-DIOXINS	1650	1550	0.587/0.336	pg/g	6.3
DPWG45810	GP-35-3.5-5.5/ DUP-100813-1	PCDD/PCDF	TOTAL TETRA-FURANS	58.3	51.5	0.154/0.111	pg/g	12

Table 5
Field Duplicate Results and Calculated Relative Percent Differences
October 2013 Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/ Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
DPWG45810	GP-35-3.5-5.5/ DUP-100813-1	PCDD/PCDF	TOTAL PENTA-FURANS	106	109	0.257/0.179	pg/g	2.8
DPWG45810	GP-35-3.5-5.5/ DUP-100813-1	PCDD/PCDF	TOTAL HEXA-FURANS	295	344	0.200/0.201	pg/g	15
DPWG45810	GP-35-3.5-5.5/ DUP-100813-1	PCDD/PCDF	TOTAL HEPTA-FURANS	574	669	0.223/0.190	pg/g	15

Data packages reviewed: DPWG45810, DPWG45857

Key:

RPD = Relative percent difference

PCDD/PCDF = Polychlorinated dibenzo-p-dioxins/Polychlorinated dibenzofurans; Method 1613B

PECDD = Pentachlorodibenzo-p-dioxin

HXCDD = Hexachlorodibenzo-p-dioxin

HPCDD = Heptachlorodibenzo-p-dioxin

OCDD = Octochlorodibenzo-p-dioxin

TCDF = Tetrachlorodibenzofuran

PECDF = Pentachlorodibenzofuran

HXCDF = Hexachlorodibenzofuran

HPCDF = Heptachlorodibenzofuran

OCDF = Octochlorodibenzofuran

pg/g = Picograms per gram

Table 6
Calibration Range Exceedances
October 2013 Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Method	Compound	Reported Concentration	Units	ERM Qualifier	Notes
DPWG45810	GP-67-4.8-6.8	PCDD/ PCDF	OCDD	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG45810	GP-35-3.5-5.5	PCDD/ PCDF	OCDD	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG45810	DUP-100813-1	PCDD/ PCDF	OCDD	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG45810	GP-40-3.5-5.5	PCDD/ PCDF	OCDD	NR	pg/g	--	Exceeds calibrated linear range, see dilution data

Data packages reviewed: DPWG45810, DPWG45857

Key:

PCDD/PCDF = Polychlorinated dibenzo-p-dioxins/Polychlorinated dibenzofurans; Method 1613B

OCDD = Octochlorodibenzo-p-dioxin

NR = Value not reported

pg/g = Picograms per gram

Memorandum

**Environmental
Resources
Management**

To: Mike Mendes

From: Irene Lavigne

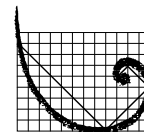
Date: 22 October 2013

Subject: Data Review of Reichhold-Glacier, Uplands Soil
Samples Collected 08-09 October 2013,
Chromium VI Analyses

Project Number: 0185447.12

Data Packages: Analytical Resources, Incorporated Data Packages
XJ01 and XJ31

2875 Michelle Drive
Suite 200
Irvine, CA 92606
(949) 623-4700
(949) 623-2940 (fax)



ERM®

The data quality was assessed and any necessary qualifiers were applied following *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004.

HOLDING TIME AND PRESERVATION EVALUATION

The sample shipments were received at the laboratory within the method-prescribed preservation requirements. The samples were prepared and analyzed within the method-prescribed time period from the date of collection. No sample data were qualified based on sample preservation or holding-time exceedances.

BLANK EVALUATION

The method blanks were nondetected for the target analyte. Sample data were not qualified based on the blank evaluation. The method blank results indicate the absence of laboratory contamination.

MATRIX SPIKE EVALUATION

The matrix spike (MS) recoveries were within the laboratories' limits of acceptance with one exception. No sample data were qualified based on a low recovery for hexavalent chromium because the data could be verified by an associated, in-control MS recovery. The outlying MS recovery is shown in Table 1.

FIELD DUPLICATE EVALUATION

One sample was collected and analyzed in duplicate. The results for both the primary and duplicate sample were nondetected, so a relative percent difference (RPD) could not be calculated.

STANDARD REFERENCE EVALUATION

The standard reference results were within acceptable recovery limits. No sample data were qualified based on the standard reference evaluation.

REPLICATE EVALUATION

The laboratory prepared and analyzed two replicate samples; one replicate sample for each of the two sample delivery groups. The relative percent difference (RPD) for each replicate was within acceptable limits (<20%). Sample data were not qualified based on the replicate RPDs.

OVERALL ASSESSMENT

No data were determined to be unusable or required qualification. All of the data can be used for decision-making purposes. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents.

Table 1
Spike Recoveries Outside of Acceptable Limits
Soil Samples Collected 08-09 October 2012 - Chromium VI Data
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	Sample Result	ERM Qualifier
XJ31	GP-70-6.1-8.1 MS	NA	Chromium, hexavalent	2.2	75-125	--	--

Data package reviewed: XJ01, XJ31

Key:

MS = Matrix spike

Memorandum

**Environmental
Resources
Management**

To: Mike Mendes

From: Irene Lavigne

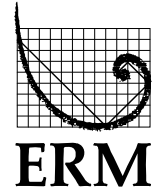
Date: 18 November 2013

Subject: Data Review of Reichhold-Glacier, Uplands Soil
Samples Collected 10 October 2013,
Chromium VI Analyses

Project Number: 0185447.12

Data Package: Analytical Resources, Incorporated Data Package
XJ52 and XM10

2875 Michelle Drive
Suite 200
Irvine, CA 92606
(949) 623-4700
(949) 623-2940 (fax)



The data quality was assessed and any necessary qualifiers were applied following *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004.

Data package XM10 contains reanalyzed hexavalent chromium results for samples originally analyzed in data package XJ52. The reanalyses were requested by ERM due to outlying matrix spike recoveries for hexavalent chromium that had resulted in rejection of three sample results for this compound. The reanalyses resulted in hexavalent chromium data that was qualified but not rejected, as explained in the matrix spike evaluation below.

HOLDING TIME AND PRESERVATION EVALUATION

The sample shipments were received at the laboratory within the method-prescribed preservation requirements. The samples were prepared and analyzed within the method-prescribed time period from the date of collection. No sample data were qualified based on sample preservation or holding-time exceedances.

BLANK EVALUATION

The method blanks were nondetected for the target analytes. Sample data were not qualified based on the blank evaluation. The method blank results indicate the absence of laboratory contamination.

MATRIX SPIKE EVALUATION

The matrix spike (MS) recoveries were below the laboratory's limits of acceptance for hexavalent chromium. Due to the low recoveries, post-digestion spikes (PS) were analyzed. The PS recovery was also below control limits, resulting in rejection (R) of the nondetected sample results for the three associated samples per National Functional Guidelines. These initial results cannot be used for decision-making purposes.

At ERM's request two samples, MW-35D-8.5-9.5 and GP-74-7.6-9.6, were reanalyzed for hexavalent chromium and the resulting data were presented in data package XM10. The PS recoveries completed in the reanalyses of these two samples were within control limits. The nondetected sample results for hexavalent chromium for these samples were qualified as estimated (UJ). The results of the reanalysis can be used for decision-making purposes. The outlying MS recoveries and qualified sample data are shown in Table 1.

STANDARD REFERENCE EVALUATION

The standard reference results were within acceptable recovery limits. No sample data were qualified based on the standard reference evaluation.

REPLICATE EVALUATION

The laboratory prepared and analyzed three replicate samples. The relative percent difference (RPD) for each replicate was within acceptable limits (<20%). Sample data were not qualified based on the replicate RPDs.

OVERALL ASSESSMENT

Three hexavalent chromium results were rejected due to significant matrix interferences. These hexavalent chromium results cannot be used for decision-making purposes. Two of these samples were reanalyzed. The results of the reanalysis for hexavalent chromium were qualified as estimated. The results of the reanalyzed samples can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation, with the exception of the rejected data, is acceptable for the preparation of technically-defensible documents.

Table 1
Spike Recoveries Outside of Acceptable Limits
Soil Samples Collected 10 October 2013 - Chromium VI Data
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	Sample Result	ERM Qualifier
XJ52	MW-31D-8.25-9.25 MS	Cr VI	See below	Chromium, hexavalent	2	75-125	--	--
XJ52	MW-31D-8.25-9.25 MS	Cr VI	See below	Chromium, hexavalent	0	75-125	--	--
XJ52	MW-31D-8.25-9.25 PS	Cr VI	See below	Chromium, hexavalent	32	75-125	--	--
XJ52	--	--	MW-31D-8.25-9.25	Chromium, hexavalent	--	--	< 0.627	R
XJ52	--	--	MW-35D-8.5-9.5	Chromium, hexavalent	--	--	< 0.552	R*
XJ52	--	--	GP-74-7.6-8.6	Chromium, hexavalent	--	--	< 0.552	R*
XM10	MW-35D-8.5-9.5 MS	Cr VI	See below	Chromium, hexavalent	18.8	75-125	--	--
XM10	MW-35D-8.5-9.5 PS	Cr VI	See below	Chromium, hexavalent	81	75-125	--	--
XM10	--	--	MW-35D-8.5-9.5	Chromium, hexavalent	--	--	< 0.553	UJ
XM10	GP-74-7.6-8.6 MS	Cr VI	See below	Chromium, hexavalent	39.5	75-125	--	--
XM10	GP-74-7.6-8.6 PS	Cr VI	See below	Chromium, hexavalent	84	75-125	--	--
XM10	--	--	GP-74-7.6-8.6	Chromium, hexavalent	--	--	< 0.532	UJ

Data packages reviewed: XJ52, XM10

Key:

MS = Matrix spike

PS = Post digestion spike

R = Sample result is rejected

R* = Sample result is rejected; sample was reanalyzed with usable results

UJ = Nondetected sample result qualified as estimated

Memorandum

**Environmental
Resources
Management**

To: Mike Mendes

From: Irene Lavigne

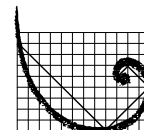
Date: 16 October 2013

Subject: Data Review of Reichhold-Glacier, Uplands Soil
Samples Collected 1-4 October 2013,
Chromium VI Analyses

Project Number: 0185447.12

Data Packages: Analytical Resources, Incorporated Data Packages
XH88 and XI58

2875 Michelle Drive
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Irvine, CA 92606
(949) 623-4700
(949) 623-2940 (fax)



ERM®

The data quality was assessed and any necessary qualifiers were applied following *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004.

HOLDING TIME AND PRESERVATION EVALUATION

The sample shipments were received at the laboratory within the method-prescribed preservation requirements. The samples were prepared and analyzed within the method-prescribed time period from the date of collection. No sample data were qualified based on sample preservation or holding-time exceedances.

BLANK EVALUATION

The method blank were nondetected for the target analyte. Sample data were not qualified based on the blank evaluation. The method blank results indicate the absence of laboratory contamination.

STANDARD REFERENCE EVALUATION

The standard reference results were within acceptable recovery limits. No sample data were qualified based on the standard reference evaluation.

REPLICATE EVALUATION

The laboratory prepared and analyzed two replicate samples; one replicate sample for each of the two sample delivery groups. The relative percent difference (RPD) for each replicate was within acceptable limits (<20%). Sample data were not qualified based on the replicate RPDs.

OVERALL ASSESSMENT

No data were determined to be unusable or required qualification. All of the data can be used for decision-making purposes. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents.

Memorandum

Environmental Resources Management

To: Mike Mendes

From: Irene Lavigne

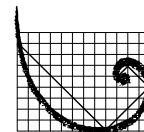
Date: 17 October 2013

Subject: Data Review of Reichhold-Glacier, Uplands Soil
Samples Collected 1-4 October 2013,
Chromium VI Analyses

Project Number: 0185447.12

Data Package: Analytical Resources, Incorporated Data Package
XI72

2875 Michelle Drive
Suite 200
Irvine, CA 92606
(949) 623-4700
(949) 623-2940 (fax)



ERM®

The data quality was assessed and any necessary qualifiers were applied following *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004.

HOLDING TIME AND PRESERVATION EVALUATION

The sample shipments were received at the laboratory within the method-prescribed preservation requirements. The samples were prepared and analyzed within the method-prescribed time period from the date of collection. No sample data were qualified based on sample preservation or holding-time exceedances.

BLANK EVALUATION

The method blank were nondetected for the target analyte. Sample data were not qualified based on the blank evaluation. The method blank results indicate the absence of laboratory contamination.

MATRIX SPIKE EVALUATION

The matrix spike (MS) recoveries were within the laboratories' limits of acceptance with one exception. Detected and nondetected sample results for hexavalent chromium were qualified as estimated, J and UJ, respectively, due to an associated low MS recovery for this compound. The outlying MS recovery and qualified sample data are shown in Table 1.

STANDARD REFERENCE EVALUATION

The standard reference results were within acceptable recovery limits. No sample data were qualified based on the standard reference evaluation.

REPLICATE EVALUATION

The laboratory prepared and analyzed two replicate samples; one replicate sample for each of the two sample delivery groups. The relative percent difference (RPD) for each replicate was within acceptable limits (<20%). Sample data were not qualified based on the replicate RPDs.

OVERALL ASSESSMENT

No data were determined to be unusable. All of the data, including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents.

Table 1
Spike Recoveries Outside of Acceptable Limits
Soil Samples Collected 07 October 2012 - Chromium VI Data
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	Sample Result	ERM Qualifier
XI72	GP-69-7.6-9.6 MS	See below	Chromium, hexavalent	71.3	75-125	--	--
XI72	GP-69-7.6-9.6 MS	MW-38D-8.5-9.5	Chromium, hexavalent	--	--	< 0.541	UJ
XI72	GP-69-7.6-9.6 MS	MW-45D-9.5-10.5	Chromium, hexavalent	--	--	< 0.540	UJ
XI72	GP-69-7.6-9.6 MS	GP-69-7.6-9.6	Chromium, hexavalent	--	--	0.592	J
XI72	GP-69-7.6-9.6 MS	GP-69-12.6-13.6	Chromium, hexavalent	--	--	< 0.568	UJ
XI72	GP-69-7.6-9.6 MS	DUP-100713-2	Chromium, hexavalent	--	--	< 0.574	UJ

Data package reviewed: XI72

Key:

MS = Matrix spike

UJ = Nondetected sample result qualified as estimated

J = Detected sample result qualified as estimated

Memorandum

Environmental Resources Management

To: Mike Mendes

From: Irene Lavigne

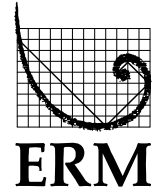
Date: 25 November 2013
Revised 04 April 2014; additional analyte reported

Subject: Data Review of Reichhold-Glacier, Uplands Soil
Samples Collected 01 October 2013

Project Number: 0185447.12

Data Packages: Analytical Resources, Incorporated Data Packages
XH88 and XH88 revised for SVOC analyses

2875 Michelle Drive
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Irvine, CA 92606
(949) 623-4700
(949) 623-2940 (fax)



The data quality was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999, *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004.

After initial analyses and reporting of the field samples in ARI Job No. XH88, the laboratory discovered an incorrect instrument setting. The laboratory explained that, for the semivolatile organic compound (SVOC) analyses, the analyte concentrations were calculated using continuing calibration data instead of initial calibration data. It is ARI's Standard Operating Procedure to use initial calibration to calculate analyte concentrations. A revised data package was issued that corrected the SVOC analyte concentrations. The laboratory released the results under the same ARI Job No. XH88; however, for the purposes of reviewing the corrected results, ERM refers to the revised SVOC results under data package "XH88-SVOCrev".

HOLDING TIME AND PRESERVATION EVALUATION

The sample shipment was received at the laboratory within the method-prescribed preservation requirements. The samples were prepared and analyzed within the method-prescribed time period from the date of collection. No sample data were qualified based on sample preservation or holding-time exceedances.

BLANK EVALUATION

The method blank and trip blank sample results were nondetected for each of the target analytes with limited exceptions. One sample result for diethylphthalate was qualified as nondetected (U) based on a detection of this compound in a method blank. Additional blank detections did not result in qualification of sample data because the associated sample concentrations exceeded five times the blank concentrations. The blank detections and qualified data are shown in Table 1.

BLANK SPIKE EVALUATION

The laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) recoveries were within the laboratory's limits of acceptance with limited exceptions. No sample data were qualified on the basis of the LCS outliers because only one recovery in the LCS/LCSD pair exceeded the acceptable control limits, or only the relative percent difference (RPD) exceeded control limits. The outlying LCS recoveries are presented in Table 2.

MATRIX SPIKE EVALUATION

The matrix spike (MS) and matrix spike duplicate recoveries were within the laboratory's limits of acceptance with one exception. Four detected arsenic results were qualified as estimated and biased high (J+) due to a MS recovery that exceeded the maximum acceptable control limits. The outlying MS recovery and associated, qualified sample data are listed in Table 3.

SURROGATE EVALUATION

The surrogate recoveries were within acceptable limits with few exceptions. Detected and nondetected results for one sample submitted for SVOC analysis were qualified as estimated, J and UJ, respectively, due to surrogate recoveries that were below the minimum acceptable limits. A list of the surrogate outliers is provided in Table 4.

FIELD DUPLICATE EVALUATION

One sample was collected and analyzed in duplicate. ERM calculated the RPD between detected results. The USEPA has not established control criteria for field duplicate samples; therefore, sample data are not qualified on the basis of field duplicate imprecision. Detected duplicate results and calculated RPDs are presented in Table 5.

ANALYTICAL DUPLICATE EVALUATION

The laboratory prepared and analyzed several samples as analytical duplicates. The RPDs were less than 20 percent, with one exception. The primary sample result for this duplicate was qualified as estimated (J), as shown in Table 6.

CONTINUING CALIBRATION EVALUATION

The laboratory noted that a continuing calibration verification (CCV) recovery for 1,2-dibromo-3-chloropropane did not meet acceptable control limits. The nondetected sample results associated with this low CCV recovery were qualified as estimated (UJ). The CCV outlier and associated, qualified data are shown in Table 7.

CALIBRATION RANGE EVALUATION

The laboratory noted one instance where the results of an undiluted sample exceeded the calibration range of the equipment. The affected sample was diluted and reanalyzed. The sample data resulting from the reanalysis were within the calibration range and should be used for decision-making purposes. The sample results which exceeded the calibration range were qualified as estimated (J), and are listed in Table 8.

STANDARD REFERENCE EVALUATION

The standard reference results were within acceptable recovery limits. No sample data were qualified based on the standard reference evaluation.

REPLICATE EVALUATION

The laboratory prepared and analyzed several replicate samples. The RPD for each replicate was within acceptable limits (<20%). Sample data were not qualified based on the replicate RPDs.

OVERALL ASSESSMENT

No data were determined to be unusable. All of the data, including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents.

Table 1
Blank and Associated Suspect Sample Detections
Uplands Soil Samples Collected 01 October 2013
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
XH88	TB-100113-1	VOC	NA	Methylene chloride	6.2	2.0	µg/L	--
XH88	TB-100113-1	VOC	NA	Acetone	4.8	10	µg/L	--
XH88	MB-101113A	VOC	NA	Methylene chloride	1.9	2.0	µg/L	--
XH88	MB-101113A	VOC	NA	Naphthalene	0.5	5.0	µg/L	--
XH88-SVOCrev	MB-100413	SVOC	See below	Diethylphthalate	25	20	µg/kg	--
XH88-SVOCrev	MB-100413	SVOC	GP-60-4.5-5.0	Diethylphthalate	74	19	µg/kg	74 U

Data package reviewed: XH88, XH88-SVOCrev

Key:

TB = Trip blank

MB = Method blank

VOC = Volatile organic compounds; Method 8260C

NA = Not applicable; qualification of sample data not required

SVOC = Semivolatile organic compounds; Method 8270D

µg/L = Micrograms per liter

µg/kg = Micrograms per kilogram

U = Nondetected

Table 2
Laboratory Control Spike Recoveries Outside of Acceptable Limits
Uplands Soil Samples Collected 01 October 2013
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Analysis	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
XH88	LCS-101113A	NA	VOC	Methylene chloride	132/114	61-128	14.9	40	--	--
XH88-SVOCrev	LCS-100413	NA	SVOC	Benzyl alcohol	20.0/34.6	19-120	53.5	30	--	--
XH88	LCS-100413	NA	SVOC-SIM	Dibenz(a,h)anthracene	121/103	38-120	16.7	30	--	--

Data package reviewed: XH88, XH88-SVOCrev

Key:

LCS = Laboratory control sample

NA = Not applicable; qualification of sample data not required

VOC = Volatile organic compounds; Method 8260C

SVOC = Semivolatile organic compounds; Method 8270D

SVOC-SIM = Semivolatile organic compounds - selected ion monitoring

Table 3
Matrix Spike Recoveries Outside of Acceptable Limits
Uplands Soil Samples Collected 01 October 2013
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	Sample Result	ERM Qualifier
XH88	GP-72-2.0-4.0 MS	Total Metals	See below	Arsenic	162	75-125	--	--
XH88	GP-72-2.0-4.0 MS	Total Metals	GP-72-2.0-4.0	Arsenic	--	--	24.3	J+
XH88	GP-72-2.0-4.0 MS	Total Metals	MW-35D-4.25-5.5	Arsenic	--	--	2.0	J+
XH88	GP-72-2.0-4.0 MS	Total Metals	GP-72-4.0-6.0	Arsenic	--	--	2.5	J+
XH88	GP-72-2.0-4.0 MS	Total Metals	GP-60-4.5-5.0	Arsenic	--	--	1.6	J+

Data package reviewed: XH88, XH88-SVOCrev

Key:

MS = Matrix spike

J+ = Detected sample result qualified as estimated and biased high

Table 4
Surrogate Recovery Results out of Acceptable Limits
Uplands Soil Samples Collected 01 October 2013
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Method	Surrogate	Recovery (%)	Limit (%)	ERM Qualifier
XH88-SVOCrev	MW-35D-4.25-5.5	SVOC	2,4,6-Tribromophenol	9.7	24-134	J/UJ
XH88-SVOCrev	MW-35D-4.25-5.5	SVOC	2-Fluorophenol	19.7	27-120	J/UJ
XH88-SVOCrev	MW-35D-4.25-5.5	SVOC	d4-2-Chlorophenol	25.5	31-120	J/UJ

Data package reviewed: XH88, XH88-SVOCrev

Key:

SVOC = Semivolatile organic compounds; Method 8270D

J = Detected sample result qualified as estimated

UJ = Nondetected sample result qualified as estimated

Table 5
Field Duplicate Results and Calculated Relative Percent Differences
Uplands Soil Samples Collected 01 October 2013
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
XH88	GP-75-4.0/DUP-100113-1	VOC	Methylene chloride	8200	8800	1700/2100	µg/kg	7.1
XH88	GP-75-4.0/DUP-100113-1	VOC	Acetone	6000	6900	4200/5100	µg/kg	14
XH88	GP-75-4.0/DUP-100113-1	VOC	Toluene	990	1600	850/1000	µg/kg	47
XH88	GP-75-4.0/DUP-100113-1	VOC	Ethylbenzene	3300	6400	850/1000	µg/kg	64
XH88	GP-75-4.0/DUP-100113-1	VOC	Styrene	580	720	850/1000	µg/kg	22
XH88	GP-75-4.0/DUP-100113-1	VOC	m,p-Xylene	3800	7000	1700/2100	µg/kg	59
XH88	GP-75-4.0/DUP-100113-1	VOC	o-Xylene	2400	4500	850/1000	µg/kg	61
XH88	GP-75-4.0/DUP-100113-1	VOC	1,3,5-Trimethylbenzene	1100	2200	850/1000	µg/kg	67
XH88	GP-75-4.0/DUP-100113-1	VOC	1,2,4-Trimethylbenzene	3400	7000	850/1000	µg/kg	69
XH88	GP-75-4.0/DUP-100113-1	VOC	Naphthalene	88000	140000	4200/5100	µg/kg	46

Data package reviewed: XH88, XH88-SVOCrev

Key:

RPD = Relative percent difference

VOC = Volatile organic compounds; Method 8260C

µg/kg = Micrograms per kilogram

Table 6
Analytical Duplicate Results and Calculated Relative Percent Differences
Uplands Soil Samples Collected 01 October 2013
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Concentration		Report Limit	Units	RPD	RPD Limit	ERM Qualifier
			Sample	Duplicate					
XH88	GP-72-2.0-4.0	Arsenic, total	24.3	30.9	0.2	mg/kg	23.9	20	J

Data package reviewed: XH88, XH88-SVOCrev

Key:

RPD = Relative percent difference

mg/kg = Milligrams per kilogram

J = Detected sample result qualified as estimated

Table 7
Calibration Verification Recoveries Outside of Acceptable Limits
Uplands Soil Samples Collected 01 October 2013
Reichhold-Glacier Site
Seattle, Washington

Lab Package	CCV ID	Analysis	Compound	CCV Recovery	CCV Limit	Associated Samples	Reported Concentration	Units	ERM Qualifier
XH88	CCV-101113	VOC	1,2-Dibromo-3-chloropropane	-23.2	20	See below	--	--	--
XH88	CCV-101113	--	--	--	--	GP-75-4.0	< 4200	µg/kg	UJ
XH88	CCV-101113	--	--	--	--	DUP-100113-1	< 5100	µg/kg	UJ

Data package reviewed: XH88, XH88-SVOCrev

Key:

CCV = Continuing calibration verification

VOC = Volatile organic compounds; Method 8260C

µg/kg = Micrograms per kilogram

UJ = Nondetected sample result qualified as estimated

Table 8
Calibration Range Exceedances
Uplands Soil Samples Collected 01 October 2013
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Method	Compound	Reported Concentration	Units	ERM Qualifier	Notes
XH88	GP-75-4.0	TPH-d	Diesel	4600 E	mg/kg	J	Result exceeded instrument calibration range
XH88	GP-75-4.0	TPH-d	Motor oil	12000 E	mg/kg	J	Result exceeded instrument calibration range

Data package reviewed: XH88, XH88-SVOCrev

Key:

E = Undiluted sample concentration exceeded calibration range; use result of dilution/reanalysis for decision-making purposes

TPH-d = Total petroleum hydrocarbons - diesel; Method NWTPH-Dx

mg/kg = Milligrams per kilogram

J = Detected sample result qualified as estimated

Memorandum

Environmental Resources Management

To: Mike Mendes

From: Irene Lavigne

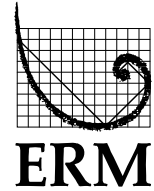
Date: 25 November 2013
Revised 04 March 2014; additional analyte reported

Subject: Data Review of Reichhold-Glacier, Uplands Soil
Samples Collected 04 October 2013

Project Number: 0185447.12

Data Package: Analytical Resources, Incorporated Data Package
XI58 and XI58 revised for SVOC analyses

2875 Michelle Drive
Suite 200
Irvine, CA 92606
(949) 623-4700
(949) 623-2940 (fax)



The data quality was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999, *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004.

After initial analyses and reporting of the field samples in ARI Job No. XI58, the laboratory discovered an incorrect instrument setting. The laboratory explained that, for the semivolatile organic compound (SVOC) analyses, the analyte concentrations were calculated using continuing calibration data instead of initial calibration data. It is ARI's Standard Operating Procedure to use initial calibration to calculate analyte concentrations. A revised data package was issued that corrected the SVOC analyte concentrations. The laboratory released the results under the same ARI Job No. XH88; however, for the purposes of reviewing the corrected results, ERM refers to the revised SVOC results under data package "XI58-SVOCrev".

HOLDING TIME AND PRESERVATION EVALUATION

The sample shipment was received at the laboratory within the method-prescribed preservation requirements. The samples were prepared and analyzed within the method-prescribed time period from the date of collection. No sample data were qualified based on sample preservation or holding-time exceedances.

BLANK EVALUATION

The method blank and trip blank sample results were nondetected for each of the target analytes. No sample data were qualified based on the blank evaluation.

BLANK SPIKE EVALUATION

The laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) recoveries were within the laboratory's limits of acceptance with limited exceptions. One nondetected sample result for benzyl alcohol was qualified as estimated (UJ) based on a low LCS/LCSD recovery pair for this compound. An additional LCS outlier did not warrant qualification of sample data because only one recovery in the LCS/LCSD pair exceeded acceptable control limits. The outlying LCS recoveries are presented in Table 1.

MATRIX SPIKE EVALUATION

The matrix spike (MS) and matrix spike duplicate recoveries were within the laboratory's limits of acceptance. No sample data were qualified on the basis of MS recoveries.

SURROGATE EVALUATION

The surrogate recoveries were within acceptable limits. No sample data required qualification as a result of the surrogate evaluation. The surrogate recoveries indicate minimal matrix interference in the samples.

ANALYTICAL DUPLICATE EVALUATION

The laboratory prepared and analyzed several samples as analytical duplicates. The relative percent difference for each duplicate pair was less than 20 percent, with one exception. The primary sample result for this duplicate was qualified as estimated (J), as shown in Table 2.

CONTINUING CALIBRATION EVALUATION

The laboratory noted that a continuing calibration verification (CCV) recovery for several compounds did not meet acceptable control limits. The nondetected sample results associated with this low CCV recoveries for 4-nitroaniline and 3,3'-dichlorobenzidine were qualified as estimated (UJ). Additional CCV outliers did not require qualification of sample data. Data were not qualified if the recoveries were biased high and the samples were nondetected for the corresponding compounds, or if the outlying compound was not a target analyte. The CCV outliers and associated, qualified data are shown in Table 3.

STANDARD REFERENCE EVALUATION

The standard reference results were within acceptable recovery limits. No sample data were qualified based on the standard reference evaluation.

REPLICATE EVALUATION

The laboratory prepared and analyzed several replicate samples. The RPD for each replicate was within acceptable limits (<20%). Sample data were not qualified based on the replicate RPDs.

OVERALL ASSESSMENT

No data were determined to be unusable. All of the data, including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents.

Table 1
Laboratory Control Spike Recoveries Outside of Acceptable Limits
Uplands Soil Samples Collected 04 October 2013
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Analysis	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
XI58SVOCrev	LCS-100913	See below	SVOC	Benzyl alcohol	NR/NR	19-120	NR	30	--	--
XI58SVOCrev	LCS-100913	GP-49-3.5-5.5	SVOC	Benzyl alcohol	--	--	--	--	< 19	UJ
XI58SVOCrev	LCS-100913	NA	SVOC	N-Nitrosodiphenylamine	106/122	36-120	13.7	30	--	--

Data package reviewed: XI58, XI58SVOCrev

Key:

LCS = Laboratory control sample

SVOC = Semivolatile organic compounds; Method 8270D

NR = Value not reported

NA = Not applicable; qualification of sample data not required

Table 2
Analytical Duplicate Results and Calculated Relative Percent Differences
Uplands Soil Samples Collected 04 October 2013
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Concentration		Report Limit	Units	RPD	RPD Limit	ERM Qualifier
			Sample	Duplicate					
XI58	GP-49-11.75-12.75	Arsenic, total	3.8	7.2	0.3	mg/kg	61.8	20	J

Data package reviewed: XI58, XI58SVOCrev

Key:

RPD = Relative percent difference

mg/kg = Milligrams per kilogram

J = Detected sample result qualified as estimated

Table 3
Calibration Verification Recoveries Outside of Acceptable Limits
Uplands Soil Samples Collected 04 October 2013
Reichhold-Glacier Site
Seattle, Washington

Lab Package	CCV ID	Analysis	Compound	CCV Recovery	CCV Limit	Associated Samples	Reported Concentration	Units	ERM Qualifier
XI58SVOCrev	CCV-101413	SVOC	4-Nitroaniline	-21.6	20	See below	--	--	--
XI58SVOCrev	CCV-101413	--	--	--	--	GP-49-3.5-5.5	< 96	µg/kg	UJ
XI58SVOCrev	CCV-101413	SVOC	4,6-Dinitro-2-methylphenol	25.1	20	NA	--	--	--
XI58SVOCrev	CCV-101413	SVOC	3,3'-Dichlorobenzidine	-22.7	20	See below	--	--	--
XI58SVOCrev	CCV-101413	--	--	--	--	GP-49-3.5-5.5	< 96	µg/kg	UJ
XI58SVOCrev	CCV-101413	SVOC	Benzidine	-94.1	20	NA	--	--	--

Data package reviewed: XI58, XI58SVOCrev

Key:

CCV = Continuing calibration verification

SVOC = Semivolatile organic compounds; Method 8270D

µg/kg = Micrograms per kilogram

UJ = Nondetected sample result qualified as estimated

Memorandum

Environmental Resources Management

To: Mike Mendes

From: Irene Lavigne

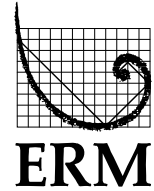
Date: 25 November 2013
Revised 04 April 2014; additional analyte reported

Subject: Data Review of Reichhold-Glacier, Uplands Soil
Samples Collected 07 October 2013

Project Number: 0185447.12

Data Package: Analytical Resources, Incorporated Data Package
XI72 and XI72 revised for SVOC analyses

2875 Michelle Drive
Suite 200
Irvine, CA 92606
(949) 623-4700
(949) 623-2940 (fax)



The data quality was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999, *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004.

After initial analyses and reporting of the field samples in ARI Job No. XI72, the laboratory discovered an incorrect instrument setting. The laboratory explained that, for the semivolatile organic compound (SVOC) analyses, the analyte concentrations were calculated using continuing calibration data instead of initial calibration data. It is ARI's Standard Operating Procedure to use initial calibration to calculate analyte concentrations. A revised data package was issued that corrected the SVOC analyte concentrations. The laboratory released the results under the same ARI Job No. XI72; however, for the purposes of reviewing the corrected results, ERM refers to the revised SVOC results under data package "XI72SVOCrev".

HOLDING TIME AND PRESERVATION EVALUATION

The sample shipment was received at the laboratory within the method-prescribed preservation requirements. The samples were prepared and analyzed within the method-prescribed time period from the date of collection. No sample data were qualified based on sample preservation or holding-time exceedances.

BLANK EVALUATION

The method blank and rinsate blank sample results were nondetected for each of the target analytes with limited exceptions. One sample result for diethylphthalate was qualified as nondetected (U) based on a detection of this compound in a method blank. Additional blank detections did not result in qualification of sample data because the associated samples were nondetected for the corresponding compound. The blank detections and qualified data are shown in Table 1.

BLANK SPIKE EVALUATION

The laboratory control sample (LCS) and laboratory control sample duplicate recoveries were within the laboratory's limits of acceptance. No sample data were qualified based on the blank spike evaluation. The LCS recoveries indicate acceptable laboratory accuracy and precision.

MATRIX SPIKE EVALUATION

The matrix spike (MS) and matrix spike duplicate recoveries were within the laboratory's limits of acceptance with limited exceptions. Eight detected arsenic results were qualified as estimated and biased high (J+) due to a MS recovery that exceeded the maximum acceptable control limits. Additionally, detected and nondetected sample results for hexavalent chromium were qualified as estimated, J and UJ, respectively, due to an associated low MS recovery for this compound. The outlying MS recoveries and associated, qualified sample data are listed in Table 2.

SURROGATE EVALUATION

The surrogate recoveries were within acceptable limits, and no sample data required qualification as a result of the surrogate evaluation. The surrogate recoveries indicate minimal matrix interference in the samples.

FIELD DUPLICATE EVALUATION

Two samples were collected and analyzed in duplicate. ERM calculated the relative percent difference (RPD) between detected results. The USEPA has not established control criteria for field duplicate samples; therefore, sample data are not qualified on the basis of field duplicate imprecision. Detected duplicate results and calculated RPDs are presented in Table 3.

ANALYTICAL DUPLICATE EVALUATION

The laboratory prepared and analyzed several samples as analytical duplicates and replicates. The RPD for each duplicate and replicate was within acceptable limits (<20%). Sample data were not qualified based on the duplicate evaluation.

CONTINUING CALIBRATION EVALUATION

Continuing calibration verification (CCV) recoveries were presented in the data and evaluated. All of the CCV recoveries were within acceptable limits. Data were not qualified on the basis of the CCV evaluation.

STANDARD REFERENCE EVALUATION

The standard reference results were within acceptable recovery limits. No sample data were qualified based on the standard reference evaluation.

OVERALL ASSESSMENT

No data were determined to be unusable. All of the data, including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents.

Table 1
Blank and Associated Suspect Sample Detections
Uplands Soil Samples Collected 07 October 2013
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
XI72SVOCrev	MB-101313	SVOC	See below	Diethylphthalate	22	20	µg/kg	--
XI72SVOCrev	MB-101313	SVOC	MW-38D-8.5-9.5	Diethylphthalate	23	20	µg/kg	23 U
XI72	RB-100713-1	Total Metals	NA	Copper	2.0	0.92	µg/L	--

Data package reviewed: XI72, XI72SVOCrev

Key:

MB = Method blank

RB = Rinsate blank

SVOC = Semivolatile organic compounds; Method 8270D

Total Metals = Method 6020

NA = Not applicable; qualification of sample data not required

µg/kg = Micrograms per kilogram

µg/L = Micrograms per liter

U = Nondetected

Table 2
Matrix Spike Recoveries Outside of Acceptable Limits
Uplands Soil Samples Collected 07 October 2013
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	Sample Result	ERM Qualifier
XI72	MW-45D-4.2-6.2 MS	Total Metals	See below	Arsenic	148	75-125	--	--
XI72	MW-45D-4.2-6.2 MS	Total Metals	MW-38D-8.5-9.5	Arsenic	--	--	3.1	J+
XI72	MW-45D-4.2-6.2 MS	Total Metals	MW-45D-4.2-6.2	Arsenic	--	--	95.2	J+
XI72	MW-45D-4.2-6.2 MS	Total Metals	MW-45D-9.5-10.5	Arsenic			288	J+
XI72	MW-45D-4.2-6.2 MS	Total Metals	DUP-100713-1	Arsenic			90.3	J+
XI72	MW-45D-4.2-6.2 MS	Total Metals	GP-67-10-11	Arsenic			176	J+
XI72	MW-45D-4.2-6.2 MS	Total Metals	GP-69-7.6-9.6	Arsenic			56.6	J+
XI72	MW-45D-4.2-6.2 MS	Total Metals	GP-69-12.6-13.5	Arsenic			5.4	J+
XI72	MW-45D-4.2-6.2 MS	Total Metals	DUP-100713-2	Arsenic			5.9	J+
XI72	MW-45D-4.2-6.2 MS	Total Metals	NA	Copper	196	75-125	4X	--
XI72	GP-69-7.6-9.6 MS	Total Metals	NA	Arsenic	161	75-125	--	--
XI72	GP-69-7.6-9.6 MS	Cr VI	See below	Chromium, hexavalent	71.3	75-125	--	--
XI72	GP-69-7.6-9.6 MS	Cr VI	MW-38D-8.5-9.5	Chromium, hexavalent	--	--	< 0.541	UJ
XI72	GP-69-7.6-9.6 MS	Cr VI	MW-45D-9.5-10.5	Chromium, hexavalent	--	--	< 0.540	UJ
XI72	GP-69-7.6-9.6 MS	Cr VI	GP-69-7.6-9.6	Chromium, hexavalent	--	--	0.592	J
XI72	GP-69-7.6-9.6 MS	Cr VI	GP-69-12.6-13.6	Chromium, hexavalent	--	--	< 0.568	UJ
XI72	GP-69-7.6-9.6 MS	Cr VI	DUP-100713-2	Chromium, hexavalent	--	--	< 0.574	UJ

Data package reviewed: XI72, XI72SVOCrev

Key:

MS = Matrix spike

Total Metals = Method 6020

Cr VI = Hexavalent chromium; Method 7196A

NA = Not applicable; qualification of sample data not required

4X = Concentration of unspiked sample was greater than 4 times the amount spiked; no qualification required

J+ = Detected sample result qualified as estimated and biased high

UJ = Nondetected sample result qualified as estimated

J = Detected sample result qualified as estimated

Table 3
Field Duplicate Results and Calculated Relative Percent Differences
Uplands Soil Samples Collected 07 October 2013
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
XI72SVOCrev	MW-45D-9.5-10.5/DUP-100713-1	SVOC	Phenol	54	160	20/19	µg/kg	99
XI72	MW-45D-9.5-10.5/DUP-100713-1	Total Metals	Arsenic	95.2	90.3	0.2	µg/kg	5.3
XI72	MW-45D-9.5-10.5/DUP-100713-1	Total Metals	Chromium	10.9	11.2	0.5/0.6	µg/kg	2.7
XI72	MW-45D-9.5-10.5/DUP-100713-1	Total Metals	Copper	287	296	0.2	µg/kg	3.1
XI72	MW-45D-9.5-10.5/DUP-100713-1	Total Metals	Zinc	82	95	1.0	µg/kg	15
XI72SVOCrev	GP-69-12.6-13.6/DUP-100713-2	SVOC	Phenol	37	33	19/20	µg/kg	11
XI72	GP-69-12.6-13.6/DUP-100713-2	Total Metals	Arsenic	5.4	5.9	0.3	µg/kg	8.8
XI72	GP-69-12.6-13.6/DUP-100713-2	Total Metals	Chromium	15.6	13.8	0.7	µg/kg	12
XI72	GP-69-12.6-13.6/DUP-100713-2	Total Metals	Copper	22.5	22.6	0.3	µg/kg	0.4
XI72	GP-69-12.6-13.6/DUP-100713-2	Total Metals	Zinc	25	27	1.0	µg/kg	7.7
XI72	GP-69-12.6-13.6/DUP-100713-2	Total Solids	Total solids	69.36	69.19	0.01	%	0.2

Data package reviewed: XI72, XI72SVOCrev

Key:

RPD = Relative percent difference

SVOC = Semivolatile organic compounds; Method 8270D

Total Metals = Method 6020

µg/kg = Micrograms per kilogram

Memorandum

Environmental Resources Management

To: Mike Mendes

From: Irene Lavigne

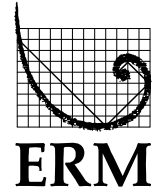
Date: 04 November 2013
Revised 04 April 2014; additional analyte reported

Subject: Data Review of Reichhold-Glacier, Uplands Soil
Samples Collected 08 October 2013

Project Number: 0185447.12

Data Package: Analytical Resources, Incorporated Data Package
XJ01

2875 Michelle Drive
Suite 200
Irvine, CA 92606
(949) 623-4700
(949) 623-2940 (fax)



The data quality was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999, *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004.

After initial analyses and reporting of the field samples in ARI Job No. Xj01, the laboratory discovered an incorrect instrument setting. The laboratory explained that, for the semivolatile organic compound (SVOC) analyses, the analyte concentrations were calculated using continuing calibration data instead of initial calibration data. It is ARI's Standard Operating Procedure to use initial calibration to calculate analyte concentrations. A revised data package was issued that corrected the SVOC analyte concentrations. The laboratory released the results under the same ARI Job No. Xj01; however, for the purposes of reviewing the corrected results, ERM refers to the revised SVOC results under data package "XJ01SVOCrev".

HOLDING TIME AND PRESERVATION EVALUATION

The sample shipment was received at the laboratory within the method-prescribed preservation requirements. The samples were prepared and analyzed within the method-prescribed time period from the date of collection. No sample data were qualified based on sample preservation or holding-time exceedances.

BLANK EVALUATION

The method blank and rinsate blank sample results were nondetected for each of the target analytes with limited exceptions. Eight sample results for diethylphthalate were qualified as nondetected (U) based on a detection of this compound in a method blank. Additional blank detections did not result in qualification of sample data because the associated samples were either nondetected for the corresponding compound, or the concentrations in the samples exceeded five times the blank concentrations. The blank detections and qualified data are shown in Table 1.

BLANK SPIKE EVALUATION

The laboratory control sample (LCS) and laboratory control sample duplicate recoveries were within the laboratory's limits of acceptance. No sample data were qualified based on the blank spike evaluation. The LCS recoveries indicate acceptable laboratory accuracy and precision.

MATRIX SPIKE EVALUATION

The matrix spike (MS) and matrix spike duplicate recoveries were within the laboratory's limits of acceptance. No sample data were qualified based on the MS evaluation.

SURROGATE EVALUATION

The surrogate recoveries were within acceptable limits, and no sample data required qualification as a result of the surrogate evaluation. The surrogate recoveries indicate minimal matrix interference in the samples.

FIELD DUPLICATE EVALUATION

Two samples were collected and analyzed in duplicate. ERM calculated the relative percent difference (RPD) between detected results. The USEPA has not established control criteria for field duplicate samples; therefore, sample data are not qualified on the basis of field duplicate

imprecision. Detected duplicate results and calculated RPDs are presented in Table 2.

ANALYTICAL DUPLICATE EVALUATION

The laboratory prepared and analyzed several samples as analytical duplicates and replicates. The RPD for each duplicate and replicate was within acceptable limits (<20%). Sample data were not qualified based on the duplicate evaluation.

CALIBRATION EVALUATION

Initial calibration verification (ICV) and continuing calibration verification (CCV) recoveries were presented in the data and evaluated. A number of the ICV and CCV recoveries exceeded acceptable limits. No data were qualified on the basis of the ICV or CCV outliers because either the recoveries were biased high and the associated samples were nondetected for the corresponding compounds, or the samples associated with the recovery outliers were quality control samples. The outlying calibration recoveries are listed in Table 3.

STANDARD REFERENCE EVALUATION

The standard reference results were within acceptable recovery limits. No sample data were qualified based on the standard reference evaluation.

OVERALL ASSESSMENT

No data were determined to be unusable. All of the data, including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents.

Table 1
Blank and Associated Suspect Sample Detections
Uplands Soil Samples Collected 08 October 2013
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
XJ01	RB-100813-2	SVOC	NA	Benzoic acid	14	20	µg/L	--
XJ01	RB-100813-1	SVOC	NA	Benzoic acid	13	20	µg/L	--
XJ01SVOCrev	MB-101513	SVOC	See below	Diethylphthalate	100	20	µg/kg	--
XJ01SVOCrev	MB-101513	SVOC	GP-35-3.5-5.5	Diethylphthalate	24	19	µg/kg	24 U
XJ01SVOCrev	MB-101513	SVOC	GP-35-11.25-12.25	Diethylphthalate	46	19	µg/kg	46 U
XJ01SVOCrev	MB-101513	SVOC	DUP-100813-1	Diethylphthalate	74	19	µg/kg	74 U
XJ01SVOCrev	MB-101513	SVOC	GP-71-7.1-9.1	Diethylphthalate	19	18	µg/kg	19 U
XJ01SVOCrev	MB-101513	SVOC	GP-71-10.6-11.6	Diethylphthalate	74	20	µg/kg	74 U
XJ01SVOCrev	MB-101513	SVOC	GP-40-3.5-5.5	Diethylphthalate	27	18	µg/kg	27 U
XJ01SVOCrev	MB-101513	SVOC	GP-40-11.3-12.3	Diethylphthalate	20	20	µg/kg	20 U
XJ01SVOCrev	MB-101513	SVOC	GP-74-4.0-5.0	Diethylphthalate	69	19	µg/kg	69 U
XJ01	RB-100813-2	SVOC-SIM	NA	Naphthalene	0.09	0.10	µg/L	--
XJ01	RB-100813-2	SVOC-SIM	NA	Phenanthrene	0.10	0.10	µg/L	--
XJ01	RB-100813-2	SVOC-SIM	NA	Indeno(1,2,3-cd)pyrene	0.31	0.10	µg/L	--
XJ01	RB-100813-2	SVOC-SIM	NA	Dibenz(a,h)anthracene	0.53	0.10	µg/L	--
XJ01	RB-100813-1	SVOC-SIM	NA	Phenanthrene	0.10	0.10	µg/L	--

Data packages reviewed: XJ01, XJ01SVOCrev

Key:

RB = Rinsate blank

MB = Method blank

SVOC = Semivolatile organic compounds; Method 8270D

SVOC-SIM = Semivolatile organic compounds - selected ion monitoring; Method 8270D-SIM

NA = Not applicable; qualification of sample data not required

µg/L = Micrograms per liter

µg/kg = Micrograms per kilogram

U = Nondetected

Table 2
Field Duplicate Results and Calculated Relative Percent Differences
Uplands Soil Samples Collected 08 October 2013
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
XJ01SVOCrev	GP-73-11.5-12.5/DUP-100813-2	SVOC	Phenol	48	41	19	µg/kg	16
XJ01SVOCrev	GP-35-3.5-5.5/DUP-100813-1	SVOC	Diethylphthalate	24	74	19	µg/kg	102
XJ01SVOCrev	GP-35-3.5-5.5/DUP-100813-1	SVOC	Di-n-butylphthalate	27	24	19	µg/kg	12
XJ01SVOCrev	GP-35-3.5-5.5/DUP-100813-1	SVOC	2,3,4,6-Tetrachlorophenol	12	14	19	µg/kg	15
XJ01	GP-35-3.5-5.5/DUP-100813-1	SVOC-SIM	Naphthalene	93	78	4.7	µg/kg	18
XJ01	GP-35-3.5-5.5/DUP-100813-1	SVOC-SIM	2-Methylnaphthalene	19	19	4.7	µg/kg	0
XJ01	GP-35-3.5-5.5/DUP-100813-1	SVOC-SIM	1-Methylnaphthalene	11	10	4.7	µg/kg	9.5
XJ01	GP-35-3.5-5.5/DUP-100813-1	SVOC-SIM	Acenaphthylene	4.7	4.0	4.7	µg/kg	16
XJ01	GP-35-3.5-5.5/DUP-100813-1	SVOC-SIM	Acenaphthene	2.5	3.3	4.7	µg/kg	28
XJ01	GP-35-3.5-5.5/DUP-100813-1	SVOC-SIM	Fluorene	5.6	5.6	4.7	µg/kg	0
XJ01	GP-35-3.5-5.5/DUP-100813-1	SVOC-SIM	Phenanthrene	61	63	4.7	µg/kg	3.2
XJ01	GP-35-3.5-5.5/DUP-100813-1	SVOC-SIM	Anthracene	2.8	2.8	4.7	µg/kg	0
XJ01	GP-35-3.5-5.5/DUP-100813-1	SVOC-SIM	Fluoranthene	28	29	4.7	µg/kg	3.5
XJ01	GP-35-3.5-5.5/DUP-100813-1	SVOC-SIM	Pyrene	18	18	4.7	µg/kg	0
XJ01	GP-35-3.5-5.5/DUP-100813-1	SVOC-SIM	Benzo(a)anthracene	5.0	5.8	4.7	µg/kg	15
XJ01	GP-35-3.5-5.5/DUP-100813-1	SVOC-SIM	Chrysene	14	14	4.7	µg/kg	0
XJ01	GP-35-3.5-5.5/DUP-100813-1	SVOC-SIM	Benzo(a)pyrene	13	15	4.7	µg/kg	14
XJ01	GP-35-3.5-5.5/DUP-100813-1	SVOC-SIM	Indeno(1,2,3-cd)pyrene	17	19	4.7	µg/kg	11
XJ01	GP-35-3.5-5.5/DUP-100813-1	SVOC-SIM	Dibenz(a,h)anthracene	24	25	4.7	µg/kg	4.1
XJ01	GP-35-3.5-5.5/DUP-100813-1	SVOC-SIM	Benzo(g,h,i)perylene	5.2	7.8	4.7	µg/kg	40
XJ01	GP-35-3.5-5.5/DUP-100813-1	SVOC-SIM	Dibenzofuran	31	29	4.7	µg/kg	6.7
XJ01	GP-35-3.5-5.5/DUP-100813-1	SVOC-SIM	Total Benzofluranthenes	12	18	4.7	µg/kg	40

Table 2
Field Duplicate Results and Calculated Relative Percent Differences
Uplands Soil Samples Collected 08 October 2013
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
XJ01	GP-35-3.5-5.5/DUP-100813-1	PCP	Pentachlorophenol	45	50	7.5/7.2	µg/kg	11
XJ01	GP-73-11.5-12.5/DUP-100813-2	PCP	Pentachlorophenol	73	67	8.5/8.8	µg/kg	8.6

Data packages reviewed: XJ01, XJ01SVOCrev

Key:

RPD = Relative percent difference

SVOC = Semivolatile organic compounds; Method 8270D

SVOC-SIM = Semivolatile organic compounds - selected ion monitoring; Method 8270D-SIM

PCP = Pentachlorophenol; Method SW8041

µg/kg = Micrograms per kilogram

Table 3
Calibration Verification Recoveries Outside of Acceptable Limits
Uplands Soil Samples Collected 08 October 2013
Reichhold-Glacier Site
Seattle, Washington

Lab Package	CCV ID	Analysis	Compound	CCV Recovery	CCV Limit	Associated Samples	Reported Concentration	Units	ERM Qualifier
XJ01	ICV-091313	SVOC	4-Chloroaniline	36.7	20	NA	--	--	--
XJ01	ICV-091313	SVOC	3-Nitroaniline	30.1	20	NA	--	--	--
XJ01	CCV-102113	SVOC	Isophorone	-20.4	20	NA	--	--	--
XJ01	CCV-102113	SVOC	Benzoic acid	-30.1	20	NA	--	--	--
XJ01	CCV-102113	SVOC	4-Chloroaniline	-31.1	20	NA	--	--	--
XJ01	CCV-102113	SVOC	Hexachlorocyclopentadiene	-23.3	20	NA	--	--	--
XJ01	CCV-102113	SVOC	4,6-Dinitro-2-methylphenol	-45.3	20	NA	--	--	--
XJ01	CCV-101613	SVOC	2,4-Dinitrotoluene	34.1	20	NA	--	--	--
XJ01	CCV-101613	SVOC	3-Nitroaniline	27.0	20	NA	--	--	--
XJ01	CCV-101613	SVOC	2,4-Dinitrotoluene	26.5	20	NA	--	--	--
XJ01	CCV-101613	SVOC	4-Nitroaniline	47.4	20	NA	--	--	--
XJ01	CCV-101613	SVOC	Carbazole	20.4	20	NA	--	--	--

Data packages reviewed: XJ01, XJ01SVOCrev

Key:

ICV = Initial calibration verification

CCV = Continuing calibration verification

SVOC = Semivolatile organic compounds; Method 8270D

Memorandum

Environmental Resources Management

To: Mike Mendes

From: Irene Lavigne

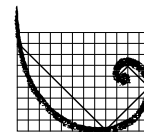
Date: 04 November 2013
Revised 04 April 2014; additional analyte reported

Subject: Data Review of Reichhold-Glacier, Uplands Soil
Samples Collected 09 October 2013

Project Number: 0185447.12

Data Package: Analytical Resources, Incorporated Data Package
XJ31

2875 Michelle Drive
Suite 200
Irvine, CA 92606
(949) 623-4700
(949) 623-2940 (fax)



ERM®

The data quality was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999, *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004.

HOLDING TIME AND PRESERVATION EVALUATION

The sample shipment was received at the laboratory within the method-prescribed preservation requirements. The samples were prepared and analyzed within the method-prescribed time period from the date of collection. No sample data were qualified based on sample preservation or holding-time exceedances.

BLANK EVALUATION

The method blank and rinsate blank sample results were nondetected for each of the target. No sample data were qualified based on the blank evaluation.

BLANK SPIKE EVALUATION

The laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) recoveries were within the laboratory's limits of acceptance with one exception. The relative percent difference for one LCS/LCSD pair exceeded acceptable control limits, as shown in Table 1. Since both of the recoveries were within control limits, no associated sample data were qualified. The LCS recoveries indicate acceptable laboratory accuracy and precision.

MATRIX SPIKE EVALUATION

The matrix spike (MS) recoveries were within the laboratory's limits of acceptance with one exception. No sample data were qualified based on a low recovery for hexavalent chromium because the data could be verified by an associated, in-control post digestion spike recovery. The outlying MS recovery is shown in Table 1.

SURROGATE EVALUATION

The surrogate recoveries were within acceptable limits, and no sample data required qualification as a result of the surrogate evaluation. The surrogate recoveries indicate minimal matrix interference in the samples.

FIELD DUPLICATE EVALUATION

Two samples were collected and analyzed in duplicate. ERM calculated the RPD between detected results. The USEPA has not established control criteria for field duplicate samples; therefore, sample data are not qualified on the basis of field duplicate imprecision. Detected duplicate results and calculated RPDs are presented in Table 2.

ANALYTICAL DUPLICATE EVALUATION

The laboratory prepared and analyzed several samples as analytical duplicates and replicates. The RPD for each duplicate and replicate was within acceptable limits (<20%). Sample data were not qualified based on the duplicate evaluation.

CALIBRATION EVALUATION

Initial calibration verification and continuing calibration verification (CCV) recoveries were presented in the data and evaluated. Several CCV recoveries exceeded acceptable limits; however, since the outlying compounds were not target analytes, no data were qualified on the basis of the CCV outliers.

STANDARD REFERENCE EVALUATION

The standard reference results were within acceptable recovery limits. No sample data were qualified based on the standard reference evaluation.

CALIBRATION RANGE EVALUATION

The laboratory noted two instances where the results of undiluted samples exceeded the calibration range of the equipment. Both of the affected samples were diluted and reanalyzed. The sample data resulting from the reanalyses were within the calibration range and should be used for decision-making purposes. The sample results which exceeded the calibration range were qualified as estimated (J), and are listed in Table 3.

OVERALL ASSESSMENT

No data were determined to be unusable. All of the data, including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents.

Table 1
Spike Recoveries Outside of Acceptable Limits
Uplands Soil Samples Collected 09 October 2013
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
LCS/LCSD									
XJ31	LCS/LCSD-101713	NA	2,4-Dimethylphenol	63.7/39.6	10-120	46.6	30	--	--
MS									
XJ31	GP-70-6.1-8.1 MS	NA	Chromium, hexavalent	2.2	75-125	--	--	--	--

Data package reviewed: XJ31

Key:

RPD = Relative percent difference

LCS/LCSD = Laboratory control sample/laboratory control sample duplicate

MS = Matrix spike

NA = Not applicable; qualification of sample data not required

Table 2
Field Duplicate Results and Calculated Relative Percent Differences
Uplands Soil Samples Collected 09 October 2013
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
XJ31	GP-70-10.8-11.8/DUP-100913-2	SVOC	Diethylphthalate	17	22	19	µg/kg	26
XJ31	GP-70-10.8-11.8/DUP-100913-2	SVOC	Di-n-butylphthalate	55	50	19	µg/kg	10
XJ31	GP-70-10.8-11.8/DUP-100913-2	SVOC-SIM	Naphthalene	19	3.4	4.7	µg/kg	139
XJ31	GP-70-10.8-11.8/DUP-100913-2	SVOC-SIM	Phenanthrene	23	2.8	4.7	µg/kg	157
XJ31	GP-54-4.1-6.1/DUP-100913-1	PCP	Pentachlorophenol	14	10	7.4/7.2	µg/kg	33
XJ31	GP-70-10.8-11.8/DUP-100913-2	PCP	Pentachlorophenol	1500	900	7.2/7.4	µg/kg	50
XJ31	GP-70-10.8-11.8/DUP-100913-2 DL	PCP	Pentachlorophenol	2300	1400	140/150	µg/kg	49
XJ31	GP-54-4.1-6.1/DUP-100913-1	Total Metals	Arsenic	1.2	1.5	0.2	mg/kg	22
XJ31	GP-54-4.1-6.1/DUP-100913-1	Total Metals	Chromium	11.0	11.6	0.6	mg/kg	5.3
XJ31	GP-54-4.1-6.1/DUP-100913-1	Total Metals	Copper	8.6	8.9	0.2	mg/kg	3.4
XJ31	GP-54-4.1-6.1/DUP-100913-1	Total Metals	Zinc	19	19	1	mg/kg	0
XJ31	GP-70-10.8-11.8/DUP-100913-2	Total Metals	Arsenic	35.6	32.9	0.3/0.2	mg/kg	7.9
XJ31	GP-70-10.8-11.8/DUP-100913-2	SVOC-SIM	Chromium	12.7	15.4	0.7/0.6	mg/kg	19.2
XJ31	GP-70-10.8-11.8/DUP-100913-2	SVOC-SIM	Copper	23.7	147	0.3/0.2	mg/kg	144
XJ31	GP-70-10.8-11.8/DUP-100913-2	SVOC-SIM	Zinc	83	43	1	mg/kg	63

Data package reviewed: XJ31

Key:

RPD = Relative percent difference

SVOC = Semivolatile organic compounds; Method 8270D

SVOC-SIM = Semivolatile organic compounds - selected ion monitoring; Method 8270D-SIM

PCP = Pentachlorophenol; Method SW8041

DL = Diluted sample analysis

µg/kg = Micrograms per kilogram

mg/kg = Milligrams per kilogram

Table 3
Calibration Range Exceedances
Uplands Soil Samples Collected 09 October 2013
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Method	Compound	Reported Concentration	Units	ERM Qualifier	Notes
XJ31	GP-70-6.1-8.1	PCP	Pentachlorophenol	1500 E	µg/kg	J	Exceeds instrument calibration range, see dilution data
XJ31	DUP-100913-2	PCP	Pentachlorophenol	900 E	µg/kg	J	Exceeds instrument calibration range, see dilution data

Data package reviewed: XJ31

Key:

PCP = Pentachlorophenol; Method SW8041

E = Undiluted sample concentration exceeded calibration range; use result of dilution/reanalysis for decision-making purposes

µg/kg = Micrograms per kilogram

J = Detected sample result qualified as estimated

Memorandum

Environmental Resources Management

To: Mike Mendes

From: Irene Lavigne

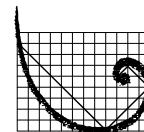
Date: 12 November 2013
Revised 04 April 2014; additional analyte reported

Subject: Data Review of Reichhold-Glacier, Uplands Soil
Samples Collected 10 October 2013

Project Number: 0185447.12

Data Package: Analytical Resources, Incorporated Data Package
XJ52 and XM10

2875 Michelle Drive
Suite 200
Irvine, CA 92606
(949) 623-4700
(949) 623-2940 (fax)



ERM®

The data quality was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999, *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004.

Data package XM10 contains reanalyzed hexavalent chromium results for samples originally analyzed in data package XJ52. The reanalyses were requested by ERM due to outlying matrix spike recoveries for hexavalent chromium that had resulted in rejection of three sample results for this compound. The reanalyses resulted in hexavalent chromium data that was qualified but not rejected, as explained in the matrix spike evaluation below.

HOLDING TIME AND PRESERVATION EVALUATION

The sample shipment was received at the laboratory within the method-prescribed preservation requirements. The samples were prepared and analyzed within the method-prescribed time period from the date of collection. No sample data were qualified based on sample preservation or holding-time exceedances.

BLANK EVALUATION

The method blank, trip blank, and rinsate blank sample results were nondetected for each of the target analytes with several exceptions. Sample results for acetone and methylene chloride were qualified as

nondetected (U) based on detections of these compounds in a rinsate blank or method blank sample. Not all blank detections resulted in qualified data. Sample data were not qualified if the associated samples were nondetected for the corresponding compound, or if sample concentration exceeded 10 times the blank concentration. The blank detections and associated, qualified data are presented in Table 1.

BLANK SPIKE EVALUATION

The laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) recoveries were within the laboratory's limits of acceptance with limited exceptions. Two sample results for methylene chloride were qualified as estimated (J) due to a LCS/LCSD recovery pair that exceeded acceptable control limits for this compound. Data were not qualified if only one recovery in a LCS/LCSD pair exceeded control limits, or if only the relative percent difference (RPD) exceeded control limits. The outlying LCS recoveries are shown in Table 2.

MATRIX SPIKE EVALUATION

The matrix spike (MS) and matrix spike duplicate (MSD) recoveries were within the laboratory's limits of acceptance with several exceptions. Low recoveries for diesel resulted in qualification of sample data as estimated, J or UJ, for two samples. Additionally, recoveries were below the laboratory's limits of acceptance for hexavalent chromium. Due to the low recoveries, post-digestion spikes (PS) were analyzed. The PS recovery was also below control limits, resulting in rejection (R) of the nondetected sample results for the three associated samples per National Functional Guidelines. These initial results cannot be used for decision-making purposes.

At ERM's request two samples, MW-35D-8.5-9.5 and GP-74-7.6-9.6, were reanalyzed for hexavalent chromium and the resulting data were presented in data package XM10. The PS recoveries completed in the reanalyses of these two samples were within control limits. The nondetected sample results for hexavalent chromium for these samples were qualified as estimated (UJ). The results of the reanalysis can be used for decision-making purposes. The outlying MS recoveries and qualified sample data are shown in Table 2.

SURROGATE EVALUATION

The surrogate recoveries were within acceptable limits with one exception. One sample submitted for total petroleum hydrocarbons as gasoline had a low surrogate recovery which resulted in qualification of the sample result as estimated (J). The surrogate recovery outlier is presented in Table 3.

ANALYTICAL DUPLICATE EVALUATION

The laboratory prepared and analyzed several samples as analytical duplicates. The RPD for four of these duplicates exceeded the acceptable limit of 20%. The primary sample result for each exceedance was qualified as estimated (J). The RPD outliers are listed in Table 4.

REPLICATE EVALUATION

The laboratory prepared and analyzed three replicate samples. The RPD for each replicate was within acceptable limits (<20%). Sample data were not qualified based on the replicate RPDs.

CALIBRATION EVALUATION

Initial calibration verification and continuing calibration verification (CCV) recoveries were presented in the data and evaluated. A number of calibration recoveries exceeded acceptable limits. Sample data for several volatile organic compounds were qualified as estimated (J or UJ) based on CCV recoveries that were outside of acceptable control limits. Sample data were not qualified if the recoveries were biased high and the sample results were nondetected, if the outlying compounds were not target analytes, or the calibration sample was not associated with field samples. A list of the outlying calibration recoveries and associated, qualified data is provided in Table 5.

STANDARD REFERENCE EVALUATION

The standard reference results were within acceptable recovery limits. No sample data were qualified based on the standard reference evaluation.

OVERALL ASSESSMENT

Three hexavalent chromium results were rejected due to significant matrix interferences. These hexavalent chromium results cannot be used for decision-making purposes. Two of these samples were reanalyzed. The results of the reanalysis for hexavalent chromium were qualified as estimated. The results of the reanalyzed samples can be used for decision-making purposes.

The remainder of the data, including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation, with the exception of the rejected data, is acceptable for the preparation of technically-defensible documents.

Table 1
Blank and Associated Suspect Sample Detections
Uplands Soil Samples Collected 10 October 2013
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
XJ52	RB-101013-2	VOC	See below	Acetone	7.2	5.0	µg/L	--
XJ52	RB-101013-2	VOC	MW-35D-7.0	Acetone	20	3.6	µg/kg	20 U
XJ52	MB-101413A	VOC	NA	Hexachlorobutadiene	0.42	0.50	µg/L	--
XJ52	MB-101413A	VOC	NA	n-Butylbenzene	0.15	0.20	µg/L	--
XJ52	MB-101713A	VOC	See below	Methylene chloride	13	2.0	µg/kg	--
XJ52	MB-101713A	VOC	MW-43D-6.9	Methylene chloride	26	6.2	µg/kg	26 U
XJ52	MB-101713A	VOC	MW-35D-7.0	Methylene chloride	7.6	1.5	µg/kg	7.6 U
XJ52	MB-101713A	VOC	NA	Naphthalene	0.6	5.0	µg/kg	--
XJ52	RB-101013-1	SVOC	NA	Phenol	0.8	1.0	µg/L	--

Data packages reviewed: XJ52, XM10

Key:

RB = Rinsate blank

MB = Method blank

VOC = Volatile organic compounds; Method 8260C

SVOC = Semivolatile organic compounds; Method 8270D

NA = Not applicable; qualification of sample data not required

µg/L = Micrograms per liter

µg/kg = Micrograms per kilogram

U = Nondetected

Table 2
Spike Recoveries Outside of Acceptable Limits
Uplands Soil Samples Collected 10 October 2013
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
LCS/LCSD										
XJ52	LCS/LCSD-101413A	VOC	NA	Carbon disulfide	123/126	77-124	2.4	40	--	--
XJ52	LCS/LCSD-101713A	VOC	See below	Methylene chloride	138/143	71-125	3.3	40	--	--
XJ52	LCS/LCSD-101713A	VOC	MW-43D-6.9	Methylene chloride	--	--	--	--	26	J
XJ52	LCS/LCSD-101713A	VOC	MW-35D-7.0	Methylene chloride	--	--	--	--	7.6	J
XJ52	LCS/LCSD-101713A	SVOC	NA	2,4-Dimethylphenol	63.7/39.6	10-120	46.6	40	--	--
XJ52	LCS/LCSD-101513	SVOC	NA	Pentachlorophenol	111/115	56-111	3.5	40	--	--
MS										
XJ52	MW-43D-6.9 MS/MSD	NWTPH-DX	See below	Diesel	43.5/60.8	64-112	10.8	40	--	--
XJ52	MW-43D-6.9 MS/MSD	NWTPH-DX	MW-43D-6.9	Diesel	--	--	--	--	4500	J
XJ52	MW-43D-6.9 MS/MSD	NWTPH-DX	MW-35D-7.0	Diesel	--	--	--	--	< 63	UJ
XJ52	GP-43-11.1-12.1 MS	Total metals	NA	Arsenic, total	903	75-125	--	--	4X	--
XJ52	GP-43-11.1-12.1 MS	Total metals	NA	Copper, total	-90.6	75-125	--	--	4X	--
XJ52	MW-31D-8.25-9.25 MS	Cr VI	See below	Chromium, hexavalent	2	75-125	--	--	--	--
XJ52	MW-31D-8.25-9.25 MS	Cr VI	See below	Chromium, hexavalent	0	75-125	--	--	--	--
XJ52	MW-31D-8.25-9.25 PS	Cr VI	See below	Chromium, hexavalent	32	75-125	--	--	--	--
XJ52	--	--	MW-31D-8.25-9.25	Chromium, hexavalent	--	--	--	--	< 0.627	R
XJ52	--	--	MW-35D-8.5-9.5	Chromium, hexavalent	--	--	--	--	< 0.552	R*
XJ52	--	--	GP-74-7.6-8.6	Chromium, hexavalent	--	--	--	--	< 0.552	R*
XM10	MW-35D-8.5-9.5 MS	Cr VI	See below	Chromium, hexavalent	18.8	75-125	--	--	--	--
XM10	MW-35D-8.5-9.5 PS	Cr VI	See below	Chromium, hexavalent	81	75-125	--	--	--	--
XM10	--	--	MW-35D-8.5-9.5	Chromium, hexavalent	--	--	--	--	< 0.553	UJ
XM10	GP-74-7.6-8.6 MS	Cr VI	See below	Chromium, hexavalent	39.5	75-125	--	--	--	--
XM10	GP-74-7.6-8.6 PS	Cr VI	See below	Chromium, hexavalent	84	75-125	--	--	--	--

Table 2
Spike Recoveries Outside of Acceptable Limits
Uplands Soil Samples Collected 10 October 2013
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
XM10	--	--	GP-74-7.6-8.6	Chromium, hexavalent	--	--	--	--	< 0.532	UJ

Data packages reviewed: XJ52, XM10

Key:

RPD = Relative percent difference

LCS/LCSD = Laboratory control sample/laboratory control sample duplicate

MS/MSD = Matrix spike/matrix spike duplicate

VOC = Volatile organic compounds; Method 8260C

SVOC = Semivolatile organic compounds; Method 8270D

NA = Not applicable; qualification of sample data not required

J = Detected sample result qualified as estimated

UJ = Nondetected sample result qualified as estimated

4X = Sample concentration exceeded four times amount spiked; no qualification required

R = Sample result is rejected

R* = Sample result is rejected; sample was reanalyzed with usable results

Table 3
Surrogate Recovery Results out of Acceptable Limits
Uplands Soil Samples Collected 10 October 2013
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Method	Surrogate	Recovery (%)	Limit (%)	Sample Result	ERM Qualifier
XJ52	MW-43D-6.9	TPH-g	Trifluorotoluene	57.5	65-128	38	J

Data packages reviewed: XJ52, XM10

Key:

TPH-g = Total petroleum hydrocarbons - gasoline; Method NWTPHG

J = Detected sample result qualified as estimated

Table 4
Analytical Duplicate Results and Calculated Relative Percent Differences
Uplands Soil Samples Collected 10 October 2013
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Concentration		Report Limit	Units	RPD	RPD Limit	ERM Qualifier
			Sample	Duplicate					
XJ52	GP-43-11.1-12.1	Arsenic, total	667	508	1	mg/kg	27.1	20	J
XJ52	GP-43-11.1-12.1	Chromium, total	35.0	22.9	0.7	mg/kg	41.8	20	J
XJ52	GP-43-11.1-12.1	Copper, total	281	200.00	0.3	mg/kg	33.7	20	J
XJ52	GP-43-11.1-12.1	Zinc, total	139	97	1	mg/kg	35.6	20	J

Data packages reviewed: XJ52, XM10

Key:

RPD = Relative percent difference

mg/kg = Milligrams per kilogram

J = Detected sample result qualified as estimated

Table 5
Calibration Verification Recoveries Outside of Acceptable Limits
Uplands Soil Samples Collected 10 October 2013
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Calibration ID	Analysis	Compound	CCV Recovery	CCV Limit	Associated Samples	Reported Concentration	Units	ERM Qualifier
XJ52	CCV-101413	VOC	Carbon disulfide	23.6	20	NA	--	--	--
XJ52	CCV-101413	VOC	Vinyl acetate	-23.8	20	NA	--	--	--
XJ52	CCV-101413	VOC	Carbon tetrachloride	20.4	20	NA	--	--	--
XJ52	CCV-101413	VOC	1,2,3-Trichlorobenzene	27.0	20	NA	--	--	--
XJ52	CCV-101713	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	26.1	20	NA	--	--	--
XJ52	CCV-101713	VOC	1,1-Dichloroethene	25.6	20	NA	--	--	--
XJ52	CCV-101713	VOC	Bromoethane	25.8	20	NA	--	--	--
XJ52	CCV-101713	VOC	Iodomethane	49.2	20	NA	--	--	--
XJ52	CCV-101713	VOC	Methylene chloride	43.6	20	See below	--	--	--
--	--	--	--	--	--	MW-43D-6.9	26	µg/kg	J
--	--	--	--	--	--	MW-35D-7.0	7.6	µg/kg	J
XJ52	CCV-101713	VOC	Carbon disulfide	21.7	20	See below	--	--	--
--	--	--	--	--	--	MW-35D-7.0	43	µg/kg	J
XJ52	CCV-101713	VOC	1,2-Dibromo-3-chloropropane	-23.8	20	See below	--	--	--
--	--	--	--	--	--	MW-43D-6.9	< 15	µg/kg	UJ
--	--	--	--	--	--	MW-35D-7.0	< 3.6	µg/kg	UJ
XJ52	ICV-091313	SVOC	4-Chloroaniline	36.7	20	NA	--	--	--

Data packages reviewed: XJ52, XM10

Key:

CCV = Continuing calibration verification

ICV = Initial calibration verification

VOC = Volatile organic compounds; Method 8260C

SVOC = Semivolatile organic compounds; Method 8270D

µg/kg = Micrograms per kilogram

J = Detected sample result qualified as estimated

UJ = Nondetected sample result qualified as estimated

Memorandum

Environmental Resources Management

To: Mike Mendes

From: Irene Lavigne

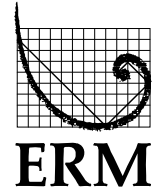
Date: 07 January 2014
Revised 04 April 2014; additional analyte reported

Subject: Data Review of Reichhold-Glacier, Uplands Soil
Samples Collected 02 October 2013

Project Number: 0185447.12

Data Package: Analytical Resources, Incorporated Data Package
XQ52

2875 Michelle Drive
Suite 200
Irvine, CA 92606
(949) 623-4700
(949) 623-2940 (fax)



The data quality was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999, *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004.

HOLDING TIME AND PRESERVATION EVALUATION

The sample shipment was received at the laboratory within the method-prescribed preservation requirements. The samples were prepared and analyzed within the method-prescribed time period from the date of collection. No sample data were qualified based on sample preservation or holding-time exceedances.

BLANK EVALUATION

The method blank sample results were nondetected for each of the target analytes. No sample data were qualified based on the blank evaluation.

BLANK SPIKE EVALUATION

The laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) recoveries were within the laboratory's limits of acceptance with limited exceptions. One detected sample result for pentachlorophenol was qualified as estimated and biased high (J+) based on a LCS/LCSD recovery pair that exceeded the maximum acceptable

limits for this compound. Additional LCS outliers did not warrant qualification of sample data because only one recovery in each LCS/LCSD pair exceeded acceptable control limits. The outlying LCS recoveries are presented in Table 1.

MATRIX SPIKE EVALUATION

The matrix spike (MS) and matrix spike duplicate recoveries were within the laboratory's limits of acceptance with several exceptions. A MS/MSD exceedance for pentachlorophenol affected the same sample qualified on the basis of the outlying LCS/LCSD recoveries discussed above. Additional MS outliers did not result in qualified sample data because either only one recovery in a MS/MSD pair exceeded control limits, or the data could be verified using an associated, in-control LCS recovery. The MS outliers are listed in Table 1.

SURROGATE EVALUATION

The surrogate recoveries were within acceptable limits. No sample data required qualification as a result of the surrogate evaluation. The surrogate recoveries indicate minimal matrix interference in the samples.

ANALYTICAL DUPLICATE EVALUATION

The laboratory prepared and analyzed for several compounds as analytical duplicate. The relative percent difference for each duplicate and replicate was within acceptable limits (<20%). Sample data were not qualified based on the duplicate evaluation.

CONTINUING CALIBRATION EVALUATION

The laboratory noted that the continuing calibration verification (CCV) recovery for several compounds did not meet acceptable control limits. The detected sample result associated with a low CCV recovery for phenol was qualified as estimated (J). Additional CCV outliers did not require qualification of sample data. Data were not qualified if the recoveries were biased high and the samples were nondetected for the corresponding compounds, or if the outlying compound was not a target

analyte. The CCV outliers and associated, qualified data are shown in Table 2.

OVERALL ASSESSMENT

No data were determined to be unusable. All of the data, including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents.

Table 1
Laboratory Control Spike Recoveries Outside of Acceptable Limits
Uplands Soil Samples Collected 02 October 2013
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
LCS/LCSD										
XQ52	LCS/LCSD-120713	SVOC	NA	2,6-Dinitrotoluene	124/120	33-123	3.3	30	--	--
XQ52	LCS/LCSD-120713	SVOC	NA	Butylbenzylphthalate	133/122	45-132	8.8	30	--	--
XQ52	LCS/LCSD-120913	PCP	See below	Pentachlorophenol	115/115	56-111	0.3	40	--	--
XQ52	LCS/LCSD-120913	PCP	MW-38D-0.83-2.0	Pentachlorophenol	--	--	--	--	67	J+
MS/MSD										
XQ52	MW-38D-0.83-2.0 MS/MSD	SVOC	NA	4-Chloroaniline	8.2/8.2	11-120	0	30	--	--
XQ52	MW-38D-0.83-2.0 MS/MSD	SVOC	NA	2,4-Dinitrotoluene	109/136	35-127	21.7	30	--	--
XQ52	MW-38D-0.83-2.0 MS/MSD	SVOC	NA	Butylbenzylphthalate	129/135	45-134	3.8	30	--	--
XQ52	MW-38D-0.83-2.0 MS/MSD	PCP	See below	Pentachlorophenol	113/146	56-111	14.6	40	--	--
XQ52	MW-38D-0.83-2.0 MS/MSD	PCP	MW-38D-0.83-2.0	Pentachlorophenol	--	--	--	--	67	J+

Data package reviewed: XQ52

Key:

LCS/LCSD = Laboratory control sample/laboratory control sample duplicate

MS/MSD = Matrix spike/matrix spike duplicate

NA = Not applicable; qualification of sample data not required

SVOC = Semivolatile organic compounds; Method 8270D

PCP = Pentachlorophenol; Method SW8041

J+ = Detected sample result qualified as estimated and biased high

Table 2
Calibration Verification Recoveries Outside of Acceptable Limits
Uplands Soil Samples Collected 02 October 2013
Reichhold-Glacier Site
Seattle, Washington

Lab Package	CCV ID	Analysis	Compound	CCV Recovery	CCV Limit	Associated Samples	Reported Concentration	Units	ERM Qualifier
XQ52	CCV-121613	SVOC	Phenol	32.5	20	See below	--	--	--
XQ52	CCV-121613	--	--	--	--	MW-38D-0.83-2.0	29	µg/kg	J
XQ52	CCV-121613	SVOC	2-Methylphenol	27.4	20	NA	--	--	--
XQ52	CCV-121613	SVOC	2-Nitroaniline	28.9	20	NA	--	--	--
XQ52	CCV-121613	SVOC	3-Nitroaniline	29.2	20	NA	--	--	--
XQ52	CCV-121613	SVOC	4-Nitrophenol	22.2	20	NA	--	--	--
XQ52	CCV-121613	SVOC	2,4-Dinitrotoluene	20.3	20	NA	--	--	--
XQ52	CCV-121613	SVOC	4-Nitroaniline	28.9	20	NA	--	--	--
XQ52	CCV-121613	SVOC	3,3'-Dichlorobenzidine	34.8	20	NA	--	--	--
XQ52	CCV-121613	SVOC	Benzo(b)fluoranthene	21.4	20	NA	--	--	--
XQ52	CCV-121613	SVOC	Benzo(a)pyrene	22.9	20	NA	--	--	--
XQ52	CCV-121613	SVOC	Benzo(g,h,i)perylene	24.2	20	NA	--	--	--
XQ52	CCV-121613	SVOC	Aniline	21.5	20	NA	--	--	--
XQ52	CCV-121613	SVOC	Benzidine	38.3	20	NA	--	--	--

Data package reviewed: XQ52

Key:

CCV = Continuing calibration verification

SVOC = Semivolatile organic compounds; Method 8270D

µg/kg = Micrograms per kilogram

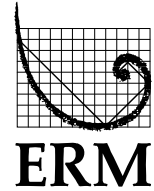
J = Detected sample result qualified as estimated

Memorandum

Environmental Resources Management

To: Mike Mendes
From: Irene Lavigne
Date: 04 February 2014
Subject: Data Review of Reichhold-Glacier Soil Samples
Collected 2-4 October 2013
Project Number: 0232280

2875 Michelle Drive
Suite 200
Irvine, CA 92606
(949) 623-4700
(949) 623-2940 (fax)



Data Package: Axys Analytical Services Data Package DPWG46343

The data quality was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999 and the *EPA Region 10 SOP for the Validation of Polychlorinated Dibenzodioxin (PCDD) and Polychlorinated Dibenzofuran (PCDF) Data*, January 1996.

HOLDING TIME AND PRESERVATION EVALUATION

The sample shipment was received at the laboratory within the method-prescribed preservation requirements. The samples were prepared and analyzed within the method-prescribed time period from the date of collection. No sample data were qualified based on sample preservation or holding-time exceedances.

BLANK EVALUATION

The lab blank sample results were nondetected for each of the target analytes with limited exceptions. The blank detections did not require qualification of sample data because either the field sample concentrations exceeded five times the blank concentrations for the corresponding compounds, or the detected dioxin/furan compounds had been identified as estimated maximum possible concentrations. The blank detections are presented in Table 1.

LABELED COMPOUND EVALUATION

Carbon-13 labeled isotope recoveries were reported for each sample submitted for dioxin/furan analysis. The recoveries of labeled PCDD and PCDF compounds is a measure of the effectiveness of the laboratory and method to extract the compounds of interest. All of the labeled compounds were within acceptable limits with one exception. However, no qualifiers were applied to the data based on the labeled compound outlier because the sample was diluted by a factor of 250, diluting the labeled compound to the point where it did not provide useful recovery information. The outlying recovery is presented in Table 2.

ESTIMATED MAXIMUM POSSIBLE CONCENTRATION

The laboratory identified several dioxin/furan results as estimated maximum possible concentrations (EMPC). An EMPC value is the maximum possible concentration of a compound that could be present in the sample. This classification is used when all of the identification criteria for a given dioxin or furan compound are not met. The sample data identified as EMPC by the laboratory were qualified as nondetected (U), and are listed in Table 3.

CALIBRATION RANGE EVALUATION

The laboratory noted a number of instances where the sample results exceeded the calibration range of the equipment for dioxin/furan compounds. The laboratory diluted and reanalyzed the affected samples. The sample results from the dilutions should be used for decision-making purposes. The samples with calibration range exceedances are presented in Table 4.

OVERALL ASSESSMENT

No data were determined to be unusable. All of the data, including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents.

Table 1
Blank and Associated Suspect Sample Detections
October 2013 Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG46343	Lab Blank	PCDD/PCDF	NA	2,3,7,8-TCDD	0.535	0.117	pg/g	EMPC
DPWG46343	Lab Blank	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDD	1.30	0.117	pg/g	EMPC
DPWG46343	Lab Blank	PCDD/PCDF	NA	OCDD	8.90	0.117	pg/g	--
DPWG46343	Lab Blank	PCDD/PCDF	NA	2,3,4,7,8-PECDF	0.332	0.117	pg/g	EMPC
DPWG46343	Lab Blank	PCDD/PCDF	NA	1,2,3,4,7,8-HXCDF	0.147	0.117	pg/g	EMPC
DPWG46343	Lab Blank	PCDD/PCDF	NA	2,3,4,6,7,8-HXCDF	0.127	0.117	pg/g	--
DPWG46343	Lab Blank	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDF	0.588	0.117	pg/g	--
DPWG46343	Lab Blank	PCDD/PCDF	NA	1,2,3,4,7,8,9-HPCDF	0.231	0.117	pg/g	--
DPWG46343	Lab Blank	PCDD/PCDF	NA	OCDF	1.80	0.117	pg/g	EMPC
DPWG46343	Lab Blank	PCDD/PCDF	NA	TOTAL HEPTA-DIOXINS	0.462	0.117	pg/g	--
DPWG46343	Lab Blank	PCDD/PCDF	NA	TOTAL TETRA-FURANS	0.119	0.117	pg/g	--
DPWG46343	Lab Blank	PCDD/PCDF	NA	TOTAL HEXA-FURANS	0.377	0.117	pg/g	--
DPWG46343	Lab Blank	PCDD/PCDF	NA	TOTAL HEPTA-FURANS	1.64	0.117	pg/g	--

Data package reviewed: DPWG46343

Key:

PCDD/PCDF = Polychlorinated dibenzo-p-dioxins/Polychlorinated dibenzofurans; Method 1613B

NA = Not applicable; qualification of sample data not required

TCDD = Tetrachlorodibenzo-p-dioxin

HPCDD = Heptachlorodibenzo-p-dioxin

OCDD = Octochlorodibenzo-p-dioxin

PECDF = Pentachlorodibenzofuran

HXCDF = Hexachlorodibenzofuran

HPCDF = Heptachlorodibenzofuran

OCDF = Octochlorodibenzofuran

pg/g = Picograms per gram

EMPC = Blank result identified as Estimated Maximum Possible Concentration; qualification of sample data not required

Table 2
Labeled Compound Recovery Results Outside of Acceptable Limits
October 2013 Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Labeled Compound	Associated Compound	Recovery (%)	Limit (%)	Note	ERM Qualifier
DPWG46343	GP-49-3.5-5.5	13C-OCDD	OCDD	133	17-130	SDO	--

Data package reviewed: DPWG46343

Key:

13C = Carbon-13 labeled isotope

OCDD = Octachlorodibenzo-p-dioxin

SDO = Spike sample diluted by a factor of 250; recovery does not provide useful information

Table 3
Estimated Maximum Possible Concentration
October 2013 Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG46343	Lab Blank	2,3,7,8-TCDD	0.535	0.117	pg/g	0.535 U
DPWG46343	Lab Blank	1,2,3,4,6,7,8-HPCDD	1.30	0.117	pg/g	1.30 U
DPWG46343	Lab Blank	2,3,4,7,8-PECDF	0.332	0.117	pg/g	0.332 U
DPWG46343	Lab Blank	1,2,3,4,7,8-HXCDF	0.147	0.117	pg/g	0.147 U
DPWG46343	Lab Blank	OCDF	1.80	0.117	pg/g	1.80 U

Data package reviewed: DPWG46343

Key:

TCDD = Tetrachlorodibenzo-p-dioxin
HPCDD = Heptachlorodibenzo-p-dioxin
PECDF = Pentachlorodibenzofuran
HXCDF = Hexachlorodibenzofuran
OCDF = Octochlorodibenzofuran
pg/g = Picograms per gram
U = Nondetected

Table 4
Calibration Range Exceedances
October 2013 Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Method	Compound	Reported Concentration	Units	ERM Qualifier	Notes
DPWG46343	GP-49-3.5-5.5	PCDD/PCDF	1,2,3,6,7,8-HXCDD	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG46343	GP-49-3.5-5.5	PCDD/PCDF	1,2,3,4,6,7,8-HPCDD	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG46343	GP-49-3.5-5.5	PCDD/PCDF	1,2,3,4,7,8-HXCDF	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG46343	GP-49-3.5-5.5	PCDD/PCDF	1,2,3,4,6,7,8-HPCDF	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG46343	GP-49-3.5-5.5	PCDD/PCDF	1,2,3,4,7,8,9-HPCDF	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG46343	GP-49-3.5-5.5	PCDD/PCDF	OCDF	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG46343	GP-49-3.5-5.5 df10	PCDD/PCDF	1,2,3,4,6,7,8-HPCDD	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG46343	GP-49-3.5-5.5 df10	PCDD/PCDF	OCDD	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG46343	GP-49-3.5-5.5 df10	PCDD/PCDF	1,2,3,4,6,7,8-HPCDF	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG46343	GP-49-3.5-5.5 df10	PCDD/PCDF	OCDF	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG46343	GP-38D-0.83-2.0	PCDD/PCDF	OCDD	NR	pg/g	--	Exceeds calibrated linear range, see dilution data

Data package reviewed: DPWG46343

Key:

PCDD/PCDF = Polychlorinated dibenzo-p-dioxins/Polychlorinated dibenzofurans; Method 1613B

HXCDD = Hexachlorodibenzo-p-dioxin

HPCDD = Heptachlorodibenzo-p-dioxin

HXCDF = Hexachlorodibenzofuran

HPCDF = Heptachlorodibenzofuran

OCDF = Octochlorodibenzofuran

HPCDD = Heptachlorodibenzo-p-dioxin

OCDD = Octochlorodibenzo-p-dioxin

NR = Value not reported

pg/g = Picograms per gram

df10 = Sample reanalysis with 10x dilution factor

Memorandum

Environmental Resources Management

To: Mike Mendes

From: Irene Lavigne

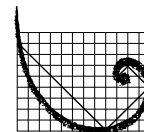
Date: 07 February 2014
revised 12 March 2014

Subject: Data Review of Reichhold-Glacier, Uplands Soil
Samples Collected 13 January 2014

Project Number: 0232280.06

Data Package: Analytical Resources, Incorporated Data Package
XU56

2875 Michelle Drive
Suite 200
Irvine, CA 92606
(949) 623-4700
(949) 623-2940 (fax)



ERM®

The data quality was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999, *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004.

HOLDING TIME AND PRESERVATION EVALUATION

The sample shipment was received at the laboratory within the method-prescribed preservation requirements. The samples were prepared and analyzed within the method-prescribed time period from the date of collection. No sample data were qualified based on sample preservation or holding-time exceedances.

BLANK EVALUATION

The method blank sample results were nondetected for each of the target analytes with one exception. A method blank detection for aroclor 1260 did not require qualification of associated sample data because the associated samples were either nondetected for this compound, or the sample concentration exceeded five times the blank concentration. The blank detection is shown in Table 1.

ELEVATED REPORTING LIMITS

The laboratory noted that the sample results for several samples analyzed for Polychlorinated Biphenyls (PCBs) had elevated reporting limits (RL) for aroclor 1248, aroclor 1260, and/or aroclor 1232 due to chromatographic interference of these compounds. Since dilution and reanalysis of the samples would not resolve the interference, the laboratory reported the values as not detected at the reported concentrations. The sample results were qualified as nondetected (U) at their respective, elevated RLs as shown in Table 2.

BLANK SPIKE EVALUATION

The laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) recoveries were within the laboratory's limits of acceptance with one exception. No sample data were qualified on the basis of the LCS outliers because only one recovery in the LCS/LCSD pair exceeded the acceptable control limits. The outlying LCS recovery is presented in Table 3.

MATRIX SPIKE EVALUATION

The matrix spike (MS) and matrix spike duplicate recoveries were within the laboratory's limits of acceptance with one exception. The laboratory reported that the recoveries for pentachlorophenol were low, but they did not report the percent recovery values. No sample data were qualified based on the recovery outlier because the concentration of the sample used for the spike sample exceeded four times the amount of the pentachlorophenol spike. The outlying MS recovery is shown in Table 3.

SURROGATE EVALUATION

The surrogate recoveries were within acceptable limits, and no sample data required qualification as a result of the surrogate evaluation. The surrogate recoveries indicate minimal matrix interference in the samples.

FIELD DUPLICATE EVALUATION

One sample was collected and analyzed in duplicate. ERM calculated the relative percent difference (RPD) between detected results. The USEPA has not established control criteria for field duplicate samples; therefore, sample data are not qualified on the basis of field duplicate imprecision. Detected duplicate results and calculated RPDs are presented in Table 4.

REPLICATE EVALUATION

The laboratory prepared and analyzed one sample as a replicate. The RPD for the replicate results was within acceptable limits (<20%). Sample data were not qualified based on the replicate results.

CONTINUING CALIBRATION EVALUATION

The laboratory noted that a continuing calibration verification (CCV) recovery for 2,3,4,6-tetrachlorophenol did not meet acceptable control limits. The detected and nondetected sample results associated with this low CCV recovery were qualified as estimated, J or UJ, respectively. The CCV outlier and associated, qualified data are shown in Table 5.

OVERALL ASSESSMENT

No data were determined to be unusable. All of the data, including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents.

Table 1
Blank and Associated Suspect Sample Detections
Uplands Soil Samples Collected 13 January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
XU56	MB-012114	PCB	NA	Aroclor 1260	3.1	4.0	µg/kg	--

Data package reviewed: XU56

Key:

MB = Method blank

PCB = Polychlorinated biphenyls; Method 8082B

NA = Not applicable; qualification of sample data not required

µg/kg = Micrograms per kilogram

Table 2
Elevated Reporting Limits
Uplands Soil Samples Collected 13 January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Analysis	Compound	Reported Concentration	Elevated RL	MDL	Units	ERM Qualifier
XU56	TB-02B-8-9.5	PCB	Aroclor 1248	380	380	14	µg/kg	380 U
XU56	TB-02B-8-9.5	PCB	Aroclor 1260	140	140	32	µg/kg	140 U
XU56	TB-02B-9.5-10.5	PCB	Aroclor 1248	120	120	5.8	µg/kg	120 U
XU56	DUP011314-1	PCB	Aroclor 1248	95	95	5.6	µg/kg	95 U
XU56	DUP011314-1	PCB	Aroclor 1260	48	48	13	µg/kg	48 U
XU56	TB-03D-7-9	PCB	Aroclor 1232	12	12	1.3	µg/kg	12 U
XU56	TB-03D-12.6-13.6	PCB	Aroclor 1232	5.9	5.9	1.3	µg/kg	5.9 U
XU56	TB-04A-1.25-3	PCB	Aroclor 1232	20	20	1.3	µg/kg	20 U

Data package reviewed: XU56

Key:

RL = Reporting Limit; elevated due to interference

MDL = Minimum detection limit

PCB = Polychlorinated biphenyls; Method 8082A

µg/kg = Micrograms per kilogram

U = Nondetected

Table 3
Spike Recoveries Outside of Acceptable Limits
Uplands Soil Samples Collected 13 January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
LCS/LCSD										
XU56	LCS/LCSD-012314	PCP	NA	Pentachlorophenol	107/119	56-111	10.5	40	--	--
MS/MSD										
XU56	TB-02B-0.5-2.5 MS/MSD	PCP	NA	Pentachlorophenol	NR/NR	56-111	4.2	40	4X	--

Data package reviewed: XU56

Key:

RPD = Relative percent difference

LCS/LCSD = Laboratory control sample/laboratory control sample duplicate

MS/MSD = Matrix spike/matrix spike duplicate

PCP = Pentachlorophenol; Method SW8041

NA = Not applicable; qualification of sample data not required

NR = Value not reported

4X = Sample concentration exceeded four times amount spiked; no qualification required

Table 4
Field Duplicate Results and Calculated Relative Percent Differences
Uplands Soil Samples Collected 13 January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
XU56	TB-02B-9.5-10.5/DUP011314-1	SVOC	Phenol	760	990	19/20	µg/kg	26
XU56	TB-02B-9.5-10.5/DUP011314-1	SVOC	2-Chlorophenol	100	150	19/20	µg/kg	40
XU56	TB-02B-9.5-10.5/DUP011314-1	SVOC	2,4-Dichlorophenol	110	100	96/98	µg/kg	10
XU56	TB-02B-9.5-10.5/DUP011314-1	SVOC	2,4,6-Trichlorophenol	46	46	96/98	µg/kg	0
XU56	TB-02B-9.5-10.5/DUP011314-1	SVOC	2,4,5-Trichlorophenol	70	65	96/98	µg/kg	7.4
XU56	TB-02B-9.5-10.5/DUP011314-1	SVOC	Hexachlorobenzene	16	20	19/20	µg/kg	22
XU56	TB-02B-9.5-10.5/DUP011314-1	SVOC	2,3,4,6-Tetrachlorophenol	360	390	19/20	µg/kg	8.0
XU56	TB-02B-9.5-10.5/DUP011314-1	PCB	Aroclor 1254	390	370	39/38	µg/kg	5.3
XU56	TB-02B-9.5-10.5/DUP011314-1	PCP	Pentachlorophenol	900	1000	42/43	µg/kg	11
XU56	TB-02B-9.5-10.5/DUP011314-1	Total Metals	Arsenic	10.9	14.3	0.2	mg/kg	27
XU56	TB-02B-9.5-10.5/DUP011314-1	Total Metals	Chromium	57.4	61.5	0.6	mg/kg	6.9
XU56	TB-02B-9.5-10.5/DUP011314-1	Total Metals	Copper	442	393	0.2	mg/kg	12
XU56	TB-02B-9.5-10.5/DUP011314-1	Total Metals	Zinc	67	56	1	mg/kg	18

Data package reviewed: XU56

Key:

RPD = Relative percent difference

SVOC = Semivolatile organic compounds; Method 8270D

PCB = Polychlorinated biphenyls; Method 8082B

Total metals = Method 6020

µg/kg = Micrograms per kilogram

mg/kg = Milligrams per kilogram

Table 5
Calibration Verification Recoveries Outside of Acceptable Limits
Uplands Soil Samples Collected 13 January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	CCV ID	Analysis	Compound	CCV Recovery	CCV Limit	Associated Samples	Reported Concentration	Units	ERM Qualifier
XU56	CCV-012414	SVOC	2,3,4,6-Tetrachlorophenol	-21.9	20	See below	--	--	--
XU56	CCV-012414	--	--	--	--	TB-02B-0.5-2.5	< 57	µg/kg	UJ
XU56	CCV-012414	--	--	--	--	TB-02B-8-9.5	200	µg/kg	J
XU56	CCV-012414	--	--	--	--	TB-02B-9.5-10	360	µg/kg	J
XU56	CCV-012414	--	--	--	--	DUP011314-1	390	µg/kg	J
XU56	CCV-012414	--	--	--	--	TB-03D-4.25-7	88	µg/kg	J
XU56	CCV-012414	--	--	--	--	TB-03D-7-9	< 19	µg/kg	UJ
XU56	CCV-012414	--	--	--	--	TB-03D-12.6-13.6	24	µg/kg	J
XU56	CCV-012414	--	--	--	--	TB-04A-0.5-1.25	100	µg/kg	J
XU56	CCV-012414	--	--	--	--	TB-04A-1.25-3	55	µg/kg	J
XU56	CCV-012414	--	--	--	--	TB-04A-7.1-8.1	690	µg/kg	J

Data package reviewed: XU56

Key:

CCV = Continuing calibration verification

SVOC = Semivolatile organic compounds; Method 8270D

UJ = Nondetected sample result qualified as estimated

J = Detected sample result qualified as estimated

µg/kg = Micrograms per kilogram

Memorandum

Environmental Resources Management

To: Mike Mendes

From: Irene Lavigne

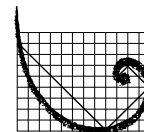
Date: 10 February 2014
revised 12 March 2014

Subject: Data Review of Reichhold-Glacier, Uplands Soil
Samples Collected 14-15 January 2014

Project Number: 0232280.06

Data Package: Analytical Resources, Incorporated Data Package
XU83/XU88

2875 Michelle Drive
Suite 200
Irvine, CA 92606
(949) 623-4700
(949) 623-2940 (fax)



ERM®

The data quality was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999, *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004.

HOLDING TIME AND PRESERVATION EVALUATION

The sample shipments were received at the laboratory within the method-prescribed preservation requirements. The samples were prepared and analyzed within the method-prescribed time period from the date of collection. No sample data were qualified based on sample preservation or holding-time exceedances.

BLANK EVALUATION

The method blank, rinsate blank, and field blank results were nondetected for the target analytes with several exceptions. Two sample results were qualified as nondetected (U) for acetone due to an associated rinsate blank detection for this compound. Additional blank detections did not require qualification of sample data because either the samples were nondetected for the corresponding compounds or the sample concentrations exceeded five times the blank concentration. The blank detections and associated, qualified samples are listed in Table 1.

ELEVATED REPORTING LIMITS

The laboratory noted that the sample results for three samples analyzed for Polychlorinated Biphenyls (PCBs) had elevated reporting limits (RL) for aroclor 1248 and/or aroclor 1260 due to chromatographic interference of these compounds. Since dilution and reanalysis of the samples would not resolve the interference, the laboratory reported the values as not detected at the reported concentrations. The sample results were qualified as nondetected (U) at their respective, elevated RLs as shown in Table 2.

BLANK SPIKE EVALUATION

The laboratory control sample (LCS) and laboratory control sample duplicate recoveries were within the laboratory's limits of acceptance. No sample data were qualified based on the blank spike evaluation. The LCS recoveries indicate acceptable laboratory accuracy and precision.

MATRIX SPIKE EVALUATION

The matrix spike (MS) and matrix spike duplicate (MSD) recoveries were within the laboratory's limits of acceptance with a number of exceptions. A recovery for zinc exceeded the maximum acceptable control limits, requiring qualification of five associated sample results as estimated and biased high (J+) for this compound. Recoveries for arsenic and zinc were out of control, low resulting in qualification of associated sample results as estimated and biased low (J-). Recoveries for hexavalent chromium were not reported due to matrix interference; however, the laboratory indicated that the results were out of control low. The laboratory performed a post spike and verified low recoveries in association with spike sample TB-06E-8.8-10.6. The nondetected field sample results associated with this spike recovery were qualified as rejected (R), and may not be used for decision-making purposes.

Additional MS/MSD outliers did not result in qualified data. Data were not qualified if only one recovery in the MS/MSD pair exceeded control limits, if the data could be verified using an associated, in-control LCS recovery, or if only the relative percent difference (RPD) exceeded control limits. The outlying MS recoveries and qualified sample data are presented in Table 3.

FIELD DUPLICATE EVALUATION

Three samples were collected and submitted in duplicate. ERM calculated the RPD between detected results. The USEPA has not established control criteria for field duplicate samples; therefore, sample data are not qualified on the basis of field duplicate imprecision. The field duplicate results and calculated RPDs are shown in Table 4.

STANDARD REFERENCE EVALUATION

The standard reference results were within acceptable recovery limits. No sample data were qualified based on the standard reference evaluation.

ANALYTICAL DUPLICATE AND REPLICATE EVALUATION

The laboratory prepared and analyzed several analytical duplicate and replicate samples. The RPDs for these samples were within acceptable limits (<20%) with several exceptions. The RPDs for metals in six analytical duplicates exceeded 20%. The primary sample results for these samples were qualified as estimated (J) based on the analytical duplicate evaluation. The analytical duplicate results and outlying RPDs are presented in Table 5.

CONTINUING CALIBRATION EVALUATION

The laboratory noted that a continuing calibration verification (CCV) recovery for bromomethane was below the acceptable control limits. Three nondetected sample results associated with this low CCV recovery were qualified as estimated (UJ) for this compound. The CCV outlier and associated, qualified data are shown in Table 6.

OVERALL ASSESSMENT

Two hexavalent chromium results were rejected due to significant matrix interferences. These hexavalent chromium results cannot be used for decision-making purposes.

The remaining data, including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation, with the exception of the rejected data, is acceptable for the preparation of technically-defensible documents.

Table 1
Blank and Associated Suspect Sample Detections
Uplands Soil Samples Collected 14-15 January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
XU83	RB-011414-1	VOC	NA	Methylene chloride	1.0	1.0	µg/L	--
XU83	FB-011414-1	VOC	NA	Methylene chloride	1.0	1.0	µg/L	--
XU83	MB-012314A	VOC	NA	Methylene chloride	1.0	2.0	µg/L	--
XU83	RB-011414-1	VOC	See below	Acetone	3.2	5.0	µg/L	--
XU83	FB-011414-1	VOC	See below	Acetone	3.0	5.0	µg/L	--
XU83	RB-011414-1	VOC	DUP011414-1	Acetone	6.4	4.2	µg/L	6.4 U
XU83	RB-011414-1	VOC	TB-06B-6-11	Acetone	11	3.7	µg/L	11 U
XU88	RB-011514-2	SVOC	NA	Phenol	1.9	1.0	µg/L	--

Data package reviewed: XU83/XU88

Key:

RB = Rinsate blank

FB = Field blank

MB = Method blank

VOC = Volatile organic compounds; Method 8260C

SVOC = Semivolatile organic compounds; Method 8270D

NA = Not applicable; qualification of sample data not required

µg/L = Micrograms per liter

U = Nondetected

Table 2
Elevated Reporting Limits
Uplands Soil Samples Collected 14-15 January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Analysis	Compound	Reported Concentration	Elevated RL	MDL	Units	ERM Qualifier
XU88	TB-06E-8.8-10.6	PCB	Aroclor 1260	200	200	13	µg/kg	200 U
XU88	TB-05B-13.6-15.6	PCB	Aroclor 1248	25	25	0.58	µg/kg	25 U
XU88	DUP011514-2	PCB	Aroclor 1248	20	20	0.57	µg/kg	20 U

Data package reviewed: XU83/XU88

Key:

RL = Reporting Limit; elevated due to interference

MDL = Minimum detection limit

PCB = Polychlorinated biphenyls; Method 8082A

µg/kg = Micrograms per kilogram

U = Nondetected

Table 3
Spike Recoveries Outside of Acceptable Limits
Uplands Soil Samples Collected 14-15 January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
XU83	TB-06B-6-11 MS/MSD	VOC	NA	Chloromethane	56.1/48.2	65-129	23.7	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	Vinyl chloride	84.8/59.8	74-134	43.0	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	Methylene chloride	34.8/30.3	61-128	22.6	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	Acetone	54.1/41.2	48-132	31.5	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	Carbon disulfide	40.9/37.5	72-146	17.4	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	1,1-Dichloroethene	69.7/60.6	73-138	22.6	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	1,1-Dichloroethane	55.6/56.2	65-139	7.5	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	trans-1,2-Dichloroethene	34.6/36.6	73-131	3.0	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	cis-1,2-Dichloroethene	31.6/33.1	75-124	4.1	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	Chloroform	48.2/47.9	75-126	9.3	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	1,2-Dichloroethane	26.0/26.4	77-120	7.0	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	2-Butanone	45.9/37.4	64-120	28.6	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	1,1,1-Trichloroethane	58.6/57.3	78-133	10.9	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	Carbon tetrachloride	65.9/63.9	76-130	11.8	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	Vinyl acetate	11.4/12.4	54-138	0	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	Bromodichloromethane	38.1/38.6	80-122	7.6	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	1,2-Dichloropropane	46.7/47.4	74-120	7.3	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	cis-1,3-Dichloropropene	19.9/22.0	80-124	1.3	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	Trichloroethene	50.3/51.5	80-120	6.2	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	Dibromochloromethane	28.3/27.0	77-123	13.3	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	1,1,2-Trichloroethane	30.3/30.3	77-120	8.7	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	Benzene	53.8/54.8	80-120	6.6	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	trans-1,3-Dichloropropene	8.8/9.6	80-126	0	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	2-Chloroethyl vinyl ether	NR/NR	20-157	NR	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	Bromoform	21.7/21.8	63-120	8.5	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	4-Methyl-2-pentanone	41.1/34.6	70-124	25.4	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	2-Hexanone	26.2/23.2	62-128	20.6	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	Tetrachloroethene	55.8/52.6	76-131	14.6	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	1,1,2,2-Tetrachloroethane	21.0/21.2	71-120	7.5	40	--	--

Table 3
Spike Recoveries Outside of Acceptable Limits
Uplands Soil Samples Collected 14-15 January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
XU83	TB-06B-6-11 MS/MSD	VOC	NA	Toluene	47.5/48.2	78-120	7.2	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	Chlorobenzene	28.5/29.8	80-120	4.5	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	Ethylbenzene	43.9/43.5	80-120	9.6	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	Styrene	16.9/20.1	80-122	8.6	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	1,1,2-Trichloro-1,2,2-trifluoroethane	81.6/64.5	72-142	32.0	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	m,p-Xylene	41.7/40.3	80-123	11.9	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	o-Xylene	38.1/38.3	80-120	8.3	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	1,2-Dichlorobenzene	12.4/13.5	77-120	0	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	1,3-Dichlorobenzene	15.2/15.4	76-120	6.9	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	1,4-Dichlorobenzene	12.1/12.9	75-120	2.1	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	Acrolein	NR/NR	60-130	NR	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	Iodomethane	86.6/48.8	34-181	63.8	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	Bromoethane	65.9/48.8	74-132	38.4	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	Acrylonitrile	19.9/16.5	59-124	27.3	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	1,1-Dichloropropene	59.6/60.1	80-123	7.9	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	Dibromomethane	15.2/14.9	80-120	10.5	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	1,1,1,2-Tetrachloroethane	37.6/40.5	80-120	1.4	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	1,2-Dibromo-3-chloropropane	16.7/17.1	61-128	6.2	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	1,2,3-Trichloropropane	23.7/22.3	75-120	14.9	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	trans-1,4-Dichloro-2-butene	NR/NR	62-127	NR	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	1,3,5-Trimethylbenzene	33.3/33.9	77-126	7.1	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	1,2,4-Trimethylbenzene	29.3/28.7	77-125	10.9	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	Hexachlorobutadiene	22.7/19.3	72-135	25.0	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	1,2-Dibromoethane	16.2/14.9	79-120	16.9	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	Bromochloromethane	23.7/22.3	69-133	14.9	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	2,2-Dichloropropane	60.6/61.2	77-137	7.8	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	1,3-Dichloropropane	25.0/25.6	77-120	6.2	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	Isopropylbenzene	44.7/44.6	77-127	8.8	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	n-Propylbenzene	36.9/36.4	76-126	10.1	40	--	--

Table 3
Spike Recoveries Outside of Acceptable Limits
Uplands Soil Samples Collected 14-15 January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
XU83	TB-06B-6-11 MS/MSD	VOC	NA	Bromobenzene	17.7/19.8	75-120	2.8	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	2-Chlorotoluene	27.8/28.7	76-120	5.6	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	4-Chlorotoluene	20.2/22.0	75-121	0	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	tert-Butylbenzene	41.2/39.1	77-125	13.8	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	sec-Butylbenzene	37.6/34.4	77-127	17.5	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	4-Isopropyltoluene	60.1/35.3	78-131	60.1	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	n-Butylbenzene	28.0/25.6	75-134	17.6	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	1,2,4-Trichlorobenzene	NR/NR	75-130	NR	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	Naphthalene	NR/NR	71-122	NR	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	1,2,3-Trichlorobenzene	NR/NR	76-122	NR	40	--	--
XU83	TB-06B-6-11 MS/MSD	VOC	NA	Methy tert butyl ether	42.7/38.8	68-124	18.1	40	--	--
XU83	TB-01B-0.8-2.4 MS	Total Metals	See below	Arsenic	-29.5	75-125	--	--	--	--
XU83	TB-01B-0.8-2.4 MS	Total Metals	TB-01B-0.8-2.4	Arsenic	--	--	--	--	70.0	J-
XU83	TB-01B-0.8-2.4 MS	Total Metals	TB-01B-5-6.9	Arsenic	--	--	--	--	4.4	J-
XU83	TB-01B-0.8-2.4 MS	Total Metals	TB-01B-6.9-7.9	Arsenic	--	--	--	--	3.8	J-
XU83	TB-01B-0.8-2.4 MS	Total Metals	TB-06A-5-6	Arsenic	--	--	--	--	60	J-
XU83	TB-01B-0.8-2.4 MS	Total Metals	TB-06A-1.5	Arsenic	--	--	--	--	6.4	J-
XU83	TB-01B-0.8-2.4 MS	Total Metals	NA	Copper	686	75-125	--	--	4X	--
XU83	TB-01B-0.8-2.4 MS	Total Metals	See below	Zinc	362	75-125	--	--	--	--
XU83	TB-01B-0.8-2.4 MS	Total Metals	TB-01B-0.8-2.4	Zinc	--	--	--	--	200	J+
XU83	TB-01B-0.8-2.4 MS	Total Metals	TB-01B-5-6.9	Zinc	--	--	--	--	56	J+
XU83	TB-01B-0.8-2.4 MS	Total Metals	TB-01B-6.9-7.9	Zinc	--	--	--	--	29	J+
XU83	TB-01B-0.8-2.4 MS	Total Metals	TB-06A-5-6	Zinc	--	--	--	--	190	J+
XU83	TB-01B-0.8-2.4 MS	Total Metals	TB-06A-1.5	Zinc	--	--	--	--	50	J+
XU88	TB-05B-13.6-15.6 MS/MSD	SVOC	NA	Phenol	38.4/243	34-120	49.0	30	--	--
XU88	TB-05B-13.6-15.6 MS/MSD	PCP	NA	Pentachlorophenol	137/168	56-111	12.3	40	--	--

Table 3
Spike Recoveries Outside of Acceptable Limits
Uplands Soil Samples Collected 14-15 January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
XU88	TB-05B-13.6-15.6 MS	Total Metals	NA	Arsenic	-456	75-125	--	--	4X	--
XU88	TB-05B-13.6-15.6 MS	Total Metals	NA	Copper	147	75-125	--	--	4X	--
XU88	TB-05B-13.6-15.6 MS	Total Metals	See below	Zinc	70.6	75-125	--	--	--	--
XU88	TB-05B-13.6-15.6 MS	Total Metals	TB-06E-3.4-5	Zinc	--	--	--	--	76	J-
XU88	TB-05B-13.6-15.6 MS	Total Metals	TB-06E-8.8-10.6	Zinc	--	--	--	--	136	J-
XU88	TB-05B-13.6-15.6 MS	Total Metals	TB-05B-2.4-5	Zinc	--	--	--	--	85	J-
XU88	TB-05B-13.6-15.6 MS	Total Metals	TB-05B-13.6-15.6	Zinc	--	--	--	--	95	J-
XU88	TB-05B-13.6-15.6 MS	Total Metals	TB-05B-18.2-19.2	Zinc	--	--	--	--	154	J-
XU88	TB-05B-13.6-15.6 MS	Total Metals	DUP011514-2	Zinc	--	--	--	--	48	J-
XU88	TB-06E-8.8-10.6 MS/MSD	Cr VI	See below	Chromium, hexavalent	NR	75-125			--	--
XU88	TB-06E-8.8-10.6 MS/MSD	Cr VI	TB-06E-8.8-10.6	Chromium, hexavalent	--	--			< 0.495	R
XU88	TB-06E-8.8-10.6 MS/MSD	Cr VI	DUP011514-1	Chromium, hexavalent	--	--			< 0.516	R

Data package reviewed: XU83/XU88

Key:

RPD = Relative percent difference

MS/MSD = Matrix spike/matrix spike duplicate

VOC = Volatile organic compounds; Method 8260C

Total Metals = Method 6020

SVOC = Semivolatile organic compounds; Method 8270D

PCP = Pentachlorophenol; Method SW8041

Cr VI = Hexavalent chromium analysis; Method 3500Cr

NR = Value not reported; no recovery or recovery low due to matrix interference

4X = Sample concentration exceeded four times amount spiked; no qualification required

J- = Detected result qualified as estimated and biased low

J+ = Detected result qualified as estimated and biased high

R = Sample result is rejected

Table 4
Field Duplicate Results and Calculated Relative Percent Differences
Uplands Soil Samples Collected 14-15 January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
XU83	TB-06B-6-11/DUP011414-1	VOC	Acetone	11	6.4	3.7/4.2	µg/kg	53
XU83	TB-06B-6-11/DUP011414-1	VOC	Benzene	0.5	0.6	0.7/0.6	µg/kg	18
XU88	TB-05B-13.6-15.6/DUP011514-2	SVOC	Phenol	1300	1000	19/20	µg/kg	26
XU88	TB-05B-13.6-15.6/DUP011514-2	SVOC	2-Chlorophenol	84	75	19/20	µg/kg	11
XU88	TB-05B-13.6-15.6/DUP011514-2	SVOC	2,4-Dichlorophenol	84	87	94/97	µg/kg	3.5
XU88	TB-05B-13.6-15.6/DUP011514-2	SVOC	2,4,6-Trichlorophenol	32	29	94/97	µg/kg	9.8
XU88	TB-05B-13.6-15.6/DUP011514-2	SVOC	Hexachlorobenzene	18	9.7	19/20	µg/kg	60
XU88	TB-05B-13.6-15.6/DUP011514-2	SVOC	2,3,4,6-Tetrachlorophenol	170	120	19/20	µg/kg	34
XU88	TB-05B-13.6-15.6/DUP011514-2	PCB	Aroclor 1254	45	38	4.0	µg/kg	17
XU88	TB-05B-13.6-15.6/DUP011514-2	PCB	Aroclor 1260	14	11	4.0	µg/kg	24
XU88	TB-05B-13.6-15.6/DUP011514-2	PCP	Pentachlorophenol	94	93	9.4/7.3	µg/kg	1.1
XU88	TB-05B-13.6-15.6/DUP011514-2	Total Metals	Arsenic	1160	286	1/0.3	mg/kg	121
XU88	TB-05B-13.6-15.6/DUP011514-2	Total Metals	Chromium	37.1	32	0.7/2	mg/kg	15
XU88	TB-05B-13.6-15.6/DUP011514-2	Total Metals	Copper	322	6530	0.3/0.7	mg/kg	181
XU88	TB-05B-13.6-15.6/DUP011514-2	Total Metals	Zinc	95	48	1/4	mg/kg	66
XU88	TB-06E-8.8-10.6/DUP011514-1	Total Solids	Total Solids	80.21	76.55	0.01	%	4.7

Data package reviewed: XU83/XU88

Key:

RPD = Relative percent difference

VOC = Volatile organic compounds; Method 8260C

SVOC = Semivolatile organic compounds; Method 8270D

PCB = Polychlorinated biphenyls; Method 8082B

PCP = Pentachlorophenol; Method SW8041

Total Metals = Method 6020

Total Solids = Method 2540G

µg/kg = Micrograms per kilogram

mg/kg = Milligrams per kilogram

Table 5
Analytical Duplicate Results and Calculated Relative Percent Differences
Uplands Soil Samples Collected 14-15 January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Concentration		Report Limit	Units	RPD	RPD Limit	ERM Qualifier
			Sample	Duplicate					
XU83	TB-01B-0.8-2.4	Arsenic, total	70.0	41.6	0.2	mg/kg	50.9	20	J
XU83	TB-01B-0.8-2.4	Chromium, total	26	33	1	mg/kg	23.7	20	J
XU88	TB-05B-13.6-15.6	Arsenic, total	1160	554	1	mg/kg	70.7	20	J
XU88	TB-05B-13.6-15.6	Chromium, total	37.1	47.5	0.7	mg/kg	24.6	20	J
XU88	TB-05B-13.6-15.6	Copper, total	322	253	0.3	mg/kg	24.0	20	J
XU88	TB-05B-13.6-15.6	Zinc, total	95	58	1	mg/kg	48.4	20	J

Data package reviewed: XU83/XU88

Key:

RPD = Relative percent difference

mg/kg = Milligrams per kilogram

J = Detected sample result qualified as estimated

Table 6
Calibration Verification Recoveries Outside of Acceptable Limits
Uplands Soil Samples Collected 14-15 January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	CCV ID	Analysis	Compound	CCV Recovery	CCV Limit	Associated Samples	Reported Concentration	Units	ERM Qualifier
XU83	CCV-012314	VOC	Bromomethane	-20.5	20	See below	--	--	--
XU83	CCV-012314	--	--	--	--	DUP011414-1	< 0.8	µg/kg	UJ
XU83	CCV-012314	--	--	--	--	TB-06B-6-11	< 0.7	µg/kg	UJ
XU83	CCV-012314	--	--	--	--	TB-011414	< 1.0	µg/kg	UJ

Data package reviewed: XU83/XU88

Key:

CCV = Continuing calibration verification

VOC = Volatile organic compounds; Method 8260C

µg/kg = Micrograms per kilogram

UJ = Nondetected sample result qualified as estimated

Memorandum

Environmental Resources Management

To: Mike Mendes

From: Irene Lavigne

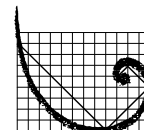
Date: 11 February 2014

Subject: Data Review of Reichhold-Glacier, Uplands Soil
Samples Collected 16 January 2014

Project Number: 0232280.06

Data Package: Analytical Resources, Incorporated Data Package
XV41

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(949) 623-2940 (fax)



ERM®

The data quality was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999, *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004.

HOLDING TIME AND PRESERVATION EVALUATION

The sample shipment was received at the laboratory within the method-prescribed preservation requirements. The samples were prepared and analyzed within the method-prescribed time period from the date of collection. No sample data were qualified based on sample preservation or holding-time exceedances.

BLANK EVALUATION

The method blank results were nondetected for the each of the target analytes with several exceptions. One sample result was qualified as nondetected (U) for 1-methylnaphthalene. Additional blank results were not qualified because the associated sample concentrations were greater than five times the blank detections. The blank detections and qualified sample are presented in Table 1.

BLANK SPIKE EVALUATION

The laboratory control sample (LCS) and laboratory control sample duplicate recoveries were within the laboratory's limits of acceptance. No sample data were qualified based on the blank spike evaluation. The LCS recoveries indicate acceptable laboratory accuracy and precision.

MATRIX SPIKE EVALUATION

The matrix spike (MS) and matrix spike duplicate recoveries were within the laboratory's limits of acceptance with few exceptions. One sample result for copper was qualified as estimated and biased low (J-) due to a recovery for this compound that was below the minimum acceptable control limits. Additional MS outliers did not result in qualified data because the concentration of the unspiked sample exceeded four times the amount of the corresponding compound. The outlying MS recoveries and qualified sample data are listed in Table 2.

STANDARD REFERENCE EVALUATION

The standard reference results were within acceptable recovery limits. No sample data were qualified based on the standard reference evaluation.

ANALYTICAL DUPLICATE EVALUATION

The laboratory prepared and analyzed several analytical duplicate samples. The RPDs for these samples were within acceptable limits (<20%). Sample data were not qualified based on the analytical duplicate evaluation.

CONTINUING CALIBRATION EVALUATION

The laboratory noted that a continuing calibration verification (CCV) recoveries for a number of volatile organic compounds (VOC) and semivolatile organic compounds (SVOC) were outside of acceptable control limits. Detected and nondetected sample results for various SVOC compounds associated with outlying CCV recoveries were qualified as estimated, J or UJ, as shown in Table 3. The VOC outliers did not result in

qualified sample data because the CCV sample was not associated with a field sample.

OVERALL ASSESSMENT

No data were determined to be unusable. All of the data, including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents.

Table 1
Blank and Associated Suspect Sample Detections
Uplands Soil Samples Collected 16 January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
XV41	MB-012814	SVOC	NA	Phenol	26	20	µg/kg	--
XV41	MB-013014	PAH	NA	2-Methylnaphthalene	3.2	5.0	µg/kg	--
XV41	MB-013014	PAH	See below	1-Methylnaphthalene	2.9	5.0	µg/kg	--
XV41	MB-013014	PAH	MW-45D-12.5-13.0	1-Methylnaphthalene	8.3	5.0	µg/kg	8.3 U
XV41	MB-012914	Total Metals	NA	Zinc	2	1	mg/kg	--

Data package reviewed: XV41

Key:

MB = Method blank

SVOC = Semivolatile organic compounds; Method 8270D

PAH = Polycyclic aromatic hydrocarbons - selected ion monitoring; Method 8270D-SIM

Total Metals = Method 6020

NA = Not applicable; qualification of sample data not required

µg/kg = Micrograms per kilogram

mg/kg = Milligrams per kilogram

U = Nondetected

Table 2
Spike Recoveries Outside of Acceptable Limits
Uplands Soil Samples Collected 16 January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	Sample Result	ERM Qualifier
XV41	MW-45D-12.5-13.0 MS/MSD	Total Metals	NA	Arsenic	205	75-125	4X	--
XV41	MW-45D-12.5-13.0 MS/MSD	Total Metals	See below	Copper	12.7	75-125	--	--
XV41	MW-45D-12.5-13.0 MS/MSD	Total Metals	MW-45D-12.5-13.0	Copper	--	--	260	J-
XV41	MW-45D-12.5-13.0 MS/MSD	Total Metals	NA	Zinc	722	75-125	4X	--

Data package reviewed: XV41

Key:

MS/MSD = Matrix spike/matrix spike duplicate

Total Metals = Method 6020

4X = Sample concentration exceeded four times amount spiked; no qualification required

J- = Detected result qualified as estimated and biased low

Table 3
Calibration Verification Recoveries Outside of Acceptable Limits
Uplands Soil Samples Collected 16 January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	CCV ID	Analysis	Compound	CCV Recovery	CCV Limit	Associated Samples	Reported Concentration	Units	ERM Qualifier
XV41	CCV-012714	VOC	Chloromethane	-23.7	20	NA	--	--	--
XV41	CCV-012714	VOC	Bromomethane	-26.1	20	NA	--	--	--
XV41	CCV-012714	VOC	Trichlorofluoromethane	-26.1	20	NA	--	--	--
XV41	CCV-012714	VOC	Iodomethane	32.1	20	NA	--	--	--
XV41	CCV-020414	SVOC	Benzoic acid	-25.0	20	See below	--	--	--
XV41	CCV-020414	--	--	--	--	MW-45D-12.5-13.0	960	µg/kg	J
XV41	CCV-020414	SVOC	Hexachlorocyclopentadiene	-26.8	20	See below	--	--	--
XV41	CCV-020414	--	--	--	--	MW-45D-12.5-13.0	< 20	µg/kg	UJ
XV41	CCV-020414	SVOC	2,4-Dinitrophenol	-41.0	20	See below	--	--	--
XV41	CCV-020414	--	--	--	--	MW-45D-12.5-13.0	< 200	µg/kg	UJ
XV41	CCV-020414	SVOC	Pentachlorophenol	-36.1	20	See below	--	--	--
XV41	CCV-020414	--	--	--	--	MW-45D-12.5-13.0	< 99	µg/kg	UJ
XV41	CCV-020414	SVOC	Butylbenzylphthalate	20.4	20	See below	--	--	--
XV41	CCV-020414	--	--	--	--	MW-45D-12.5-13.0	19	µg/kg	J

Data package reviewed: XV41

Key:

CCV = Continuing calibration verification

VOC = Volatile organic compounds; Method 8260C

NA = Not applicable; qualification of sample data not required

SVOC = Semivolatile organic compounds; Method 8270D

µg/kg = Micrograms per kilogram

J = Detected sample result qualified as estimated

UJ = Nondetected sample result qualified as estimated

Memorandum

**Environmental
Resources
Management**

To: Mike Mendes

From: Irene Lavigne

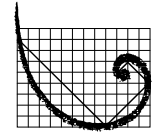
Date: 06 February 2014

Subject: Data Review of Reichhold-Glacier, Uplands Soil
Samples Collected 21 January 2014,
Total Metals Analyses

Project Number: 0232280.06

Data Package: Analytical Resources, Incorporated Data Package
XV46

2875 Michelle Drive
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(949) 623-4700
(949) 623-2940 (fax)



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The data quality was assessed and any necessary qualifiers were applied following *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004.

HOLDING TIME AND PRESERVATION EVALUATION

The sample shipment was received at the laboratory within the method-prescribed preservation requirements. The samples were prepared and analyzed within the method-prescribed time period from the date of collection. No sample data were qualified based on sample preservation or holding-time exceedances.

BLANK EVALUATION

The method blank samples were nondetected for the target analytes. Sample data were not qualified based on the blank evaluation. The method blank results indicate the absence of laboratory contamination.

BLANK SPIKE EVALUATION

The laboratory control sample (LCS) recoveries were within the laboratory's limits of acceptance. No sample data were qualified based on the blank spike evaluation. The LCS recoveries indicate acceptable laboratory accuracy and precision.

OVERALL ASSESSMENT

No data were determined to be unusable or required qualification. All of the data can be used for decision-making purposes. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents.

Memorandum

Environmental Resources Management

To: Mike Mendes

From: Irene Lavigne

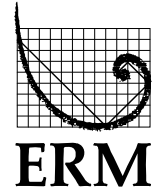
Date: 06 February 2014

Subject: Data Review of Reichhold-Glacier, Uplands Soil Samples Collected 22 January 2014; CrVI, metals, TOC, grain size analyses

Project Number: 0232280.06

Data Package: Analytical Resources, Incorporated Data Package XV62/XV72

2875 Michelle Drive
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(949) 623-4700
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The data quality was assessed and any necessary qualifiers were applied following *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004.

HOLDING TIME AND PRESERVATION EVALUATION

The sample shipment was received at the laboratory within the method-prescribed preservation requirements. The samples were prepared and analyzed within the method-prescribed time period from the date of collection. No sample data were qualified based on sample preservation or holding-time exceedances.

BLANK EVALUATION

The method blank results were nondetected for the target analytes with limited exceptions. Two method blanks had detections for zinc. Associated sample data were not qualified on the basis of the method blank detections because the sample results exceeded four times the blank concentrations. The method blank detections are shown in Table 1.

BLANK SPIKE EVALUATION

The laboratory control sample (LCS) recoveries were within the laboratory's limits of acceptance. No sample data were qualified based on the blank spike evaluation. The LCS recoveries indicate acceptable laboratory accuracy and precision.

MATRIX SPIKE EVALUATION

The matrix spike (MS) recoveries were within the laboratory's limits of acceptance with few exceptions. Sample data were not qualified based on the MS outliers. A post digest spike (PDS) was analyzed for copper to verify the low MS recovery for this compound. The PDS was within acceptable limits; thus, associated copper results were not qualified. Additional recovery outliers for arsenic and zinc did not require qualification of associated sample data because the concentrations of the unspiked MS sample was greater than four times the amount of the spiked compounds. The outlying MS recoveries are listed in Table 2.

POST DIGESTION SPIKE EVALUATION

The post digestion spike (PDS) recoveries were within the laboratory's limits of acceptance. Sample data are not qualified solely on the basis of PDS recoveries. The PDS results are used in conjunction with the MS recoveries, when there is an outlying MS recovery, to evaluate the validity of the sample data.

STANDARD REFERENCE EVALUATION

The standard reference results were within acceptable recovery limits. No sample data were qualified based on the standard reference evaluation.

FIELD DUPLICATE EVALUATION

One sample was collected and submitted in duplicate. ERM calculated the relative percent difference (RPD) between detected results. The USEPA has not established control criteria for field duplicate samples; therefore, sample data are not qualified on the basis of field duplicate imprecision. The field duplicate results and calculated RPD are presented in Table 3.

REPLICATE EVALUATION

The laboratory prepared and analyzed several replicate samples. The RPD for each replicate was within acceptable limits (<20%). Sample data were not qualified based on the replicate RPDs.

OVERALL ASSESSMENT

No data were determined to be unusable or required qualification. All of the data can be used for decision-making purposes. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents.

Table 1
Blank and Associated Suspect Sample Detections
Uplands Soil Samples Collected 22 January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
XV62	MB-012914	Total Metals	NA	Zinc	2	1	mg/kg	--
XV72	MB-013114	Total Metals	NA	Zinc	2	1	mg/kg	--

Data package reviewed: XV62/XV72

Key:

MB = Method blank

Total Metals = Method 6020

NA = Not applicable; qualification of sample data not required

mg/kg = Milligrams per kilogram

Table 2
Matrix Spike & Post Digest Spike Recoveries Outside of Acceptable Limits
Uplands Soil Samples Collected 22 January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	Sample Result	ERM Qualifier
XV62	MW-45D-12.5-13.0 MS	Total Metals	NA	Arsenic	205	75-125	4X	--
XV62	MW-45D-12.5-13.0 MS	Total Metals	NA	Copper	12.7	75-125	--	--
XV62	MW-45D-12.5-13.0 PDS	Total Metals	NA	Copper	104.6	75-125	--	--
XV62	MW-45D-12.5-13.0 MS	Total Metals	NA	Zinc	722	75-125	4X	--

Data package reviewed: XV62/XV72

Key:

MS = Matrix spike

PDS = Post digest spike

Total Metals = Method 6020

NA = Not applicable; qualification of sample data not required

J- = Detected sample result qualified as estimated and biased low

4X = Concentration of unspiked sample was greater than 4 times the amount spiked; no qualification required

Table 3
Field Duplicate Results and Calculated Relative Percent Differences
Uplands Soil Samples Collected 22 January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
XV62	GP-71-15-17/DUP012214-1	Total Metals	Arsenic	1.5	1.3	0.2	mg/kg	14
XV62	GP-71-15-17/DUP012214-1	Total Metals	Chromium	12.5	11.6	0.6	mg/kg	7.5
XV62	GP-71-15-17/DUP012214-1	Total Metals	Copper	44.4	15.1	0.2	mg/kg	98
XV62	GP-71-15-17/DUP012214-1	Total Metals	Zinc	31	28	1	mg/kg	10
XV62	GP-71-15-17/DUP012214-1	Total Solids	Total Solids	75.25	77.63	.01	%	3.1

Data package reviewed: XV62/XV72

Key:

RPD = Relative percent difference

Total Metals = Method 6020

Total Solids = Method 2540G

mg/kg = Milligrams per kilogram

Memorandum

Environmental Resources Management

To: Mike Mendes

From: Irene Lavigne

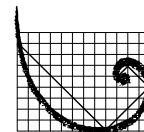
Date: 14 February 2014
revised 12 March 2014

Subject: Data Review of Reichhold-Glacier, Uplands Soil
Samples Collected 23 - 24 January 2014,

Project Number: 0232280.06

Data Package: Analytical Resources, Incorporated Data Package
XV81/XV93

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The quality of the data was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999 and *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004.

HOLDING TIME AND PRESERVATION EVALUATION

The sample shipments were received at the laboratory within the method-prescribed preservation requirements. The samples were prepared and analyzed within the method-prescribed time period from the date of collection. No sample data were qualified based on sample preservation or holding-time exceedances.

BLANK EVALUATION

The method blank and rinsate blank sample results were nondetected for the target analytes with limited exceptions. Sample data for phenol and copper were qualified as nondetected (U) due to detections of phenol in a method blank and copper in a rinsate blank. Additional blank detections did not require qualification of sample data because the sample results exceeded 10 times the blank concentration. The blank detections and associated, qualified data are presented in Table 1.

ELEVATED REPORTING LIMITS

The laboratory noted that the sample results for one sample analyzed for Polychlorinated Biphenyls (PCBs) had elevated reporting limits (RL) for aroclor 1248 and aroclor 1260 due to chromatographic interference of these compounds. Since dilution and reanalysis of the sample would not resolve the interference, the laboratory reported the values as not detected at the reported concentrations. The sample results were qualified as nondetected (U) at their respective, elevated RLs as shown in Table 2.

BLANK SPIKE EVALUATION

The laboratory control sample (LCS) and laboratory control sample duplicate recoveries were within the laboratory's limits of acceptance with one exception. No sample data were qualified based on the LCS outlier because the data could be confirmed using an associated, in-control matrix spike recovery. The LCS outlier is shown in Table 3. The LCS recoveries indicate acceptable laboratory accuracy and precision

MATRIX SPIKE EVALUATION

The matrix spike (MS) and matrix spike duplicate recoveries were within the laboratory's limits of acceptance with limited exceptions. A recovery for hexavalent chromium that was below the minimum acceptable control limits required qualification of four associated, nondetected samples as estimated (UJ) for this compound. Outlying MS recoveries for semivolatile organic compounds (SVOC) did not require qualification of sample data because the data could be verified using an associated, in-control LCS recovery. The MS outliers and associated, qualified sample results are listed in Table 3.

STANDARD REFERENCE EVALUATION

The standard reference results were within acceptable recovery limits. No sample data were qualified based on the standard reference evaluation.

FIELD DUPLICATE EVALUATION

One sample was collected and submitted in duplicate. ERM calculated the relative percent difference (RPD) between detected results. The USEPA has not established control criteria for field duplicate samples; therefore, sample data are not qualified on the basis of field duplicate imprecision. The field duplicate results and calculated RPD are presented in Table 4.

ANALYTICAL DUPLICATE AND REPLICATE EVALUATION

The laboratory prepared and analyzed several analytical duplicate and replicate samples. The RPDs for these samples were within acceptable limits (< 20%) with one exception. The RPD for total arsenic for one sample exceeded 20%. The primary sample result for this duplicate pair was qualified as estimated (J). The analytical duplicate results and outlying RPD is presented in Table 5.

CONTINUING CALIBRATION EVALUATION

The laboratory noted that continuing calibration verification (CCV) recoveries for a number of semivolatile organic compounds were outside of acceptable control limits. Sample data were not qualified on the basis of the outlying CCV recoveries because either the recoveries were biased high and the sample results were nondetected, or the CCV sample was not associated with field samples. A list of the outlying CCV recoveries is provided in Table 6.

OVERALL ASSESSMENT

No data were determined to be unusable. All of the data, including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents.

Table 1
Blank and Associated Suspect Sample Detections
Uplands Soil Samples Collected 23-24 January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
XV81	MB-012814	SVOC	See below	Phenol	26	20	µg/kg	--
XV81	MB-012814	SVOC	GP-68-4-6	Phenol	51	19	µg/kg	51 U
XV81	MB-012814	SVOC	DUP-012314-1	Phenol	60	19	µg/kg	60 U
XV93	MB-012814	SVOC	TB-07-0-1	Phenol	46	19	µg/kg	46 U
XV93	MB-020514	Total Metals	NA	Zinc	1	1	mg/kg	--
XV93	RB-012314-1	Total Metals	See below	Copper	3	3	mg/kg	--
XV93	RB-012314-1	Total Metals	MW-35D-19.3-20	Copper	10.6	0.2	mg/kg	10.6 U
XV93	RB-012314-1	Total Metals	GP-68-4-6	Copper	8.5	0.2	mg/kg	8.5 U
XV93	RB-012314-1	Total Metals	DUP-012314-1	Copper	8.3	0.3	mg/kg	8.3 U
XV93	RB-012314-1	Total Metals	GP-68-9.4-10.4	Copper	12.8	0.3	mg/kg	12.8 U

Data package reviewed: XV81/XV93

Key:

MB = Method blank

SVOC = Semivolatile organic compounds; Method 8270D

Total Metals = Method 6020

NA = Not applicable; qualification of sample data not required

µg/kg = Micrograms per kilogram

mg/kg = Milligrams per kilogram

U = Nondetected

Table 2
Elevated Reporting Limits
Uplands Soil Samples Collected 23-24 January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Analysis	Compound	Reported Concentration	Elevated RL	MDL	Units	ERM Qualifier
XV93	TB-06F-14-16	PCB	Aroclor 1248	49	49	0.58	µg/kg	49 U
XV93	TB-06F-14-16	PCB	Aroclor 1260	240	240	1.3	µg/kg	240 U

Data package reviewed: XV81/XV93

Key:

RL = Reporting Limit; elevated due to interference

MDL = Minimum detection limit

PCB = Polychlorinated biphenyls; Method 8082A

µg/kg = Micrograms per kilogram

U = Nondetected

Table 3
Spike Recoveries Outside of Acceptable Limits
Uplands Soil Samples Collected 23-24 January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
LCS/LCSD										
XV81	LCS/LCSD-012814	SVOC	NA	2,2'-oxybis(1-Chloropropane)	36.0/35.2	39-101	2.2	40	--	--
MS/MSD										
XV81	GP-68-4-6 MS/MSD	SVOC	NA	4-Chloroaniline	NR/NR	11-120	NR	30	--	--
XV81	GP-68-4-6 MS/MSD	SVOC	NA	3-Nitroaniline	18.8/23.8	22-120	23.6	30	--	--
XV81	GP-68-4-6 MS/MSD	SVOC	NA	3,3'-Dichlorobenzidine	NR/NR	10-120	NR	30	--	--
XV81	GP-68-4-6 MS/MSD	SVOC	NA	Benzo(g,h,i)perylene	34.6/35.0	38-126	1.2	30	--	--
XV81	GP-68-4-6 MS	Cr VI	See below	Chromium, hexavalent	63.2	75-125	--	--	--	--
XV81	GP-68-4-6 MS	Cr VI	MW-35D-19.3-20	Chromium, hexavalent	--	--	--	--	< 0.485	UJ
XV81	GP-68-4-6 MS	Cr VI	GP-68-4-6	Chromium, hexavalent	--	--	--	--	< 0.523	UJ
XV81	GP-68-4-6 MS	Cr VI	DUP-012314-1	Chromium, hexavalent	--	--	--	--	< 0.519	UJ
XV81	GP-68-4-6 MS	Cr VI	GP-68-9.4-10.4	Chromium, hexavalent	--	--	--	--	< 0.622	UJ

Data package reviewed: XV81/XV93

Key:

RPD = Relative percent difference

MS/MSD = Matrix spike/matrix spike duplicate

SVOC = Semivolatile organic compounds; Method 8270D

Cr VI = Hexavalent chromium analysis; Method 3500Cr

NA = Not applicable; qualification of sample data not required

NR = Value not reported

UJ = Nondetected sample result qualified as estimated

Table 4
Field Duplicate Results and Calculated Relative Percent Differences
Uplands Soil Samples Collected 23-24 January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
XV81	GP-68-4-6/DUP-012314-1	SVOC	Phenol	51	60	19	µg/kg	16
XV81	GP-68-4-6/DUP-012314-1	SVOC-SIM	Naphthalene	2.6	2.8	4.7/4.8	µg/kg	7.4
XV81	GP-68-4-6/DUP-012314-1	SVOC-SIM	2-Methylnaphthalene	2.9	5.8	4.7/4.8	µg/kg	67
XV81	GP-68-4-6/DUP-012314-1	SVOC-SIM	Phenanthrene	2.9	5.8	4.7/4.8	µg/kg	67
XV81	GP-68-4-6/DUP-012314-1	SVOC-SIM	Fluoranthene	3.8	3.8	4.7/4.8	µg/kg	0
XV81	GP-68-4-6/DUP-012314-1	SVOC-SIM	Pyrene	2.9	3.0	4.7/4.8	µg/kg	3.4
XV81	GP-68-4-6/DUP-012314-1	PCP	Pentachlorophenol	6.4	6.6	7.7/7.9	µg/kg	3.1
XV81	GP-68-4-6/DUP-012314-1	Total Metals	Arsenic	2.5	2.3	0.2	mg/kg	8.3
XV81	GP-68-4-6/DUP-012314-1	Total Metals	Chromium	10.6	10.2	0.6	mg/kg	3.8
XV81	GP-68-4-6/DUP-012314-1	Total Metals	Copper	8.5	8.3	0.2/0.3	mg/kg	2.4
XV81	GP-68-4-6/DUP-012314-1	Total Metals	Zinc	21	19	1	mg/kg	10
XV81	GP-68-4-6/DUP-012314-1	Total Solids	Total Solids	76.17	76.51	0.01	%	0.4

Data package reviewed: XV81/XV93

Key:

RPD = Relative percent difference

SVOC = Semivolatile organic compounds; Method 8270D

SVOC-SIM = Semivolatile organic compounds - Selected Ion Monitoring; Method 8270D

PCP = Pentachlorophenol; Method SW8041

Total Metals = Method 6020

Table 5
Analytical Duplicate Results and Calculated Relative Percent Differences
Uplands Soil Samples Collected 23-24 January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Concentration		Report Limit	Units	RPD	RPD Limit	ERM Qualifier
			Sample	Duplicate					
XV81	GP-68-4-6	Arsenic, total	2.5	1.7	0.2	mg/kg	38.1	20	J

Data package reviewed: XV81/XV93

Key:

RPD = Relative percent difference

mg/kg = Milligrams per kilogram

J = Detected sample result qualified as estimated

Table 6
Calibration Verification Recoveries Outside of Acceptable Limits
Uplands Soil Samples Collected 23-24 January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	CCV ID	Analysis	Compound	CCV Recovery	CCV Limit	Associated Samples	Reported Concentration	Units	ERM Qualifier
XV81	CCV-013014	SVOC	2,2'-oxybis(1-Chloropropane)	-39.2	20	NA	--	--	--
XV81	CCV-013014	SVOC	Hexachlorobutadiene	27.9	20	NA	--	--	--
XV81	CCV-013014	SVOC	2,4-Dinitrophenol	27.0	20	NA	--	--	--
XV81	CCV-013014	SVOC	4-Nitroaniline	-21.1	20	NA	--	--	--
XV93	CCV-020414	SVOC	Benzoic acid	25.0	20	NA	--	--	--
XV93	CCV-020414	SVOC	Hexachlorocyclopentadiene	-26.8	20	NA	--	--	--
XV93	CCV-020414	SVOC	2,4-Dinitrophenol	-41.0	20	NA	--	--	--
XV93	CCV-020414	SVOC	Pentachlorophenol	-36.1	20	NA	--	--	--
XV93	CCV-020414	SVOC	Butylbenzylphthalate	20.4	20	NA	--	--	--

Data package reviewed: XV81/XV93

Key:

CCV = Continuing calibration verification

SVOC = Semivolatile organic compounds; Method 8270D

Memorandum

Environmental Resources Management

To: Mike Mendes

From: Irene Lavigne

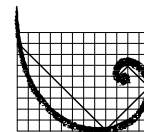
Date: 14 February 2014
Revised 04 April 4, 2014; additional analyte reported

Subject: Data Review of Reichhold-Glacier, Uplands Soil
Samples Collected 23 - 24 January 2014,

Project Number: 0232280.06

Data Package: Analytical Resources, Incorporated Data Package
XV81/XV93

2875 Michelle Drive
Suite 200
Irvine, CA 92606
(949) 623-4700
(949) 623-2940 (fax)



ERM®

The quality of the data was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999 and *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004.

HOLDING TIME AND PRESERVATION EVALUATION

The sample shipments were received at the laboratory within the method-prescribed preservation requirements. The samples were prepared and analyzed within the method-prescribed time period from the date of collection. No sample data were qualified based on sample preservation or holding-time exceedances.

BLANK EVALUATION

The method blank and rinsate blank sample results were nondetected for the target analytes with limited exceptions. Sample data for phenol and copper were qualified as nondetected (U) due to detections of phenol in a method blank and copper in a rinsate blank. Additional blank detections did not require qualification of sample data because the sample results exceeded 10 times the blank concentration. The blank detections and associated, qualified data are presented in Table 1.

ELEVATED REPORTING LIMITS

The laboratory noted that the sample results for one sample analyzed for Polychlorinated Biphenyls (PCBs) had elevated reporting limits (RL) for aroclor 1248 and aroclor 1260 due to chromatographic interference of these compounds. Since dilution and reanalysis of the sample would not resolve the interference, the laboratory reported the values as not detected at the reported concentrations. The sample results were qualified as nondetected (U) at their respective, elevated RLs as shown in Table 2.

BLANK SPIKE EVALUATION

The laboratory control sample (LCS) and laboratory control sample duplicate recoveries were within the laboratory's limits of acceptance with one exception. No sample data were qualified based on the LCS outlier because the data could be confirmed using an associated, in-control matrix spike recovery. The LCS outlier is shown in Table 3. The LCS recoveries indicate acceptable laboratory accuracy and precision

MATRIX SPIKE EVALUATION

The matrix spike (MS) and matrix spike duplicate recoveries were within the laboratory's limits of acceptance with limited exceptions. A recovery for hexavalent chromium that was below the minimum acceptable control limits required qualification of four associated, nondetected samples as estimated (UJ) for this compound. Outlying MS recoveries for semivolatile organic compounds (SVOC) did not require qualification of sample data because the data could be verified using an associated, in-control LCS recovery. The MS outliers and associated, qualified sample results are listed in Table 3.

STANDARD REFERENCE EVALUATION

The standard reference results were within acceptable recovery limits. No sample data were qualified based on the standard reference evaluation.

FIELD DUPLICATE EVALUATION

One sample was collected and submitted in duplicate. ERM calculated the relative percent difference (RPD) between detected results. The USEPA has not established control criteria for field duplicate samples; therefore, sample data are not qualified on the basis of field duplicate imprecision. The field duplicate results and calculated RPD are presented in Table 4.

ANALYTICAL DUPLICATE AND REPLICATE EVALUATION

The laboratory prepared and analyzed several analytical duplicate and replicate samples. The RPDs for these samples were within acceptable limits (< 20%) with one exception. The RPD for total arsenic for one sample exceeded 20%. The primary sample result for this duplicate pair was qualified as estimated (J). The analytical duplicate results and outlying RPD is presented in Table 5.

CONTINUING CALIBRATION EVALUATION

The laboratory noted that continuing calibration verification (CCV) recoveries for a number of semivolatile organic compounds were outside of acceptable control limits. Sample data were not qualified on the basis of the outlying CCV recoveries because either the recoveries were biased high and the sample results were nondetected, or the CCV sample was not associated with field samples. A list of the outlying CCV recoveries is provided in Table 6.

OVERALL ASSESSMENT

No data were determined to be unusable. All of the data, including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents.

Table 1
Blank and Associated Suspect Sample Detections
Uplands Soil Samples Collected 23-24 January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
XV81	MB-012814	SVOC	See below	Phenol	26	20	µg/kg	--
XV81	MB-012814	SVOC	GP-68-4-6	Phenol	51	19	µg/kg	51 U
XV81	MB-012814	SVOC	DUP-012314-1	Phenol	60	19	µg/kg	60 U
XV93	MB-012814	SVOC	TB-07-0-1	Phenol	46	19	µg/kg	46 U
XV93	MB-020514	Total Metals	NA	Zinc	1	1	mg/kg	--
XV93	RB-012314-1	Total Metals	See below	Copper	3	3	mg/kg	--
XV93	RB-012314-1	Total Metals	MW-35D-19.3-20	Copper	10.6	0.2	mg/kg	10.6 U
XV93	RB-012314-1	Total Metals	GP-68-4-6	Copper	8.5	0.2	mg/kg	8.5 U
XV93	RB-012314-1	Total Metals	DUP-012314-1	Copper	8.3	0.3	mg/kg	8.3 U
XV93	RB-012314-1	Total Metals	GP-68-9.4-10.4	Copper	12.8	0.3	mg/kg	12.8 U

Data package reviewed: XV81/XV93

Key:

MB = Method blank

SVOC = Semivolatile organic compounds; Method 8270D

Total Metals = Method 6020

NA = Not applicable; qualification of sample data not required

µg/kg = Micrograms per kilogram

mg/kg = Milligrams per kilogram

U = Nondetected

Table 2
Elevated Reporting Limits
Uplands Soil Samples Collected 23-24 January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Analysis	Compound	Reported Concentration	Elevated RL	MDL	Units	ERM Qualifier
XV93	TB-06F-14-16	PCB	Aroclor 1248	49	49	0.58	µg/kg	49 U
XV93	TB-06F-14-16	PCB	Aroclor 1260	240	240	1.3	µg/kg	240 U

Data package reviewed: XV81/XV93

Key:

RL = Reporting Limit; elevated due to interference

MDL = Minimum detection limit

PCB = Polychlorinated biphenyls; Method 8082A

µg/kg = Micrograms per kilogram

U = Nondetected

Table 3
Spike Recoveries Outside of Acceptable Limits
Uplands Soil Samples Collected 23-24 January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
LCS/LCSD										
XV81	LCS/LCSD-012814	SVOC	NA	2,2'-oxybis(1-Chloropropane)	36.0/35.2	39-101	2.2	40	--	--
MS/MSD										
XV81	GP-68-4-6 MS/MSD	SVOC	NA	4-Chloroaniline	NR/NR	11-120	NR	30	--	--
XV81	GP-68-4-6 MS/MSD	SVOC	NA	3-Nitroaniline	18.8/23.8	22-120	23.6	30	--	--
XV81	GP-68-4-6 MS/MSD	SVOC	NA	3,3'-Dichlorobenzidine	NR/NR	10-120	NR	30	--	--
XV81	GP-68-4-6 MS/MSD	SVOC	NA	Benzo(g,h,i)perylene	34.6/35.0	38-126	1.2	30	--	--
XV81	GP-68-4-6 MS	Cr VI	See below	Chromium, hexavalent	63.2	75-125	--	--	--	--
XV81	GP-68-4-6 MS	Cr VI	MW-35D-19.3-20	Chromium, hexavalent	--	--	--	--	< 0.485	UJ
XV81	GP-68-4-6 MS	Cr VI	GP-68-4-6	Chromium, hexavalent	--	--	--	--	< 0.523	UJ
XV81	GP-68-4-6 MS	Cr VI	DUP-012314-1	Chromium, hexavalent	--	--	--	--	< 0.519	UJ
XV81	GP-68-4-6 MS	Cr VI	GP-68-9.4-10.4	Chromium, hexavalent	--	--	--	--	< 0.622	UJ

Data package reviewed: XV81/XV93

Key:

RPD = Relative percent difference

MS/MSD = Matrix spike/matrix spike duplicate

SVOC = Semivolatile organic compounds; Method 8270D

Cr VI = Hexavalent chromium analysis; Method 3500Cr

NA = Not applicable; qualification of sample data not required

NR = Value not reported

UJ = Nondetected sample result qualified as estimated

Table 4
Field Duplicate Results and Calculated Relative Percent Differences
Uplands Soil Samples Collected 23-24 January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
XV81	GP-68-4-6/DUP-012314-1	SVOC	Phenol	51	60	19	µg/kg	16
XV81	GP-68-4-6/DUP-012314-1	SVOC-SIM	Naphthalene	2.6	2.8	4.7/4.8	µg/kg	7.4
XV81	GP-68-4-6/DUP-012314-1	SVOC-SIM	2-Methylnaphthalene	2.9	5.8	4.7/4.8	µg/kg	67
XV81	GP-68-4-6/DUP-012314-1	SVOC-SIM	Phenanthrene	2.9	5.8	4.7/4.8	µg/kg	67
XV81	GP-68-4-6/DUP-012314-1	SVOC-SIM	Fluoranthene	3.8	3.8	4.7/4.8	µg/kg	0
XV81	GP-68-4-6/DUP-012314-1	SVOC-SIM	Pyrene	2.9	3.0	4.7/4.8	µg/kg	3.4
XV81	GP-68-4-6/DUP-012314-1	PCP	Pentachlorophenol	6.4	6.6	7.7/7.9	µg/kg	3.1
XV81	GP-68-4-6/DUP-012314-1	Total Metals	Arsenic	2.5	2.3	0.2	mg/kg	8.3
XV81	GP-68-4-6/DUP-012314-1	Total Metals	Chromium	10.6	10.2	0.6	mg/kg	3.8
XV81	GP-68-4-6/DUP-012314-1	Total Metals	Copper	8.5	8.3	0.2/0.3	mg/kg	2.4
XV81	GP-68-4-6/DUP-012314-1	Total Metals	Zinc	21	19	1	mg/kg	10
XV81	GP-68-4-6/DUP-012314-1	Total Solids	Total Solids	76.17	76.51	0.01	%	0.4

Data package reviewed: XV81/XV93

Key:

RPD = Relative percent difference

SVOC = Semivolatile organic compounds; Method 8270D

SVOC-SIM = Semivolatile organic compounds - Selected Ion Monitoring; Method 8270D

PCP = Pentachlorophenol; Method SW8041

Total Metals = Method 6020

Table 5
Analytical Duplicate Results and Calculated Relative Percent Differences
Uplands Soil Samples Collected 23-24 January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Concentration		Report Limit	Units	RPD	RPD Limit	ERM Qualifier
			Sample	Duplicate					
XV81	GP-68-4-6	Arsenic, total	2.5	1.7	0.2	mg/kg	38.1	20	J

Data package reviewed: XV81/XV93

Key:

RPD = Relative percent difference

mg/kg = Milligrams per kilogram

J = Detected sample result qualified as estimated

Table 6
Calibration Verification Recoveries Outside of Acceptable Limits
Uplands Soil Samples Collected 23-24 January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	CCV ID	Analysis	Compound	CCV Recovery	CCV Limit	Associated Samples	Reported Concentration	Units	ERM Qualifier
XV81	CCV-013014	SVOC	2,2'-oxybis(1-Chloropropane)	-39.2	20	NA	--	--	--
XV81	CCV-013014	SVOC	Hexachlorobutadiene	27.9	20	NA	--	--	--
XV81	CCV-013014	SVOC	2,4-Dinitrophenol	27.0	20	NA	--	--	--
XV81	CCV-013014	SVOC	4-Nitroaniline	-21.1	20	NA	--	--	--
XV93	CCV-020414	SVOC	Benzoic acid	25.0	20	NA	--	--	--
XV93	CCV-020414	SVOC	Hexachlorocyclopentadiene	-26.8	20	NA	--	--	--
XV93	CCV-020414	SVOC	2,4-Dinitrophenol	-41.0	20	NA	--	--	--
XV93	CCV-020414	SVOC	Pentachlorophenol	-36.1	20	NA	--	--	--
XV93	CCV-020414	SVOC	Butylbenzylphthalate	20.4	20	NA	--	--	--

Data package reviewed: XV81/XV93

Key:

CCV = Continuing calibration verification

SVOC = Semivolatile organic compounds; Method 8270D

Memorandum

**Environmental
Resources
Management**

To: Mike Mendes

From: Irene Lavigne

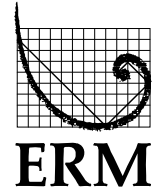
Date: 13 February 2014

Subject: Data Review of Reichhold-Glacier, Uplands Soil
Samples Collected 14-15 January 2014,
Chromium VI Analyses

Project Number: 0232280.06

Data Package: Analytical Resources, Incorporated Data Package
XW71

2875 Michelle Drive
Suite 200
Irvine, CA 92606
(949) 623-4700
(949) 623-2940 (fax)



The data quality was assessed and any necessary qualifiers were applied following *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004.

The samples analyzed in this data package were reanalyses of samples originally submitted under sample delivery group (SDG) XU88.

HOLDING TIME AND PRESERVATION EVALUATION

The sample shipments were received at the laboratory within the method-prescribed preservation requirements. The samples were prepared and analyzed within the method-prescribed time period from the date of collection. No sample data were qualified based on sample preservation or holding-time exceedances.

BLANK EVALUATION

The method blanks samples were nondetected for the target analytes. Sample data were not qualified based on the blank evaluation. The method blank results indicate the absence of laboratory contamination.

MATRIX SPIKE EVALUATION

The matrix spike (MS) recoveries were within acceptable control limits with one exception. The recoveries for hexavalent chromium were below the minimum acceptable limits, requiring the qualification of two associated, nondetected sample results as estimated (UJ) for this compound. The results for these two samples were previously rejected as reported in SDG XU88; however, the more recent results from the reanalyses contained in SDG XW71 may be used for decision-making purposes. The outlying MS recovery and qualified sample data are shown in Table 1.

FIELD DUPLICATE EVALUATION

One sample was collected and submitted in duplicate. ERM calculated the relative percent difference (RPD) between detected results. The USEPA has not established control criteria for field duplicate samples; therefore, sample data are not qualified on the basis of field duplicate imprecision. The field duplicate results and calculated RPD is presented in Table 2.

STANDARD REFERENCE EVALUATION

The standard reference results were within acceptable recovery limits. No sample data were qualified based on the standard reference evaluation.

REPLICATE EVALUATION

The laboratory prepared and analyzed a replicate sample. The RPDs for the replicate were within acceptable limits (<20%). Sample data were not qualified based on the replicate RPDs.

OVERALL ASSESSMENT

No data were determined to be unusable. All of the data, including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents.

Table 1
Spike Recoveries Outside of Acceptable Limits
Uplands Soil Samples Collected 14-15 January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	Sample Result	ERM Qualifier
XW71	TB-06E-8.8-10.6 MS/MSD	Cr VI	See below	Chromium, hexavalent	44.3	75-125	--	--
XW71	TB-06E-8.8-10.6 MS/MSD	Cr VI	TB-06E-8.8-10.6	Chromium, hexavalent	--	--	< 0.478	UJ
XW71	TB-06E-8.8-10.6 MS/MSD	Cr VI	DUP011514-1	Chromium, hexavalent	--	--	< 0.475	UJ

Data packages reviewed: XW71 (reanalyses of samples from SDG XU88)

Key:

RPD = Relative percent difference

MS/MSD = Matrix spike/matrix spike duplicate

NR = Value not reported; no recovery or recovery low due to matrix interference

UJ = Nondetected sample results qualified as estimated

Table 2
Field Duplicate Results and Calculated Relative Percent Differences
Uplands Soil Samples Collected 14-15 January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
XW71	TB-06E-8.8-10.6/DUP011514-1	Total Solids	Total Solids	82.96	93.15	0.01	%	12

Data packages reviewed: XW71 (reanalyses of samples from SDG XU88)

Key:

RPD = Relative percent difference

Total Solids = Method 2540G

Memorandum

**Environmental
Resources
Management**

To: Mike Mendes

From: Irene Lavigne

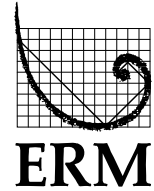
Date: 18 March 2014

Subject: Data Review of Reichhold-Glacier, Archived Uplands
Soil Samples Collected October 2013

Project Number: 0232280.06

Data Package: Analytical Resources, Incorporated Data Package
XZ77

2875 Michelle Drive
Suite 200
Irvine, CA 92606
(949) 623-4700
(949) 623-2940 (fax)



The data quality was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999, *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004.

HOLDING TIME AND PRESERVATION EVALUATION

The sample shipments were received at the laboratory within the method-prescribed preservation requirements. The samples were frozen upon receipt at the laboratory. Selected samples were subsequently defrosted, prepared and analyzed within the method-prescribed time period for frozen soil samples. No sample data were qualified based on sample preservation or holding-time exceedances.

BLANK EVALUATION

The method blank results were nondetected for the target analytes. No sample data were qualified based on the blank evaluation. The blank results indicate that no contaminants were introduced to the field samples during laboratory handling and processing.

BLANK SPIKE EVALUATION

The laboratory control sample (LCS) and laboratory control sample duplicate recoveries were within the laboratory's limits of acceptance. No sample data were qualified based on the blank spike evaluation. The LCS recoveries indicate acceptable laboratory accuracy and precision.

MATRIX SPIKE EVALUATION

The matrix spike (MS) and matrix spike duplicate (MSD) recoveries were within the laboratory's limits of acceptance with one exception. A recovery for hexavalent chromium was below the acceptable control limits. The laboratory performed a post spike and verified the low recovery in association with spike sample MW-45D-2.3-4.2. The nondetected field sample results associated with this spike recovery were qualified as rejected (R), and may not be used for decision-making purposes. The outlying MS recovery and qualified sample data are presented in Table 1.

STANDARD REFERENCE EVALUATION

The standard reference results were within acceptable recovery limits. No sample data were qualified based on the standard reference evaluation.

ANALYTICAL DUPLICATE AND REPLICATE EVALUATION

The laboratory prepared and analyzed analytical duplicate and replicate samples. The RPDs for these samples were within acceptable limits (<20%); thus, no sample data were qualified based on the duplicate or replicate results.

CALIBRATION EVALUATION

Calibration verification recoveries were included in the laboratory report and evaluated. The calibration recoveries were within acceptable control limits. No sample data were qualified on the basis of calibration exceedances.

OVERALL ASSESSMENT

Two hexavalent chromium results were rejected due to significant matrix interferences. These hexavalent chromium results cannot be used for decision-making purposes.

The remaining data were determined to be usable without qualification, and can be used for decision-making purposes. The quality of the data generated during this investigation, with the exception of the rejected data, is acceptable for the preparation of technically-defensible documents.

Table 1
Spike Recoveries Outside of Acceptable Limits
Archived Uplands Soil Samples Collected October 2013
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	Sample Result	ERM Qualifier
XZ77	MW-45D-2.3-4.2 MS	Cr VI	See below	Chromium, hexavalent	2.4	75-125	--	--
XZ77	MW-45D-2.3-4.2 MS	Cr VI	MW-45D-2.3-4.2	Chromium, hexavalent	--	--	< 0.902	R
XZ77	MW-45D-2.3-4.2 MS	Cr VI	GP-69-0-2	Chromium, hexavalent	--	--	< 0.442	R

Data package reviewed: XZ77

Key:

MS/MSD = Matrix spike/matrix spike duplicate

Cr VI = Hexavalent chromium analysis; Method 3500Cr

R = Sample result is rejected

Memorandum

**Environmental
Resources
Management**

To: Mike Mendes

From: Irene Lavigne

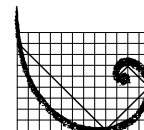
Date: 24 April 2014

Subject: Data Review of Reichhold-Glacier, Archived Uplands
Soil Samples Collected 04-10 October 2013

Project Number: 0232280.06

Data Package: Analytical Resources, Incorporated Data Package
YG83

2875 Michelle Drive
Suite 200
Irvine, CA 92606
(949) 623-4700
(949) 623-2940 (fax)



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The data quality was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999, *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004.

HOLDING TIME AND PRESERVATION EVALUATION

The sample shipments were received at the laboratory within the method-prescribed preservation requirements. The samples were frozen upon receipt at the laboratory. Selected samples were subsequently defrosted, prepared and analyzed within the method-prescribed time period for frozen soil samples. No sample data were qualified based on sample preservation or holding-time exceedances.

BLANK EVALUATION

The method blank sample results were nondetected for the target analytes. No sample data were qualified based on the blank evaluation. The blank results indicate that no contaminants were introduced to the field samples during laboratory handling and processing.

BLANK SPIKE EVALUATION

The laboratory control sample (LCS) and laboratory control sample duplicate recoveries were within the laboratory's limits of acceptance. No

sample data were qualified based on the blank spike evaluation. The LCS recoveries indicate acceptable laboratory accuracy and precision.

MATRIX SPIKE EVALUATION

The matrix spike (MS) and matrix spike duplicate recoveries were within the laboratory's limits of acceptance with limited exceptions. Recoveries for arsenic and copper exceeded the maximum acceptable control limits in one MS sample; however, no associated sample data were qualified based on these recovery exceedances because the concentrations of the unspiked sample exceeded four times the amount spiked for the corresponding compounds. The outlying MS recoveries are presented in Table 1.

SURROGATE EVALUATION

The surrogate recoveries were within acceptable limits with one exception. A surrogate compound for one sample submitted for semivolatile organic analysis – select ion monitoring (Method 8270D-SIM) exceeded the maximum acceptable limits. The detected sample results for this sample were qualified as estimated (J). The outlying surrogate recovery is shown in Table 2.

ANALYTICAL DUPLICATE AND REPLICATE EVALUATION

The laboratory prepared and analyzed analytical duplicate samples. The RPDs for these samples were within acceptable limits (<20%); thus, no sample data were qualified based on the duplicate or replicate results.

CALIBRATION EVALUATION

Initial and continuing calibration verification recoveries were included in the laboratory report and evaluated. The calibration recoveries for all target analytes were within acceptable control limits. No sample data were qualified on the basis of calibration exceedances.

CALIBRATION RANGE EVALUATION

The laboratory noted two instances where the sample results exceeded the calibration range of the equipment for pentachlorophenol. The laboratory diluted and reanalyzed the affected samples. The sample results from the dilutions should be used for decision-making purposes. The undiluted sample results were qualified as estimated (J). The samples with calibration range exceedances are presented in Table 3.

OVERALL ASSESSMENT

No data were determined to be unusable. All of the data, including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents

Table 1
Matrix Spike Recoveries Outside of Acceptable Limits
Uplands Soil Samples Collected October 2013
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	Sample Result	ERM Qualifier
YG83	GP-73-4.0-5.8 MS	Total metals	NA	Arsenic	127	75-125	4X	--
YG83	GP-73-4.0-5.8 MS	Total metals	NA	Copper	150	75-125	4X	--

Data package reviewed: YG83

Key:

MS = Matrix spike

Total metals = Method 6010C

NA = Not applicable; qualification of sample data not required

4X = Sample concentration exceeded four times amount spiked; no qualification required

Table 2
Surrogate Recovery Results Outside of Acceptable Limits
Uplands Soil Samples Collected October 2013
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Method	Surrogate	Recovery (%)	Limit (%)	ERM Qualifier
YG83	GP-75-0-2.0	SVOC-SIM	d10-Fluoranthene	138	36-134	J

Data package reviewed: YG83

Key:

SVOC-SIM = Semivolatile organic compounds-select ion monitoring; Method 8270D-SIM

J = Detected sample result qualified as estimated

Table 3
Calibration Range Exceedances
Uplands Soil Samples Collected October 2013
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Method	Compound	Reported Concentration	Units	ERM Qualifier	Notes
YG83	GP-54-1.5-3.0	PCP	Pentachlorophenol	1400 E	µg/kg	J	Exceeds calibration range; see dilution data
YG83	GP-70-3.0-5.0	PCP	Pentachlorophenol	9700 E	µg/kg	J	Exceeds calibration range; see dilution data

Data package reviewed: YG83

Key:

PCP = Pentachlorophenol; Method SW8041

E = Undiluted sample concentration exceeded calibration range; use result of dilution/reanalysis for decision-making purposes

µg/kg = Micrograms per kilogram

J = Detected sample result qualified as estimated

Memorandum

Environmental Resources Management

To: Mike Mendes

From: Irene Lavigne

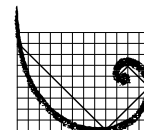
Date: 15 April 2014

Subject: Data Review of Reichhold-Glacier Soil Samples
Collected January 2014

Project Number: 0232280

Data Packages: AXYS Analytical Services Data Packages
DPWG46910, Analysis WG46222
DPWG46910, Analysis WG46473
DPWG46930, Analysis WG46389

2875 Michelle Drive
Suite 200
Irvine, CA 92606
(949) 623-4700
(949) 623-2940 (fax)



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The data quality was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999 and the *EPA Region 10 SOP for the Validation of Polychlorinated Dibenzodioxin (PCDD) and Polychlorinated Dibenzofuran (PCDF) Data*, January 1996.

HOLDING TIME AND PRESERVATION EVALUATION

The sample shipments were received at the laboratory within the method-prescribed preservation requirements. The samples were prepared and analyzed within the method-prescribed time period from the date of collection. No sample data were qualified based on sample preservation or holding-time exceedances.

BLANK EVALUATION

The lab blank and rinsate blank sample results were nondetected for each of the target analytes with limited exceptions. Detections of dioxin/furan compounds in one lab blank resulted in the qualification of two associated sample results as nondetected (U). Additional blank detections did not result in qualified data because either the field sample concentrations exceeded five times the blank concentrations for the corresponding compounds, the associated samples were nondetected, or the detected dioxin/furan compounds had been identified as estimated maximum possible concentrations. The blank detections are presented in Table 1.

MATRIX SPIKE EVALUATION

The matrix spike (MS) and matrix spike duplicate (MSD) recoveries were within the laboratory's limits of acceptance with few exceptions. One detected sample result for octochlorodibenzofuran (OCDF) was qualified as estimated (J) due to low recoveries for this compound in the associated MS/MSD pair. Additional recovery outliers did not require qualification of data. Data were not qualified if the concentration of the unspiked sample exceeded four times the spiked amount, or if the sample was diluted causing dilution of the spike compound to a point where it did not provide useful recovery information. The outlying MS recoveries and qualified data are shown in Table 2.

LABELED COMPOUND EVALUATION

Carbon-13 labeled isotope recoveries were reported for each sample submitted for dioxin/furan analysis. The recoveries of labeled PCDD and PCDF compounds is a measure of the effectiveness of the laboratory and method to extract the compounds of interest. All of the labeled compounds were within acceptable limits with one exception. However, no qualifiers were applied to the data based on the labeled compound outlier because the sample was diluted by a factor of 12.5, diluting the labeled compound to the point where it did not provide useful recovery information. The outlying recovery is presented in Table 3.

ESTIMATED MAXIMUM POSSIBLE CONCENTRATION

The laboratory identified several dioxin/furan results as estimated maximum possible concentrations (EMPC). An EMPC value is the maximum possible concentration of a compound that could be present in the sample. This classification is used when all of the identification criteria for a given dioxin or furan compound are not met. The sample data identified as EMPC by the laboratory were qualified as nondetected (U), and are listed in Table 4.

FIELD DUPLICATE EVALUATION

Several samples were collected and analyzed in duplicate. ERM calculated the relative percent difference (RPD) between detected results. The USEPA has not established control criteria for field duplicate samples; therefore, sample data are not qualified on the basis of field duplicate imprecision. Detected duplicate results and calculated RPDs are listed in Table 5.

CALIBRATION RANGE EVALUATION

The laboratory noted 10 instances where the sample results exceeded the calibration range of the equipment for dioxin/furan compounds. The laboratory diluted and reanalyzed the affected samples. The sample results from the dilutions should be used for decision-making purposes. The samples with calibration range exceedances are presented in Table 6.

OVERALL ASSESSMENT

No data were determined to be unusable. All of the data, including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents.

Table 1
Blank and Associated Suspect Sample Detections
January - March 2014 Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG46910	RB-011514-2	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDD	1.04	0.572	pg/g	EMPC
DPWG46910	RB-011514-2	PCDD/PCDF	NA	OCDD	6.32	0.572	pg/g	EMPC
DPWG46910	RB-011514-2	PCDD/PCDF	NA	1,2,3,4,7,8-HXCDF	0.758	0.572	pg/g	EMPC
DPWG46910	RB-011514-2	PCDD/PCDF	NA	1,2,3,6,7,8-HXCDF	0.874	0.572	pg/g	EMPC
DPWG46910	RB-011514-2	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDF	1.34	0.572	pg/g	EMPC
DPWG46910	RB-011514-2	PCDD/PCDF	NA	1,2,3,4,7,8,9-HPCDF	0.584	0.572	pg/g	EMPC
DPWG46910	RB-011514-2	PCDD/PCDF	NA	OCDF	1.01	0.572	pg/g	EMPC
DPWG46910	RB-011514-2	PCDD/PCDF	NA	TOTAL HEPTA-DIOXINS	1.78	0.572	pg/g	--
DPWG46910	Lab Blank 022714	PCDD/PCDF	NA	2,3,7,8-TCDD	0.302	0.113	pg/g	EMPC
DPWG46910	Lab Blank 022714	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDD	0.412	0.113	pg/g	EMPC
DPWG46910	Lab Blank 022714	PCDD/PCDF	NA	OCDD	1.18	0.113	pg/g	--
DPWG46910	Lab Blank 022714	PCDD/PCDF	NA	2,3,4,7,8-PECDF	0.266	0.113	pg/g	EMPC
DPWG46910	Lab Blank 022714	PCDD/PCDF	NA	1,2,3,7,8,9-HXCDF	0.163	0.113	pg/g	EMPC
DPWG46910	Lab Blank 022714	PCDD/PCDF	See below	2,3,4,6,7,8-HXCDF	0.122	0.113	pg/g	--
DPWG46910	--	--	TB-03D-7-9	2,3,4,6,7,8-HXCDF	0.198	0.105	pg/g	0.198 U
DPWG46910	Lab Blank 022714	PCDD/PCDF	See below	1,2,3,4,6,7,8-HPCDF	0.135	0.113	pg/g	--
DPWG46910	--	--	TB-03D-12.6-13.6	1,2,3,4,6,7,8-HPCDF	0.608	0.108	pg/g	0.608 U
DPWG46910	Lab Blank 022714	PCDD/PCDF	NA	OCDF	0.263	0.113	pg/g	EMPC
DPWG46910	Lab Blank 022714	PCDD/PCDF	NA	TOTAL HEXA-FURANS	0.122	0.113	pg/g	--

Table 1
Blank and Associated Suspect Sample Detections
January - March 2014 Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG46910	Lab Blank 022714	PCDD/PCDF	NA	TOTAL HEPTA-FURANS	0.135	0.113	pg/g	--
DPWG46910	Lab Blank 021114	PCDD/PCDF	NA	1,2,3,7,8-PECDD	0.563	0.500	pg/g	EMPC
DPWG46910	Lab Blank 021114	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDD	0.842	0.500	pg/g	EMPC
DPWG46910	Lab Blank 021114	PCDD/PCDF	NA	OCDD	3.31	0.500	pg/g	--
DPWG46910	Lab Blank 021114	PCDD/PCDF	NA	2,3,4,6,7,8-HXCDF	0.550	0.500	pg/g	EMPC
DPWG46910	Lab Blank 021114	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDF	1.70	0.500	pg/g	EMPC
DPWG46910	Lab Blank 021114	PCDD/PCDF	NA	1,2,3,4,7,8,9-HPCDF	0.544	0.500	pg/g	EMPC
DPWG46910	Lab Blank 021114	PCDD/PCDF	NA	OCDF	0.838	0.516	pg/g	EMPC
DPWG46910	Lab Blank 021114	PCDD/PCDF	NA	TOTAL HEXA-DIOXINS	0.696	0.500	pg/g	--
DPWG46930	Lab Blank 030114	PCDD/PCDF	NA	2,3,7,8-TCDD	0.214	0.100	pg/g	EMPC
DPWG46930	Lab Blank 030114	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDD	0.689	0.100	pg/g	--
DPWG46930	Lab Blank 030114	PCDD/PCDF	NA	OCDD	5.91	0.100	pg/g	--
DPWG46930	Lab Blank 030114	PCDD/PCDF	NA	2,3,4,7,8-PECDF	0.266	0.100	pg/g	EMPC
DPWG46930	Lab Blank 030114	PCDD/PCDF	NA	2,3,4,6,7,8-HXCDF	0.386	0.100	pg/g	--

Table 1
Blank and Associated Suspect Sample Detections
January - March 2014 Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG46930	Lab Blank 030114	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDF	0.128	0.100	pg/g	EMPC
DPWG46930	Lab Blank 030114	PCDD/PCDF	NA	1,2,3,4,7,8,9-HPCDF	0.113	0.100	pg/g	EMPC
DPWG46930	Lab Blank 030114	PCDD/PCDF	NA	OCDF	0.256	0.100	pg/g	EMPC
DPWG46930	Lab Blank 030114	PCDD/PCDF	NA	TOTAL HEPTA-DIOXINS	0.943	0.100	pg/g	--
DPWG46930	Lab Blank 030114	PCDD/PCDF	NA	TOTAL TETRA-FURANS	0.109	0.100	pg/g	--
DPWG46930	Lab Blank 030114	PCDD/PCDF	NA	TOTAL HEXA-FURANS	0.510	0.100	pg/g	--

Data packages reviewed: DPWG46910/WG46222, DPWG46910/WG46473, DPWG46930/WG46389

Key:

PCDD/PCDF = Polychlorinated dibenzo-p-dioxins/Polychlorinated dibenzofurans; Method 1613B

NA = Not applicable; qualification of sample data not required

HPCDD = Heptachlorodibenzo-p-dioxin

OCDD = Octochlorodibenzo-p-dioxin

HXCDF = Hexachlorodibenzofuran

HPCDF = Heptachlorodibenzofuran

OCDF = Octochlorodibenzofuran

TCDD = Tetrachlorodibenzo-p-dioxin

PECDF = Pentachlorodibenzofuran

PECDD = Pentachlorodibenzo-p-dioxin

pg/g = Picograms per gram

EMPC = Blank result identified as Estimated Maximum Possible Concentration; qualification of sample data not required

U = Nondetected

Table 2
Spike Recoveries Outside of Acceptable Limits
January - March 2014 Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
DPWG46910	TB-05B-13.6-15.6 MS/MSD	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDD	0.935/30.5	70-130	188	30	4X	--
DPWG46910	TB-05B-13.6-15.6 MS/MSD	PCDD/PCDF	NA	OCDD	527/NR	70-130	NR	30	SDO	--
DPWG46910	TB-05B-13.6-15.6 MS/MSD	PCDD/PCDF	See below	OCDF	57.5/43.9	70-130	26.7	30		
DPWG46910	--	--	TB-05B-13.6-15.6	OCDF	--	--	--	--	1310	J

Data packages reviewed: DPWG46910/WG46222, DPWG46910/WG46473, DPWG46930/WG46389

Key:

RPD = Relative percent difference

MS/MSD = Matrix spike/matrix spike duplicate

PCDD/PCDF = Polychlorinated dibenzo-p-dioxins/Polychlorinated dibenzofurans; Method 1613B

NA = Not applicable; qualification of sample data not required

HPCDD = Heptachlorodibenzo-p-dioxin

OCDD = Octochlorodibenzo-p-dioxin

OCDF = Octochlorodibenzofuran

4X = Concentration of unspiked sample was greater than 4 times the amount spiked; no qualification required

NR = Value not reported

SDO = Surrogate diluted out of sample, no qualification required; Sample diluted by a factor of 5x or more

J = Detected sample result qualified as estimated

Table 3
Labeled Compound Recovery Results Outside of Acceptable Limits
January - March 2014 Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Labeled Compound	Associated Compound	Recovery (%)	Limit (%)	Note	ERM Qualifier
DPWG46910	TB-06E-8.8-10.6	13C-1,2,3,4,7,8,9-HPCDF	1,2,3,4,7,8,9-HPCDF	118	86-116	SDO	--

Data packages reviewed: DPWG46910/WG46222, DPWG46910/WG46473, DPWG46930/WG46389

Key:

13C = Carbon-13 labeled isotope

HPCDF = Heptachlorodibenzofuran

SDO = Spike sample diluted by a factor of 12.5; recovery does not provide useful information

Table 4
Estimated Maximum Possible Concentration
January - March 2014 Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG46910	TB-02B-9.5-10.5	2,3,7,8-TCDD	5.85	4.29	pg/g	5.85 U
DPWG46910	TB-03D-7-9	2,3,7,8-TCDD	0.337	0.105	pg/g	0.337 U
DPWG46910	TB-03D-7-9	1,2,3,6,7,8-HXCDF	0.409	0.105	pg/g	0.409 U
DPWG46910	TB-03D-12.6-13.6	2,3,7,8-TCDD	0.346	0.108	pg/g	0.346 U
DPWG46910	TB-03D-12.6-13.6	1,2,3,7,8-PECDF	0.192	0.108	pg/g	0.192 U
DPWG46910	TB-03D-12.6-13.6	1,2,3,6,7,8-HXCDF	0.143	0.108	pg/g	0.143 U
DPWG46910	TB-03D-12.6-13.6	2,3,4,6,7,8-HXCDF	0.115	0.108	pg/g	0.115 U
DPWG46910	TB-03D-12.6-13.6	1,2,3,4,7,8,9-HPCDF	0.137	0.108	pg/g	0.137 U
DPWG46910	TB04A-1.25-3	2,3,7,8-TCDD	0.385	0.106	pg/g	0.385 U
DPWG46910	TB04A-7.1-8.1	1,2,3,4,7,8,9-HPCDF	4.19	2.72	pg/g	4.19 U
DPWG46910	TB04A-7.1-8.1	2,3,7,8-TCDD	0.384	0.110	pg/g	0.384 U
DPWG46910	TB-01B-5-6.9	1,2,3,7,8-PECDD	2.26	0.842	pg/g	2.26 U
DPWG46910	TB-01B-6.9-7.9	2,3,7,8-TCDD	0.378	0.113	pg/g	0.378 U
DPWG46910	TB-05B-13.6-15.6	2,3,7,8-TCDD	1.81	1.02	pg/g	1.81 U
DPWG46910	TB-05B-18.2-19.2	2,3,7,8-TCDD	0.315	0.112	pg/g	0.315 U
DPWG46910	TB-05B-18.2-19.2	1,2,3,6,7,8-HXCDD	0.407	0.112	pg/g	0.407 U
DPWG46910	TB-05B-18.2-19.2	1,2,3,7,8-PECDF	0.194	0.112	pg/g	0.194 U
DPWG46910	TB-05B-18.2-19.2	2,3,4,6,7,8-HXCDF	0.153	0.112	pg/g	0.153 U
DPWG46910	DUP011514-2	2,3,7,8-TCDD	1.07	0.934	pg/g	1.07 U
DPWG46910	DUP011514-2	1,2,3,7,8-PECDD	11.4	1.07	pg/g	11.4 U
DPWG46910	DUP011514-2	1,2,3,7,8,9-HXCDF	7.50	3.17	pg/g	7.50 U
DPWG46930	TB-07-0-1	2,3,7,8-TCDD	0.598	0.092	pg/g	0.598 U

Data packages reviewed: DPWG46910/WG46222, DPWG46910/WG46473, DPWG46930/WG46389

Key:

TCDD = Tetrachlorodibenzo-p-dioxin

HXCDF = Hexachlorodibenzofuran

PECDF = Pentachlorodibenzofuran

HPCDF = Heptachlorodibenzofuran

PECDD = Pentachlorodibenzo-p-dioxin

HXCDD = Hexachlorodibenzo-p-dioxin

OCDF = Octochlorodibenzofuran

HPCDD = Heptachlorodibenzo-p-dioxin

TCDF = Tetrachlorodibenzofuran

pg/g = Picograms per gram

U = Nondetected

Table 5
Field Duplicate Results and Calculated Relative Percent Differences
January - March 2014 Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/ Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
DPWG46910	TB-02B-8-9.5/ DUP011314-1	PCDD/PCDF	1,2,3,7,8-PECDD	10.1	14.0	2.15/2.96	pg/g	32
DPWG46910	TB-02B-8-9.5/ DUP011314-1	PCDD/PCDF	1,2,3,7,8-PECDD	91.3	89.8	6.51/6.09	pg/g	1.7
DPWG46910	TB-02B-8-9.5/ DUP011314-1	PCDD/PCDF	1,2,3,4,7,8-HXCDD	199	175	7.38/6.79	pg/g	13
DPWG46910	TB-02B-8-9.5/ DUP011314-1	PCDD/PCDF	1,2,3,6,7,8-HXCDD	1360	1760	7.38/6.79	pg/g	26
DPWG46910	TB-02B-8-9.5/ DUP011314-1	PCDD/PCDF	1,2,3,7,8,9-HXCDD	508	486	7.38/6.79	pg/g	4.4
DPWG46910	TB-02B-8-9.5/ DUP011314-1	PCDD/PCDF	1,2,3,4,6,7,8-HPCDD	35600	52500	10.6	pg/g	38
DPWG46910	TB-02B-8-9.5/ DUP011314-1	PCDD/PCDF	OCDD	715000	65600	136/120	pg/g	166
DPWG46910	TB-02B-8-9.5/ DUP011314-1	PCDD/PCDF	2,3,7,8-TCDF	27.3	28.0	0.876/0.994	pg/g	2.5
DPWG46910	TB-02B-8-9.5/ DUP011314-1	PCDD/PCDF	1,2,3,7,8-PECDF	133	168	9.89/7.81	pg/g	23
DPWG46910	TB-02B-8-9.5/ DUP011314-1	PCDD/PCDF	2,3,4,7,8-PECDF	510	541	9.89/7.81	pg/g	5.9
DPWG46910	TB-02B-8-9.5/ DUP011314-1	PCDD/PCDF	1,2,3,4,7,8-HXCDF	6830	10600	10.9/10.4	pg/g	43
DPWG46910	TB-02B-8-9.5/ DUP011314-1	PCDD/PCDF	1,2,3,6,7,8-HXCDF	1060	1550	10.9/10.4	pg/g	38
DPWG46910	TB-02B-8-9.5/ DUP011314-1	PCDD/PCDF	1,2,3,7,8,9-HXCDF	47.1	78.5	10.9/10.4	pg/g	50
DPWG46910	TB-02B-8-9.5/ DUP011314-1	PCDD/PCDF	2,3,4,6,7,8-HXCDF	386	517	10.9/10.4	pg/g	29
DPWG46910	TB-02B-8-9.5/ DUP011314-1	PCDD/PCDF	1,2,3,4,6,7,8-HPCDF	21000	22300	9.81/14.3	pg/g	6.0
DPWG46910	TB-02B-8-9.5/ DUP011314-1	PCDD/PCDF	1,2,3,4,7,8,9-HPCDF	3400	5580	9.81/14.3	pg/g	49
DPWG46910	TB-02B-8-9.5/ DUP011314-1	PCDD/PCDF	OCDF	33100	37900	0.876/110	pg/g	14
DPWG46910	TB-05B-13.6-15.6/ DUP011514-2	PCDD/PCDF	1,2,3,4,7,8-HXCDD	22.4	21.8	1.52/2.60	pg/g	2.7
DPWG46910	TB-05B-13.6-15.6/ DUP011514-2	PCDD/PCDF	1,2,3,6,7,8-HXCDD	153	191	1.52/2.60	pg/g	22
DPWG46910	TB-05B-13.6-15.6/ DUP011514-2	PCDD/PCDF	1,2,3,7,8,9-HXCDD	58.9	59.5	1.52/2.60	pg/g	1.0

Table 5
Field Duplicate Results and Calculated Relative Percent Differences
January - March 2014 Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/ Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
DPWG46910	TB-05B-13.6-15.6/ DUP011514-2	PCDD/PCDF	1,2,3,4,6,7,8-HPCDD	3980	4440	3.30/7.29	pg/g	11
DPWG46910	TB-05B-13.6-15.6/ DUP011514-2	PCDD/PCDF	OCDD	97500	121000	255/2.66	pg/g	22
DPWG46910	TB-05B-13.6-15.6/ DUP011514-2	PCDD/PCDF	2,3,7,8-TCDF	7.98	9.62	1.02/0.835	pg/g	19
DPWG46910	TB-05B-13.6-15.6/ DUP011514-2	PCDD/PCDF	1,2,3,7,8-PECDF	13.1	22.2	1.25/2.30	pg/g	52
DPWG46910	TB-05B-13.6-15.6/ DUP011514-2	PCDD/PCDF	2,3,4,7,8-PECDF	51.5	100	1.25/2.30	pg/g	64
DPWG46910	TB-05B-13.6-15.6/ DUP011514-2	PCDD/PCDF	1,2,3,4,7,8-HXCDF	488	910	1.78/3.17	pg/g	60
DPWG46910	TB-05B-13.6-15.6/ DUP011514-2	PCDD/PCDF	1,2,3,6,7,8-HXCDF	92.6	153	1.78/3.17	pg/g	49
DPWG46910	TB-05B-13.6-15.6/ DUP011514-2	PCDD/PCDF	2,3,4,6,7,8-HXCDF	36.9	52.2	1.78/3.17	pg/g	34
DPWG46910	TB-05B-13.6-15.6/ DUP011514-2	PCDD/PCDF	1,2,3,4,6,7,8-HPCDF	1630	2140	2.27/6.02	pg/g	27
DPWG46910	TB-05B-13.6-15.6/ DUP011514-2	PCDD/PCDF	1,2,3,4,7,8,9-HPCDF	218	290	2.27/6.02	pg/g	28
DPWG46910	TB-05B-13.6-15.6/ DUP011514-2	PCDD/PCDF	OCDF	3130	2980	1.02/4.98	pg/g	4.9

Data packages reviewed: DPWG46910/WG46222, DPWG46910/WG46473, DPWG46930/WG46389

Key:

PCDD/PCDF = Polychlorinated dibenzo-p-dioxins/Polychlorinated dibenzofurans; Method 1613B

PECDD = Pentachlorodibenzo-p-dioxin

HXCDD = Hexachlorodibenzo-p-dioxin

HPCDD = Heptachlorodibenzo-p-dioxin

OCDD = Octochlorodibenzo-p-dioxin

TCDF = Tetrachlorodibenzofuran

PECDF = Pentachlorodibenzofuran

HXCDF = Hexachlorodibenzofuran

HPCDF = Heptachlorodibenzofuran

OCDF = Octochlorodibenzofuran

RPD = Relative percent difference

pg/g = Picograms per gram

Table 6
Calibration Range Exceedances
January - March 2014 Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Method	Compound	Reported Concentration	Units	ERM Qualifier	Notes
DPWG46910	TB-02B-8-9.5	PCDD/PCDF	OCDD	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG46910	TB-02B-9.5-10.5	PCDD/PCDF	OCDD	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG46910	DUP011314-1	PCDD/PCDF	OCDD	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG46910	TB-06E-8.8-10.6	PCDD/PCDF	1,2,3,4,6,7,8-HPCDD	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG46910	TB-06E-8.8-10.6	PCDD/PCDF	OCDD	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG46910	TB-06E-8.8-10.6	PCDD/PCDF	1,2,3,4,6,7,8-HPCDF	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG46910	TB-06E-8.8-10.6	PCDD/PCDF	OCDF	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG46910	TB-05B-13.6-15.6	PCDD/PCDF	OCDD	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG46930	TB-06F-14-16	PCDD/PCDF	OCDD	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG46930	TB-06F-14-16	PCDD/PCDF	OCDF	NR	pg/g	--	Exceeds calibrated linear range, see dilution data

Data packages reviewed: DPWG46910/WG46222, DPWG46910/WG46473, DPWG46930/WG46389

Key:

PCDD/PCDF = Polychlorinated dibenzo-p-dioxins/Polychlorinated dibenzofurans; Method 1613B

OCDD = Octochlorodibenzo-p-dioxin

HPCDD = Heptachlorodibenzo-p-dioxin

HPCDF = Heptachlorodibenzofuran

OCDF = Octochlorodibenzofuran

NR = Value not reported

pg/g = Picograms per gram

Memorandum

**Environmental
Resources
Management**

To: Mike Mendes

From: Irene Lavigne

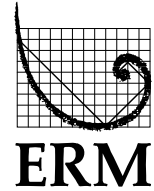
Date: 04 February 2014

Subject: Data Review of Reichhold-Glacier, Uplands Soil
Samples Collected 17 & 20 January 2014

Project Number: 0232280.06

Data Packages: Analytical Resources, Incorporated Data Packages
XV23 and XV39

2875 Michelle Drive
Suite 200
Irvine, CA 92606
(949) 623-4700
(949) 623-2940 (fax)



The data quality was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999, *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004.

HOLDING TIME AND PRESERVATION EVALUATION

The sample shipments were received at the laboratory within the method-prescribed preservation requirements. The samples were prepared and analyzed within the method-prescribed time period from the date of collection. No sample data were qualified based on sample preservation or holding-time exceedances.

BLANK EVALUATION

The method blanks were nondetected for the target analytes with limited exceptions. Detections of zinc in two method blanks did not require qualification of associated sample data because the associated sample concentrations exceeded 10 times the blank concentrations. The method blank detections are shown in Table 1.

MATRIX SPIKE EVALUATION

The matrix spike (MS) recoveries were within the laboratory's limits of acceptance with one exception. A recovery for arsenic exceeded the maximum acceptable limits for this compound in the MS sample. Three associated sample detections for this compound were qualified as estimated and biased high (J+). The MS recovery outlier and associated, qualified data are presented in Table 2.

SURROGATE EVALUATION

The surrogate recoveries were within acceptable limits, and no sample data required qualification as a result of the surrogate evaluation. The surrogate recoveries indicate minimal matrix interference in the samples.

FIELD DUPLICATE EVALUATION

One sample was collected and submitted in duplicate. ERM calculated the relative percent difference (RPD) between detected results. The USEPA has not established control criteria for field duplicate samples; therefore, sample data are not qualified on the basis of field duplicate imprecision. The field duplicate results and calculated RPDs are listed in Table 3.

ANALYTICAL DUPLICATE EVALUATION

The laboratory prepared and analyzed several samples as analytical duplicates. The RPD for each duplicate was within acceptable limits (<20%) with two exceptions. The RPDs for total copper and total chromium for two samples exceeded 20%. The primary sample results for these two samples were qualified as estimated (J) based on the analytical duplicate evaluation. The analytical duplicate results and outlying RPDs are shown in Table 4.

STANDARD REFERENCE EVALUATION

The standard reference results were within acceptable recovery limits. No sample data were qualified based on the standard reference evaluation.

OVERALL ASSESSMENT

No data were determined to be unusable. All of the data, including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents.

Table 1
Blank and Associated Suspect Sample Detections
Uplands Soil Samples Collected 17 & 20 January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
XV23	MB-012814	Total Metals	NA	Zinc	2	1	mg/kg	--
XV39	MB-012914	Total Metals	NA	Zinc	2	1	mg/kg	--

Data packages reviewed: XV23, XV39

Key:

MB = Method blank

Total Metals = Method 6020

NA = Not applicable; qualification of sample data not required

mg/kg = Milligrams per kilogram

Table 2
Matrix Spike Recoveries Outside of Acceptable Limits
Uplands Soil Samples Collected 17 & 20 January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	Sample Result	ERM Qualifier
XV23	MW-45D-17.3-19.3 MS	Total Metals	See below	Arsenic	146	75-125	--	--
XV23	MW-45D-17.3-19.3 MS	Total Metals	MW-45D-17.3-19.3	Arsenic	--	--	76.8	J+
XV23	MW-45D-17.3-19.3 MS	Total Metals	DUP 011714-1	Arsenic	--	--	71.9	J+
XV23	MW-45D-17.3-19.3 MS	Total Metals	MW-20D-22.5-24.5	Arsenic	--	--	1.8	J+

Data packages reviewed: XV23, XV39

Key:

MS = Matrix spike

Total Metals = Method 6020

J+ = Detected sample result qualified as estimated and biased high

Table 3
Field Duplicate Results and Calculated Relative Percent Differences
Uplands Soil Samples Collected 17 & 20 January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
XV23	MW-45D-17.3-19.3/DUP 011714-1	Total Metals	Arsenic	76.8	71.9	0.2/0.3	mg/kg	6.6
XV23	MW-45D-17.3-19.3/DUP 011714-1	Total Metals	Chromium	14.3	13.1	0.6	mg/kg	8.8
XV23	MW-45D-17.3-19.3/DUP 011714-1	Total Metals	Copper	9.7	8.6	0.2	mg/kg	12
XV23	MW-45D-17.3-19.3/DUP 011714-1	Total Metals	Zinc	46	44	1	mg/kg	4.4
XV23	MW-45D-17.3-19.3/DUP 011714-1	Total Solids	Total Solids	75.83	77.80	0.01	%	2.6

Data packages reviewed: XV23, XV39

Key:

RPD = Relative percent difference

Total Metals = Method 6020

Total Solids = Method 2540G

Table 4
Analytical Duplicate Results and Calculated Relative Percent Differences
Uplands Soil Samples Collected 17 & 20 January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Concentration		Report Limit	Units	RPD	RPD Limit	ERM Qualifier
			Sample	Duplicate					
XV23	MW45D-17.3-19.3	Copper, total	9.7	13.5	0.3	mg/kg	32.8	20	J
XV39	GP-69-20-22	Chromium, total	12.7	16.0	0.6	mg/kg	23.0	20	J

Data packages reviewed: XV23, XV39

Key:

RPD = Relative percent difference

mg/kg = Milligrams per kilogram

J = Detected sample result qualified as estimated

Memorandum

Environmental Resources Management

To: Mike Mendes

From: Irene Lavigne

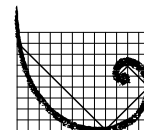
Date: 25 August 2014

Subject: Data Review of Reichhold-Glacier, Uplands Soil Samples Collected October 2013 and January 2014

Project Number: 0232280.06

Data Packages: Analytical Resources, Incorporated Data Packages YP82 and YQ00

2875 Michelle Drive
Suite 200
Irvine, CA 92606
(949) 623-4700
(949) 623-2940 (fax)



ERM®

The quality of the data was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999 and *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004.

HOLDING TIME AND PRESERVATION EVALUATION

The sample shipments were received at the laboratory within the method-prescribed preservation requirements. The samples were prepared and analyzed within the method-prescribed time period from the date of collection. No sample data were qualified based on sample preservation or holding-time exceedances.

BLANK EVALUATION

The method blank and rinsate blank sample results were nondetected for the target analytes. No sample data were qualified based on the blank evaluation. The blank results indicate that no contaminant were introduced to the samples during preparation or analyses.

ELEVATED REPORTING LIMITS

The laboratory noted that the sample results for a number of samples analyzed for polychlorinated biphenyls (PCBs) had elevated reporting limits (RL) due to chromatographic interference. Since dilution and reanalysis of the sample would not resolve the interference, the laboratory

reported the values as not detected at the reported concentrations. The sample results were qualified as nondetected (U) at their respective, elevated RLs as presented in Table 1.

BLANK SPIKE EVALUATION

The laboratory control sample (LCS) and laboratory control sample duplicate recoveries were within the laboratory's limits of acceptance with one exception. No sample data were qualified based on the LCS outlier because only the relative percent difference (RPD) exceeded acceptable limits. The LCS outlier is shown in Table 2. The LCS recoveries indicate acceptable laboratory accuracy and precision.

MATRIX SPIKE EVALUATION

The matrix spike (MS) and matrix spike duplicate recoveries were within the laboratory's limits of acceptance with limited exceptions. A recovery for arsenic that exceeded the maximum acceptable control limits required qualification of five associated, detected samples as estimated (J) for this compound. The MS outlier and associated, qualified sample results are listed in Table 2.

STANDARD REFERENCE EVALUATION

The standard reference results were within acceptable recovery limits. No sample data were qualified based on the standard reference evaluation.

ANALYTICAL DUPLICATE AND REPLICATE EVALUATION

The laboratory prepared and analyzed several analytical duplicate and replicate samples. The RPDs for these samples were within acceptable limits (< 20%) with one exception. The RPD for total chromium for one sample exceeded 20%. The primary sample result for this duplicate pair was qualified as estimated (J). The analytical duplicate result with the outlying RPD is presented in Table 3.

CONTINUING CALIBRATION EVALUATION

The laboratory noted that continuing calibration verification (CCV) recoveries for pentachlorophenol were outside of acceptable control limits. Sample data were not qualified on the basis of the outlying CCV recoveries because the recoveries were biased high and the sample results were nondetected. A list of the outlying CCV recoveries is provided in Table 4.

CALIBRATION RANGE EVALUATION

The laboratory noted one instance where the sample result exceeded the calibration range of the equipment for Aroclor 1254. The laboratory diluted and reanalyzed the affected sample. The sample result from the dilution should be used for decision-making purposes. The undiluted sample result was qualified as estimated (J), as shown in Table 5.

CHROMATOGRAPHIC INTERFERENCE ASSESSMENT

The laboratory noted that the RPD between concentrations of Aroclor 1260 in the two chromatographic columns was greater than 40%. No obvious chromatographic interference was noted. The associated sample has been qualified as estimated (J), as shown in Table 6.

OVERALL ASSESSMENT

No data were determined to be unusable. All of the data, including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents.

Table 1
Elevated Reporting Limits
Uplands Soil Samples Collected October 2013 & January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Analysis	Compound	Reported Concentration	Elevated RL	MDL	Units	ERM Qualifier
YP82	GP-72-2.0-4.0	PCB	Aroclor 1260	< 6.0	6.0	0.59	µg/kg	< 6.0 U
YP82	GP-72-8.2-9.2	PCB	Aroclor 1232	< 7.7	7.7	1.49	µg/kg	< 7.7 U
YP82	TB-02B-0.5-2.5	PCB	Aroclor 1248	< 13	13	1.49	µg/kg	< 13 U
YP82	TB-03D-4.25-7	PCB	Aroclor 1248	< 120	120	1.88	µg/kg	< 120 U
YP82	TB-03D-4.25-7	PCB	Aroclor 1260	< 180	180	0.71	µg/kg	< 180 U
YP82	TB-03D-4.25-7 Dil	PCB	Aroclor 1248	< 360	360	18.8	µg/kg	< 360 U
YP82	TB-03D-4.25-7 Dil	PCB	Aroclor 1260	< 240	240	7.11	µg/kg	< 240 U
YP82	TB-05B-2.4-5	PCB	Aroclor 1248	< 18	18	1.55	µg/kg	< 18 U
YP82	TB-05B-2.4-5	PCB	Aroclor 1260	< 80	80	0.59	µg/kg	< 80 U

Data packages reviewed: YP82, YQ00

Key:

RL = Reporting Limit; elevated due to interference

MDL = Minimum detection limit

PCB = Polychlorinated biphenyls; Method 8082A

µg/kg = Micrograms per kilogram

U = Nondetected

Table 2
Spike Recoveries Outside of Acceptable Limits
Uplands Soil Samples Collected October 2013 & January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
LCS/LCSD										
YQ00	LCS/LCSD-070214	PCP	NA	Pentachlorophenol	74.6/102	56-120	30.7	30	--	--
MS/MSD										
YP82	TB-06C-1.25-4.6 MS	Total Metals	See below	Arsenic	127	75-125	--	--	--	--
YP82	--	Total Metals	TB-06C-1.25-4.6	Arsenic	--	--	--	--	31.3	J
YP82	--	Total Metals	MW-34D-14.5-16.5	Arsenic					61.7	J
YP82	--	Total Metals	GP-74-3.0-4.0	Arsenic					11.1	J
YP82	--	Total Metals	GP-51-17.4-19.4	Arsenic					11.5	J
YP82	--	Total Metals	GP-49-6.0-8.0	Arsenic					11.5	J

Data packages reviewed: YP82, YQ00

Key:

RPD = Relative percent difference

LCS/LCSD = Laboratory control sample/laboratory control sample duplicate

MS/MSD = Matrix spike/matrix spike duplicate

PCP = Pentachlorophenol; Method SW8041

Total Metals = Method 6020

NA = Not applicable; qualification of sample data not required

J = Detected sample result qualified as estimated

Table 3
Analytical Duplicate Results and Calculated Relative Percent Differences
Uplands Soil Samples Collected October 2013 & January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Concentration		Report Limit	Units	RPD	RPD Limit	ERM Qualifier
			Sample	Duplicate					
YP82	TB-06C-1.25-4.6	Chromium, total	37.9	24.7	0.5	mg/kg	42.2	20	J

Data packages reviewed: YP82, YQ00

Key:

RPD = Relative percent difference

mg/kg = Milligrams per kilogram

J = Detected sample result qualified as estimated

Table 4
Calibration Verification Recoveries Outside of Acceptable Limits
Uplands Soil Samples Collected October 2013 & January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	CCV ID	Analysis	Compound	CCV Recovery	CCV Limit	Associated Samples	Reported Concentration	Units	ERM Qualifier
YP82	CCV-070914	PCP	Pentachlorophenol	26.4	20	NA	--	--	--
YQ00	CCV-070914	PCP	Pentachlorophenol	30.8	20	NA	--	--	--

Data packages reviewed: YP82, YQ00

Key:

CCV = Continuing calibration verification

PCP = Pentachlorophenol; Method SW8041

Table 5
Calibration Range Exceedances
Uplands Soil Samples Collected October 2013 & January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Method	Compound	Reported Concentration	Units	ERM Qualifier	Notes
YP82	TB-03D-4.25-7	PCB	Aroclor 1254	1700 E	µg/kg	J	Exceeds calibration range; see dilution data

Data packages reviewed: YP82, YQ00

Key:

PCB = Polychlorinated biphenyls; Method 8082A

E = Undiluted sample concentration exceeded calibration range; use result of dilution/reanalysis for decision-making purposes

µg/kg = Micrograms per kilogram

J = Detected sample result qualified as estimated

Table 6
Chromatographic Interference Assessment
Uplands Soil Samples Collected October 2013 & January 2014
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Method	Compound	Reported Concentration	Units	ERM Qualifier	Notes
YP82	TB-02B-0.5-2.5	PCB	Aroclor 1260	70	µg/kg	J	The analyte was detected on both chromatographic columns but the quantified values differ by over 40% RPD with no obvious chromatographic interference

Data packages reviewed: YP82, YQ00

Key:

µg/kg = Micrograms per kilogram

J = Detected sample result qualified as estimated

PCB = Polychlorinated biphenyls; Method 8082A

RPD = Relative percent difference

Memorandum

Environmental Resources Management

To: Mike Mendes

From: Irene Lavigne

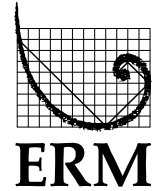
Date: 26 August 2014

Subject: Data Review of Reichhold-Glacier, Archived Uplands
Soil Samples Collected October 2013

Project Number: 0232280

Data Packages: AXYS Analytical Services Data Packages
DPWG48252, Analysis WG47959
DPWG48286, Analysis WG47960

2875 Michelle Drive
Suite 200
Irvine, CA 92606
(949) 623-4700
(949) 623-2940 (fax)



The data quality was assessed and any necessary qualifiers were applied following the *EPA Region 10 SOP for the Validation of Polychlorinated Dibenzodioxin (PCDD) and Polychlorinated Dibenzofuran (PCDF) Data*, January 1996 and the *USEPA National Functional Guidelines for Chlorinated Dibenzo-*p*-dioxins (CDDs) and Chlorinated Dibenzofurans (CDFs) Data Review*, September 2011.

HOLDING TIME AND PRESERVATION EVALUATION

The sample shipments were received at the laboratory within the method-prescribed preservation requirements. The samples were frozen upon receipt at the laboratory. Selected samples were subsequently defrosted, prepared and analyzed within the method-prescribed time period for frozen soil samples. No sample data were qualified based on sample preservation or holding-time exceedances.

BLANK EVALUATION

The lab blank sample results were nondetected for each of the target analytes with limited exceptions. Detections of dioxin/furan compounds in two lab blanks resulted in the qualification of 54 associated sample results as nondetected (U). Additional blank detections did not result in qualified data because either the field sample concentrations exceeded five times the blank concentrations for the corresponding compounds, the associated samples were nondetected, or the detected dioxin/furan compounds had been identified as estimated maximum possible concentrations. The blank detections are presented in Table 1.

MATRIX SPIKE EVALUATION

The matrix spike (MS) and matrix spike duplicate recoveries were within the laboratory's limits of acceptance. No sample data were qualified based on the MS evaluation.

LABELED COMPOUND EVALUATION

Carbon-13 labeled isotope recoveries were reported for each sample submitted for dioxin/furan analysis. The recoveries of labeled PCDD and PCDF compounds is a measure of the effectiveness of the laboratory and method to extract the compounds of interest. All of the labeled compounds were within acceptable limits with several exceptions. Sample results for octochlorodibenzo-p-dioxin (OCDD) were qualified as estimated (J) in four samples due to high recoveries for the corresponding labeled isotope (¹³C-OCDD). The outlying labeled compound recoveries are shown in Table 2.

ESTIMATED MAXIMUM POSSIBLE CONCENTRATION

The laboratory identified several dioxin/furan results as estimated maximum possible concentrations (EMPC). An EMPC value is the maximum possible concentration of a compound that could be present in the sample. This classification is used when all of the identification criteria for a given dioxin or furan compound are not met. The sample data identified as EMPC by the laboratory were qualified as nondetected (U), and are listed in Table 3.

ANALYTICAL DUPLICATE EVALUATION

The laboratory prepared and analyzed two samples as analytical duplicate samples. The RPDs for these samples were within acceptable limits (<20%) with a number of exceptions. Eight duplicate sample pairs were qualified as estimated (J) due to RPDs that exceeded 20%. The duplicate detections and RPDs are listed in Table 4.

CALIBRATION RANGE EVALUATION

The laboratory noted a number of instances where the sample results exceeded the calibration range of the equipment for dioxin/furan compounds. The laboratory diluted and reanalyzed the affected samples. The sample results from the dilutions should be used for decision-making purposes. The samples with calibration range exceedances are presented in Table 5.

OVERALL ASSESSMENT

No data were determined to be unusable. All of the data, including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents.

Table 1
Blank and Associated Suspect Sample Detections
Archived Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG48252	Lab Blank 073114	PCDD/PCDF	NA	2,3,7,8-TCDD	0.436	0.112	pg/g	EMPC
DPWG48252	Lab Blank 073114	PCDD/PCDF	See below	1,2,3,7,8-PECDD	0.202	0.112	pg/g	--
DPWG48252	--	--	GP-49-11.75-12.75	1,2,3,7,8-PECDD	0.252	0.119	pg/g	0.252 U
DPWG48252	Lab Blank 073114	PCDD/PCDF	See below	1,2,3,6,7,8-HXCDD	0.149	0.112	pg/g	--
DPWG48252	--	--	GP-49-11.75-12.75	1,2,3,6,7,8-HXCDD	0.296	0.199	pg/g	0.296 U
DPWG48252	--	--	GP-72-8.2-9.2	1,2,3,6,7,8-HXCDD	0.474	0.158	pg/g	0.474 U
DPWG48252	--	--	GP-35-11.25-12.25	1,2,3,6,7,8-HXCDD	0.220	0.107	pg/g	0.220 U
DPWG48252	--	--	GP-40-11.3-12.3	1,2,3,6,7,8-HXCDD	0.211	0.108	pg/g	0.211 U
DPWG48252	--	--	MW-43D-7.25-9.25	1,2,3,6,7,8-HXCDD	0.321	0.102	pg/g	0.321 U
DPWG48252	Lab Blank 073114	PCDD/PCDF	See below	1,2,3,4,6,7,8-HPCDD	0.445	0.112	pg/g	--
DPWG48252	--	--	GP-35-11.25-12.25	1,2,3,4,6,7,8-HPCDD	1.86	0.107	pg/g	1.86 U
DPWG48252	--	--	GP-40-11.3-12.3	1,2,3,4,6,7,8-HPCDD	1.96	0.108	pg/g	1.96 U
DPWG48252	Lab Blank 073114	PCDD/PCDF	NA	OCDD	1.78	0.112	pg/g	--
DPWG48252	Lab Blank 073114	PCDD/PCDF	See below	2,3,7,8-TCDF	0.206	0.112	pg/g	--
DPWG48252	--	--	GP-49-11.75-12.75	2,3,7,8-TCDF	0.490	0.111	pg/g	0.490 U
DPWG48252	--	--	GP-72-8.2-9.2	2,3,7,8-TCDF	0.371	0.108	pg/g	0.371 U
DPWG48252	--	--	GP-35-11.25-12.25	2,3,7,8-TCDF	0.809	0.107	pg/g	0.809 U
DPWG48252	--	--	GP-40-11.3-12.3	2,3,7,8-TCDF	0.413	0.108	pg/g	0.413 U
DPWG48252	--	--	GP-74-7.6-8.6	2,3,7,8-TCDF	0.437	0.118	pg/g	0.437 U
DPWG48252	Lab Blank 073114	PCDD/PCDF	See below	1,2,3,7,8-PECDF	0.277	0.112	pg/g	--
DPWG48252	--	--	GP-49-11.75-12.75	1,2,3,7,8-PECDF	0.367	0.134	pg/g	0.367 U
DPWG48252	--	--	GP-72-8.2-9.2	1,2,3,7,8-PECDF	0.170	0.108	pg/g	0.170 U

Table 1
Blank and Associated Suspect Sample Detections
Archived Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG48252	--	--	GP-35-11.25-12.25	1,2,3,7,8-PECDF	0.255	0.107	pg/g	0.255 U
DPWG48252	--	--	GP-40-11.3-12.3	1,2,3,7,8-PECDF	0.166	0.108	pg/g	0.166 U
DPWG48252	--	--	MW-43D-7.25-9.25	1,2,3,7,8-PECDF	0.164	0.102	pg/g	0.164 U
DPWG48252	Lab Blank 073114	PCDD/PCDF	See below	2,3,4,7,8-PECDF	0.463	0.112	pg/g	--
DPWG48252	--	--	GP-49-11.75-12.75	2,3,4,7,8-PECDF	0.550	0.134	pg/g	0.550 U
DPWG48252	--	--	GP-72-8.2-9.2	2,3,4,7,8-PECDF	0.467	0.108	pg/g	0.467 U
DPWG48252	--	--	GP-35-11.25-12.25	2,3,4,7,8-PECDF	0.461	0.107	pg/g	0.461 U
DPWG48252	--	--	GP-40-11.3-12.3	2,3,4,7,8-PECDF	0.370	0.108	pg/g	0.370 U
DPWG48252	--	--	MW-43D-7.25-9.25	2,3,4,7,8-PECDF	0.386	0.102	pg/g	0.386 U
DPWG48252	Lab Blank 073114	PCDD/PCDF	NA	1,2,3,4,7,8-HXCDF	0.157	0.112	pg/g	EMPC
DPWG48252	Lab Blank 073114	PCDD/PCDF	See below	1,2,3,6,7,8-HXCDF	0.176	0.112	pg/g	--
DPWG48252	--	--	GP-49-11.75-12.75	1,2,3,6,7,8-HXCDF	0.195	0.145	pg/g	0.195 U
DPWG48252	--	--	GP-35-11.25-12.25	1,2,3,6,7,8-HXCDF	0.194	0.107	pg/g	0.194 U
DPWG48252	--	--	MW-43D-7.25-9.25	1,2,3,6,7,8-HXCDF	0.194	0.102	pg/g	0.194 U
DPWG48252	Lab Blank 073114	PCDD/PCDF	NA	1,2,3,7,8,9-HXCDF	0.188	0.112	pg/g	--
DPWG48252	Lab Blank 073114	PCDD/PCDF	NA	2,3,4,6,7,8-HXCDF	0.116	0.112	pg/g	EMPC
DPWG48252	Lab Blank 073114	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDF	0.191	0.112	pg/g	EMPC
DPWG48252	Lab Blank 073114	PCDD/PCDF	See below	1,2,3,4,7,8,9-HPCDF	0.146	0.112	pg/g	--
DPWG48252	--	--	GP-49-11.75-12.75	1,2,3,4,7,8,9-HPCDF	0.397	0.135	pg/g	0.397 U
DPWG48252	--	--	GP-72-8.2-9.2	1,2,3,4,7,8,9-HPCDF	0.562	0.149	pg/g	0.562 U
DPWG48252	--	--	MW-43D-7.25-9.25	1,2,3,4,7,8,9-HPCDF	0.289	0.102	pg/g	0.289 U
DPWG48252	--	--	GP-74-7.6-8.6	1,2,3,4,7,8,9-HPCDF	0.294	0.136	pg/g	0.294 U

Table 1
Blank and Associated Suspect Sample Detections
Archived Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG48252	Lab Blank 073114	PCDD/PCDF	See below	OCDF	0.244	0.112	pg/g	--
DPWG48252	--	--	GP-35-11.25-12.25	OCDF	0.931	0.107	pg/g	0.931 U
DPWG48252	--	--	GP-40-11.3-12.3	OCDF	0.621	0.108	pg/g	0.621 U
DPWG48252	Lab Blank 073114	PCDD/PCDF	NA	TOTAL TETRA-DIOXINS	0.251	0.112	pg/g	--
DPWG48252	Lab Blank 073114	PCDD/PCDF	NA	TOTAL PENTA-DIOXINS	0.202	0.112	pg/g	--
DPWG48252	Lab Blank 073114	PCDD/PCDF	NA	TOTAL HEXA-DIOXINS	0.149	0.112	pg/g	--
DPWG48252	Lab Blank 073114	PCDD/PCDF	NA	TOTAL HEPTA-DIOXINS	0.445	0.112	pg/g	--
DPWG48252	Lab Blank 073114	PCDD/PCDF	See below	TOTAL TETRA-FURANS	0.206	0.112	pg/g	--
DPWG48252	--	--	MW-43D-7.25-9.25	TOTAL TETRA-FURANS	0.333	0.102	pg/g	0.333 U
DPWG48252	Lab Blank 073114	PCDD/PCDF	See below	TOTAL PENTA-FURANS	0.979	0.112	pg/g	--
DPWG48252	--	--	GP-49-11.75-12.75	TOTAL PENTA-FURANS	0.687	0.134	pg/g	0.687 U
DPWG48252	--	--	GP-35-11.25-12.25	TOTAL PENTA-FURANS	1.98	0.107	pg/g	1.98 U
DPWG48252	--	--	GP-40-11.3-12.3	TOTAL PENTA-FURANS	1.09	0.108	pg/g	1.09 U
DPWG48252	--	--	MW-43D-7.25-9.25	TOTAL PENTA-FURANS	1.59	0.102	pg/g	1.59 U
DPWG48252	--	--	GP-74-7.6-8.6	TOTAL PENTA-FURANS	2.38	0.155	pg/g	2.38 U
DPWG48252	Lab Blank 073114	PCDD/PCDF	See below	TOTAL HEXA-FURANS	0.364	0.112	pg/g	--
DPWG48252	--	--	GP-35-11.25-12.25	TOTAL HEXA-FURANS	0.715	0.107	pg/g	0.715 U
DPWG48252	--	--	GP-40-11.3-12.3	TOTAL HEXA-FURANS	0.591	0.108	pg/g	0.591 U
DPWG48252	Lab Blank 073114	PCDD/PCDF	NA	TOTAL HEPTA-FURANS	0.146	0.112	pg/g	--

Table 1
Blank and Associated Suspect Sample Detections
Archived Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG48252	Lab Blank 072314	PCDD/PCDF	See below	2,3,7,8-TCDF	0.238	0.112	pg/g	--
DPWG48252	--	--	GP-49-11.75-12.75	2,3,7,8-TCDF	0.302	0.111	pg/g	0.302 U
DPWG48252	--	--	GP-72-8.2-9.2	2,3,7,8-TCDF	0.235	0.108	pg/g	0.235 U
DPWG48252	--	--	GP-35-11.25-12.25	2,3,7,8-TCDF	0.382	0.142	pg/g	0.382 U
DPWG48252	--	--	GP-40-11.3-12.3	2,3,7,8-TCDF	0.205	0.178	pg/g	0.205 U
DPWG48252	--	--	MW-43D-7.25-9.25	2,3,7,8-TCDF	0.221	0.155	pg/g	0.221 U
DPWG48286	Lab Blank 73014	PCDD/PCDF	NA	2,3,7,8-TCDD	0.350	0.113	pg/g	EMPC
DPWG48286	Lab Blank 73014	PCDD/PCDF	NA	1,2,3,7,8-PECDD	0.120	0.113	pg/g	EMPC
DPWG48286	Lab Blank 73014	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDD	0.623	0.223	pg/g	--
DPWG48286	Lab Blank 73014	PCDD/PCDF	NA	OCDD	10.3	0.156	pg/g	--
DPWG48286	Lab Blank 73014	PCDD/PCDF	See below	2,3,7,8-TCDF	0.153	0.113	pg/g	--
DPWG48286	--	--	GP-69-12.6-13.6	2,3,7,8-TCDF	0.254	0.111	pg/g	0.254 U
DPWG48286	--	--	TB-06F-20-22	2,3,7,8-TCDF	0.358	0.117	pg/g	0.358 U
DPWG48286	Lab Blank 73014	PCDD/PCDF	See below	2,3,4,7,8-PECDF	0.345	0.113	pg/g	--
DPWG48286	--	--	MW-38D-8.5-9.5	2,3,4,7,8-PECDF	0.515	0.112	pg/g	0.515 U
DPWG48286	--	--	MW-38D-8.5-9.5 (dup)	2,3,4,7,8-PECDF	0.568	0.199	pg/g	0.568 U
DPWG48286	--	--	MW-45D-4.2-6.2	2,3,4,7,8-PECDF	0.822	0.112	pg/g	0.822 U
DPWG48286	--	--	GP-69-7.6-9.6	2,3,4,7,8-PECDF	0.471	0.137	pg/g	0.471 U
DPWG48286	--	--	GP-69-12.6-13.6	2,3,4,7,8-PECDF	0.367	0.111	pg/g	0.367 U
DPWG48286	Lab Blank 73014	PCDD/PCDF	NA	1,2,3,4,7,8-HXCDF	0.145	0.113	pg/g	EMPC

Table 1
Blank and Associated Suspect Sample Detections
Archived Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG48286	Lab Blank 73014	PCDD/PCDF	NA	1,2,3,6,7,8-HXCDF	0.130	0.113	pg/g	EMPC
DPWG48286	Lab Blank 73014	PCDD/PCDF	See below	1,2,3,4,6,7,8-HPCDF	0.230	0.149	pg/g	--
DPWG48286	--	--	GP-69-12.6-13.6	1,2,3,4,6,7,8-HPCDF	0.669	0.132	pg/g	0.669 U
DPWG48286	Lab Blank 73014	PCDD/PCDF	See below	OCDF	0.452	0.113	pg/g	--
DPWG48286	--	--	MW-45D-4.2-6.2	OCDF	1.99	0.135	pg/g	1.99 U

Data packages reviewed: DPWG48252/WG47959, DPWG48286/WG47960

Key:

PCDD/PCDF = Polychlorinated dibenzo-p-dioxins/Polychlorinated dibenzofurans; Method 1613B

NA = Not applicable; qualification of sample data not required

TCDD = Tetrachlorodibenzo-p-dioxin

PECDD = Pentachlorodibenzo-p-dioxin

HXCDD = Hexachlorodibenzo-p-dioxin

HPCDD = Heptachlorodibenzo-p-dioxin

OCDD = Octochlorodibenzo-p-dioxin

TCDF = Tetrachlorodibenzofuran

PECDF = Pentachlorodibenzofuran

HXCDF = Hexachlorodibenzofuran

HPCDF = Heptachlorodibenzofuran

OCDF = Octochlorodibenzofuran

pg/g = Picograms per gram

EMPC = Blank result identified as Estimated Maximum Possible Concentration

U = Nondetected

Table 2
Labeled Compound Recovery Results Outside of Acceptable Limits
Archived Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Labeled Compound	Associated Compound	Recovery (%)	Limit (%)	ERM Qualifier
DPWG48252	GP-74-3.0-4.0	13C-OCDD	OCDD	207	17-130	J
DPWG48252	GP-72-2.0-4.0	13C-OCDD	OCDD	278	17-130	J
DPWG48286	TB-03D-4.25-7	13C-OCDD	OCDD	430	17-130	J
DPWG48286	TB-04A-0.5-1.25	13C-OCDD	OCDD	231	17-130	J

Data packages reviewed: DPWG48252/WG47959, DPWG48286/WG47960

Key:

13C = Carbon-13 labeled isotope

OCDD = Octochlorodibenzo-p-dioxin

J = Detected sample result qualified as estimated

Table 3
Estimated Maximum Possible Concentration
Archived Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG48252	GP-51-4.3-6.3	1,2,3,7,8-PECDF	20.3	1.23	pg/g	20.3 U
DPWG48252	GP-49-6.0-8.0	1,2,3,7,8-PECDD	4.86	0.964	pg/g	4.86 U
DPWG48252	MW-45D-2.3-4.2	2,3,7,8-TCDD	2.24	0.974	pg/g	2.24 U
DPWG48252	MW-45D-2.3-4.2	1,2,3,7,8,9-HXCDF	2.08	1.94	pg/g	2.08 U
DPWG48252	MW-45D-2.3-4.2	2,3,7,8-TCDF	1.92	1.59	pg/g	1.92 U
DPWG48252	GP-49-11.75-12.75	2,3,7,8-TCDD	0.439	0.111	pg/g	0.439 U
DPWG48252	GP-49-11.75-12.75	2,3,7,8-TCDF	0.490	0.111	pg/g	0.490 U
DPWG48252	GP-49-11.75-12.75	1,2,3,7,8-PECDF	0.367	0.134	pg/g	0.367 U
DPWG48252	GP-49-11.75-12.75	2,3,4,6,7,8-HXCDF	0.187	0.145	pg/g	0.187 U
DPWG48252	GP-49-11.75-12.75	2,3,7,8-TCDF	0.302	0.111	pg/g	0.302 U
DPWG48252	GP-72-2.0-4.0	2,3,7,8-TCDD	2.48	0.943	pg/g	2.48 U
DPWG48252	GP-72-2.0-4.0	2,3,7,8-TCDF	5.44	0.943	pg/g	5.44 U
DPWG48252	GP-72-2.0-4.0	1,2,3,7,8-PECDF	14.7	1.66	pg/g	14.7 U
DPWG48252	GP-72-2.0-4.0	1,2,3,7,8,9-HXCDF	6.65	2.76	pg/g	6.65 U
DPWG48252	GP-72-8.2-9.2	2,3,7,8-TCDD	0.375	0.108	pg/g	0.375 U
DPWG48252	GP-72-8.2-9.2	1,2,3,7,8-PECDD	0.140	0.108	pg/g	0.140 U
DPWG48252	GP-72-8.2-9.2	1,2,3,6,7,8-HXCDF	0.281	0.167	pg/g	0.281 U
DPWG48252	GP-35-11.25-12.25	2,3,7,8-TCDD	0.360	0.107	pg/g	0.360 U
DPWG48252	GP-35-11.25-12.25	1,2,3,7,8-PECDD	0.211	0.107	pg/g	0.211 U
DPWG48252	GP-35-11.25-12.25	1,2,3,4,7,8-HXCDF	0.235	0.107	pg/g	0.235 U
DPWG48252	GP-35-11.25-12.25	2,3,4,6,7,8-HXCDF	0.132	0.107	pg/g	0.132 U
DPWG48252	GP-35-11.25-12.25	1,2,3,4,7,8,9-HPCDF	0.147	0.107	pg/g	0.147 U
DPWG48252	GP-40-11.3-12.3	2,3,7,8-TCDD	0.316	0.108	pg/g	0.316 U
DPWG48252	GP-40-11.3-12.3	1,2,3,6,7,8-HXCDF	0.118	0.108	pg/g	0.118 U
DPWG48252	GP-40-11.3-12.3	2,3,7,8-TCDF	0.205	0.178	pg/g	0.205 U
DPWG48252	MW-43D-7.25-9.25	2,3,7,8-TCDD	0.341	0.102	pg/g	0.341 U
DPWG48252	MW-43D-7.25-9.25	1,2,3,7,8-PECDD	0.142	0.102	pg/g	0.142 U
DPWG48252	MW-43D-7.25-9.25	2,3,7,8-TCDF	0.189	0.102	pg/g	0.189 U
DPWG48252	MW-43D-7.25-9.25	2,3,7,8-TCDF	0.221	0.155	pg/g	0.221 U
DPWG48252	GP-74-7.6-8.6	2,3,7,8-TCDD	0.397	0.118	pg/g	0.397 U
DPWG48252	GP-74-7.6-8.6	1,2,3,6,7,8-HXCDD	0.252	0.195	pg/g	0.252 U
DPWG48252	GP-74-7.6-8.6	1,2,3,7,8-PECDF	0.208	0.140	pg/g	0.208 U
DPWG48252	GP-74-7.6-8.6	2,3,4,7,8-PECDF	0.446	0.140	pg/g	0.446 U
DPWG48252	GP-74-7.6-8.6	2,3,7,8-TCDF	0.241	0.187	pg/g	0.241 U
DPWG48252	Lab Blank 7-31-14	2,3,7,8-TCDD	0.436	0.112	pg/g	0.436 U
DPWG48252	Lab Blank 7-31-14	1,2,3,4,7,8-HXCDF	0.157	0.112	pg/g	0.157 U
DPWG48252	Lab Blank 7-31-14	2,3,4,6,7,8-HXCDF	0.116	0.112	pg/g	0.116 U
DPWG48252	Lab Blank 7-31-14	1,2,3,4,6,7,8-HPCDF	0.191	0.112	pg/g	0.191 U
DPWG48286	MW-38D-8.5-9.5	2,3,7,8-TCDD	0.412	0.112	pg/g	0.412 U
DPWG48286	MW-38D-8.5-9.5	1,2,3,7,8-PECDD	0.210	0.112	pg/g	0.210 U
DPWG48286	MW-38D-8.5-9.5 (dup)	2,3,7,8-TCDD	0.433	0.154	pg/g	0.433 U
DPWG48286	MW-45D-4.2-6.2	2,3,7,8-TCDD	0.498	0.112	pg/g	0.498 U

Table 3
Estimated Maximum Possible Concentration
Archived Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG48286	GP-69-7.6-9.6	2,3,7,8-TCDD	0.317	0.110	pg/g	0.317 U
DPWG48286	GP-69-7.6-9.6	1,2,3,7,8-PECDD	0.142	0.139	pg/g	0.142 U
DPWG48286	GP-69-7.6-9.6	2,3,7,8-TCDF	0.311	0.110	pg/g	0.311 U
DPWG48286	GP-69-12.6-13.6	2,3,7,8-TCDD	0.359	0.111	pg/g	0.359 U
DPWG48286	GP-69-12.6-13.6	2,3,4,6,7,8-HXCDF	0.217	0.111	pg/g	0.217 U
DPWG48286	TB-06F-20-22	2,3,7,8-TCDD	0.390	0.183	pg/g	0.390 U
DPWG48286	Lab Blank 7-30-14	2,3,7,8-TCDD	0.350	0.113	pg/g	0.350 U
DPWG48286	Lab Blank 7-30-14	1,2,3,7,8-PECDD	0.120	0.113	pg/g	0.120 U
DPWG48286	Lab Blank 7-30-14	1,2,3,4,7,8-HXCDF	0.145	0.113	pg/g	0.145 U
DPWG48286	Lab Blank 7-30-14	1,2,3,6,7,8-HXCDF	0.130	0.113	pg/g	0.130 U

Data packages reviewed: DPWG48252/WG47959, DPWG48286/WG47960

Key:

PECDF = Pentachlorodibenzofuran

PECDD = Pentachlorodibenzo-p-dioxin

TCDD = Tetrachlorodibenzo-p-dioxin

HXCDF = Hexachlorodibenzofuran

TCDF = Tetrachlorodibenzofuran

HPCDF = Heptachlorodibenzofuran

HXCDD = Hexachlorodibenzo-p-dioxin

pg/g = Picograms per gram

U = Nondetected

Table 4
Analytical Duplicate Results and Calculated Relative Percent Differences
Archived Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Analysis	Compound	Concentration		Report Limit		Units	RPD	ERM
				Sample	Duplicate	Sample	Duplicate			Qualifier
DPWG48252	GP-43-3.0-5.0	PCDD/PCDF	1,2,3,7,8-PECDD	23.9	19.1	3.33	1.69	pg/g	22	J
DPWG48252	GP-43-3.0-5.0	PCDD/PCDF	1,2,3,4,7,8-HXCDD	56.7	57.2	7.03	1.95	pg/g	0.9	--
DPWG48252	GP-43-3.0-5.0	PCDD/PCDF	1,2,3,6,7,8-HXCDD	315	300	7.03	1.95	pg/g	4.9	--
DPWG48252	GP-43-3.0-5.0	PCDD/PCDF	1,2,3,7,8,9-HXCDD	114	104	7.03	1.95	pg/g	9.2	--
DPWG48252	GP-43-3.0-5.0	PCDD/PCDF	1,2,3,4,6,7,8-HPCDD	6230	6700	15.3	5.48	pg/g	7.3	--
DPWG48252	GP-43-3.0-5.0	PCDD/PCDF	OCDD	90200	94800	7.65	0.985	pg/g	5.0	--
DPWG48252	GP-43-3.0-5.0	PCDD/PCDF	2,3,7,8-TCDF	7.55	7.98	1.86	0.985	pg/g	5.5	--
DPWG48252	GP-43-3.0-5.0	PCDD/PCDF	1,2,3,7,8-PECDF	23.9	24.6	4.19	1.85	pg/g	2.9	--
DPWG48252	GP-43-3.0-5.0	PCDD/PCDF	2,3,4,7,8-PECDF	97.3	91.4	4.19	1.85	pg/g	6.3	--
DPWG48252	GP-43-3.0-5.0	PCDD/PCDF	1,2,3,4,7,8-HXCDF	1270	1380	7.61	5.34	pg/g	8.3	--
DPWG48252	GP-43-3.0-5.0	PCDD/PCDF	1,2,3,6,7,8-HXCDF	217	246	7.61	5.34	pg/g	13	--
DPWG48252	GP-43-3.0-5.0	PCDD/PCDF	1,2,3,7,8,9-HXCDF	11.8	13.6	7.61	5.34	pg/g	14	--
DPWG48252	GP-43-3.0-5.0	PCDD/PCDF	2,3,4,6,7,8-HXCDF	76.4	79.9	7.61	5.34	pg/g	4.5	--
DPWG48252	GP-43-3.0-5.0	PCDD/PCDF	1,2,3,4,6,7,8-HPCDF	3020	3580	10.4	6.05	pg/g	17	--
DPWG48252	GP-43-3.0-5.0	PCDD/PCDF	1,2,3,4,7,8,9-HPCDF	643	615	10.4	6.05	pg/g	4.5	--
DPWG48252	GP-43-3.0-5.0	PCDD/PCDF	OCDF	4050	3740	2.00	0.985	pg/g	8.0	--
DPWG48252	GP-43-3.0-5.0	PCDD/PCDF	TOTAL TETRA-DIOXINS	217	263	3.16	0.985	pg/g	19	--
DPWG48252	GP-43-3.0-5.0	PCDD/PCDF	TOTAL PENTA-DIOXINS	249	192	3.33	1.69	pg/g	26	J
DPWG48252	GP-43-3.0-5.0	PCDD/PCDF	TOTAL HEXA-DIOXINS	1060	1010	7.03	1.95	pg/g	4.8	--
DPWG48252	GP-43-3.0-5.0	PCDD/PCDF	TOTAL HEPTA-DIOXINS	10700	11300	15.3	5.48	pg/g	5.5	--
DPWG48252	GP-43-3.0-5.0	PCDD/PCDF	TOTAL TETRA-FURANS	64.5	89.4	1.86	0.985	pg/g	32	J
DPWG48252	GP-43-3.0-5.0	PCDD/PCDF	TOTAL PENTA-FURANS	1270	1520	4.19	1.85	pg/g	18	--
DPWG48252	GP-43-3.0-5.0	PCDD/PCDF	TOTAL HEXA-FURANS	6980	7330	7.61	5.34	pg/g	4.9	--
DPWG48252	GP-43-3.0-5.0	PCDD/PCDF	TOTAL HEPTA-FURANS	11200	13000	10.4	6.05	pg/g	15	--
DPWG48252	GP-43-3.0-5.0	PCDD/PCDF	2,3,7,8-TCDF	3.94	3.87	2.50	1.69	pg/g	1.8	--
										--
DPWG48286	MW-38D-8.5-9.5	PCDD/PCDF	1,2,3,6,7,8-HXCDD	0.452	0.460	0.135	0.225	pg/g	1.8	--
DPWG48286	MW-38D-8.5-9.5	PCDD/PCDF	1,2,3,7,8,9-HXCDD	0.351	0.368	0.135	0.225	pg/g	4.7	--
DPWG48286	MW-38D-8.5-9.5	PCDD/PCDF	1,2,3,4,6,7,8-HPCDD	7.30	8.27	0.209	0.250	pg/g	12	--

Table 4
Analytical Duplicate Results and Calculated Relative Percent Differences
Archived Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Analysis	Compound	Concentration		Report Limit		Units	RPD	ERM Qualifier
				Sample	Duplicate	Sample	Duplicate			
DPWG48286	MW-38D-8.5-9.5	PCDD/PCDF	OCDD	131	157	0.112	0.234	pg/g	18	--
DPWG48286	MW-38D-8.5-9.5	PCDD/PCDF	2,3,7,8-TCDF	0.857	0.963	0.112	0.117	pg/g	12	--
DPWG48286	MW-38D-8.5-9.5	PCDD/PCDF	1,2,3,7,8-PECDF	0.226	0.333	0.112	0.199	pg/g	38	J
DPWG48286	MW-38D-8.5-9.5	PCDD/PCDF	2,3,4,7,8-PECDF	0.515	0.568	0.112	0.199	pg/g	9.8	--
DPWG48286	MW-38D-8.5-9.5	PCDD/PCDF	1,2,3,4,7,8-HXCDF	1.04	1.12	0.148	0.206	pg/g	7.4	--
DPWG48286	MW-38D-8.5-9.5	PCDD/PCDF	1,2,3,6,7,8-HXCDF	0.333	0.363	0.148	0.206	pg/g	8.6	--
DPWG48286	MW-38D-8.5-9.5	PCDD/PCDF	1,2,3,4,6,7,8-HPCDF	2.64	2.84	0.184	0.269	pg/g	7.3	--
DPWG48286	MW-38D-8.5-9.5	PCDD/PCDF	1,2,3,4,7,8,9-HPCDF	0.556	0.619	0.184	0.269	pg/g	11	--
DPWG48286	MW-38D-8.5-9.5	PCDD/PCDF	OCDF	5.33	6.80	0.136	0.284	pg/g	24	J
DPWG48286	MW-38D-8.5-9.5	PCDD/PCDF	TOTAL TETRA-DIOXINS	3.27	3.98	0.112	0.154	pg/g	20	--
DPWG48286	MW-38D-8.5-9.5	PCDD/PCDF	TOTAL PENTA-DIOXINS	2.25	4.15	0.112	0.184	pg/g	59	J
DPWG48286	MW-38D-8.5-9.5	PCDD/PCDF	TOTAL HEXA-DIOXINS	4.64	5.02	0.135	0.225	pg/g	7.9	--
DPWG48286	MW-38D-8.5-9.5	PCDD/PCDF	TOTAL HEPTA-DIOXINS	15.4	20.6	0.209	0.250	pg/g	29	J
DPWG48286	MW-38D-8.5-9.5	PCDD/PCDF	TOTAL TETRA-FURANS	7.87	9.01	0.112	0.117	pg/g	14	--
DPWG48286	MW-38D-8.5-9.5	PCDD/PCDF	TOTAL PENTA-FURANS	3.51	4.34	0.112	0.199	pg/g	21	J
DPWG48286	MW-38D-8.5-9.5	PCDD/PCDF	TOTAL HEXA-FURANS	6.66	7.70	0.148	0.206	pg/g	14	--
DPWG48286	MW-38D-8.5-9.5	PCDD/PCDF	TOTAL HEPTA-FURANS	9.23	11.3	0.184	0.269	pg/g	20	--

Data packages reviewed: DPWG48252/WG47959, DPWG48286/WG47960

Key:

PCDD/PCDF = Polychlorinated dibenzo-p-dioxins/Polychlorinated dibenzofurans; Method 1613B

PECDD = Pentachlorodibenzo-p-dioxin

HXCDD = Hexachlorodibenzo-p-dioxin

HPCDD = Heptachlorodibenzo-p-dioxin

OCDD = Octochlorodibenzo-p-dioxin

TCDF = Tetrachlorodibenzofuran

PECDF = Pentachlorodibenzofuran

HXCDF = Hexachlorodibenzofuran

HPCDF = Heptachlorodibenzofuran

OCDF = Octochlorodibenzofuran

RPD = Relative percent difference

pg/g = Picograms per gram

J = Detected sample result qualified as estimated

Table 5
Calibration Range Exceedances
January - March 2014 Soil Samples
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Method	Compound	Reported Concentration	Units	ERM Qualifier	Notes
DPWG48252	GP-74-3.0-4.0	PCDD/PCDF	1,2,3,4,6,7,8-HPCDD	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG48252	GP-74-3.0-4.0	PCDD/PCDF	OCDD	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG48252	GP-72-2.0-4.0	PCDD/PCDF	OCDD	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG48286	TB-01B-0.8-2.4	PCDD/PCDF	OCDD	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG48286	TB-06C-1.25-4.6	PCDD/PCDF	OCDD	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG48286	TB-02B-0.5-2.5	PCDD/PCDF	OCDD	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG48286	TB-03D-4.25-7	PCDD/PCDF	OCDD	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG48286	TB-04A-0.5-1.25	PCDD/PCDF	OCDD	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG48286	TB-06E-3.4-5	PCDD/PCDF	OCDD	NR	pg/g	--	Exceeds calibrated linear range, see dilution data
DPWG48286	TB-05B-2.4-5	PCDD/PCDF	OCDD	NR	pg/g	--	Exceeds calibrated linear range, see dilution data

Data packages reviewed: DPWG48252/WG47959, DPWG48286/WG47960

Key:

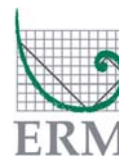
PCDD/PCDF = Polychlorinated dibenzo-p-dioxins/Polychlorinated dibenzofurans; Method 1613B

HPCDD = Heptachlorodibenzo-p-dioxin

OCDD = Octochlorodibenzo-p-dioxin

NR = Value not reported

pg/g = Picograms per gram

**Memo**

To	Suzanne Dolberg
From	Rachel James
Date	08 August 2019
Reference	0401356
Subject	Data Review of Glacier Northwest Soil Samples, May 2019: SGS AXYS Data Packages DPWG68839 and DPWG69099.

The data quality was assessed and any necessary qualifiers were applied following the *USEPA National Functional Guidelines for High Resolution Superfund Methods Data Review*, April 2016.

SAMPLE RECEIPT COMMENTS

The laboratory noted that one or more jars for samples GP-78-1-2.5, GP-78-3-5, GP-79-5-7, DUP-051519-02, GP-82-5-7, GP-78-10.5-11.5, GP-83-11.7-12.7, GP-80-13-14, GP-79-11.5-12.5, and GP-82-8.5-9.5 were received broken, but that sample integrity was maintained. No qualifications were applied.

HOLDING TIME AND PRESERVATION EVALUATION

The samples were prepared and analyzed within the method-prescribed time period from the date of collection. The sample shipments were received at the laboratory within the method-prescribed temperature preservation requirements of less than 6°C. No qualifications were necessary.

BLANK EVALUATION

Several target analytes were detected in the rinse and trip blank samples. The blank results are several orders of magnitude below the sample results; therefore, the sample results are considered unaffected by the rinse and trip blank contamination.

Several target analytes were detected in the method blank samples at concentrations above the reporting limits. Associated sample results less than the blank concentration were qualified as non-detect (U) at the sample concentration. Associated sample results within five times the blank concentration (and greater than the blank concentration) were qualified as estimated with a high bias (J+). Results qualified as J by the laboratory for concentrations less than the lowest calibration equivalent were qualified as estimates (J). The blank detections and associated data are presented in Table 1.

BLANK SPIKE EVALUATION

The laboratory control sample (LCS) recoveries were within the laboratory's limits of acceptance. The LCS recoveries indicate acceptable laboratory accuracy.

MATRIX SPIKE EVALUATION

The laboratory prepared sample GP-78-1-2.5 as a matrix spike (MS)/matrix spike duplicate (MSD) for dioxin/furan analysis. The laboratory report did not include limits of acceptance for MS/MSD recovery or precision.

LABELED COMPOUND EVALUATION

The labeled compound recoveries were within acceptable limits. No qualifications were required based on labeled compound recoveries. The labeled compound recoveries indicate minimal matrix interference in the samples.

CALIBRATION RANGE EXCEEDANCES

The laboratory qualified select results in samples GP-81-1.5-3.5, GP-81-5-6.5, GP-82-3-5, GP-82-5-7, GP-83-3.25-4, and GP-83-4-6 as exceeding the instrument calibration range. In all cases, the laboratory re-ran the samples at a dilution and reported the results within the calibration range. No qualifications were necessary.

ESTIMATED MAXIMUM POSSIBLE CONCENTRATION

The laboratory identified several dioxin and furan results in project samples as estimated maximum possible concentrations (EMPC). An EMPC value is the maximum possible concentration of a compound that could be present in the sample. This classification is used when all of the identification criteria for a given dioxin or furan compound are not met. The affected results have been qualified as non-detect (U). The data identified as EMPC by the laboratory as presented in Table 2.

LABORATORY DUPLICATE EVALUATION

The laboratory prepared sample GP-79-5-7 as a laboratory duplicate for dioxin/furan analysis. The laboratory report did not include limits of acceptance for precision.

FIELD DUPLICATE EVALUATION

Two samples were submitted in duplicate. ERM calculated the relative percent differences (RPDs) between detected results in Table 3. The USEPA has not established control criteria for field duplicate samples; therefore, sample data are not qualified on the basis of field duplicate imprecision.

OVERALL ASSESSMENT

None of the data required rejection. All of the data, including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation is acceptable for the preparation of technically defensible documents.

Table 1
Blank and Associated Suspect Sample Detections
May 2019 Soil Samples
Glacier Northwest
Seattle, Washington

Lab Package	Blank ID	Associated Sample	Detected Compound	Reported Concentration	Lab Qualifier	Report Limit	Units	ERM Qualifier
DPWG68839	MB WG68424-101	See below	OCDD	1.95	J	0.500	pg/L	--
	--	RB-051519-01		3.62	J	0.611	pg/L	J+
	--	TB-051519-01		5.16	J	0.522	pg/L	J+
	--	TB-051719-01		9.28	J	0.511	pg/L	J+
	RB-051719-01	--	2,3,7,8-TCDD	4.29	J	0.516	pg/L	J
		--	1,2,3,6,7,8-HXCDD	0.626	J	0.563	pg/L	0.626 U ¹
		--	1,2,3,4,6,7,8-HPCDD	4.45	J	0.969	pg/L	J
		--	OCDD	51.8	J	2.50	pg/L	J
		--	2,3,7,8-TCDF	1.47	J	0.516	pg/L	J
		--	1,2,3,4,7,8-HXCDF	1.96	J	0.527	pg/L	1.96 U ¹
		--	1,2,3,6,7,8-HXCDF	0.605	J	0.527	pg/L	J
		--	1,2,3,4,6,7,8-HPCDF	7.16	J	0.668	pg/L	J
		--	OCDF	10.6	J	1.25	pg/L	J
		--	TOTAL TETRA-DIOXINS	4.29	--	0.516	pg/L	--
		--	TOTAL PENTA-DIOXINS	1.61	--	0.516	pg/L	--
		--	TOTAL HEXA-DIOXINS	1.43	--	0.563	pg/L	--
		--	TOTAL HEPTA-DIOXINS	10.8	--	0.969	pg/L	--
		--	TOTAL TETRA-FURANS	0.668	--	0.516	pg/L	--
		--	TOTAL PENTA-FURANS	0.911	--	0.516	pg/L	--
		--	TOTAL HEXA-FURANS	2.16	--	0.527	pg/L	--
		--	TOTAL HEPTA-FURANS	10.4	--	0.668	pg/L	--

Table 1
Blank and Associated Suspect Sample Detections
May 2019 Soil Samples
Glacier Northwest
Seattle, Washington

Lab Package	Blank ID	Associated Sample	Detected Compound	Reported Concentration	Lab Qualifier	Report Limit	Units	ERM Qualifier
DPWG68839	TB-051719-01	--	1,2,3,4,6,7,8-HPCDD	1.35	J	0.511	pg/L	J
		--	OCDD	9.28	J	0.511	pg/L	J
		--	1,2,3,4,6,7,8-HPCDF	0.562	J	0.511	pg/L	0.562 U ¹
		--	OCDF	0.994	J	0.511	pg/L	J
		--	TOTAL HEPTA-DIOXINS	1.35	--	0.511	pg/L	--
		--	TOTAL TETRA-FURANS	1.34	--	0.511	pg/L	--
		--	TOTAL PENTA-FURANS	0.656	--	0.511	pg/L	--
		--	TOTAL HEPTA-FURANS	0.794	--	0.511	pg/L	--
	RB-051519-01	--	1,2,3,4,6,7,8-HPCDD	0.750	J	0.611	pg/L	J
		--	OCDD	3.62	J	0.611	pg/L	J
		--	OCDF	0.619	J	0.611	pg/L	0.619 U ¹
		--	TOTAL HEPTA-DIOXINS	0.750	--	0.611	pg/L	--
	TB-051519-01	--	1,2,3,4,6,7,8-HPCDD	0.723	J	0.522	pg/L	J
		--	OCDD	5.16	J	0.522	pg/L	J
		--	TOTAL HEPTA-DIOXINS	0.723	--	0.522	pg/L	--
DPWG69099	MB WG68475-101	See below	1,2,3,4,7,8-HXCDD	0.058	J	0.050	pg/g	--
		See below	1,2,3,6,7,8-HXCDD	0.125	J	0.050	pg/g	--
		See below	1,2,3,4,6,7,8-HPCDD	1.86	J	0.050	pg/g	--
		See below	OCDD	25.1	--	0.050	pg/g	--
		See below	1,2,3,7,8-PECDF	0.069	J	0.050	pg/g	--
		See below	2,3,4,7,8-PECDF	0.070	J	0.050	pg/g	--
		See below	1,2,3,4,7,8-HXCDF	0.292	J	0.050	pg/g	--
		See below	1,2,3,6,7,8-HXCDF	0.070	J	0.050	pg/g	--

Table 1
Blank and Associated Suspect Sample Detections
May 2019 Soil Samples
Glacier Northwest
Seattle, Washington

Lab Package	Blank ID	Associated Sample	Detected Compound	Reported Concentration	Lab Qualifier	Report Limit	Units	ERM Qualifier
DPWG69099	MB WG68475-101	See below	1,2,3,4,6,7,8-HPCDF	0.806	J	0.050	pg/g	--
		See below	1,2,3,4,7,8,9-HPCDF	0.145	J	0.050	pg/g	--
		See below	OCDF	1.62	J	0.050	pg/g	--
		See below	TOTAL HEXA-DIOXINS	0.125	--	0.050	pg/g	--
		See below	TOTAL HEPTA-DIOXINS	3.08	--	0.050	pg/g	--
		See below	TOTAL PENTA-FURANS	0.222	--	0.050	pg/g	--
		See below	TOTAL HEXA-FURANS	1.33	--	0.050	pg/g	--
		See below	TOTAL HEPTA-FURANS	2.93	--	0.050	pg/g	--
	--	GP-80-4-5.5	1,2,3,4,7,8-HXCDD	0.074	J	0.048	pg/g	0.074 U ¹
	--	GP-78-3-5		0.068	J	0.050	pg/g	0.068 U ¹
	--	GP-79-2-4		0.238	J	0.050	pg/g	J+
	--	DUP-051519-01		0.231	J	0.049	pg/g	J+
	--	GP-79-5-7		0.245	J	0.050	pg/g	0.245 U ¹
	--	GP-78-10.5-11.5		0.066	J	0.046	pg/g	J+
	--	GP-83-11.7-12.7		0.073	J	0.050	pg/g	0.073 U ¹
	--	GP-80-13-14		0.084	J	0.045	pg/g	0.084 U ¹
	--	GP-79-11.5-12.5		0.121	J	0.050	pg/g	0.121 U ¹
	--	GP-82-8.5-9.5		0.120	J	0.048	pg/g	J+
	--	GP-81-9-10		0.266	J	0.048	pg/g	J+
	--	GP-80-4-5.5	1,2,3,6,7,8-HXCDD	0.148	J	0.048	pg/g	0.148 U ¹
	--	GP-78-3-5		0.190	J	0.050	pg/g	0.190 U ¹
	--	GP-79-2-4		0.419	J	0.050	pg/g	J+
	--	DUP-051519-01		0.477	J	0.049	pg/g	J+
	--	GP-79-5-7		0.381	J	0.050	pg/g	0.381 U ¹
	--	GP-78-10.5-11.5		0.139	J	0.046	pg/g	0.139 U ¹
	--	GP-83-11.7-12.7		0.305	J	0.050	pg/g	J+
	--	GP-80-13-14		0.183	J	0.045	pg/g	J+
	--	GP-79-11.5-12.5		0.164	J	0.050	pg/g	J+
	--	GP-82-8.5-9.5		0.563	J	0.048	pg/g	J+

Table 1
Blank and Associated Suspect Sample Detections
May 2019 Soil Samples
Glacier Northwest
Seattle, Washington

Lab Package	Blank ID	Associated Sample	Detected Compound	Reported Concentration	Lab Qualifier	Report Limit	Units	ERM Qualifier
DPWG69099	--	GP-80-4-5.5	1,2,3,4,6,7,8-HPCDD	2.13	J	0.048	pg/g	J+
	--	GP-78-3-5		4.02	J	0.055	pg/g	J+
	--	GP-79-2-4		5.75	--	0.050	pg/g	J+
	--	DUP-051519-01		5.80	--	0.049	pg/g	J+
	--	GP-79-5-7		5.33	--	0.050	pg/g	J+
	--	GP-78-10.5-11.5		2.44	J	0.046	pg/g	J+
	--	GP-83-11.7-12.7		6.94	--	0.051	pg/g	J+
	--	GP-80-13-14		2.78	J	0.062	pg/g	J+
	--	GP-79-11.5-12.5		1.48	J	0.050	pg/g	J+
	--	GP-80-4-5.5	OCDD	23.4	--	0.100	pg/g	23.4 U
	--	GP-78-3-5		76.3	--	0.259	pg/g	J+
	--	GP-79-2-4		114	--	0.137	pg/g	J+
	--	DUP-051519-01		116	--	0.049	pg/g	J+
	--	GP-79-5-7		71.4	--	0.166	pg/g	J+
	--	GP-78-10.5-11.5		24.0	--	0.046	pg/g	24.0 U
	--	GP-83-11.7-12.7		111	--	0.439	pg/g	J+
	--	GP-80-13-14		39.8	--	0.109	pg/g	J+
	--	GP-79-11.5-12.5		19.3	--	0.086	pg/g	19.3 U
	--	GP-78-1-2.5	1,2,3,7,8-PECDF	0.232	J	0.051	pg/g	0.232 U ¹
	--	GP-79-5-7		0.100	J	0.065	pg/g	0.100 U ¹
	--	GP-78-10.5-11.5		0.121	J	0.046	pg/g	J+
	--	GP-83-11.7-12.7		0.115	J	0.050	pg/g	J+
	--	GP-80-13-14		0.070	J	0.060	pg/g	J+
	--	GP-79-11.5-12.5		0.245	J	0.055	pg/g	0.245 U ¹
	--	GP-82-8.5-9.5		0.158	J	0.056	pg/g	J+
	--	GP-81-9-10		0.221	J	0.048	pg/g	J+

Table 1
Blank and Associated Suspect Sample Detections
May 2019 Soil Samples
Glacier Northwest
Seattle, Washington

Lab Package	Blank ID	Associated Sample	Detected Compound	Reported Concentration	Lab Qualifier	Report Limit	Units	ERM Qualifier
DPWG69099	--	GP-80-4-5.5	2,3,4,7,8-PECDF	0.049	J	0.048	pg/g	0.049 U ¹
	--	GP-78-3-5		0.060	J	0.050	pg/g	0.060 U ¹
	--	GP-78-10.5-11.5		0.076	J	0.046	pg/g	0.076 U ¹
	--	GP-83-11.7-12.7		0.142	J	0.050	pg/g	0.142 U ¹
	--	GP-80-13-14		0.072	J	0.060	pg/g	0.072 U ¹
	--	GP-79-11.5-12.5		0.199	J	0.055	pg/g	J+
	--	GP-82-8.5-9.5		0.181	J	0.056	pg/g	J+
	--	GP-80-4-5.5	1,2,3,4,7,8-HXCDF	0.107	J	0.048	pg/g	0.107 U
	--	GP-78-3-5		0.394	J	0.050	pg/g	J+
	--	GP-79-5-7		0.065	J	0.050	pg/g	0.065 U ¹
	--	GP-78-10.5-11.5		0.095	J	0.046	pg/g	0.095 U
	--	GP-83-11.7-12.7		0.910	J	0.050	pg/g	J+
	--	GP-80-13-14		0.286	J	0.045	pg/g	0.286 U
	--	GP-79-11.5-12.5		0.112	J	0.050	pg/g	0.112 U
	--	GP-82-8.5-9.5		0.920	J	0.048	pg/g	J+
	--	GP-80-4-5.5	1,2,3,6,7,8-HXCDF	0.056	J	0.048	pg/g	0.056 U ¹
	--	GP-78-3-5		0.081	J	0.050	pg/g	J+
	--	GP-78-10.5-11.5		0.057	J	0.046	pg/g	0.057 U ¹
	--	GP-83-11.7-12.7		0.201	J	0.050	pg/g	J+
	--	GP-80-13-14		0.067	J	0.045	pg/g	0.067 U
	--	GP-79-11.5-12.5		0.125	J	0.050	pg/g	J+
	--	GP-82-8.5-9.5		0.245	J	0.048	pg/g	J+

Table 1
Blank and Associated Suspect Sample Detections
May 2019 Soil Samples
Glacier Northwest
Seattle, Washington

Lab Package	Blank ID	Associated Sample	Detected Compound	Reported Concentration	Lab Qualifier	Report Limit	Units	ERM Qualifier
DPWG69099	--	GP-80-4-5.5	1,2,3,4,6,7,8-HPCDF	0.400	J	0.048	pg/g	0.400 U
	--	GP-78-3-5		1.23	J	0.050	pg/g	J+
	--	GP-79-5-7		0.227	J	0.050	pg/g	0.227 U
	--	GP-78-10.5-11.5		0.283	J	0.046	pg/g	0.283 U
	--	GP-83-11.7-12.7		2.67	J	0.050	pg/g	J+
	--	GP-80-13-14		0.744	J	0.045	pg/g	0.744 U
	--	GP-79-11.5-12.5		0.226	J	0.050	pg/g	0.226 U
	--	GP-82-8.5-9.5		3.48	J	0.048	pg/g	J+
	--	GP-80-4-5.5	1,2,3,4,7,8,9-HPCDF	0.060	J	0.048	pg/g	0.060 U ¹
	--	GP-78-3-5		0.229	J	0.050	pg/g	0.229 U ¹
	--	GP-78-10.5-11.5		0.080	J	0.046	pg/g	0.080 U
	--	GP-83-11.7-12.7		0.484	J	0.050	pg/g	J+
	--	GP-80-13-14		0.166	J	0.045	pg/g	J+
	--	GP-82-8.5-9.5		0.566	J	0.048	pg/g	J+
	--	GP-80-4-5.5	OCDF	0.854	J	0.048	pg/g	0.0854 U
	--	GP-78-3-5		2.20	J	0.050	pg/g	J+
	--	GP-79-5-7		0.505	J	0.050	pg/g	0.505 U
	--	GP-78-10.5-11.5		0.403	J	0.046	pg/g	0.403 U
	--	GP-83-11.7-12.7		5.50	J	0.050	pg/g	J+
	--	GP-80-13-14		1.51	J	0.048	pg/g	1.51 U
	--	GP-79-11.5-12.5		0.165	J	0.050	pg/g	0.165 U
	--	GP-80-4-5.5	TOTAL HEXA-DIOXINS	0.216	--	0.048	pg/g	J+

Table 1
Blank and Associated Suspect Sample Detections
May 2019 Soil Samples
Glacier Northwest
Seattle, Washington

Lab Package	Blank ID	Associated Sample	Detected Compound	Reported Concentration	Lab Qualifier	Report Limit	Units	ERM Qualifier
DPWG69099	--	GP-80-4-5.5	TOTAL HEPTA-DIOXINS	4.62	--	0.048	pg/g	J+
	--	GP-78-3-5		7.34	--	0.055	pg/g	J+
	--	GP-79-2-4		12.0	--	0.050	pg/g	J+
	--	DUP-051519-01		11.4	--	0.049	pg/g	J+
	--	GP-79-5-7		12.2	--	0.050	pg/g	J+
	--	GP-78-10.5-11.5		4.89	--	0.046	pg/g	J+
	--	GP-83-11.7-12.7		13.9	--	0.051	pg/g	J+
	--	GP-80-13-14		5.81	--	0.062	pg/g	J+
	--	GP-79-11.5-12.5		4.13	--	0.050	pg/g	J+
	--	GP-80-4-5.5	TOTAL PENTA-FURANS	0.317	--	0.048	pg/g	J+
	--	GP-78-3-5		0.171	--	0.050	pg/g	0.171 U
	--	GP-79-5-7		0.201	--	0.065	pg/g	0.201 U
	--	GP-78-10.5-11.5		0.933	--	0.046	pg/g	J+
	--	GP-80-13-14		0.702	--	0.060	pg/g	J+
	--	GP-80-4-5.5	TOTAL HEXA-FURANS	0.669	--	0.048	pg/g	0.669 U
	--	GP-78-3-5		1.97	--	0.050	pg/g	J+
	--	GP-78-10.5-11.5		0.311	--	0.046	pg/g	0.311 U
	--	GP-83-11.7-12.7		4.99	--	0.050	pg/g	J+
	--	GP-80-13-14		1.22	--	0.045	pg/g	J+
	--	GP-79-11.5-12.5		0.711	--	0.050	pg/g	0.711 U
	--	GP-82-8.5-9.5		6.48	--	0.048	pg/g	J+

Table 1
Blank and Associated Suspect Sample Detections
May 2019 Soil Samples
Glacier Northwest
Seattle, Washington

Lab Package	Blank ID	Associated Sample	Detected Compound	Reported Concentration	Lab Qualifier	Report Limit	Units	ERM Qualifier
DPWG69099	--	GP-80-4-5.5	TOTAL HEPTA-FURANS	1.16	--	0.048	pg/g	1.16 U
	--	GP-78-3-5		3.62	--	0.050	pg/g	J+
	--	GP-79-5-7		0.227	--	0.050	pg/g	0.227 U
	--	GP-78-10.5-11.5		0.695	--	0.046	pg/g	0.695 U
	--	GP-83-11.7-12.7		9.84	--	0.050	pg/g	J+
	--	GP-80-13-14		2.86	--	0.045	pg/g	2.86 U
	--	GP-79-11.5-12.5		0.307	--	0.050	pg/g	0.307 U
	--	GP-82-8.5-9.5		14.2	--	0.048	pg/g	J+

Lab packages reviewed: DPWG68839 and DPWG69099

Notes:

1 = Qualified U due to additional estimated maximum possible concentration

MB = Method blank

J = Estimated results detected below lowest calibration equivalent

J+ = Detected results are estimated with a high bias

pg/g = Picrograms per gram

pg/L = Picrograms per liter

RB = Rinse blank

TB = Trip blank

U = Nondetected

Table 2
Estimated Maximum Possible Concentration
May 2019 Soil Samples
Glacier Northwest
Seattle, Washington

Lab Package	Sample ID	Compound	Reported Concentration	Lab Qualifier	Report Limit	Units	ERM Qualifier
DPWG68839	RB-051719-01	1,2,3,6,7,8-HXCDD	0.626	J	0.563	pg/L	0.626 U
		1,2,3,4,7,8-HXCDF	1.96	J	0.527	pg/L	1.96 U
		2,3,7,8-TCDF	1.47	J	0.516	pg/L	1.47 U
	RB-051519-01	OCDF	0.619	J	0.611	pg/L	0.619 U
	TB-051719-01	1,2,3,4,6,7,8-HPCDF	0.562	J	0.511	pg/L	0.562 U
DPWG69099	GP-80-1.5-3.5	1,2,3,7,8-PECDF	0.449	J	0.056	pg/g	0.449 U
		1,2,3,7,8,9-HXCDF	0.097	J	0.048	pg/g	0.097 U
	GP-80-4-5.5	1,2,3,7,8-PECDD	0.071	J	0.048	pg/g	0.071 U
		1,2,3,4,7,8-HXCDD	0.074	J	0.048	pg/g	0.074 U
		1,2,3,6,7,8-HXCDD	0.148	J	0.048	pg/g	0.148 U
		2,3,4,7,8-PECDF	0.049	J	0.048	pg/g	0.049 U
		1,2,3,6,7,8-HXCDF	0.056	J	0.048	pg/g	0.056 U
		1,2,3,4,7,8,9-HPCDF	0.060	J	0.048	pg/g	0.060 U
		1,2,3,7,8-PECDD	0.268	J	0.102	pg/g	0.268 U
	GP-78-1-2.5	1,2,3,7,8-PECDF	0.232	J	0.051	pg/g	0.232 U
		2,3,4,7,8-PECDF	0.698	J	0.051	pg/g	0.698 U
		1,2,3,4,7,8-HXCDD	0.068	J	0.050	pg/g	0.068 U
	GP-78-3-5	1,2,3,6,7,8-HXCDD	0.190	J	0.050	pg/g	0.190 U
		1,2,3,7,8,9-HXCDD	0.163	J	0.050	pg/g	0.163 U
		2,3,7,8-TCDF	0.067	J	0.050	pg/g	0.067 U
		2,3,4,7,8-PECDF	0.060	J	0.050	pg/g	0.060 U
		1,2,3,4,7,8,9-HPCDF	0.229	J	0.050	pg/g	0.229 U
		1,2,3,7,8,9-HXCDF	0.061	J	0.050	pg/g	0.061 U
	GP-79-2-4	2,3,7,8-TCDD	0.111	J	0.057	pg/g	0.111 U
	DUP-051519-01	1,2,3,7,8-PECDD	0.228	J	0.070	pg/g	0.228 U
		1,2,3,7,8,9-HXCDF	0.091	J	0.091	pg/g	0.091 U

Table 2
Estimated Maximum Possible Concentration
May 2019 Soil Samples
Glacier Northwest
Seattle, Washington

Lab Package	Sample ID	Compound	Reported Concentration	Lab Qualifier	Report Limit	Units	ERM Qualifier
DPWG69099	GP-79-5-7	2,3,7,8-TCDD	0.081	J	0.050	pg/g	0.081 U
		1,2,3,7,8-PECDD	0.193	J	0.070	pg/g	0.193 U
		1,2,3,4,7,8-HXCDD	0.245	J	0.050	pg/g	0.245 U
		1,2,3,6,7,8-HXCDD	0.381	J	0.050	pg/g	0.381 U
		1,2,3,7,8,9-HXCDD	0.845	J	0.050	pg/g	0.845 U
		1,2,3,7,8-PECDF	0.100	J	0.065	pg/g	0.100 U
		1,2,3,4,7,8-HXCDF	0.065	J	0.050	pg/g	0.065 U
		2,3,7,8-TCDF	0.072	J	0.050	pg/g	0.072 U
	DUP-051519-02	2,3,7,8-TCDD	0.182	J	0.081	pg/g	0.182 U
		1,2,3,7,8,9-HXCDF	0.621	J	0.075	pg/g	0.621 U
	GP-81-5-6.5	2,3,7,8-TCDD	0.178	J	0.048	pg/g	0.178 U
	GP-82-5-7	1,2,3,7,8,9-HXCDF	17.2	J	15.7	pg/g	17.2 U
	GP-78-10.5-11.5	2,3,7,8-TCDD	0.089	J	0.046	pg/g	0.089 U
		1,2,3,7,8-PECDD	0.103	J	0.046	pg/g	0.103 U
		1,2,3,6,7,8-HXCDD	0.139	J	0.046	pg/g	0.139 U
		2,3,4,7,8-PECDF	0.076	J	0.046	pg/g	0.076 U
		1,2,3,6,7,8-HXCDF	0.057	J	0.046	pg/g	0.057 U
		1,2,3,7,8,9-HXCDD	0.230	J	0.046	pg/g	0.230 U
	GP-83-11.7-12.7	1,2,3,4,7,8-HXCDD	0.073	J	0.050	pg/g	0.073 U
		1,2,3,7,8,9-HXCDD	0.327	J	0.050	pg/g	0.327 U
		2,3,4,7,8-PECDF	0.142	J	0.050	pg/g	0.142 U
		1,2,3,7,8,9-HXCDD	0.227	J	0.050	pg/g	0.227 U

Table 2
Estimated Maximum Possible Concentration
May 2019 Soil Samples
Glacier Northwest
Seattle, Washington

Lab Package	Sample ID	Compound	Reported Concentration	Lab Qualifier	Report Limit	Units	ERM Qualifier
DPWG69099	GP-80-13-14	1,2,3,7,8-PECDD	0.055	J	0.045	pg/g	0.055 U
		1,2,3,4,7,8-HXCDD	0.084	J	0.045	pg/g	0.084 U
		2,3,4,7,8-PECDF	0.072	J	0.060	pg/g	0.072 U
	GP-79-11.5-12.5	2,3,7,8-TCDD	0.121	J	0.063	pg/g	0.121 U
		1,2,3,7,8-PECDD	0.139	J	0.063	pg/g	0.139 U
		1,2,3,4,7,8-HXCDD	0.121	J	0.050	pg/g	0.121 U
		1,2,3,7,8,9-HXCDD	0.387	J	0.050	pg/g	0.387 U
		1,2,3,7,8-PECDF	0.245	J	0.055	pg/g	0.245 U
		1,2,3,7,8,9-HXCDD	0.228	J	0.050	pg/g	0.228 U
		2,3,7,8-TCDD	0.086	J	0.062	pg/g	0.086 U
	GP-82-8.5-9.5	2,3,7,8-TCDD	0.077	J	0.048	pg/g	0.077 U
	GP-81-9-10	1,2,3,7,8,9-HXCDD	0.684	J	0.048	pg/g	0.684 U
		1,2,3,7,8,9-HXCDF	0.088	J	0.048	pg/g	0.088 U
		2,3,4,6,7,8-HXCDF	0.366	J	0.048	pg/g	0.366 U

Lab packages reviewed: DPWG68839 and DPWG69099

Notes:

J = Estimated results detected below lowest calibration equivalent

pg/g = Picograms per gram

pg/L = Picograms per liter

U = Nondetected

Table 3
Field Duplicate Results and Calculated Relative Percent Differences
May 2019 Soil Samples
Glacier Northwest
Seattle, Washington

Lab Package	Primary/Duplicate Sample ID	Compound	Concentration		Report Limit		Units	RPD
			Sample	Duplicate	Sample	Duplicate		
DPWG69099	GP-79-2-4/ DUP-051519-01	2,3,7,8-TCDD	0.097	0.111	0.050	0.057	pg/g	13
		1,2,3,7,8-PECDD	0.189	0.228	0.059	0.070	pg/g	19
		1,2,3,4,7,8-HXCDD	0.238	0.231	0.050	0.049	pg/g	3.0
		1,2,3,6,7,8-HXCDD	0.419	0.477	0.050	0.049	pg/g	13
		1,2,3,7,8,9-HXCDD	0.512	0.521	0.050	0.049	pg/g	1.7
		1,2,3,4,6,7,8-HPCDD	5.75	5.80	0.050	0.049	pg/g	0.9
		OCDD	114	116	0.137	0.049	pg/g	1.7
		2,3,7,8-TCDF	1.27	1.54	0.050	0.049	pg/g	19
		1,2,3,7,8-PECDF	0.407	0.455	0.072	0.049	pg/g	11
		2,3,4,7,8-PECDF	0.506	0.629	0.072	0.049	pg/g	22
		1,2,3,4,7,8-HXCDF	2.63	1.51	0.050	0.049	pg/g	54
		1,2,3,6,7,8-HXCDF	1.09	1.31	0.050	0.049	pg/g	18
		1,2,3,7,8,9-HXCDF	0.061	0.091	0.050	0.049	pg/g	39
		2,3,4,6,7,8-HXCDF	0.622	0.992	0.050	0.049	pg/g	46
		1,2,3,4,6,7,8-HPCDF	17.4	15.8	0.050	0.049	pg/g	9.6
		1,2,3,4,7,8,9-HPCDF	1.20	1.27	0.050	0.049	pg/g	5.7
		OCDF	14.8	26.2	0.050	0.049	pg/g	56
		1,2,3,7,8,9-HXCDD	0.357	0.383	0.050	0.049	pg/g	7.0
		2,3,7,8-TCDF	0.300	0.331	0.050	0.049	pg/g	9.8
		TOTAL TETRA-DIOXINS	2.45	2.78	0.050	0.057	pg/g	13
		TOTAL PENTA-DIOXINS	1.45	2.2	0.059	0.070	pg/g	41
		TOTAL HEXA-DIOXINS	3.35	3.21	0.050	0.049	pg/g	4.3
		TOTAL HEPTA-DIOXINS	12.0	11.4	0.050	0.049	pg/g	5.1
		TOTAL TETRA-FURANS	7.80	8.73	0.050	0.049	pg/g	11
		TOTAL PENTA-FURANS	7.56	9.54	0.072	0.049	pg/g	23
		TOTAL HEXA-FURANS	10.4	11.5	0.050	0.049	pg/g	10
		TOTAL HEPTA-FURANS	22.7	20.3	0.050	0.049	pg/g	11

Table 3
Field Duplicate Results and Calculated Relative Percent Differences
May 2019 Soil Samples
Glacier Northwest
Seattle, Washington

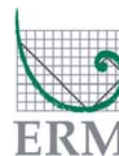
Lab Package	Primary/Duplicate Sample ID	Compound	Concentration		Report Limit		Units	RPD
			Sample	Duplicate	Sample	Duplicate		
DPWG69099	GP-81-5-6.5/ DUP-051519-02	2,3,7,8-TCDD	0.178	0.182	0.048	0.081	pg/g	2.2
		1,2,3,7,8-PECDD	1.99	1.84	0.082	0.112	pg/g	7.8
		1,2,3,4,7,8-HXCDD	14.1	18.4	0.060	0.086	pg/g	26
		1,2,3,6,7,8-HXCDD	36.9	33.8	0.060	0.086	pg/g	8.8
		1,2,3,7,8,9-HXCDD	12.5	10.5	0.060	0.086	pg/g	17
		1,2,3,4,6,7,8-HPCDD	1370	1450	0.185	0.234	pg/g	5.7
		OCDD	15700	14200	0.568	0.200	pg/g	10
		2,3,7,8-TCDF	1.37	1.24	0.148	0.073	pg/g	10
		1,2,3,7,8-PECDF	1.65	1.46	0.148	0.074	pg/g	12
		2,3,4,7,8-PECDF	7.26	5.61	0.063	0.074	pg/g	26
		1,2,3,4,7,8-HXCDF	60.9	53.4	0.063	0.075	pg/g	13
		1,2,3,6,7,8-HXCDF	10.8	10.0	0.063	0.075	pg/g	7.7
		1,2,3,7,8,9-HXCDF	0.738	0.621	0.063	0.075	pg/g	17
		2,3,4,6,7,8-HXCDF	4.54	4.07	0.107	0.075	pg/g	11
		1,2,3,4,6,7,8-HPCDF	311	312	0.107	0.148	pg/g	0.32
		1,2,3,4,7,8,9-HPCDF	51.5	46.3	0.048	0.18	pg/g	11
		OCDF	1170	1210	0.048	0.064	pg/g	3.4
		1,2,3,7,8,9-HXCDD	9.57	8.95	0.309	0.310	pg/g	6.7
		2,3,7,8-TCDF	0.570	0.518	0.102	0.078	pg/g	9.6
		TOTAL TETRA-DIOXINS	6.50	4.46	0.048	0.081	pg/g	37.2
		TOTAL PENTA-DIOXINS	16.9	17.7	0.082	0.112	pg/g	4.6
		TOTAL HEXA-DIOXINS	201	206	0.060	0.086	pg/g	2.5
		TOTAL HEPTA-DIOXINS	2020	2110	0.185	0.234	pg/g	4.4
		TOTAL TETRA-FURANS	10.1	9.44	0.048	0.073	pg/g	6.8
		TOTAL PENTA-FURANS	80.9	70.0	0.148	0.074	pg/g	14.4
		TOTAL HEXA-FURANS	408	385	0.063	0.075	pg/g	5.8
		TOTAL HEPTA-FURANS	1390	1440	0.107	0.148	pg/g	3.5

Lab packages reviewed: DPWG68839 and DPWG69099

Notes:

pg/g = Picrograms per gram

RPD = Relative percent difference

**Memo**

To	Suzanne Dolberg
From	Rachel James
Date	18 June 2019
Reference	0401356
Subject	Data Review of Glacier Northwest Soil Samples, May 2019: Analytical Resources, Incorporated Data Packages 19E0285 and 19E0339.

The data quality was assessed and any necessary qualifiers were applied following the *USEPA National Functional Guidelines for Organic Superfund Methods Data Review*, January 2017 and *USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review*, January 2017.

CHAIN-OF-CUSTODY DISCREPANCIES

The laboratory noted some issues between the chain-of-custody and the labels on sample containers. In report 19E0285, labels stated DUP and GP-83-, but the COC stated DUP-051519-01 and GP-83-3.25-4. The laboratory logged the samples in per the COC ID.

NON-PREFERRED (DUPLICATE) RESULTS

The laboratory reported two sets of Aroclor results for all samples in report 19E0285 due to method blank contamination in the original batch. The reanalysis batch results (BHF0006, analyzed on 6/5/19), were reported out of hold and are considered non-preferred. The non-preferred results were not reviewed in this validation effort and are presented in Table 1.

HOLDING TIME AND PRESERVATION EVALUATION

The samples were prepared and analyzed within the method-prescribed time period from the date of collection. The sample shipments were received at the laboratory within the method-prescribed temperature preservation requirements of less than 6°C with two exceptions. One of two coolers received for lab report 19E0285 arrived at the laboratory at a temperature of 9.1°C. It is not possible to discern which samples were in the second cooler; therefore, results for all Aroclor samples were conservatively qualified as estimates (J/UJ). Results for metals were not qualified as thermal preservation is not required. Additionally, the cooler received for lab report 19E0339 arrived at the laboratory at a temperature of 7.4°C; however, the sample was collected on the same day as receipt and qualifications were not necessary. The samples with exceeded preservation requirements are displayed in Table 2.

BLANK EVALUATION

The method and rinse blank sample results were nondetected for each of the target analytes with one exception. Aroclor 1254 was detected in a method blank sample at a concentration greater than the reporting limit. Results less than the blank concentration were qualified as non-detect (UJ) at the sample concentration due to both method blank contamination and additional column disagreement. Results within five times the blank concentration and greater than the reporting limit were qualified as estimated with a high bias (J+). The blank detections and associated data are presented in Table 3.

CONTINUING CALIBRATION VERIFICATION (CCV) EVALUATION

The continuing calibration verification (CCV) recoveries were within the laboratory's limits of acceptance, with two exceptions. CCV recoveries were outside the control limits for target analytes Aroclor 1254 or Aroclor 1260 on one column. However, since associated sample results for these compounds were reported from columns with acceptable CCV recoveries, no sample data were qualified. The CCVs that did not meet control limits are presented in Table 4.

BLANK SPIKE EVALUATION

The laboratory control sample (LCS) recoveries were within the laboratory's limits of acceptance. The LCS recoveries indicate acceptable laboratory accuracy.

MATRIX SPIKE EVALUATION

The matrix spike (MS)/matrix spike duplicate (MSD) recoveries and RPDs were within laboratory limits of acceptance with one exception. Aroclor 1016 was recovered below the control limit in the MS and MSD samples prepared from GP-82-5-7; therefore, the non-detected result in the parent sample was qualified as an estimate (UJ). Aroclor 1260 was recovered above the control limit in the MSD sample prepared from GP-82-5-7; however, the recovery was within control limits in the MS sample and qualifications were not necessary. The MS/MSD outliers and associated qualifications can be found in Table 5.

SURROGATE SPIKE EVALUATION

The surrogate recoveries were within acceptable limits with several exceptions. PCB surrogate decachlorobiphenyl was recovered above the control limits in samples GP-81-1.5-3.5 and GP-81-5-6.5. No qualifications were applied as the results were reported from the first column, which had acceptable surrogate recoveries. Aroclor surrogate decachlorobiphenyl was also recovered above the control limits on both columns for sample GP-81-9-10; however, all Aroclors were non-detected and qualifications were not necessary.

The laboratory qualified several surrogate recoveries as "NRS", meaning that the surrogate recovery was not reported due to chromatographic interference. Since the surrogate compounds experienced interference, it is assumed that target compounds reported from the same column would also be affected. All Aroclors in the affected project samples that were reported from the same column were qualified as estimates (J/UJ). MS/MSD samples were not qualified for the surrogate recoveries and were instead assessed based upon the recovery of spiked target compounds. The surrogate outliers are presented in Table 6.

COLUMN AGREEMENT

The laboratory noted that the agreement of results between the primary and confirmation columns for target compounds Aroclor 1254, Aroclor 1260, and surrogates decachlorobiphenyl and tetrachlorometaxylene exceeded 40 percent in several samples. No qualifications were applied based upon the column disagreement for surrogate compounds or for method blank, LCS, or MS/MSD samples. The Aroclor 1254 result in sample DUP-051519-02 was qualified as estimated non-detected at the sample concentration (UJ) based upon both method blank contamination and the column disagreement. The Aroclor 1254 results in samples GP-82-3-5, GP-82-5-7, and GP-83-3.25-4 were qualified as estimates with a high bias based upon both method blank contamination and the column disagreement. The samples with column agreements outside control limits are presented in Table 7.

FIELD DUPLICATE EVALUATION

Four samples were submitted in duplicate. ERM calculated the relative percent differences (RPDs) between detected results in Table 8. Target compounds were not detected in sample pair GP-79-2-4/DUP-051519-01; therefore RPDs are not displayed in Table 8. The USEPA has not established control criteria for field duplicate samples; therefore, sample data are not qualified on the basis of field duplicate imprecision.

OVERALL ASSESSMENT

None of the data required rejection. All of the data, including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation is acceptable for the preparation of technically defensible documents.

Table 1
Samples with Non-Preferred Results
May 2019 Soil Samples
Glacier Northwest
Seattle, Washington

Lab Package	Sample ID	Method	Analysis Date/Time	Compound	Result	Units
19E0285	GP-77-2.75-4.75	8082A	Batch BHF0006 Analyzed 6/5/19	All	Varies	µg/kg
	GP-77-5-7					
	GP-79-2-4					
	GP-79-5-7					
	DUP-051519-01					
	GP-81-1.5-3.5					
	GP-81-5-6.5					
	DUP-051519-02					
	GP-82-3-5					
	GP-82-5-7					
	GP-77-10.5-11.5					
	GP-83-3.25-4					
	GP-83-4-6					
	GP-83-11.7-12.7					
	GP-79-11.5-12.5					
	GP-82-8.5-9.5					

Lab packages reviewed: 19E0285 and 19E0339

Notes:

µg/kg = Micrograms per kilogram

Table 2
Samples with Exceeded Preservation Requirements
May 2019 Soil Samples
Glacier Northwest
Seattle, Washington

Lab Package	Sample ID	Method	Preservation Condition	Limits	ERM Qualifier
19E0285	GP-77-2.75-4.75	8082A	Cooler temp = 9.1°C	0 - 6°C	J/UJ
	GP-77-5-7				
	GP-79-2-4				
	GP-79-5-7				
	DUP-051519-01				
	GP-81-1.5-3.5				
	GP-81-5-6.5				
	DUP-051519-02				
	GP-82-3-5				
	GP-82-5-7				
	GP-77-10.5-11.5				
	GP-83-3.25-4				
	GP-83-4-6				
	GP-83-11.7-12.7				
	GP-79-11.5-12.5				
	GP-82-8.5-9.5				
	RB-051719-01				
	RB-051519-01				
19E0339	GP-81-9-10	8082A	Cooler temp = 7.4°C	0 - 6°C	--

Lab packages reviewed: 19E0285 and 19E0339

Notes:

°C = *Degrees Celsius*

J/UJ = *Detected results are estimated; nondetected results are estimated at the report limit*

Table 3
Blank and Associated Suspect Sample Detections
May 2019 Soil Samples
Glacier Northwest
Seattle, Washington

Lab Package	Blank ID	Associated Sample	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
19E0285	MB BHE0649-BLK1	See below	Aroclor 1254	7.6	4.0	µg/kg	--
	--	GP-81-1.5-3.5		32.3	4.0	µg/kg	J+
	--	GP-81-5-6.5		8.2	4.0	µg/kg	J+
	--	DUP-051519-02		7.1	4.0	µg/kg	7.1 UJ ¹
	--	GP-82-3-5		28.6	4.0	µg/kg	J+
	--	GP-82-5-7		18.7	4.0	µg/kg	J+
	--	GP-83-3.25-4		15.9	4.0	µg/kg	J+
	--	GP-83-4-6		24.9	4.0	µg/kg	J+

Lab packages reviewed: 19E0285 and 19E0339

Notes:

1 = Qualified UJ based upon additional column disagreement

MB = Method blank

J+ = Detected results are estimated with a high bias

UJ = Nondetected, estimated report limit

µg/kg = Micrograms per kilogram

Table 4
Calibration Verification Recoveries Outside of Acceptable Limits
May 2019 Soil Samples
Glacier Northwest
Seattle, Washington

Lab Package	CCV Sample ID	Compound	CCV Recovery (%)	CCV Limits (%)	Associated Sample	Reported Concentration	Units	ERM Qualifier
19E0285	Batch CCV (column zb-35)	Aroclor 1254	Low	NR	--	--	--	--
19E0339	Batch CCV2 (column zb-5)	Aroclor 1260	High	NR	--	--	--	--

Lab packages reviewed: 19E0285 and 19E0339

Notes:

CCV = Continuing calibration verification

High = Recovery above maximum acceptable limit

Low = Recovery below minimum acceptable limit

Table 5
Spike Recoveries Outside of Acceptable Limits
May 2019 Soil Samples
Glacier Northwest
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Result	Units	ERM Qualifier
MS/MSD										
19E0285	GP-82-5-7 MS/MSD	GP-82-5-7	Aroclor 1016	53.6/52.1	56-120	2.70	30	ND	µg/kg	UJ
			Aroclor 1260	58.5/130	58-120	68.4	30	--	--	--

Lab packages reviewed: 19E0285 and 19E0339

Notes:

MS/MSD - Matrix spike/matrix spike duplicate

ND = Not detected

RPD = Relative percent difference

µg/kg = Micrograms per kilogram

UJ = Nondetected, estimated report limit

Table 6
Surrogate Recovery Results out of Acceptable Limits
May 2019 Soil Samples
Glacier Northwest
Seattle, Washington

Lab Package	Sample ID	Method	Surrogate	Recovery (%)	Limit (%)	Affected Compound	Dilution Factor	ERM Qualifier
19E0285	GP-81-1.5-3.5	8082A	Decachlorobiphenyl (second column)	218	40-126	--	1	--
	GP-81-5-6.5			139				
	DUP-051519-02	8082A	Decachlorobiphenyl (second column)	NRS	40-126	--	1	--
	GP-82-3-5	8082A	Decachlorobiphenyl (both columns)	NRS	40-126	All	1	J/UJ
	GP-82-5-7	8082A	Decachlorobiphenyl (both columns)	NRS	40-126	All	1	J/UJ
	GP-83-3.25-4	8082A	Decachlorobiphenyl (second column)	NRS	40-126	--	1	--
	GP-83-4-6	8082A	Decachlorobiphenyl (both columns)	NRS	40-126	All	1	J/UJ
	GP-82-5-7 MS/MSD	8082A	Decachlorobiphenyl (both columns)	NRS	40-126	--	1	--
19E0339	GP-81-9-10	8082A	Decachlorobiphenyl (both columns)	143/129	40-126	--	1	--

Lab packages reviewed: 19E0285 and 19E0339

Notes:

MS/MSD = Matrix spike/matrix spike duplicate

NRS = Surrogate not reported

J/UJ = Detected results are estimated; nondetected results are estimated at the report limit

Table 7
Column Agreement
May 2019 Soil Samples
Glacier Northwest
Seattle, Washington

Lab Package	Sample ID	Method	Compound	Result	Units	ERM Qualifier
19E0285	GP-81-1.5-3.5	8082A	Decachlorobiphenyl (surrogate)	95.3	%	--
	DUP-051519-02	8082A	Aroclor 1254	7.1	µg/kg	7.1 UJ ¹
	GP-82-3-5	8082A	Aroclor 1254	28.6	µg/kg	J+ ²
	GP-82-5-7	8082A	Aroclor 1254	18.7	µg/kg	J+ ²
	GP-83-3.25-4	8082A	Aroclor 1254	15.9	µg/kg	J+ ²
	MB BHE0649-BLK1	8082A	Decachlorobiphenyl (surrogate)	76.2	%	--
	LCS BHE0649-BS1	8082A	Tetrachlorometaxylene (surrogate)	78.8	%	--
	GP-82-5-7 MSD	8082A	Aroclor 1260	142	µg/kg	--
19E0339	MB HE0788-BLK1	8082A	Tetrachlorometaxylene (surrogate)	96.5	%	--

Lab packages reviewed: 19E0285 and 19E0339

Notes:

1 = Qualified UJ based upon additional method blank contamination

2 = Qualified J+ based upon additional method blank contamination

J+ = Detected results are estimated with a high bias

LCS = Laboratory control sample

MB = Method blank

MSD = Matrix spike duplicate

µg/kg = Micrograms per kilogram

UJ = Nondetected, estimated report limit

Table 8
Field Duplicate Results and Calculated Relative Percent Differences
May 2019 Soil Samples
Glacier Northwest
Seattle, Washington

Lab Package	Primary/Duplicate Sample ID	Compound	Concentration		Report Limit		Units	RPD
			Sample	Duplicate	Sample	Duplicate		
19E0285	GP-76-4.25-6.25/ DUP-051419-01	Arsenic	1.55	2.53	0.23	0.24	mg/kg	48
	GP-81-5-6.5/ DUP-051519-02	Aroclor 1254	8.2	7.1	4.0	4.0	µg/kg	14
		Aroclor 1260	9.2	7.9	4.0	4.0	µg/kg	15
	GP-78-10.5-11.5/ DUP-051719-01	Arsenic	5.61	5.57	0.30	0.28	mg/kg	0.72

Lab packages reviewed: 19E0285 and 19E0339

Notes:

mg/kg = Milligrams per kilogram

RPD = Relative percent difference

µg/kg = Micrograms per kilogram

Memorandum

Environmental Resources Management

To: Mike Mendes

From: Irene Lavigne

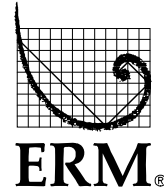
Date: 14 December 2012
09 January 2013, revised to include additional lab report

Subject: Data Review of Reichhold-Glacier Storm Water & Storm Water Solids Samples Collected August – October 2012

Project Number: 0155129

Data Packages: Analytical Resources Incorporated Data Packages VI13, VO46, and VQ27
Axy's Analytical Services Data Packages DPWG41412, DPWG41596, DPWG41862, and DPWG42297

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The data quality was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999, *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004, and the *EPA Region 10 SOP for the Validation of Polychlorinated Dibenzodioxin (PCDD) and Polychlorinated Dibenzofuran (PCDF) Data*, January 1996.

HOLDING TIME AND PRESERVATION EVALUATION

The sample shipments were received at the laboratory within the method-prescribed preservation requirements. No sample data were qualified based on the sample preservation evaluation.

The samples were prepared and analyzed within the method-prescribed time period from the date of collection with two exceptions. One analyses each for mercury and total organic carbon were performed outside of the 28-day holding time for these analyses. The detected sample results were qualified as estimated and biased low (J-) , as shown in Table 1.

BLANK EVALUATION

The method blank, trip blank, field blank, and rinsate blank sample results were nondetected for each of the target analytes with several exceptions. Detections of various semivolatile, volatile, and dioxin/furan compounds resulted in qualification of associated samples as nondetected (U). Not all blank detections resulted in qualification of associated data. Data were not qualified if the samples were nondetected for the associated compounds, if the sample results exceeded the five times the blank concentrations of organic compounds or 10 times the blank concentrations of inorganic compounds, or if the blank results were identified as estimated maximum possible concentrations for dioxin/furan analyses. The blank detections and associated, qualified data are listed in Table 2.

BLANK SPIKE EVALUATION

The laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) recoveries were within the laboratory's limits of acceptance with one exception. No sample data were qualified on the basis of the LCS outlier because only one recovery in the LCS/LCSD pair exceeded the acceptable control limits. The outlying LCS recovery is shown in Table 3.

MATRIX SPIKE EVALUATION

The matrix spike (MS) and matrix spike duplicate (MSD) recoveries were within the laboratory's limits of acceptance with several exceptions. No sample data were qualified based on the MS outliers. Data were not qualified if only the relative percent difference (RPD) exceeded control limits, if only one recovery in a MS/MSD pair exceeded control limits, or if the concentration of the unspiked samples was greater than four times the amount spiked. Additionally, if the spike sample was diluted by a factor of 10 time or more, the surrogate compounds did not provide useful recovery information, and did not result in qualified data. The outlying MS recoveries and qualified sample data are listed in Table 4.

LABELED COMPOUND EVALUATION

Carbon-13 labeled isotope recoveries were reported for each sample submitted for dioxin/furan analysis. The recoveries of labeled PCDD and PCDF compounds is a measure of the effectiveness of the laboratory and method to extract the compounds of interest. One sample had a recovery of ¹³C-octachlorodibenzo-p-dioxin that exceeded the maximum acceptable limits. No qualifiers were applied to the corresponding compound because the sample had been diluted by a factor of 20, resulting in dilution of the carbon-13 compound to a point where the recovery did not provide useful information. The outlying isotope recovery is shown in Table 5.

SURROGATE EVALUATION

The surrogate recoveries were within acceptable limits, and no sample data required qualification as a result of the surrogate evaluation. The surrogate recoveries indicate minimal matrix interference in the samples.

ESTIMATED MAXIMUM POSSIBLE CONCENTRATION

The laboratory identified several dioxin results as estimated maximum possible concentration (EMPC). An EMPC value is the maximum possible concentration of a compound that could be present in the sample. This classification is used when all of the identification criteria for a given dioxin or furan compound are not met. The sample data identified as EMPC by the laboratory were qualified as nondetected (U), as shown in Table 6.

FIELD DUPLICATE EVALUATION

Two samples were collected and analyzed in duplicate. ERM calculated the RPD between detected results. The USEPA has not established control criteria for field duplicate samples; therefore, sample data are not qualified on the basis of field duplicate imprecision. Detected duplicate results and calculated RPDs are presented in Table 7.

CONTINUING CALIBRATION EVALUATION

The laboratory noted that two continuing calibration verification (CCV) recoveries for a number of compound did not meet acceptable control limits. Detected and nondetected sample results associated with low CCV recoveries were qualified as estimated and biased low (J-) or estimated (UJ), respectively. Detected sample data associated with high CCV recoveries were qualified as estimated and biased high (J+). The CCV outliers and associated, qualified data are shown in Table 8. A number of the CCV outliers were associated with compounds that were not constituents of concern; these compounds are not included in Table 8. Not all CCV outliers resulted in qualified data. Data were not qualified if the CCV recoveries were biased high and the associated samples were nondetected for the corresponding compounds.

CALIBRATION RANGE EVALUATION

The laboratory noted four instances where the results of undiluted samples exceeded the calibration range of the equipment. Two of the affected samples were diluted and reanalyzed. The sample data resulting from the reanalyses were within the calibration range and should be used for decision-making purposes. The sample results which exceeded the calibration range were qualified as estimated (J), and are listed in Table 9.

OVERALL ASSESSMENT

No data were determined to be unusable. All of the data, including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents.

Table 1
Samples with Exceeded Holding Times
Storm Water and Storm Water Solids Collected August -October 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Method	Holding Time (days)	Days Exceeded	Sample Result	ERM Qualifier
VO46	SWD-02	Mercury; Method 7471A	28	22	0.02	J-
VO46	SWD-02	TOC; Method 9060M	28	21	3.46	J-

Data packages reviewed: ARI VI13, VO46, VQ27; Axys DPWG41412, DPWG41596, DPWG41862, DPWG42297

Key:

TOC = Total organic carbon

J- = Detected sample result qualified as estimated and biased low

Table 2
Blank and Associated Suspect Sample Detections
Storm Water and Storm Water Solids Collected August -October 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
VI13	MB-091112	SVOC	NA	bis(2-Ethylhexyl) phthalate	44	25	µg/kg	--
VI13	MB-091112	SVOC-SIM	See below	Diethylphthalate	6.7	5.0	µg/kg	--
VI13	MB-091112	SVOC-SIM	TANK-01	Diethylphthalate	27	4.6	µg/kg	27 U
VI13	MB-091112	SVOC-SIM	DUP090412	Diethylphthalate	27	4.6	µg/kg	27 U
VI13	MB-091812	Total metals	NA	Zinc	1	1.0	mg/kg	--
VO46	MB-102312	SVOC	See below	bis(2-Ethylhexyl) phthalate	20	25	µg/kg	--
VO46	MB-102312	SVOC	SWD-02	bis(2-Ethylhexyl) phthalate	34	23	µg/kg	34 U
VO46	MB-102312	SVOC-SIM	NA	Diethylphthalate	4.9	5.0	µg/kg	--
VQ27	MB-110512A	VOC	See below	Acetone	4.9	5.0	µg/L	--
VQ27	MB-110512A	VOC	STW-01-103012	Acetone	7.4	5.0	µg/L	7.4 U
VQ27	MB-110512A	VOC	DUP103012-1	Acetone	6.7	5.0	µg/L	6.7 U
VQ27	MB-110512A	VOC	NA	Hexachlorobutadiene	0.32	0.50	µg/L	--
VQ27	MB-110512A	VOC	NA	n-Butylbenzene	0.13	0.20	µg/L	--
VQ27	MB-110912	Total metals	NA	Copper	0.8	0.5	µg/L	--
DPWG41412	RB090412	PCDD/PCDF	NA	1,2,3,4,7,8-HXCDD	0.649	0.520	pg/L	EMPC
DPWG41412	RB090412	PCDD/PCDF	NA	1,2,3,6,7,8-HXCDD	0.539	0.520	pg/L	EMPC
DPWG41412	RB090412	PCDD/PCDF	NA	1,2,3,7,8,9-HXCDD	0.802	0.520	pg/L	EMPC
DPWG41412	RB090412	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDD	3.43	0.547	pg/L	--
DPWG41412	RB090412	PCDD/PCDF	NA	OCDD	22.5	0.520	pg/L	--
DPWG41412	RB090412	PCDD/PCDF	See below	2,3,4,7,8-PECDF	0.659	0.520	pg/L	--

Table 2
Blank and Associated Suspect Sample Detections
Storm Water and Storm Water Solids Collected August -October 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG41412	RB090412	PCDD/PCDF	TANK-01	2,3,4,7,8-PECDF	2.62	0.050	pg/g	2.62 U
DPWG41412	RB090412	PCDD/PCDF	DUP090412	2,3,4,7,8-PECDF	2.96	0.050	pg/g	2.96 U
DPWG41412	RB090412	PCDD/PCDF	NA	1,2,3,4,7,8-HXCDF	0.610	0.520	pg/L	EMPC
DPWG41412	RB090412	PCDD/PCDF	NA	1,2,3,6,7,8-HXCDF	0.741	0.520	pg/L	--
DPWG41412	RB090412	PCDD/PCDF	See below	2,3,4,6,7,8-HXCDF	0.929	0.520	pg/L	--
DPWG41412	RB090412	PCDD/PCDF	TANK-01	2,3,4,6,7,8-HXCDF	2.13	0.086	pg/g	2.13 U
DPWG41412	RB090412	PCDD/PCDF	DUP090412	2,3,4,6,7,8-HXCDF	2.31	0.135	pg/g	2.31 U
DPWG41412	RB090412	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDF	0.904	0.520	pg/L	EMPC
DPWG41412	RB090412	PCDD/PCDF	NA	1,2,3,4,7,8,9-HPCDF	1.04	0.520	pg/L	EMPC
DPWG41412	RB090412	PCDD/PCDF	NA	OCDF	3.85	0.520	pg/L	--
DPWG41412	RB090412	PCDD/PCDF	NA	TOTAL HEPTA-DIOXINS	4.81	0.547	pg/L	--
DPWG41412	Lab Blank	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDD	0.857	0.500	pg/L	--
DPWG41412	Lab Blank	PCDD/PCDF	NA	OCDD	2.49	0.500	pg/L	EMPC
DPWG41412	Lab Blank	PCDD/PCDF	NA	1,2,3,4,7,8,9-HPCDF	0.607	0.500	pg/L	--
DPWG41412	Lab Blank	PCDD/PCDF	NA	OCDF	0.921	0.500	pg/L	EMPC
DPWG41412	Lab Blank	PCDD/PCDF	NA	TOTAL HEPTA-DIOXINS	0.857	0.500	pg/L	--
DPWG41412	Lab Blank	PCDD/PCDF	NA	TOTAL HEPTA-FURANS	0.607	0.500	pg/L	--
DPWG41862	Lab Blank	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDD	0.083	0.050	pg/g	EMPC
DPWG41862	Lab Blank	PCDD/PCDF	NA	OCDD	0.828	0.050	pg/g	--
DPWG41862	Lab Blank	PCDD/PCDF	NA	OCDF	0.079	0.050	pg/g	EMPC
DPWG42297	Lab Blank	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDD	0.548	0.500	pg/L	EMPC
DPWG42297	Lab Blank	PCDD/PCDF	NA	OCDD	21.7	0.500	pg/L	--

Table 2
Blank and Associated Suspect Sample Detections
Storm Water and Storm Water Solids Collected August -October 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG42297	Lab Blank	PCDD/PCDF	NA	OCDF	0.695	0.500	pg/L	EMPC

Data packages reviewed: ARI VI13, VO46, VQ27; Axy DPWG41412, DPWG41596, DPWG41862, DPWG42297

Key:

MB = Method blank

RB = Rinsate blank

SVOC = Semivolatile organic compounds; Method 8270D

SVOC-SIM = Semivolatile organic compounds - selected ion monitoring

VOC = Volatile organic compounds; Method 8260C

NA = Not applicable; qualification of sample data not required

U = Nondetected

PCDD/PCDF = Polychlorinated dibenzo-p-dioxins/Polychlorinated dibenzofurans; Method 1613B

pg/L = Picograms per liter

pg/g = Picograms per gram

EMPC = Blank result identified as Estimated Maximum Possible Concentration; qualification of sample data not required

µg/kg = Micrograms per kilogram

mg/kg = milligrams per kilogram

µg/L = Micrograms per liter

HXCDD = Hexachlorodibenzo-p-dioxin

HPCDD = Heptachlorodibenzo-p-dioxin

OCDD = Octochlorodibenzo-p-dioxin

PECDF = Pentachlorodibenzofuran

HXCDF = Hexachlorodibenzofuran

HPCDF = Heptachlorodibenzofuran

OCDF = Octochlorodibenzofuran

Table 3
Laboratory Control Spike Recoveries Outside of Acceptable Limits
Storm Water and Storm Water Solids Collected August -October 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Analysis	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
VQ27	LCS-110512A	NA	VOC	Acrolein	113/133	60-124	16.4	40	--	--

Data packages reviewed: ARI VI13, VO46, VQ27; Axys DPWG41412, DPWG41596, DPWG41862, DPWG42297

Key:

LCS = Laboratory control sample

NA = Not applicable; qualification of sample data not required

VOC = Volatile organic compounds; Method 8260C

Table 4
Matrix Spike Recoveries Outside of Acceptable Limits
Storm Water and Storm Water Solids Collected August -October 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
VI13	SWD-01 MS/MSD	SVOC	NA	Phenol	NC/NC	30-160	8.8	30	4X	--
VI13	SWD-01 MS/MSD	SVOC	NA	Benzyl alcohol	NC/NC	30-160	10.2	30	4X	--
VI13	SWD-01 MS/MSD	SVOC	NA	Benzoic acid	NC/NC	30-160	16	30	4X	--
VI13	SWD-01 MS/MSD	SVOC	NA	N-Nitrosodiphenylamine	NC/NC	30-160	NC	30	--	--
VI13	SWD-01 MS/MSD	SVOC-SIM	NA	N-Nitrosodiphenylamine	2.2/3.4	30-160	45.4	30	--	--
VI13	SWD-01 MS/MSD	SVOC-SIM	NA	Benzyl alcohol	NC/NC	30-160	13.2	30	--	--
VQ27	STW-01-103012 MS/MSD	VOC	NA	Styrene	123/120	80-120	2.5	30	--	--
DPWG41596	GP-55_2.5-4 MS/MSD	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDD	1000	70-130	NC	20	SDO	--
DPWG41596	GP-55_2.5-4 MS/MSD	PCDD/PCDF	NA	OCDD	81400	70-130	NC	20	SDO	--
DPWG41596	GP-55_2.5-4 MS/MSD	PCDD/PCDF	NA	2,3,7,8-TCDF	112/83.0	70-130	29.6	20	--	--
DPWG41596	GP-55_2.5-4 MS/MSD	PCDD/PCDF	NA	2,3,4,7,8-PECDF	134/99.3	70-130	29.7	20	--	--
DPWG41596	GP-55_2.5-4 MS/MSD	PCDD/PCDF	NA	1,2,3,4,7,8-HXCDF	185/96.1	70-130	63.0	20	--	--
DPWG41596	GP-55_2.5-4 MS/MSD	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDF	261	70-130	NC	20	SDO	--
DPWG41596	GP-55_2.5-4 MS/MSD	PCDD/PCDF	NA	1,2,3,4,7,8,9-HPCDF	130	70-130	52.3	20	SDO	--
DPWG41596	GP-55_2.5-4 MS/MSD	PCDD/PCDF	NA	OCDF	1510	70-130	NC	20	SDO	--
DPWG41596	SWD-01 MS/MSD	PCDD/PCDF	NA	1,2,3,7,8,9-HXCDD	85.3/115	70-130	29.3	20	--	--
DPWG41596	SWD-01 MS/MSD	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDD	723/552	70-130	26.8	20	SDO	--
DPWG41596	SWD-01 MS/MSD	PCDD/PCDF	NA	OCDD	4520/11600	70-130	87.5	20	SDO	--
DPWG41596	SWD-01 MS/MSD	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDF	189/97.4	70-130	64.0	20	--	--

Table 4
Matrix Spike Recoveries Outside of Acceptable Limits
Storm Water and Storm Water Solids Collected August -October 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
DPWG41596	SWD-01 MS/MSD	PCDD/PCDF	NA	OCDF	292/234	70-130	21.8	20	SDO	--

Data packages reviewed: ARI VI13, VO46, VQ27; Axys DPWG41412, DPWG41596, DPWG41862, DPWG42297

Key:

MS/MSD = Matrix spike/matrix spike duplicate

RPD = Relative percent difference

NA = Not applicable; qualification of sample data not required

SVOC = Semivolatile organic compounds; Method 8270D

SVOC-SIM = Semivolatile organic compounds - selected ion monitoring

VOC = Volatile organic compounds; Method 8260C

PCDD/PCDF = Polychlorinated dibenzo-p-dioxins/Polychlorinated dibenzofurans; Method 1613B

SDO = Spike sample diluted by a factor of 20; recovery does not provide useful information

4X = Concentration of unspiked sample was greater than 4 times the amount spiked; no qualification required

TCDF = Tetrachlorodibenzofuran

HXCDF = Hexachlorodibenzofuran

OCDF = Octochlorodibenzofuran

HPCDD = Heptachlorodibenzo-p-dioxin

OCDD = Octochlorodibenzo-p-dioxin

HPCDF = Heptachlorodibenzofuran

Table 5
Labeled Compound Recovery Results Outside of Acceptable Limits
Storm Water and Storm Water Solids Collected August -October 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Labeled Compound	Associated Compound	Recovery (%)	Limit (%)	Note	ERM Qualifier
DPWG41596	GP-55_2.5-4	13C-OCDD	OCDD	149	25-130	SDO	--

Data packages reviewed: ARI VI13, VO46, VQ27; Axys DPWG41412, DPWG41596, DPWG41862, DPWG42297

Key:

13C = Carbon-13 labeled isotope

OCDD = Octachlorodibenzo-p-dioxin

SDO = Spike sample diluted by a factor of 20; recovery does not provide useful information

Table 6
Estimated Maximum Possible Concentration
Storm Water and Storm Water Solids Collected August -October 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG41412	RB090412	1,2,3,4,7,8-HXCDD	0.649	0.520	pg/L	0.649 U
DPWG41412	RB090412	1,2,3,6,7,8-HXCDD	0.539	0.520	pg/L	0.539 U
DPWG41412	RB090412	1,2,3,7,8,9-HXCDD	0.802	0.520	pg/L	0.802 U
DPWG41412	RB090412	1,2,3,4,7,8-HXCDF	0.610	0.520	pg/L	0.610 U
DPWG41412	RB090412	1,2,3,4,6,7,8-HPCDF	0.904	0.520	pg/L	0.904 U
DPWG41412	RB090412	1,2,3,4,7,8,9-HPCDF	1.04	0.520	pg/L	1.04 U
DPWG41412	Lab Blank	OCDD	2.49	0.500	pg/L	2.49 U
DPWG41412	Lab Blank	OCDF	0.921	0.500	pg/L	0.921 U
DPWG41596	DUP090412	2,3,7,8-TCDD	0.240	0.050	pg/g	0.240 U
DPWG41862	Lab Blank	1,2,3,4,6,7,8-HPCDD	0.083	0.050	pg/g	0.083 U
DPWG41862	Lab Blank	OCDF	0.079	0.050	pg/g	0.079 U
DPWG42297	STW-01-103012	2,3,7,8-TCDD	0.613	0.541	pg/L	0.613 U
DPWG42297	STW-01-103012	2,3,7,8-TCDF	0.571	0.541	pg/L	0.571 U
DPWG42297	DUP103012	2,3,7,8-TCDD	0.650	0.535	pg/L	0.650 U
DPWG42297	Lab Blank	1,2,3,4,6,7,8-HPCDD	0.548	0.500	pg/L	0.548 U
DPWG42297	Lab Blank	OCDF	0.695	0.500	pg/L	0.695 U

Data packages reviewed: ARI VI13, VO46, VQ27; Axys DPWG41412, DPWG41596, DPWG41862, DPWG42297

Key:

TCDD = Tetrachlorodibenzo-p-dioxin

pg/g = Picograms per gram

pg/L = Picograms per liter

U = Nondetected

Table 7
Field Duplicate Results and Calculated Relative Percent Differences
Storm Water and Storm Water Solids Collected August -October 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
VI13	TANK-01/DUP090412	SVOC	Benzyl alcohol	38	35	18	µg/kg	8.2
VI13	TANK-01/DUP090412	SVOC	Phenanthrene	33	32	18	µg/kg	3.1
VI13	TANK-01/DUP090412	SVOC	Di-n-butylphthalate	11	12	18	µg/kg	8.7
VI13	TANK-01/DUP090412	SVOC	Fluoranthene	26	28	18	µg/kg	7.4
VI13	TANK-01/DUP090412	SVOC	Pyrene	34	36	18	µg/kg	5.7
VI13	TANK-01/DUP090412	SVOC	bis(2-Ethylhexyl)phthalate	290	280	23	µg/kg	3.5
VI13	TANK-01/DUP090412	SVOC	Chrysene	26	28	18	µg/kg	7.4
VI13	TANK-01/DUP090412	SVOC	Benzo(a)pyrene	10	13	18	µg/kg	26
VI13	TANK-01/DUP090412	SVOC	Indeno(1,2,3-cd)pyrene	12	12	18	µg/kg	0
VI13	TANK-01/DUP090412	SVOC	Benzo(g,h,i)perylene	26	28	18	µg/kg	7.4
VI13	TANK-01/DUP090412	SVOC	Total Benzofluoranthenes	41	44	36	µg/kg	7.1
VI13	TANK-01/DUP090412	SVOC-SIM	Dibenz(a,h)anthracene	3.2	3.4	4.6	µg/kg	6.1
VI13	TANK-01/DUP090412	SVOC-SIM	Diethylphthalate	27	27	4.6	µg/kg	0
VI13	TANK-01/DUP090412	SVOC-SIM	Butylbenzylphthalate	21	23	4.6	µg/kg	9.1
VI13	TANK-01/DUP090412	SVOC-SIM	N-Nitrosodiphenylamine	2.6	2.6	18	µg/kg	0
VI13	TANK-01/DUP090412	SVOC-SIM	Benzyl alcohol	35	24	18	µg/kg	37
VI13	TANK-01/DUP090412	PCB	Aroclor 1254	3.0	3.3	3.8/3.9	µg/kg	10
VI13	TANK-01/DUP090412	Total metals	Arsenic	13.1	12.5	0.2	mg/kg	4.7
VI13	TANK-01/DUP090412	Total metals	Cadmium	28.9	29.7	0.09/0.1	mg/kg	2.7
VI13	TANK-01/DUP090412	Total metals	Chromium	33	33	2/3	mg/kg	0
VI13	TANK-01/DUP090412	Total metals	Copper	181	180	1	mg/kg	0.6
VI13	TANK-01/DUP090412	Total metals	Lead	39.0	37.4	0.09/0.1	mg/kg	4.2
VI13	TANK-01/DUP090412	Total metals	Mercury	0.04	0.04	0.02	mg/kg	0
VI13	TANK-01/DUP090412	Total metals	Zinc	590	568	5	mg/kg	3.8
VI13	TANK-01/DUP090412	Solids	Total solids	97.60	97.70	0.01	%	0.1
VI13	TANK-01/DUP090412	TOC	TOC	1.73	1.39	0.020	%	22
VQ27	STW-01-103012/DUP103012-1	VOC	Acetone	7.4	6.7	5.0	µg/L	10
VQ27	STW-01-103012/DUP103012-1	TPH-d	Motor oil	0.11	0.11	0.20	mg/L	0

Table 7
Field Duplicate Results and Calculated Relative Percent Differences
Storm Water and Storm Water Solids Collected August -October 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
VQ27	STW-01-103012/DUP103012-1	Total metals	Antimony	0.6	0.6	0.2	µg/L	0
VQ27	STW-01-103012/DUP103012-1	Total metals	Arsenic	2.9	3.0	0.2	µg/L	3.4
VQ27	STW-01-103012/DUP103012-1	Total metals	Chromium	1.6	1.7	0.5	µg/L	6.1
VQ27	STW-01-103012/DUP103012-1	Total metals	Copper	18.7	20.6	0.5	µg/L	9.7
VQ27	STW-01-103012/DUP103012-1	Total metals	Lead	1.4	1.6	0.1	µg/L	13
VQ27	STW-01-103012/DUP103012-1	Total metals	Nickel	1.7	1.8	0.5	µg/L	5.7
VQ27	STW-01-103012/DUP103012-1	Total metals	Zinc	20	22	4	µg/L	9.5
VQ27	STW-01-103012/DUP103012-1	Dissolved metals	Antimony	0.5	0.5	0.2	µg/L	0
VQ27	STW-01-103012/DUP103012-1	Dissolved metals	Arsenic	2.3	2.3	0.2	µg/L	0
VQ27	STW-01-103012/DUP103012-1	Dissolved metals	Chromium	1.0	1.0	0.5	µg/L	0
VQ27	STW-01-103012/DUP103012-1	Dissolved metals	Copper	7.2	7.6	0.5	µg/L	5.4
VQ27	STW-01-103012/DUP103012-1	Dissolved metals	Nickel	0.8	0.8	0.5	µg/L	0
VQ27	STW-01-103012/DUP103012-1	Dissolved metals	Zinc	6	8	4	µg/L	29
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	2,3,7,8-TCDD	0.259	0.240	0.050	pg/g	7.6
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	1,2,3,7,8-PECDD	1.89	1.76	0.092/0.055	pg/g	7.1
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	1,2,3,4,7,8-HXCDD	4.31	3.89	0.094/0.079	pg/g	10
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	1,2,3,6,7,8-HXCDD	12.7	13.1	0.094/0.079	pg/g	3.1
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	1,2,3,7,8,9-HXCDD	11.4	11.4	0.094/0.079	pg/g	0
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	1,2,3,4,6,7,8-HPCDD	380	392	0.260/0.397	pg/g	3.1
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	2,3,7,8-TCDF	1.08	1.08	0.050	pg/g	0
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	1,2,3,7,8-PECDF	0.925	0.941	0.050	pg/g	1.7
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	2,3,4,7,8-PECDF	2.62	2.96	0.050	pg/g	12
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	1,2,3,4,7,8-HXCDF	22.6	25.2	0.086/0.135	pg/g	11
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	1,2,3,6,7,8-HXCDF	4.55	4.91	0.086/0.135	pg/g	7.6
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	1,2,3,7,8,9-HXCDF	0.265	0.338	0.086/0.135	pg/g	24
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	2,3,4,6,7,8-HXCDF	2.13	2.31	0.086/0.135	pg/g	8.1
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	1,2,3,4,6,7,8-HPCDF	77.0	91.6	0.175/0.170	pg/g	17
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	1,2,3,4,7,8,9-HPCDF	12.7	14.8	0.175/0.170	pg/g	15

Table 7
Field Duplicate Results and Calculated Relative Percent Differences
Storm Water and Storm Water Solids Collected August -October 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	OCDF	195	251	0.060/0.067	pg/g	25
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	TOTAL TETRA-DIOXINS	3.93	3.77	0.050	pg/g	4.2
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	TOTAL PENTA-DIOXINS	15.1	14.2	0.092/0.055	pg/g	6.1
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	TOTAL HEXA-DIOXINS	88.1	91.7	0.094/0.079	pg/g	4.0
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	TOTAL HEPTA-DIOXINS	744	777	0.260/0.397	pg/g	4.3
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	TOTAL TETRA-FURANS	8.64	9.61	0.050	pg/g	11
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	TOTAL PENTA-FURANS	31.1	40.4	0.050	pg/g	26
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	TOTAL HEXA-FURANS	145	168	0.086/0.135	pg/g	15
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	TOTAL HEPTA-FURANS	269	332	0.175/0.170	pg/g	21
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	OCDD	11700	15600	0.255/0.363	pg/g	29
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	2,3,7,8-TCDF	0.408	0.495	0.050/0.092	pg/g	19
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	2,3,7,8-TCDD	0.613	0.650	0.541/0.535	pg/L	5.9
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	1,2,3,7,8-PECDD	0.887	0.706	0.541/0.535	pg/L	23
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	1,2,3,4,7,8-HXCDD	1.88	1.28	0.541/0.535	pg/L	38
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	1,2,3,6,7,8-HXCDD	5.48	4.33	0.541/0.535	pg/L	23
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	1,2,3,7,8,9-HXCDD	4.67	3.06	0.541/0.535	pg/L	42
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	1,2,3,4,6,7,8-HPCDD	149	115	0.705/0.535	pg/L	26
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	OCDD	4310	2910	1.01/0.535	pg/L	39
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	2,3,7,8-TCDF	0.571	0.672	0.541/0.535	pg/L	16
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	2,3,4,7,8-PECDF	1.98	1.51	0.541/0.535	pg/L	27
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	1,2,3,4,7,8-HXCDF	14.5	11.4	0.541/0.535	pg/L	24
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	1,2,3,6,7,8-HXCDF	2.64	2.29	0.541/0.535	pg/L	14
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	2,3,4,6,7,8-HXCDF	1.28	0.903	0.541/0.535	pg/L	35
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	1,2,3,4,6,7,8-HPCDF	47.7	36.5	0.541/0.535	pg/L	27
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	1,2,3,4,7,8,9-HPCDF	7.87	5.80	0.541/0.535	pg/L	30
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	OCDF	126	96.8	0.541/0.535	pg/L	26
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	TOTAL PENTA-DIOXINS	2.06	1.61	0.541/0.535	pg/L	25
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	TOTAL HEXA-DIOXINS	27.0	23.0	0.541/0.535	pg/L	16

Table 7
Field Duplicate Results and Calculated Relative Percent Differences
Storm Water and Storm Water Solids Collected August -October 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	TOTAL HEPTA-DIOXINS	273	210	0.705/0.535	pg/L	26
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	TOTAL TETRA-FURANS	1.53	1.24	0.541/0.535	pg/L	21
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	TOTAL PENTA-FURANS	20.6	17.0	0.541/0.535	pg/L	19
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	TOTAL HEXA-FURANS	86.3	65.0	0.541/0.535	pg/L	28
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	TOTAL HEPTA-FURANS	166	131	0.541/0.535	pg/L	24

Data packages reviewed: ARI VI13, VO46, VQ27; Axys DPWG41412, DPWG41596, DPWG41862, DPWG42297

Key:

RPD = Relative percent difference

µg/kg = Micrograms per kilogram

µg/L = Micrograms per liter

mg/kg = Milligrams per kilogram

pg/g = Picograms per gram

SVOC = Semivolatile organic compounds; Method 8270D

SVOC-SIM = Semivolatile organic compounds - selected ion monitoring

PCB = Polychlorinated biphenyls; Method 8082B

Solids = Total solids; Method 2540B

TOC = Total organic carbon; Method 9060

VOC = Volatile organic compounds; Method 8260C

TPH-d = Total petroleum hydrocarbons - diesel; Method NWTPH-Dx

TOC = Total organic carbon

TCDD = Tetrachlorodibenzo-p-dioxin

PECDD = Pentachlorodibenzo-p-dioxin

HXCDD = Hexachlorodibenzo-p-dioxin

HPCDD = Heptachlorodibenzo-p-dioxin

OCDD = Octochlorodibenzo-p-dioxin

TCDF = Tetrachlorodibenzofuran

PECDF = Pentachlorodibenzofuran

HXCDF = Hexachlorodibenzofuran

HPCDF = Heptachlorodibenzofuran

OCDF = Octochlorodibenzofuran

Table 8
Calibration Verification Recoveries Outside of Acceptable Limits
Storm Water and Storm Water Solids Collected August -October 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	CCV ID	Analysis	Compound	CCV Recovery	CCV Limit	Associated Samples	Reported Concentration	Units	ERM Qualifier
VI13	CCV-091412	SVOC	Benzoic acid	-27.6	20	See below	--	--	--
VI13	CCV-091412	--	--	--	--	SWD-01	22000	µg/kg	J-
VI13	CCV-091412	--	--	--	--	CB-01	5500	µg/kg	J-
VI13	CCV-091412	-	--	--	--	TANK-01	< 360	µg/kg	UJ
VI13	CCV-091412	--	--	--	--	DUP090412	< 360	µg/kg	UJ
VI13	CCV-091712	SVOC	Butylbenzylphthalate	20.6	20	See below	--	--	--
VI13	CCV-091712	--	--	--	--	CB-01 DIL	1400	µg/kg	J+
VI13	CCV-091412	SVOC-SIM	Pentachlorophenol	-28.8	20	See below	--	--	--
VI13	CCV-091412	--	--	--	--	SWD-01	310	µg/kg	J-
VI13	CCV-091412	--	--	--	--	CB-01	< 680	µg/kg	UJ
VI13	CCV-091412	--	--	--	--	TANK-01	< 46	µg/kg	UJ
VI13	CCV-091412	--	--	--	--	DUP090412	< 46	µg/kg	UJ
VI13	CV-091112	PCB	Aroclor-1248	24.1	20	NA	--	--	--
VI13	CV-091112	PCB	Aroclor-1248	30.0	20	NA	--	--	--
VO46	CCV-102412	SVOC-SIM	Pentachlorophenol	-26.4	20	See below	--	--	--
VO46	CCV-102412	--	--	--	--	SWD-02	< 47	µg/kg	UJ
VO46	CCV-102412	SVOC-SIM	Butylbenzylphthalate	24.6	20	See below	--	--	--
VO46	CCV-102412	--	--	--	--	SWD-02	8.5	µg/kg	J+
VQ27	CCV-110512	VOC	2-Chloroethyl vinyl ether	-21.7	20	See below	--	--	--
VQ27	CCV-110512	--	--	--	--	STW-01-103012	< 1.0	µg/L	UJ
VQ27	CCV-110512	--	--	--	--	DUP103012-1	< 1.0	µg/L	UJ
VQ27	CCV-110812	SVOC	Benzoic acid	-27.7	20	See below	--	--	--
VQ27	CCV-110812	--	--	--	--	STW-01-103012	< 20	µg/L	UJ
VQ27	CCV-110812	--	--	--	--	DUP103012-1	< 20	µg/L	UJ

Table 8
Calibration Verification Recoveries Outside of Acceptable Limits
Storm Water and Storm Water Solids Collected August -October 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	CCV ID	Analysis	Compound	CCV Recovery	CCV Limit	Associated Samples	Reported Concentration	Units	ERM Qualifier
VQ27	CCV-110812	SVOC	Benzo(g,h,i)perylene	-24.2	20	See below	--	--	--
VQ27	CCV-110812	--	--	--	--	STW-01-103012	< 1.0	µg/L	UJ
VQ27	CCV-110812	--	--	--	--	DUP103012-1	< 1.0	µg/L	UJ

Data packages reviewed: ARI VI13, VO46, VQ27; Axys DPWG41412, DPWG41596, DPWG41862, DPWG42297

Key:

CCV = Continuing calibration verification

µg/kg = Micrograms per kilogram

µg/L = Micrograms per liter

J- = Detected sample result qualified as estimated and biased low

J+ = Detected sample result qualified as estimated and biased high

UJ = Nondetected sample result qualified as estimated

DIL = Diluted/reanalyzed sample

SVOC = Semivolatile organic compounds; Method 8270D

SVOC-SIM = Semivolatile organic compounds - selected ion monitoring

PCB = Polychlorinated biphenyls; Method 8082B

Metals = Total metals; Method 6010B/6020

VOC = Volatile organic compounds; Method 8260C

Table 9
Calibration Range Exceedances
Storm Water and Storm Water Solids Collected August -October 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Method	Compound	Reported Concentration	Units	ERM Qualifier	Notes
VI13	SWD-01	SVOC	Benzyl alcohol	57000 E	µg/kg	J	Result exceeded instrument calibration range
VI13	CB-01	SVOC	bis(2-Ethylhexyl)phthalate	30000 E	µg/kg	J	Result exceeded instrument calibration range
VI13	SWD-01	SVOC-SIM	Benzyl alcohol	53000 E	µg/kg	J	Result exceeded instrument calibration range
VI13	CB-01	SVOC-SIM	Benzyl alcohol	11000 E	µg/kg	J	Result exceeded instrument calibration range

Data packages reviewed: ARI VI13, VO46, VQ27; Axys DPWG41412, DPWG41596, DPWG41862, DPWG42297

Key:

E = Undiluted sample concentration exceeded calibration range; use result of dilution/reanalysis for decision-making purposes

SVOC = Semivolatile organic compounds; Method 8270D

SVOC-SIM = Semivolatile organic compounds - selected ion monitoring

µg/kg = Micrograms per kilogram

J = Detected sample result qualified as estimated

Memorandum

Environmental Resources Management

To: Mike Mendes

From: Irene Lavigne

Date: 14 February 2013

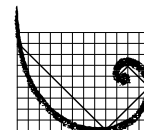
Subject: Data Review of Reichhold-Glacier Storm Water
Samples Collected 14 December 2012

Project Number: 0155129

Data Packages: Axys Analytical Services Data Package DPWG42663

Analytical Resources Incorporated Data Package
VW60

2875 Michelle Drive
Suite 200
Irvine, CA 92606
(949) 623-4700
(949) 623-2940 (fax)



ERM®

The data quality was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999, *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004, and the *EPA Region 10 SOP for the Validation of Polychlorinated Dibenzodioxin (PCDD) and Polychlorinated Dibenzofuran (PCDF) Data*, January 1996.

HOLDING TIME AND PRESERVATION EVALUATION

The sample shipments were received at the laboratory within the method-prescribed preservation requirements. The samples were prepared and analyzed within the method-prescribed time period from the date of collection. No sample data were qualified based on sample preservation or holding-time exceedances.

BLANK EVALUATION

The method blank, trip blank, and field blank sample results were nondetected for each of the target analytes with limited exceptions. Detections of various dioxin/furan compounds in a lab blank did not require qualification of associated sample data. Data were not qualified because either the sample results exceeded the five times the blank concentrations, or if the blank results were identified as estimated

maximum possible concentrations for dioxin/furan analyses. The blank detections are listed in Table 1.

BLANK SPIKE EVALUATION

The laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) recoveries were within the laboratory's limits of acceptance with several exceptions. Two nondetected sample results for pyrene were qualified as estimated (UJ) due to a low recovery for this compound in the associated spike sample. Additional LCS outliers did not require qualification of sample data. Data were not qualified if only one recovery in a LCS/LCSD pair exceeded acceptable control limits, if the data could be verified using an associated, in-control matrix spike recovery, or if the outlying recovery was biased high and the sample result was nondetected for the corresponding compound. The outlying LCS recoveries are presented in Table 2.

MATRIX SPIKE EVALUATION

The matrix spike (MS) and matrix spike duplicate (MSD) recoveries were within the laboratory's limits of acceptance with several exceptions. Nondetected sample results for 2-chloroethylvinylether and pyrene were qualified as estimated (UJ) based on MS recoveries that were below the acceptable limits. Not all MS recovery outliers resulted in qualification of associated sample data. Data were not qualified if only the relative percent difference (RPD) exceeded control limits, if only one recovery in a MS/MSD pair exceeded control limits, if the MS recovery was biased high and the sample result was nondetected for the corresponding compound, or if the data could be verified using an associated, in-control LCS recovery. The outlying MS recoveries and qualified sample data are shown in Table 3.

LABELED COMPOUND EVALUATION

Carbon-13 labeled isotope recoveries were reported for each sample submitted for dioxin/furan analysis. The recoveries of labeled PCDD and PCDF compounds is a measure of the effectiveness of the laboratory and method to extract the compounds of interest. All of the labeled compounds were within acceptable limits, and no qualifiers were required based on the labeled compound evaluation.

SURROGATE EVALUATION

The surrogate recoveries were within acceptable limits, and no sample data required qualification as a result of the surrogate evaluation. The surrogate recoveries indicate minimal matrix interference in the samples.

ESTIMATED MAXIMUM POSSIBLE CONCENTRATION

The laboratory identified several dioxin results as estimated maximum possible concentration (EMPC). An EMPC value is the maximum possible concentration of a compound that could be present in the sample. This classification is used when all of the identification criteria for a given dioxin or furan compound are not met. The sample data identified as EMPC by the laboratory were qualified as nondetected (U), as shown in Table 4.

FIELD DUPLICATE EVALUATION

One sample was collected and analyzed in duplicate. ERM calculated the RPD between detected results. The USEPA has not established control criteria for field duplicate samples; therefore, sample data are not qualified on the basis of field duplicate imprecision. Detected duplicate results and calculated RPDs are presented in Table 5.

CONTINUING CALIBRATION EVALUATION

The laboratory noted that several continuing calibration verification (CCV) recoveries for a number of compounds did not meet acceptable control limits. Nondetected sample results associated with low CCV recoveries were qualified as estimated (UJ). The CCV outliers and associated, qualified data are shown in Table 6. A number of the CCV outliers were associated with compounds that were not constituents of concern; these compounds are not included in Table 6. Not all CCV outliers resulted in qualified data. Data were not qualified if the CCV recoveries were biased high and the associated samples were nondetected for the corresponding compounds.

OVERALL ASSESSMENT

No data were determined to be unusable. All of the data, including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents.

Table 1
Blank and Associated Suspect Sample Detections
December 2012 Storm Water Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG42663	Lab Blank	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDD	0.936	0.500	pg/L	--
DPWG42663	Lab Blank	PCDD/PCDF	NA	OCDD	2.05	0.500	pg/L	--
DPWG42663	Lab Blank	PCDD/PCDF	NA	1,2,3,4,7,8,9-HPCDF	0.598	0.500	pg/L	EMPC
DPWG42663	Lab Blank	PCDD/PCDF	NA	OCDF	0.643	0.500	pg/L	EMPC
DPWG42663	Lab Blank	PCDD/PCDF	NA	TOTAL HEPTA-DIOXINS	0.936	0.500	pg/L	--

Data packages reviewed: Axys DPWG42663; ARI VW60

Key:

PCDD/PCDF = Polychlorinated dibenzo-p-dioxins/Polychlorinated dibenzofurans; Method 1613B

NA = Not applicable; qualification of sample data not required

HPCDD = Heptachlorodibenzo-p-dioxin

OCDD = Octochlorodibenzo-p-dioxin

HPCDF = Heptachlorodibenzofuran

OCDF = Octochlorodibenzofuran

pg/L = Picograms per liter

EMPC = Blank result identified as Estimated Maximum Possible Concentration; qualification of sample data not required

Table 2
Laboratory Control Spike Recoveries Outside of Acceptable Limits
December 2012 Storm Water Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Analysis	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
VW60	LCS-121912A	NA	VOC	2-Butanone	123/124	73-123	1.3	40	--	--
VW60	LCS-121912A	NA	VOC	4-Methyl-2-pentanone	130/128	80-125	1.9	40	--	--
VW60	LCS-121912A	NA	VOC	2-Hexanone	128/130	80-129	1.7	40	--	--
VW60	LCS-121912A	NA	VOC	Acrolein	80.0/53.6	60-124	39.5	40	--	--
VW60	LCS-122012	NA	SVOC	4-Nitrophenol	111/119	10-103	6.7	40	--	--
VW60	LCS-122012	NA	SVOC	Phenanthrene	62.0/73.6	64-115	17.1	40	--	--
VW60	LCS-122012	NA	SVOC	Anthracene	54.0/67.6	59-107	22.4	40	--	--
VW60	LCS-122012	NA	SVOC	Pyrene	52.4/52.4	57-117	0	40	--	--
VW60	LCS-122012	STW-01-121412	SVOC	Pyrene	--	--	--	--	< 1.0	UJ
VW60	LCS-122012	DUP121412-1	SVOC	Pyrene	--	--	--	--	< 1.0	UJ

Data packages reviewed: Axys DPWG42663; ARI VW60

Key:

RPD = Relative percent difference

LCS = Laboratory control sample

NA = Not applicable; qualification of sample data not required

VOC = Volatile organic compounds; Method 8260C

SVOC = Semivolatile organic compounds; Method 8270D

UJ = Nondetected sample result qualified as estimated

Table 3
Matrix Spike Recoveries Outside of Acceptable Limits
December 2012 Storm Water Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
DPWG42663	STW-01-121412 MS/MSD	PCDD/PCDF	NA	1,2,3,4,7,8-HXCDD	105/130	70-130	21.5	20	--	--
DPWG42663	STW-01-121412 MS/MSD	PCDD/PCDF	NA	1,2,3,6,7,8-HXCDD	107/138	70-130	25.4	20	--	--
DPWG42663	STW-01-121412 MS/MSD	PCDD/PCDF	NA	1,2,3,7,8,9-HXCDD	120/145	70-130	18.7	20	--	--
DPWG42663	STW-01-121412 MS/MSD	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDD	101/141	70-130	33.4	20	--	--
DPWG42663	STW-01-121412 MS/MSD	PCDD/PCDF	NA	OCDD	72.4/180	70-130	85.2	20	--	--
DPWG42663	STW-01-121412 MS/MSD	PCDD/PCDF	NA	1,2,3,6,7,8-HXCDF	103/133	70-130	25.3	20	--	--
DPWG42663	STW-01-121412 MS/MSD	PCDD/PCDF	NA	1,2,3,7,8,9-HXCDF	104/131	70-130	22.6	20	--	--
DPWG42663	STW-01-121412 MS/MSD	PCDD/PCDF	NA	2,3,4,6,7,8-HXCDF	99.9/127	70-130	23.5	20	--	--
DPWG42663	STW-01-121412 MS/MSD	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDF	110/141	70-130	25.0	20	--	--
DPWG42663	STW-01-121412 MS/MSD	PCDD/PCDF	NA	1,2,3,4,7,8,9-HPCDF	101/132	70-130	26.9	20	--	--
DPWG42663	STW-01-121412 MS/MSD	PCDD/PCDF	NA	OCDF	93.9/145	70-130	42.7	20	--	--
VW60	STW-01-121412 MS/MSD	VOC	See below	2-Chloroethylvinylether	NR/NR low	80-120	NR	30	--	--
VW60	STW-01-121412 MS/MSD	VOC	STW-01-121412	2-Chloroethylvinylether	--	--	--	--	< 1.0	UJ
VW60	STW-01-121412 MS/MSD	VOC	DUP121412-1	2-Chloroethylvinylether	--	--	--	--	< 1.0	UJ
VW60	STW-01-121412 MS/MSD	SVOC	NA	4-Nitrophenol	108/113	10-103	4.8	30	--	--
VW60	STW-01-121412 MS/MSD	SVOC	NA	Anthracene	58.8/65.2	59-107	10.3	30	--	--
VW60	STW-01-121412 MS/MSD	SVOC	See below	Pyrene	46.4/50.4	57-117	8.3	30	--	--
VW60	STW-01-121412 MS/MSD	SVOC	STW-01-121412	Pyrene	--	--	--	--	< 1.0	UJ

Table 3
Matrix Spike Recoveries Outside of Acceptable Limits
December 2012 Storm Water Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
VW60	STW-01-121412 MS/MSD	SVOC	DUP121412-1	Pyrene	--	--	--	--	< 1.0	UJ

Data packages reviewed: Axys DPWG42663; ARI VW60

Key:

MS/MSD = Matrix spike/matrix spike duplicate

RPD = Relative percent difference

PCDD/PCDF = Polychlorinated dibenzo-p-dioxins/Polychlorinated dibenzofurans; Method 1613B

NA = Not applicable; qualification of sample data not required

HXCDD = Hexachlorodibenzo-p-dioxin

HPCDD = Heptachlorodibenzo-p-dioxin

OCDD = Octochlorodibenzo-p-dioxin

HXCDF = Hexachlorodibenzofuran

HPCDF = Heptachlorodibenzofuran

OCDF = Octochlorodibenzofuran

VOC = Volatile organic compounds; Method 8260C

SVOC = Semivolatile organic compounds; Method 8270D

NR low = Value not reported; reported as "low" by laboratory

UJ = Nondetected sample result qualified as estimated

Table 4
Estimated Maximum Possible Concentration
December 2012 Storm Water Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG42663	STW-01-121412	2,3,7,8-TCDD	0.573	0.541	pg/L	0.573 U
DPWG42663	STW-01-121412	1,2,3,7,8-PECDD	0.567	0.541	pg/L	0.567 U
DPWG42663	STW-01-121412	2,3,4,6,7,8-PECDF	1.26	0.541	pg/L	1.26 U
DPWG42663	DUP121412-1	2,3,7,8-TCDD	0.693	0.537	pg/L	0.693 U
DPWG42663	DUP121412-1	1,2,3,6,7,8-HXCDD	3.37	0.537	pg/L	3.37 U
DPWG42663	DUP121412-1	1,2,3,7,8,9-HXCDD	4.26	0.537	pg/L	4.26 U
DPWG42663	DUP121412-1	1,2,3,6,7,8-HXCDF	1.72	0.537	pg/L	1.72 U
DPWG42663	DUP121412-1	2,3,4,6,7,8-HXCDF	0.649	0.537	pg/L	0.649 U
DPWG42663	DUP121412-1	1,2,3,4,7,8,9-HPCDF	2.94	0.537	pg/L	2.94 U
DPWG42663	Lab Blank	1,2,3,4,7,8,9-HPCDF	0.598	0.500	pg/L	0.598 U
DPWG42663	Lab Blank	OCDF	0.643	0.500	pg/L	0.653 U

Data packages reviewed: Axys DPWG42663; ARI VW60

Key:

TCDD = Tetrachlorodibenzo-p-dioxin
 PECDD = Pentachlorodibenzo-p-dioxin
 PECDF = Pentachlorodibenzofuran
 HXCDD = Hexachlorodibenzo-p-dioxin
 HXCDF = Hexachlorodibenzofuran
 HPCDF = Heptachlorodibenzofuran
 OCDF = Octochlorodibenzofuran
 pg/L = Picograms per liter
 U = Nondetected

Table 5
Field Duplicate Results and Calculated Relative Percent Differences
December 2012 Storm Water Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
DPWG42663	STW-01-121412/DUP121412-1	PCDD/PCDF	2,3,7,8-TCDD	0.573	0.693	0.541/0.537	pg/L	19
DPWG42663	STW-01-121412/DUP121412-1	PCDD/PCDF	1,2,3,4,7,8-HXCDD	1.03	1.54	0.541/0.537	pg/L	40
DPWG42663	STW-01-121412/DUP121412-1	PCDD/PCDF	1,2,3,6,7,8-HXCDD	4.13	3.37	0.541/0.537	pg/L	20
DPWG42663	STW-01-121412/DUP121412-1	PCDD/PCDF	1,2,3,7,8,9-HXCDD	3.80	4.26	0.541/0.537	pg/L	11
DPWG42663	STW-01-121412/DUP121412-1	PCDD/PCDF	1,2,3,4,6,7,8-HPCDD	99.0	95.7	0.847/0.654	pg/L	3.4
DPWG42663	STW-01-121412/DUP121412-1	PCDD/PCDF	OCDD	2850	2920	0.541/1.20	pg/L	2.4
DPWG42663	STW-01-121412/DUP121412-1	PCDD/PCDF	2,3,7,8-TCDF	0.546	0.540	0.541/0.537	pg/L	1.1
DPWG42663	STW-01-121412/DUP121412-1	PCDD/PCDF	2,3,4,7,8-PECDF	1.26	1.11	0.541/0.537	pg/L	13
DPWG42663	STW-01-121412/DUP121412-1	PCDD/PCDF	1,2,3,4,7,8-HXCDF	5.84	5.32	0.541/0.537	pg/L	9.3
DPWG42663	STW-01-121412/DUP121412-1	PCDD/PCDF	1,2,3,6,7,8-HXCDF	1.89	1.72	0.541/0.537	pg/L	9.4
DPWG42663	STW-01-121412/DUP121412-1	PCDD/PCDF	2,3,4,6,7,8-HXCDF	0.816	0.649	0.541/0.537	pg/L	23
DPWG42663	STW-01-121412/DUP121412-1	PCDD/PCDF	1,2,3,4,6,7,8-HPCDF	20.8	21.9	0.541/0.537	pg/L	5.2
DPWG42663	STW-01-121412/DUP121412-1	PCDD/PCDF	1,2,3,4,7,8,9-HPCDF	3.43	2.94	0.541/0.537	pg/L	15
DPWG42663	STW-01-121412/DUP121412-1	PCDD/PCDF	OCDF	48.0	45.2	0.541/0.537	pg/L	6.0
DPWG42663	STW-01-121412/DUP121412-1	PCDD/PCDF	TOTAL HEXA-DIOXINS	23.5	16.9	0.541/0.537	pg/L	33
DPWG42663	STW-01-121412/DUP121412-1	PCDD/PCDF	TOTAL HEPTA-DIOXINS	187	190	0.847/0.654	pg/L	1.6
DPWG42663	STW-01-121412/DUP121412-1	PCDD/PCDF	TOTAL TETRA-FURANS	0.546	0.540	0.541/0.537	pg/L	1.1
DPWG42663	STW-01-121412/DUP121412-1	PCDD/PCDF	TOTAL HEXA-FURANS	38.4	35.2	0.541/0.537	pg/L	8.7
DPWG42663	STW-01-121412/DUP121412-1	PCDD/PCDF	TOTAL HEPTA-FURANS	65.5	63.2	0.541/0.537	pg/L	3.6
VW60	STW-01-121412/DUP121412-1	SVOC	bis(2-Ethylhexyl) phthalate	1.8	2.2	3.0	µg/L	20
VW60	STW-01-121412/DUP121412-1	Total metals	Antimony	0.5	0.5	0.2	µg/L	0
VW60	STW-01-121412/DUP121412-1	Total metals	Arsenic	5.4	5.3	0.2	µg/L	1.9
VW60	STW-01-121412/DUP121412-1	Total metals	Cadmium	0.1	0.1	0.1	µg/L	0
VW60	STW-01-121412/DUP121412-1	Total metals	Chromium	1.3	1.3	0.5	µg/L	0
VW60	STW-01-121412/DUP121412-1	Total metals	Copper	24.4	24.2	0.5	µg/L	0.8
VW60	STW-01-121412/DUP121412-1	Total metals	Lead	1.2	1.2	0.1	µg/L	0
VW60	STW-01-121412/DUP121412-1	Total metals	Nickel	2.6	2.5	0.5	µg/L	3.9

Table 5
Field Duplicate Results and Calculated Relative Percent Differences
December 2012 Storm Water Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
VW60	STW-01-121412/DUP121412-1	Total metals	Zinc	32	36	4	µg/L	12
VW60	STW-01-121412/DUP121412-1	Dissolved metals	Antimony	0.5	0.5	0.2	µg/L	0
VW60	STW-01-121412/DUP121412-1	Dissolved metals	Arsenic	3.7	3.8	0.2	µg/L	2.7
VW60	STW-01-121412/DUP121412-1	Dissolved metals	Chromium	0.6	0.6	0.5	µg/L	0
VW60	STW-01-121412/DUP121412-1	Dissolved metals	Copper	4.9	5.4	0.5	µg/L	9.7
VW60	STW-01-121412/DUP121412-1	Dissolved metals	Nickel	1.0	1.1	0.5	µg/L	9.5
VW60	STW-01-121412/DUP121412-1	Dissolved metals	Zinc	15	17	4	µg/L	13

Data packages reviewed: Axys DPWG42663; ARI VW60

Key:

RPD = Relative percent difference

PCDD/PCDF = Polychlorinated dibenzo-p-dioxins/Polychlorinated dibenzofurans; Method 1613B

TCDD = Tetrachlorodibenzo-p-dioxin

HXCDD = Hexachlorodibenzo-p-dioxin

HCDD = Heptachlorodibenzo-p-dioxin

OCDD = Octochlorodibenzo-p-dioxin

TCDF = Tetrachlorodibenzofuran

PCDF = Pentachlorodibenzofuran

HXCF = Hexachlorodibenzofuran

HCDF = Heptachlorodibenzofuran

OCDF = Octochlorodibenzofuran

SVOC = Semivolatile organic compounds; Method 8270D

pg/L = Picograms per liter

µg/L = Micrograms per liter

Table 6
Calibration Verification Recoveries Outside of Acceptable Limits
December 2012 Storm Water Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	CCV ID	Analysis	Compound	CCV Recovery	CCV Limit	Associated Samples	Reported Concentration	Units	ERM Qualifier
VW60	CCV-121912	VOC	Trichlorofluoromethane	-20.1	20	See below	--	--	--
VW60	CCV-121912	VOC	--	--	--	STW-01-121412	< 0.20	µg/L	UJ
VW60	CCV-121912	VOC	--	--	--	DUP121412-1	< 0.20	µg/L	UJ
VW60	CCV-121912	VOC	Acrolein	-51.3	20	See below	--	--	--
VW60	CCV-121912	VOC	--	--	--	STW-01-121412	< 5.0	µg/L	UJ
VW60	CCV-121912	VOC	--	--	--	DUP121412-1	< 5.0	µg/L	UJ
VW60	CCV-121912	VOC	2-Chloroethylvinylether	24.4	20	NA	--	--	--
VW60	CCV-121912	VOC	4-Methyl-2-pentanone	20.3	20	NA	--	--	--
VW60	CCV-121912	VOC	2-Hexanone	26.1	20	NA	--	--	--
VW60	CCV-121912	VOC	trans-1,4-Dichloro-2-butene	23.6	20	NA	--	--	--
VW60	CCV-122612	SVOC	Hexachlorobutadiene	26.2	20	NA	--	--	--
VW60	CCV-122612	SVOC	4-Nitroaniline	-27.8	20	See below	--	--	--
VW60	CCV-122612	SVOC	--	--	--	STW-01-121412	< 3.0	µg/L	UJ
VW60	CCV-122612	SVOC	--	--	--	DUP121412-1	< 3.0	µg/L	UJ
VW60	CCV-122612	SVOC	Carbazole	-31.6	20	See below	--	--	--
VW60	CCV-122612	SVOC	--	--	--	STW-01-121412	< 1.0	µg/L	UJ
VW60	CCV-122612	SVOC	--	--	--	DUP121412-1	< 1.0	µg/L	UJ
VW60	CCV-122712	SVOC	2,4-Dinitrophenol	28.7	20	NA	--	--	--
VW60	CCV-122712	SVOC	4-Nitrophenol	40.9	20	NA	--	--	--
VW60	CCV-122712	SVOC	Carbazole	-35.3	20	NA	--	--	--

Data packages reviewed: Axy's DPWG42663; ARI VW60

Key:

CCV = Continuing calibration verification

VOC = Volatile organic compounds; Method 8260C

SVOC = Semivolatile organic compounds; Method 8270D

µg/L = Micrograms per liter

UJ = Nondetected sample result qualified as estimated

Memorandum

Environmental Resources Management

To: Dylan Stankus

From: Irene Lavigne

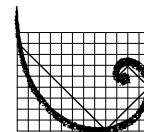
Date: 15 April 2013

Subject: Data Review of Reichhold-Glacier Storm Water
Samples Collected 08 April 2013

Project Number: 0155129

Data Packages: Axys Analytical Services Data Package DPWG43602
Analytical Resources Incorporated Data Package
WK87

2875 Michelle Drive
Suite 200
Irvine, CA 92606
(949) 623-4700
(949) 623-2940 (fax)



ERM®

The data quality was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999, *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004, and the *EPA Region 10 SOP for the Validation of Polychlorinated Dibenzodioxin (PCDD) and Polychlorinated Dibenzofuran (PCDF) Data*, January 1996.

HOLDING TIME AND PRESERVATION EVALUATION

The sample shipments were received at each laboratory within the method-prescribed preservation requirements. The samples were prepared and analyzed within the method-prescribed time period from the date of collection. No sample data were qualified based on sample preservation or holding-time exceedances.

BLANK EVALUATION

The method blank and field blank sample results were nondetected for each of the target analytes with limited exceptions. Detections of dioxin/furan compounds in a lab blank did not require qualification of associated sample data because the field sample concentrations exceeded five times the blank detections. Additionally, detections of volatile organic compounds in a field blank and method blank did not require qualification of sample data because the sample results were nondetected for the corresponding compounds. The blank detections are listed in Table 1.

BLANK SPIKE EVALUATION

The laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) recoveries were within the laboratories' limits of acceptance with one exception. No sample data were qualified based on the blank spike outlier because only one recovery in the LCS/LCSD pair exceeded control limits. The outlying LCS recoveries are presented in Table 2.

MATRIX SPIKE EVALUATION

The matrix spike (MS) and matrix spike duplicate (MSD) recoveries were within the laboratories' limits of acceptance with a few exceptions. Detected sample results for octochlorodibenzo-p-dioxin were qualified as estimated (J) based on an MS recovery that exceeded the maximum acceptable limits. Not all MS recovery outliers resulted in qualification of associated sample data. Data were not qualified if only one recovery in a MS/MSD pair exceeded control limits. The outlying MS recoveries and qualified sample data are shown in Table 2.

LABELED COMPOUND EVALUATION

Carbon-13 labeled isotope recoveries were reported for each sample submitted for dioxin/furan analysis. The recoveries of labeled PCDD and PCDF compounds is a measure of the effectiveness of the laboratory and method to extract the compounds of interest. All of the labeled compounds were within acceptable limits, and no qualifiers were required based on the labeled compound evaluation.

SURROGATE EVALUATION

The surrogate recoveries were within acceptable limits, and no sample data required qualification as a result of the surrogate evaluation. The surrogate recoveries indicate minimal matrix interference in the samples.

ESTIMATED MAXIMUM POSSIBLE CONCENTRATION

The laboratory identified several dioxin/furan results as estimated maximum possible concentrations (EMPC). An EMPC value is the maximum possible concentration of a compound that could be present in the sample. This classification is used when all of the identification criteria for a given dioxin or furan compound are not met. The sample data identified as EMPC by the laboratory were qualified as nondetected (U), as presented in Table 3.

FIELD DUPLICATE EVALUATION

One sample was collected and analyzed in duplicate. ERM calculated the relative percent difference (RPD) between detected results. The USEPA has not established control criteria for field duplicate samples; therefore, sample data are not qualified on the basis of field duplicate imprecision. Detected duplicate results and calculated RPDs are listed in Table 4.

CONTINUING CALIBRATION EVALUATION

The laboratory noted that continuing calibration verification (CCV) recoveries for acetone and 4-nitrophenol did not meet acceptable control limits. The CCV outliers did not require qualification of associated sample data because the CCV recoveries were biased high and the associated samples were nondetected for the corresponding compounds. A list of the outlying CCV recoveries is provided in Table 5.

OVERALL ASSESSMENT

No data were determined to be unusable. All of the data, including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents.

Table 1
Blank and Associated Suspect Sample Detections
April 2013 Storm Water Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG43602	Lab Blank	PCDD/PCDF	NA	OCDD	0.856	0.500	pg/L	--
DPWG43602	Lab Blank	PCDD/PCDF	NA	OCDF	0.570	0.500	pg/L	--
WK87	FB-040813	VOC	NA	Hexachlorobutadiene	0.33	0.50	µg/L	--
WK87	FB-040813	VOC	NA	n-Butylbenzene	0.19	0.20	µg/L	--
WK87	FB-040813	VOC	NA	1,2,4-Trichlorobenzene	0.13	0.50	µg/L	--
WK87	MB-040913A	VOC	NA	Hexachlorobutadiene	0.47	0.50	µg/L	--
WK87	MB-040913A	VOC	NA	n-Butylbenzene	0.12	0.20	µg/L	--
WK87	MB-040913A	VOC	NA	1,2,4-Trichlorobenzene	0.11	0.50	µg/L	--
WK87	MB-040913A	VOC	NA	1,2,3-Trichlorobenzene	0.28	0.50	µg/L	--

Data packages reviewed: Axy's DPWG43602; ARI WK87

Key:

PCDD/PCDF = Polychlorinated dibenzo-p-dioxins/Polychlorinated dibenzofurans; Method 1613B

NA = Not applicable; qualification of sample data not required

OCDD = Octochlorodibenzo-p-dioxin

OCDF = Octochlorodibenzofuran

pg/L = Picograms per liter

VOC = Volatile organic compounds; Method 8260C

µg/L = Micrograms per liter

Table 2
Spike Recoveries Outside of Acceptable Limits
April 2013 Storm Water Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
LCS/LCSD										
WK87	LCS-040913	SVOC	NA	4-Chloroaniline	149/156	10-153	4.4	40	--	--
MS/MSD										
DPWG43602	STW-01-040813 MS/MSD	PCDD/PCDF	See below	OCDD	184/156	70-130	16.3	30	--	--
DPWG43602	STW-01-040813 MS/MSD	PCDD/PCDF	STW-01-040813	OCDD	--	--	--	--	3160	J
DPWG43602	STW-01-040813 MS/MSD	PCDD/PCDF	DUP-040813	OCDD	--	--	--	--	3730	J
WK87	STW-01-040813 MS/MSD	VOC	NA	Acetone	107/169	64-125	45	40	--	--
WK87	STW-01-040813 MS/MSD	VOC	NA	Acrylonitrile	92/131	76-123	35	40	--	--

Data packages reviewed: Axys DPWG43602; ARI WK87

Key:

LCS/LCSD = Laboratory control sample/laboratory control sample duplicate

RPD = Relative percent difference

SVOC = Semivolatile organic compounds; Method 8270D

MS/MSD = Matrix spike/matrix spike duplicate

PCDD/PCDF = Polychlorinated dibenzo-p-dioxins/Polychlorinated dibenzofurans; Method 1613B

OCDD = Octochlorodibenzo-p-dioxin

VOC = Volatile organic compounds; Method 8260C

NA = Not applicable; qualification of sample data not required

J = Detected sample result qualified as estimated

Table 3
Estimated Maximum Possible Concentration
April 2013 Storm Water Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG43602	STW-01-040813	1,2,3,7,8-PECDD	0.593	0.550	pg/L	0.593 U
DPWG43602	STW-01-040813	1,2,3,4,7,8-HXCDD	1.31	0.550	pg/L	1.31 U
DPWG43602	STW-01-040813	1,2,3,7,8-PECDF	0.694	0.550	pg/L	0.694 U
DPWG43602	DUP-040813	2,3,7,8-TCDD	0.713	0.514	pg/L	0.713 U
DPWG43602	DUP-040813	1,2,3,4,7,8-HXCDD	1.08	0.514	pg/L	1.08 U
DPWG43602	DUP-040813	1,2,3,6,7,8-HXCDF	2.59	0.514	pg/L	2.59 U

Data packages reviewed: Axys DPWG43602; ARI WK87

Key:

PECDD = Pentachlorodibenzo-p-dioxin

HXCDD = Hexachlorodibenzo-p-dioxin

PECDF = Pentachlorodibenzofuran

TCDD = Tetrachlorodibenzo-p-dioxin

HXCDF = Hexachlorodibenzofuran

pg/L = Picograms per liter

U = Nondetected

Table 4
Field Duplicate Results and Calculated Relative Percent Differences
April 2013 Storm Water Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
DPWG43602	STW-01-040813/DUP-040813	PCDD/PCDF	1,2,3,6,7,8-HxCDD	4.26	4.75	0.550/0.514	pg/L	11
DPWG43602	STW-01-040813/DUP-040813	PCDD/PCDF	1,2,3,7,8,9-HxCDD	4.39	3.91	0.550/0.514	pg/L	12
DPWG43602	STW-01-040813/DUP-040813	PCDD/PCDF	1,2,3,4,6,7,8-HpCDD	144	144	0.841/0.548	pg/L	0
DPWG43602	STW-01-040813/DUP-040813	PCDD/PCDF	OCDD	3160	3730	0.550/0.514	pg/L	17
DPWG43602	STW-01-040813/DUP-040813	PCDD/PCDF	2,3,4,7,8-PeCDF	1.33	1.82	0.550/0.514	pg/L	31
DPWG43602	STW-01-040813/DUP-040813	PCDD/PCDF	1,2,3,4,7,8-HxCDF	7.81	10.5	0.573/0.514	pg/L	29
DPWG43602	STW-01-040813/DUP-040813	PCDD/PCDF	2,3,4,6,7,8-HxCDF	1.46	2.37	0.573/0.514	pg/L	48
DPWG43602	STW-01-040813/DUP-040813	PCDD/PCDF	1,2,3,4,6,7,8-HpCDF	30.2	39.8	0.550/0.664	pg/L	27
DPWG43602	STW-01-040813/DUP-040813	PCDD/PCDF	1,2,3,4,7,8,9-HpCDF	5.17	5.99	0.550/0.664	pg/L	15
DPWG43602	STW-01-040813/DUP-040813	PCDD/PCDF	OCDF	98.3	127	0.550/0.514	pg/L	25
DPWG43602	STW-01-040813/DUP-040813	PCDD/PCDF	TOTAL PENTA-DIOXINS	1.61	2.27	0.550/0.514	pg/L	34
DPWG43602	STW-01-040813/DUP-040813	PCDD/PCDF	TOTAL HEXA-DIOXINS	25.6	21.0	0.550/0.514	pg/L	20
DPWG43602	STW-01-040813/DUP-040813	PCDD/PCDF	TOTAL HEPTA-DIOXINS	268	258	0.841/0.548	pg/L	3.8
DPWG43602	STW-01-040813/DUP-040813	PCDD/PCDF	TOTAL PENTA-FURANS	7.45	17.2	0.550/0.514	pg/L	79
DPWG43602	STW-01-040813/DUP-040813	PCDD/PCDF	TOTAL HEXA-FURANS	56.9	73.5	0.573/0.514	pg/L	25
DPWG43602	STW-01-040813/DUP-040813	PCDD/PCDF	TOTAL HEPTA-FURANS	98.4	135	0.550/0.664	pg/L	31
WK87	STW-01-040813/DUP-040813	Total metals	Antimony	0.7	0.8	0.2	µg/L	13
WK87	STW-01-040813/DUP-040813	Total metals	Arsenic	2.3	2.5	0.2	µg/L	8.3
WK87	STW-01-040813/DUP-040813	Total metals	Copper	10.0	10.4	0.5	µg/L	3.9
WK87	STW-01-040813/DUP-040813	Total metals	Lead	0.3	0.3	0.1	µg/L	0
WK87	STW-01-040813/DUP-040813	Total metals	Nickel	0.8	0.9	0.5	µg/L	12
WK87	STW-01-040813/DUP-040813	Total metals	Zinc	12	13	4	µg/L	8.0
WK87	STW-01-040813/DUP-040813	Dissolved metals	Antimony	0.7	0.8	0.2	µg/L	13
WK87	STW-01-040813/DUP-040813	Dissolved metals	Arsenic	2.2	2.2	0.2	µg/L	0
WK87	STW-01-040813/DUP-040813	Dissolved metals	Copper	7.7	7.8	0.5	µg/L	1.3
WK87	STW-01-040813/DUP-040813	Dissolved metals	Nickel	0.6	0.6	0.5	µg/L	0

Table 4
Field Duplicate Results and Calculated Relative Percent Differences
April 2013 Storm Water Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
WK87	STW-01-040813/DUP-040813	Dissolved metals	Zinc	10	10	4	µg/L	0

Data packages reviewed: Axys DPWG43602; ARI WK87

Key:

RPD = Relative percent difference

PCDD/PCDF = Polychlorinated dibenzo-p-dioxins/Polychlorinated dibenzofurans; Method 1613B

HXCDD = Hexachlorodibenzo-p-dioxin

HPCDD = Heptachlorodibenzo-p-dioxin

OCDD = Octochlorodibenzo-p-dioxin

PECDF = Pentachlorodibenzofuran

HXCDF = Hexachlorodibenzofuran

HPCDF = Heptachlorodibenzofuran

OCDF = Octochlorodibenzofuran

pg/L = Picograms per liter

VOC = Volatile organic compounds; Method 8260C

µg/L = Micrograms per liter

Table 5
Calibration Verification Recoveries Outside of Acceptable Limits
April 2013 Storm Water Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	CCV ID	Analysis	Compound	CCV Recovery	CCV Limit	Associated Samples	Reported Concentration	Units	ERM Qualifier
WK87	CCV-040913	VOC	Acetone	22.5	20	NA	--	--	--
WK87	CCV-041113	SVOC	4-Nitrophenol	30.0	20	NA	--	--	--

Data packages reviewed: Axy's DPWG43602; ARI WK87

Key:

CCV = Continuing calibration verification

VOC = Volatile organic compounds; Method 8260C

SVOC = Semivolatile organic compounds; Method 8270D

Memorandum

Environmental Resources Management

To: Mike Mendes

From: Irene Lavigne

Date: 04 March 2013

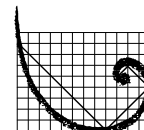
Subject: Data Review of Reichhold-Glacier Storm Water
Samples Collected 09 January 2013

Project Number: 0155129

Data Packages: Axys Analytical Services Data Package DPWG42810

Analytical Resources Incorporated Data Package
VY91

2875 Michelle Drive
Suite 200
Irvine, CA 92606
(949) 623-4700
(949) 623-2940 (fax)



ERM®

The data quality was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999, *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004, and the *EPA Region 10 SOP for the Validation of Polychlorinated Dibenzodioxin (PCDD) and Polychlorinated Dibenzofuran (PCDF) Data*, January 1996.

HOLDING TIME AND PRESERVATION EVALUATION

The sample shipments were received at the laboratory within the method-prescribed preservation requirements. The samples were prepared and analyzed within the method-prescribed time period from the date of collection. No sample data were qualified based on sample preservation or holding-time exceedances.

BLANK EVALUATION

The method blank, trip blank, and field blank sample results were nondetected for each of the target analytes with limited exceptions. A detection of total tetra-furans in a lab blank resulted in qualification of two samples as nondetected (U) for this compound. Detections of additional dioxin/furan compounds in the same lab blank did not require qualification of associated sample data because either the sample results were nondetected for the corresponding compounds, or the blank results

were identified as estimated maximum possible concentrations for dioxin/furan analyses. Detections of volatile organic compounds in a method blank required qualification of two sample data as nondetected (U) for naphthalene and 1,2,3-trichlorobenzene. The blank detections are listed in Table 1.

BLANK SPIKE EVALUATION

The laboratory control sample and laboratory control sample duplicate recoveries were within the laboratory's limits of acceptance. No sample data were qualified based on the blank spike evaluation.

MATRIX SPIKE EVALUATION

The matrix spike (MS) and matrix spike duplicate (MSD) recoveries were within the laboratory's limits of acceptance with several exceptions. Detected sample results for octochlorodibenzo-p-dioxin and acetone were qualified as estimated (J) based on MS recoveries that exceeded the maximum acceptable limits. Not all MS recovery outliers resulted in qualification of associated sample data. Data were not qualified if only one recovery in a MS/MSD pair exceeded control limits, or if the MS recovery was biased high and the sample result was nondetected for the corresponding compound. The outlying MS recoveries and qualified sample data are shown in Table 2.

LABELED COMPOUND EVALUATION

Carbon-13 labeled isotope recoveries were reported for each sample submitted for dioxin/furan analysis. The recoveries of labeled PCDD and PCDF compounds is a measure of the effectiveness of the laboratory and method to extract the compounds of interest. All of the labeled compounds were within acceptable limits, and no qualifiers were required based on the labeled compound evaluation.

SURROGATE EVALUATION

The surrogate recoveries were within acceptable limits, and no sample data required qualification as a result of the surrogate evaluation. The surrogate recoveries indicate minimal matrix interference in the samples.

ESTIMATED MAXIMUM POSSIBLE CONCENTRATION

The laboratory identified several dioxin results as estimated maximum possible concentration (EMPC). An EMPC value is the maximum possible concentration of a compound that could be present in the sample. This classification is used when all of the identification criteria for a given dioxin or furan compound are not met. The sample data identified as EMPC by the laboratory were qualified as nondetected (U), as presented in Table 3.

FIELD DUPLICATE EVALUATION

One sample was collected and analyzed in duplicate. ERM calculated the RPD between detected results. The USEPA has not established control criteria for field duplicate samples; therefore, sample data are not qualified on the basis of field duplicate imprecision. Detected duplicate results and calculated RPDs are listed in Table 4.

CONTINUING CALIBRATION EVALUATION

The laboratory noted that several continuing calibration verification (CCV) recoveries for two compounds did not meet acceptable control limits. Nondetected sample results for pentachlorophenol associated with a low CCV recovery were qualified as estimated (UJ). The CCV outliers and associated, qualified data are shown in Table 5. Not all CCV outliers resulted in qualified data. Data were not qualified if the CCV recoveries were biased high and the associated samples were nondetected for the corresponding compounds.

OVERALL ASSESSMENT

No data were determined to be unusable. All of the data, including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents.

Table 1
Blank and Associated Suspect Sample Detections
January 2013 Storm Water Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG42810	Lab Blank	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDD	0.548	0.500	pg/L	EMPC
DPWG42810	Lab Blank	PCDD/PCDF	NA	OCDD	1.03	0.500	pg/L	EMPC
DPWG42810	Lab Blank	PCDD/PCDF	NA	2,3,7,8-TCDF	1.31	0.500	pg/L	--
DPWG42810	Lab Blank	PCDD/PCDF	NA	2,3,4,7,8-PECDF	0.561	0.500	pg/L	EMPC
DPWG42810	Lab Blank	PCDD/PCDF	See below	TOTAL TETRA-FURANS	10.7	0.500	pg/L	--
DPWG42810	Lab Blank	PCDD/PCDF	STW-01-010913	TOTAL TETRA-FURANS	0.763	0.528	pg/L	0.763 U
DPWG42810	Lab Blank	PCDD/PCDF	DUP-010913	TOTAL TETRA-FURANS	0.554	0.529	pg/L	0.554 U
VY91	MB-011713A	VOC	See below	Naphthalene	0.13	0.12	µg/L	--
VY91	MB-011713A	VOC	STW-01-010913	Naphthalene	0.16	0.12	µg/L	0.16 U
VY91	MB-011713A	VOC	See below	1,2,3-Trichlorobenzene	0.12	0.11	µg/L	--
VY91	MB-011713A	VOC	STW-01-010913	1,2,3-Trichlorobenzene	0.12	0.11	µg/L	0.12 U
VY91	MB-012313A	VOC	NA	1,2,4-Trichlorobenzene	0.15	0.50	µg/L	--
VY91	MB-012313A	VOC	NA	Naphthalene	0.23	0.50	µg/L	--
VY91	MB-012313A	VOC	NA	1,2,3-Trichlorobenzene	0.15	0.50	µg/L	--

Data packages reviewed: Axys DPWG42810; ARI VY91

Key:

PCDD/PCDF = Polychlorinated dibenzo-p-dioxins/Polychlorinated dibenzofurans; Method 1613B

NA = Not applicable; qualification of sample data not required

HPCDD = Heptachlorodibenzo-p-dioxin

OCDD = Octochlorodibenzo-p-dioxin

TCDF = Tetrachlorodibenzofuran

PECDF = Pentachlorodibenzofuran

EMPC = Blank result identified as Estimated Maximum Possible Concentration; qualification of sample data not required

pg/L = Picograms per liter

VOC = Volatile organic compounds; Method 8260C

µg/L = Micrograms per liter

U = Nondetected

Table 2
Matrix Spike Recoveries Outside of Acceptable Limits
January 2013 Storm Water Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
DPWG42810	STW-01-010913 MS/MSD	PCDD/PCDF	See below	OCDD	302/290	70-130	4.08	20	--	--
DPWG42810	STW-01-010913 MS/MSD	PCDD/PCDF	STW-01-010913	OCDD	--	--	--	--	726	J
DPWG42810	STW-01-010913 MS/MSD	PCDD/PCDF	DUP-010913	OCDD	--	--	--	--	5150	J
VY91	STW-01-010913 MS/MSD	VOC	See below	Acetone	151/146	64-125	3.6	30	--	--
VY91	STW-01-010913 MS/MSD	VOC	STW-01-010913	Acetone	--	--	--	--	6.5	J
VY91	STW-01-010913 MS/MSD	VOC	DUP-010913	Acetone	--	--	--	--	7.8	J
VY91	STW-01-010913 MS/MSD	VOC	NA	Chloroform	120/121	80-120	0.8	30	--	--
VY91	STW-01-010913 MS/MSD	VOC	NA	1,2-Dichloroethane	124/119	80-121	4.1	30	--	--
VY91	STW-01-010913 MS/MSD	VOC	NA	2-Butanone	137/135	73-123	1.3	30	--	--
VY91	STW-01-010913 MS/MSD	VOC	NA	4-Methyl-2-pentanone	130/127	80-125	2.8	30	--	--
VY91	STW-01-010913 MS/MSD	VOC	NA	Acrylonitrile	134/126	76-123	6.2	30	--	--
VY91	STW-01-010913 MS/MSD	VOC	NA	1,2-Dibromoethane	121/117	80-120	3.4	30	--	--
VY91	STW-01-010913 MS/MSD	VOC	NA	Isopropylbenzene	122/123	80-120	0.8	30	--	--
VY91	STW-01-010913 MS/MSD	VOC	NA	n-Propylbenzene	122/121	80-120	0.8	30	--	--
VY91	STW-01-010913 MS/MSD	VOC	NA	sec-Butylbenzene	120/123	80-121	2.5	30	--	--

Data packages reviewed: Axys DPWG42810; ARI VY91

Key:

MS/MSD = Matrix spike/matrix spike duplicate

RPD = Relative percent difference

PCDD/PCDF = Polychlorinated dibenzo-p-dioxins/Polychlorinated dibenzofurans; Method 1613B

OCDD = Octochlorodibenzo-p-dioxin

VOC = Volatile organic compounds; Method 8260C

NA = Not applicable; qualification of sample data not required

J = Detected sample result qualified as estimated

Table 3
Estimated Maximum Possible Concentration
January 2013 Storm Water Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG42810	STW-01-010913	2,3,7,8-TCDD	1.05	0.528	pg/L	1.05 U
DPWG42810	STW-01-010913	1,2,3,6,7,8-HXCDD	1.46	0.650	pg/L	1.46 U
DPWG42810	STW-01-010913	2,3,4,7,8-PECDF	0.745	0.528	pg/L	0.745 U
DPWG42810	STW-01-010913	1,2,3,6,7,8-HXCDF	0.761	0.528	pg/L	0.761 U
DPWG42810	STW-01-010913	1,2,3,7,8,9-HXCDF	0.601	0.528	pg/L	0.601 U
DPWG42810	STW-01-010913	2,3,4,6,7,8-HXCDF	0.875	0.528	pg/L	0.875 U
DPWG42810	STW-01-010913	1,2,3,4,7,8,9-HPCDF	1.79	0.528	pg/L	1.79 U
DPWG42810	DUP-010913	1,2,3,6,7,8-HXCDD	7.14	0.529	pg/L	7.14 U
DPWG42810	Lab Blank	1,2,3,4,6,7,8-HPCDD	0.548	0.500	pg/L	0.548 U
DPWG42810	Lab Blank	OCDD	1.03	0.500	pg/L	1.03 U
DPWG42810	Lab Blank	2,3,4,7,8-PECDF	0.561	0.500	pg/L	0.561 U

Data packages reviewed: Axys DPWG42810; ARI VY91

Key:

TCDD = Tetrachlorodibenzo-p-dioxin

HXCDD = Hexachlorodibenzo-p-dioxin

PECDF = Pentachlorodibenzofuran

HXCDF = Hexachlorodibenzofuran

HPCDF = Heptachlorodibenzofuran

HPCDD = Heptachlorodibenzo-p-dioxin

OCDD = Octochlorodibenzo-p-dioxin

pg/L = Picograms per liter

U = Nondetected

Table 4
Field Duplicate Results and Calculated Relative Percent Differences
January 2013 Storm Water Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
DPWG42810	STW-01-010913/DUP-010913	PCDD/PCDF	1,2,3,4,7,8-HXCDD	0.897	1.60	0.650/0.529	pg/L	56
DPWG42810	STW-01-010913/DUP-010913	PCDD/PCDF	1,2,3,6,7,8-HXCDD	1.46	7.14	0.650/0.529	pg/L	132
DPWG42810	STW-01-010913/DUP-010913	PCDD/PCDF	1,2,3,7,8,9-HXCDD	1.42	3.47	0.650/0.529	pg/L	84
DPWG42810	STW-01-010913/DUP-010913	PCDD/PCDF	1,2,3,4,6,7,8-HPCDD	37.9	215	0.528/0.529	pg/L	140
DPWG42810	STW-01-010913/DUP-010913	PCDD/PCDF	OCDD	726	5150	1.13/0.529	pg/L	151
DPWG42810	STW-01-010913/DUP-010913	PCDD/PCDF	2,3,4,7,8-PECDF	0.745	2.05	0.528/0.529	pg/L	93
DPWG42810	STW-01-010913/DUP-010913	PCDD/PCDF	1,2,3,4,7,8-HXCDF	3.42	12.9	0.528/0.529	pg/L	116
DPWG42810	STW-01-010913/DUP-010913	PCDD/PCDF	1,2,3,6,7,8-HXCDF	0.761	2.58	0.528/0.529	pg/L	109
DPWG42810	STW-01-010913/DUP-010913	PCDD/PCDF	2,3,4,6,7,8-HXCDF	0.875	1.25	0.528/0.529	pg/L	35
DPWG42810	STW-01-010913/DUP-010913	PCDD/PCDF	1,2,3,4,6,7,8-HPCDF	9.76	40.2	0.528/0.529	pg/L	122
DPWG42810	STW-01-010913/DUP-010913	PCDD/PCDF	1,2,3,4,7,8,9-HPCDF	1.79	7.23	0.528/0.529	pg/L	121
DPWG42810	STW-01-010913/DUP-010913	PCDD/PCDF	OCDF	25.3	114	0.528/0.529	pg/L	127
DPWG42810	STW-01-010913/DUP-010913	PCDD/PCDF	TOTAL HEXA-DIOXINS	2.32	24.3	0.650/0.529	pg/L	165
DPWG42810	STW-01-010913/DUP-010913	PCDD/PCDF	TOTAL HEPTA-DIOXINS	64.8	381	0.528/0.529	pg/L	142
DPWG42810	STW-01-010913/DUP-010913	PCDD/PCDF	TOTAL TETRA-FURANS	0.763	0.554	0.528/0.529	pg/L	32
DPWG42810	STW-01-010913/DUP-010913	PCDD/PCDF	TOTAL HEXA-FURANS	4.08	78.3	0.528/0.529	pg/L	180
DPWG42810	STW-01-010913/DUP-010913	PCDD/PCDF	TOTAL HEPTA-FURANS	30.1	145	0.528/0.529	pg/L	131
VY91	STW-01-010913/DUP-010913	VOC	Acetone	6.5	7.8	2.1	µg/L	18
VY91	STW-01-010913/DUP-010913	Total metals	Antimony	0.4	0.4	0.2	µg/L	0
VY91	STW-01-010913/DUP-010913	Total metals	Arsenic	3.5	3.4	0.2	µg/L	2.9
VY91	STW-01-010913/DUP-010913	Total metals	Chromium	2	2	0.5	µg/L	0
VY91	STW-01-010913/DUP-010913	Total metals	Copper	28.8	28.8	0.5	µg/L	0
VY91	STW-01-010913/DUP-010913	Total metals	Lead	1.5	1.5	0.1	µg/L	0
VY91	STW-01-010913/DUP-010913	Total metals	Nickel	2.7	2.6	0.5	µg/L	3.8
VY91	STW-01-010913/DUP-010913	Total metals	Zinc	39	46	4	µg/L	16
VY91	STW-01-010913/DUP-010913	Dissolved metals	Antimony	0.4	0.4	0.2	µg/L	0
VY91	STW-01-010913/DUP-010913	Dissolved metals	Arsenic	2.2	2.2	0.2	µg/L	0

Table 4
Field Duplicate Results and Calculated Relative Percent Differences
January 2013 Storm Water Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
VY91	STW-01-010913/DUP-010913	Dissolved metals	Copper	4.2	4.0	0.5	µg/L	4.9
VY91	STW-01-010913/DUP-010913	Dissolved metals	Zinc	11	12	4	µg/L	8.7

Data packages reviewed: Axys DPWG42810; ARI VY91

Key:

RPD = Relative percent difference

PCDD/PCDF = Polychlorinated dibenzo-p-dioxins/Polychlorinated dibenzofurans; Method 1613B

HXCDD = Hexachlorodibenzo-p-dioxin

HPCDD = Heptachlorodibenzo-p-dioxin

OCDD = Octochlorodibenzo-p-dioxin

PECDF = Pentachlorodibenzofuran

HXCDF = Hexachlorodibenzofuran

HPCDF = Heptachlorodibenzofuran

OCDF = Octochlorodibenzofuran

pg/L = Picograms per liter

VOC = Volatile organic compounds; Method 8260C

µg/L = Micrograms per liter

Table 5
Calibration Verification Recoveries Outside of Acceptable Limits
January 2013 Storm Water Sampling
Reichhold-Glacier Site
Seattle, Washington

Lab Package	CCV ID	Analysis	Compound	CCV Recovery	CCV Limit	Associated Samples	Reported Concentration	Units	ERM Qualifier
VY91	CCV-011713	SVOC	Benzoic acid	37.6	20	NA	--	--	--
VY91	CCV-011713	SVOC	Pentachlorophenol	-40.0	20	See below	--	--	--
VY91	CCV-011713	SVOC	--	--	--	STW-01-010913	< 10	µg/L	UJ
VY91	CCV-011713	SVOC	--	-	--	DUP-010913	< 10	µg/L	UJ

Data packages reviewed: Axys DPWG42810; ARI VY91

Key:

CCV = Continuing calibration verification

SVOC = Semivolatile organic compounds; Method 8270D

µg/L = Micrograms per liter

UJ = Nondetected sample result qualified as estimated

Memorandum

Environmental Resources Management

To: Mike Mendes

From: Irene Lavigne

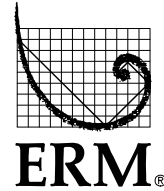
Date: 14 December 2012
09 January 2013, revised to include additional lab report

Subject: Data Review of Reichhold-Glacier Storm Water & Storm Water Solids Samples Collected August – October 2012

Project Number: 0155129

Data Packages: Analytical Resources Incorporated Data Packages VI13, VO46, and VQ27
Axy's Analytical Services Data Packages DPWG41412, DPWG41596, DPWG41862, and DPWG42297

2875 Michelle Drive
Suite 200
Irvine, CA 92606
(949) 623-4700
(949) 623-2940 (fax)



The data quality was assessed and any necessary qualifiers were applied following the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, October 1999, *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004, and the *EPA Region 10 SOP for the Validation of Polychlorinated Dibenzodioxin (PCDD) and Polychlorinated Dibenzofuran (PCDF) Data*, January 1996.

HOLDING TIME AND PRESERVATION EVALUATION

The sample shipments were received at the laboratory within the method-prescribed preservation requirements. No sample data were qualified based on the sample preservation evaluation.

The samples were prepared and analyzed within the method-prescribed time period from the date of collection with two exceptions. One analyses each for mercury and total organic carbon were performed outside of the 28-day holding time for these analyses. The detected sample results were qualified as estimated and biased low (J-) , as shown in Table 1.

BLANK EVALUATION

The method blank, trip blank, field blank, and rinsate blank sample results were nondetected for each of the target analytes with several exceptions. Detections of various semivolatile, volatile, and dioxin/furan compounds resulted in qualification of associated samples as nondetected (U). Not all blank detections resulted in qualification of associated data. Data were not qualified if the samples were nondetected for the associated compounds, if the sample results exceeded the five times the blank concentrations of organic compounds or 10 times the blank concentrations of inorganic compounds, or if the blank results were identified as estimated maximum possible concentrations for dioxin/furan analyses. The blank detections and associated, qualified data are listed in Table 2.

BLANK SPIKE EVALUATION

The laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) recoveries were within the laboratory's limits of acceptance with one exception. No sample data were qualified on the basis of the LCS outlier because only one recovery in the LCS/LCSD pair exceeded the acceptable control limits. The outlying LCS recovery is shown in Table 3.

MATRIX SPIKE EVALUATION

The matrix spike (MS) and matrix spike duplicate (MSD) recoveries were within the laboratory's limits of acceptance with several exceptions. No sample data were qualified based on the MS outliers. Data were not qualified if only the relative percent difference (RPD) exceeded control limits, if only one recovery in a MS/MSD pair exceeded control limits, or if the concentration of the unspiked samples was greater than four times the amount spiked. Additionally, if the spike sample was diluted by a factor of 10 time or more, the surrogate compounds did not provide useful recovery information, and did not result in qualified data. The outlying MS recoveries and qualified sample data are listed in Table 4.

LABELED COMPOUND EVALUATION

Carbon-13 labeled isotope recoveries were reported for each sample submitted for dioxin/furan analysis. The recoveries of labeled PCDD and PCDF compounds is a measure of the effectiveness of the laboratory and method to extract the compounds of interest. One sample had a recovery of ¹³C-octachlorodibenzo-p-dioxin that exceeded the maximum acceptable limits. No qualifiers were applied to the corresponding compound because the sample had been diluted by a factor of 20, resulting in dilution of the carbon-13 compound to a point where the recovery did not provide useful information. The outlying isotope recovery is shown in Table 5.

SURROGATE EVALUATION

The surrogate recoveries were within acceptable limits, and no sample data required qualification as a result of the surrogate evaluation. The surrogate recoveries indicate minimal matrix interference in the samples.

ESTIMATED MAXIMUM POSSIBLE CONCENTRATION

The laboratory identified several dioxin results as estimated maximum possible concentration (EMPC). An EMPC value is the maximum possible concentration of a compound that could be present in the sample. This classification is used when all of the identification criteria for a given dioxin or furan compound are not met. The sample data identified as EMPC by the laboratory were qualified as nondetected (U), as shown in Table 6.

FIELD DUPLICATE EVALUATION

Two samples were collected and analyzed in duplicate. ERM calculated the RPD between detected results. The USEPA has not established control criteria for field duplicate samples; therefore, sample data are not qualified on the basis of field duplicate imprecision. Detected duplicate results and calculated RPDs are presented in Table 7.

CONTINUING CALIBRATION EVALUATION

The laboratory noted that two continuing calibration verification (CCV) recoveries for a number of compound did not meet acceptable control limits. Detected and nondetected sample results associated with low CCV recoveries were qualified as estimated and biased low (J-) or estimated (UJ), respectively. Detected sample data associated with high CCV recoveries were qualified as estimated and biased high (J+). The CCV outliers and associated, qualified data are shown in Table 8. A number of the CCV outliers were associated with compounds that were not constituents of concern; these compounds are not included in Table 8. Not all CCV outliers resulted in qualified data. Data were not qualified if the CCV recoveries were biased high and the associated samples were nondetected for the corresponding compounds.

CALIBRATION RANGE EVALUATION

The laboratory noted four instances where the results of undiluted samples exceeded the calibration range of the equipment. Two of the affected samples were diluted and reanalyzed. The sample data resulting from the reanalyses were within the calibration range and should be used for decision-making purposes. The sample results which exceeded the calibration range were qualified as estimated (J), and are listed in Table 9.

OVERALL ASSESSMENT

No data were determined to be unusable. All of the data, including qualified data, can be used for decision-making purposes; however, the limitations indicated by the applied qualifiers should be considered when using the data. The quality of the data generated during this investigation is acceptable for the preparation of technically-defensible documents.

Table 1
Samples with Exceeded Holding Times
Storm Water and Storm Water Solids Collected August -October 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Method	Holding Time (days)	Days Exceeded	Sample Result	ERM Qualifier
VO46	SWD-02	Mercury; Method 7471A	28	22	0.02	J-
VO46	SWD-02	TOC; Method 9060M	28	21	3.46	J-

Data packages reviewed: ARI VI13, VO46, VQ27; Axys DPWG41164, DPWG41227, DPWG41516

Key:

TOC = Total organic carbon

J- = Detected sample result qualified as estimated and biased low

Table 2
Blank and Associated Suspect Sample Detections
Storm Water and Storm Water Solids Collected August -October 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
VI13	MB-091112	SVOC	NA	bis(2-Ethylhexyl) phthalate	44	25	µg/kg	--
VI13	MB-091112	SVOC-SIM	See below	Diethylphthalate	6.7	5.0	µg/kg	--
VI13	MB-091112	SVOC-SIM	TANK-01	Diethylphthalate	27	4.6	µg/kg	27 U
VI13	MB-091112	SVOC-SIM	DUP090412	Diethylphthalate	27	4.6	µg/kg	27 U
VI13	MB-091812	Total metals	NA	Zinc	1	1.0	mg/kg	--
VO46	MB-102312	SVOC	See below	bis(2-Ethylhexyl) phthalate	20	25	µg/kg	--
VO46	MB-102312	SVOC	SWD-02	bis(2-Ethylhexyl) phthalate	34	23	µg/kg	34 U
VO46	MB-102312	SVOC-SIM	NA	Diethylphthalate	4.9	5.0	µg/kg	--
VQ27	MB-110512A	VOC	See below	Acetone	4.9	5.0	µg/L	--
VQ27	MB-110512A	VOC	STW-01-103012	Acetone	7.4	5.0	µg/L	7.4 U
VQ27	MB-110512A	VOC	DUP103012-1	Acetone	6.7	5.0	µg/L	6.7 U
VQ27	MB-110512A	VOC	NA	Hexachlorobutadiene	0.32	0.50	µg/L	--
VQ27	MB-110512A	VOC	NA	n-Butylbenzene	0.13	0.20	µg/L	--
VQ27	MB-110912	Total metals	NA	Copper	0.8	0.5	µg/L	--
DPWG41412	RB090412	PCDD/PCDF	NA	1,2,3,4,7,8-HXCDD	0.649	0.520	pg/L	EMPC
DPWG41412	RB090412	PCDD/PCDF	NA	1,2,3,6,7,8-HXCDD	0.539	0.520	pg/L	EMPC
DPWG41412	RB090412	PCDD/PCDF	NA	1,2,3,7,8,9-HXCDD	0.802	0.520	pg/L	EMPC
DPWG41412	RB090412	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDD	3.43	0.547	pg/L	--
DPWG41412	RB090412	PCDD/PCDF	NA	OCDD	22.5	0.520	pg/L	--
DPWG41412	RB090412	PCDD/PCDF	See below	2,3,4,7,8-PECDF	0.659	0.520	pg/L	--

Table 2
Blank and Associated Suspect Sample Detections
Storm Water and Storm Water Solids Collected August -October 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG41412	RB090412	PCDD/PCDF	TANK-01	2,3,4,7,8-PECDF	2.62	0.050	pg/g	2.62 U
DPWG41412	RB090412	PCDD/PCDF	DUP090412	2,3,4,7,8-PECDF	2.96	0.050	pg/g	2.96 U
DPWG41412	RB090412	PCDD/PCDF	NA	1,2,3,4,7,8-HXCDF	0.610	0.520	pg/L	EMPC
DPWG41412	RB090412	PCDD/PCDF	NA	1,2,3,6,7,8-HXCDF	0.741	0.520	pg/L	--
DPWG41412	RB090412	PCDD/PCDF	See below	2,3,4,6,7,8-HXCDF	0.929	0.520	pg/L	--
DPWG41412	RB090412	PCDD/PCDF	TANK-01	2,3,4,6,7,8-HXCDF	2.13	0.086	pg/g	2.13 U
DPWG41412	RB090412	PCDD/PCDF	DUP090412	2,3,4,6,7,8-HXCDF	2.31	0.135	pg/g	2.31 U
DPWG41412	RB090412	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDF	0.904	0.520	pg/L	EMPC
DPWG41412	RB090412	PCDD/PCDF	NA	1,2,3,4,7,8,9-HPCDF	1.04	0.520	pg/L	EMPC
DPWG41412	RB090412	PCDD/PCDF	NA	OCDF	3.85	0.520	pg/L	--
DPWG41412	RB090412	PCDD/PCDF	NA	TOTAL HEPTA-DIOXINS	4.81	0.547	pg/L	--
DPWG41412	Lab Blank	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDD	0.857	0.500	pg/L	--
DPWG41412	Lab Blank	PCDD/PCDF	NA	OCDD	2.49	0.500	pg/L	EMPC
DPWG41412	Lab Blank	PCDD/PCDF	NA	1,2,3,4,7,8,9-HPCDF	0.607	0.500	pg/L	--
DPWG41412	Lab Blank	PCDD/PCDF	NA	OCDF	0.921	0.500	pg/L	EMPC
DPWG41412	Lab Blank	PCDD/PCDF	NA	TOTAL HEPTA-DIOXINS	0.857	0.500	pg/L	--
DPWG41412	Lab Blank	PCDD/PCDF	NA	TOTAL HEPTA-FURANS	0.607	0.500	pg/L	--
DPWG41862	Lab Blank	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDD	0.083	0.050	pg/g	EMPC
DPWG41862	Lab Blank	PCDD/PCDF	NA	OCDD	0.828	0.050	pg/g	--
DPWG41862	Lab Blank	PCDD/PCDF	NA	OCDF	0.079	0.050	pg/g	EMPC
DPWG42297	Lab Blank	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDD	0.548	0.500	pg/L	EMPC
DPWG42297	Lab Blank	PCDD/PCDF	NA	OCDD	21.7	0.500	pg/L	--

Table 2
Blank and Associated Suspect Sample Detections
Storm Water and Storm Water Solids Collected August -October 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Blank ID	Analysis	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG42297	Lab Blank	PCDD/PCDF	NA	OCDF	0.695	0.500	pg/L	EMPC

Data packages reviewed: ARI VII3, VO46, VQ27; Axys DPWG41164, DPWG41227, DPWG41516

Key:

MB = Method blank

RB = Rinsate blank

SVOC = Semivolatile organic compounds; Method 8270D

SVOC-SIM = Semivolatile organic compounds - selected ion monitoring

VOC = Volatile organic compounds; Method 8260C

NA = Not applicable; qualification of sample data not required

U = Nondetected

PCDD/PCDF = Polychlorinated dibenzo-p-dioxins/Polychlorinated dibenzofurans; Method 1613B

pg/L = Picograms per liter

pg/g = Picograms per gram

EMPC = Blank result identified as Estimated Maximum Possible Concentration; qualification of sample data not required

µg/kg = Micrograms per kilogram

mg/kg = milligrams per kilogram

µg/L = Micrograms per liter

HXCDD = Hexachlorodibenzo-p-dioxin

HPCDD = Heptachlorodibenzo-p-dioxin

OCDD = Octochlorodibenzo-p-dioxin

PECDF = Pentachlorodibenzofuran

HXCDF = Hexachlorodibenzofuran

HPCDF = Heptachlorodibenzofuran

OCDF = Octochlorodibenzofuran

Table 3
Laboratory Control Spike Recoveries Outside of Acceptable Limits
Storm Water and Storm Water Solids Collected August -October 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Associated Sample	Analysis	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
VQ27	LCS-110512A	NA	VOC	Acrolein	113/133	60-124	16.4	40	--	--

Data packages reviewed: ARI VI13, VO46, VQ27; Axys DPWG41164, DPWG41227, DPWG41516

Key:

LCS = Laboratory control sample

NA = Not applicable; qualification of sample data not required

VOC = Volatile organic compounds; Method 8260C

Table 4
Matrix Spike Recoveries Outside of Acceptable Limits
Storm Water and Storm Water Solids Collected August -October 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
VI13	SWD-01 MS/MSD	SVOC	NA	Phenol	NC/NC	30-160	8.8	30	4X	--
VI13	SWD-01 MS/MSD	SVOC	NA	Benzyl alcohol	NC/NC	30-160	10.2	30	4X	--
VI13	SWD-01 MS/MSD	SVOC	NA	Benzoic acid	NC/NC	30-160	16	30	4X	--
VI13	SWD-01 MS/MSD	SVOC	NA	N-Nitrosodiphenylamine	NC/NC	30-160	NC	30	--	--
VI13	SWD-01 MS/MSD	SVOC-SIM	NA	N-Nitrosodiphenylamine	2.2/3.4	30-160	45.4	30	--	--
VI13	SWD-01 MS/MSD	SVOC-SIM	NA	Benzyl alcohol	NC/NC	30-160	13.2	30	--	--
VQ27	STW-01-103012 MS/MSD	VOC	NA	Styrene	123/120	80-120	2.5	30	--	--
DPWG41596	GP-55_2.5-4 MS/MSD	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDD	1000	70-130	NC	20	SDO	--
DPWG41596	GP-55_2.5-4 MS/MSD	PCDD/PCDF	NA	OCDD	81400	70-130	NC	20	SDO	--
DPWG41596	GP-55_2.5-4 MS/MSD	PCDD/PCDF	NA	2,3,7,8-TCDF	112/83.0	70-130	29.6	20	--	--
DPWG41596	GP-55_2.5-4 MS/MSD	PCDD/PCDF	NA	2,3,4,7,8-PECDF	134/99.3	70-130	29.7	20	--	--
DPWG41596	GP-55_2.5-4 MS/MSD	PCDD/PCDF	NA	1,2,3,4,7,8-HXCDF	185/96.1	70-130	63.0	20	--	--
DPWG41596	GP-55_2.5-4 MS/MSD	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDF	261	70-130	NC	20	SDO	--
DPWG41596	GP-55_2.5-4 MS/MSD	PCDD/PCDF	NA	1,2,3,4,7,8,9-HPCDF	130	70-130	52.3	20	SDO	--
DPWG41596	GP-55_2.5-4 MS/MSD	PCDD/PCDF	NA	OCDF	1510	70-130	NC	20	SDO	--
DPWG41596	SWD-01 MS/MSD	PCDD/PCDF	NA	1,2,3,7,8,9-HXCDD	85.3/115	70-130	29.3	20	--	--
DPWG41596	SWD-01 MS/MSD	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDD	723/552	70-130	26.8	20	SDO	--
DPWG41596	SWD-01 MS/MSD	PCDD/PCDF	NA	OCDD	4520/11600	70-130	87.5	20	SDO	--
DPWG41596	SWD-01 MS/MSD	PCDD/PCDF	NA	1,2,3,4,6,7,8-HPCDF	189/97.4	70-130	64.0	20	--	--

Table 4
Matrix Spike Recoveries Outside of Acceptable Limits
Storm Water and Storm Water Solids Collected August -October 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Spike Sample ID	Analysis	Associated Sample	Compound	Recovery (%)	Limit (%)	RPD	RPD Limit	Sample Result	ERM Qualifier
DPWG41596	SWD-01 MS/MSD	PCDD/PCDF	NA	OCDF	292/234	70-130	21.8	20	SDO	--

Data packages reviewed: ARI VI13, VO46, VQ27; Axys DPWG41164, DPWG41227, DPWG41516

Key:

MS/MSD = Matrix spike/matrix spike duplicate

RPD = Relative percent difference

NA = Not applicable; qualification of sample data not required

SVOC = Semivolatile organic compounds; Method 8270D

SVOC-SIM = Semivolatile organic compounds - selected ion monitoring

VOC = Volatile organic compounds; Method 8260C

PCDD/PCDF = Polychlorinated dibenzo-p-dioxins/Polychlorinated dibenzofurans; Method 1613B

SDO = Spike sample diluted by a factor of 20; recovery does not provide useful information

4X = Concentration of unspiked sample was greater than 4 times the amount spiked; no qualification required

TCDF = Tetrachlorodibenzofuran

HXCDF = Hexachlorodibenzofuran

OCDF = Octochlorodibenzofuran

HPCDD = Heptachlorodibenzo-p-dioxin

OCDD = Octochlorodibenzo-p-dioxin

HPCDF = Heptachlorodibenzofuran

Table 5
Labeled Compound Recovery Results Outside of Acceptable Limits
Storm Water and Storm Water Solids Collected August -October 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Labeled Compound	Associated Compound	Recovery (%)	Limit (%)	Note	ERM Qualifier
DPWG41596	GP-55_2.5-4	13C-OCDD	OCDD	149	25-130	SDO	--

Data packages reviewed: ARI VII3, VO46, VQ27; Axys DPWG41164, DPWG41227, DPWG41516

Key:

13C = Carbon-13 labeled isotope

OCDD = Octachlorodibenzo-p-dioxin

SDO = Spike sample diluted by a factor of 20; recovery does not provide useful information

Table 6
Estimated Maximum Possible Concentration
Storm Water and Storm Water Solids Collected August -October 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
DPWG41596	DUP090412	2,3,7,8-TCDD	0.240	0.050	pg/g	U
DPWG42297	STW-01-103012	2,3,7,8-TCDD	0.613	0.541	pg/L	U
DPWG42297	STW-01-103012	2,3,7,8-TCDF	0.571	0.541	pg/L	U
DPWG42297	DUP103012	2,3,7,8-TCDD	0.650	0.535	pg/L	U

Data packages reviewed: ARI VI13, VO46, VQ27; Axys DPWG41164, DPWG41227, DPWG41516, DPWG42297

Key:

TCDD = Tetrachlorodibenzo-p-dioxin

pg/g = Picograms per gram

pg/L = Picograms per liter

U = Nondetected

Table 7
Field Duplicate Results and Calculated Relative Percent Differences
Storm Water and Storm Water Solids Collected August -October 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
VI13	TANK-01/DUP090412	SVOC	Benzyl alcohol	38	35	18	µg/kg	8.2
VI13	TANK-01/DUP090412	SVOC	Phenanthrene	33	32	18	µg/kg	3.1
VI13	TANK-01/DUP090412	SVOC	Di-n-butylphthalate	11	12	18	µg/kg	8.7
VI13	TANK-01/DUP090412	SVOC	Fluoranthene	26	28	18	µg/kg	7.4
VI13	TANK-01/DUP090412	SVOC	Pyrene	34	36	18	µg/kg	5.7
VI13	TANK-01/DUP090412	SVOC	bis(2-Ethylhexyl)phthalate	290	280	23	µg/kg	3.5
VI13	TANK-01/DUP090412	SVOC	Chrysene	26	28	18	µg/kg	7.4
VI13	TANK-01/DUP090412	SVOC	Benzo(a)pyrene	10	13	18	µg/kg	26
VI13	TANK-01/DUP090412	SVOC	Indeno(1,2,3-cd)pyrene	12	12	18	µg/kg	0
VI13	TANK-01/DUP090412	SVOC	Benzo(g,h,i)perylene	26	28	18	µg/kg	7.4
VI13	TANK-01/DUP090412	SVOC	Total Benzofluoranthenes	41	44	36	µg/kg	7.1
VI13	TANK-01/DUP090412	SVOC-SIM	Dibenz(a,h)anthracene	3.2	3.4	4.6	µg/kg	6.1
VI13	TANK-01/DUP090412	SVOC-SIM	Diethylphthalate	27	27	4.6	µg/kg	0
VI13	TANK-01/DUP090412	SVOC-SIM	Butylbenzylphthalate	21	23	4.6	µg/kg	9.1
VI13	TANK-01/DUP090412	SVOC-SIM	N-Nitrosodiphenylamine	2.6	2.6	18	µg/kg	0
VI13	TANK-01/DUP090412	SVOC-SIM	Benzyl alcohol	35	24	18	µg/kg	37
VI13	TANK-01/DUP090412	PCB	Aroclor 1254	3.0	3.3	3.8/3.9	µg/kg	10
VI13	TANK-01/DUP090412	Total metals	Arsenic	13.1	12.5	0.2	mg/kg	4.7
VI13	TANK-01/DUP090412	Total metals	Cadmium	28.9	29.7	0.09/0.1	mg/kg	2.7
VI13	TANK-01/DUP090412	Total metals	Chromium	33	33	2/3	mg/kg	0
VI13	TANK-01/DUP090412	Total metals	Copper	181	180	1	mg/kg	0.6
VI13	TANK-01/DUP090412	Total metals	Lead	39.0	37.4	0.09/0.1	mg/kg	4.2
VI13	TANK-01/DUP090412	Total metals	Mercury	0.04	0.04	0.02	mg/kg	0
VI13	TANK-01/DUP090412	Total metals	Zinc	590	568	5	mg/kg	3.8
VI13	TANK-01/DUP090412	Solids	Total solids	97.60	97.70	0.01	%	0.1
VI13	TANK-01/DUP090412	TOC	TOC	1.73	1.39	0.020	%	22
VQ27	STW-01-103012/DUP103012-1	VOC	Acetone	7.4	6.7	5.0	µg/L	10
VQ27	STW-01-103012/DUP103012-1	TPH-d	Motor oil	0.11	0.11	0.20	mg/L	0

Table 7
Field Duplicate Results and Calculated Relative Percent Differences
Storm Water and Storm Water Solids Collected August -October 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
VQ27	STW-01-103012/DUP103012-1	Total metals	Antimony	0.6	0.6	0.2	µg/L	0
VQ27	STW-01-103012/DUP103012-1	Total metals	Arsenic	2.9	3.0	0.2	µg/L	3.4
VQ27	STW-01-103012/DUP103012-1	Total metals	Chromium	1.6	1.7	0.5	µg/L	6.1
VQ27	STW-01-103012/DUP103012-1	Total metals	Copper	18.7	20.6	0.5	µg/L	9.7
VQ27	STW-01-103012/DUP103012-1	Total metals	Lead	1.4	1.6	0.1	µg/L	13
VQ27	STW-01-103012/DUP103012-1	Total metals	Nickel	1.7	1.8	0.5	µg/L	5.7
VQ27	STW-01-103012/DUP103012-1	Total metals	Zinc	20	22	4	µg/L	9.5
VQ27	STW-01-103012/DUP103012-1	Dissolved metals	Antimony	0.5	0.5	0.2	µg/L	0
VQ27	STW-01-103012/DUP103012-1	Dissolved metals	Arsenic	2.3	2.3	0.2	µg/L	0
VQ27	STW-01-103012/DUP103012-1	Dissolved metals	Chromium	1.0	1.0	0.5	µg/L	0
VQ27	STW-01-103012/DUP103012-1	Dissolved metals	Copper	7.2	7.6	0.5	µg/L	5.4
VQ27	STW-01-103012/DUP103012-1	Dissolved metals	Nickel	0.8	0.8	0.5	µg/L	0
VQ27	STW-01-103012/DUP103012-1	Dissolved metals	Zinc	6	8	4	µg/L	29
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	2,3,7,8-TCDD	0.259	0.240	0.050	pg/g	7.6
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	1,2,3,7,8-PECDD	1.89	1.76	0.092/0.055	pg/g	7.1
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	1,2,3,4,7,8-HXCDD	4.31	3.89	0.094/0.079	pg/g	10
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	1,2,3,6,7,8-HXCDD	12.7	13.1	0.094/0.079	pg/g	3.1
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	1,2,3,7,8,9-HXCDD	11.4	11.4	0.094/0.079	pg/g	0
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	1,2,3,4,6,7,8-HPCDD	380	392	0.260/0.397	pg/g	3.1
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	2,3,7,8-TCDF	1.08	1.08	0.050	pg/g	0
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	1,2,3,7,8-PECDF	0.925	0.941	0.050	pg/g	1.7
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	2,3,4,7,8-PECDF	2.62	2.96	0.050	pg/g	12
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	1,2,3,4,7,8-HXCDF	22.6	25.2	0.086/0.135	pg/g	11
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	1,2,3,6,7,8-HXCDF	4.55	4.91	0.086/0.135	pg/g	7.6
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	1,2,3,7,8,9-HXCDF	0.265	0.338	0.086/0.135	pg/g	24
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	2,3,4,6,7,8-HXCDF	2.13	2.31	0.086/0.135	pg/g	8.1
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	1,2,3,4,6,7,8-HPCDF	77.0	91.6	0.175/0.170	pg/g	17
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	1,2,3,4,7,8,9-HPCDF	12.7	14.8	0.175/0.170	pg/g	15

Table 7
Field Duplicate Results and Calculated Relative Percent Differences
Storm Water and Storm Water Solids Collected August -October 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	OCDF	195	251	0.060/0.067	pg/g	25
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	TOTAL TETRA-DIOXINS	3.93	3.77	0.050	pg/g	4.2
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	TOTAL PENTA-DIOXINS	15.1	14.2	0.092/0.055	pg/g	6.1
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	TOTAL HEXA-DIOXINS	88.1	91.7	0.094/0.079	pg/g	4.0
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	TOTAL HEPTA-DIOXINS	744	777	0.260/0.397	pg/g	4.3
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	TOTAL TETRA-FURANS	8.64	9.61	0.050	pg/g	11
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	TOTAL PENTA-FURANS	31.1	40.4	0.050	pg/g	26
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	TOTAL HEXA-FURANS	145	168	0.086/0.135	pg/g	15
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	TOTAL HEPTA-FURANS	269	332	0.175/0.170	pg/g	21
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	OCDD	11700	15600	0.255/0.363	pg/g	29
DPWG41596	TANK-01/DUP090412	PCDD/PCDF	2,3,7,8-TCDF	0.408	0.495	0.050/0.092	pg/g	19
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	2,3,7,8-TCDD	0.613	0.650	0.541/0.535	pg/L	5.9
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	1,2,3,7,8-PECDD	0.887	0.706	0.541/0.535	pg/L	23
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	1,2,3,4,7,8-HXCDD	1.88	1.28	0.541/0.535	pg/L	38
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	1,2,3,6,7,8-HXCDD	5.48	4.33	0.541/0.535	pg/L	23
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	1,2,3,7,8,9-HXCDD	4.67	3.06	0.541/0.535	pg/L	42
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	1,2,3,4,6,7,8-HPCDD	149	115	0.705/0.535	pg/L	26
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	OCDD	4310	2910	1.01/0.535	pg/L	39
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	2,3,7,8-TCDF	0.571	0.672	0.541/0.535	pg/L	16
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	2,3,4,7,8-PECDF	1.98	1.51	0.541/0.535	pg/L	27
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	1,2,3,4,7,8-HXCDF	14.5	11.4	0.541/0.535	pg/L	24
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	1,2,3,6,7,8-HXCDF	2.64	2.29	0.541/0.535	pg/L	14
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	2,3,4,6,7,8-HXCDF	1.28	0.903	0.541/0.535	pg/L	35
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	1,2,3,4,6,7,8-HPCDF	47.7	36.5	0.541/0.535	pg/L	27
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	1,2,3,4,7,8,9-HPCDF	7.87	5.80	0.541/0.535	pg/L	30
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	OCDF	126	96.8	0.541/0.535	pg/L	26
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	TOTAL PENTA-DIOXINS	2.06	1.61	0.541/0.535	pg/L	25
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	TOTAL HEXA-DIOXINS	27.0	23.0	0.541/0.535	pg/L	16

Table 7
Field Duplicate Results and Calculated Relative Percent Differences
Storm Water and Storm Water Solids Collected August -October 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample/Duplicate ID	Analysis	Compound	Concentration		Report Limit	Units	RPD
				Sample	Duplicate			
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	TOTAL HEPTA-DIOXINS	273	210	0.705/0.535	pg/L	26
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	TOTAL TETRA-FURANS	1.53	1.24	0.541/0.535	pg/L	21
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	TOTAL PENTA-FURANS	20.6	17.0	0.541/0.535	pg/L	19
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	TOTAL HEXA-FURANS	86.3	65.0	0.541/0.535	pg/L	28
DPWG42297	STW-01-103012/DUP103012	PCDD/PCDF	TOTAL HEPTA-FURANS	166	131	0.541/0.535	pg/L	24

Data packages reviewed: ARI VI13, VO46, VQ27; Axys DPWG41164, DPWG41227, DPWG41516

Key:

RPD = Relative percent difference

µg/kg = Micrograms per kilogram

µg/L = Micrograms per liter

mg/kg = Milligrams per kilogram

pg/g = Picograms per gram

SVOC = Semivolatile organic compounds; Method 8270D

SVOC-SIM = Semivolatile organic compounds - selected ion monitoring

PCB = Polychlorinated biphenyls; Method 8082B

Solids = Total solids; Method 2540B

TOC = Total organic carbon; Method 9060

VOC = Volatile organic compounds; Method 8260C

TPH-d = Total petroleum hydrocarbons - diesel; Method NWTPH-Dx

TOC = Total organic carbon

TCDD = Tetrachlorodibenzo-p-dioxin

PECDD = Pentachlorodibenzo-p-dioxin

HXCDD = Hexachlorodibenzo-p-dioxin

HPCDD = Heptachlorodibenzo-p-dioxin

OCDD = Octochlorodibenzo-p-dioxin

TCDF = Tetrachlorodibenzofuran

PECDF = Pentachlorodibenzofuran

HXCDF = Hexachlorodibenzofuran

HPCDF = Heptachlorodibenzofuran

OCDF = Octochlorodibenzofuran

Table 8
Calibration Verification Recoveries Outside of Acceptable Limits
Storm Water and Storm Water Solids Collected August -October 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	CCV ID	Analysis	Compound	CCV Recovery	CCV Limit	Associated Samples	Reported Concentration	Units	ERM Qualifier
VI13	CCV-091412	SVOC	Benzoic acid	-27.6	20	See below	--	--	--
	CCV-091412	--	--	--	--	SWD-01	22000	µg/kg	J-
	CCV-091412	--	--	--	--	CB-01	5500	µg/kg	J-
	CCV-091412	-	--	--	--	TANK-01	< 360	µg/kg	UJ
	CCV-091412	--	--	--	--	DUP090412	< 360	µg/kg	UJ
VI13	CCV-091712	SVOC	Butylbenzylphthalate	20.6	20	See below	--	--	--
	CCV-091712	--	--	--	--	CB-01 DIL	1400	µg/kg	J+
VI13	CCV-091412	SVOC-SIM	Pentachlorophenol	-28.8	20	See below	--	--	--
	CCV-091412	--	--	--	--	SWD-01	310	µg/kg	J-
	CCV-091412	--	--	--	--	CB-01	< 680	µg/kg	UJ
	CCV-091412	--	--	--	--	TANK-01	< 46	µg/kg	UJ
	CCV-091412	--	--	--	--	DUP090412	< 46	µg/kg	UJ
VI13	CV-091112	PCB	Aroclor-1248	24.1	20	NA	--	--	--
VI13	CV-091112	PCB	Aroclor-1248	30.0	20	NA	--	--	--
VO46	CCV-102412	SVOC-SIM	Pentachlorophenol	-26.4	20	See below	--	--	--
	CCV-102412	--	--	--	--	SWD-02	< 47	µg/kg	UJ
VO46	CCV-102412	SVOC-SIM	Butylbenzylphthalate	24.6	20	See below	--	--	--
	CCV-102412	--	--	--	--	SWD-02	8.5	µg/kg	J+
VQ27	CCV-110512	VOC	2-Chloroethyl vinyl ether	-21.7	20	See below	--	--	--
	CCV-110512	--	--	--	--	STW-01-103012	< 1.0	µg/L	UJ
	CCV-110512	--	--	--	--	DUP103012-1	< 1.0	µg/L	UJ
VQ27	CCV-110812	SVOC	Benzoic acid	-27.7	20	See below	--	--	--
	CCV-110812	--	--	--	--	STW-01-103012	< 20	µg/L	UJ
	CCV-110812	--	--	--	--	DUP103012-1	< 20	µg/L	UJ

Table 8
Calibration Verification Recoveries Outside of Acceptable Limits
Storm Water and Storm Water Solids Collected August -October 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	CCV ID	Analysis	Compound	CCV Recovery	CCV Limit	Associated Samples	Reported Concentration	Units	ERM Qualifier
VQ27	CCV-110812	SVOC	Benzo(g,h,i)perylene	-24.2	20	See below	--	--	--
	CCV-110812	--	--	--	--	STW-01-103012	< 1.0	µg/L	UJ
	CCV-110812	--	--	--	--	DUP103012-1	< 1.0	µg/L	UJ

Data packages reviewed: ARI VI13, VO46, VQ27; Axys DPWG41164, DPWG41227, DPWG41516

Key:

CCV = Continuing calibration verification

µg/kg = Micrograms per kilogram

µg/L = Micrograms per liter

J- = Detected sample result qualified as estimated and biased low

J+ = Detected sample result qualified as estimated and biased high

UJ = Nondetected sample result qualified as estimated

DIL = Diluted/reanalyzed sample

SVOC = Semivolatile organic compounds; Method 8270D

SVOC-SIM = Semivolatile organic compounds - selected ion monitoring

PCB = Polychlorinated biphenyls; Method 8082B

Metals = Total metals; Method 6010B/6020

VOC = Volatile organic compounds; Method 8260C

Table 9
Calibration Range Exceedances
Storm Water and Storm Water Solids Collected August -October 2012
Reichhold-Glacier Site
Seattle, Washington

Lab Package	Sample ID	Method	Compound	Reported Concentration	Units	ERM Qualifier	Notes
VI13	SWD-01	SVOC	Benzyl alcohol	57000 E	µg/kg	J	Result exceeded instrument calibration range
VI13	CB-01	SVOC	bis(2-Ethylhexyl)phthalate	30000 E	µg/kg	J	Result exceeded instrument calibration range
VI13	SWD-01	SVOC-SIM	Benzyl alcohol	53000 E	µg/kg	J	Result exceeded instrument calibration range
VI13	CB-01	SVOC-SIM	Benzyl alcohol	11000 E	µg/kg	J	Result exceeded instrument calibration range

Data packages reviewed: ARI VI13, VO46, VQ27; Axys DPWG41164, DPWG41227, DPWG41516

Key:

E = Undiluted sample concentration exceeded calibration range; use result of dilution/reanalysis for decision-making purposes

SVOC = Semivolatile organic compounds; Method 8270D

SVOC-SIM = Semivolatile organic compounds - selected ion monitoring

µg/kg = Micrograms per kilogram

J = Detected sample result qualified as estimated