

TECHNICAL MEMORANDUM No. OFS5-1

City Outfall Basin S-5 Inline Solids Sampling

TO:	Tom Roick, DEQ, Northwest Region Cleanup & Portland Harbor Section
FROM:	Dawn Sanders, City of Portland, BES Linda Scheffler, City of Portland, BES
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DATE:	June 16, 2006
SUBJECT:	Portland Harbor Source Control Investigation

Introduction

This technical memorandum (TM) summarizes the results of the City of Portland (City) Bureau of Environmental Services' (BES) source control investigation of inline solids that have entered a portion of the City Outfall Basin S-5 stormwater conveyance system. This investigation, conducted in July 2005, is part of the City's ongoing source control program associated with the Portland Harbor City of Portland Outfalls Project. These investigation results are submitted pursuant to the August 13, 2003, Intergovernmental Agreement (IGA) between the Oregon Department of Environmental Quality (DEQ) and the City.

Purpose and Objectives

The purpose of this source control investigation is to evaluate whether inline solids discharged into portions of the Outfall Basin S-5 stormwater conveyance system contain contaminants at concentrations that could be detrimental to the Willamette River.

Outfall Basin S-5 was designated as a Priority 2 outfall, based on elevated concentrations of copper, zinc, and bis(2-ethylhexyl)phthalate detected in one of the surface sediment samples collected by the City near Outfall S-5 in 2002 (CH2M Hill, 2004). This priority category is applied to outfalls with slightly elevated concentrations of contaminants that may affect sediment quality. Concentrations exceeded DEQ High screening level values (SLVs); comparison of this dataset to the December 2005 Portland Harbor Joint Source Control Strategy (JSCS) (DEQ/EPA, 2005) SLVs indicates that the same three constituents exceed toxicity SLVs (see Attachment A) at one sample location (out of a total of six samples). Based on these data, EPA has included the outfall vicinity in a draft Area of Potential Concern (AOPC). The objectives of this source control investigation

are to determine whether inline solids contain elevated levels of metals and semivolatile organic compounds (SVOCs), and to identify possible sources for these contaminants.

Background

No DEQ cleanup sites are located within Outfall Basin S-5 (DEQ, 2005). Only one site has an NPDES 1200-Z stormwater permit in the basin: Environmental Fibers Intl. (formerly Greenstone Industries) located at 4325 N. Commerce St. on the western end of the basin. The facility recycles paper, cardboard, and plastic materials. Other properties in the basin are used for commercial and industrial activities that do not require a stormwater permit under current NPDES regulations.

Outfall Basin S-5 consists of two main branches that drain portions of N. Channel Avenue and the adjoining properties. One segment drains the western portion of the basin, while the other drains the eastern portion. These two line segments meet at manhole AAP982 and drain through a 36-inch-diameter concrete line to Outfall S-5. The original intent of the sampling event was to collect several solids samples within each branch to assist in source tracing.

Because of the limited availability of inline solids, samples were collected only from the line segment draining the western portion of the basin. Consequently, potential contaminant contributions to the eastern portion of the conveyance system remain unknown. Figures 1 through 3 show the locations of the Outfall Basin S-5 stormwater conveyance system and the two sampling locations for this investigation.

Field Activities

The City coordinated with DEQ regarding this source control investigation before conducting this work. Inline solids were sampled by the BES Field Operations section between approximately 11:30 a.m. and 12:30 p.m. on July 26, 2005. Photographs of the solids are included in Attachment B. Field notes taken during sampling activities are provided in Attachment C.

Solids samples were collected using a stainless steel spoon and bowl, in accordance with BES Field Operations' Standard Operating Procedures. Solids were collected in the western portion of the basin from the 24-inch-diameter line. The first sample was collected just downstream of manhole AAP965, which is approximately 875 feet downstream from the Environmental Fibers lateral connection to this line. The solids at this location consisted of sand, gravel, and cobbles, and had a slight rotting odor. These solids represent contributions from facilities on the north side of N. Channel Ave. as well as discharges from four catch basins on N. Channel Avenue.

The second sampling location was at manhole AAP981. Inline solids with the consistency of clay were collected from both upstream and downstream of the manhole. This sample was collected approximately 2,000 feet downstream of the first sample. There are four catch basins on N. Channel Avenue and at least three stormwater lateral connections to the main line between the two sampling locations.

Summary of Results

The two inline solids samples obtained from Outfall Basin S-5 were analyzed for metals and SVOCs. The laboratory analytical results and data validation report for the two samples are

provided in Attachment D. Table 1 summarizes the chemical analytical data results. The chemical data resulting from the Outfall Basin S-5 sampling were compared with the JSCS SLVs. Metals concentrations also were compared with DEQ Default Background Concentrations for metals in soil (DEQ, 2002). The results of the comparisons are summarized as follows:

- Of the 10 detected metal constituents, both samples had concentrations of cadmium, copper, and zinc exceeding the JSCS SLVs. Sample AAP981 also had concentrations of chromium, lead, and nickel exceeding the SLVs. Concentrations of all metals were greater in the downstream sample (AAP981) compared with the upstream sample (AAP965). Both samples exceeded background concentrations of arsenic, barium, chromium, copper, and zinc. Sample AAP981 also exceeded background concentrations for lead, mercury, and nickel. Anthropogenic sources can be assumed where metals exceed background concentrations.
- Of the SVOCs, bis(2-ethylhexyl)phthalate and di-n-butyl phthalate (in both samples) and benzo(g,h,i)perylene (in sample AAP981) were the only constituents that were reported at concentrations greater than JSCS SLVs.

Figures 1 through 3 show the locations of the two samples with a summary of the analytical results.

Conclusions and Recommendations

The results of the Outfall Basin S-5 source control investigation indicate that metals and SVOCs are being discharged to the City stormwater conveyance system in concentrations that exceed JSCS SLVs. The matrices of the two samples were very different; the most downstream sample (AAP981) was primarily clay while the upstream sample (AAP965) had coarser materials. Therefore, making any conclusions on the spatial pattern as it relates to sources may be misleading (i.e. the concentrations in the finer-grain materials could be similar in both samples but would be diluted in the upstream sample by larger-grain solids). While the sample collected farthest downstream had the highest concentrations of contaminants, it is unclear if additional contaminants are being discharged to the stormwater system between manholes AAP965 and AAP981 or if the differences in concentrations are a result of the sample matrix.

The contaminants found in these samples are consistent with those found in river sediments located adjacent to Outfall S-5. No solids were available for sampling in the eastern portion of the basin; therefore, the potential contaminant contributions to that portion of the conveyance system remain unknown.

The City will update the facility list developed for Outfall Basin S-5 (CH2M HILL, 2000) and send an *Industrial and Commercial Environmental Survey* to facilities that discharge stormwater to this basin. This survey is conducted continuously by the BES Industrial Source Control Division to identify industrial or commercial dischargers that may be subject to pretreatment or stormwater program requirements. Survey information will be reviewed to further evaluate whether contaminant concentrations detected in inline solids and river sediment could be traced to sources within the basin.

References

CH2M HILL. 2000. *Preliminary Evaluation of City Outfalls – Portland Harbor Study Area*. Notebook 1, Eastshore Stormwater and CSO Outfalls. Prepared for the City of Portland, Bureau of Environmental Services, July 2000.

CH2M HILL. 2004. *Programmatic Source Control Remedial Investigation Work Plan for the City of Portland Outfalls Project*. Prepared for the City of Portland, Bureau of Environmental Services, March 19, 2004.

DEQ. 2002. DEQ Environmental Cleanup Program Memorandum to Cleanup Project Managers, Default Background Concentrations for Metals. Prepared by DEQ Toxicology Workgroup, October 28, 2002.

DEQ. 2005. DEQ Site Summary Reports. DEQ Environmental Cleanup Site Information (ECSI) Database. Accessed December 2005.

DEQ/EPA. 2005. Portland Harbor Joint Source Control Strategy, Final, dated December 2005.

Integral. 2005. Portland Harbor RI/FS, Round 2A Sediment Site Characterization Report. Prepared for the Lower Willamette Group.

Table

Table 1 - Summary of Chemical Analytical Results, Inline Solids Sampling

Figures

Figure 1 - Outfall Basin S-5 Inline Solids Sampling – Metals Figure 2 - Outfall Basin S-5 Inline Solids Sampling – PAHs Figure 3 - Outfall Basin S-5 Inline Solids Sampling – Phthalates

Attachments

Attachment A – 2002 City Sediment Data Attachment B - Field Photographs Attachment C - Field Notes Attachment D - Laboratory Results

Table 1Summary of Chemical Analytical ResultsInline Solids Sampling

City Outfall Basin S-5

			Upstream	> Downstream			DEO Default
			AAP965	AAP981	JSCS	JSCS	Background
			IL-S5-AAP965-0705	IL-S5-AAP981-0705	Screening Level	Screening Level	Concentrations
Class	Analyte	Units	7/26/2005	7/26/2005	(Toxicity) ⁽⁵⁾	(Bioaccumulation) ⁽⁶⁾	Soil
Metals	(EPA 6020)						
	Arsenic	mg/Kg	11.6	11.7	33		4
	Barium	mg/Kg	93.1	370			7
	Cadmium	mg/Kg	0.98	10.1	4.98	0.003	
	Chromium	mg/Kg	40.1	130	111	4200	1
	Copper	mg/Kg	181	430	149	10	42
	Lead	mg/Kg	13.2	1490	128	128	36
	Mercury	mg/Kg	0.082	0.62	1.06		17
	Nickel	mg/Kg	19.6	70.3	48.6	316	38
	Silver	mg/Kg	0.29	0.80	5		1
	Zinc	mg/Kg	511	1300	459	3	86
Metals	(EPA 7471)						
	Mercury	mg/Kg	0.0199 U	0.179	1.06		0.07
PAHs ((EPA 8270-SIM)						
	1-Methylnaphthalene	µg/Kg	5.66	56.3			
	2-Methylnaphthalene	µg/Kg	5.81	198	200		
	Acenaphthene	µg/Kg	5.66 U	34.6	300		
	Acenaphthylene	μg/Kg	5.66 U	30.3	200		
	Anthracene	μg/Kg	5.66 U	44.3	845		
	Benzo(a)anthracene	µg/Kg	42.5	145	1050		
	Benzo(a)pyrene	ug/Kg	40.7	336	1450		
	Benzofluoranthenes	ug/Kg	70.2	328	13000		
	Benzo(g,h,i)pervlene	ug/Kg	33	332	300		
	Chrysene	μg/Kg	55.1	210	1290		
	Dibenzo(a,h)anthracene	ug/Kg	7.27	6.83 U	1300		
	Fluoranthene	μg/Kg	74.2	252	2230		
	Fluorene	ug/Kg	6.39	25.0	536		
	Indeno(1,2,3-cd)pyrene	μg/Kg	31.8	6.83 U	100		
	Phenanthrene	μg/Kg	48.9	184	1170		
	Pyrene	μg/Kg	64.3	295	1520		
	Total PAHs	μg/Kg	485.83	2470.5			
Phthala	ates (EPA 8270-SIM)						
	Bis(2-ethylhexyl) phthalate	µg/Kg	1410 J	1490 J	800	330	
	Butyl benzyl phthalate	μg/Kg	254 J	540 J			
	Diethyl phthalate	µg/Kg	22.6 UJ	28.0 J	600		
	Dimethyl phthalate	µg/Kg	22.6 UJ	47.4 J			
	Di-n-butyl phthalate	µg/Kg	137 J	262 J	100		
	Di-n-octyl phthalate	µg/Kg	132 J	222 J			

Notes:

J = The analyte was detected and has been qualified as an estimated quantity.

U = The analyte was not detected above the reported sample quaniffication limit.

UJ = The analyte was not detected above the the reported sample quantification limit; the quantitation limit is estimated.

All units in micrograms per kilogram (ug/Kg) or milligrams per kilogram (mg/Kg) dry weight.

JSCS - Portland Harbor Joint Source Control Strategy (DEQ/EPA Final December 2005).

⁽⁵⁾ MacDonald PEC and other SQVs Screening level for Soil/Catch Basin Sediment.

⁽⁶⁾ DEQ 2001 Bioaccumulative Sediment SLVs Screening level for Soil/Catch Basin Sediment.

-- No JSCS screening level available.

Only compounds detected in one or more samples are shown on Table 1, see Attachment D for complete laboratory results.



Manhole AAP965 Downstream from node

PAHs: Total PAHs - 2470.5 ug/Kg

AP995

Benzo(a)anthracene - 42.5 µg/Kg Benzo(a)pyrene - 40.7 µg/Kg Benzofluoranthenes - 70.2 µg/Kg Benzo(g,h,i)perylene - 33 µg/Kg Chrysene - 55.1 µg/Kg Dibenzo(a,h)anthracene - 7.27 µg/Kg Fluoranthene - 74.2 µg/Kg Indeno(1,2,3-cd)pyrene - 31.8 µg/Kg Pyrene - 64.3 µg/Kg 1-Methylnaphthalene - 5.66 µg/Kg 2-Methylnaphthalene - 5.81 µg/Kg Fluorene - 6.39 µg/Kg Phenanthrene - 48.9 µg/Kg

AAQ000



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Permits

Note: Only detected constituents are shown. µg/Kg = micrograms/Kilogram dry weight

Figure 2 Outfall S-5 Inline Solids Sampling PAHs

Sample Date: 7/26/2005

Source City of Portland BES Aerial photo 2005	ENVIRONMENTAL SERVICES CITY OF PORTLAND 1120 SW Fifth Avenue, Room 1000 Portland Oregon, 97204-1912
File Name: s:\gis\outfalls\outfalls_S5\ ofS5_figure2_011806_sg.mxd	Program Manager: Dawn Sanders Portland Harbor Superfund
Sheet No.	Date Printed: 06/06/2006
1 OF 1	Prepared by: Sara Gardner

Manhole AAP981

PAHs: Total PAHs - 485.83 µg/Kg

Benzo(a)anthracene - 145 µg/Kg Benzo(a)pyrene - 336 µg/Kg Benzofluoranthenes - 328 µg/Kg Benzo(g,h,i)perylene - 332 µg/Kg Chrysene - 210 µg/Kg Fluoranthene - 252 µg/Kg Pyrene - 295 µg/Kg 1-Methylnaphthalene - 56.3 µg/Kg 2-Methylnaphthalene - 198 µg/Kg Acenaphthylene - 34.6 µg/Kg Acenaphthylene - 30.3 µg/Kg Anthracene - 44.3 µg/Kg Fluorene - 25.0 µg/Kg Phenanthrene - 184 µg/Kg AAP969



Attachment A 2002 City Sediment Data

TABLE 1Outfall Sediment Analytical Data Adjacent to City Outfall S-52002 City Source Control Sediment Investigation

			Upstream At Outfall		Outfall Discharge Channel						Downstre	eam]						
	Location (ft from OF al	ong shore)	75' up																
	(tt ottsnore) Sample ID	SI0195	070 040	\$101950	10	8101850	20	0101050	20	0104050		0104050				JSCS Catch		
	Sa	ample Date	10/21/2	.002	10/21/20	002	10/21/20	102	10/21/20	130	5101550	150 102	SI01S50	70 02	SI01S50)60)02	Basin	JSCS Catch	
	Analyte	Units ^a	Norm	al	Norma	al	Norma	1	Norma	1	Norma	1	Normal	02	Norma	JUZ al	Toxicity SI Ve ^b	Basin Bioacc	DEQ Inriver
	Total Organic Carbon	mg/kg	882		14300	T	43.3	U	709	1	759	1	3250	1	1810	1		<u>SLVS</u>	20000
Total	Metals		.								1				1010				20000
	Aluminum	mg/kg	12700		7370		14500		6160		6390		7900		6590				42800
-	Antimony	mg/kg	0.375	J	4.56		0.432	J	0.202	J	0.631	J	0.267	J	0.235	J	64	10	5
	Cadmium	ma/ka	0.00163	- u	1.02		0.00286	11	0.00184	1 11	0.00159		2.43		2.08		33		5
	Chromium	mg/kg	18.2		28.8		21.9	-	11.1		11.2		16.8		19.5		4.90	4200	41
	Copper	mg/kg	24.9	B2	404	B2	34.5	B2	28.2	B2	23.8	B2	21.6	B2	18.5	B2	149	10	60
	Lead	mg/kg	40	B2	86.5	B2	32.1	B2	15.9	B2	23.2	B2	13.2	B2	53.3	B2	128	128	30
	Nickel	mg/kg	0.0729	B2	0.0785	B2	0.0224	J	0.0139	J	0.0146	J	0.0466		0.0879		1.06		0.1
	Selenium	mg/kg	0.0885	U	0.0796	U	0.155	U B2	0.0994	U	0.0862	B2 U	0.102	B2	14.6	B2	48.6	316	32
	Silver	mg/kg	0.21	B2	0.569	B2	0.194	J B2	0.098	J B1	0.0984	J B2	0.149	B2	0.100	J B2	5		1.4
	Zinc	mg/kg	77.2	B2	748	B2	155	B2	81.3	B2	122	B2	63.2	B2	68.4	B2	459	3	118
PAHs	2 Mothylpophthologo		4 47		100		0.00												
	Acenaphthene	ug/kg ug/kg	1.47	UJ	132	UJ	2.68	UJ	1.61		1.59 2.79	UJ	1.58	UJ	16.8	UJ	200		150
	Acenaphthylene	ug/kg	1.47	UJ	132	UJ	2.68	UJ	1.61	UJ	1.59	UJ	1.67	J	16.8	UJ	200		60
	Anthracene Ronzo (a) onthropping	ug/kg	2.49	J	132	UJ	2.68	UJ	1.61	UJ	1.59	UJ	4.14	J	16.8	UJ	845		150
	Benzo (a) pyrene	ug/kg ug/kg	6.79	J	132	UJ	2.9	J	1.61		1.59		1.58	UJ	16.8	UJ	1050		360
	Benzo [g,h,i] perylene	ug/kg	9.41	J	160	J	7.26	J	1.61	UJ	1.59	UJ	18.3	J	16.8	UJ	300		250
	Benzofluoranthenes	ug/kg	13.1	J	264	UJ	5.36	UJ	3.22	UJ	3.7	J	27.1	J	33.6	UJ			
	Dibenzo (a,h) anthracene	ug/kg ug/ka	1.58		132	UJ	4.33	J U.I	1.61	UJ	1.59	UJ	9.95	J	16.8	UJ	1290		425
	Fluoranthene	ug/kg	8.17	J	132	UJ	2.68	UJ	1.61	UJ	1.59	UJ	16.8	J	16.8	UJ	2230		600
 	Huorene	ug/kg	1.47	UJ	132	UJ	3.73	J	1.61	UJ	1.59	UJ	20.2	J	54.7	J	536		125
	Naphthalene	ug/kg ug/kg	9.40		132	UJ	2.68 2.68	UJ	1.61	UJ U.I	1.59	UJ [].1	1.58	UJ	16.8 16.8	UJ	100	<u>⊢_</u>]	225
	Phenanthrene	ug/kg	9.86	J	132	UJ	2.68	UJ	1.61	UJ	1.59	UJ	11.4	J	30.7	- J	1170		700
	Pyrene	ug/kg	15.9	J	159	J	5.4	J	3.02	J	5.51	J	21.9	J	106	J	1520		700
	Estimated Total LPAHs ^{1,4}	ug/kg ug/ka	12.35		319		23.62				2.79 0.21		19.69]	30.7				
	Estimated Total PAHs ^{1,4}	ug/kg	89.28		319		23.62		3.02		12		145.04		191.4			<u> </u>	
Phthal	ates									·				·					
	Bis(2-Ethylhexyl) Phthalate	ug/kg	20.5	J B1	4230	B1 J	30.8	J B1	16.3	J B1	22.3	JB1	81.3	B1 J	284	J B1	800	330	390
<u> </u>	Butyl Benzyl Phthalate	ug/kg	14.7		1320	UJ	26.8	UJ	16.1	UJ	15.9	UJ	15.8	UJ	168	UJ			20
	Dimethyl Phthalate	ug/kg	14.7		1320	UJ	26.8	UJ	16.1	UJ	15.9	UJ	15.8	UJ UJ	168	UJ	600		
	Di-n-Butyl Phthalate	ug/kg	14.7	UJ	1320	UJ	26.8	UJ	16.1	UJ	15.9	UJ	15.8	UJ	168	UJ	100		20
	Di-n-Octyl Phthalate	ug/kg	14.7	UJ	1320	UJ	26.8	UJ	16.1	UJ	15.9	UJ	15.8	UJ	168	UJ			20
Other	1 2 4-Trichlorobenzene	1.110/140	147		1000		00.0				15.0	<u> </u>		I		1			
	1 2-Dichlorobenzene	ug/kg ug/kg	14.7		1320	0.00	26.8	UJ	16.1	UJ	15.9	UJ	15.8	UJ	168	UJ	9200		
	1,3-Dichlorobenzene	ug/kg	14.7	UJ	1320	UJ	26.8	UJ	16.1	UJ	15.9	0.0	15.8	0.0	168		300		
	1,4-Dichlorobenzene	ug/kg	14.7	UJ	1320	UJ	26.8	UJ	16.1	UJ	15.9	UJ	15.8	UJ	168	UJ	300		
	2,3,4,6-Tetrachlorophenol	ug/kg	14.7	UJ	1320	UJ	26.8	UJ	16.1	UJ	15.9	UJ	15.8	UJ	168	UJ			
	2,3,5,6-Tetrachiorophenol	ug/kg	14.7		1320	UJ	26.8	UJ	16.1	UJ	15.9	UJ	15.8	UJ	168	UJ			
	2,4,6-Trichlorophenol	ug/kg ug/kg	14.7		1320	UJ	26.8	UJ	16.1	U.I	15.9	UJ	15.8	UJ	168	UJ			
	2,4-Dichlorophenol	ug/kg	14.7	UJ	1320	UJ	26.8	UJ	16.1	UJ	15.9	UJ	15.8	UJ	168	UJ			
	2,4-Dimethylphenol	ug/kg	73.6	UJ	1320	UJ	26.8	UJ	16.1	UJ	15.9	UJ	15.8	UJ	168	UJ			
—	2,4-Dinitrotoluene	ug/kg	14.7	UJ	1320	UJ	26.8	UJ	16.1	UJ	15.9	UJ	15.8	UJ	168	U.I			
	2,6-Dinitrotoluene	ug/kg	14.7	UJ	1320	UJ	26.8	UJ	16.1	UJ	15.9	UJ	15.8	UJ	168	UJ			
	2-Chloronaphthalene	ug/kg	1.47	UJ	132	UJ	2.68	UJ	1.61	UJ	1.59	UJ	1.58	UJ	16.8	UJ			
	2-Methylphenol	ug/kg	14.7	UJ	1320	UJ	26.8	UJ	16.1	UJ	15.9	UJ	15.8	UJ	168	UJ			
	2-Nitroaniline	ug/kg	14.7	UJ	1320	UJ	26.8	UJ	16.1	UJ	15.9	UJ	15.8	UJ	168	UJ			
	2-Nitrophenol	ug/kg	14.7	UJ	1320	UJ	26.8	UJ	16.1	UJ	15.9	UJ	15.8	UJ	168	UJ			
	3-Nitroaniline	ug/kg ug/kg	14.7	UJ	1320	UJ	26.8	UJ	16.1	UJ	15.9	UJ	15.8	UJ	168	UJ			
	4,6-Dinitro-2-Methylphenol	ug/kg	73.6	UJ	6610	UJ	134	UJ	80.4	UJ	79.7	UJ	79.2	UJ	840	UJ			
⊩	4-Bromophenyl Phenyl Ether	ug/kg	14.7	UJ	1320	UJ	26.8	UJ	16.1	UJ	15.9	UJ	15.8	UJ	168	UJ			
┣───	4-Chloroaniline	ug/kg ug/ka	14.7	UJ	1320	UJ	26.8	UJ U.I	16.1	UJ U.I	15.9 15.9		15.8 15.8	UJ	168	UJ			
	4-Chlorophenyl Phenyl Ether	ug/kg	14.7	UJ	1320	UJ	26.8	UJ	16.1	UJ	15.9	UJ	15.8	UJ	168	UJ			
⊩	4-Methylphenol	ug/kg	29.4	UJ	2640	UJ	53.6	UJ	32.2	UJ	31.9	UJ	31.7	UJ	336	UJ			680
	4-Nitrophenol	ug/kg	73.6	UJ	6610	UJ	20.8 134	UJ	80.4	U.J	15.9 79.7	UJ U.I	15.8 79.2	UJ U.I	168 840				
	Aniline	ug/kg	14.7	UJ	1320	UJ	26.8	UJ	16.1	UJ	15.9	UJ	15.8	UJ	168	UJ			
	Benzoic Acid	ug/kg	73.6	UJ	6610	UJ	134	UJ	80.4	UJ	79.7	UJ	79.2	UJ	840	UJ			200
	Bis(2-Chloroethoxy) Methane	ug/kg ug/kg	14.7	UJ	1320	UJ	26.8	UJ	16.1 16.1	UJ	15.9 15.9	UJ	15.8 15.8	UJ 0.1	168				20
	Bis(2-Chloroethyl) Ether	ug/kg	14.7	UJ	1320	UJ	26.8	UJ	16.1	UJ	15.9	UJ	15.8	UJ	168	UJ			
	Bis(2-Chloroisopropyl) Ether	ug/kg	14.7	UJ	1320	UJ	26.8	UJ	16.1	UJ	15.9	UJ	15.8	UJ	168	UJ			
	Dibenzofuran	ug/kg ug/ka	14.7	UJ	1320	UJ	26.8	U.I	16.1	UJ U.I	15.9	UJ	15.8 15.8	UJ	168	UJ	1600		100
	Hexachlorobenzene	ug/kg	14.7	UJ	1320	UJ	26.8	UJ	16.1	UJ	15.9	UJ	15.8	UJ	168	UJ	100		
	Hexachlorobutadiene	ug/kg	14.7	UJ	1320	UJ	26.8	UJ	16.1	UJ	15.9	UJ	15.8	UJ	168	UJ	600		
	Hexachlorocyclopentadiene	ug/kg	14.7	UJ	1320	UJ	26.8	UJ	16.1	UJ	15.9	UJ	15.8	UJ	168	UJ	400		
	Isophorone	ug/kg ug/ka	14.7		1320	UJ	26.8	UJ	16.1	UJ	15.9	UJ	15.8	UJ	168	UJ			
	n-Nitrosodi-n-Propylamine	ug/kg	14.7	UJ	1320	UJ	26.8	UJ	16.1	UJ	15.9	UJ	15.8	UJ	168	U.I			
	n-Nitrosodimethylamine	ug/kg	73.6	UJ	6610	UJ	134	UJ	80.4	UJ	79.7	UJ	79.2	UJ	840	UJ			
	Nitrosodiphenylamine	ug/kg	14.7	UJ	1320	UJ	26.8	UJ	16.1	UJ	15.9	UJ	15.8	UJ	168	UJ			
	Pentachlorophenol	ug/kg	14.7	UJ	1320	UJ	20.0	03	16.1	U1	15.9	UJ	15.8	U.I	168	UJ 1).1			 97
	Phenol	ug/kg	14.7	UJ	1320	UJ	26.8	UJ	16.1	UJ	15.9	UJ	15.8	UJ	168	UJ	50		20
Chlorin	ated Herbicides				0.6							l							
	2,4,5-TP	ug/kg ug/ka	NA NA	+	2.94	U U	NA NA		NA NA		NA NA	├{	NA		NA				
	2,4-D	ug/kg	NA		2.49	Ŭ	NA		NA		NA		NA		NA				3.3
	2,4-Db	ug/kg	NA	+	1.8	U	NA		NA		NA		NA		NA				5
	Dalapon	ug/kg ug/ka	NA	+	1.43		NA		NA NA		NA NA		NA NA		NA				
	Dicamba	ug/kg	NA		1.47	U	NA		NA		NA		NA		NA				
	Dichloroprop	ug/kg	NA	+	2.37	U	NA		NA		NA		NA		NA				
	Мсрр	ug/kg ug/ka	NA NA	+	2.81		NA NA		NA		NA		NA		NA	[
	Pentachlorophenol	ug/kg	NA		1.84	U	NA		NA		NA		NA		NA				97

TPH total petroleum hydrocarbon

polychlorinated biphenyl	ьсв
polycyclic aromatic hydrocarbon	НАЧ
pezklere job	ΨN
milligrams per kilogram	6ү/бш
micrograms ber kilogram	6 _{7/6} n
Not available or applicable	
viations/Definitions:	Abbrev
The difference between the analyte detected in the front and back column is greater than 40%.	Ь
detection limit necessary to accurately and precisely measure the analyte in the sample.	
The analyte was not detected above the reported method detection limit. However, the reported method detection limit is approximate and may or may not represent the actual method	n
The analyte was not detected above the reported method detection limit.	n
The analyte was analyzed for and positively identified, but the associated numerical value is an estimated quantity.	r
additional dilution required to bring the analyte within the calibration range.	
The analyte exceeded the linear calibration range and the sample was diluted and reaner to reported result for the analyte has been flagged with "D" and a number representing the	D10
additional dilution required to bring the analyte within the calibration range.	
The analyte exceeded the linear calibration range and the sample was diluted and reands the reported result for the analyte has been flagged with "D" and a number representing the	D2
The higher result was reported unless anomalies were noted.	
Second column confirmation was performed. The RPD between the results on the two columns was evaluated and determined to be > 40%.	CS
Second column confirmation was performed. The relative percence value (RPD) between the results on the two columns was evaluated and determined to be < 40%.	٢J
(greater than 10 times the concentration reported in the blank).	
This analyte was detected in the associated method blank. The analyte concentration in the sample was determined to be significantly higher than the method blank	B2
(less than 10 times the concentration reported in the blank).	
This analyte was detected in the associated method blank. The concentration was determined not to be significantly higher than the associated method blank	١a
sið	Qualific
il DDTs: Sum of 4,4-DDD, 4,4'-DDT.	etoT ⁸
Total PCB = 1.95 (Σ congeners listed) + 2.1.	Ŭ
: list can be used to estimate total PGBs in accordance with the VAO Method provided in AOU ACM ACM of ACM ACM A 49 (August 1989). Calculations follow the Battelle wethod:	sidT
Material Evaluations, EPA 823-B-95-001 (April 1995).	
il PCBs: The list of PCB congeners is based on EPA recommendations provided in QA/QC Guidance for Sampling and Analysis of Sediment, Water, and Tissues for Dredged	etoT ^e
il PRHs: Represents the sum of Total LPAHs and of the sum of total LPAHs.	etoT *
dibent[a,h]anthracene, and benzo[ghi]penylene.	
il HPAHs: High molecular weight polycyclic aromatic hydrocarbons includes fluoranthene, pyrene, benzeland for t	stoT ^s
I LPAHs: low molecular weight polycyclic aromatic hydrocarbons includes naphthalene, acenaphthene, anthrecene, phenanthrene, anthrecene, and 2-methylnaphthalene.	² Tota

implied that these are estimated quantities.

¹ Total parameters (i.e., LPAHs, HPAHs, PCBs, and DDTs) were calculated based on detections only. Qualifiers are not included on total parameters as it is

shaded The reported value exceeds JSCS Toxicity Screening Level.

bold The detected concentration exceeds JSCS Bioaccumulation Screening Level.

italic The method reporting limit exceeds JSCS Screening Levels.

MI results reported on a dry-weight basis. Portland Harbor Joint Source Control Strategy (DEQ/EPA Final, December 2005) levels are presented for comparison to sediment sample results. Portland Harbor Joint Source Control Strategy (DEQ/EPA Final, December 2005) levels are presented for comparison to sediment sample results.

		Contrast and the second second																	
				136		901	n	35.55	ſ	9.15		l'†9		109		8.26	mg/kg	Lube Oil - NWTPH	
				7.84		7.22	n	47.8	n	96.4		8.91		5.26		24.2	6y/6w	Diesel	
					•				•		• • • • • • • • • • • • • • • • • • • •		•		-				НЫ
			01	19'Z	In	6'7	01	/ L. Z	L CO	69'7	n	67.5	n	67.7	l no l	τ ε.2	бя/бп	I Lans-Nonachior	
			n	/.CI	n	7.81	n	0.61	ro	6.01	co l	1.62	ro	4.41	01	0.41	6x/6n	enenee -	
			ro	10.2	0	6.7	ro	/1.7	CO	60.7	10	6/'9	<u> </u>	67.7	10	+0.2	6y/6n	enterioria	
		CC.F		0.000	100		00	200:0		3 60	00	02 8		0.000	00	000:0	61/60		
		00 1	111	896.0		111		0 831	111	100 0		971	m	928.0	111	268.0	6,00	agebail	
			TN .	901	111	971	In	601	rn	51	102	56.1	n	SLL	rn	211	na/ka	Hexachloroethane	
			n	96.1	m	571	rn	60.1	<u>rn</u>	£.1	n	68.1	n	51.1 2	n	21.1	na\ka	Hexachlorobutadiene	
			CSI	4'32	n	1.45	n	60.1	n	6.1	n	68.1	1C1	t∕6`l	n	21.1	nd\kd	Hexachlorobenzene	
		91	01	916.0	n	90.1	n	467.0	m	846.0	n	86.1	n	768.0	n	4 28.0	64/6n	Heptachlor Epoxide	
		01	n	£88.0	n	666.0	n	647.0	n	£68.0	m	E.1	n	687.0	n	208.0	6א/bn	Heptachlor	
			n	407.0	n	218.0	n	119.0	n	0.729	m	90.1	n	449.0	n	299.0	6y/ɓn	Endrin Ketone	
			n	1.02	n	81.1	n	988.0	m	90. r	m	1.54	n	0.934	m	6.953	бу/бn	Endrin Aldehyde	
		702	n	4 06.0	01	90.F	n	687.0	01	956.0	m	15.1	n	/78.0	n	548.0	бя/бn	Fuquu	
			01	Z16.0	00	90.1	ro l	16/.0	CO	##6:0	<u> </u>	86.1	ro	558.0	01	CQ.U	 бя/6n		
			0	696.0	0.1	71.1	ro	+0.0	0.1	1100	0	04.1	0	0000	00	206.0	6y/6n		
			0	/0.1	01	+7.1	<u> </u>	076.0	0	1.1	0	10.1		3000	100	0000	6x/6n		
		0:10		200	00	70010	00	300 0		100:0		+31	00	920 0		300.0	61/60		
		818		0 800		0 952		0 213		128.0		761		192.0		292.0	611-6-	Dieldrin	
			111	296.0		111		9.835	111	966 0		571	101	1:32	rn	268.0	na/ka	delta-BHC	
			nn	19.2	1.0	5.9	nu	21.2		5.59		62.5		2.29	n	2.34	nd\ka	cis-Nonachlor	
		9.71	n	966.0	n	S1.1	n	4 98.0	n	£0.1	m	13.1	n	116.0	n	0.929	6ϡ/ɓn	cis-Chlordane	
		9.71	n	55.5	n	80.4	n	30.E	n	3.65	n	5.33	n	52.5	n	3.29	6א/bn	Chlordane	
		9.71	n	20.1	n	81.1	n	£88.0	n	<u>۹</u> 0.۲	m	1.54	n	6.0	n	676.0	6y/6n	Beta-Chlordane	
			n	90. L	In	£7.1	n	76.0	n	L'L	n	9'1	n	/6.0	n	686.0	бя/бп	DH8-B190	
			01	6//:0	rn	L06:0	n	9/9:0	n	908.0	rn r	81.1	n	Z1/10	n	97/.0	бя/бп	JH8-snqiA	
		0#	0	90.1	ro	CZ.1	0	956.0	ro	71.1	10	C0.1	0	996.0	0.0	10.1	6x/6n		
			r/1	CH.C	10		0	66.2	- CO	10:0		77.0	- CO	0000	0	77'0	6y/6n		
077	0:0			375		V	111	00 0	111	29 8	<u> </u>	60.9		312		3 33	6,00		
550	50													87.5			10/80	^{8,1} aTOO letoT betemita∃	· · · · · ·
	0.3	6.29	m	679.0	m	0.752	m	0.563	m	278.0	m	186.0	1C1	3.48	m	909'0	by/bn	T00-'4'4	
	0.3	31.3	m	229.0	m	899.0	m	9.0	m	269.0	m	278.0	m	723.0	m	0.538	6դ/ɓn	4'4-DDE	
	0.3	58	m	287.0	m	¢99`0	m	0.423	m	¢09.0	m	757.0	m	9445	m	994.0	6y/6n	4,4'-DDD	
			n	19.2	n	5.9	n	21.2	n	5.59	n	62.5	n	2.29	n	5.34	6y/6n	2,4'-DDT	
			n	19.2	n	5.9	01	71.2	n	69'7	n	6/.8	n	67.2	n	7.34	бу/бп	2't-DDE	
			n	19.2	n	6.2	n	/1.2	n	69'7	01	6/18	n	67.7	n	7.34	бя/бп		
											1		I		1			Sale Sale Sale Sale Sale Sale Sale Sale	เกมารอะ
001		0.10		0:01	1	0:0	<u> </u>	1.7		0:0				0.71	1	1:01	61/60		1011005
180		929		081		09		27		69				9 62		201	03/011	^{c,1} ,9929 letoT botemita3	
				82.1	ar	22.0	- JP	2.0	n	21.0	n	0.24	d	2.51	Ь	67.0	na\ka	PCB-187	L
			Г	99.0		0.26		92.0		51.0	I N	2.0	Ь	3.22	1 r	0.53	nd\ka	bCB-180	ļ
			JP I	0.26		61.0		S1.0		91.0	Π	22.0		30.5	l qu	2.0	nd\ka	PCB-170	I
	<u> </u>			7.1	JP	0.32	Π	61.0		29.0		82.0		4.32	Ь	69.0	by/bn	PCB-153	
				78.0	n	6 <u>7</u> .0	Π	G1.0	JP	81.0	Π	0.22	Ь	66°L	n	79.0	քא/քո	PCB-138	
			n	14.0	n	21.0	ЛЬ	62.0	n	0.14	Π	2.0	Ь	33. f	l L	0.35	6א/6n	PCB-128	
			Ъ	92.0	n	2.0	n	91.0	n	21.0	Π	0.24	ЛЬ	0.52	Π	81.0	nð\kg	PCB-118	
			n	0.14	Π	91.0	n	61.0	n	٥.14	\cap	61.0	Π	21.0	$\left[\cap \right]$	S1.0	6y/6n	PCB-105	
				0.4	Π	72.0	Π	0.22	ſ	0.26	Π	2£.0		78.0	ſ	0.34	6y/6n	PCB-101	
			Ь	19.0	Π	61.0		0.32		9.0	Π	62.0		1.35		62.0	6y/6n	PCB-066	
			Ъ	Z9.0	n	66.0	Π	72.0	n	82.0	Π	0.4		2.91	Π	£.0	6ą/6n	PCB-052	
			Π	61.0	Π	12.0		21.0	n	81.0	Π	0.25	Ь	7 9.0	Π	61.0	6ą/6n	PCB-044	
			ſ	79.0	r	14.0	Π	61.0	n	6.0	Π	82.0	Π	81.0	Га	S.0	6դ/ɓn	PCB-028	
			Π	0.33	n	75.0	n	£.0	n	15.0	n	0.44	n	8Z.0	0	0.33	бу/бп	PCB-018	1
			n	0.33	n	75.0	ЪГ	98.0	n	0.32	n	0.45	n	82.0	n	0.34	6y/6n	PCB-008	1
	T				•		•		l			-	•					s Congeners	se sgo
anilassa	SV18	SV18		Nomal	1	Normal	T	Normal	1	ISMION	1	Normal	T	Normai		IEMION	51110	ลาส์เขาพ	
	DOBOIG IL			07/17/01	_,	0.7/1.7/01		07/17/01	_/		-	0.03/1.7/01		07/17/01			^s stin()	uno	
	UDIRO S	Ulicito T	05	06/16/01	1 20	10/21/201	05	10/12/01	1 20	10/21/201		10/21/200	05	06/16/01	1 20	10/21/201	ats(] alg	me2.	
	10,005	10180 6060	09	09S10IS	0.	20981018	09	2101220	0	2101 S 200	0	21012205	01	09S10IS	0	209S10IS	DI elqme	S	
	1	4-1-1 2721			1				1		1		1		l ə	nearshor	offshore)	11)	
Ľ		<u></u>											1			dn.c/	(ajous 6i		
				O POLING C			1		1	1101000	L		1		<u> </u>		1,	10 10 10 10 10	
				Downstre				lennshO ep	Cischa	llettuO			H 10	sttuO tA	լ ս	Upstrean	1		

2002 City Source Control Sediment Investigation Cuttall Sediment Analytical Data Adjacent to City Outfall S-5 t 3jaat

Attachment B Field Photographs



Photo 1 (July, 2005). Inline solids collected just downstream from manhole AAP965 in a 24-inchdiameter line.



Photo 2 (July, 2005). Sample collected from manhole AAP981.

Attachment C Field Notes

City of Portland Environmental Services

DAILY FIELD REPORT

	Page of
Project PORTINO IJANDON INVINCE SED SAMP Location 16755 Subject 5720 NOTES	Project No. 1020.00) Date $7/26/05$ By 105
1030 PROMED TO BASIN SS ONG in :	SWAN ISLAND.
1050 NRRIVE NT ANP912- NO SEDS 1110 ARVINE NT ANP913- NO SEDS 1110 ARVINE NT ANP913- NO SEDS 1116 ANNIVE NT ANP965- Scomple coller	ter
120) AMRIVÉ AT AAP 982 - NO SEDS	
12-40 ARRIVERT PARAMET - SAMPA 12-40 ARRIVERT PARAMET NO SCORE	Collecter
1308 PRILLE AT ARP996- NO SEDS	· · · · · · · · · · · · · · · · · · ·
	``
Attachments	

S.					ivirc	CITY OF PORT MMENTAL Water Following of the 1 7648 N. BUIldoron Portage Rev2208	AND SER aboration Ava 1959	VIOES	
		ROR	tlân	D HAF	ibour T	INUNE'SEDI Teld Data 9	Ment (Sheet	SAMPLING - 1020-001	
Date: 7	26	05	Time:	1059		Current Weather co	onditions:	SUDN'T 80'S	
Samplin	Sampling Team Present: MJP/JJM/ PDA								
Basin:	S	5			Node:	DAP962		Subbasin:	
Address	5:		Ν.	CIIZORO	AVE				

SECTION 1 - PRE-SAMPLING VISUAL OBSERVATION REPORT									
Describe any flowing or standing water observed in the line?	MINOR Bas								
Does river appear to back up to this location? Describe rate/color/odor of flow:	No								
Are sediments observed in the line?	NO								
Is there enough sediment in the line to collect a sample?	No								
Describe lateral extent and depth of sample- able sediments present in the line:									
SITE DIAGRAM: Include street intersections/late	SITE DIAGRAM: Include street intersections/laterals/MH's/driveways cuts and extent of solids accumulation								
	RIVER								
	4								
	Chrice Basin								
	N. CHANNEL AVE								
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ting in the second of the second s				
	VIRO,	NMENTAL SER Vator Policities control Laborationy ce42 N Depression Ave., Pontrol Management Ave.,	VICES	
	BOUR	INLINE SEDIMENT S	AMRUNG - 1020.001	
	Ê	eld data sheet		
Date: 7/26/05 Time: 1104	C	Current Weather conditions:	SUNNY 80'S	
ב ונבוא Sampling Team Present:	IJM) P)	A(
Basin: S5	Node:	AAP969-	Subbasin:	
Address: W	1 CPAN	IN AUE		
SECTION 1 -	- PRE-S	AMPLING VISUAL OBS	ERVATION REPORT	
Describe any flowing or standing water observed in the line?		15" sterring water	ΥΥ ΠΥΥΥΥ ΝΑΝΟΡΙΣΤΟΙΟ ΠΟΙΣΤΟΝ ΤΟ	
Does river appear to back up to this lo Describe rate/color/odor of flow:	ocation?	Nð		
Are sediments observed in the line?		NO		
Is there enough sediment in the line to c sample?	collect a	NO		
Describe lateral extent and depth of sable sediments present in the line:	sample-			
SITE DIAGRAM: Include street intersec	ctions/late	rals/MH's/driveways cuts and	extent of solids accumulation	
••••••••••••••••••••••••••••••••••••••			1	
			N, CHNNNE AVE	
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			E	MIR	CITY OF PORTLAND DNMENITAL SEP Water Polytopic of the Laboratory 6543 N. Bullington Ave. Portuant Scriptons 5452	MICES			
	POR	TLAN	ð har	Bour	NLINE SÉDIMENT RELD DATA SHEET	SAMPLING - 1020.00			
Date: 7/26	05	Time:	1116		Current Weather conditions:	SUNN 80'S			
Sampling To	Sampling Team Present: パゴー ゴル								
Basin:	s <i>5</i>			Node	: ANP 965	Subbasin:			
Address:									

SECTION 1 - PRE-SAMPLING VISUAL OBSERVATION REPORT						
Describe any flowing or standing water observed in the line?	minor					
Does river appear to back up to this location? Describe rate/color/odor of flow:	NO					
Are sediments observed in the line?	YES					
Is there enough sediment in the line to collect a sample?	YES					
Describe lateral extent and depth of sample- able sediments present in the line:	μ m».					

SITE DIAGRAM: Include street intersections/laterals/MH's/driveways cuts and extent of solids accumulation

N. Chowned

. Series Sporad <u>ナ</u>" . 24"

SEC	TION 2	- SAMPLE COLLECTI	ON REPORT	Node:
Sampling Equipment:	\$5	SPOON .		
Equipment Decontamination process:	Per F	Ops SOP 70.1a	Other (Describe)
Sample date: $\gamma/\gamma_{-6}/\sigma_{5}$	Samp	le time: 1124		
Sample Identification: (IL-XX-NNNNN-n	וד זיין (ער ויין	L-55-AAP968		
Sample location: (number of feet from node of entry)	Don	NTILLOM GROM	NGDE	
Sample collection technique:	5556	CON N		
Color of sample:	R	ACK		
Texture/Particle size:	SANDS GALOR Coppler			
Visual or olfactory evidence of contamination:		B suising nothing	smell.	
Depth of solids in area where sample collected:	1/2			
Amount and type of debris:				
Compositing notes:				
		Sample Jars Collected		
If not enough sample to fill all of the jars, th jars in this order:	nen fill	Metals PAHs/SVOCs PCBs TPH (two jars) TOC		
Duplicate sample collected?			<u>`</u>	
Duplicate sample fictitious identification # c	on COC:		· · · · · · · · · · · · · · · · · · ·	
Samples placed in chilled cooler? Y/N				
Samples delivered to lab? Y/N		Lab ID Number: F	FO 050///	
Describe any deviations from standard proc	cedures:			

SECTION 3 - PHOTOGRAPH LOG			
Photograph Log	In-Pipe sample location		
	Homogenized sample		

	CITY OF PORTLAND WIRONMENTAL SERV Water Pelluhordontrol laboratory Sensin Deliniopton Ave Portland, 02107200-5452	IOES
BORTLAND HAR	Bour Inline Sediment Sa Field Data Sheet	MRLING 1020-001
Date: 7/26/05 Time: 1201	Current Weather conditions:	ZUNNJ 80,7
Sampling Team Present: MJA) JJ M	
Basin: 55	Node: ANP 982	Subbasin:
Address:		

SECTION 1 - PRE-	SECTION 1 - PRE-SAMPLING VISUAL OBSERVATION REPORT				
Describe any flowing or standing water observed in the line?	MINOR				
Does river appear to back up to this location? Describe rate/color/odor of flow:	No				
Are sediments observed in the line?	NO				
Is there enough sediment in the line to collect a sample?	NO				
Describe lateral extent and depth of sample- able sediments present in the line:					





ENVIRO	CITY OF PORTLAND DNMENTAL SERVIC Water Pollution control Laboratory 6543 N. Burlington Ave., Portland, OR:97203-5452	DES
PORTLAND HARBOUF	INLINE SEDIMENT SAN TELD DATA SHEET	APLING - 1020.001
Date: 7/26/01 Time: 1224	Current Weather conditions: 5.	INN RO'S
Sampling Team Present: MJを) JTM		
Basin: SS Node	1.8P 940	Subbasin:
Address: N. CI)ANNAL.		
SECTION 1 - PRE-	SAMPLING VISUAL OBSER	ATION REPORT
Describe any flowing or standing water observed in the line?	BALLEY	
Does river appear to back up to this location? Describe rate/color/odor of flow:	NO	
Are sediments observed in the line?	VES ON THE SIDE	UP + Donw
Is there enough sediment in the line to collect a sample?	YB	
Describe lateral extent and depth of sample- able sediments present in the line:		
SITE DIAGRAM: Include street intersections/late	erals/MH's/driveways cuts and exter	nt of solids accumulation
	180 Jul	
	\	
		N. CAANNE)
	N. BALLAST	

SECT	10N 2	- SAMPLE COLLECTION	REPORT	Node: ARP981
Sampling Equipment:	SSSECON			
Equipment Decontamination process:	Per F0	Ops SOP 70.1a	Other (Describe	•)
Sample date: フィンム - o S	Sampl	e time: 1228		
Sample Identification: (IL-XX-NNNNNN-m		- 55 - AAP 981 -	0705	
Sample location: (number of feet from node of entry)	NP-	DOWN FROM NO	DE	
Sample collection technique:	SS SPOON			
Color of sample:	BL,	عدار		· · ·
Texture/Particle size:	CLF	54		
Visual or olfactory evidence of contamination:				
Depth of solids in area where sample collected:	ふ	solids accumulate	NON Siz	le of pipe
Amount and type of debris:		、 、		
Compositing notes:				
		Sample Jars Collected		
If not enough sample to fill all of the jars, then fill jars in this order:		Metals PAHs/SVOCs PCBs TPH (two jars) TOC		
Duplicate sample collected?				
Duplicate sample fictitious identification # or	n COC:			
Samples placed in chilled cooler? Y/N				
Samples delivered to lab? Y/N		Lab ID Number: FO 050778		
Describe any deviations from standard proc	edures:			

SECTION 3 - PHOTOGRAPH LOG			
Photograph Log	In-Pipe sample location		
	Homogenized sample		

		CITY OF PORTLAND NVIRONMENTAL S Water Pollution control Labora 6543 N. Burlington Ave., Portland, OP 97208-5452) ERVICES Nory	
POF	TLAND HAP	RBOUR INLINE SEDIME FIELD DATA SHE	NT SAMPLING - 10 IET	20.001
Date: ハルしび	Time: 1240	Current Weather condition	ons: JUNNY 80's	
Sampling Team Pres	sent: mai			
Basin: 55		Node: AAP995	Subbasin:	· · · · · · · · · · · · · · · · · · ·
Address:				

SECTION 1 - PRE-SAMPLING VISUAL OBSERVATION REPORT		
Describe any flowing or standing water observed in the line?		
Does river appear to back up to this location? Describe rate/color/odor of flow:	NG	
Are sediments observed in the line?	No	
Is there enough sediment in the line to collect a sample?	NO	
Describe lateral extent and depth of sample- able sediments present in the line:		

SITE DIAGRAM: Include street intersections/laterals/MH's/driveways cuts and extent of solids accumulation

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	مىتىرىمى مىرىمىرى	ENV	CITY OF PORTLAND IRONMENTAL SEP Water Pollution control Laboratory 6543 N. Burlington Ave., Portland, OP 97203-5452	RVICES	
P	ORTLAN	D HARB(OUR INLINE SEDIMENT	SAMPLING - 1020.00	
: 		· · · · · · · · · · · · · · · · · · ·	FIELD DATA SHEET		er en la calacterística de
Date: 7-26-	نځن Time:	1308	Current Weather conditions:	JUNNY SOY	
Sampling Team	Present:	M2H :	JTM		
Basin: S	5		Node: NAP 996	Subbasin:	
Address:					
	050				

SECTION 1 - PRE-	SAMPLING VISUAL OBSERVATION REPORT
Describe any flowing or standing water observed in the line?	
Does river appear to back up to this location? Describe rate/color/odor of flow:	NO
Are sediments observed in the line?	Cill
Is there enough sediment in the line to collect a sample?	No
Describe lateral extent and depth of sample- able sediments present in the line:	
SITE DIAGRAM: Include street intersections/late	erals/MH's/driveways cuts and extent of solids accumulation
Risin ME	

Attachment D Laboratory Results



Laboratory Data QA/QC Review Upland Source Control Investigation City Outfall Basin S-5

To:	File
From:	Eric Collins, RG – GSI
	Robyn Cook, GSI
Date:	May 15, 2006

This memorandum presents a quality assurance/quality control (QA/QC) review of the laboratory data generated during source control investigation sampling and analyses recently conducted by the City of Portland (City) in Outfall Basin S5. The results of the sampling and analysis are presented in Technical Memorandum No. OF S5-1.

The laboratory analysis for these source control program samples were completed by the City's BES laboratory and a subcontracted laboratory. The following analyses were conducted by each laboratory:

- BES Laboratory
 - o Metals (EPA Method 6020)
- STL Laboratory
 - Semivolatile Organics (EPA Method 8270-SIM)
 - Mercury by CVAA (EPA Method 7471)

Attachment C of the Technical Memorandum No. OF S5-1 presents the BES laboratory LIMS summary report for all analyses associated with this Outfall Basin investigation and the subcontracted laboratory's data reports. Subcontracted laboratories frequently receive batches of samples related to several BES sampling projects. In this case, only those analytical results (and QA/QC pages) pertinent to this Outfall Basin investigation memorandum are provided with the subcontractor's reports.

This QA/QC review is based upon the available documentation supplied from each laboratory. The QA/QC review of the analytical data consisted of reviewing the following for each laboratory report:

• Chain-of-custody complete and correct

- Analysis within holding times
- Chemicals of interest in method blanks
- Surrogate recoveries within accuracy control limits
- Laboratory duplicates within analytical accuracy control limits
- Laboratory blank spike recoveries within accuracy control limits
- Laboratory blank spike duplicate results within analytical precision control limits
- Matrix spike recoveries within accuracy control limits
- Matrix spike duplicate results within analytical precision control limits

The results of the laboratory report QA/QC review are presented below.

Chain-of-Custody

The chain-of-custody forms showed continuous custody of the samples. The chain-of-custody procedures were adequate and sample integrity was maintained through the sample collection and delivery process.

Analysis Holding Times

Semi-Volatile Organic Analyses

All samples were extracted and analyzed within the required holding times.

Mercury Analyses

All samples were extracted and analyzed within the required holding times.

Metal Analyses

All samples were extracted and analyzed within the required holding times.

Method Blanks

Method blanks were processed during the laboratory analysis of SVOCs, metals and mercury. No chemicals were detected in the method blanks associated with metals or mercury. Three analytes were detected in the method blank associated with the SVOC analysis. Two of the analytes (Di-n-butylphthalate and butylbenzylphthalate) were qualified as estimates by flagging the detected compounds with a "J." The third analyte (bis(2-Ethylhexyl)phthalate) was detected in the sample at concentrations significantly higher than the concentration in the method blank; therefore this analyte was not qualified.

Surrogate Recoveries

Surrogate recoveries were completed during the laboratory analysis of SVOCs (including phthalate analyses). All surrogate recoveries were within laboratory control limits during the first round of analyses (SVOCs). One of the surrogates analyzed with the phthalates (2-flourobiphenyl) was outside laboratory control limits due to matrix interference. Only one surrogate is outside laboratory control limits; therefore no data are qualified.

Laboratory Duplicate

A laboratory duplicate was processed during the laboratory analyses of mercury. Relative percent differences (RPDs) were within analytical accuracy control limits.

Laboratory Control Sample Recoveries

Laboratory control samples were processed during the laboratory analyses of SVOCs, metals and mercury. All laboratory blank spike recoveries were within laboratory control limits. A laboratory control sample was not processed during the analysis of phthalates because these compounds were re-run after the SVOC analysis. Therefore, all phthalate results have been qualified as estimates by flagging the detected compounds with a "J." Reporting limits are also qualified as estimates and are flagged with a "UJ."

Matrix Spike Recoveries

A matrix spike was processed during the laboratory analyses of mercury. The matrix spike recovery was outside of the laboratory control limits, but because the concentration of mercury in the sample was relatively high, no data are qualified.

Laboratory Control Sample Duplicates

Laboratory blank spike duplicates and laboratory matrix spike duplicates were processed during the laboratory analyses of SVOCs (but not during phthalate analyses). The relative percent difference (RPD) between the laboratory blank and the laboratory blank spike duplicate for one of the compounds exceeded quality control limits. The RPDs between four compounds from the laboratory matrix spikes and the laboratory matrix spike duplicates exceeded quality control limits. Matrix interference was indicated based on acceptable blank spike recoveries for all three of these compounds. Because no laboratory control duplicates were processed during the laboratory analysis of phthalates, all phthalate results have been qualified as estimates by flagging the detected compounds with a "J." Reporting limits are also qualified as estimates and are flagged with a "UJ."

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Date: 7/26/05 Page: 1 of) Collected By: <u>MJH/JJM/PHK</u>		yses	Field Comments		こうした いっかい アイト・アイス ないまます おくれい しゅうちょう しょうしょう しょうしょう しょうしょう しょうしょう しょうしょうしょう										-		Inquished By: 4.		ited Name: Date:	cceived By: 4. Trme: Attraction of the contraction	Ited Name: Date:	
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Sample Date/Time 7/	/26/2005 11:24	System ID AJ07146	Sample ID	FO050777
Proj./Company Name Address/Location:	: PORTLAND HARB	OR INLINE SAMP	Page: Date Received: Sample Status:	1 7/26/2005 COMPLETE AND VALIDATED
Proj Subcategory: Sample Point Code: IMS File/Invoice #:	5140 N CHANNEL / REGULATORY PL/ S5_1 1020.001	AVE AN & EVAL	Sample Type: Sample Matrix: Collected By:	COMPOSITE SEDIMENT MJH/JJM

Comments: QA/QC: Except as follows, all analytical QA/QC criteria were met for this sample including holding times, calibration, method blanks, laboratory control sample recoveries, duplicate precision, matrix spike recoveries, and surrogate recoveries, as applicable. Results for two phthalate compounds are flagged as estimates because low levels of these compounds were also detected in the method blank.

Test Parameter	Result	Units	MRL	Method
METALS				
ARSENIC	11.6	mg/Kg dry wt	0.50	EPA 6020
BARIUM	93.1	mg/Kg dry wt	0.10	EPA 6020
CADMIUM	0.98	mg/Kg dry wt	0.10	EPA 6020
CHROMIUM	40.1	mg/Kg dry wt	0.50	EPA 6020
COPPER	181	mg/Kg dry wt	0.25	EPA 6020
LEAD	13.2	mg/Kg dry wt	0.10	EPA 6020
MERCURY	0.082	mg/Kg dry wt	0.010	EPA 6020
NICKEL	19.6	mg/Kg dry wt	0.25	EPA 6020
SILVER	0.29	mg/Kg dry wt	0.10	EPA 6020
ZINC	511	mg/Kg dry wt	0.50	EPA 6020
OUTSIDE				
MERCURY	<0.0199	mg/Kg dry wt	0.0199	EPA 7471
SEMI-VOLATILE ORGANICS - CUSTOM				
1-Methylnaphthalene	<5.66	µg/Kg dry wt	5.66	EPA 8270-SIM
2-Methylnaphthalene	5.81	µg/Kg dry wt	5.66	EPA 8270-SIM
Acenaphthene	<5.66	µg/Kg dry wt	5.66	EPA 8270-SIM
Acenaphthylene	<5.66	µg/Kg dry wt	5.66	EPA 8270-SIM
Anthracene	<5.66	µg/Kg dry wt	5.66	EPA 8270-SIM
Benzo(a)anthracene	42.5	µg/Kg dry wt	5.66	EPA 8270-SIM
Benzo(a)pyrene	40.7	µg/Kg dry wt	5.66	EPA 8270-SIM
Benzo(g,h,i)perylene	33.0	µg/Kg dry wt	5.66	EPA 8270-SIM
Benzofluoranthenes	70.2	µg/Kg dry wt	11.3	EPA 8270-SIM
Bis(2-ethylhexyl) phthalate	1410	µg/Kg dry wt	22.6	EPA 8270-SIM
Butylbenzylphthalate	EST 254	µg/Kg dry wt	22.6	EPA 8270-SIM
Chrysene	55.1	µg/Kg dry wt	5.66	EPA 8270-SIM
Dibenzo(a,h)anthracene	7.27	µg/Kg dry wt	5.66	EPA 8270-SIM

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Report Date: 9/16/2005

Validated By: Signature on File





Sample Date/Time 7	/26/2005 1	1:24	System ID	AJ07146	Sample ID	FO050777
Proj./Company Name Address/Location:	: PORTLAND IL-S5-AAP9	HARBO	R INLINE S	AMP	Page: Date Received: Sample Status:	2 7/26/2005 COMPLETE AND VALIDATED
Proj Subcategory: Sample Point Code: IMS File/Invoice #:	REGULATO S5_1 1020.001	RY PLA	N & EVAL		Sample Type: Sample Matrix: Collected By:	COMPOSITE SEDIMENT MJH/JJM

Comments: QA/QC: Except as follows, all analytical QA/QC criteria were met for this sample including holding times, calibration, method blanks, laboratory control sample recoveries, duplicate precision, matrix spike recoveries, and surrogate recoveries, as applicable. Results for two phthalate compounds are flagged as estimates because low levels of these compounds were also detected in the method blank.

Test Parameter	Result	Units	MRL	Method
Diethyl phthalate	<22.6	µg/Kg dry wt	22.6	EPA 8270-SIM
Dimethyl phthalate	<22.6	µg/Kg dry wt	22.6	EPA 8270-SIM
Di-n-butyl phthalate	EST 137	µg/Kg dry wt	22.6	EPA 8270-SIM
Di-n-octyl phthalate	132	µg/Kg dry wt	22.6	EPA 8270-SIM
Fluoranthene	74.2	µg/Kg dry wt	5.66	EPA 8270-SIM
Fluorene	6.39	µg/Kg dry wt	5.66	EPA 8270-SIM
Indeno(1,2,3-cd)pyrene	31.8	µg/Kg dry wt	5.66	EPA 8270-SIM
Naphthalene	<5.66	µg/Kg dry wt	5.66	EPA 8270-SIM
Phenanthrene	48.9	µg/Kg dry wt	5.66	EPA 8270-SIM
Pyrene	64.3	µg/Kg dry wt	5.66	EPA 8270-SIM

End of Report for Sample ID: FO050777

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Sample Date/Time 7/	/26/2005 12:28	System ID	AJ07147	Sample ID	FO050778
Proj./Company Name Address/Location:	: PORTLAND HARB IL-S5-AAP981-070 N CHANNEL & BAI	OR INLINE SAI 5 LLAST	MP	Page: Date Received: Sample Status:	1 7/26/2005 COMPLETE AND VALIDATED
Proj Subcategory: Sample Point Code: IMS File/Invoice #:	REGULATORY PL/ S5_2 1020.001	AN & EVAL		Sample Type: Sample Matrix: Collected By:	COMPOSITE SEDIMENT MJH/JJM

Comments: QA/QC: Except as follows, all analytical QA/QC criteria were met for this sample including holding times, calibration, method blanks, laboratory control sample recoveries, duplicate precision, matrix spike recoveries, and surrogate recoveries, as applicable. Results for two phthalate compounds are flagged as estimates because low levels of these compounds were also detected in the method blank.

Test Parameter	Result	Units	MRL	Method
				<u> </u>
METALS				
ARSENIC	11.7	mg/Kg dry wt	0.50	EPA 6020
BARIUM	370	mg/Kg dry wt	0.10	EPA 6020
CADMIUM	10.1	mg/Kg dry wt	0.10	EPA 6020
CHROMIUM	130	mg/Kg dry wt	0.50	EPA 6020
COPPER	430	mg/Kg dry wt	0.25	EPA 6020
LEAD	1490	mg/Kg dry wt	0.10	EPA 6020
MERCURY	0.62	mg/Kg dry wt	0.010	EPA 6020
NICKEL	70.3	mg/Kg dry wt	0.25	EPA 6020
SILVER	0.80	mg/Kg dry wt	0.10	EPA 6020
ZINC	1300	mg/Kg dry wt	0.50	EPA 6020
OUTSIDE				
MERCURY	0.179	mg/Kg dry wt	0.0229	EPA 7471
SEMI-VOLATILE ORGANICS - CUSTOM				
1-Methylnaphthalene	56.3	µg/Kg dry wt	6.83	EPA 8270-SIM
2-Methylnaphthalene	198	µg/Kg dry wt	6.83	EPA 8270-SIM
Acenaphthene	34.6	µg/Kg dry wt	6.83	EPA 8270-SIM
Acenaphthylene	30.3	µg/Kg dry wt	6.83	EPA 8270-SIM
Anthracene	44.3	µg/Kg dry wt	6.83	EPA 8270-SIM
Benzo(a)anthracene	145	µg/Kg dry wt	6.83	EPA 8270-SIM
Benzo(a)pyrene	336	µg/Kg dry wt	6.83	EPA 8270-SIM
Benzo(g,h,i)perylene	332	µg/Kg dry wt	6.83	EPA 8270-SIM
Benzofluoranthenes	328	µg/Kg dry wt	13.7	EPA 8270-SIM
Bis(2-ethylhexyl) phthalate	1490	µg/Kg dry wt	27.3	EPA 8270-SIM
Butylbenzylphthalate	EST 540	µg/Kg dry wt	27.3	EPA 8270-SIM
Chrysene	210	µg/Kg dry wt	6.83	EPA 8270-SIM
Dibenzo(a,h)anthracene	<6.83	µg/Kg dry wt	6.83	EPA 8270-SIM

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Report Date: 9/16/2005

Validated By: Signature on File





Sample Date/Time 7	/26/2005 12:28	System ID AJ07147	Sample ID	FO050778
Proj./Company Name Address/Location:	: PORTLAND HARB IL-S5-AAP981-070	OR INLINE SAMP 5	Page: Date Received: Sample Status:	2 7/26/2005 COMPLETE AND VALIDATED
Proj Subcategory: Sample Point Code: IMS File/Invoice #:	N CHANNEL & BAI REGULATORY PL S5_2 1020.001	LLAST AN & EVAL	Sample Type: Sample Matrix: Collected By:	COMPOSITE SEDIMENT MJH/JJM

Comments: QA/QC: Except as follows, all analytical QA/QC criteria were met for this sample including holding times, calibration, method blanks, laboratory control sample recoveries, duplicate precision, matrix spike recoveries, and surrogate recoveries, as applicable. Results for two phthalate compounds are flagged as estimates because low levels of these compounds were also detected in the method blank.

Test Parameter	Result	Units	MRL	Method
Diethyl phthalate	28.0	µg/Kg dry wt	27.3	EPA 8270-SIM
Dimethyl phthalate	47.4	µg/Kg dry wt	27.3	EPA 8270-SIM
Di-n-butyl phthalate	EST 262	µg/Kg dry wt	27.3	EPA 8270-SIM
Di-n-octyl phthalate	222	µg/Kg dry wt	27.3	EPA 8270-SIM
Fluoranthene	252	µg/Kg dry wt	6.83	EPA 8270-SIM
Fluorene	25.0	µg/Kg dry wt	6.83	EPA 8270-SIM
Indeno(1,2,3-cd)pyrene	<6.83	µg/Kg dry wt	6.83	EPA 8270-SIM
Naphthalene	107	µg/Kg dry wt	6.83	EPA 8270-SIM
Phenanthrene	184	µg/Kg dry wt	6.83	EPA 8270-SIM
Pyrene	295	µg/Kg dry wt	6.83	EPA 8270-SIM

End of Report for Sample ID: FO050778

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Seattle	11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244 425.420.9200 fax 425.420.9210
Spokane	East 11115 Montgomery, Suite B, Spokane, WA 99206-4776 509.924.9200 fax 509.924.9290
Portland	9405 SW Nimbus Avenue, Beaverton, OR 97008-7132 503.906.9200 fax 503.906.9210
Bend	20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 541.383.9310 fax 541.382.7588
Anchorage	2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119 907.563.9200 fax 907.563.9210

August 24, 2005

Jennifer Shackelford City of Portland Water Pollution Laboratory 6543 N. Burlington Ave. Portland, OR 97203

RE: Portland Harbor

Enclosed are the results of analyses for samples received by the laboratory on 07/27/05 17:05. The following list is a summary of the NCA Work Orders contained in this report. If you have any questions concerning this report, please feel free to contact me.

Work	Project	ProjectNumber
P5G1088	Portland Harbor	40567

Thank You,

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Howard Holmes, Project Manager



 Seattle
 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244 phone: (425) 420.9200

 Spokane
 East 11115 Montgomery, Suite B, Spokane, WA 99206-4776 phone: (509) 924.9200

 Portland
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 Bend
 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 phone: (541) 383.9310

 Anchorage
 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119 phone: (907) 563.9200

City of Portland Water Pollution Laboratory	Project Name:	Portland Harbor	
6543 N. Burlington Ave.	Project Number:	40567	Report Created:
Portland, OR 97203	Project Manager:	Jennifer Shackelford	08/24/05 18:30

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
FO 050774	P5G1088-01	Soil	07/26/05 09:38	07/27/05 17:05
FO 050775	P5G1088-02	Soil	07/26/05 08:38	07/27/05 17:05
FO 050776	P5G1088-03	Soil	07/26/05 09:50	07/27/05 17:05
FO 050777	P5G1088-04	Soil	07/26/05 11:24	07/27/05 17:05
FO 050778	P5G1088-05	Soil	07/26/05 12:28	07/27/05 17:05

North Creek Analytical - Portland

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Howard Holmes, Project Manager

the results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



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 fax: (425) 420.9210

 Spokane
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 Bend
 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 phone: (541) 383.9310
 fax: 541.382.7588

 Anchorage
 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119 phone: (907) 563.9200
 fax: (907) 563.9210

<u>City of Portland Water Pollution Laboratory</u>	Project Name:	Portland Harbor	
6543 N. Burlington Ave.	Project Number:	40567	Report Created:
Portland, OR 97203	Project Manager:	Jennifer Shackelford	08/24/05 18:30
Conventional Chemis	stry Parameter	rs by APHA/EPA Methods	

North Creek Analytical - Bothell											
Analyte		Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
P5G1088-01	Soil	FO 050774	Sampl	ed: 07/26/(05 09:38						
Total Organic Ca	arbon	EPA 9060 mod.	46900		1590	mg/kg dry	1x	5H17036	08/05/05	08/16/05 00:00	
P5G1088-03 Soil FO 050776 Sampled: 07/26/05 09:50											
Total Organic Ca	arbon	EPA 9060 mod.	34500		3090	mg/kg dry	1x	5H17036	08/05/05	08/16/05 00:00	

North Creek Analytical - Portland

Hauk tolun L

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Howard Holmes, Project Manager



 Seattle
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 fax: (425) 420.9210

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 fax: (509) 924.9290

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 fax: 541.382.7588

 Anchorage
 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119 phone: (907) 563.9200
 fax: (907) 563.9210

City of Portland Water Pollution Laboratory	Project Name:	Portland Harbor	
6543 N. Burlington Ave.	Project Number:	40567	Report Created:
Portland, OR 97203	Project Manager:	Jennifer Shackelford	08/24/05 18:30
Dhysical Dar	motors by ADHA	ASTM/FPA Mathada	· · · · · · · · · · · · · · · · · · ·

North Creek Analytical - Bothell											
Analyte		Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
P5G1088-01	Soil	FO 050774	Sampl	ed: 07/26/()5 09:38						
Dry Weight	z	BSOPSPL003R0	31.5		1.00	%	1x	5H04034	4 08/04/05	08/05/05 00:00	
P5G1088-03 Soil FO 050776 Sampled: 07/26/05 09:50											
Dry Weight		BSOPSPL003R0	16.2		1.00	%	1 x	5H04034	4 08/04/05	08/05/05 00:00	

North Creek Analytical - Portland

blus Hauk

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Howard Holmes, Project Manager



 Seattle
 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244 phone: (425) 420.9200 fax: (425) 420.9210

 Spokane
 East 11115 Montgomery, Suite B, Spokane, WA 99206-4776 phone: (509) 924.9200 fax: (509) 924.9290

 Portland
 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132 phone: (503) 906.9200 fax: (503) 906.9210

 Bend
 2032 Empire Avenue, Suite F-1, Bend, OR 97701-5711 phone: (513) 383.9310 fax: 541.382.7588

 Anchorage
 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119 phone: (907) 563.9200 fax: (907) 563.9210

City of Portland Water 6543 N. Burlington Ave. Portland, OR 97203	Pollution La	aboratory		Project N Project N Project M	ame: umber: lanager:	Portlan 40567 Jennife	nd Harb r Shacke	<u>or</u> lford					<u>Report Crea</u> 08/24/05 1	<u>uted:</u> 8:30
	Total Mero	cury per EF	PA Meth North C	od 7471. reek Ana	<u>A - La</u> llytical -	<u>borato</u> Portlan	ry Qual d	lity Co	ontro	l Resul	ts			
QC Batch: 5071235	Soil Pr	reparation M	lethod:	EPA 163	1									
Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	MRPD (I	Limits	s) Analyzed	Notes
Blank (5071235-BLK1)								Ext	racted:	07/28/05	5 11:02			
Mercury	EPA 7471A	ND		0.100	mg/kg	1x							07/28/05 12:56	
LCS (5071235-BS1)								Ext	racted:	07/28/05	5 11:02			
Mercury	EPA 7471A	1.05		0.100	mg/kg	lx		1.00	105%	(80-120)			07/28/05 12:58	
LCS Dup (5071235-BSD1)						•		Ext	racted:	07/28/05	5 11:02			
Mercury	EPA 7471A	1.00		0.100	mg/kg	1x		1.00	100%	(80-120)	4.88% ((20)	07/28/05 13:00	
Duplicate (5071235-DUP1)				QC Sourc	e: P5G10	88-01		Ext	racted:	07/28/05	5 11:02			
Mercury	EPA 7471A	1.07		0.248	mg/kg dry	/ 1x	ND				166% ((40)	07/28/05 13:02	Q-06
Matrix Spike (5071235-MS	1)			QC Sourc	e: P5G10	88-01		Ext	racted:	07/28/05	5 11:02			
Mercury	EPA 7471A	2.66		0.241	mg/kg dry	/ 1x	0.100	2.41	106%	(75-125)			07/28/05 13:05	
Matrix Spike Dup (5071235	5-MSD1)			QC Sourc	e: P5G10	88-01		Ext	racted:	07/28/05	5 11:02			
Mercury	EPA 7471A	2.42		0.220	mg/kg dry	/ lx	0.100	2.20	105%	(75-125)	9.45% ((40)	07/28/05 13:07	

North Creek Analytical - Portland

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Howard Holmes, Project Manager



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Portland	9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
	phone: (503) 906.9200 fax: (503) 906.9210
Bend	20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
	phone: (541) 383.9310 fax: 541.382.7588
Anchorage	2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
	phone: (907) 563.9200 fax: (907) 563.9210

City of Portland Water 6543 N. Burlington Ave. Portland, OR 97203	r Pollution La	boratory		Project N Project N Project M	ame: umber: lanager:	Portlan 40567 Jennife	nd Harb r Shacke	<u>or</u> lford					<u>Report Crea</u> 08/24/05 1	<u>uted:</u> 8:30
Conventi	onal Chemist	ry Parame	ters by A North (APHA/E Creek An	<u>PA Met</u> alytical -	<u>hods</u> - Bothel	Laboi	ratory	Qua	lity Co	ntrol	Resi	<u>ults</u>	
QC Batch: 5H17036	Soil Pr	eparation M	ethod:	General	Preparat	ion								
Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limi	its) Analyzed	Notes
Blank (5H17036-BLK1)								Extr	acted:	08/16/05	00:00			
Total Organic Carbon	EPA 9060 mod.	ND		500	mg/kg	1x							08/16/05 00:00	
LCS (5H17036-BS1)								Extr	acted:	05/18/05	00:00			
Total Organic Carbon	EPA 9060 mod.	30700		500	mg/kg	1x		29900	103%	(72-130)			08/16/05 00:00	
LCS Dup (5H17036-BSD1)							Extr	acted:	05/18/05	00:00			
Total Organic Carbon	EPA 9060 mod.	28000		500	mg/kg	1x		29900	93.6%	(72-130)	9.20%	6 (30)	08/16/05 00:00	
Duplicate (5H17036-DUP1)			QC Source	e: P5G108	8-01		Extr	acted:	08/05/05	00:00			
Total Organic Carbon	EPA 9060 mod.	53000		1590	mg/kg dry	1x	46900				12.2%	6 (35)	08/16/05 00:00	
Duplicate (5H17036-DUP2)			QC Sourc	e: B5H005	9-01		Extr	acted:	08/05/05	00:00			
Total Organic Carbon	EPA 9060 mod.	6900		500	mg/kg dry	1x	5460				23.3%	6 (35)	08/16/05 00:00	
Duplicate (5H17036-DUP3)			QC Source	e: B5H006	7-04		Extr	acted:	08/05/05	00:00			
Total Organic Carbon	EPA 9060 mod.	3500		500	mg/kg dry	1x	4260				19.6%	6 (35)	08/16/05 00:00	
Duplicate (5H17036-DUP4)			QC Sourc	e: B5H010	6-01		Extr	acted:	08/05/05	00:00			
Total Organic Carbon	EPA 9060 mod.	11900		500	mg/kg dry	1x	12700				6.50%	6 (35)	08/16/05 00:00	
Duplicate (5H17036-DUP5)			QC Sourc	e: B5H012	6-11		Extr	acted:	08/16/05	00:00			
Total Organic Carbon	EPA 9060 mod.	101000		2720	mg/kg dry	1x	123000				19.6%	6 (35)	08/16/05 00:00	
Matrix Spike (5H17036-M	S1)			QC Sourc	e: P5G108	8-01		Extr	acted:	08/05/05	00:00			
Total Organic Carbon	EPA 9060 mod.	70100		1590	mg/kg dry	1x	46900	21700	107%	(40-160)			08/16/05 00:00	

North Creek Analytical - Portland

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Howard Holmes, Project Manager



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Extracted: 08/04/05 10:29

City of Portland Water 6543 N. Burlington Ave. Portland, OR 97203	Pollution La	boratory	Project Project Project	Name: Number: Manager:	<u>Portlan</u> 40567 Jennifer	d Harbo	<u>or</u> ford				<u>Report C</u> 08/24/05	<u>reated:</u> 5 18:30
Physic	al Paramet	ers by APHA/A No	STM/EPA rth Creek A	Method nalytical	l <u>s - La</u> l - Bothell	borator	y Qua	lity Co	ntrol R	<u>esults</u>		
QC Batch: 5H04034	Soil Pr	eparation Metho	d: Dry W	eight								
Analyte	Method	Result M	DL* MRI	L Units	Dil	Source Result	Spike Amt	REC ^{(L}	mits) R	% PD (Limit	ts) Analyzeo	l Notes

Blank (5H04034-BLK1)

Dry Weight

BSOPSPL003R0 8 100

1.00 % 1x

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-- -- 08/05/05 00:00

North Creek Analytical - Portland

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City of Portland Water Pollution Laboratory	Project Name:	Portland Harbor	
6543 N. Burlington Ave. Portland, OR 97203	Project Number: Project Manager:	40567 Jennifer Shackelford	Report Created: 08/24/05 18:30

Notes and Definitions

Report Specific Notes:

Q-06 - RPD is not applicable for analyte concentrations less than 5 times the MRL.

Laboratory Reporting Conventions:

<u>DET</u> - Analyte <u>DETECTED</u> at or above the Reporting Limit. Qualitative Analyses only.

<u>ND</u> - Analyte <u>NOT DETECTED</u> at or above the reporting limit (MDL or MRL, as appropriate).

<u>NR / NA</u> - <u>Not Reported</u> / <u>Not Available</u>

dry - Sample results reported on a dry weight basis. Reporting Limits are corrected for %Solids when %Solids are <50%.

wet - Sample results and reporting limits reported on a wet weight basis (as received).

<u>RPD</u> - <u>Relative Percent Difference</u>. (RPDs calculated using Results, not Percent Recoveries).

<u>MRL</u> - <u>METHOD REPORTING LIMIT</u>. Reporting Level at, or above, the lowest level standard of the Calibration Table.

- <u>MDL*</u> <u>METHOD DETECTION LIMIT.</u> Reporting Level at, or above, the statistically derived limit based on 40CFR, Part 136, Appendix B. *MDLs are listed on the report only if the data has been evaluated below the MRL. Results between the MDL and MRL are reported as Estimated results.
- <u>Dil</u> Dilutions are calculated based on deviations from the standard dilution performed for an analysis, and may not represent the dilution found on the analytical raw data.
- Reporting Reporting limits (MDLs and MRLs) are adjusted based on variations in sample preparation amounts, analytical dilutions and percent solids, where applicable.

North Creek Analytical - Portland

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Howard Holmes, Project Manager

129140

Page 19



SUBCONTRACT ORDER

North Creek Analytical - Portland P5G1088

SENDING LABORATORY:

North Creek Analytical - Portland 9405 SW Nimbus Ave. Beaverton, OR 97008 Phone: (503) 906-9200 Fax: (503) 906-9210 Project Manager: Howard Holmes

RECEIVING LABORATORY:

Severn Trent Laboratories - Tacoma 5755 8th Street East Tacoma, WA 98424 Phone :253-922-2310 Fux: 253-922-5047

Analysis	Duc	Expires	Laboratory ID	Comments	
	Coll Sem	med:07/76/05 09.38		FO	050774
Sample ID: P5G1088-01	00/10/06 16:400	00/00/05 00:28		LHS list 🔆	
8270 SIM PAH	08/10/03 10:00	00/07/03 07.30			
Hg Total 7471A	08/10/05 16:00	08/23/03 07.38			
8081A/8082 Pest/PCB	08/10/05 16:00	08/09/03 09/38			
Containers Supplied:		1	N N		
4 oz. jar (A)	4 oz. jar (B)	4 oz. jar (C		3	
Sample ID: P5G1088-02	Soll Sen	nplcd:07/26/05 08:38	UTTER	FO	050775
8081A/8082 Pest/PCB	08/10/05 16:00	08/09/05 08:38			
8270 SIM PAH	08/10/05 16:00	08/09/05 08:38		LHS List	
Hg Total 7471A	08/10/05 16:00	08/23/05 08:38		•	
Solids, Dry Weight	08/03/05 16:00	08/23/05 08:38			
Containers Supplied:					
4 oz. jar (A)	4 oz. jar (B)				
				1 m	07.771
Sample ID: P5G1088-03	Soil San	npled:07/26/05 09:50	ar i reference a la l	E FOR	100116
Hg Total 7471A	08/10/05 16:00	08/23/05 09:50			
8270 SIM PAH	08/10/05 16:00	08/09/05 09:50		LHS List	
Solids, Dry Weight	08/03/05 16:00	08/23/05 09:50			
8081A/8082 Pest/PCB	08/10/05 16:00	08/09/05 09:50			
Containers Supplied:					
4 oz. jar (A)	4 oz. jar (B)	4 oz. jar (C	C)		
Sample ID: P5G1088-04	Soli Sa	mpled:07/26/05 11:24		For	50777
8270 SIM PAH	08/10/05 16:00	08/09/05 11:24		LHS List	
He Total 7471A	08/10/05 16:00	08/23/05 11:24			
Solids, Dry Weight	08/03/05 16:00	08/23/05 11:24			
Containers Supplied:					
4 oz. jar (A)	4 oz. jar (B)				
The first of the second	Date	7-28·05	Received By	ainn	6/1/5
Released By	Dal	e	Received By	Da	te

Page 2 of 3^{KS}

.

SUBCONTRACT ORDER

North Creek Analytical - Portland

P5G1088

A nulvals	Due	Expires	Laboratory ID	Comments
0	Soil	Sampled:07/26/05 12:28		FO 050 778
Solids, Dry Weight 8270 SIM PAH Hg Total 7471A	08/03/05 16: 08/10/05 16: 08/10/05 16:	00 08/23/05 12:28 00 08/09/05 12:28 00 08/23/05 12:28 00 08/23/05 12:28		
Containers Supplied: 4 oz. jar (A)	4 oz. jar (B)			

S 28-05 I Date Received By Date Date Received By Date

Page 3 of 5



STL Seattle 5755 8th Street East Tacoma, WA 98424

Tel: 253 922 2310 Fax: 253 922 5047 www.stl-inc.com

TRANSMITTAL MEMORANDUM

DATE: December 14, 2005

TO: Howard Holmes North Creek Analytical 9405 S. W. Nimbus Ave. Beaverton, OR 97008

PROJECT: P5G1088

REPORT NUMBER: 129140 REV3

TOTAL NUMBER OF PAGES: _____

Enclosed are the test results for five samples received at STL Seattle on August 1, 2005.

The report consists of this transmittal memo, analytical results, quality control reports, a copy of the chain-of-custody, a list of data qualifiers and analytical narrative when applicable, and a copy of any requested raw data.

Nonconformance Narrative: For SW8270 the recovery of 1-Methyinaphthalene exceeded QC criteria in the Blank Spike. The recovery of the Blank Spike Duplicate was within the QC limits. No further corrective action was taken.

The original results for SW8270 were analyzed by SIM method but the analyst did not include the phthalates. This revised report includes the phthalate compound list using the standard SW8270 method.

The analysis was done on the existing extract because the sample was exhausted. The original QC was also used for the re-run because the spiking of compounds is done prior to extracting the sample. A Method Blank was run with the samples.

The Method Blank suffered low level hits of Di-n-Butylphthalate, Butylbenxlphthalate, and bis(2-Ethylhexyl)phthalate., probable due to plastic tubing in our water system or glassware residual.

Should there be any questions regarding this report, please contact me at (253) 922-2310.

Sincerely

Tom Coyner Project Manager

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STL Seattle 5755 8th Street East Tacoma, WA 98424

Tel: 253 922 2310 Fax: 253 922 5047 www.stl-inc.com

TRANSMITTAL MEMORANDUM

DATE: September 12, 2005

TO: Howard Holmes North Creek Analytical 9405 S. W. Nimbus Ave. Beaverton, OR 97008

PROJECT: P5G1088

REPORT NUMBER: 129140 REV

TOTAL NUMBER OF PAGES: _____

Enclosed are the test results for five samples received at STL Seattle on August 1, 2005.

The report consists of this transmittal memo, analytical results, quality control reports, a copy of the chain-of-custody, a list of data qualifiers and analytical narrative when applicable, and a copy of any requested raw data.

Revision: The original results for SW8270 were analyzed by SIM method but did not include the phthalates. This revised report includes the phthalate compound list using the standard SW8270 method.

Should there be any questions regarding this report, please contact me at (253) 922-2310.

Sincerelv

Tom Coynér Project Manager

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Sample Identification:

<u>Client ID</u>	Date/Time Sampled	<u>Matrix</u>	
P5G1088-01	07-26-05 09:38	solid	
P5G1088-02	07-26-05 08:38	solid	
P5G1088-03	07-26-05 09:50	solid	
P5G1088-04	07-26-05 11:24	solid	
P5G1088-05	07-26-05 12:28	solid	
	<u>Client ID</u> P5G1088-01 P5G1088-02 P5G1088-03 P5G1088-04 P5G1088-05	Client IDDate/Time SampledP5G1088-0107-26-05 09:38P5G1088-0207-26-05 08:38P5G1088-0307-26-05 09:50P5G1088-0407-26-05 11:24P5G1088-0507-26-05 12:28	Client IDDate/Time SampledMatrixP5G1088-0107-26-05 09:38solidP5G1088-0207-26-05 08:38solidP5G1088-0307-26-05 09:50solidP5G1088-0407-26-05 11:24solidP5G1088-0507-26-05 12:28solid

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Client Name:	North Creek Analytical
Client ID:	P5G1088-04
Lab ID:	129140-04
Date Received:	8/1/2005
Date Prepared:	8/4/2005
Date Analyzed:	8/19/2005
% Solids	87.32
Dilution Factor	1

Semivolatile Organics by EPA Method 8270

			Recov	ery Limits
Surrogate	% Recovery	Flags	Low	High
Nitrobenzene - d5	98		37	156
2 - Fluorobiphenyl	87.8		35	144
p - Terphenyl - d14	86.7		39	158

Result				
Analyte		(ug/kg)	RL	Flags
Naphthalene	ND		5.66	
2-Methylnaphthalene		5.81	5.66	
1-Methylnaphthalene	ND		5.66	
Acenaphthylene	ND		5.66	
Acenaphthene	ND		5.66	
Fluorene		6.39	5.66	
Phenanthrene		48.9	5.66	
Anthracene	ND		5.66	
Fluoranthene		74.2	5.66	
Pyrene		64.3	5.66	
Benzo(a)anthracene		42.5	5.66	
Chrysene		55.1	5.66	
Benzofluoranthenes		70.2	11.3	
Benzo(a)pyrene		40.7	5.66	
Indeno(1,2,3-cd)pyrene		31.8	5.66	
Dibenz(a,h)anthracene		7.27	5.66	
Benzo(g,h,i)perylene		33	5.66	

Client Name:	North Creek Analytical
Client ID:	P5G1088-04
Lab ID:	129140-04
Date Received:	8/1/2005
Date Prepared:	8/4/2005
Date Analyzed:	9/2/2005
% Solids	87.32
Dilution Factor	1

Semivolatile Organics by EPA Method 8270

			Recovery Limits		
Surrogate	% Recovery	Flags	Low	High	
2 - Fluorobiphenyl	93.7	X9	42	140	
p - Terphenyl - d14	80.3		42	151	

	Result		
Analyte	(ug/kg)	RL	Flags
Dimethylphthalate	ND	22.6	
Diethylphthalate	· ND	22.6	
Di-n-butylphthalate	1	37 22.6	B1
Butylbenzylphthalate	2	54 22.6	B1
bis(2-Ethylhexyl)phthalate	14	10 22.6	B2
Di-n-octylphthalate	1	32 22.6	

Client Name:	North Creek Analytical
Client ID:	P5G1088-05
Lab ID:	129140-05
Date Received:	8/1/2005
Date Prepared:	8/4/2005
Date Analyzed:	8/19/2005
% Solids	71.88
Dilution Factor	1

Semivolatile Organics by EPA Method 8270

			Recov	ery Limits
Surrogate	% Recovery	Flags	Low	High
Nitrobenzene - d5	100		37	156
2 - Fluorobiphenyl	76.9		35	144
p - Terphenyl - d14	84.2		39	158

		Result		
Analyte		(ug/kg)	RL	Flags
Naphthalene		107	6.83	
2-Methylnaphthalene		198	6.83	
1-Methylnaphthalene		56.3	6.83	
Acenaphthylene		30.3	6.83	
Acenaphthene		34.6	6.83	
Fluorene		25	6.83	
Phenanthrene		184	6.83	
Anthracene		44.3	6.83	
Fluoranthene		252	6.83	
Pyrene		295	6.83	
Benzo(a)anthracene		145	6.83	
Chrysene		210	6.83	
Benzofluoranthenes		328	13.7	
Benzo(a)pyrene		336	6.83	
Indeno(1,2,3-cd)pyrene	ND		6.83	
Dibenz(a,h)anthracene	ND		6.83	
Benzo(g,h,i)perylene		332	6.83	

Client Name:	North Creek Analytical
Client ID:	P5G1088-05
Lab ID:	129140-05
Date Received:	8/1/2005
Date Prepared:	8/4/2005
Date Analyzed:	9/2/2005
% Solids	71.88
Dilution Factor	· 1

Semivolatile Organics by EPA Method 8270

Surrogate	% Recovery		Recove Low	ery Limits Hiah
unoyate				
2 - Fluorobiphenyl	93.7	X9	42	140
p - Terphenyl - d14	80.3		42	151

	Result		
Analyte	(ug/kg)	RL	Flags
Dimethylphthalate	47.4	27.3	
Diethylphthalate	28	27.3	
Di-n-butylphthalate	262	27.3	B1
Butylbenzylphthalate	540	27.3	B1
bis(2-Ethylhexyl)phthalate	1490	27.3	B2
Di-n-octylphthalate	222	27.3	

Client Name	North Creek Analytical
Client ID:	P5G1088-04
Lab ID:	129140-04
Date Received:	8/1/2005
Date Prepared:	8/10/2005
Date Analyzed:	8/10/2005
Dilution Factor	1
% Solids	87.32

Mercury by CVAA - USEPA Method 7471

	Result		
Analyte	(mg/kg)	RL	Flags
Mercury	ND	0.0199	

Client Name	North Creek Analytical
Client ID:	P5G1088-05
Lab ID:	129140-05
Date Received:	8/1/2005
Date Prepared:	8/10/2005
Date Analyzed:	8/10/2005
Dilution Factor	1
% Solids	71.88

Mercury by CVAA - USEPA Method 7471

	Result		
Analyte	(mg/kg)	RL	Flags
Mercury	0.179	0.0229	

Lab ID: Method Blank - SS1487 Date Received: -Date Prepared: 8/4/2005 Date Analyzed: 8/19/2005 % Solids Dilution Factor 1

Semivolatile Organics by EPA Method 8270

			Recov	ery Limits
Surrogate	% Recovery	Flags	Low	High
Nitrobenzene - d5	117		37	156
2 - Fluorobiphenyl	⁻ 108		35	144
p - Terphenyl - d14	125		39	158

Sample results are on an as received basis.

		Result		
Analyte	((ug/kg)	RL	Flags
Naphthalene	ND		5	
2-Methylnaphthalene	ND		5	
1-Methylnaphthalene	ND		5	
Acenaphthylene	ND		5	
Acenaphthene	ND		5	
Fluorene	ND		5	
Phenanthrene	ND		5	
Anthracene	ND		5	
Fluoranthene	ND		5	
Pyrene	ND		5	
Benzo(a)anthracene	ND		5	
Chrysene	ND		5	
Benzofluoranthenes	ND		10	
Benzo(a)pyrene	ND		5	
Indeno(1,2,3-cd)pyrene	ND		5	
Dibenz(a,h)anthracene	ND		5	
Benzo(g,h,i)perylene	ND		5	

Matrix Spike/Matrix Spike Duplicate Report

Client Sample ID: Lab ID: Date Prepared: Date Analyzed: QC Batch ID: P5G1088-02 129140-02 8/4/2005 8/19/2005 SS1487

Semivolatile Organics by EPA Method 8270

	Sample Result	Spike Amount	MS Result	MS	MSD Result	MSD		
Compound Name	(ug/kg)	(ug/kg)	(ug/kg)	% Rec.	(ug/kg)	% Rec.	RPD	Flag
Naphthalene	6.1	2000	1220	60.7	1330	67.3	10	
2-Methylnaphthalene	2.9	2000	1090	54.6	1170	59.4	8.4	
1-Methylnaphthalene	1.5	2000	1140	57	1230	62.3	8.9	X7
Acenaphthylene	2.4	2000	1150	57.2	1190	60.5	5.6	
Acenaphthene	2.4	2000	1120	56	1180	60	6.9	
Fluorene	2.2	2000	1140	56.9	1170	59.7	4.8	
Phenanthrene	42	2000	1140	54.9	1160	57	3.8	X7
Anthracene	6.2	2000	1160	57.6	1150	58.5	1.6	
Fluoranthene	110	2000	1390	63.9	1350	63	-1.4	
Pyrene	110	2000	1330	61	1290	60	-1.7	
Benzo(a)anthracene	45	2000	1400	67.7	1330	65.5	-3.3	
Chrysene	70	2000	1230	58.1	1310	63	8.1	X7
Benzofluoranthenes	130	4000	2420	57.4	2430	58.6	2.1	
Benzo(a)pyrene	59	2000	1210	57.6	1250	60.7	5.2	
Indeno(1.2.3-cd)pyrene	61	2000	1230	58.6	1180	57.2	-2.4	
Dibenz(a,h)anthracene	13	2000	1150	57.1	1130	56.7	-0.7	
Benzo(g,h,i)perylene	64	2000	1080	50.8	1060	50.8	0	X7

Blank Spike/Blank Spike Duplicate Report

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Lab ID:	SS1487
Date Prepared:	8/4/2005
Date Analyzed:	8/19/2005
QC Batch ID:	SS1487

Semivolatile Organics by EPA Method 8270

	Blank Result	Spike Amount	BS Result	BS	BSD Result	BSD		
Compound Name	(ug/kg)	(ug/kg)	(ug/kg)	% Rec.	(ug/kg)	% Rec.	RPD	Flag
Naphthalene	0.27	500	586	117	470	94	-22	
2-Methylnaphthalene	0	500	614	123	494	98.7	-22	
1-Methylnaphthalene	0.11	500	625	125	506	101	-21	N
Acenaphthylene	0.15	500	626	125	49 9	99.7	-23	
Acenaphthene	0	500	631	126	503	101	-22	
Fluorene	0.09	500	644	129	515	103	-22	
Phenanthrene	0.38	500	617	123	506	101	-20	
Anthracene	0.18	500	652	130	518	104	-22	
Fluoranthene	0.22	500	662	132	527	105	-23	
Pyrene	0.51	500	647	129	514	103	-22	
Benzo(a)anthracene	0.3	500	588	118	480	95.9	-21	
Chrysene	0	500	604	121	508	102	-17	
Benzofluoranthenes	0.34	1000	1240	124	1030	103	-19	
Benzo(a)pyrene	0.059	500	623	125	503	101	-21	
Indeno(1,2,3-cd)pyrene	0.1	500	599	120	467	93.4	-25	
Dibenz(a,h)anthracene	0.28	500	599	120	479	95.8	-22	
Benzo(g,h,i)perylene	0.29	500	574	115	469	93.7	-20	

Lab ID: Date Received: Date Prepared: Date Analyzed: Dilution Factor Method Blank - ZS423

8/10/2005 8/10/2005 1

Mercury by CVAA - USEPA Method 7471

Sample results are on an as received basis.

	Result		
Analyte	(mg/kg)	RL	Flags
Mercury	. ND	0.02	

Matrix Spike Report

Client Sample ID: Lab ID: Date Prepared: Date Analyzed: QC Batch ID: DV1-4 129077-08 8/10/2005 8/10/2005 ZS423

Mercury by CVAA - USEPA Method 7471

	Sample	Spike	MS		
	Result	Amount	Result	MS	
Parameter Name	(mg/kg)	(mg/kg)	(mg/kg)	% Rec.	Flag
Mercury	2.45	0.199	2.59	72	X7a

Blank Spike/Blank Spike Duplicate Report

 Lab ID:
 ZS423

 Date Prepared:
 8/10/2005

 Date Analyzed:
 8/10/2005

 QC Batch ID:
 ZS423

Mercury by CVAA - USEPA Method 7471

	Blank Result	Spike Amount	BS Result	BS	BSD Result	BSD		
Compound Name Mercury	(mg/kg) 0	(mg/kg) 0.2	(mg/kg) 0.199	% Rec. 99.5	(mg/kg) 0.164	% Rec. 82	-19	Flag

Duplicate Report

Client Sample ID: Lab ID: Date Prepared: Date Analyzed: QC Batch ID: DV1-4 129077-08 8/10/2005 8/10/2005 ZS423

Mercury by CVAA - USEPA Method 7471

	Sample	Duplicate		
	Result	Result	RPD	
Parameter Name	(mg/kg)	(mg/kg)	%	Flag
Mercury	2.4	2.3	4.3	



SUBCONTRACT ORDER



North Creek Analytical - Portland

P5G1088

SENDING LABORATORY:

North Creek Analytical - Portland 9405 SW Nimbus Ave. Beaverton, OR 97008 Phone: (503) 906-9200 Fax: (503) 906-9210 Project Manager: Howard Holmes

RECEIVING LABORATORY:

Severn Trent Laboratories - Tacoma 5755 8th Street East Tacoma, WA 98424 Phone :253-922-2310 Fax: 253-922-5047

	Due	Expires	Laboratory ID	Comments			
Sample ID: P5G1088-01	Soil	Sampled:07/26/05 09:38			<u>sa</u>	COP	00
8270 SIM PAH	08/10/05 16	:00 08/09/05 09:38		LHS list 🤸			
Hg Total 7471A	08/10/05 16	:00 08/23/05 09:38	8				
8081A/8082 Pest/PCB	08/10/05 16	:00 08/09/05 09:38	}				
Containers Supplied:							
4 oz. jar (A)	4 oz. jar (B)) 4 oz. jar	· (C)				
Sample ID: P5G1088-02	Soil	Sampled:07/26/05 08:38					
8081A/8082 Pest/PCB	08/10/05 16	:00 08/09/05 08:38	3				
8270 SIM PAH	08/10/05 16	08/09/05 08:38	3	LHS List			
Hg Total 7471A	08/10/05 16	:00 08/23/05 08:38	3				
Solids, Dry Weight	08/03/05 16	:00 08/23/05 08:38	}				
Containers Supplied:							
4 oz. jar (A)	4 oz. jar (B))					
Sample ID: P5G1088-03	Soil	Sampled:07/26/05 09:5		3			
Hg Total 7471A	08/10/05 16	08/23/05 09:50)				
8270 SIM PAH	08/10/05 16	08/09/05 09:50)	LHS List			
Solids, Dry Weight	08/03/05 16	08/23/05 09:5)				
8081A/8082 Pest/PCB	08/10/05 16	6:00 08/09/05 09:5)				
Containers Supplied:							
4 oz. jar (A)	4 oz. jar (B) 4 oz. ja	r (C)				
Sample ID: P5G1088-04	Soil	Sampled:07/26/05 11:2		111 parts			
8270 SIM PAH	08/10/05 16	5:00 08/09/05 11:2	4	LHS List			
Hg Total 7471A	08/10/05 16	5:00 08/23/05 11:2·	4				
Solids, Dry Weight	08/03/05 16	5:00 08/23/05 11:2	4				
Containers Supplied:							
••	4 oz. jar (B)					

SUBCONTRACT ORDER

North Creek Analytical - Portland

P5G1088

Analysis	Due	Expires	Laboratory ID	Comments
Sample ID: P5G1088-05	Soil	Sampled:07/26/05 12:28		
Solids, Dry Weight	08/03/05 16:0	00 08/23/05 12:28		
8270 SIM PAH	08/10/05 16:0	00 08/09/05 12:28		
Hg Total 7471A	08/10/05 16:0	00 08/23/05 12:28		
Containers Supplied:				
4 oz. jar (A)	4 oz. jar (B)			

8/1/5 maria <u>7-28-05</u> Date Received By Date Date

Released By