CITY OF PORTLAND
ENVIRONMENTAL SERVICES
1120 SW Fifth Avenue, Room 1000, Portland, Oregon 97204-1912 ▪ Sam Adams, Commissioner ▪ Dean Marriott, Director

TECHNICAL MEMORANDUM No. OF49-1

City Outfall Basin 49
Inline Solids Sampling and Basin Priority Reassessment

TO: Tom Roick, DEQ, Northwest Region Cleanup & Portland Harbor Section

FROM: Dawn Sanders, City of Portland, Bureau of Environmental Services
Linda Scheffler, City of Portland, Bureau of Environmental Services

COPIES: Kristine Koch, EPA, Office of Environmental Cleanup
Bruce Brody-Heine, GSI

DATE: May 8, 2006

SUBJECT: **Portland Harbor Source Control Investigation**

Introduction

This technical memorandum (TM) summarizes a City of Portland (City) Bureau of Environmental Services' (BES) 2005 source control investigation and presents our reevaluation of the Priority 2 ranking of City Outfall Basin 49 in the City's outfalls source control remedial investigation (RI) work plan (CH2M Hill, 2004). The inline solids investigation summarized in this TM is part of the City's ongoing source control program associated with the Portland Harbor City of Portland Outfalls Project. These new inline solids data and additional sediment data collected by the Lower Willamette Group (LWG) near City Outfall 49 (Outfall 49) (Round 2 Sediment Data [Integral, 2005]) are compared to the finalized Portland Harbor Joint Source Control Strategy (JSCS) (DEQ/EPA, 2005) screening level values (SLVs) to reevaluate the original prioritization of Outfall Basin 49. These results are submitted pursuant to the August 13, 2003, Intergovernmental Agreement between the Oregon Department of Environmental Quality (DEQ) and the City.

Background

The Outfall Basin 49 stormwater conveyance system collects stormwater from the area shown in Figure 1. Land use within Outfall Basin 49, based on zoning, is primarily single-family residential; less than 7 percent of land in the basin is zoned commercial or industrial. There are no facilities in the basin with permitted stormwater or non-stormwater discharges to the City stormwater conveyance system. According to the DEQ Environmental Cleanup Site Information (ECSI) database, there are no DEQ cleanup sites located within the basin (DEQ, 2005).

Virtually all of the stormwater runoff in Outfall Basin 49 is collected and conveyed through two main branches of the conveyance system to a treatment swale located approximately 500 feet upstream from Outfall 49. The "western" branch, a 24-inch-diameter line, includes limited runoff

from commercial activities along North Richmond Avenue. The "northern" branch, a 27-inch-diameter line, primarily drains residential areas within the basin. The treatment swale was installed in 1995 as part of the City's combined sewer overflow (CSO) separation projects. Stormwater runoff is conveyed to Outfall 49 after treatment in the swale, where it discharges to the Willamette River through an 18-inch-diameter line. Figure 1 shows the location of the Outfall Basin 49 stormwater conveyance system including the sampling locations for the City's 2005 inline solids investigation and the treatment swale.

Original Outfall Basin 49 Prioritization

In the RI work plan (CH2M Hill, 2004), Outfall Basin 49 was designated as a Priority 2 basin based on elevated concentrations of mercury and slightly elevated concentrations of light polynuclear aromatic hydrocarbons (LPAH) detected in the Willamette River sediment samples collected by the City in 2002 (Appendix B of CH2M Hill, 2004). The designation also was based on a comparison of City sediment data with the DEQ Portland Harbor baseline values as described in the RI work plan (CH2M Hill, 2004). Figure 2 shows the City river sediment sample locations. During the City's basin prioritization process, the sediment samples collected just offshore and downstream from Outfall 49 detected a maximum mercury concentration of 0.918 milligram per kilogram (mg/Kg), which was designated "considerably elevated" relative to the DEQ Portland Harbor baseline level of 0.1 mg/Kg.

Table 1 summarizes the chemical analytical results of the City's 2002 Source Control Sediment Investigation samples adjacent to Outfall 49. Table 1 also presents a screening of the 2002 sediment data against the December 2005 JSCS SLVs. Outfall Basin 49 was assigned a Priority 2 designation because only one contaminant (mercury) was identified at "considerably elevated" concentrations relative to the DEQ Portland Harbor baseline values. However, these mercury concentrations do not exceed the new JSCS SLV for mercury of 1.06 mg/Kg.

LWG Round 2 Sediment Sampling

LWG collected an extensive set of surface (grab) and subsurface (core) river sediment samples during Round 2 of the Portland Harbor RI in 2004 (Integral, 2005). Figure 2 shows LWG's Round 2 Willamette River sediment samples collected in the vicinity of Outfall 49. Table 2 summarizes the chemical analytical results of the LWG river sediment samples collected near Outfall 49.

The concentrations of mercury in all of the samples taken near Outfall 49 were less than the JSCS SLV for mercury. Because detected PAH concentrations in river sediment did not highlight Outfall 49 as a source, and there are known inriver PAH sources upstream, this inline solids investigation focused on evaluating potential sources of mercury within the basin.

City 2005 Inline Sampling

Purpose

The purpose of the City's 2005 investigation was to confirm that there are no significant mercury sources to the Outfall Basin 49 stormwater system. Based on a field reconnaissance of inline solids in the system, there were no inline solids downstream of the stormwater treatment swale.

Therefore, the City sampled inline solids from the two branches of Outfall Basin 49, upstream of the treatment facility, to evaluate the potential presence of mercury sources within the basin. While these samples are not representative of what may discharge to the river, since they were collected above the treatment system, they do assist in evaluating potential upland sources.

Field Activities

The City coordinated with DEQ regarding this source control investigation before conducting this work. The BES Field Operations section sampled inline solids at two locations between approximately 12:40 p.m. and 1:20 p.m. on July 25, 2005. Attachment A presents photographs of the sampling locations and inline solids. Attachment B presents field notes recorded during sampling activities.

Solids samples were collected using a stainless steel spoon and bowl, in accordance with BES Field Operations' standard operating procedures. Solids were collected from node AAG648, representing contributions from the western branch (see Photo 1 in Attachment A). The solids in this line had a slight petroleum odor, but no sheen was observed on the water in the line. The second sampling location, representing discharge from the northern branch, was located in the 27-inch-diameter line upstream from the junction with the western branch (node AAG642). Downstream from this node the conveyance line empties into the treatment swale. The sampling team noted that the solids had a decomposition odor.

Summary of Results for Inline Sampling

The two inline solids samples obtained from Outfall Basin 49 were analyzed for mercury by two laboratories, each using different U.S. Environmental Protection Agency (EPA) methods. Method EPA 6020 achieves a lower method reporting limit, but is not included in the Programmatic Quality Assurance Project Plan prepared for the City of Portland Outfalls Project (Appendix D of CH2M Hill, 2004). Table 3 and Figure 1 summarize the results of the analytical data. Attachment C includes the laboratory analytical results and data validation report for the samples. Sampling results were compared to the JSCS SLV (DEQ/EPA, 2005) as well as to DEQ background concentrations for metals (DEQ, 2002); the results are summarized as follows:

- Mercury was not detected in the sample from the western branch (manhole AAG648).
- Mercury was detected in the sample from the northern branch (manhole AAG642) at a concentration of 0.014 mg/Kg using method EPA 6020; mercury was not detected by method EPA 7471. The detected concentration of mercury in the sample was below the JSCS SLV (1.06 mg/Kg) and the DEQ background concentration for soil (0.07 mg/Kg).

Inline Solids Investigation Conclusions

The results of the 2005 source control investigation of inline solids indicate that while mercury is present in inline solids collected in the Outfall Basin 49 stormwater conveyance system, the detected concentration of mercury is two orders-of-magnitude less than the JSCS SLV of 1.06 mg/Kg and is approximately an order-of-magnitude less than concentrations detected in sediment near Outfall 49 (Integral, 2005).

Based on this investigation, it appears that there are no significant sources of mercury in the basin and the mercury detected near Outfall 49 is not representative of a current source within Outfall Basin 49.

Outfall Basin 49 Priority Reevaluation

The prioritization process designated Outfall Basin 49 as a Priority 2 basin based on the available data and screening levels used at that time (CH2M Hill, 2004). This priority designation was reevaluated by comparing the final JSCS SLVs (DEQ/EPA, 2005) to the City's 2002 and LWG's 2004 river sediment samples and the City's 2005 inline sample datasets. Figure 2 shows all the sediment sample locations: one at the discharge point of Outfall 49, and several offshore, upstream, and downstream from the outfall. Tables 1, 2, and 3 present the sediment and inline solids analytical results and compare the data to the JSCS Soil/Stormwater Sediment toxicity and bioaccumulation SLVs.

City sediment concentrations in the sample at the outfall discharge were either non-detect, or less than the JSCS toxicity and bioaccumulation SLVs, with the exception of cadmium, copper, selenium and zinc (see Table 1). All four metals were below the JSCS toxicity SLVs. Method reporting limits for cadmium and selenium exceeded the JSCS bioaccumulation SLVs, but like copper and zinc, sediment concentrations for all four metals were less than the DEQ inriver baseline values.

City and LWG analyses of sediment concentrations in the samples upstream, offshore, and downstream of Outfall 49 detected PAH, pesticide, PCB, and metal contaminants at concentrations greater than the JSCS toxicity and bioaccumulation SLVs (see Tables 1 and 2). Contaminants that exceeded the SLVs for toxicity and bioaccumulation are summarized as follows:

- Toxicity SLV Exceedances:

  Upstream from Outfall 49: PAHs and pesticides
  Offshore from Outfall 49: PAHs and pesticides
  Downstream from Outfall 49: PAHs and pesticides

- Bioaccumulation SLV Exceedances:

  Upstream from Outfall 49: Metals, pesticides, and PCBs
  Offshore from Outfall 49: Metals and pesticides
  Downstream from Outfall 49: Metals, pesticides, and PCBs

Similar contaminants in the upstream and downstream samples supports the conclusion that these contaminants likely are associated with upstream contaminant sources rather than with Outfall 49. This conceptual model for sediment contaminant sources is supported by documented upstream current and historical sources for these contaminants (e.g., McCormick and Baxter and Willamette Cove).

In addition, the 2005 City inline solids investigation determined that there are no significant sources of mercury within Outfall Basin 49. Inline solids samples utilized for this source investigation were collected upstream of the stormwater treatment swale.

Summary of Outfall 49 Dataset Evaluation

The Outfall 49 sediment datasets demonstrate that river sediment pollutant concentrations in the vicinity of Outfall 49 likely are attributable to the transport and redeposition of contaminated sediment associated with upstream sources. This conclusion is further supported for mercury by the lack of significant sources within Outfall Basin 49, the presence of the stormwater treatment swale downstream of the inline solids sampling locations and prior to the outfall, and the City inline solids and Outfall 49 sediment sampling results.

Priority Reevaluation Recommendation

The City proposes to reprioritize Outfall Basin 49 as a Priority 4 basin, based on screening of the City and LWG sediment datasets for Outfall 49, and analysis of the City 2005 inline solids investigation data. The City defines a Priority 4 basin as an outfall that does not appear to be a significant pathway for contamination based on the current data.

References

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 Environmental Cleanup Site Information Database (ECSI). Accessed November 2005. www.deq.state.or.us/wmc/ecsi/

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

Integral. 2005. Portland Harbor RI/FS, Round 2A Sediment Site Characterization Summary Report. Prepared for the Lower Willamette Group, July 15, 2005. Integral Consulting, Inc.

Tables

Figures

Attachments

Attachment C – *Laboratory Results*

Table 1
Summary of Chemical Analytical Results
2002 City Source Control Sediment Investigation
City Outfall Basin 49

		Upstream		At Outfall				Offshore from Outfall				Downstream						
Location (ft from OF along shore)												50'		100'				
(ft offshore)				Next to OF		OF Duplicate		50' out		100' out		near shore		near shore		JSCS Catch Basin Toxicity SLVs	JSCS Catch Basin Bioacc SLVs	DEQ Inriver Baseline
Sample ID		SI0149060		SI0149010		SI0149011		SI0149040		SI0149050		SI0149020		SI0149030				
Sample Date		10/17/2002		10/17/2002		10/17/2002		10/17/2002		10/17/2002		10/17/2002		10/17/2002				
Analyte	**Units***					Duplicate												
General Chemistry																		
Total Organic Carbon	mg/kg	268		664		555		1020		3220		572		3270			--	20000
Metals																		
Aluminum	mg/kg	3230		6630		6520		5700		9720		5810		7960		--	--	42800
Antimony	mg/kg	0.182		0.159		0.207		0.225		0.491		0.228		0.326		64	10	5
Arsenic	mg/kg	1.7		2.2		2.23		1.95		3.74		2.4		2.62		33	--	5
Cadmium	mg/kg	*0.27*	U	*0.228*	U	*0.246*	U	*0.272*	U	*0.293*	U	*0.265*	U	*0.324*	U	4.98	0.003	0.6
Chromium	mg/kg	9.75		13.9		15		17.7		19.5		12		19.3		111	4200	41
Copper	mg/kg	**17**		**18.2**		**19.2**		**17.7**		**34.6**		**16.2**		**34.5**		149	10	60
Lead	mg/kg	11.4	B2	8.92	B2	12.5	B2	15	B2	24.9	B2	13.1	B2	26	B2	128	128	30
Mercury	mg/kg	0.0694		0.0759		0.0979		0.45		0.893		0.162		0.918		1.06	--	0.1
Nickel	mg/kg	13.8		16.4		18.6		19.9		22.4		15.8		21.9		48.6	316	32
Selenium	mg/kg	*0.451*	U	*0.381*	U	*0.409*	U	*0.454*	U	*0.489*	U	*0.442*	U	*0.541*	U	5	0.1	15
Silver	mg/kg	0.0836		0.427		0.086		0.086		0.224		0.0824		0.161		5	--	1.4
Zinc	mg/kg	**33.2**		**54.2**		**54.2**		**52.4**		**69.3**		**53.2**		**72.9**		459	3	118
PCBs as Congeners:																		
PCB-008	ug/kg	0.31	U	0.25	U	0.25	U	0.32	U	0.37	U	0.31	U	0.35	U	--	--	--
PCB-018	ug/kg	0.31	U	0.25	U	0.24	U	0.31	U	0.36	U	0.31	U	0.34	U	--	--	--
PCB-028	ug/kg	0.2	U	0.21	J	0.16	U	0.2	U	0.23	U	0.2	U	0.22	U	--	--	--
PCB-044	ug/kg	0.18	U	0.14	U	0.14	U	0.18	U	0.21	U	0.18	U	0.19	U	--	--	--
PCB-052	ug/kg	0.28	U	0.22	U	0.22	U	0.28	U	0.33	U	0.27	U	0.3	U	--	--	--
PCB-066	ug/kg	0.16	U	0.13	U	0.13	U	0.17	U	0.19	U	0.16	U	0.18	U	--	--	--
PCB-101	ug/kg	0.23	U	0.18	U	0.18	U	0.23	U	0.27	U	0.22	U	0.25	U	--	--	--
PCB-105	ug/kg	0.14	U	0.11	U	0.11	U	0.14	U	0.16	U	0.14	U	0.15	U	--	--	--
PCB-118	ug/kg	0.17	U	0.13	U	0.13	U	0.17	U	0.2	U	0.17	U	0.18	U	--	--	--
PCB-128	ug/kg	0.14	U	0.11	U	0.11	U	0.14	U	0.17	U	0.14	U	0.16	U	--	--	--
PCB-138	ug/kg	0.15	U	0.12	U	0.12	U	0.16	U	0.18	U	0.15	U	0.42	JP	--	--	--
PCB-153	ug/kg	0.2	U	0.16	U	0.15	U	0.2	U	0.23	U	0.19	U	0.68	P	--	--	--
PCB-170	ug/kg	0.16	U	0.12	U	0.12	U	0.16	U	0.18	U	0.16	U	0.17	U	--	--	--
PCB-180	ug/kg	0.14	U	0.11	U	0.11	U	0.14	U	0.16	U	0.14	U	0.28	JP	--	--	--
PCB-187	ug/kg	0.17	U	0.13	U	0.13	U	0.17	U	0.2	U	0.17	U	0.19	U	--	--	--
Estimated Total PCBs	ug/kg	--		2.5		--		--		--		--		4.8		676	--	180
Pesticides																		
2,4'-DDD	ug/kg	1.97	U	1.94	U	1.97	U	2.31	U	2.56	U	2.16	U	2.42	U	--	--	--
2,4'-DDE	ug/kg	1.97	U	1.94	U	1.97	U	2.31	U	2.56	U	2.16	U	2.42	U	--	--	--
2,4'-DDT	ug/kg	1.97	U	1.94	U	1.97	U	2.31	U	2.56	U	2.16	U	2.42	U	--	--	--
4,4'-DDD	ug/kg	0.383	U	0.377	U	0.383	U	0.448	U	0.498	U	0.421	U	**2.74**	J C1	28	0.3	--
4,4'-DDE	ug/kg	0.453	U	0.447	U	0.453	U	0.531	U	0.589	U	0.498	U	0.558	U	31.3	0.3	--
4,4'-DDT	ug/kg	0.51	U	0.503	U	0.51	U	0.597	U	**4.95**	J C2	0.561	U	**4.04**	J C2	62.9	0.3	--
Estimated Total DDT	ug/kg	--		--		--		--		**4.95**		--		**6.78**			0.3	220
4,4'-Methoxychlor	ug/kg	2.71	U	2.67	U	2.71	U	3.17	U	3.52	U	2.98	U	3.34	U	--	--	--
Aldrin	ug/kg	0.849	U	0.837	U	0.849	U	0.995	U	1.1	U	0.934	U	1.05	U	40	--	--
alpha-BHC	ug/kg	0.612	U	0.603	U	0.611	U	0.716	U	0.795	U	0.672	U	0.753	U	--	--	--
beta-BHC	ug/kg	0.833	U	0.821	U	0.833	U	0.976	U	1.08	U	0.916	U	1.03	U	--	--	--
Beta-Chlordane	ug/kg	0.799	U	0.788	U	0.799	U	0.936	U	1.04	U	0.879	U	0.983	U	17.6	--	--
Chlordane	ug/kg	2.77	U	2.73	U	2.77	U	3.25	U	3.6	U	3.05	U	3.41	U	17.6	--	--
cis-Chlordane	ug/kg	0.783	U	0.772	U	0.782	U	0.916	U	1.02	U	0.86	U	0.963	U	17.6	--	--
cis-Nonachlor	ug/kg	1.97	U	1.94	U	1.97	U	2.31	U	2.56	U	2.16	U	2.42	U	--	--	--
delta-BHC	ug/kg	0.756	U	0.745	U	0.755	U	0.885	U	0.982	U	0.83	U	0.93	U	--	--	--
Dieldrin	ug/kg	0.646	U	0.637	U	0.646	U	0.756	U	0.839	U	0.71	U	0.795	U	61.8	--	--
Endosulfan I	ug/kg	0.838	U	0.826	U	0.838	U	0.982	U	1.09	U	0.921	U	1.03	U	--	--	--

Table 1
Summary of Chemical Analytical Results
2002 City Source Control Sediment Investigation
City Outfall Basin 49

		Upstream		At Outfall				Offshore from Outfall				Downstream						
Location (ft from OF along shore)												50'		100'				
(ft offshore)				Next to OF		OF Duplicate		50' out		100' out		near shore		near shore		JSCS Catch Basin Toxicity SLVs	JSCS Catch Basin Bioacc SLVs	DEQ Inriver Baseline
Sample ID		SI0149060		SI0149010		SI0149011		SI0149040		SI0149050		SI0149020		SI0149030				
Sample Date		10/17/2002		10/17/2002		10/17/2002		10/17/2002		10/17/2002		10/17/2002		10/17/2002				
Analyte	**Units***					Duplicate												
Endosulfan II	ug/kg	0.761	U	0.75	U	0.761	U	0.891	U	0.989	U	0.836	U	0.936	U	--	--	--
Endosulfan Sulfate	ug/kg	0.716	U	0.706	U	0.716	U	0.839	U	0.931	U	0.787	U	0.881	U	--	--	--
Endrin	ug/kg	0.71	U	0.7	U	0.71	U	0.832	U	0.923	U	0.781	U	0.874	U	207	--	--
Endrin Aldehyde	ug/kg	0.803	U	0.791	U	0.802	U	0.94	U	1.04	U	0.882	U	0.988	U	--	--	--
Endrin Ketone	ug/kg	0.553	U	0.545	U	0.553	U	0.648	U	0.719	U	0.608	U	0.681	U	--	--	--
Heptachlor	ug/kg	0.678	U	0.668	U	0.678	U	0.794	U	0.881	U	0.745	U	0.834	U	10	--	--
Heptachlor Epoxide	ug/kg	0.719	U	0.709	U	0.719	U	0.842	U	0.935	U	0.79	U	0.885	U	16	--	--
Hexachlorobenzene	ug/kg	0.984	U	0.97	U	0.984	U	1.15	U	1.28	U	1.08	U	1.21	U		100	--
Hexachlorobutadiene	ug/kg	0.984	U	0.97	U	0.984	U	1.15	U	1.28	U	1.08	U	1.21	U		600	--
Hexachloroethane	ug/kg	0.984	U	0.97	U	0.984	U	1.15	U	1.28	U	1.08	U	1.21	U		--	--
gamma-BHC; Lindane	ug/kg	0.752	U	0.742	U	0.752	U	0.881	U	0.978	U	0.827	U	0.926	U	4.99	--	--
Oxychlordane	ug/kg	1.97	U	1.94	U	1.97	U	2.31	U	2.56	U	2.16	U	2.42	U	--	--	--
Toxaphene	ug/kg	12.3	U	12.2	U	12.3	U	14.4	U	16	U	13.6	U	15.2	U	--	--	--
Trans-Nonachlor	ug/kg	1.97	U	1.94	U	1.97	U	2.31	U	2.56	U	2.16	U	2.42	U	--	--	--
Chlorinated Herbicides																		
2,4,5-T	ug/kg	NA		2.89	U	2.66	U	NA		NA		NA		NA		--	--	--
2,4,5-TP	ug/kg	NA		2.36	U	2.18	U	NA		NA		NA		NA		--	--	--
2,4-D	ug/kg	NA		2.45	U	2.26	U	NA		NA		NA		NA		--	--	3.3
2,4-Db	ug/kg	NA		1.77	U	1.63	U	NA		NA		NA		NA		--	--	5
4-Nitrophenol	ug/kg	NA		1.4	U	1.3	U	NA		NA		NA		NA		--	--	--
Dalapon	ug/kg	NA		1.41	U	1.31	U	NA		NA		NA		NA		--	--	--
Dicamba	ug/kg	NA		1.45	U	1.33	U	NA		NA		NA		NA		--	--	--
Dichloroprop	ug/kg	NA		2.33	U	2.15	U	NA		NA		NA		NA		--	--	--
Mcpa	ug/kg	NA		2.76	U	2.55	U	NA		NA		NA		NA		--	--	--
Mcpp	ug/kg	NA		1.23	U	1.14	U	NA		NA		NA		NA		--	--	--
Pentachlorophenol	ug/kg	NA		1.81	U	1.67	U	NA		NA		NA		NA		1000	--	97
Phthalates																		
Bis(2-ethylhexyl) phthalate	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	19.5	UJ	800	330	390
Butylbenzyl phthalate	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	17.9	U	--	--	20
Dibutyl phthalate	ug/kg	16.3	U	12.4	U	12.9	U	17.9	J	*175*	U	16.3	U	17.9	U	100	--	20
Diethyl phthalate	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	17.9	U	600	--	--
Dimethyl phthalate	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	17.9	U	--	--	20
Di-n-octyl phthalate	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	17.9	U	--	--	20
PAHs																		
2-Methylnaphthalene	ug/kg	1.63	U	7.78		5.78		8.35		341		19.2		322		200	--	150
Acenaphthene	ug/kg	1.63	U	1.24	U	1.29	U	3.96		35.1		10.4		20.7		300	--	180
Acenaphthylene	ug/kg	3.1	J	14.8		9.51		18.7		516		56.9		268		200	--	60
Anthracene	ug/kg	1.63	U	9.39		6.25		12.3		287		41.2		221		845	--	150
Benzo (a) anthracene	ug/kg	6.21		24		13.8		24		987		123		497	D10	1050	--	360
Benzo (a) pyrene	ug/kg	6.63		36.8		24.4		43.6		1010		183		618	D10	1450	--	500
Benzofluoranthenes	ug/kg	14		41.3		32		45.9		819		181		435		--	--	--
Benzo [g,h,i] perylene	ug/kg	3.26	U	48.7		33.3		51.3		1150		224		561		300	--	250
Chrysene	ug/kg	8.76		32.7		22.2		37.2		1440		165		681	D10	1290	--	425
Dibenzo (a,h) anthracene	ug/kg	1.63	U	5.53		4.72		12.5		175		24		103		1300	--	125
Fluoranthene	ug/kg	9.08		34		22.4		50.2		974		187		652	D10	2230	--	600
Fluorene	ug/kg	1.63	U	3.18		1.29	U	4.08		87.9		12.2		71.5		536	--	125
Indeno (1,2,3-cd) pyrene	ug/kg	8.58		27.8		20.1		29.3		496		124		305		100	--	225
Naphthalene	ug/kg	1.63	U	10.3		8.5		12.9		426		31.2		573	D10	561	--	200
Phenanthrene	ug/kg	1.73	J	23.6		10.6		30.6		354		99.2		373		1170	--	700
Pyrene	ug/kg	14.1		52		33.5		79.7		2050		282		1570	D10	1520	--	700

Table 1
Summary of Chemical Analytical Results
2002 City Source Control Sediment Investigation
City Outfall Basin 49

		Upstream		At Outfall				Offshore from Outfall				Downstream						
Location (ft from OF along shore)												50'		100'				
(ft offshore)				Next to OF		OF Duplicate		50' out		100' out		near shore		near shore		JSCS Catch Basin Toxicity SLVs	JSCS Catch Basin Bioacc SLVs	DEQ Inriver Baseline
Sample ID		SI0149060		SI0149010		SI0149011		SI0149040		SI0149050		SI0149020		SI0149030				
Sample Date		10/17/2002		10/17/2002		10/17/2002		10/17/2002		10/17/2002		10/17/2002		10/17/2002				
Analyte	**Units***					Duplicate												
Phenolic SVOCs																		
2,3,4,5-Tetrachlorophenol	ug/kg	NA		NA		NA		NA		NA		NA		NA		--	--	--
2,3,4,6;2,3,5,6-Tetrachlorophenol coelution	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	17.9	U	--	--	--
2,4-Dichlorophenol	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	17.9	U	--	--	--
2,4-Dimethylphenol	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	17.9	U	--	--	--
2,4-Dinitrophenol	ug/kg	81.4	U	62	U	64.7	U	85.4	U	876	U	81.5	U	89.3	U	--	--	--
2,4,5-Trichlorophenol	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	17.9	U	--	--	--
2,4,6-Trichlorophenol	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	17.9	U	--	--	--
2-Chlorophenol	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	17.9	U	--	--	--
2-Methylphenol	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	17.9	U	--	--	--
2-Nitrophenol	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	17.9	U	--	--	--
4,6-Dinitro-2-methylphenol	ug/kg	81.4	U	62	U	64.7	U	85.4	U	876	U	81.5	U	89.3	U	--	--	--
4-Chloro-3-methylphenol	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	17.9	U	--	--	--
4-Methylphenol	ug/kg	32.6	U	24.8	U	25.9	U	34.2	U	350	U	32.6	U	35.7	U	--	--	680
4-Nitrophenol	ug/kg	81.4	U	62	U	64.7	U	85.4	U	876	U	81.5	U	89.3	U	--	--	--
Pentachlorophenol	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	17.9	U	1000	--	97
Phenol	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	17.9	U	50	--	20
Organonitrogen SVOCs																		
Nitrobenzene	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	17.9	U	--	--	--
Aniline	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	17.9	U	--	--	--
2-Nitroaniline	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	17.9	U	--	--	--
3-Nitroaniline	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	17.9	U	--	--	--
4-Nitroaniline	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	17.9	U	--	--	--
2,4-Dinitrotoluene	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	17.9	U	--	--	--
2,6-Dinitrotoluene	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	17.9	U	--	--	--
4-Chloroaniline	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	17.9	U	--	--	--
Carbazole	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	41.6		1600	--	100
n-Nitrosodimethylamine	ug/kg	81.4	U	62	U	64.7	U	85.4	U	876	U	81.5	U	89.3	U	--	--	--
n-Nitrosodiphenylamine	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	17.9	U	--	--	--
n-Nitrosodi-n-Propylamine	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	17.9	U	--	--	--
Halogenated SVOCs																		
1,2,4-Trichlorobenzene	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	17.9	U	9200	--	--
1,2-Dichlorobenzene	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	17.9	U	1700	--	--
1,3-Dichlorobenzene	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	17.9	U	300	--	--
1,4-Dichlorobenzene	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	17.9	U	300	--	--
2-Chloronaphthalene	ug/kg	1.63	U	1.24	U	1.29	U	1.71	U	17.5	U	1.63	U	1.79	U	--	--	--
3,3'-Dichlorobenzidine	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	17.9	U	--	--	--
4-Bromophenyl phenyl ether	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	17.9	U	--	--	--
4-Chlorophenyl phenyl ether	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	17.9	U	--	--	--
Azobenzene	ug/kg	NA		NA		NA		NA		NA		NA		NA		--	--	
Bis(2-chloroethoxy) methane	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	17.9	U	--	--	--
Bis(2-chloroethyl) ether	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	17.9	U	--	--	--
Bis(2-chloroisopropyl) ether	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	17.9	U	--	--	--
Hexachlorobenzene	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	17.9	U	100	--	--
Hexachlorocyclopentadiene	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	17.9	U	400	--	--
Hexachlorobutadiene	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	17.9	U	600	--	--
Hexachloroethane	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	17.9	U	--	--	--
Oxygen-Containing SVOCs																		
Benzoic acid	ug/kg	81.4	U	62	U	64.7	U	85.4	U	876	U	81.5	U	89.3	U	--	--	200
Benzyl alcohol	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	17.9	U	--	--	20
Dibenzofuran	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	18.1	J	--	--	100
Isophorone	ug/kg	16.3	U	12.4	U	12.9	U	17.1	U	175	U	16.3	U	17.9	U	--	--	--

Table 1
Summary of Chemical Analytical Results
2002 City Source Control Sediment Investigation
City Outfall Basin 49

		Upstream		At Outfall				Offshore from Outfall				Downstream						
Location (ft from OF along shore)												50'		100'				
(ft offshore)				Next to OF		OF Duplicate		50' out		100' out		near shore		near shore		JSCS Catch Basin Toxicity SLVs	JSCS Catch Basin Bioacc SLVs	DEQ Inriver Baseline
Sample ID		SI0149060		SI0149010		SI0149011		SI0149040		SI0149050		SI0149020		SI0149030				
Sample Date		10/17/2002		10/17/2002		10/17/2002		10/17/2002		10/17/2002		10/17/2002		10/17/2002				
Analyte	**Units***					Duplicate												
TPH																		
Diesel	mg/kg	3.07		4.39	J	2.36	J	8.65		19.5		11.4		12.8		--	--	--
Lube Oil - NWTPH	mg/kg	7.96		22.1		11.3		27.1		53		17.9		38		--	--	--

Notes:

All results reported on a dry-weight basis.

Portland Harbor Joint Source Control Strategy (DEQ/EPA Final December 2005) levels are presented for screening sediment samples.

DEQ baseline values are used here for comparison purposes only.

DEQ background metal concentrations are from DEQ Toxological Workgroup, October 2002, Memorandum to the Cleanup Program

Total parameters:

Total DDT - Sum of 4,4'-DDD, 4,4'-DDE and 4,4'-DDT.

Total PCBs - 1.95 * (sum of detected congeners) + 2.1.

Total PAHs - Sum of the detected analytes.

italic The method reporting limit exceeds JSCS Screening Levels.

bold The detected concentration exceeds JSCS Bioaccumulation Screening Level.

shaded The detected concentration exceeds JSCS Toxicity Screening Level.

Qualifiers:

J = Estimate.

P = The difference between the analyte detected in the front and back column is greater than 40%.

B2 = 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 (greater than 10 times the concentration reported in the blank).

U = Not detected at value shown.

UJ - Not detected, and the detection limit is an estimate.

D10 - The sample was diluted by a factor of 10 to bring the analyte within the calibration range.

Table 2
Summary of Chemical Analytical Results
LWG Round 2 Sediment Data Adjacent to City Outfall 49
City Outfall Basin 49

		Upstream						Offshore from Outfall			Downstream							
Location (ft from OF along shore)		475' up	475' up	475' up	185' up	185' up	185' up	50' to 75'	50' to 75'	50' to 75'	250' down	250' down	560' down	560' down	560' down	JSCS	JSCS	DEQ
(ft offshore)		75' offshore	75' offshore	75' offshore	125' offshore	125' offshore	125' offshore				75' offshore	125' offshore	75' offshore	100' offshore	100' offshore	Catch Basin	Catch Basin	Inriver
Sample Type		Surface	Subsurface	Subsurface	Surface	Subsurface	Subsurface	Surface	Subsurface	Subsurface	Surface	Subsurface	Surface	Subsurface	Subsurface	Toxicity	Bioacc	Baseline[3]
SampleID		LW2-G268	LW2-C268b	LW2-C268c	LW2-G266	LW2-C266b	LW2-C266c	LW2-G260	LW2-C260b	LW2-C260c	LW2-G257	LW2-C257	LW2-G254	LW2-C254b	LW2-C254c	SLs[2]	SLs[2]	
SampleDate		9/14/2004	10/19/2004	10/19/2004	8/23/2004	10/5/2004	10/5/2004	9/14/2004	10/5/2004	10/5/2004	8/23/2004	10/27/2004	9/8/2004	10/18/2004	10/27/2004			
Depth		0-26 cm	30-151 cm	151-252 cm	0-16 cm	30-131 cm	131-276 cm	0-20 cm	30-114 cm	114-163 cm	0-26 cm	30-85 cm	0-29 cm	30-74 cm	74-104 cm			
Total Organic Carbon	%	4.22	0.03 J	0.03 J	1.04	0.06	0.06	0.36	2.5	0.16	0.64 T	1.32	5.54	4.44 T	0.1	--	--	--
Metals	**Units[1]**																	
Aluminum	mg/kg	26500	6570 J	5960 J	12000	10300	9120	12400	12500	11400	12600	17000	18400	19500 JT	6500 J	--	--	42800
Antimony	mg/kg	0.16 J	0.061 UJ	0.059 UJ	0.1 UJ	0.09 UJ	0.1 UJ	0.1 J	0.81 J	0.17 UJ	0.13 UJ	0.34 J	0.2 J	0.401 JT	0.135 UJ	64	10	5
Arsenic	mg/kg	4.64 J	0.8	1.07	3.42	1.57	1.54	2.6 J	3.8	2.75	2.62	2.32 J	2.58 J	4.14 T	0.99	33	--	5
Cadmium	mg/kg	**0.304**	**0.07**	**0.055**	**0.226** J	**0.123**	**0.094**	**0.097**	**0.159**	**0.094**	**0.11** J	**0.173** J	**0.163**	**0.253** T	**0.065**	4.98	0.003	0.6
Chromium	mg/kg	35.1	11.8	9.29	17.6	16	16.7	18.1	17.5	15.2	19.3	28.7	25.2	30.4 T	14.9	111	4200	41
Copper	mg/kg	**42.9**	**18**	**16.4**	**24.5**	**21.8**	**18.6**	**17.8**	**63.8**	**33.8**	**17.1**	**34.6**	**24.4**	**37.4** T	**21.5**	149	10	60
Lead	mg/kg	32.5	2.59 J	2.22 J	9.55	3.37	2.48	17.5	51.4	34.6	11.9	15.2	16.2	25.7 JT	2.74 J	128	128	30
Mercury	mg/kg	0.122	0.01 J	0.009 U	0.029	0.006 U	0.007 J	0.624	0.575	0.234	0.31 T	0.074	0.387	0.2 T	0.014 J	1.06	--	0.1
Nickel	mg/kg	24.3	11.1	11	14.9	14.3	16.1	22.8	19.4	17.7	19	21.1	25.4	27.2 T	11.3	48.6	316	32
Selenium	mg/kg	**0.18**	0.04 U	0.04 U	*0.1* U	0.05 U	0.05 U	0.05 U	0.04 U	0.05 U	0.06 U	0.06 J	**0.1** J	**0.145** T	**0.1** J	5	0.1	15
Silver	mg/kg	0.235	0.033	0.029	0.106	0.042	0.035	0.035	0.109	0.057	0.306	0.143	0.09	0.182 T	0.04	5	--	1.4
Zinc	mg/kg	**196**	**50.6**	**34.2**	**81.5**	**55.2**	**52.7**	**70.8**	**105**	**89.8**	**69.8**	**105**	**89.2**	**137** T	**45.9**	459	3	118
Pesticides																		
2,4'-DDD	ug/kg	4.51 NJ	0.206 NJ	0.0283 U	0.739 J	0.0298 UJ	31.9 NJ	1.52 NJ	13.9 NJ	10.5 J	1.07 NJ	5.09 NJ	1.38 NJ	4.49 NJ	0.0277 U	--	--	--
2,4'-DDE	ug/kg	0.0536 U	0.0351 U	0.0301 U	0.0442 U	0.124 NJ	0.217 UJ	0.865 NJ	0.173 UJ	0.221 UJ	0.0389 U	0.171 U	0.414 U	0.3 U	0.0294 U	--	--	--
2,4'-DDT	ug/kg	1.27 J	0.491 J	0.0397 UJ	0.469 J	0.0418 UJ	34.9 J	0.658 NJ	9.76 J	0.292 UJ	0.452	13.2 J	0.548 U	0.396 UJ	0.0389 UJ	--	--	--
4,4'-DDD	ug/kg	**5.36**	0.297 NJ	0.0424 U	**0.701**	0.0446 UJ	**89.7** J	**0.797** NJ	**19** J	**35.9** J	**0.837**	**157** NJ	**9.39** NJ	**14**	0.0415 U	28	0.3	--
4,4'-DDE	ug/kg	**2.69**	0.0464 U	0.0397 U	**0.685**	0.0418 UJ	**6.7** J	**0.906** J	**1.05** J	**13.8** NJ	**0.513**	**9.24** NJ	**0.809** NJ	**3.95**	0.0389 U	31.3	0.3	--
4,4'-DDT	ug/kg	**2.72** J	**0.495** J	0.049 UJ	**1.85** NJ	0.0516 UJ	**92.1** J	**2.98** NJ	**30** J	**5.43** J	**2.35** NJ	**246** J	**1.76** J	**2.42** J	0.087 J	62.9	0.3	--
Estimated Total DDT	ug/kg	**10.77**	**0.792**	ND	**3.236**	0.124	**188.50**	**0.00**	**50.05**	**55.13**	**0.00**	**412.24**	**0.00**	**20.37**	0.087	--	0.3	220
alpha-Hexachlorocyclohexane (α-BHC)	ug/kg	NA	0.232 J	0.0294 U	0.0432 U	0.0309 UJ	0.213 UJ	NA	0.17 UJ	0.216 UJ	0.0381 U	0.168 U	0.405 U	0.769 J	0.0288 U	--	--	--
beta-Hexachlorocyclohexane (β-BHC)	ug/kg	0.053 UJ	0.205 NJ	0.0297 U	0.299 NJ	0.058 J	2.06 NJ	0.033 UJ	2.71 NJ	9.37 J	2.48 NJ	0.169 U	0.41 U	0.296 U	0.0291 U	--	--	--
delta-Hexachlorocyclohexane (δ-BHC)	ug/kg	0.112 U	0.0734 UJ	0.0629 UJ	0.0923 U	0.0662 UJ	0.455 UJ	0.092 J	0.363 UJ	0.462 UJ	0.0814 U	0.358 UJ	0.867 UJ	0.626 UJ	0.0615 UJ	--	--	--
gamma-Hexachlorocyclohexane (γ-BHC, Lindane	ug/kg	0.12 U	0.0784 U	0.0672 U	0.0987 U	0.0707 UJ	0.486 UJ	0.0746 U	0.387 UJ	7.99 J	0.087 U	0.383 U	0.926 U	0.669 U	0.0657 U	4.99	--	--
Aldrin	ug/kg	0.049 UJ	0.0321 UJ	0.0275 UJ	0.0404 UJ	0.029 UJ	0.199 UJ	0.0306 UJ	0.159 UJ	0.202 UJ	0.0357 UJ	0.157 UJ	0.38 UJ	0.274 UJ	0.0269 UJ	40	--	--
cis-Chlordane	ug/kg	0.594	0.0342 U	0.0293 U	0.096 J	0.0308 UJ	0.212 UJ	0.0326 UJ	0.169 UJ	0.215 UJ	0.0379 U	0.167 U	0.404 U	0.651 J	0.0286 U	17.6	--	--
trans-Chlordane (Chlordane)	ug/kg	0.846 NJ	0.0216 U	0.0185 U	0.174 NJ	0.0195 UJ	0.134 UJ	0.0206 UJ	0.107 UJ	0.136 UJ	0.024 U	0.105 U	0.976 NJ	0.184 U	0.0181 U	17.6	--	--
Dieldrin	ug/kg	0.0802 UJ	0.0526 UJ	0.045 UJ	0.0661 U	0.0474 UJ	0.326 UJ	0.0501 UJ	0.26 UJ	0.331 UJ	0.0583 U	0.257 U	0.621 U	0.449 UJ	0.044 UJ	61.8	--	--
alpha-Endosulfan	ug/kg	0.0451 U	0.0296 U	0.0253 U	0.0372 U	0.0267 UJ	0.183 UJ	0.0281 U	0.146 UJ	0.186 UJ	0.0328 U	0.144 U	0.349 U	0.252 U	0.0248 U	--	--	--
beta-Endosulfan	ug/kg	0.0377 U	0.267 NJ	0.213 NJ	0.0311 U	0.133 J	0.153 UJ	0.187 J	0.122 UJ	0.155 UJ	0.0274 U	0.627 NJ	0.291 U	0.211 UJ	0.208 NJ	--	--	--
Endosulfan sulfate	ug/kg	0.116 UJ	0.0758 U	0.065 U	0.0954 U	0.0684 UJ	0.47 UJ	0.0722 UJ	0.375 UJ	0.477 UJ	0.0841 U	0.37 UJ	0.896 UJ	0.647 U	0.0635 U	--	--	--
Endrin	ug/kg	0.0622 U	NA	NA	0.0513 U		NA	4.51 J	0.201 UJ	NA	0.0452 U	NA	0.719 J	NA	NA	207	--	--
Endrin aldehyde	ug/kg	0.0685 UJ	0.0449 U	0.134 NJ	0.0564 U	0.0404 UJ	0.278 UJ	0.0427 UJ	0.222 UJ	0.282 UJ	0.0498 U	0.219 U	0.53 U	0.383 U	0.069 NJ	--	--	--
Endrin ketone	ug/kg	0.613 J	0.0302 U	0.0259 U	0.038 U	0.0272 UJ	0.187 UJ	0.0288 UJ	0.149 UJ	0.19 UJ	0.0335 U	0.148 U	0.357 U	1.4 NJ	0.0253 U	--	--	--
Heptachlor	ug/kg	0.0477 U	0.0312 U	0.0268 U	0.0393 U	0.0282 UJ	0.194 UJ	0.0297 U	0.154 UJ	0.197 UJ	0.0347 U	0.153 UJ	0.369 U	0.267 U	0.0262 U	10	--	--
Heptachlor epoxide	ug/kg	0.0622 U	0.0407 U	0.0349 U	0.0513 U	0.0367 UJ	0.252 UJ	0.0388 U	0.201 UJ	0.256 UJ	0.0452 U	0.199 U	0.481 U	0.348 U	0.0341 U	16	--	--
Methoxychlor	ug/kg	0.062 U	0.0406 UJ	0.0348 UJ	0.0511 U	0.0366 UJ	16.6 NJ	4.62 J	0.201 UJ	0.256 UJ	0.95 J	0.198 UJ	2.5 NJ	0.347 UJ	0.034 UJ	--	--	--
Mirex	ug/kg	0.0563 U	0.0369 U	0.0316 U	0.0464 U	0.0333 UJ	0.229 UJ	0.0351 U	0.182 UJ	0.232 UJ	0.0409 U	0.18 U	0.436 UJ	0.315 U	0.0309 U	--	--	--
cis-Nonachlor	ug/kg	0.674 NJ	0.0428 U	0.0367 U	0.0539 U	0.0386 UJ	0.265 UJ	0.0408 UJ	0.211 UJ	0.269 UJ	0.0475 U	0.209 U	0.506 U	0.365 U	0.0359 U	--	--	--
trans-Nonachlor	ug/kg	0.497 J	0.0373 U	0.0319 U	0.157 J	0.0336 UJ	4.6 NJ	0.412 J	0.184 UJ	0.235 UJ	0.0414 U	1.06	0.44 U	0.318 U	0.0312 U	--	--	--
Oxychlordane	ug/kg	0.0282 U	0.0185 U	0.0159 U	0.0233 U	0.0167 UJ	0.115 UJ	0.0176 U	0.0915 UJ	0.116 UJ	0.0205 U	0.0904 U	0.219 U	0.158 U	0.0155 U	--	--	--
Toxaphene	ug/kg	14.7 U	9.66 U	8.27 U	12.2 U	8.71 UJ	59.9 UJ	9.2 U	47.7 UJ	60.8 UJ	10.7 U	47.2 U	114 U	82.4 U	8.09 U	--	--	--
PCBs																		
Aroclor 1016	ug/kg	1.96 U	1.28 U	1.09 U	1.6 U	1.16 U	1.6 U	1.18 U	1.26 U	3.2 U	1.4 U	3.83 U	1.47 U	2.15 U	1.09 U	530	420	--
Aroclor 1221	ug/kg	3.64 U	2.38 U	2.02 U	2.9 U	2.15 U	2.96 U	2.37 U	2.34 U	6.4 U	2.7 U	7.09 U	2.72 U	3.98 U	2.02 U	--	--	--
Aroclor 1232	ug/kg	3.28 U	2.15 U	1.82 U	2.6 U	1.94 U	2.67 U	1.98 U	2.11 U	5.35 U	2.4 U	6.4 U	2.46 U	3.59 U	1.83 U	--	--	--
Aroclor 1242	ug/kg	*2* U	1.31 U	1.11 U	1.6 U	1.18 U	1.62 U	1.2 U	1.28 U	*3.25* U	1.5 U	*3.89* U	1.5 U	*2.18* U	1.11 U	--	2	--
Aroclor 1248	ug/kg	**9.29**	1.67 U	1.42 U	2.1 U	1.51 U	**55.2** J	1.54 U	1.64 U	*4.17* U	1.9 U	**131**	1.92 U	**25.1** J	1.42 U	1500	4	--
Aroclor 1254	ug/kg	**58.6**	0.781 U	0.662 U	3.2 UJ	0.704 U	**16.9**	0.718 U	0.766 U	1.94 U	0.87 U	**141** J	**23.8** J	**137** J	0.663 U	300	10	--
Aroclor 1260	ug/kg	44.5 J	1 U	0.85 U	6.7	0.904 U	7.37	7.75 J	0.983 U	2.49 U	27	83.5 J	28.9 J	63.2 J	0.851 U	200	--	--
Aroclor 1262	ug/kg	1.83 U	1.2 U	1.02 U	1.5 U	1.08 U	1.49 U	1.1 U	1.18 U	2.99 U	1.3 U	3.57 U	1.37 U	2 U	1.02 U	--	--	--
Aroclor 1268	ug/kg	3.93 U	1.03 U	0.874 U	3.2 UJ	0.93 U	1.280 U	0.948 U	1.01 U	2.560 U	2.9 UJ	3.07 U	1.18 U	1.72 U	0.875 U	--	--	--
Estimated Total PCBs	ug/kg	112.39	ND	ND	6.7	ND	79.47	7.75	ND	ND	27.00	355.50	52.70	225.30	ND	676	--	180

Table 2
Summary of Chemical Analytical Results
LWG Round 2 Sediment Data Adjacent to City Outfall 49
City Outfall Basin 49

		Upstream						Offshore from Outfall			Downstream							
Location (ft from OF along shore)		475' up	475' up	475' up	185' up	185' up	185' up	50' to 75'	50' to 75'	50' to 75'	250' down	250' down	560' down	560' down	560' down			
(ft offshore)		75' offshore	75' offshore	75' offshore	125' offshore	125' offshore	125' offshore				75' offshore	125' offshore	75' offshore	100' offshore	100' offshore			
Sample Type		Surface	Subsurface	Subsurface	Surface	Subsurface	Subsurface	Surface	Subsurface	Subsurface	Surface	Subsurface	Surface	Subsurface	Subsurface			
SampleID		LW2-G268	LW2-C268b	LW2-C268c	LW2-G266	LW2-C266b	LW2-C266c	LW2-G260	LW2-C260b	LW2-C260c	LW2-G257	LW2-C257	LW2-G254	LW2-C254b	LW2-C254c			
SampleDate		9/14/2004	10/19/2004	10/19/2004	8/23/2004	10/5/2004	10/5/2004	9/14/2004	10/5/2004	10/5/2004	8/23/2004	10/27/2004	9/8/2004	10/18/2004	10/27/2004			
Depth		0-26 cm	30-151 cm	151-252 cm	0-16 cm	30-131 cm	131-276 cm	0-20 cm	30-114 cm	114-163 cm	0-26 cm	30-85 cm	0-29 cm	30-74 cm	74-104 cm	JSCS Catch Basin Toxicity SLs[2]	JSCS Catch Basin Bioacc SLs[2]	DEQ Inriver Baseline[3]
Phthalates																		
Bis(2-ethylhexyl) phthalate	ug/kg	40 U	110 U	100 U	52 U	5.4 J	4.9 J	15 U	8.8 U	6.7 U	26 U	60 J	56 U	180 U	140 U	800	330	390
Butylbenzyl phthalate	ug/kg	6.5 U	1.7 U	1.7 U	2.6 U	1.8 U	1.8 U	2.1 U	4.7 U	3.8 U	2.2 U	9.7 U	49 U	5.7 U	1.8 U	--	--	390
Dibutyl phthalate	ug/kg	12 U	3.7 J	3.4 J	5.6 J	4.6 J	3.1 U	5.5 J	8.1 U	6.5 U	5.3 J	22 J	85 U	9.9 U	3.2 U	100	--	--
Diethyl phthalate	ug/kg	16 U	3.8 U	3.9 U	6.1 U	4.1 U	4.2 U	4.9 U	110	8.7 U	5.2 U	23 U	120 U	14 U	4.2 U	600	--	--
Dimethyl phthalate	ug/kg	7.8 U	2 U	2 U	3.2 U	2.1 U	2.2 U	2.5 U	5.6 U	4.5 U	2.7 U	12 U	59 U	6.8 U	2.2 U	--	--	20
Di-n-octyl phthalate	ug/kg	5.2 U	1.4 U	1.4 U	2.1 U	1.4 U	1.5 U	1.7 U	3.8 U	3 U	1.8 U	7.8 U	40 U	4.6 U	1.5 U	--	--	20
PAHs																		
2-Methylnaphthalene	ug/kg	13	0.66 J	0.54 J	4.5	0.4 J	0.41 U	31	34	8.9	110	340	23	58	1.3 J	200	--	150
Acenaphthene	ug/kg	28	0.19 J	0.18 U	3.4	0.19 U	0.19 U	8	53	12	24	680	130	68	0.76 J	300	--	180
Acenaphthylene	ug/kg	9.7	0.24 U	0.25 U	18	0.26 U	0.27 U	31	25	15	110	70	26	24	0.82 J	200	--	60
Anthracene	ug/kg	65	0.24 U	0.25 U	18	0.26 U	0.27 U	39	35	14	87	420	120	67	1.4 J	845	--	150
Benz(a)anthracene	ug/kg	64	0.22 U	0.18 U	73	0.56 J	0.19 U	170	120	59	190	970	640	210	4.2	1050	--	360
Benzo(a)pyrene	ug/kg	84	0.34 J	0.25 U	140	0.51 J	0.27 U	270	190	90	460	1100	1100	320	6.6	1450	--	500
Benzo(b)fluoranthene	ug/kg	120	0.53 U	0.53 U	130	0.56 U	0.57 U	250	170	61	370	1200	1200	290	6.3	--	--	--
Benzo(g,h,i)perylene	ug/kg	73	0.37 J	0.26 U	130	0.59 J	0.28 U	230	220	96	300	840	970	320	6.3	300	--	250
Benzo(k)fluoranthene	ug/kg	36	0.36 U	0.37 U	45	0.39 U	0.4 U	79	99	57	110	410	430	170	3.4	13000	--	--
Chrysene	ug/kg	120	0.45 U	0.46 U	98	0.51 J	0.49 U	240	170	81	300	1200	910	260	5.7	1290	--	425
Dibenz(a,h)anthracene	ug/kg	16	0.29 U	0.29 U	15	0.31 U	0.31 U	38	28	11	78	140	290	49	0.97 J	1300	--	125
Fluoranthene	ug/kg	170	0.6 U	0.38 U	68	0.57 J	0.41 U	290	300	130	160	2900	1200	490	8.6	2230	--	600
Fluorene	ug/kg	24	0.21 U	0.21 U	3.8	0.23 U	0.23 U	10	22	6.1	20	480	71	52	0.67 J	536	--	125
Indeno(1,2,3-cd)pyrene	ug/kg	71	0.29 J	0.27 U	120	0.48 J	0.29 U	200	180	82	320	780	1200	300	5.3	100	--	225
Naphthalene	ug/kg	30	2.3 U	2 U	11 U	1 U	0.97 U	54	120	29	200	720	110	230	5.1 U	561	--	200
Phenanthrene	ug/kg	85	0.6 J	0.37 U	17	0.41 J	0.4 U	150	310	77	130	2000	470	190	3.7	1170	--	700
Pyrene	ug/kg	160	0.58 U	0.4 U	110	0.69 J	0.43 U	380	360	170	270	2600	1200	450	11	1520	--	700
Phenolic SVOCs																		
2,3,4,5-Tetrachlorophenol	ug/kg	1.3 U	0.63 U	0.64 U	1.1 U	1.2 U	0.69 U	0.8 U	0.9 U	0.73 U	0.86 U	0.75 U	4.8 U	4.1 U	1 J	--	--	--
2,3,4,6;2,3,5,6-Tetrachlorophenol coelution	ug/kg	0.78 U	0.4 U	0.4 U	0.63 U	0.42 U	0.43 U	0.5 U	0.56 U	0.45 U	0.53 U	0.47 U	3 U	1.1 J	0.44 U	--	--	--
2,4-Dichlorophenol	ug/kg	7.8 U	2 U	2 U	3.2 U	2.1 U	2.2 U	2.5 U	5.6 U	4.5 U	2.7 U	12 U	59 U	6.8 U	2.2 U	--	--	--
2,4-Dimethylphenol	ug/kg	24 U	6 U	6.1 U	9.5 U	NA		7.6 U	NA		8.1 U	36 U	180 U	21 U	6.6 U	--	--	--
2,4-Dinitrophenol	ug/kg	160 U	40 U	40 U	63 U	42 U	43 U	50 U	120 U	90 U	53 U	240 U	1200 U	140 U	44 U	--	--	--
2,4,5-Trichlorophenol	ug/kg	0.63 U	0.32 U	0.32 U	3.7 U	0.34 U	0.35 U	0.4 U	0.46 U	0.37 U	0.43 U	0.38 U	2.4 U	0.55 U	0.35 U	--	--	--
2,4,6-Trichlorophenol	ug/kg	0.78 U	0.4 U	0.4 U	0.63 U	0.42 U	0.43 U	0.5 U	0.56 U	0.45 U	0.53 U	0.47 U	3 U	0.68 U	0.44 U	--	--	--
2-Chlorophenol	ug/kg	7.3 U	1.9 U	1.9 U	3 U	2 U	2.1 U	2.4 U	5.3 U	4.3 U	2.5 U	11 U	56 U	6.5 U	2.1 U	--	--	--
2-Methylphenol	ug/kg	15 U	3.7 U	3.8 U	5.9 U	4 UJ	4.1 UJ	4.7 U	11 U	8.5 U	5 U	22 U	120 U	13 U	4.1 U	--	--	--
2-Nitrophenol	ug/kg	12 U	2.9 U	2.9 U	4.5 U	3.1 U	3.1 U	3.6 U	8.1 U	6.5 U	3.9 U	17 U	85 U	9.9 U	3.2 U	--	--	--
4,6-Dinitro-2-methylphenol	ug/kg	7.3 U	1.9 U	1.9 U	3 U	2 U	2.1 U	2.4 U	5.3 U	4.3 U	2.5 U	11 U	56 U	6.5 U	2.1 U	--	--	--
4-Chloro-3-methylphenol	ug/kg	9.1 U	2.3 U	2.4 U	3.7 U	2.5 U	2.5 U	2.9 U	6.6 U	5.3 U	3.1 U	14 U	69 U	8 U	2.6 U	--	--	--
4-Methylphenol	ug/kg	13 U	3.2 U	3.2 U	5.1 U	3.4 UJ	3.5 UJ	4 U	46 J	7.3 UJ	4.3 U	19 U	95 U	51	3.5 U	--	--	680
4-Nitrophenol	ug/kg	130 U	33 U	34 U	52 U	35 U	36 U	0.9 U	1 U	0.838 U	44 U	200 U	980 U	120 U	36 U	--	--	--
Pentachlorophenol	ug/kg	11 J	0.43 U	0.43 U	2.7 J	0.46 U	0.47 U	0.54 U	3.5 J	0.49 U	0.58 U	6.2 J	3.2 U	15	0.47 U	1000	--	97
Phenol	ug/kg	8.2 U	2.8 J	2.4 J	11 J	6.2 U	5.8 U	2.7 U	11 U	5.5 U	13 J	46 U	62 U	21 J	2.3 U	50	--	20
Organonitrogen SVOCs																		
Nitrobenzene	ug/kg	8.6 U	2.2 U	2.3 U	3.5 U	2.4 U	2.4 U	2.8 U	6.3 U	5 U	3 U	13 U	66 U	7.6 U	2.4 U	--	--	--
Aniline	ug/kg	6.5 U	1.7 UJ	1.7 U	2.6 U	1.8 U	NA	2.1 U	NA	NA	2.2 U	9.7 U	49 U	5.7 U	1.8 U	--	--	--
2-Nitroaniline	ug/kg	12 U	3 U	3 U	4.7 U	3.2 U	3.3 U	3.8 U	8.4 U	6.8 U	4 U	18 U	88 U	11 U	3.3 U	--	--	--
3-Nitroaniline	ug/kg	12 U	2.9 U	2.9 U	4.5 U	3.1 U	3.1 U	3.6 U	8.1 U	6.5 U	3.9 U	17 U	85 U	9.9 U	3.2 U	--	--	--
4-Nitroaniline	ug/kg	15 U	3.7 U	3.8 U	5.9 U	4 U	4.1 U	4.7 U	11 U	8.5 U	5 U	22 U	120 U	13 U	4.1 U	--	--	--
2,4-Dinitrotoluene	ug/kg	13 U	3.1 U	3.1 U	4.9 U	3.3 U	3.4 U	3.9 U	8.7 U	7 U	4.2 U	19 U	92 U	11 U	3.4 U	--	--	--
2,6-Dinitrotoluene	ug/kg	13 U	3.1 U	3.1 U	4.9 U	3.3 U	3.4 U	3.9 U	8.7 U	7 U	4.2 U	19 U	92 U	11 U	3.4 U	--	--	--
4-Chloroaniline	ug/kg	9.1 U	2.3 U	2.4 U	3.7 U	2.5 U	2.5 U	2.9 U	6.6 U	5.3 U	3.1 U	14 UJ	69 U	8 U	2.6 U	--	--	--
Carbazole	ug/kg	12 J	1.5 U	1.5 U	2.8 J	1.6 U	1.6 U	15	13 J	4.1 J	17	130	75 J	39	1.6 U	1600	--	100
N-Nitrosodimethylamine	ug/kg	27 U	6.7 U	6.8 U	11 U	7.1 U	7.3 UJ	8.4 U	19 U	16 U	9 U	40 U	200 U	24 U	7.4 U	--	--	--
N-Nitrosodiphenylamine	ug/kg	9.5 U	2.4 U	2.5 U	3.8 U	2.6 U	2.7 U	3.1 U	24 J	5.5 UJ	3.3 U	15 U	72 U	8.4 U	2.7 U	--	--	--
N-Nitrosodipropylamine	ug/kg	14 U	3.5 U	3.6 U	5.6 U	3.8 U	3.8 U	4.5 U	10 U	8 U	4.7 U	21 U	110 U	13 U	3.9 U	--	--	--
Halogenated SVOCs																		--
1,2,4-Trichlorobenzene	ug/kg	6.5 U	1.7 U	1.7 U	2.6 U	1.8 U	1.8 U	2.1 U	4.7 U	3.8 U	2.2 U	9.7 U	49 U	5.7 U	1.8 U	9200	--	--
1,2-Dichlorobenzene	ug/kg	5.6 U	1.5 U	1.5 U	2.3 U	1.6 U	1.6 U	1.8 U	4.1 U	3.3 U	2 U	8.4 U	43 U	5 U	1.6 U	1700	--	--
1,3-Dichlorobenzene	ug/kg	6.9 U	1.8 U	1.8 U	2.8 U	1.9 U	1.9 U	2.3 U	5 U	4 U	2.4 U	11 U	53 U	6.1 U	2 U	300	--	--
1,4-Dichlorobenzene	ug/kg	8.2 U	2.1 U	2.1 U	3.3 U	2.3 U	2.3 U	2.7 U	5.9 U	4.8 U	2.8 U	13 U	62 U	7.2 U	2.3 U	300	--	--
2-Chloronaphthalene	ug/kg	16 U	4 U	4 U	6.3 U	4.2 U	4.3 U	5 U	12 U	9 U	5.3 U	24 U	120 U	14 U	4.4 U	--	--	--

Table 2
Summary of Chemical Analytical Results
LWG Round 2 Sediment Data Adjacent to City Outfall 49
City Outfall Basin 49

		Upstream						Offshore from Outfall			Downstream							
Location (ft from OF along shore)		475' up	475' up	475' up	185' up	185' up	185' up	50' to 75'	50' to 75'	50' to 75'	250' down	250' down	560' down	560' down	560' down	JSCS Catch Basin Toxicity SLs[2]	JSCS Catch Basin Bioacc SLs[2]	DEQ Inriver Baseline[3]
(ft offshore)		75' offshore	75' offshore	75' offshore	125' offshore	125' offshore	125' offshore				75' offshore	125' offshore	75' offshore	100' offshore	100' offshore			
Sample Type		Surface	Subsurface	Subsurface	Surface	Subsurface	Subsurface	Surface	Subsurface	Subsurface	Surface	Subsurface	Surface	Subsurface	Subsurface			
SampleID		LW2-G268	LW2-C268b	LW2-C268c	LW2-G266	LW2-C266b	LW2-C266c	LW2-G260	LW2-C260b	LW2-C260c	LW2-G257	LW2-C257	LW2-G254	LW2-C254b	LW2-C254c			
SampleDate		9/14/2004	10/19/2004	10/19/2004	8/23/2004	10/5/2004	10/5/2004	9/14/2004	10/5/2004	10/5/2004	8/23/2004	10/27/2004	9/8/2004	10/18/2004	10/27/2004			
Depth		0-26 cm	30-151 cm	151-252 cm	0-16 cm	30-131 cm	131-276 cm	0-20 cm	30-114 cm	114-163 cm	0-26 cm	30-85 cm	0-29 cm	30-74 cm	74-104 cm			
3,3'-Dichlorobenzidine	ug/kg	16 U	4.1 U	4.1 U	6.4 U	4.3 U	4.4 U	5.1 U	12 UJ	9.2 UJ	5.5 U	24 UJ	130 U	14 U	4.5 U	--	--	--
4-Bromophenyl phenyl ether	ug/kg	6.1 U	1.6 U	1.6 U	2.5 U	1.7 U	1.7 U	2 U	4.4 U	3.5 U	2.1 U	9.1 U	46 U	5.3 U	1.7 U	--	--	--
4-Chlorophenyl phenyl ether	ug/kg	8.6 U	2.2 U	2.3 U	3.5 U	2.4 U	2.4 U	2.8 U	6.3 U	5 U	3 U	13 U	66 U	7.6 U	2.4 U	--	--	--
Azobenzene	ug/kg	11 U	2.7 U	2.7 U	4.2 U	2.8 U	2.9 U	3.4 U	7.5 U	6 U	3.6 U	16 U	79 U	9.1 U	2.9 U	--	--	--
Bis(2-chloroethoxy) methane	ug/kg	5.6 U	1.5 U	1.5 U	2.3 U	1.6 U	1.6 U	1.8 U	4.1 U	3.3 U	2 U	8.4 U	43 U	5 U	1.6 U	--	--	--
Bis(2-chloroethyl) ether	ug/kg	11 U	2.7 U	2.7 U	4.2 U	2.8 U	2.9 U	3.4 U	7.5 U	6 U	3.6 U	16 U	79 U	9.1 U	2.9 U	--	--	--
Bis(2-chloroisopropyl) ether	ug/kg	5.2 U	1.4 U	1.4 U	2.1 U	1.4 U	1.5 U	1.7 UJ	3.8 U	3 U	1.8 U	7.8 U	40 U	4.6 U	1.5 U	--	--	--
Hexachlorobenzene	ug/kg	9.1 U	0.0184 U	2.4 U	0.419	0.0166 UJ	2.5 U	2.9 U	1.77 J	5.3 U	1.07	14 U	0.217 U	0.451 J	2.6 U	100	--	--
Hexachlorocyclopentadiene	ug/kg	65 U	17 U	17 U	26 U	18 U	18 U	21 U	47 U	38 U	22 U	97 U	*490* U	57 U	18 U	400	--	--
Hexachlorobutadiene	ug/kg	0.0541 UJ	0.0355 U	0.0304 U	0.0446 U	0.032 UJ	0.22 UJ	0.0338 UJ	0.175 UJ	0.223 UJ	0.0394 U	0.173 U	0.419 U	0.303 U	0.0297 U	600	--	--
Hexachloroethane	ug/kg	0.08 UJ	0.0524 UJ	0.0449 UJ	0.066 U	0.0473 UJ	0.325 UJ	0.0499 UJ	0.259 UJ	0.33 UJ	0.0582 U	0.256 UJ	0.619 UJ	0.448 UJ	0.0439 UJ	--	--	--
Oxygen-Containing SVOCs																		
Benzoic acid	ug/kg	420 U	110 U	110 U	170 U	120 UJ	120 UJ	140 U	300 UJ	240 UJ	150 U	620 U	3200 U	370 U	120 U	--	--	200
Benzyl alcohol	ug/kg	16 U	4.1 U	4.1 U	6.4 U	4.3 U	4.4 U	5.1 U	12 U	9.2 U	14	24 U	130 U	25	4.5 U	--	--	20
Dibenzofuran	ug/kg	22	0.24 J	0.19 U	2.9	0.2 U	0.21 U	3	8.1	1.8 J	7.7	230	16	39	0.53 J	--	--	100
Isophorone	ug/kg	6.9 U	1.8 U	1.8 U	2.8 U	1.9 U	1.9 U	2.3 U	5 U	4 U	2.4 U	11 U	53 U	6.1 U	2 U	--	--	
TPH																		
Diesel Fuel	mg/kg	NA	NA	NA	NA	NA	NA	63 JT	NA	NA	NA	NA	NA	NA	NA	--	--	--
Residual Range Organics	mg/kg	NA	NA	NA	NA	NA	NA	134 JT	NA	NA	NA	NA	NA	NA	NA	--	--	--
Petroleum hydrocarbons as gasoline	mg/kg	NA	NA	NA	NA	NA	NA	1.5 UT	NA	NA	NA	NA	NA	NA	NA	--	--	--

Notes:
[1]All results reported on a dry-weight basis.
[2]Portland Harbor Joint Source Control Strategy (DEQ/EPA Final, December 2005) levels are presented for comparison to sediment sample results.
[3]DEQ baseline values are used here for comparison purposes only.

Total parameters:
Total DDT - Sum of 4,4'-DDD, 4,4'-DDE and 4,4'-DDT.
Total PCBs - Sum of detected aroclors.
Total PAHs - Sum of the detected analytes.
italic The method reporting limit exceeds JSCS Screening Levels.
bold The detected concentration exceeds JSCS Bioaccumulation Screening Level.
shaded The detected concentration exceeds JSCS Toxicity Screening Level.
Qualifiers:
J = Estimate.
N = Presumptive evidence of a compound.
T = Value is an average or selected result.
U = Not detected at value shown.
UJ - Not detected, and the detection limit is an estimate.

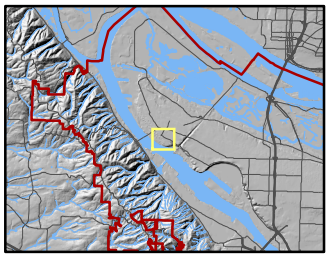
Table 3

Summary of Mercury Analytical Results
Inline Solids Sampling
City Outfall Basin 49

Class	Analyte	Units	Western AAG648 IL-49-AAG648-0705 7/25/2005	Northern AAG642 IL-49-AAG642-0705 7/25/2005	JSCS Screening Level Value (Toxicity)[5]	JSCS Screening Level Value (Bioaccumulation)[6]	DEQ Default Background Concentration* Soil
Mercury (EPA 6020)							
	Mercury	mg/Kg	0.010 U	0.014	1.06	--	0.07
Mercury (EPA 7471)							
	Mercury	mg/Kg	0.0212 U	0.0232 U	1.06	--	0.07

Notes:

All units in milligrams per Kilogram (mg/Kg) dry weight.
U = None detected - Value shown is the method reporting limit.
JSCS - Portland Harbor Joint Source Control Strategy (DEQ/EPA Final December 2005).
[5] MacDonald PEC and other SQV's Screening level for Soil/Catch Basin Sediment.
[6] DEQ 2001 Bioaccumulative Sediment SLV's Screening level for Soil/Catch Basin Sediment.
*DEQ (2002) Background Concentration is shown for comparison.
-- No JSCS SLV available.
See Attachment C for complete set of analytical laboratory sheets.



Legend

@ Trashracks

Storm Pipe

(Manhole

Taxlots

49 Basin Boundary

Sample Location

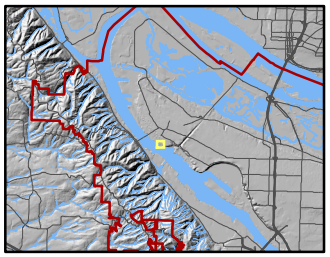
0 250 500 1000 Feet

*EPA Method 6020; Mercury was not detected using EPA 7471

mg/Kg = milligrams/Kilogram dry weight

Figure 1
Outfall 49
Inline Solids Sampling
Mercury
Sample Date: 7/25/2005

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_49\ figure1.mxd	**Program Manager:** Dawn Sanders Portland Harbor Superfund
Sheet No. 1 OF 1	**Date Printed:** 05/08/06 **Prepared by:** Sara Gardner



Legend

- Storm Inlet
- Storm Pipe
- Manhole
- Trashracks
- Taxlots
- 2002 City Sample Sample Location
- LWG Round 2 Sample Location
- Inline Sample Location
- 49 Basin Boundary

0 250 500 1000 Feet

Figure 2
Outfall 49
Inline Solids Sampling

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_49\ figure2.mxd	**Program Manager:** Dawn Sanders Portland Harbor Superfund
Sheet No. 1 OF 1	**Date Printed:** 05/08/06 **Prepared by:** Sara Gardner

Attachment A
Field Photographs

Photo 1 (July, 2005). Inline solids at node AAG648.

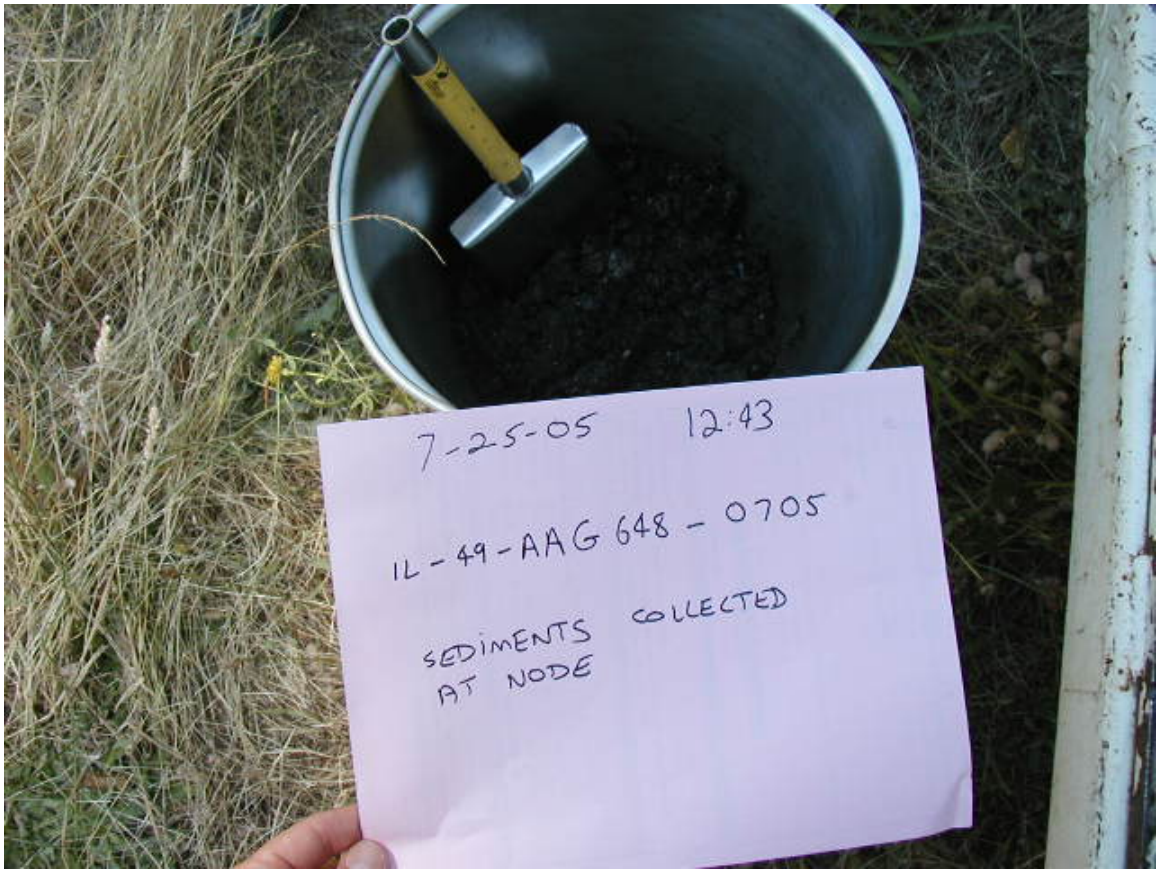


Photo 2 (July, 2005). Solids were collected with a stainless steel spoon and bowl.

Photo 3 (July, 2005). Looking toward the drainage swale in Outfall Basin 49 from node AAG642. Solids were collected upstream from this location (see Photo 4).

Photo 4 (July, 2005). Inline solids were collected at this location, which is the segment north of node AAG642 and downstream of node AAG649. The western line enters at the bottom left from node AAG648.

Attachment B
Field Notes

City of Portland
Environmental Services

DAILY FIELD REPORT

Page 1 of 1

Project PORTLAND HARBOR INLINE SED SAMP
Project No. 1020.001
Location
Date 7/25/05
Subject FIELD NOTES
By MJH

0730 PREPARE EQUIPMENT FOR TODAYS SAMPLING ACTIVITIES
DECON SPOONS + BOWLS + BUCKETS PER SOP 7.01a.

1100 PROCEED TO BASIN 52A
1120 Arrive at AAE 628. Collect sed sample. ATINA + TM SHOW UP

1145 PROCEED TO AAE 847. NO SEDIMENT PRESENT HERE
PROCEED TO ALTERNATE. AAE069.

1220 PROCEED TO BASIN 49, WHICH IS BY LAMPROS STEEL YARD.

1230 ARRIVE AT AAG 648. GOOD SAMPLE HERE.

1255 PROCEED TO AA6649. —NO SAMPLE POSSIBLE. PROCEED DOWN LINE TO ALTERNATE AA6 647.
SAMPLE COLLECTED IN ENE FROM AA6 649.
1300 ALL SAMPLES PLACED IN CHILLED COOLER.
1400 RETURN TO WPCL. SUBMIT SAMPLES TO WPCL LAB UNDER CHAIN OF CUSTODY

Attachments

CITY OF PORTLAND

ENVIRONMENTAL SERVICES

Water Pollution control Laboratory
6543 N. Burlington Ave.,
Portland, OR 97203-5452

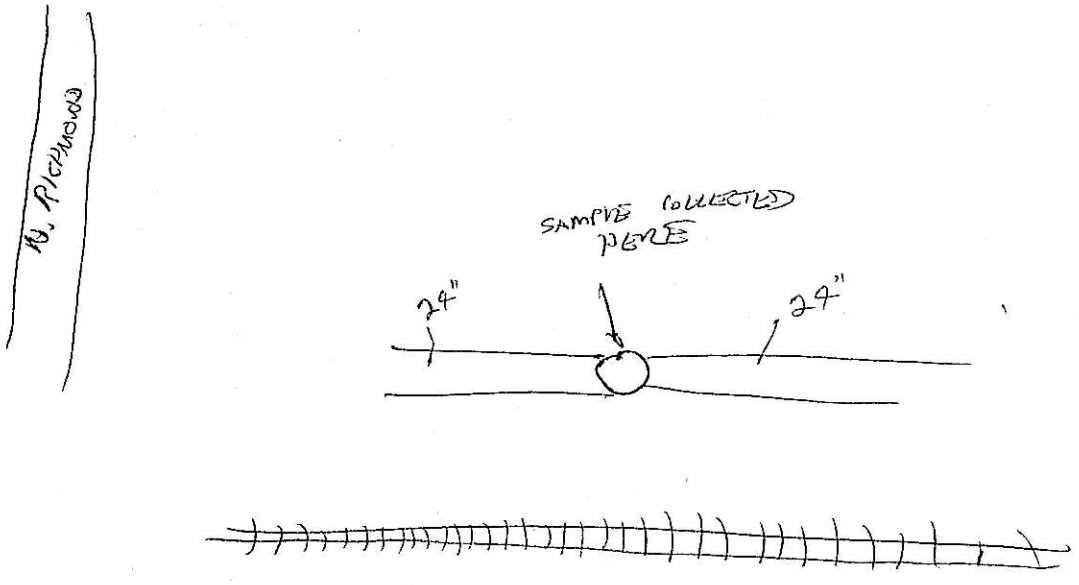
PORTLAND HARBOUR INLINE SEDIMENT SAMPLING - 1020.001
FIELD DATA SHEET

Date: 7/25/05	Time: 1233	Current Weather conditions: SUNNY 70's	
Sampling Team Present: MSH/RCB/RJS			
Basin: 4-9	Node: AAG 648	Subbasin:	
Address: N. RICHMOND			

SECTION 1 - PRE-SAMPLING VISUAL OBSERVATION REPORT

Describe any flowing or standing water observed in the line?	SEDS ARE SATURATED. NO STANDING WATER
Does river appear to back up to this location? Describe rate/color/odor of flow:	NO
Are sediments observed in the line?	YES MAX DEPTH = 2"
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:	SEDS EXTEND AS FAR AS VISIBLE

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



SECTION 2 - SAMPLE COLLECTION REPORT

Node: AAG 648

Sampling Equipment:	SS SPOON + BUCKET
Equipment Decontamination process:	(Per FOps SOP 70.1a) Other (Describe)
Sample date: 7-25-05	Sample time: 1243
Sample Identification: (IL-XX-NNNNNN-mmyy)	IL-40-AAG648-0705
Sample location: (number of feet from node of entry)	AT NODE
Sample collection technique:	SS SPOON USED TO COLLECT SEDS INTO BUCKET
Color of sample:	Dr BROWN
Texture/Particle size:	SANDS + GRAVELS
Visual or olfactory evidence of contamination:	SLIGHT DEGRADED PETROLEUM ODOR. NO SPLEEN ON WATER
Depth of solids in area where sample collected:	2"
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?	ND
Duplicate sample fictitious identification # on COC:	
Samples placed in chilled cooler? (Y)N	
Samples delivered to lab? (Y)N	Lab ID Number: PO 050759
Describe any deviations from standard procedures:	

SECTION 3 - PHOTOGRAPH LOG

Photograph Log	In-Pipe sample location	
	Homogenized sample	

CITY OF PORTLAND

ENVIRONMENTAL SERVICES

Water Pollution control Laboratory
6543 N. Burlington Ave.,
Portland, OR 97203-5452

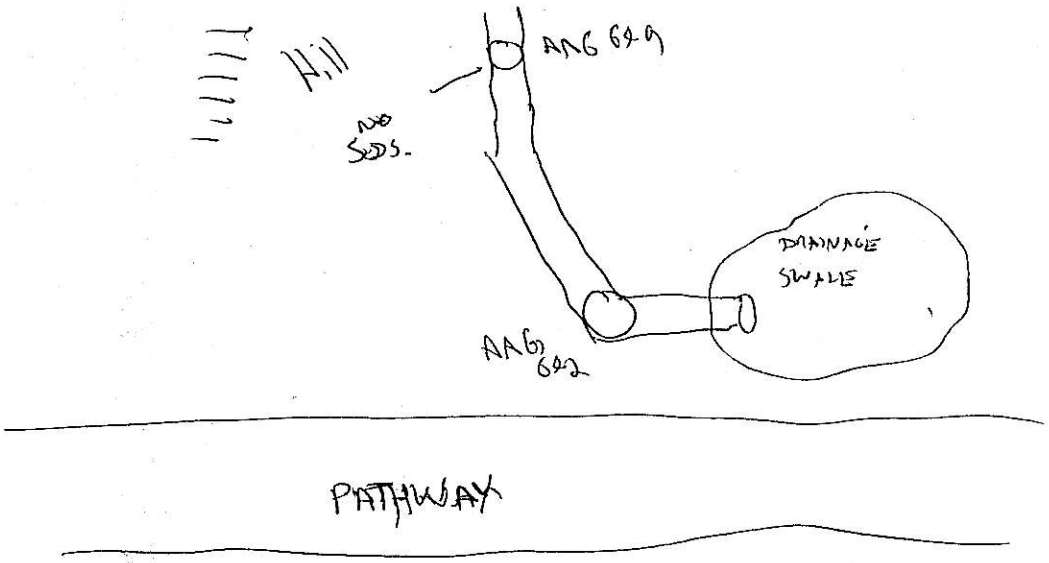
PORTLAND HARBOUR INLINE SEDIMENT SAMPLING - 1020.001
FIELD DATA SHEET

Date: 7/25/05	Time: 1302	Current Weather conditions: SUNNY 80'S
Sampling Team Present: MSP / KCB / RJS		
Basin: 49	Node: AAG 649	Subbasin:
Address: 2001 E OF N RICHMOND ON HILL OFF OF PATHWAY		

SECTION 1 - PRE-SAMPLING VISUAL OBSERVATION REPORT

Describe any flowing or standing water observed in the line?	NONE
Does river appear to back up to this location? Describe rate/color/odor of flow:	NO
Are sediments observed in the line?	YES, a Little bit
Is there enough sediment in the line to collect a sample?	(NO) PROCEED TO ALTERNATE AAG 642
Describe lateral extent and depth of sample-able sediments present in the line:	VERY THIN.

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



CITY OF PORTLAND

ENVIRONMENTAL SERVICES

Water Pollution control Laboratory
6543 N. Burlington Ave.,
Portland, OR 97203-5452

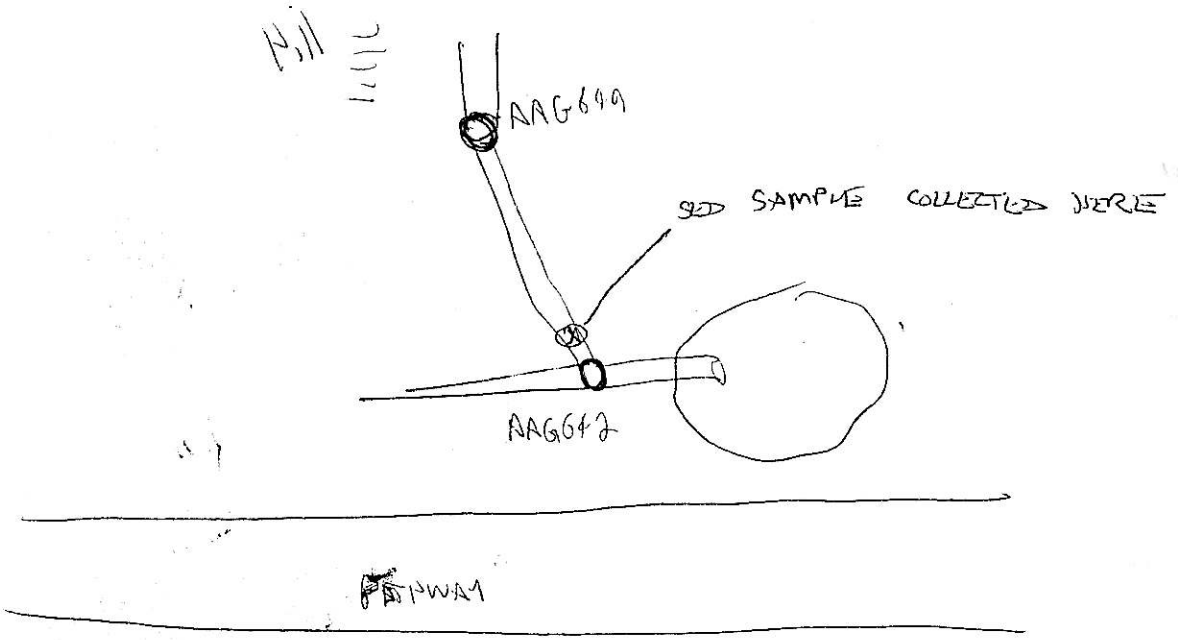
PORTLAND HARBOUR INLINE SEDIMENT SAMPLING - 1020.001
FIELD DATA SHEET

Date: 7/25/05	Time: 1310	Current Weather conditions: SUNNY 80's
Sampling Team Present: MJJ | RJS | RCB		
Basin: 4-9	Node: AAG642	Subbasin: —
Address: 2001 EAST OF N. RICHMOND NEAR PIER		

SECTION 1 - PRE-SAMPLING VISUAL OBSERVATION REPORT

Describe any flowing or standing water observed in the line?	NO WATER. DRY
Does river appear to back up to this location? Describe rate/color/odor of flow:	NO
Are sediments observed in the line?	YES. IN ALL LINES AT THIS NODE
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:	SEDS EXTEND 8' UP LINE WE SAMPLED FROM DEPTH = 3" AT INVERT.

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



SECTION 2 - SAMPLE COLLECTION REPORT

Node: AAG 642

Sampling Equipment:	SS SPOON + BUCKET
Equipment Decontamination process:	(Per FOps SOP 70.1a) Other (Describe)
Sample date: 7/25/05	Sample time: ~~7~~ 1320
Sample Identification: (IL-XX-NNNNNN-mmyy)	IL-99-AAG642-0705
Sample location: (number of feet from node of entry)	3' UP FROM NODE AAG 642
Sample collection technique:	SS SPOON USED TO COLLECT SEDS INTO BUCKET.
Color of sample:	DK BROWN
Texture/Particle size:	SANDS + GRAVELS
Visual or olfactory evidence of contamination:	DECOMPOSITION ODOR
Depth of solids in area where sample collected:	3"
Amount and type of debris:	—
Compositing notes:	SEDS COMPOSITED PRIOR TO

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 # on COC:	
Samples placed in chilled cooler? (Y)N	
Samples delivered to lab? (Y)N	Lab ID Number: PO 050760
Describe any deviations from standard procedures:	

SECTION 3 - PHOTOGRAPH LOG

Photograph Log	In-Pipe sample location	
	Homogenized sample	

Attachment C
Laboratory Results

Groundwater Solutions, Inc.
55 SW Yamhill Street, Suite 400 Portland, Oregon 97204
ph: 503.239.8799 fx: 503.239.8940 e: groundwatersolutions.com

Laboratory Data QA/QC Review
Upland Source Control Investigation
City Outfall Basin 49

To: File

From: Robyn Cook, GSI

Walter Burt, RG – GSI

Date: January 12, 2005

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 49. The results of the sampling and analysis are presented in the January 2006, Technical Memorandum No. OF 49-1.

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 each laboratory:

- BES Laboratory
    - Total Metals (EPA Method 6020)
- STL Laboratory
    - Mercury by CVAA (EPA Method 7471)

Attachment C of the Technical Memorandum No. OF 49-1 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

- Laboratory duplicates within analytical accuracy control limits
- Matrix spike recoveries within accuracy 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

Mercury Analyses

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

Method Blanks

Method blanks were processed during the laboratory analyses of mercury. No chemicals were detected in the method blanks associated with mercury analysis.

Laboratory Duplicate

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

Matrix Spike Recoveries

A matrix spike was processed during the laboratory analyses of mercury. The matrix spike recovery was within the laboratory control limits.

Water Pollution Control Laboratory
6543 N. Burlington Ave.
Portland, Oregon 97203-4552
(503) 823-5696

City of Portland Chain-of-Custody

Bureau of Environmental Services

Date: 7/25/05
Page: 1 of 1
Collected By: MJH/ RJS RCB

Project Name: PORTLAND HARBOR INLINE SAMP
File Number: 1020.001 **Matrix:** SEDIMENT

Requested Analyses

OUTFALL 49
* Collect two metals bottles per sample, mercury analysis to be performed by EPA 6020 at WPCL and by EPA 7417 by STL

7/25/05

WPCL Sample I.D.	Location	Point Code	Sample Date	Sample Time	Sample Type	General	Metals: Total Mercury (EPA 7471)	Metals: Total Mercury (EPA 6020)	Field Comments
FO 050759	IL-49-AAG648-~~0705~~ 0725 W END OF N RICHMOND	49_1	7/25/05	1243	C		●	●	
FO 050760	IL-49-AAG642-~~0705~~ 0725 S OF N RICHMOND	49_2	7/25/05	1320	C		●	●	
	original -0705- is correct 11/16/05								

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.	Relinquished By: 4.
Signature:	Signature:	Signature:	Signature:
Time: 1404	Time:	Time:	Time:
Printed Name: MICHAEL HALSEY	Printed Name:	Printed Name:	Printed Name:
Date: 7-25-05	Date:	Date:	Date:
Received By: 1.	**Received By:** 2.	**Received By:** 3.	**Received By:** 4.
Signature:	Signature:	Signature:	Signature:
Time: 1404	Time:	Time:	Time:
Printed Name: KRIS DENNIS	Printed Name:	Printed Name:	Printed Name:
Date: 7/25/05	Date:	Date:	Date:

City of Portland
Water Pollution Control Laboratory
Laboratory Analysis Report

Sample Date/Time 7/25/2005 12:43 **System ID** AJ07086 **Sample ID** **FO050759**

Page: 1

Proj./Company Name: PORTLAND HARBOR INLINE SAMP
Address/Location: IL-49-AAG648-0705
WEST END OF N RICHMOND

Date Received: 7/25/2005
Sample Status: COMPLETE AND VALIDATED

Proj Subcategory: REGULATORY PLAN & EVAL
Sample Point Code: 49_1
IMS File/Invoice #: 1020.001

Sample Type: COMPOSITE
Sample Matrix: SEDIMENT
Collected By: MJH/RCB

Comments: QA/QC: Unless otherwise noted, 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.

Test Parameter	Result	Units	MRL	Method
METALS				
MERCURY	<0.010	mg/Kg dry wt	0.010	EPA 6020
OUTSIDE				
MERCURY	<0.0212	mg/Kg dry wt	0.0212	EPA 7471

End of Report for Sample ID: FO050759

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656

Report Date: 8/29/2005

Validated By: Signature on File

City of Portland
Water Pollution Control Laboratory
Laboratory Analysis Report

Sample Date/Time 7/25/2005 13:20 **System ID** AJ07087 **Sample ID** **FO050760**

Page: 1

Proj./Company Name: PORTLAND HARBOR INLINE SAMP
Address/Location: IL-49-AAG642-0705
S OF WEST END OF N RICHMOND ST

Date Received: 7/25/2005
Sample Status: COMPLETE AND VALIDATED

Proj Subcategory: REGULATORY PLAN & EVAL
Sample Point Code: 49_2
IMS File/Invoice #: 1020.001

Sample Type: COMPOSITE
Sample Matrix: SEDIMENT
Collected By: MJH/RCB

Comments: QA/QC: Unless otherwise noted, 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.

Test Parameter	Result	Units	MRL	Method
METALS				
MERCURY	0.014	mg/Kg dry wt	0.010	EPA 6020
OUTSIDE				
MERCURY	<0.0232	mg/Kg dry wt	0.0232	EPA 7471

End of Report for Sample ID: FO050760

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656

Report Date: 8/29/2005

Validated By: Signature on File

2.8°C

SUBCONTRACT ORDER

1290 66

North Creek Analytical - Portland

P5G0989

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

Analysis	Due	Expires	Laboratory ID	Comments
Sample ID: P5G0989-01	**Soil**	**Sampled:07/25/05 11:28**	[redacted]	**See City of Portland COC**
Solids, Dry Weight	08/01/05 16:00	08/22/05 11:28		FO 050757
8270C Semivolatiles	08/08/05 16:00	08/08/05 11:28		
8082 PCB	08/08/05 16:00	08/08/05 11:28		
Containers Supplied:				
4 oz. jar (A)	4 oz. jar (B)			
Sample ID: P5G0989-02	**Soil**	**Sampled:07/25/05 12:07**	[redacted]	**See City of Portland COC**
Solids, Dry Weight	08/01/05 16:00	08/22/05 12:07		FO 050758
8270C Semivolatiles	08/08/05 16:00	08/08/05 12:07		
8082 PCB	08/08/05 16:00	08/08/05 12:07		
Containers Supplied:				
4 oz. jar (A)	4 oz. jar (B)			
Sample ID: P5G0989-03	**Soil**	**Sampled:07/25/05 12:43**	[redacted]	**See City of Portland COC**
Solids, Dry Weight	08/01/05 16:00	08/22/05 12:43		FO 050759
Hg Total 7471A	08/08/05 16:00	08/22/05 12:43		
Containers Supplied:				
4 oz. jar (A)				
Sample ID: P5G0989-04	**Soil**	**Sampled:07/25/05 13:20**	[redacted]	**See City of Portland COC**
Solids, Dry Weight	08/01/05 16:00	08/22/05 13:20		FO 050760
Hg Total 7471A	08/08/05 16:00	08/22/05 13:20		
Containers Supplied:				
4 oz. jar (A)				

Released By	Date	Received By	Date
[signature]	7/26/05	[signature]	7/27/5 900
Released By	Date	Received By	Date
			22

SEVERN TRENT STL

STL Seattle
5755 8th Street East
Tacoma, WA 98424

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

TRANSMITTAL MEMORANDUM

DATE: August 12, 2005

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

PROJECT: P5G0989

REPORT NUMBER: 129066

TOTAL NUMBER OF PAGES: 23

Enclosed are the test results for four samples received at STL Seattle on July 27, 2005.

Analytical Narrative for method 8082: The relative percent difference values for aroclor 1242/1260 were outside quality control acceptance limits. No corrective action was taken based on the outlier since they failed high and the percent recoveries were within acceptance range.

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.

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

Sincerely,

Darla Powell
Project Manager

STL Seattle

Sample Identification:

Lab. No.	Client ID	Date/Time Sampled	Matrix
129066-1	P5G0989-01	07-25-05 11:28	solid
129066-2	P5G0989-02	07-25-05 12:07	solid
129066-3	P5G0989-03	07-25-05 12:43	solid
129066-4	P5G0989-04	07-25-05 13:20	solid

STL Seattle

Client Name	North Creek Analytical
Client ID:	P5G0989-03
Lab ID:	129066-03
Date Received:	7/27/2005
Date Prepared:	7/29/2005
Date Analyzed:	7/29/2005
Dilution Factor	1
% Solids	81.66

Mercury by CVAA - USEPA Method 7471

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	RL	Flags
Mercury	ND	0.0212	

STL Seattle

Client Name	North Creek Analytical
Client ID:	P5G0989-04
Lab ID:	129066-04
Date Received:	7/27/2005
Date Prepared:	7/29/2005
Date Analyzed:	7/29/2005
Dilution Factor	1
% Solids	77.08

Mercury by CVAA - USEPA Method 7471

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	RL	Flags
Mercury	ND	0.0232	

STL Seattle

Lab ID:	Method Blank - ZS414
Date Received:	-
Date Prepared:	7/29/2005
Date Analyzed:	7/29/2005
Dilution Factor	1

Mercury by CVAA - USEPA Method 7471

Sample results are on an as received basis.

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

STL Seattle

Matrix Spike Report

Client Sample ID:	ST-TP02-05
Lab ID:	129011-03
Date Prepared:	7/29/2005
Date Analyzed:	7/29/2005
QC Batch ID:	ZS414

Mercury by CVAA - USEPA Method 7471

Parameter Name	Sample Result (mg/kg)	Spike Amount (mg/kg)	MS Result (mg/kg)	MS % Rec.	Flag
Mercury	0.0193	0.186	0.204	100	

STL Seattle

Duplicate Report

Client Sample ID:	ST-TP02-05
Lab ID:	129011-03
Date Prepared:	7/29/2005
Date Analyzed:	7/29/2005
QC Batch ID:	ZS414

Mercury by CVAA - USEPA Method 7471

Parameter Name	Sample Result (mg/kg)	Duplicate Result (mg/kg)	RPD %	Flag
Mercury	0.019	0.026	-31.0	

SEVERN TRENT STL

STL Seattle
5755 8th Street East
Tacoma, WA 98424

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

DATA QUALIFIERS AND ABBREVIATIONS

B1: This analyte was detected in the associated method blank. The analyte concentration was determined not to be significantly higher than the associated method blank (less than ten times the concentration reported in the blank).

B2: 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 (greater than ten times the concentration reported in the blank).

C1: Second column confirmation was performed. The relative percent difference value (RPD) between the results on the two columns was evaluated and determined to be < 40%.

C2: Second column confirmation was performed. The RPD between the results on the two columns was evaluated and determined to be > 40%. The higher result was reported unless anomalies were noted.

C3: Second analysis confirmation was performed. The relative percent difference value (RPD) between the results on the two columns was evaluated and determined to be ≤ 30%.

C4: Second analysis confirmation was performed. The RPD between the results on the two columns was evaluated and determined to be > 30%. The presence of this analyte was not verified per WAC 246-290-010. The original analysis was reported unless anomalies were noted.

M: GC/MS confirmation was performed. The result derived from the original analysis was reported.

D: The reported result for this analyte was calculated based on a secondary dilution factor.

E: The concentration of this analyte exceeded the instrument calibration range and should be considered an estimated quantity.

J: The analyte was analyzed for and positively identified, but the associated numerical value is an estimated quantity.

MCL: Maximum Contaminant Level

MDL: Method Detection Limit

MRL: Method Reporting Limit

N: See analytical narrative

ND: Not Detected

PQL: Practical Quantitation Limit

X1: Contaminant does not appear to be "typical" product. Elution pattern suggests it may be _____.

X2: Contaminant does not appear to be "typical" product.

X3: Identification and quantitation of the analyte or surrogate was complicated by matrix interference.

X4: RPD for duplicates was outside advisory QC limits. The sample was re-analyzed with similar results. The sample matrix may be nonhomogeneous.

X4a: RPD for duplicates outside advisory QC limits due to analyte concentration near the method practical quantitation limit/detection limit.

X5: Matrix spike recovery was not determined due to the required dilution.

X6: Recovery and/or RPD values for matrix spike(/matrix spike duplicate) outside advisory QC limits. Sample was re-analyzed with similar results.

X7: Recovery and/or RPD values for matrix spike(/matrix spike duplicate) outside advisory QC limits. Matrix interference may be indicated based on acceptable blank spike recovery and/or RPD.

X7a: Recovery and/or RPD values for this spiked analyte outside advisory QC limits due to high concentration of the analyte in the original sample.

X8: Surrogate recovery was not determined due to the required dilution.

X9: Surrogate recovery outside advisory QC limits due to matrix interference.

2.8°C

SUBCONTRACT ORDER

129066

North Creek Analytical - Portland

P5G0989

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

Analysis	Due	Expires	Laboratory ID	Comments
Sample ID: P5G0989-01	**Soil**	**Sampled:07/25/05 11:28**		**See City of Portland COC**
Solids, Dry Weight	08/01/05 16:00	08/22/05 11:28		
8270C Semivolatiles	08/08/05 16:00	08/08/05 11:28		
8082 PCB	08/08/05 16:00	08/08/05 11:28		
Containers Supplied:				
4 oz. jar (A)	4 oz. jar (B)			
Sample ID: P5G0989-02	**Soil**	**Sampled:07/25/05 12:07**		**See City of Portland COC**
Solids, Dry Weight	08/01/05 16:00	08/22/05 12:07		
8270C Semivolatiles	08/08/05 16:00	08/08/05 12:07		
8082 PCB	08/08/05 16:00	08/08/05 12:07		
Containers Supplied:				
4 oz. jar (A)	4 oz. jar (B)			
Sample ID: P5G0989-03	**Soil**	**Sampled:07/25/05 12:43**		**See City of Portland COC**
Solids, Dry Weight	08/01/05 16:00	08/22/05 12:43		
Hg Total 7471A	08/08/05 16:00	08/22/05 12:43		
Containers Supplied:				
4 oz. jar (A)				
Sample ID: P5G0989-04	**Soil**	**Sampled:07/25/05 13:20**		**See City of Portland COC**
Solids, Dry Weight	08/01/05 16:00	08/22/05 13:20		
Hg Total 7471A	08/08/05 16:00	08/22/05 13:20		
Containers Supplied:				
4 oz. jar (A)				

Released By	Date	Received By	Date
[signature]	7/26/05	[signature]	7/27/5 900
Released By	Date	Received By	Date 22

11720 North Creek Pkwy N Suite 400, Bothell, WA 98011-8244 425-420-9200 FAX 420-9210
11922 E 1st Ave, Spokane, WA 99206-5302 509-924-9200 FAX 924-9290
9405 SW Nimbus Ave, Beaverton, OR 97008-7145 503-906-9200 FAX 906-9210 [X]
20332 Empire Ave, Ste F1, Bend, OR 97701-5712 541-383-9310 FAX 382-7588
2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

CHAIN OF CUSTODY REPORT

Work Order #: PG0515

NCA CLIENT: CITY OF PORTLAND
REPORT TO: TENN
ADDRESS:
PHONE: FAX:

INVOICE TO: CHARLES LYTLE
P.O. NUMBER: 40567

PROJECT NAME: PORTLAND HARBOR
PROJECT NUMBER: JOINT
SAMPLED BY:

TURNAROUND REQUEST in Business Days *

Organic & Inorganic Analyses: [10 STD.] [7] [5] [4] [3] [2] [1] [<1]

Petroleum Hydrocarbon Analyses: [5 STD.] [4] [3] [2] [1] [<1]

[OTHER] Specify:

* Turnaround Requests less than standard may incur Rush Charges.

PRESERVATIVE: Cool | Sin - LHS

REQUESTED ANALYSES: PCB EPA 8082 | EPA 8270 SIM SEMS-VOC | Hg EPA 7471

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	PCB EPA 8082	EPA 8270 SIM SEMS-VOC	Hg EPA 7471	MATRIX (W, S, O)	# OF CONT.	LOCATION / COMMENTS	NCA WO ID
1	PO 050757	7/25/05 1128	X	X		S	2		
2	PO 050758	1207	X	X		S	2		
3	PO 050759	1243			X	S	1		
4	PO 050760	1320			X	S	1		
5									
6									
7									
8									
9									
10									

RELEASED BY: [signature] DATE: 7/25/05
PRINT NAME: KRIS DENNIS FIRM: COP TIME: 1430

RECEIVED BY: [signature] DATE: 7/25/05
PRINT NAME: [illegible] FIRM: NCA TIME: 14:32

RELEASED BY: [signature] DATE: 7/25/05
PRINT NAME: Bob F FIRM: NCA TIME: 16:30

RECEIVED BY: [signature] DATE: 7-25-05
PRINT NAME: EMIL JENSEN FIRM: NCA TIME: 16:30

ADDITIONAL REMARKS:

TEMP: 5.5

COC REV 09/04

PAGE OF