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

TECHNICAL MEMORANDUM No. OF46-1

City Outfall Basin 46
Inline Solids Sampling in the Vicinity of the Union Pacific Railroad Albina Yard

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DATE: June 28, 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 entering the south branch of the City Outfall Basin 46 stormwater conveyance system. The south branch receives stormwater flow from portions of the Union Pacific Railroad (UPRR) Albina Yard (UPRR site), the adjacent North Greeley Avenue and North Interstate Avenue rights-of-way, and an upstream area containing mixed commercial and residential uses. This investigation, conducted in August 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

Outfall Basin 46 is included in the expanded Portland Harbor Study Area; the purpose of this investigation is to provide DEQ with a recommendation for prioritization of this basin in accordance with the Programmatic Work Plan for the City of Portland Outfalls Project. The objective of this investigation is to evaluate potentially significant contaminant sources within the basin through analysis of inline solids.

By 2011, the City is planning to divert a large portion of the south branch of the conveyance system that is upstream of the UPRR site to the new East Side Combined Sewer Overflow (CSO) Tunnel.

Background

Figure 1 provides an overview of the portion of the Outfall Basin 46 stormwater conveyance system adjacent to the Willamette River shoreline. Outfall 46 is connected to an 80-inch-diameter brick stormwater main that extends inland across the UPRR Albina Yard toward N. Greeley Avenue. Three main branches merge into this 80-inch-diameter line near the western edge of North Greeley Avenue: a northeast branch that drains a subbasin located east of North Greeley Avenue, a northwest branch that drains a subbasin located to the north, and the south branch that drains the southern subbasin. Following completion of the CSO separation project, flows from the area of the southern subbasin generally east of N. Greeley Avenue will routed to the wastewater treatment plant.

Inline solids were not observed in the 80-inch-diameter main line. Therefore, the focus of this investigation is on the 66-inch-diameter south branch that receives stormwater flow from the majority of the basin, including: portions of the UPRR site, the North Greeley Avenue and North Interstate Avenue rights-of-way, and the area upstream of the rail yard connections that includes mixed commercial and residential uses.

According to the DEQ Environmental Cleanup Site Information (ECSI) database, two DEQ cleanup sites had or currently have connections to the south branch of the Outfall Basin 46 stormwater conveyance system below the planned CSO diversion point: the Industrial Battery Building site and the UPRR site. Six additional ECSI sites are located in the upstream CSO portion of the basin.

The Industrial Battery Building DEQ cleanup site (ECSI No. 935) is located at 3166 N. Greeley Avenue, upstream of the UPRR site (see Figure 1). Following the detection of high levels of lead in soil at the site, the contaminated soil was removed and the DEQ issued a No Further Action (NFA) determination in 1995 (DEQ, 2005a). Plumbing records indicate that the Industrial Battery facility had a historical connection to the City stormwater conveyance system on N. Greeley Ave. The stormwater pathway likely was not evaluated before issuance of the NFA.

In 2000, DEQ conducted an Expanded Preliminary Assessment at the UPRR site, which included collection of four surface sediment samples and three core samples from the Willamette River offshore of the UPRR site (Jacobs Engineering, 2000). One sample (SD-3) was collected just off of Outfall 46 and downstream from the dock. This sample was analyzed for petroleum hydrocarbons, semivolatile organic compounds (SVOCs), metals, polychlorinated biphenyls (PCBs), and tributyltin (TBT). The Lower Willamette Group (LWG) subsequently collected an extensive set of surface (grab) and subsurface (core) river sediment samples during Round 2 of the Portland Harbor Remedial Investigation (RI) in 2004 (Integral, 2005). Figure 2 shows LWG's Round 2 Willamette River sediment samples collected adjacent to Outfall 46 as well as two of the sediment samples collected by DEQ. Table 1 summarizes the chemical analytical results of the LWG and UPRR river sediment samples collected near Outfall 46.

Based on available records, stormwater from the UPRR site enters the south branch of Outfall Basin 46 at three locations (see Figure 3). At manhole AAX588, a 24-inch-diameter lateral owned by UPRR discharges stormwater collected from the east and north sides of the rail yard freight

house to the City 66-inch-diameter stormwater main. The UPRR stormwater sampling manhole (UPRR SW SMH #1) is located on the 24-inch-diameter private pipe approximately 250 feet upstream from the inlet to the City's stormwater conveyance system. The south branch also receives stormwater flow from two small subbasin areas on the east and west sides of the 66-inch-diameter stormwater main, downstream of where the UPRR site's 24-inch-diameter lateral enters the system. The eastern branch consists of a 12-inch-diameter line, which drains a portion of the UPRR site adjacent to North Greeley Avenue and catch basins on North Greeley Avenue; this line discharges to the 66-inch-diameter main at manhole AAX585. The western branch is a 12-inch-diameter line that drains a container staging area in the UPRR site and discharges to the 66-inch-diameter main at manhole AAX579.

During the summer of 2005, UPRR moved a portion of the City stormwater line located at the UPRR site to facilitate a track realignment project. In addition, UPRR also sampled and cleaned portions of its onsite stormwater collection system. Preliminary details provided to DEQ regarding the stormwater system do not clarify all the existing connections of the UPRR system to Outfall Basin 46.

According to the ECSI Site Summary Report for the UPRR site (ECSI Site No. 178), contaminants of interest at the site include petroleum hydrocarbons, phthalates, and metals (DEQ, 2005b). Site investigation and cleanup activities at the UPRR site related to freight car repair, paint stripping, and fuel storage and transfer operations have been conducted primarily in the southern portion of the rail yard (Jacobs, 2000). UPRR has sampled stormwater at the site, including collection of a sample from the UPRR stormwater conveyance system located near the freight house that discharges to the Outfall 46 stormwater conveyance system. Petroleum hydrocarbons, polynuclear aromatic hydrocarbons (PAHs), and metals (copper, lead, mercury, and zinc) were analyzed and detected in the sample (CDM, 2002).

By 2011, the City plans to complete modifications in the upstream portions of the Outfall Basin 46 stormwater conveyance system as part of the East Side CSO Tunnel Project. After these modifications are completed, runoff to the conveyance system will come from the portions of the UPRR site that are connected to the City system and several catch basins located on North Greeley Avenue. The current upstream portions of the outfall basin, including where the Industrial Battery Building site is located, will no longer discharge to Outfall 46.

Field Activities

The City coordinated with DEQ regarding this source control investigation before conducting this work. Inline solids were sampled at four separate locations (see Figures 3 - 5) by the BES Field Operations section between approximately 11 a.m. and 2 p.m. on August 2, 2005. Sampling locations were limited by inline solids availability. Samples were collected using a stainless steel spoon and bowl, in accordance with BES Field Operations' Standard Operating Procedures. Photographs of the sampling locations and solids are included in Attachment A. Field notes taken during sampling activities are provided in Attachment B.

Four samples were collected, each representing a different portion of the basin. Sampling locations are described as follows:

Upstream Stormwater Main (Manhole AAX611): Inline solids were sampled approximately 40 feet upstream from manhole AAX611, where a 12-inch-diameter branch enters the main conveyance line. This sample represents solids entering the stormwater conveyance system

upstream of discharges from the UPRR site, including runoff from the North Greeley Avenue right-of-way, upstream residential/commercial areas, and an industrial area where the Industrial Battery site is located.

Albina Yard (UPRR SW SMH #1): Sufficient solids were available to sample directly from manhole UPRR SW SMH #1. This is the designated sampling location for NPDES stormwater permit compliance, and is located in the UPRR lateral that drains the area of the yard near the freight warehouse as well as truck parking areas.

East Branch (Manhole AAX582): Solids were collected from a branch on the east side of the main line at manhole AAX582. This branch drains catch basins on North Greeley Avenue and the eastern edge of the UPRR site. Solids collected at this location had a slight petroleum odor.

West Branch (Manhole AAX580): Solids were collected just upstream from manhole AAX580, representing material from a small branch to the west of the main line, which originates in a container staging area at the UPRR site. Solids collected at this location had a slight petroleum odor.

Summary of Results

The four inline solids samples obtained from Outfall Basin 46 were analyzed for metals, SVOCs, and total petroleum hydrocarbons. The laboratory analytical results and data validation report for the samples are provided in Attachment C. Data validation qualified the SVOC concentrations for all samples as estimated due to matrix interference. Table 2 summarizes the chemical analytical data results. Figures 3 - 5 show the sample locations with a summary of the analytical results.

The chemical data from the Outfall Basin 46 sampling were compared with the Portland Harbor Joint Source Control Strategy (JSCS) (DEQ/EPA, 2005) screening level values (SLVs) for bioaccumulation and toxicity, and DEQ Default Background Concentrations (DEQ, 2002). The results of the comparisons are summarized as follows:

- Various metals concentrations in all four samples exceeded the DEQ background concentrations for soil and JSCS bioaccumulation SLVs. Only zinc exceeded the JSCS toxicity SLV.
- Bis(2-ethylhexyl)phthalate and di-n-butyl phthalate were the only SVOC constituents that were detected at concentrations greater than JSCS SLVs.
- Motor-oil range petroleum hydrocarbons were detected in all samples with concentrations ranging from 514 milligrams per kilogram (mg/kg) to 2,990 mg/kg. JSCS SLVs for total petroleum hydrocarbons have not been established.

Conclusions and Recommendations

The investigation results indicated that solids discharged to the Outfall 46 conveyance system, both at and upstream of the UPRR site, contained metals and phthalates at concentrations that exceeded both DEQ background concentrations and JSCS SLVs. All exceedances, with the exception of the lead concentration at manhole AAX582, were less than two times the JSCS

toxicity SLV. Although this source investigation did not identify significant differences between the sample locations, two observations can be made:

- While the lead concentration in the upstream City main sample exceeds the JSCS SLV, the concentration does not differ greatly from those detected in other downstream branches, suggesting that there is not a current signal from the Industrial Battery site.
- Concentrations of metals, PAHs, and petroleum hydrocarbons in solids from the two downstream sampling locations are generally higher than in the upstream sample and the UPRR stormwater sampling manhole.

The City's East Side CSO Tunnel Project includes will redirect a majority of the stormwater flow upstream of the UPRR site to the CSO tunnel. Following these modifications, stormwater runoff to this branch of the Outfall Basin 46 conveyance system will include only runoff from portions of the UPRR site and a limited number of catch basins on North Greeley Avenue. This source control action is expected to reduce loading of the constituents identified in the upstream sample.

A comparison of sediment data collected at Outfall 46, with sediment data collected upstream and downstream of the outfall, indicates that Outfall 46 does not have a significant contaminant contribution to river sediment in the vicinity of the outfall. Contaminant concentrations in sediment samples obtained near and downstream of the outfall are not appreciably different from those detected upstream. None of the outfall sediment concentrations exceeded the JSCS toxicity SLVs, and although some metals exceeded the JSCS bioaccumulation SLVs they were below DEQ in-river baseline concentrations.

Outfall Basin 46 was not included in the Initial Study Area (ISA), and therefore has not been prioritized. With the expansion of the Study Area to river mile 11, the City recommends that Outfall Basin 46 be classified as a Priority 4 basin, based on the results of in-water sediment sampling and this stormwater system solids investigation. The City defines a Priority 4 outfall basin as one that does not appear to be a significant pathway for contamination based on the current data.

References

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DEQ. 2005a. DEQ Site Summary Report – Details for ECSI Site No. 935. DEQ Environmental Cleanup Site Information Database (ECSI). Accessed November 2005. www.deq.state.or.us/wmc/ECSI/ecsidetail.asp?seqnbr=935

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Jacobs Engineering. 2000. Preliminary Assessment and Expanded Preliminary Assessment Work Plan. Union Pacific Railroad Albina Rail Yard. Portland, Oregon. Prepared for ODEQ. July 2000.

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

Table

Figures

Attachments

Table 1
Summary of Inriver Sediment Chemical Analytical Results
City Outfall Basin 46

		Upstream		At Outfall	Downstream					
Location (ft from OF along shore)		450' up	50' up		540' down		JSCS Catch Basin Toxicity SLVs[2]	JSCS Catch Basin Bioacc SLVs[2]	DEQ Inriver Baseline[3]	DEQ Background Concentrations
(ft offshore)		50' out	River-side of dock	Even with dock	50' out	(near UPRR #4)				
Sample ID		LW2-G507	LW2-G505	SD-3	LW2-G502	LW2-G500				Freshwater Sediment
Sample Date		9/3/2004	9/3/2004	8/9/2000	9/3/2004	9/3/2004				
Depth		0-20 cm	0-22 cm	NA	0-20 cm	0-26 cm				
Analyte	**Units[1]**									
Total Orgainc Carbon	%	1.09	0.88	0.93	0.23	1.65			20000	
Metals										
Aluminum	mg/kg	24700	6760	--	7190	23400	--	--	42800	--
Antimony	mg/kg	0.08 J	0.1 J	0.40	0.1 J	0.07 J	64	10	5	1
Arsenic	mg/kg	3.35 J	1.27 J	2.7	3.07 J	3.01 J	33	--	5	7.9
Cadmium	mg/kg	**0.148**	**0.375**	**0.27**	**0.088**	**0.181**	4.98	0.003	0.6	0.5
Chromium	mg/kg	28.8	12.7	16.2	10.1	25.5	111	4200	41	30
Copper	mg/kg	**26.6**	**32**	**45.0**	**16**	**28.2**	149	10	60	12
Lead	mg/kg	9.73	30.4	24.7	21.1	16.4	128	128	30	2
Mercury	mg/kg	0.053	0.144	0.06	0.01 J	0.045	1.06	--	0.1	0.2
Nickel	mg/kg	23.9	12.5	19.9	12.6	22.9	48.6	316	32	20
Selenium	mg/kg	**0.11**	0.07 J	**2.2**	0.03 J	0.06	5	0.1	15	0.4
Silver	mg/kg	0.088	0.224	0.17	0.04	0.22	5	--	1.4	0.4
Zinc	mg/kg	**78.6**	**203**	**117**	**47.6**	**86.9**	459	3	118	53
Pesticides										
2,4'-DDD	ug/kg	0.627 NJ	5.36 U	--	0.492 U	0.854 NJ	--	--	--	
2,4'-DDE	ug/kg	0.228 J	5.36 U	--	0.492 U	0.609 NJ	--	--	--	
2,4'-DDT	ug/kg	0.103 J	5.36 U	--	0.492 U	0.639 U	--	--	--	
4,4'-DDD	ug/kg	**0.392**	*5.36 U*	--	*0.492 U*	**0.694** J	28	0.3	--	
4,4'-DDE	ug/kg	**0.678**	*5.36 U*	--	*0.492 U*	**0.776** J	31.3	0.3	--	
4,4'-DDT	ug/kg	*0.329 UJ*	*5.36 UJ*	--	*0.492 UJ*	*1.65 UJ*	62.9	0.3	--	
Estimated Total DDT	ug/kg	**1.07**	ND	--	ND	**1.47**	--	0.3	220	
alpha-BHC (α-BHC)[4]	ug/kg	0.121 U	5.36 U	--	0.492 U	0.639 U	--	--	--	
beta-BHC (β-BHC)[4]	ug/kg	0.121 U	5.36 U	--	0.492 U	0.639 U	--	--	--	
delta-BHC (δ-BHC)[4]	ug/kg	0.121 UJ	5.36 UJ	--	0.492 UJ	0.639 UJ	--	--	--	
gamma-BHC (γ-BHC, Lindane)[4]	ug/kg	0.121 U	*5.36* U	--	0.492 U	0.639 U	4.99	--	--	
Aldrin	ug/kg	0.121 UJ	5.36 UJ	--	0.492 UJ	0.639 UJ	40	--	--	
cis-Chlordane	ug/kg	0.076 J	5.36 U	--	0.492 U	0.639 U	17.6	--	--	
trans-Chlordane	ug/kg	0.35 NJ	7.04 J	--	0.492 U	0.273 NJ	17.6	--	--	
Dieldrin	ug/kg	0.121 U	5.36 U	--	0.492 U	0.639 U	61.8	--	--	
alpha-Endosulfan	ug/kg	0.121 U	5.36 U	--	0.492 U	0.639 U	--	--	--	
beta-Endosulfan	ug/kg	0.121 U	5.36 U	--	0.492 U	0.639 U	--	--	--	
Endosulfan sulfate	ug/kg	0.121 UJ	5.36 UJ	--	0.492 UJ	0.639 UJ	--	--	--	
Endrin	ug/kg	--	**--**	--	**--**	**--**	207	--	--	
Endrin aldehyde	ug/kg	0.121 U	5.36 U	--	0.492 U	0.639 U	--	--	--	
Endrin ketone	ug/kg	0.121 U	5.36 U	--	0.397 NJ	1.88 NJ	--	--	--	
Heptachlor	ug/kg	0.121 U	5.36 U	--	0.492 U	0.639 U	10	--	--	
Heptachlor epoxide	ug/kg	0.121 U	5.36 U	--	0.492 U	0.639 U	16	--	--	
Methoxychlor	ug/kg	0.121 UJ	5.36 UJ	--	0.492 UJ	0.639 UJ	--	--	--	
Mirex	ug/kg	0.121 U	5.36 U	--	0.492 U	0.639 U	--	--	--	
cis-Nonachlor	ug/kg	0.121 U	5.36 U	--	0.492 U	0.639 U	--	--	--	
trans-Nonachlor	ug/kg	0.054 J	5.36 U	--	0.492 U	0.639 U	--	--	--	
Oxychlordane	ug/kg	0.121 U	5.36 U	--	0.492 U	0.639 U	--	--	--	
Toxaphene	ug/kg	15.1 U	670 U	--	61.5 U	79.9 U	--	--	--	
PCBs										
Aroclor 1016	ug/kg	1.5 U	13.4 UJ	10 U	1.2 U	1.6 U	530	420	--	
Aroclor 1221	ug/kg	2.78 U	13.4 UJ	20 U	2.23 U	2.97 U	--	--	--	
Aroclor 1232	ug/kg	2.51 U	13.4 UJ	15 U	2.01 U	2.68 U	--	--	--	
Aroclor 1242	ug/kg	1.53 U	*13.4 UJ*	*10 U*	1.22 U	1.63 U	--	2	--	
Aroclor 1248	ug/kg	1.96 U	*13.4 UJ*	*10 U*	1.57 U	**4.61**	1500	4	--	
Aroclor 1254	ug/kg	0.912 U	**45.5** J	9 J	**22.4** J	**24.7** J	300	10	--	
Aroclor 1260	ug/kg	7.56 J	13.4 UJ	6 J	12.2 J	14.6	200	--	--	
Aroclor 1262	ug/kg	1.4 U	13.4 UJ	**--**	1.12 U	1.5 U	--	--	--	
Aroclor 1268	ug/kg	1.2 UJ	13.4 UJ	--	0.965 UJ	1.29 UJ	--	--	--	
Estimated Total PCBs	ug/kg	7.56	45.5	15	34.6	43.91	676	--	180	
Phthalates										
Bis(2-ethylhexyl) phthalate	ug/kg	46 UJ	*1100 UJ*	200	25 UJ	**340** J	800	330	390	
Butylbenzyl phthalate	ug/kg	2.7 UJ	2 UJ	3 J	2 UJ	2.7 UJ	--	--	20	
Dibutyl phthalate	ug/kg	5.8 J	3.3 UJ	9 J	3.7 J	15 J	100	--	20	
Diethyl phthalate	ug/kg	6.3 UJ	4.5 UJ	2 J	4.5 UJ	6.3 UJ	600	--	--	
Dimethyl phthalate	ug/kg	3.3 UJ	2.3 UJ	0.6 J	2.3 UJ	3.3 UJ	--	--	20	
Di-n-octyl phthalate	ug/kg	2.2 UJ	1.6 UJ	280 U	1.6 UJ	2.2 UJ	--	--	20	
PAHs										
2-Methylnaphthalene	ug/kg	3.4 U	4.8	1 J	1.3 J	20	200	--	150	
Acenaphthene	ug/kg	1.1 J	3.2	14 U	0.34 J	45	300	--	180	
Acenaphthylene	ug/kg	3 J	7.1	10 J	1.4 J	35	200	--	60	
Anthracene	ug/kg	3.2 J	10	16 J	1.3 J	120	845	--	150	
Benz(a)anthracene	ug/kg	11	44	25	3.9	450	1050	--	360	
Benzo(a)pyrene	ug/kg	14	50	17	7.2	610	1450	--	500	
Benzo(b)fluoranthene	ug/kg	17	74	23 J	8.3	650	--	--	--	
Benzo(g,h,i)perylene	ug/kg	13	90	10 J	15	450	300	--	250	
Benzo(k)fluoranthene	ug/kg	5.7	20	9 J	3	200	13000	--	--	
Chrysene	ug/kg	15	40	27	9.7	680	1290	--	425	
Dibenz(a,h)anthracene	ug/kg	2.5 J	18	3 J	2.4 J	85	1300	--	125	
Fluoranthene	ug/kg	22	92	71 J	6.4	1000	2230	--	600	
Fluorene	ug/kg	1.5 J	3.8	7 J	0.44 J	32	536	--	125	
Indeno(1,2,3-cd)pyrene	ug/kg	12	70	10 J	10	480	100	--	225	
Naphthalene	ug/kg	11 U	9.7	4 J	2.3 U	45	561	--	200	
Phenanthrene	ug/kg	11	36	55 J	2.9	660	1170	--	700	
Pyrene	ug/kg	22	69	55 J	6.7	1200	1520	--	700	
Estimated Total PAHs	ug/kg	154	641.6	343	80.28	6762	--	--	--	

		Upstream		At Outfall	Downstream					
Location (ft from OF along shore)		450' up	50' up		540' down					
(ft offshore)		50' out	River-side of dock	Even with dock	50' out	(near UPRR #4)				
Sample ID		LW2-G507	LW2-G505	SD-3	LW2-G502	LW2-G500	JSCS Catch Basin Toxicity SLVs[2]	JSCS Catch Basin Bioacc SLVs[2]	DEQ Inriver Baseline[3]	DEQ Background Concentrations
Sample Date		9/3/2004	9/3/2004	8/9/2000	9/3/2004	9/3/2004				Freshwater Sediment
Depth		0-20 cm	0-22 cm	NA	0-20 cm	0-26 cm				
Analyte	**Units[1]**									
Phenolic SVOCs										
2,3,4,5-Tetrachlorophenol	ug/kg	5.2 U	3.7 U	--	3.7 U	5.3 U	--	--	--	
2,3,4,6;2,3,5,6-Tetrachlorophenol coelution	ug/kg	3.3 U	2.3 U	--	2.3 U	3.3 U	--	--	--	
2,4-Dichlorophenol	ug/kg	3.3 UJ	2.3 UJ	140 U	2.3 UJ	3.3 UJ	--	--	--	
2,4-Dimethylphenol	ug/kg	9.9 UJ	7 UJ	280 U	7 UJ	9.9 UJ	--	--	--	
2,4-Dinitrophenol	ug/kg	65 UJ	46 UJ	420 U	46 UJ	65 UJ	--	--	--	
2,4,5-Trichlorophenol	ug/kg	2.6 U	1.9 U	71 U	1.9 U	2.7 U	--	--	--	
2,4,6-Trichlorophenol	ug/kg	3.3 U	2.3 U	71 U	2.3 U	3.3 U	--	--	--	
2-Chlorophenol	ug/kg	3.1 UJ	2.2 UJ	71 U	2.2 UJ	3.1 UJ	--	--	--	
2-Methylphenol	ug/kg	6.1 UJ	4.4 UJ	280 U	4.4 UJ	6.2 UJ	--	--	--	
2-Nitrophenol	ug/kg	4.7 UJ	3.3 UJ	71 U	3.3 UJ	4.7 UJ	--	--	--	
4,6-Dinitro-2-methylphenol	ug/kg	3.1 UJ	2.2 UJ	280 U	2.2 UJ	3.1 UJ	--	--	--	
4-Chloro-3-methylphenol	ug/kg	3.8 UJ	2.7 UJ	71 U	2.7 UJ	3.8 UJ	--	--	--	
4-Methylphenol	ug/kg	5.2 UJ	66 J	280 U	3.7 UJ	9.5 J	--	--	680	
4-Nitrophenol	ug/kg	54 UJ	39 UJ	140 U	39 UJ	54 UJ	--	--	--	
Pentachlorophenol	ug/kg	3.5 U	4.7 U	420 U	2.5 U	3.6 U	1000	--	97	
Phenol	ug/kg	7.4 UJ	5.1 UJ	*71 U*	2.5 UJ	6.7 UJ	50	--	20	
Organonitrogen SVOCs										
Nitrobenzene	ug/kg	3.6 UJ	2.6 UJ	14 U	2.6 UJ	3.6 UJ	--	--	--	
Aniline	ug/kg	2.7 UJ	2 UJ	--	2 UJ	2.7 UJ	--	--	--	
2-Nitroaniline	ug/kg	4.9 UJ	3.5 UJ	14 U	3.5 UJ	4.9 UJ	--	--	--	
3-Nitroaniline	ug/kg	4.7 UJ	3.3 UJ	280 U	3.3 UJ	4.7 UJ	--	--	--	
4-Nitroaniline	ug/kg	6.1 UJ	4.4 UJ	140 U	4.4 UJ	6.2 UJ	--	--	--	
2,4-Dinitrotoluene	ug/kg	5 UJ	3.6 UJ	71 U	3.6 UJ	5.1 UJ	--	--	--	
2,6-Dinitrotoluene	ug/kg	5 UJ	3.6 UJ	28 U	3.6 UJ	5.1 UJ	--	--	--	
4-Chloroaniline	ug/kg	3.8 UJ	2.7 UJ	71 U	2.7 UJ	3.8 UJ	--	--	--	
Carbazole	ug/kg	2.4 UJ	5 J	7 J	1.7 UJ	33 J	1600	--	100	
N-Nitrosodimethylamine	ug/kg	11 UJ	7.8 UJ	--	7.8 UJ	11 UJ	--	--	--	
N-Nitrosodiphenylamine	ug/kg	4 UJ	2.8 UJ	14 U	2.8 UJ	4 UJ	--	--	--	
N-Nitrosodipropylamine	ug/kg	5.8 UJ	4.1 UJ	14 U	4.1 UJ	5.8 UJ	--	--	--	
Halogenated SVOCs										
1,2,4-Trichlorobenzene	ug/kg	2.7 UJ	2 UJ	14 U	2 UJ	2.7 UJ	9200	--	--	
1,2-Dichlorobenzene	ug/kg	2.4 UJ	1.7 UJ	14 U	1.7 UJ	2.4 UJ	1700	--	--	
1,3-Dichlorobenzene	ug/kg	2.9 UJ	2.1 UJ	14 U	2.1 UJ	2.9 UJ	300	--	--	
1,4-Dichlorobenzene	ug/kg	3.4 UJ	730 J	10 J	2.5 UJ	3.5 UJ	300	--	--	
2-Chloronaphthalene	ug/kg	6.5 UJ	4.6 UJ	--	4.6 UJ	6.5 UJ	--	--	--	
3,3'-Dichlorobenzidine	ug/kg	6.7 UJ	4.7 UJ	90 U	4.7 UJ	6.7 UJ	--	--	--	
4-Bromophenyl phenyl ether	ug/kg	2.5 UJ	1.8 UJ	--	1.8 UJ	2.6 UJ	--	--	--	
4-Chlorophenyl phenyl ether	ug/kg	3.6 UJ	2.6 UJ	14 U	2.6 UJ	3.6 UJ	--	--	--	
Azobenzene	ug/kg	4.3 UJ	3.1 UJ	--	3.1 UJ	4.4 UJ	--	--	--	
Bis(2-chloroethoxy) methane	ug/kg	2.4 UJ	1.7 UJ	28 U	1.7 UJ	2.4 UJ	--	--	--	
Bis(2-chloroethyl) ether	ug/kg	4.3 UJ	3.1 UJ	14 U	3.1 UJ	4.4 UJ	--	--	--	
Bis(2-chloroisopropyl) ether	ug/kg	2.2 UJ	1.6 UJ	14 U	1.6 UJ	2.2 UJ	--	--	--	
Hexachlorobenzene	ug/kg	3.8 UJ	2.7 UJ	14 U	0.492 U	0.639 U	100	--	--	
Hexachlorocyclopentadiene	ug/kg	27 UJ	20 UJ	280 U	20 UJ	27 UJ	400	--	--	
Hexachlorobutadiene	ug/kg	0.121 UJ	1.8 UJ	14 U	0.492 UJ	0.639 UJ	600	--	--	
Hexachloroethane	ug/kg	0.121 UJ	5.36 UJ	57 U	0.492 UJ	0.639 UJ	--	--	--	
Oxygen-Containing SVOCs										
Benzoic acid	ug/kg	180 UJ	130 UJ	40 J	130 UJ	180 UJ	--	--	200	
Benzyl alcohol	ug/kg	6.7 UJ	4.7 UJ	71 U	4.7 UJ	6.7 UJ	--	--	20	
Dibenzofuran	ug/kg	1 U	2.4 J	2 J	0.41 J	21	--	--	100	
Isophorone	ug/kg	2.9 UJ	2.1 UJ	14 U	2.1 UJ	2.9 UJ	--	--	--	
TBT										
Tri-n-butylin Cation	mg/kg	--	--	3	--	--	--	--	--	
Di-n-butylin Cation	mg/kg	--	--	4	--	--	--	--	--	
n-butylin Cation	mg/kg	--	--	2	--	--	--	--	--	
Total Butylins	mg/kg	--	--	9	--	--	--	--	--	
TPH										
Diesel Range Hydrocarbons	mg/kg	--	--	84	--	--	--	--	--	
Gasoline Range Hydrocarbons	mg/kg	--	--	52 U	--	--	--	--	--	
Residual Range Hydrocarbons	mg/kg	--	--	360	--	--	--	--	--	

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.

[4]BHC = Hexachlorocyclohexane

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.

-- Analysis not run for this sample; No JSCS SLVs

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 2
Summary of Chemical Analytical Results
Inline Solids Sampling
City Outfall Basin 46

Upstream ----------> Downstream

Class	Analyte	Units	AAX611 IL-46-AAX611-0805 8/2/2005	UPRR SW SMH #1 UPRR SW SMH #1 8/2/2005	AAX582 IL-46-AAX582-0805 8/2/2005	AAX580 IL-46-AAX580-0805 8/2/2005	JSCS Screening Level (Toxicity)[5]	JSCS Screening Level (Bioaccumulation)[6]	DEQ Background Concentrations Soil
Metals (EPA 6020)									
	Arsenic	mg/Kg	2.49	2.47	5.45	2.98	33	--	7
	Barium	mg/Kg	88.5	67.7	123	112	--	--	--
	Cadmium	mg/Kg	1.15	1.32	1.51	1.92	4.98	0.003	1
	Chromium	mg/Kg	30.5	25.7	62.1	37.0	111	4200	42
	Copper	mg/Kg	91.5	87.8	103	142	149	10	36
	Lead	mg/Kg	165	65.5	538	124	128	128	17
	Nickel	mg/Kg	26.8	16.8	35.8	26.2	48.6	316	38
	Silver	mg/Kg	1.42	0.10 U	0.10	0.20	5	--	1
	Zinc	mg/Kg	798	626	460	583	459	3	86
Mercury (EPA 7471)									
	Mercury	mg/Kg	0.269	0.280	0.020 U	0.143	1.06	--	0.07
PAHs (EPA 8270-SIM)									
	2-Methylnaphthalene	µg/Kg	24.8 UJ	20.6 UJ	58.2 J	45 J	200	--	
	Acenaphthene	µg/Kg	24.8 UJ	20.6 UJ	108 J	21.2 UJ	300	--	
	Acenaphthylene	µg/Kg	41.9 J	20.6 UJ	74.1 J	46.9 J	200	--	
	Anthracene	µg/Kg	44.2 J	33.6 J	554 J	88.5 J	845	--	
	Benzo(a)anthracene	µg/Kg	24.8 UJ	20.6 UJ	370 J	196 J	1050	--	
	Chrysene	µg/Kg	24.8 UJ	20.6 UJ	165 J	209 J	1290	--	
	Dibenzo(a,h)anthracene	µg/Kg	24.8 UJ	20.6 UJ	22.7 J	21.2 UJ	1300	--	
	Fluoranthene	µg/Kg	233 J	20.6 UJ	1070 J	178 J	2230	--	
	Fluorene	µg/Kg	24.8 UJ	20.6 UJ	123 J	56.8 J	536	--	
	Naphthalene	µg/Kg	24.8 UJ	20.6 UJ	47.5 J	60 J	561	--	
	Phenanthrene	µg/Kg	90.3 J	84.4 J	415 J	117 J	1170	--	
	Pyrene	µg/Kg	180 J	103 J	1370 J	426 J	1520	--	
Phthalates (EPA 8270-SIM)									
	Bis(2-ethylhexyl)phthalate	µg/Kg	996 J	206 UJ	227 UJ	856 J	800	330	
	Di-n-butylphthalate	µg/Kg	124 UJ	103 UJ	172 J	106 UJ	100	--	
Total Petroleum Hydrocarbons - Hydrocarbon Identification (NWTPH-HCID Method)									
	Diesel	mg/Kg	50 U	50 U	50 U	50 U	--		
	Gasoline	mg/Kg	20 U	20 U	20 U	20 U	--		
	Heavy Fuel Oil	mg/Kg	100 U	100 U	Detected	Detected	--	--	
	Lube Oil	mg/Kg	Detected	Detected	Detected	Detected	--	--	
	Other	mg/Kg	100 U	100 U	100 U	100 U	--		
Total Petroleum Hydrocarbons - Diesel Extended Range (NWTPH-Dx Method)									
	#6 Fuel Oil	mg/Kg	250 U	250 U	2000 U	2000 U	--		
	Diesel	mg/Kg	125 U	125 U	1000 U	1000 U	--		
	Kerosene	mg/Kg	125 U	125 U	1000 U	1000 U	--		
	Motor Oil	mg/Kg	895	514	2370	2990	--	--	

Notes:

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

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

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

µg/Kg = Micrograms per Kilogram dry weight; mg/Kilogram = Milligrams per Kilogram dry weight

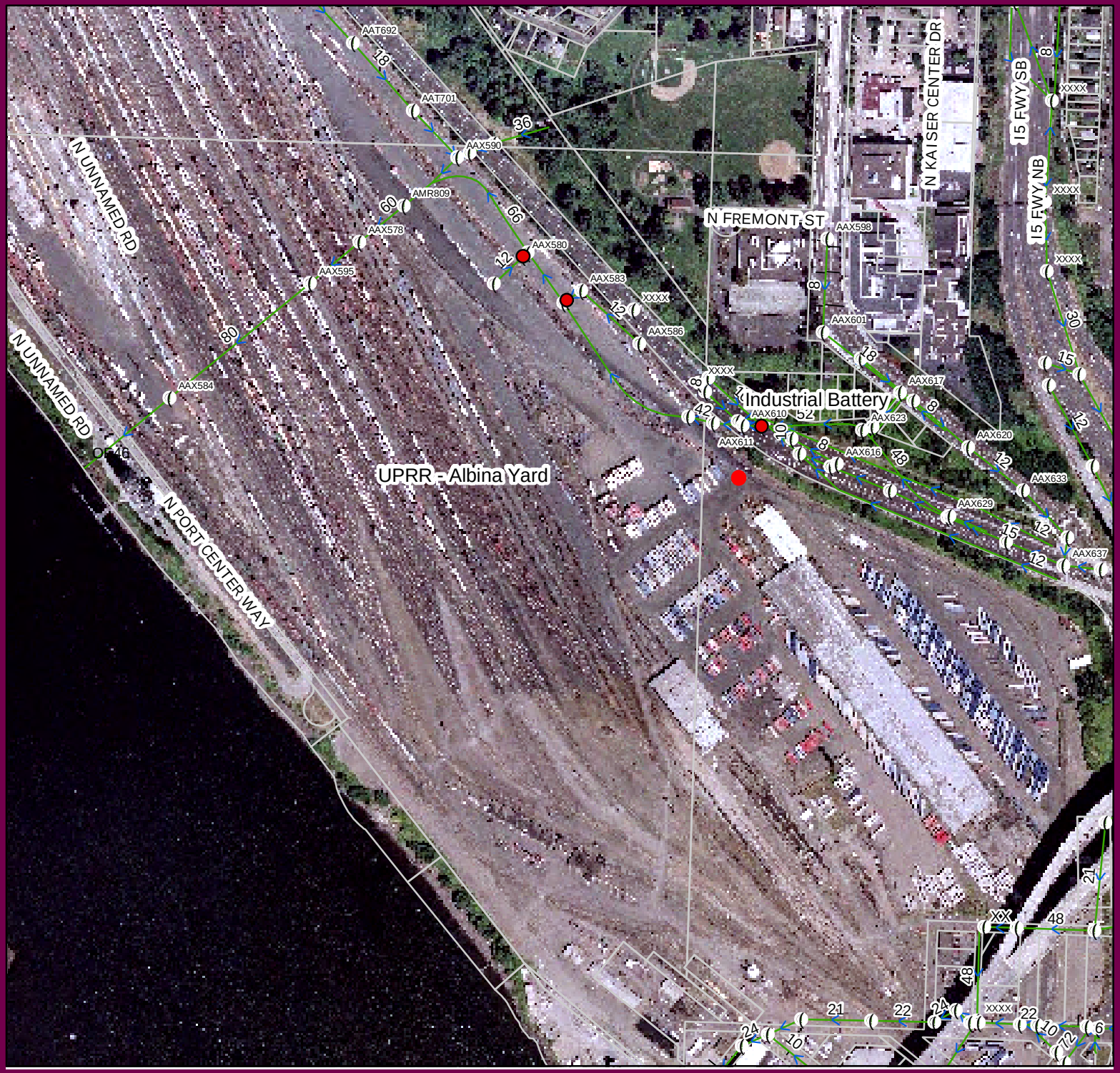
JSCS - Portland Harbor Joint Source Control Strategy (DEQ/EPA Final December 2005)

[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

-- No JSCS screening level available

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



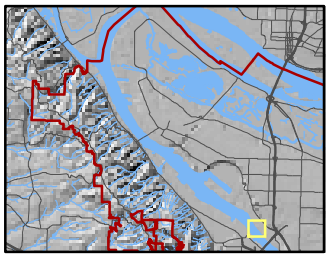
Legend

- Storm Pipe
- Manhole
- Taxlots
- Sample Location

0 250 500 1000 Feet

Figure 1
Outfall 46
Overview Map
Sample Date: 8/2/2005

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\outfall_46\ of46_figure1_021506_sg.mxd	**Program Manager:** Dawn Sanders Portland Harbor Superfund
Sheet No. 1 OF 1	**Date Printed:** 02/15/2006 **Prepared by:** Sara Gardner



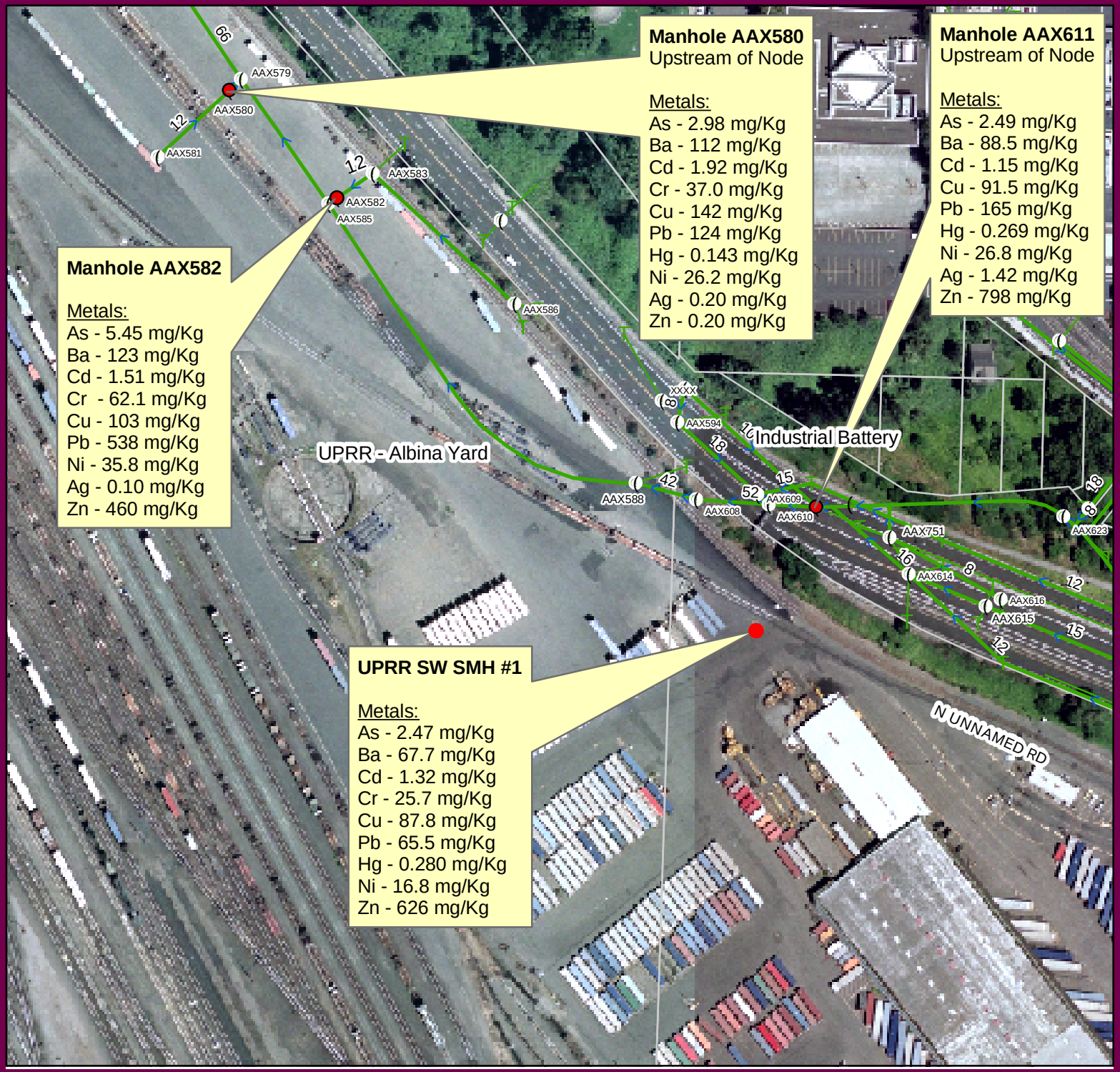
Legend

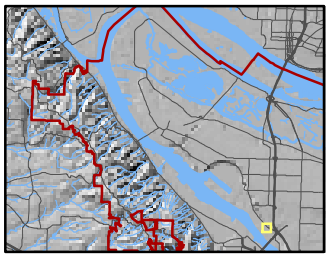
- Jacobs Engineering Group (for DEQ)
- LWG Round 2 Sample Location
- 5-feet Bathymetric Contour
- City Outfall
- Non-City Outfall

0 25 50 100 Feet

Figure 2
Outfall 46
LWG Round 2 and DEQ
River Sediment
Sampling Locations

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: d:\gis\outfalls\outfalls_46\ figure2.mxd	**Program Manager:** Dawn Sanders Portland Harbor Superfund
Sheet No. 1 OF 1	**Date Printed:** 06/02/06 **Prepared by:** Sara Gardner





Legend

- Storm Inlets
- Storm Pipe
- Manhole
- Taxlots
- Sample Location

0 250 500 1000 Feet

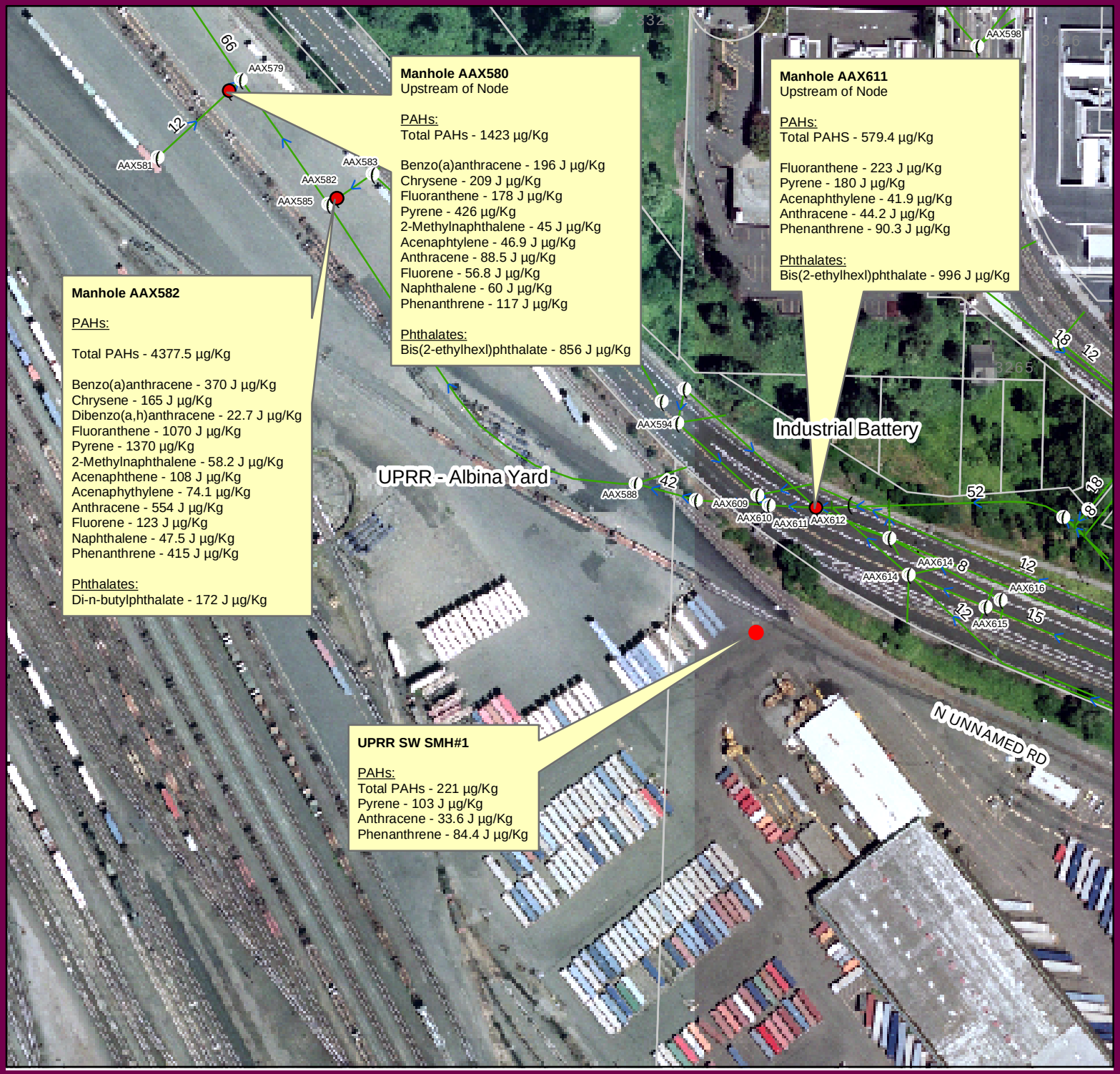
Note: Only detected constituents are shown.

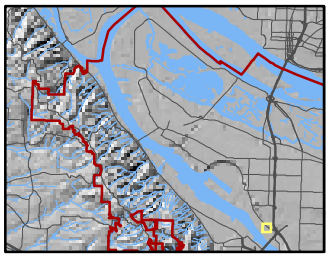
mg/Kg = milligrams/Kilogram dry weight

DEQ Environmental Cleanup Sites (ECSI) sites shown on map.

Figure 3
Outfall 46
Inline Solids Sampling
Metals
Sample Date: 8/2/2005

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\outfall_46\of46_figure3.mxd	Program Manager: Dawn Sanders Portland Harbor Superfund
Sheet No. 1 OF 1	Date Printed: 06/15/2006 Prepared by: Sara Gardner





Legend

- Storm Pipe
- Manhole
- Taxlots
- Sample Location

0 250 500 1000 Feet

Note: Only detected constituents are shown.

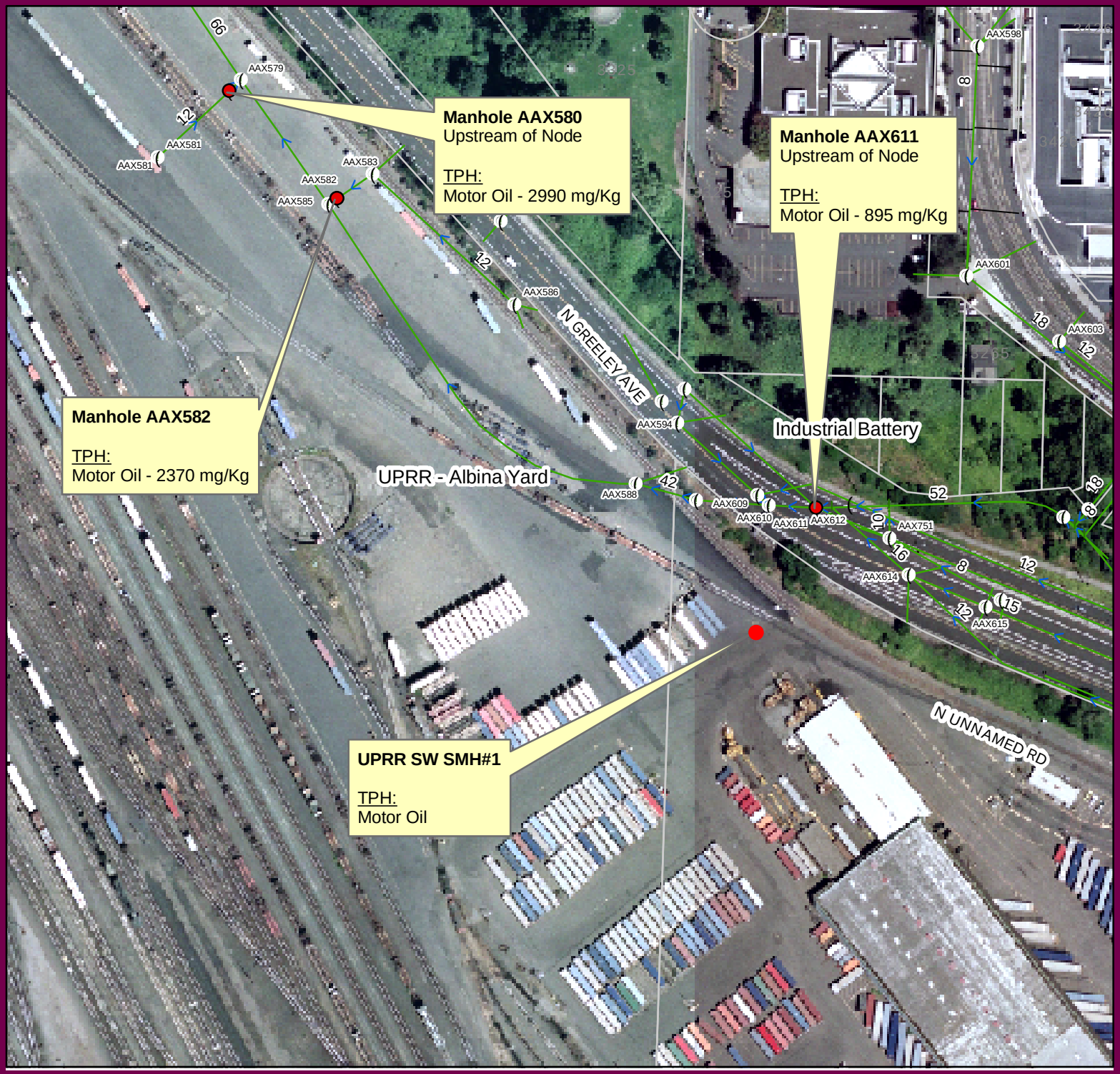
µg/Kg = micrograms/Kilogram dry weight

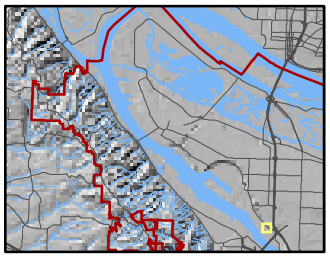
J = Estimated Value

DEQ Environmental Cleanup Sites (ECSI) sites shown on map.

Figure 4
Outfall 46
Inline Solids Sampling
SVOCs
Sample Date: 8/2/2005

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\outfall_46\of46_figure4.mxd	**Program Manager:** Dawn Sanders Portland Harbor Superfund
Sheet No. 1 OF 1	**Date Printed:** 06/15/2006 **Prepared by:** Sara Gardner





Legend

- Storm Pipe
- Manhole
- Taxlots
- Sample Location

0 250 500 1000 Feet

Note: Only detected constituents are shown.

mg/Kg = milligrams/Kilogram dry weight

DEQ Environmental Cleanup Sites (ECSI) sites shown on map.

Figure 5
Outfall 46
Inline Solids Sampling
Total Petroleum Hydrocarbons (TPH)
Sample Date: 8/2/2005

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\outfall_46\of46_figure5.mxd	**Program Manager:** Dawn Sanders Portland Harbor Superfund
Sheet No. 1 OF 1	**Date Printed:** 06/15/2006 **Prepared by:** Sara Gardner

Attachment A
Field Photographs

Photo 1 (August, 2005). Solid samples were collected in the line 40 ft upstream from manhole AAX611 where a plugged 12” line enters the main line.

Photo 2 (August, 2005). Sampling location upstream of AAX611.

Photo 3 (August, 2005). Aboveground view of the area near manhole UPRR SW SMH#1.

Photo 4 (August, 2005). Solids sampled in UPRR manhole (UPRR SW SMH #1).

Photo 5 (August, 2005). The line upstream from manhole AAX582. Solids were collected at the manhole.

Photo 6 (August, 2005). Inline solids at manhole AAX580.

Photo 7 (August, 2005). Solids were collected just upstream from manhole AAX580.

Attachment B
Field Notes

City of Portland
Environmental Services

DAILY FIELD REPORT

Project BASIN 46 SEDIMENT SAMPLING
Project No. 1080-001
Location ALBINA YARD
Date 8-2-05
Subject FIELD NOTES
By MJH

7:00 PREPARE FOR TODAYS WORK AT BASIN 46. CLEAN BOWLS + SPOONS PER SOP 9.01a

900 MEET AT YARD OFFICE TO DISCUSS ENTRY AT UPRR ALBINA YARD. MEET W/ NORM SIMLER, SWITCHMAN + HEAD HONCHO. DISCUSS SAFETY. PROCEED TO FIRST SITE

0950 ARRIVE AT AAX595. NO SEDS. NO SAMPLE COLLECTED. PROCEED TO ALTERNATE

1030 ARRIVE AT AAX594. NO SED. NO SAMPLE COLLECTED. PROCEED TO NEXT SITE.

1053 ARRIVE AT AAX579. NO SEDIMENT NO SAMPLE COLLECTED.

1105 AAX580. THIS IS A SHALLOW MH. COLLECT SEDIMENTS PURE

THIS MH IS VERY NEAR THE PREVIOUS MH.

1137 AAX585. WE ARE EXPECTING TO SEE TWO MH'S HERE BUT WE ONLY SEE ONE. THERE IS AN AREA OF DISTURBED ASPHALT WHERE WE EXPECT TO SEE A MH BUT WE WERE UNABLE TO UNCOVER IT.

1206 ARRIVE AT AAX588. AT LEAST WE THINK IT IS. THE AERIAL PHOTOGRAPH DOES NOT HELP US TO CONFIRM WITH ANY CONFIDENCE IF THIS IS ACTUALLY AAX588. WE DOCUMENT PIPE SIZES AT THIS NODE SEDIMENTS OF ALL DIRECTIONS SAMPLE COLLECTED HERE

Attachments

City of Portland
Environmental Services

DAILY FIELD REPORT

Project PORTLAND HARBOR SED SAMP Project No. 1020-001

Location ALBINA YARD Date 6-2-05

Subject FIELD NOTES By MJP

1300 ARRIVE AT PARK #1. ASSESS TRAFFIC SITUATION AND DETERMINE IT IS SAFE TO PROCEED.

AGAIN THE PAPE LAYOUT OBSERVED DOES NOT MATCH THE MAPS. DOCUMENT OBSERVED LAYOUT AS BEST AS POSSIBLE.

SEDS WERE OBSERVED ABOUT 40' UP THE SLOPE WHERE A 12" LINE COMES IN. COLLECTED THESE SEDS.

ALL SAMPLES PUT IN A CHILLED COOLER FOR DELIVERY TO THE LAB.

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

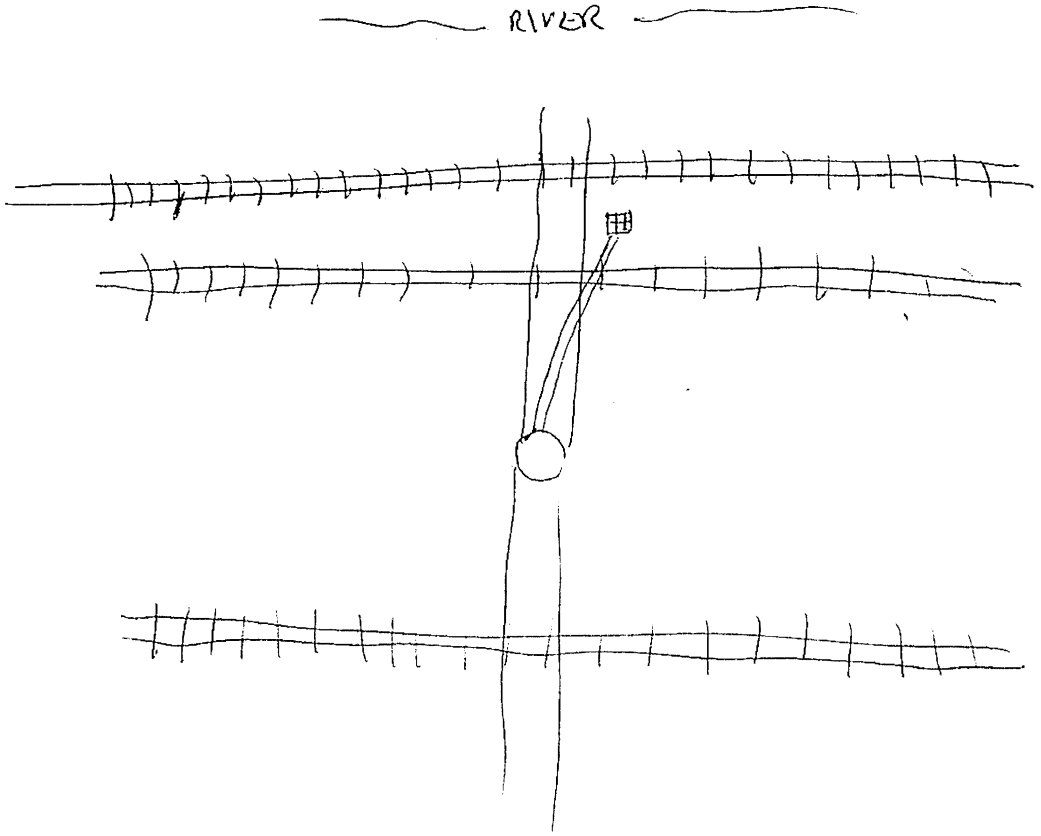
FIELD DATA SHEET

Date: 8/2/05	Time: 0954	Current Weather conditions: SUNNY 80'S
Sampling Team Present: MTH/ WCR/ RCB		
Basin: 46	Node: AAX595	Subbasin:
Address: ALBINA YARD.		

SECTION 1 - PRE-SAMPLING VISUAL OBSERVATION REPORT

Describe any flowing or standing water observed in the line?	3/8" OF CLEAR FLOW
Does river appear to back up to this location? Describe rate/color/odor of flow:	NO
Are sediments observed in the line?	NO (IRON BACTERIA ACCRETIONS PRESENT)
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



CITY OF PORTLAND
ENVIRONMENTAL SERVICES
Water Pollution control Laboratory
6543 N. Burlington Ave.,
Portland, OR 97203-5452

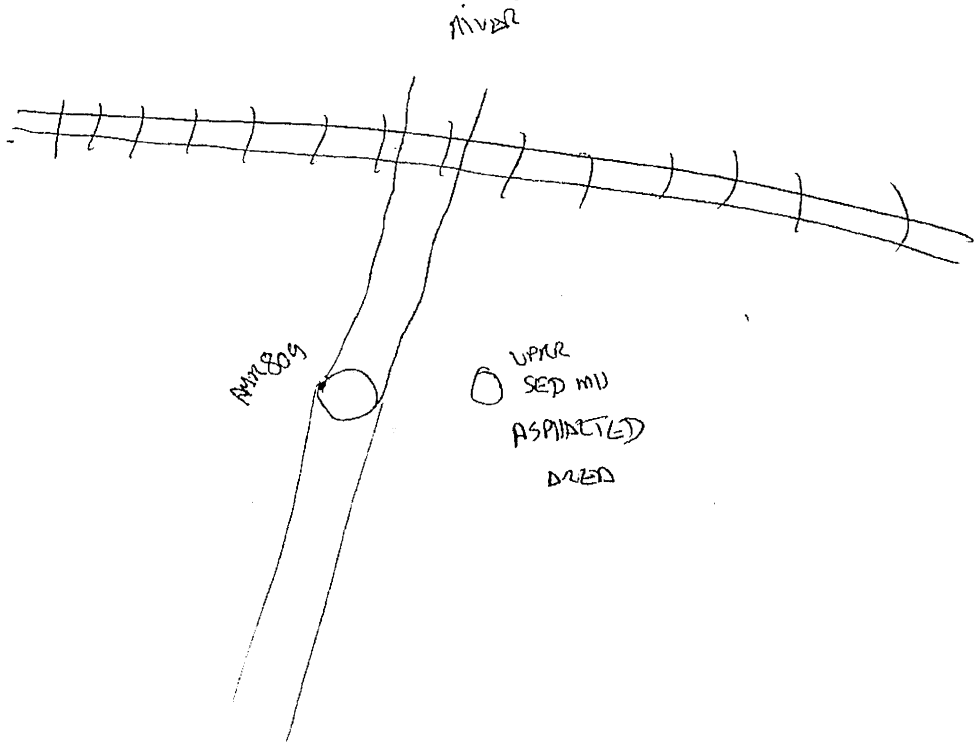
PORTLAND HARBOUR INLINE SEDIMENT SAMPLING - 1020.001
FIELD DATA SHEET

Date: 8/2/05	Time: 1038	Current Weather conditions: SUNNY 80's
Sampling Team Present: MJN | WCR | RCB		
Basin: 46	Node: AMR 809	Subbasin:
Address:		

SECTION 1 - PRE-SAMPLING VISUAL OBSERVATION REPORT

Describe any flowing or standing water observed in the line?	STANDING WATER AT NODE
Does river appear to back up to this location? Describe rate/color/odor of flow:	NO
Are sediments observed in the line?	NO (IRON BACTERIA)
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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ENVIRONMENTAL SERVICES
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Portland, OR 97203-5452

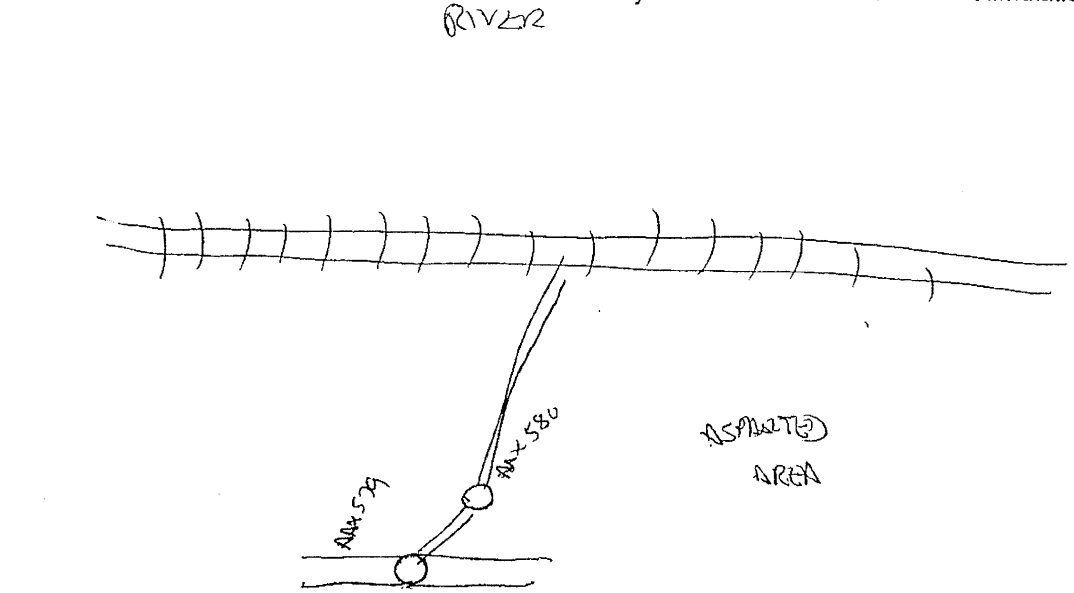
PORTLAND HARBOUR INLINE SEDIMENT SAMPLING - 1020.001
FIELD DATA SHEET

Date: 8-2-05	Time: 1052	Current Weather conditions: SUNNY 80's
Sampling Team Present: MJA/RCB/WCR		
Basin: 46	Node: AAX579	Subbasin:
Address: UPRR - DOBINA YARD.		

SECTION 1 - PRE-SAMPLING VISUAL OBSERVATION REPORT

Describe any flowing or standing water observed in the line?	DRY
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/laterals/MH's/driveways cuts and extent of solids accumulation



GRADELEY

CITY OF PORTLAND
ENVIRONMENTAL SERVICES
Water Pollution Control Laboratory
6543 N. Burlington Ave.,
Portland, OR 97203-5452

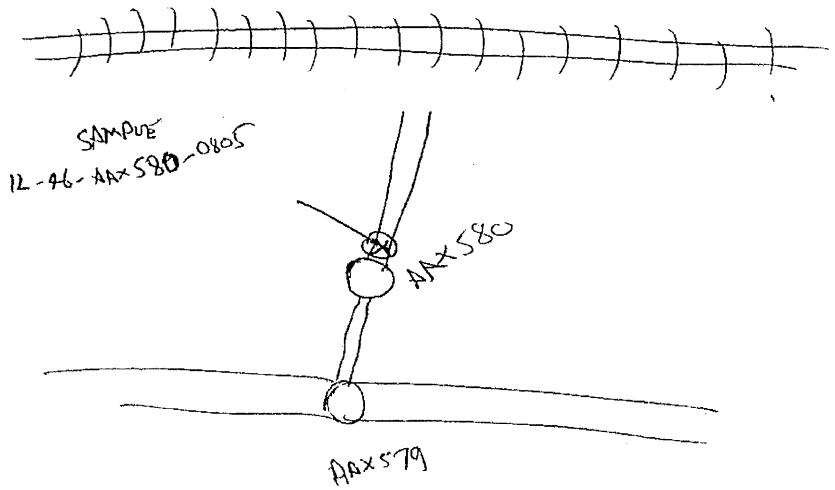
PORTLAND HARBOUR INLINE SEDIMENT SAMPLING - 1020.001
FIELD DATA SHEET

Date: 8-2-05	Time: 1105	Current Weather conditions: SUNNY 80'S
Sampling Team Present: MJN/WCR/RCB		
Basin: 4-6	Node: AAX580	Subbasin:
Address:		

SECTION 1 - PRE-SAMPLING VISUAL OBSERVATION REPORT

Describe any flowing or standing water observed in the line?	NO
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:	IN MH AND DOWN LINE

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



SECTION 2 - SAMPLE COLLECTION REPORT		Node: NAX 579
Sampling Equipment:	SS Bowl + Spoon	
Equipment Decontamination process:	(Per FOps SOP 70.1a)	Other (Describe)
Sample date: 8-2-05	Sample time: 1110	
Sample Identification: (IL-XX-NNNNNN-mmyy)	IL-46 - NAX 580-0805	
Sample location: (number of feet from node of entry)	JUST UP FROM NODE	
Sample collection technique:	SS SPOON USED TO COLLECT SEDS INTO Bowl. SEDIMENTS THEN HOMOGINIZED + PUT INTO SAMPLE JARS	
Color of sample:	GREY	
Texture/Particle size:	FINE	
Visual or olfactory evidence of contamination:	SLIGHT PETROLEUM (HEAVY END)	
Depth of solids in area where sample collected:	1½"	
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?	NO
Duplicate sample fictitious identification # on COC:	
Samples placed in chilled cooler? (Y)/N	
Samples delivered to lab? Y/N	Lab ID Number:
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

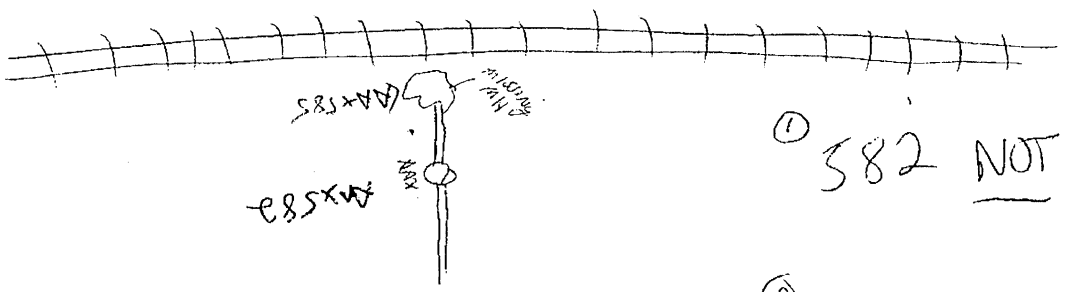
Date: 8-2-05	Time: 1137	Current Weather conditions:	SUNNY 80'S
Sampling Team Present:	MTJH | RCB | WCK		
Basin: 46	Node: AAX585	Subbasin:	
Address:	UPRR – ALBINA YARD.		

SECTION 1 - PRE-SAMPLING VISUAL OBSERVATION REPORT

Describe any flowing or standing water observed in the line?	NO
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:	BASIN # DEEP 7" UPSTREAM LINE 2" DEEP.

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

RAILROAD



① 582 NOT 585

② 588 IS ACTUALLY UPRR SW SMH #1

Page 1 of 2

SECTION 2 - SAMPLE COLLECTION REPORT

Node: AAX585

Sampling Equipment:	SS SPOON & BOWL
Equipment Decontamination process:	~~Per EQps SOP 70.1a~~ Other (Describe)
Sample date: 8-2-05	Sample time: 1145
Sample Identification: (IL-XX-NNNNNN-mmyy)	IL-46-AAX585-0805
Sample location: (number of feet from node of entry)	AT NODE
Sample collection technique:	SS SPOON USED TO COLLECT SAMPLE INTO BOWL. SAMPLE COMPOSITED AND PUT INTO SAMPLE CONTAINERS
Color of sample:	DK GREY
Texture/Particle size:	FINE SANDS
Visual or olfactory evidence of contamination:	SLIGHT PETROLEUM ODOR.
Depth of solids in area where sample collected:	7"
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?	NO
Duplicate sample fictitious identification # on COC:	
Samples placed in chilled cooler? (Y)N	
Samples delivered to lab? Y/N	Lab ID Number:
Describe any deviations from standard procedures:	

SECTION 3 - PHOTOGRAPH LOG

Photograph Log	In-Pipe sample location	
	Homogenized sample	

City of Portland
ENVIRONMENTAL SERVICES

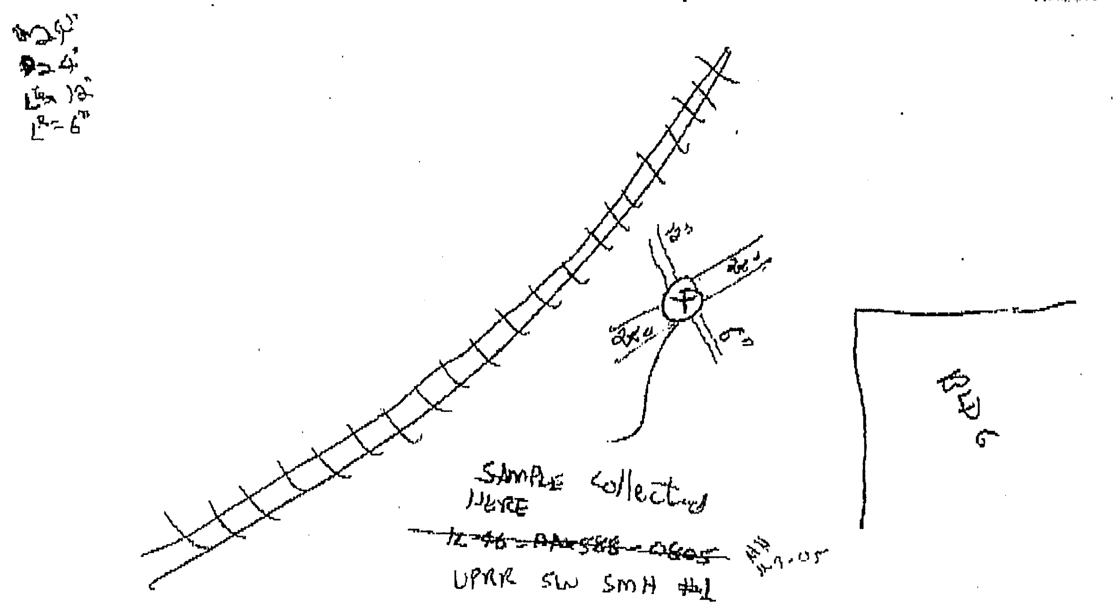
PORTLAND HARBOUR INLINE SEDIMENT SAMPLING - 1020.001
FIELD DATA SHEET

Date: 8-2-05	Time: 1206	Current Weather conditions: SUNNY 80's
Sampling Team Present: MJH / RCB / WCR		
Basin: 46	Node: ~~AAX 588~~ UPRR SW SMH#1 AH 11-7-05	Subbasin:
Address: UPRR ALBINA YARD		

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
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 ARE AND EXTEND IN ALL DIRECTION

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



SECTION 2 - SAMPLE COLLECTION REPORT

Node: ~~AAX~~ 588 11-7-05

Sampling Equipment:	SS SPOON + BOWL
Equipment Decontamination process:	(Per FOps SOP 70.1a) Other (Describe)
Sample date: 8-2-05	Sample time: ~~1224~~ 1215
Sample Identification: (IL-XX-NNNNNN-mmyy)	~~IL-46-AAX588-0805~~ UPRR SW SMH #1
Sample location: (number of feet from node of entry)	AT NODE 588 UPRR SW SMH #1
Sample collection technique:	SS SPOON USED TO Collect Sample into bowl. SAMPLE COMPOSITED AND PLACED INTO CONTAINER ?
Color of sample:	BLACK
Texture/Particle size:	SANDS + GRAVELS
Visual or olfactory evidence of contamination:	NO
Depth of solids in area where sample collected:	3"
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?	NO
Duplicate sample fictitious identification # on COC:	
Samples placed in chilled cooler? (Y)/N	
Samples delivered to lab? Y/N	Lab ID Number:
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

SEDIMENT SAMPLING FIELD DATA SHEET

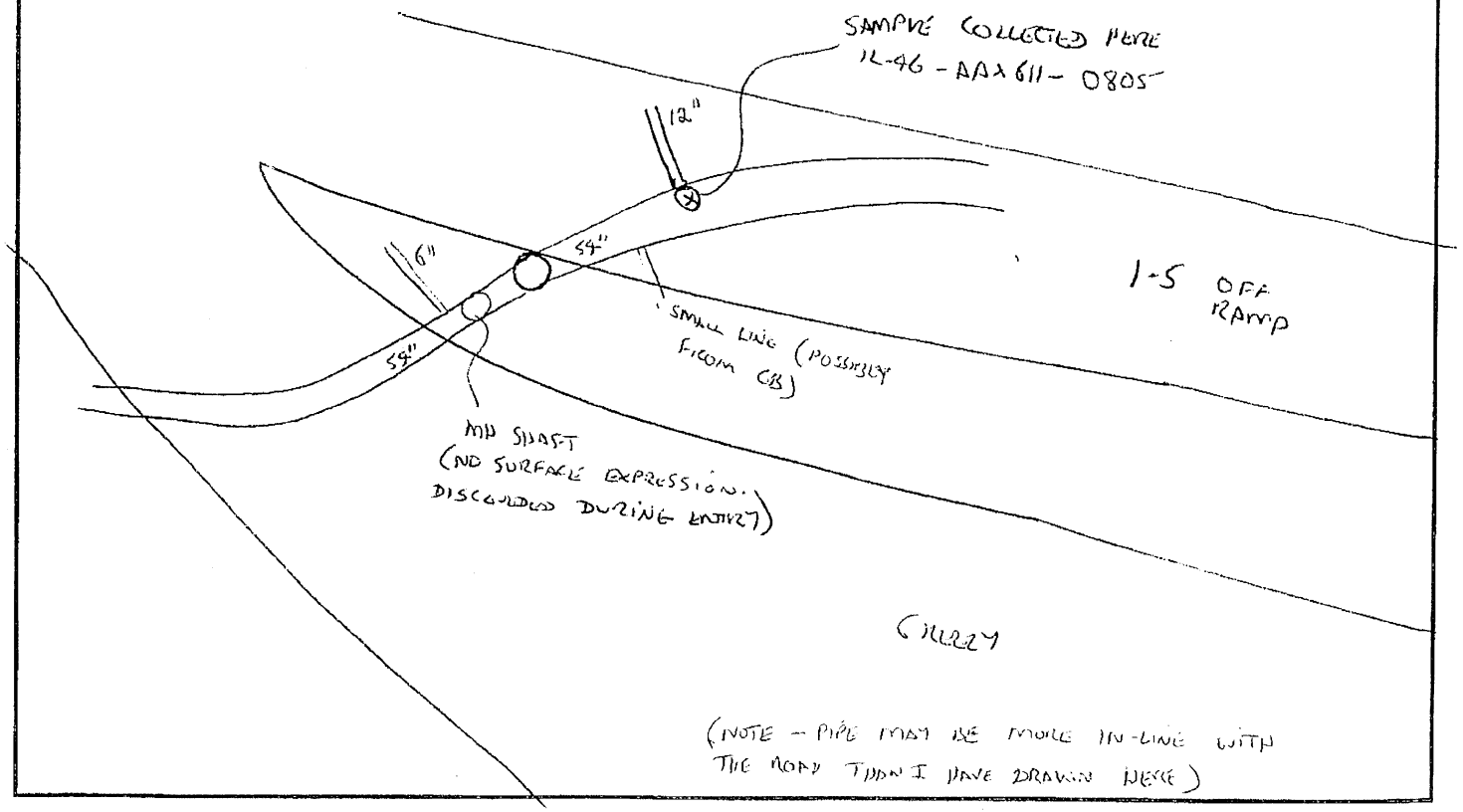
Date: 12/2/04	Time: 1320	Current Weather conditions: SUNNY 60's
Sampling Team Present: MJH/WCR RCB		
Basin: 46	Node: AAX 611	Subbasin:
Sampling Location Description/Address: NEAR SPRY - ALBINA YARDS	I-5 OFF RAMP ONTO GREELEY	

SECTION 1 - PRE-SAMPLING VISUAL OBSERVATION REPORT

Describe any flowing or standing water observed in the line?	ND
Does river appear to back up to this location? Describe rate/color/odor of flow:	NO
Are sediments observed in the line?	MINOR
Are sample-able quantities of sediments present in the line?	YES - FROM 12" LINE ABOUT 40' ABOVE THIS NODE
Describe lateral extent of sample-able sediments present in the line:	AT 12" LATERAL

THE MAPS OF THIS AREA DO NOT MATCH PIPE LAYOUT OBSERVED

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



SECTION 2 - SAMPLE COLLECTION REPORT	Node: AAx611
Sampling Equipment:	☒ Stainless steel spoon & stainless steel bucket ☐ Other (Describe)
Equipment Decontamination process:	☒ Per SOP7.01a ☐ Other (Describe)
Sample date: 8-2-05	Sample time: 1350
Sample Identification: (IL-XX-NNNNNN-mmyy)	IL-46-AAx611-0805
Sample location description: (number of feet from node of entry)	SAMPLE COLLECTED AT 12" LATERAL LOCATED 40' UP FROM NODE.
Sample collection technique:	SS SPOON USED TO COLLECT SAMPLE INTO BOWL.
Describe Color of sample:	BLACK
Describe Texture/Particle size:	SANDS + GRAVELS
Describe visual or olfactory evidence of contamination:	NO
Desacribe depth of solids in area where sample collected:	2"
Describe amount and type of debris in sample:	
Compositing notes:	

Sample Jars Collected				
If not enough sample to fill all of the jars, then fill jars in this order:	Metals	One 4oz glass jar		
	PAHs/SVOCs	One 4oz glass jar		
	PCBs	One 4oz glass jar		
	TPH (two jars)	Two 4oz glass jars		
	TOC	One 4oz glass jar		

Duplicate sample collected?	NO
Duplicate sample fictitious identification # on COC:	
Samples placed in chilled cooler? (Y)/N	
Samples delivered to lab? Y/N	Lab ID Number:
Describe any deviations from standard procedures:	

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 46

To: File

From: Robyn Cook, GSI

Walter Burt, RG – GSI

Date: November 11, 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 46. The results of the sampling and analysis are presented in Technical Memorandum No. OF 46-1.

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
  - Metals (EPA Method 6020)
  - NWTPH-Dx (NWTPH-Dx Method)
  - NWTPH-HCID (NWTPH-HCID Method)
- STL Laboratory
  - Semivolatile Organics (EPA Method 8270-SIM)
  - Mercury by CVAA (EPA Method 7471)

Attachment C of the Technical Memorandum No. OF 46-1 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.

Semi-Volatile Petroleum Products (NWTPH-Dx, NWTPH-HCID) 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, NWTPH-Dx, NWTPH-HCID, total metals and mercury. No chemicals were detected in the method blanks associated with SVOCs, NWTPH-Dx, NWTPH-HCID, metals or mercury. A surrogate compound (Nitrobenzene-d5) was detected in method blank associated with the SVOC analysis, but because the surrogate was low and all other surrogates were within quality control limits, no further actions were taken.

Surrogate Recoveries

Surrogate recoveries were completed during the laboratory analysis of SVOCs and NWTPH-DCID. Surrogate recoveries were within laboratory control limits for the NWTPH-DCID

analyses. Surrogate recoveries were outside of quality control acceptance limits for SVOC analyses. Due to matrix interference, the results for SVOCs have been qualified as estimates by flagging any detected compounds with a "J."

Laboratory Duplicate

A laboratory duplicate was processed during the laboratory analyses of mercury. Both the sample and the laboratory duplicate were non-detect; accordingly, relative percent differences (RPDs) could not be calculated.

Laboratory Control Sample Recoveries

Laboratory control samples were processed during the laboratory analyses of SVOCs, NWTPH-Dx, NWTPH-HCID, total metals and mercury. All laboratory blank spike recoveries were within laboratory 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.

Laboratory Control Sample Duplicates

Laboratory blank spike duplicates and laboratory matrix spike duplicates were processed during the laboratory analyses of SVOCs. The percent recoveries of three compounds in the blank spike duplicate exceeded quality control limits. The relative percent difference (RPD) between four compounds from the laboratory blank spike and the laboratory blank spikes duplicate exceeded laboratory control limits for both analyses. The RPDs between eight of eleven 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. Based on erratic recoveries for the blank spike duplicates, matrix spikes and matrix spike duplicates, all SVOC results have been qualified as estimates by flagging any detected compounds with a "J" due to matrix interference. Method reporting limits (MRL) are also considered estimates and are flagged with a "UJ."

Rec'd 8/3/05

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: 8-2-05

Page: 1 of 1

Collected By: MJH | RCB | WCR

Project Name: PORTLAND HARBOR INLINE SAMP

File Number: 1020.001 Matrix: SEDIMENT

OUTFALL 46

[1]Run NWTPH-Dx and NWTPH-Gx if detect on NWTPH-HCID scan
*Semi-volatiles and Total Mercury will be analyzed by Severn Trent Laboratory
STL - Please send invoice to Howard Holmes at Northcreek and lab reports to Jennifer Shackelford at the City

Requested Analyses

WPCL Sample I.D.	Location	Point Code	Sample Date	Sample Time	Sample Type	General: NWTPH-HCID[1]	General: SVOCs - LHS Custom List*	Metals: Total Metals (Ag, As, Ba, Cd, Cr, Cu, Hg, Ni, Pb, Zn)	Metals: Total Mercury (EPA 7471)*	Field Comments
FO 050806	IL-46-AAX580-0805 UPRR - SW OF 66" LINE	46_1	8-2-05	1110	C	●	●	●	●	
FO 050807	IL-46-AAX582-0805 UPRR - NE OF 66" LINE	46_2	"	1145	C	●	●	●	●	
FO 050808	UPRR SW SMH #1 NEAR BUILDING	46_3	"	1215	C	●	●	●	●	
FO 050809	IL-46-AAX611-0805 I-5 OFF-RAMP/GREELEY	46_4	"	1356	C	●	●	●	●	

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.	Relinquished By: 4.
Signature: [signature] Time: 0823	Signature: Time:	Signature: Time:	Signature: Time:
Printed Name: MICHAEL HAUSER Date: 8-3-05	Printed Name: Date:	Printed Name: Date:	Printed Name: Date:
Received By: 1.	**Received By:** 2.	**Received By:** 3.	**Received By:** 4.
Signature: [signature] Time: 0823	Signature: Time:	Signature: Time:	Signature: Time:
Printed Name: Daniel V. Van Metre Date: 8/3/05	Printed Name: Date:	Printed Name: Date:	Printed Name: Date:

City of Portland
Water Pollution Control Laboratory
Laboratory Analysis Report

Sample Date/Time 8/2/2005 11:10 **System ID** AJ07383 **Sample ID** **FO050806**

Proj./Company Name: PORTLAND HARBOR INLINE SAMP
Address/Location: IL-46-AAX580-0805
UPRR SW OF 66 INCH LINE

Date Received: 8/3/2005
Sample Status: COMPLETE AND VALIDATED

Proj Subcategory: REGULATORY PLAN & EVAL
Sample Point Code: 46_1
IMS File/Invoice #: 1020.001

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

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. Based on erratic recoveries (some high and some low) of surrogate, blank spike, and matrix spike compounds, results for the Semi-volatile Organics should be considered estimates due to matrix interferences.

Test Parameter	Result	Units	MRL	Method
METALS				
ARSENIC	2.98	mg/Kg dry wt	0.50	EPA 6020
BARIUM	112	mg/Kg dry wt	0.10	EPA 6020
CADMIUM	1.92	mg/Kg dry wt	0.10	EPA 6020
CHROMIUM	37.0	mg/Kg dry wt	0.50	EPA 6020
COPPER	142	mg/Kg dry wt	0.25	EPA 6020
LEAD	124	mg/Kg dry wt	0.10	EPA 6020
MERCURY	0.225	mg/Kg dry wt	0.010	EPA 6020
NICKEL	26.2	mg/Kg dry wt	0.25	EPA 6020
SILVER	0.20	mg/Kg dry wt	0.10	EPA 6020
ZINC	583	mg/Kg dry wt	0.50	EPA 6020
OUTSIDE				
MERCURY	0.143	mg/Kg dry wt	0.020	EPA 7471
SEMI-VOLATILE ORGANICS - CUSTOM				
1-Methylnaphthalene	<21.2	µg/Kg dry wt	21.2	EPA 8270-SIM
2-Methylnaphthalene	45	µg/Kg dry wt	21.2	EPA 8270-SIM
Acenaphthene	<21.2	µg/Kg dry wt	21.2	EPA 8270-SIM
Acenaphthylene	46.9	µg/Kg dry wt	21.2	EPA 8270-SIM
Anthracene	88.5	µg/Kg dry wt	21.2	EPA 8270-SIM
Benzo(a)anthracene	196	µg/Kg dry wt	21.2	EPA 8270-SIM
Benzo(a)pyrene	<21.2	µg/Kg dry wt	21.2	EPA 8270-SIM
Benzo(g,h,i)perylene	<21.2	µg/Kg dry wt	21.2	EPA 8270-SIM
Benzofluoranthenes	<42.4	µg/Kg dry wt	42.4	EPA 8270-SIM
Bis(2-ethylhexyl) phthalate	856	µg/Kg dry wt	212	EPA 8270-SIM
Butylbenzylphthalate	<212	µg/Kg dry wt	212	EPA 8270-SIM
Chrysene	209	µg/Kg dry wt	21.2	EPA 8270-SIM
Dibenzo(a,h)anthracene	<21.2	µg/Kg dry wt	21.2	EPA 8270-SIM

City of Portland
Water Pollution Control Laboratory
Laboratory Analysis Report

Sample Date/Time 8/2/2005 11:10 **System ID** AJ07383 **Sample ID** **FO050806**

Page: 2

Proj./Company Name: PORTLAND HARBOR INLINE SAMP
Address/Location: IL-46-AAX580-0805
UPRR SW OF 66 INCH LINE

Date Received: 8/3/2005
Sample Status: COMPLETE AND VALIDATED

Proj Subcategory: REGULATORY PLAN & EVAL
Sample Point Code: 46_1
IMS File/Invoice #: 1020.001

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

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. Based on erratic recoveries (some high and some low) of surrogate, blank spike, and matrix spike compounds, results for the Semi-volatile Organics should be considered estimates due to matrix interferences.

Test Parameter	Result	Units	MRL	Method
Diethyl phthalate	<106	µg/Kg dry wt	106	EPA 8270-SIM
Dimethyl phthalate	<106	µg/Kg dry wt	106	EPA 8270-SIM
Di-n-butyl phthalate	<106	µg/Kg dry wt	106	EPA 8270-SIM
Di-n-octyl phthalate	<212	µg/Kg dry wt	212	EPA 8270-SIM
Fluoranthene	178	µg/Kg dry wt	21.2	EPA 8270-SIM
Fluorene	56.8	µg/Kg dry wt	21.2	EPA 8270-SIM
Indeno(1,2,3-cd)pyrene	<21.2	µg/Kg dry wt	21.2	EPA 8270-SIM
Naphthalene	60	µg/Kg dry wt	21.2	EPA 8270-SIM
Phenanthrene	117	µg/Kg dry wt	21.2	EPA 8270-SIM
Pyrene	426	µg/Kg dry wt	21.2	EPA 8270-SIM
NWTPH-Dx				
#6 FUEL OIL	<2000	mg/Kg dry wt	2000	NWTPH-Dx
DIESEL	<1000	mg/Kg dry wt	1000	NWTPH-Dx
KEROSENE	<1000	mg/Kg dry wt	1000	NWTPH-Dx
MOTOR OIL	2990	mg/Kg dry wt	2000	NWTPH-Dx
NWTPH-HCID				
DIESEL	<50	mg/Kg dry wt	50	NWTPH-HCID
GASOLINE	<20	mg/Kg dry wt	20	NWTPH-HCID
HEAVY FUEL OIL	DET	mg/Kg dry wt	100	NWTPH-HCID
LUBE OIL	DET	mg/Kg dry wt	100	NWTPH-HCID
OTHER	<100	mg/Kg dry wt	100	NWTPH-HCID
Surrogate Recovery (%)	98	mg/Kg dry wt		NWTPH-HCID

End of Report for Sample ID: FO050806

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

Report Date: 9/29/2005

Validated By: Signature on File

City of Portland
Water Pollution Control Laboratory
Laboratory Analysis Report

Sample Date/Time 8/2/2005 11:45 **System ID** AJ07384 **Sample ID** **FO050807**

Proj./Company Name: PORTLAND HARBOR INLINE SAMP
Address/Location: IL-46-AAX582-0805
UPRR NE OF 66 INCH LINE

Date Received: 8/3/2005
Sample Status: COMPLETE AND VALIDATED

Proj Subcategory: REGULATORY PLAN & EVAL
Sample Point Code: 46_2
IMS File/Invoice #: 1020.001

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

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. Based on erratic recoveries (some high and some low) of surrogate, blank spike, and matrix spike compounds, results for the Semi-volatile Organics should be considered estimates due to matrix interferences.

Test Parameter	Result	Units	MRL	Method
METALS				
ARSENIC	5.45	mg/Kg dry wt	0.50	EPA 6020
BARIUM	123	mg/Kg dry wt	0.10	EPA 6020
CADMIUM	1.51	mg/Kg dry wt	0.10	EPA 6020
CHROMIUM	62.1	mg/Kg dry wt	0.50	EPA 6020
COPPER	103	mg/Kg dry wt	0.25	EPA 6020
LEAD	538	mg/Kg dry wt	0.10	EPA 6020
MERCURY	0.109	mg/Kg dry wt	0.010	EPA 6020
NICKEL	35.8	mg/Kg dry wt	0.25	EPA 6020
SILVER	0.10	mg/Kg dry wt	0.10	EPA 6020
ZINC	460	mg/Kg dry wt	0.50	EPA 6020
OUTSIDE				
MERCURY	<0.020	mg/Kg dry wt	0.020	EPA 7471
SEMI-VOLATILE ORGANICS - CUSTOM				
1-Methylnaphthalene	<22.7	µg/Kg dry wt	22.7	EPA 8270-SIM
2-Methylnaphthalene	58.2	µg/Kg dry wt	22.7	EPA 8270-SIM
Acenaphthene	108	µg/Kg dry wt	22.7	EPA 8270-SIM
Acenaphthylene	74.1	µg/Kg dry wt	22.7	EPA 8270-SIM
Anthracene	554	µg/Kg dry wt	22.7	EPA 8270-SIM
Benzo(a)anthracene	370	µg/Kg dry wt	22.7	EPA 8270-SIM
Benzo(a)pyrene	<22.7	µg/Kg dry wt	22.7	EPA 8270-SIM
Benzo(g,h,i)perylene	<22.7	µg/Kg dry wt	22.7	EPA 8270-SIM
Benzofluoranthenes	<45.4	µg/Kg dry wt	45.4	EPA 8270-SIM
Bis(2-ethylhexyl) phthalate	<227	µg/Kg dry wt	227	EPA 8270-SIM
Butylbenzylphthalate	<227	µg/Kg dry wt	227	EPA 8270-SIM
Chrysene	165	µg/Kg dry wt	22.7	EPA 8270-SIM
Dibenzo(a,h)anthracene	<22.7	µg/Kg dry wt	22.7	EPA 8270-SIM

Report Date: 9/29/2005

Validated By: Signature on File

City of Portland
Water Pollution Control Laboratory
Laboratory Analysis Report

Sample Date/Time 8/2/2005 11:45 **System ID** AJ07384 **Sample ID** **FO050807**

Proj./Company Name: PORTLAND HARBOR INLINE SAMP
Address/Location: IL-46-AAX582-0805
UPRR NE OF 66 INCH LINE

Date Received: 8/3/2005
Sample Status: COMPLETE AND VALIDATED

Proj Subcategory: REGULATORY PLAN & EVAL
Sample Point Code: 46_2
IMS File/Invoice #: 1020.001

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

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. Based on erratic recoveries (some high and some low) of surrogate, blank spike, and matrix spike compounds, results for the Semi-volatile Organics should be considered estimates due to matrix interferences.

Test Parameter	Result	Units	MRL	Method
Diethyl phthalate	<114	µg/Kg dry wt	114	EPA 8270-SIM
Dimethyl phthalate	<114	µg/Kg dry wt	114	EPA 8270-SIM
Di-n-butyl phthalate	172	µg/Kg dry wt	114	EPA 8270-SIM
Di-n-octyl phthalate	<227	µg/Kg dry wt	227	EPA 8270-SIM
Fluoranthene	1070	µg/Kg dry wt	22.7	EPA 8270-SIM
Fluorene	123	µg/Kg dry wt	22.7	EPA 8270-SIM
Indeno(1,2,3-cd)pyrene	<22.7	µg/Kg dry wt	22.7	EPA 8270-SIM
Naphthalene	47.5	µg/Kg dry wt	22.7	EPA 8270-SIM
Phenanthrene	415	µg/Kg dry wt	22.7	EPA 8270-SIM
Pyrene	1370	µg/Kg dry wt	22.7	EPA 8270-SIM
NWTPH-Dx				
#6 FUEL OIL	<2000	mg/Kg dry wt	2000	NWTPH-Dx
DIESEL	<1000	mg/Kg dry wt	1000	NWTPH-Dx
KEROSENE	<1000	mg/Kg dry wt	1000	NWTPH-Dx
MOTOR OIL	2370	mg/Kg dry wt	2000	NWTPH-Dx
NWTPH-HCID				
DIESEL	<50	mg/Kg dry wt	50	NWTPH-HCID
GASOLINE	<20	mg/Kg dry wt	20	NWTPH-HCID
HEAVY FUEL OIL	DET	mg/Kg dry wt	100	NWTPH-HCID
LUBE OIL	DET	mg/Kg dry wt	100	NWTPH-HCID
OTHER	<100	mg/Kg dry wt	100	NWTPH-HCID
Surrogate Recovery (%)	101	mg/Kg dry wt		NWTPH-HCID

End of Report for Sample ID: FO050807

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

Report Date: 9/29/2005

Validated By: Signature on File

City of Portland
Water Pollution Control Laboratory
Laboratory Analysis Report

Sample Date/Time 8/2/2005 12:15 **System ID** AJ07385 **Sample ID** **FO050808**

Page: 1

Proj./Company Name: PORTLAND HARBOR INLINE SAMP
Address/Location: UPRR SW SMH #1
NEAR BUILDING

Date Received: 8/3/2005
Sample Status: COMPLETE AND VALIDATED

Proj Subcategory: REGULATORY PLAN & EVAL
Sample Point Code: 46_3
IMS File/Invoice #: 1020.001

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

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. Based on erratic recoveries (some high and some low) of surrogate, blank spike, and matrix spike compounds, results for the Semi-volatile Organics should be considered estimates due to matrix interferences.

Test Parameter	Result	Units	MRL	Method
METALS				
ARSENIC	2.47	mg/Kg dry wt	0.50	EPA 6020
BARIUM	67.7	mg/Kg dry wt	0.10	EPA 6020
CADMIUM	1.32	mg/Kg dry wt	0.10	EPA 6020
CHROMIUM	25.7	mg/Kg dry wt	0.50	EPA 6020
COPPER	87.8	mg/Kg dry wt	0.25	EPA 6020
LEAD	65.5	mg/Kg dry wt	0.10	EPA 6020
MERCURY	0.549	mg/Kg dry wt	0.010	EPA 6020
NICKEL	16.8	mg/Kg dry wt	0.25	EPA 6020
SILVER	<0.10	mg/Kg dry wt	0.10	EPA 6020
ZINC	626	mg/Kg dry wt	0.50	EPA 6020
OUTSIDE				
MERCURY	0.280	mg/Kg dry wt	0.020	EPA 7471
SEMI-VOLATILE ORGANICS - CUSTOM				
1-Methylnaphthalene	<20.6	µg/Kg dry wt	20.6	EPA 8270-SIM
2-Methylnaphthalene	<20.6	µg/Kg dry wt	20.6	EPA 8270-SIM
Acenaphthene	<20.6	µg/Kg dry wt	20.6	EPA 8270-SIM
Acenaphthylene	<20.6	µg/Kg dry wt	20.6	EPA 8270-SIM
Anthracene	33.6	µg/Kg dry wt	20.6	EPA 8270-SIM
Benzo(a)anthracene	<20.6	µg/Kg dry wt	20.6	EPA 8270-SIM
Benzo(a)pyrene	<20.6	µg/Kg dry wt	20.6	EPA 8270-SIM
Benzo(g,h,i)perylene	<20.6	µg/Kg dry wt	20.6	EPA 8270-SIM
Benzofluoranthenes	<41.3	µg/Kg dry wt	41.3	EPA 8270-SIM
Bis(2-ethylhexyl) phthalate	<206	µg/Kg dry wt	206	EPA 8270-SIM
Butylbenzylphthalate	<206	µg/Kg dry wt	206	EPA 8270-SIM
Chrysene	<20.6	µg/Kg dry wt	20.6	EPA 8270-SIM
Dibenzo(a,h)anthracene	<20.6	µg/Kg dry wt	20.6	EPA 8270-SIM

City of Portland
Water Pollution Control Laboratory
Laboratory Analysis Report

Sample Date/Time 8/2/2005 12:15 **System ID** AJ07385 **Sample ID** **FO050808**

Proj./Company Name: PORTLAND HARBOR INLINE SAMP
Address/Location: UPRR SW SMH #1
NEAR BUILDING

Proj Subcategory: REGULATORY PLAN & EVAL
Sample Point Code: 46_3
IMS File/Invoice #: 1020.001

Date Received: 8/3/2005
Sample Status: COMPLETE AND VALIDATED

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

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. Based on erratic recoveries (some high and some low) of surrogate, blank spike, and matrix spike compounds, results for the Semi-volatile Organics should be considered estimates due to matrix interferences.

Test Parameter	Result	Units	MRL	Method
Diethyl phthalate	<103	µg/Kg dry wt	103	EPA 8270-SIM
Dimethyl phthalate	<103	µg/Kg dry wt	103	EPA 8270-SIM
Di-n-butyl phthalate	<103	µg/Kg dry wt	103	EPA 8270-SIM
Di-n-octyl phthalate	<206	µg/Kg dry wt	206	EPA 8270-SIM
Fluoranthene	<20.6	µg/Kg dry wt	20.6	EPA 8270-SIM
Fluorene	<20.6	µg/Kg dry wt	20.6	EPA 8270-SIM
Indeno(1,2,3-cd)pyrene	<20.6	µg/Kg dry wt	20.6	EPA 8270-SIM
Naphthalene	<20.6	µg/Kg dry wt	20.6	EPA 8270-SIM
Phenanthrene	84.4	µg/Kg dry wt	20.6	EPA 8270-SIM
Pyrene	103	µg/Kg dry wt	20.6	EPA 8270-SIM
NWTPH-Dx				
#6 FUEL OIL	<250	mg/Kg dry wt	250	NWTPH-Dx
DIESEL	<125	mg/Kg dry wt	125	NWTPH-Dx
KEROSENE	<125	mg/Kg dry wt	125	NWTPH-Dx
MOTOR OIL	514	mg/Kg dry wt	250	NWTPH-Dx
NWTPH-HCID				
DIESEL	<50	mg/Kg dry wt	50	NWTPH-HCID
GASOLINE	<20	mg/Kg dry wt	20	NWTPH-HCID
HEAVY FUEL OIL	<100	mg/Kg dry wt	100	NWTPH-HCID
LUBE OIL	DET	mg/Kg dry wt	100	NWTPH-HCID
OTHER	<100	mg/Kg dry wt	100	NWTPH-HCID
Surrogate Recovery (%)	100	mg/Kg dry wt		NWTPH-HCID

End of Report for Sample ID: FO050808

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

Report Date: 9/29/2005

Validated By: Signature on File

City of Portland
Water Pollution Control Laboratory
Laboratory Analysis Report

Sample Date/Time 8/2/2005 13:50 **System ID** AJ07386 **Sample ID** **FO050809**

Page: 1

Proj./Company Name: PORTLAND HARBOR INLINE SAMP
Address/Location: IL-46-AAX611-0805
I-5 OFF-RAMP / GREELEY

Date Received: 8/3/2005
Sample Status: COMPLETE AND VALIDATED

Proj Subcategory: REGULATORY PLAN & EVAL
Sample Point Code: 46_4
IMS File/Invoice #: 1020.001

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

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. Based on erratic recoveries (some high and some low) of surrogate, blank spike, and matrix spike compounds, results for the Semi-volatile Organics should be considered estimates due to matrix interferences.

Test Parameter	Result	Units	MRL	Method
METALS				
ARSENIC	2.49	mg/Kg dry wt	0.50	EPA 6020
BARIUM	88.5	mg/Kg dry wt	0.10	EPA 6020
CADMIUM	1.15	mg/Kg dry wt	0.10	EPA 6020
CHROMIUM	30.5	mg/Kg dry wt	0.50	EPA 6020
COPPER	91.4	mg/Kg dry wt	0.25	EPA 6020
LEAD	165	mg/Kg dry wt	0.10	EPA 6020
MERCURY	0.242	mg/Kg dry wt	0.010	EPA 6020
NICKEL	26.8	mg/Kg dry wt	0.25	EPA 6020
SILVER	1.42	mg/Kg dry wt	0.10	EPA 6020
ZINC	798	mg/Kg dry wt	0.50	EPA 6020
OUTSIDE				
MERCURY	0.269	mg/Kg dry wt	0.020	EPA 7471
SEMI-VOLATILE ORGANICS - CUSTOM				
1-Methylnaphthalene	<24.8	µg/Kg dry wt	24.8	EPA 8270-SIM
2-Methylnaphthalene	<24.8	µg/Kg dry wt	24.8	EPA 8270-SIM
Acenaphthene	<24.8	µg/Kg dry wt	24.8	EPA 8270-SIM
Acenaphthylene	41.9	µg/Kg dry wt	24.8	EPA 8270-SIM
Anthracene	44.2	µg/Kg dry wt	24.8	EPA 8270-SIM
Benzo(a)anthracene	<24.8	µg/Kg dry wt	24.8	EPA 8270-SIM
Benzo(a)pyrene	<24.8	µg/Kg dry wt	24.8	EPA 8270-SIM
Benzo(g,h,i)perylene	<24.8	µg/Kg dry wt	24.8	EPA 8270-SIM
Benzofluoranthenes	<49.6	µg/Kg dry wt	49.6	EPA 8270-SIM
Bis(2-ethylhexyl) phthalate	996	µg/Kg dry wt	248	EPA 8270-SIM
Butylbenzylphthalate	<248	µg/Kg dry wt	248	EPA 8270-SIM
Chrysene	<24.8	µg/Kg dry wt	24.8	EPA 8270-SIM
Dibenzo(a,h)anthracene	<24.8	µg/Kg dry wt	24.8	EPA 8270-SIM

City of Portland
Water Pollution Control Laboratory
Laboratory Analysis Report

Sample Date/Time 8/2/2005 13:50 **System ID** AJ07386 **Sample ID** **FO050809**

Proj./Company Name: PORTLAND HARBOR INLINE SAMP
Address/Location: IL-46-AAX611-0805
I-5 OFF-RAMP / GREELEY
Proj Subcategory: REGULATORY PLAN & EVAL
Sample Point Code: 46_4
IMS File/Invoice #: 1020.001

Date Received: 8/3/2005
Sample Status: COMPLETE AND VALIDATED
Sample Type: COMPOSITE
Sample Matrix: SEDIMENT
Collected By: MJH/RCB/WCR

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. Based on erratic recoveries (some high and some low) of surrogate, blank spike, and matrix spike compounds, results for the Semi-volatile Organics should be considered estimates due to matrix interferences.

Test Parameter	Result	Units	MRL	Method
Diethyl phthalate	<124	µg/Kg dry wt	124	EPA 8270-SIM
Dimethyl phthalate	<124	µg/Kg dry wt	124	EPA 8270-SIM
Di-n-butyl phthalate	<124	µg/Kg dry wt	124	EPA 8270-SIM
Di-n-octyl phthalate	<248	µg/Kg dry wt	248	EPA 8270-SIM
Fluoranthene	233	µg/Kg dry wt	24.8	EPA 8270-SIM
Fluorene	<24.8	µg/Kg dry wt	24.8	EPA 8270-SIM
Indeno(1,2,3-cd)pyrene	<24.8	µg/Kg dry wt	24.8	EPA 8270-SIM
Naphthalene	<24.8	µg/Kg dry wt	24.8	EPA 8270-SIM
Phenanthrene	90.3	µg/Kg dry wt	24.8	EPA 8270-SIM
Pyrene	180	µg/Kg dry wt	24.8	EPA 8270-SIM
NWTPH-Dx				
#6 FUEL OIL	<250	mg/Kg dry wt	250	NWTPH-Dx
DIESEL	<125	mg/Kg dry wt	125	NWTPH-Dx
KEROSENE	<125	mg/Kg dry wt	125	NWTPH-Dx
MOTOR OIL	895	mg/Kg dry wt	250	NWTPH-Dx
NWTPH-HCID				
DIESEL	<50	mg/Kg dry wt	50	NWTPH-HCID
GASOLINE	<20	mg/Kg dry wt	20	NWTPH-HCID
HEAVY FUEL OIL	<100	mg/Kg dry wt	100	NWTPH-HCID
LUBE OIL	DET	mg/Kg dry wt	100	NWTPH-HCID
OTHER	<100	mg/Kg dry wt	100	NWTPH-HCID
Surrogate Recovery (%)	101	mg/Kg dry wt		NWTPH-HCID

End of Report for Sample ID: FO050809

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

Report Date: 9/29/2005

Validated By: Signature on File

6.5°C
TB 11.4°C

SUBCONTRACT ORDER

North Creek Analytical - Portland

P5H0166

129210

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: P5H0166-01	**Soil**	**Sampled:08/02/05 11:10**	[redacted]	FO 050806
Subcontract Outside	08/17/05 16:00	01/29/06 11:10		SVOC LHS Custom, see COP chain
Solids, Dry Weight	08/10/05 16:00	08/30/05 11:10		
Hg Total 7471A	08/17/05 16:00	08/30/05 11:10		
Containers Supplied:				
4 oz. jar (A)	4 oz. jar (B)			
Sample ID: P5H0166-02	**Soil**	**Sampled:08/02/05 11:45**	[redacted]	FO 050807
Subcontract Outside	08/17/05 16:00	01/29/06 11:45		SVOC LHS Custom, see COP chain
Solids, Dry Weight	08/10/05 16:00	08/30/05 11:45		
Hg Total 7471A	08/17/05 16:00	08/30/05 11:45		
Containers Supplied:				
4 oz. jar (A)	4 oz. jar (B)			
Sample ID: P5H0166-03	**Soil**	**Sampled:08/02/05 12:15**	[redacted]	FO 050808
Subcontract Outside	08/17/05 16:00	01/29/06 12:15		SVOC LHS Custom, see COP chain
Solids, Dry Weight	08/10/05 16:00	08/30/05 12:15		
Hg Total 7471A	08/17/05 16:00	08/30/05 12:15		
Containers Supplied:				
4 oz. jar (A)	4 oz. jar (B)			
Sample ID: P5H0166-04	**Soil**	**Sampled:08/02/05 13:50**	[redacted]	FO 050809
Subcontract Outside	08/17/05 16:00	01/29/06 13:50		SVOC LHS Custom, see COP chain
Solids, Dry Weight	08/10/05 16:00	08/30/05 13:50		
Hg Total 7471A	08/17/05 16:00	08/30/05 13:50		
Containers Supplied:				
4 oz. jar (A)	4 oz. jar (B)			

Released By	Date	Received By	Date
[signature]	8-4-05	[signature]	8/5/5
Released By	Date	Received By	Date

00022

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: September 20, 2005

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

PROJECT: P5H0166

REPORT NUMBER: 129210 REV

TOTAL NUMBER OF PAGES: _____

Enclosed are the test results for four samples received at STL Seattle on August 5, 2005.

Analytical Narrative for EPA Method 8270: The percent recovery of Nitrobenzene-d5 (surrogate compound) in the method blank associated with batch SS1490 exceeded quality control limits. The recovery was slightly low and all other surrogates were within quality control limits. No further action was taken on this outlier.

The percent recoveries of Phenol, 2-Chlorophenol, and N-nitroso-di-n-propylamine in the blank spike duplicate exceeded quality control limits. The recoveries for these compound in the blank spike was within quality control limits. No further action was taken on these outliers.

The relative percent difference of N-nitroso-di-n-propylamine and Pyrene between the blank spike and the blank spike duplicate exceeded quality control limits. The recovery of N-nitroso-di-n-propylamine in the blank spike and Pyrene in the blank spike and blank spike duplicate was within quality control limits. No further action was taken on these outliers.

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,

Tom Coyner
Project Manager

STL Seattle

Sample Identification:

Lab. No.	Client ID	Date/Time Sampled	Matrix
129210-1	P5H0166-01	08-02-05 11:10	solid
129210-2	P5H0166-02	08-02-05 11:45	solid
129210-3	P5H0166-03	08-02-05 12:15	solid
129210-4	P5H0166-04	08-02-05 13:50	solid

STL Seattle

Client Name:	North Creek Analytical
Client ID:	P5H0166-01
Lab ID:	129210-01
Date Received:	8/5/05
Date Prepared:	8/8/05
Date Analyzed:	8/19/05
% Solids	94.35
Dilution Factor	10

Semivolatile Organics by EPA Method 8270

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
2 - Fluorophenol	40.4		36	145
Phenol - d5	8.86	X9	38	149
Nitrobenzene - d5	206	X9	38	141
2 - Fluorobiphenyl	65.7		42	140
2,4,6 - Tribromophenol	39.1		28	143
p - Terphenyl - d14	362	X9	42	151

Sample results are on a dry weight basis.

		Result		
Analyte		**(ug/kg)**	**RL**	**Flags**
Naphthalene		60	21.2	
2-Methylnaphthalene		45	21.2	
Dimethylphthalate	ND		106	
Acenaphthylene		46.9	21.2	
Acenaphthene	ND		21.2	
Diethylphthalate	ND		106	
Fluorene		56.8	21.2	
Phenanthrene		117	21.2	
Anthracene		88.5	21.2	
Di-n-butylphthalate	ND		106	
Fluoranthene		178	21.2	
Pyrene		426	21.2	
Butylbenzylphthalate	ND		212	
Benzo(a)anthracene		196	21.2	
Chrysene		209	21.2	
bis(2-Ethylhexyl)phthalate		856	212	
Di-n-octylphthalate	ND		212	
Benzofluoranthenes	ND		42.3	
Benzo(a)pyrene	ND		21.2	
Indeno(1,2,3-cd)pyrene	ND		21.2	
Dibenz(a,h)anthracene	ND		21.2	
Benzo(g,h,i)perylene	ND		21.2	
1-Methylnaphthalene	ND		21.2	

STL Seattle

Client Name:	North Creek Analytical
Client ID:	P5H0166-02
Lab ID:	129210-02
Date Received:	8/5/05
Date Prepared:	8/8/05
Date Analyzed:	8/19/05
% Solids	87.46
Dilution Factor	10

Semivolatile Organics by EPA Method 8270

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
2 - Fluorophenol	0	X9	36	145
Phenol - d5	30.7	X9	38	149
Nitrobenzene - d5	208	X9	38	141
2 - Fluorobiphenyl	105		42	140
2,4,6 - Tribromophenol	175	X9	28	143
p - Terphenyl - d14	177	X9	42	151

Sample results are on a dry weight basis.

		Result		
Analyte		**(ug/kg)**	**RL**	**Flags**
Naphthalene		47.5	22.7	
2-Methylnaphthalene		58.2	22.7	
Dimethylphthalate	ND		113	
Acenaphthylene		74.1	22.7	
Acenaphthene		108	22.7	
Diethylphthalate	ND		113	
Fluorene		123	22.7	
Phenanthrene		415	22.7	
Anthracene		554	22.7	
Di-n-butylphthalate		172	113	
Fluoranthene		1070	22.7	
Pyrene		1370	22.7	
Butylbenzylphthalate	ND		227	
Benzo(a)anthracene		370	22.7	
Chrysene		165	22.7	
bis(2-Ethylhexyl)phthalate	ND		227	
Di-n-octylphthalate	ND		227	
Benzofluoranthenes	ND		45.3	
Benzo(a)pyrene	ND		22.7	
Indeno(1,2,3-cd)pyrene	ND		22.7	
Dibenz(a,h)anthracene	ND		22.7	
Benzo(g,h,i)perylene	ND		22.7	
1-Methylnaphthalene	ND		22.7	

STL Seattle

Client Name:	North Creek Analytical
Client ID:	P5H0166-03
Lab ID:	129210-03
Date Received:	8/5/05
Date Prepared:	8/8/05
Date Analyzed:	8/19/05
% Solids	92.5
Dilution Factor	10

Semivolatile Organics by EPA Method 8270

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
2 - Fluorophenol	19.9	X9	36	145
Phenol - d5	8.94	X9	38	149
Nitrobenzene - d5	115		38	141
2 - Fluorobiphenyl	82.4		42	140
2,4,6 - Tribromophenol	89.5		28	143
p - Terphenyl - d14	236	X9	42	151

Sample results are on a dry weight basis.

Analyte	**Result (ug/kg)**	**RL**	**Flags**
Naphthalene	ND	20.6	
2-Methylnaphthalene	ND	20.6	
Dimethylphthalate	ND	103	
Acenaphthylene	ND	20.6	
Acenaphthene	ND	20.6	
Diethylphthalate	ND	103	
Fluorene	ND	20.6	
Phenanthrene	84.4	20.6	
Anthracene	33.6	20.6	
Di-n-butylphthalate	ND	103	
Fluoranthene	ND	20.6	
Pyrene	103	20.6	
Butylbenzylphthalate	ND	206	
Benzo(a)anthracene	ND	20.6	
Chrysene	ND	20.6	
bis(2-Ethylhexyl)phthalate	ND	206	
Di-n-octylphthalate	ND	206	
Benzofluoranthenes	ND	41.3	
Benzo(a)pyrene	ND	20.6	
Indeno(1,2,3-cd)pyrene	ND	20.6	
Dibenz(a,h)anthracene	ND	20.6	
Benzo(g,h,i)perylene	ND	20.6	
1-Methylnaphthalene	ND	20.6	

STL Seattle

Client Name:	North Creek Analytical
Client ID:	P5H0166-04
Lab ID:	129210-04
Date Received:	8/5/05
Date Prepared:	8/8/05
Date Analyzed:	8/19/05
% Solids	79.62
Dilution Factor	10

Semivolatile Organics by EPA Method 8270

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
2 - Fluorophenol	40.7		36	145
Phenol - d5	4.8	X9	38	149
Nitrobenzene - d5	82.3		38	141
2 - Fluorobiphenyl	78.9		42	140
2,4,6 - Tribromophenol	83.4		28	143
p - Terphenyl - d14	144		42	151

Sample results are on a dry weight basis.

Analyte	**Result (ug/kg)**	**RL**	**Flags**
Naphthalene	ND	24.8	
2-Methylnaphthalene	ND	24.8	
Dimethylphthalate	ND	124	
Acenaphthylene	41.9	24.8	
Acenaphthene	ND	24.8	
Diethylphthalate	ND	124	
Fluorene	ND	24.8	
Phenanthrene	90.3	24.8	
Anthracene	44.2	24.8	
Fluoranthene	233	24.8	
Pyrene	180	24.8	
Butylbenzylphthalate	ND	248	
Benzo(a)anthracene	ND	24.8	
Chrysene	ND	24.8	
bis(2-Ethylhexyl)phthalate	996	248	
Di-n-octylphthalate	ND	248	
Benzofluoranthenes	ND	49.6	
Benzo(a)pyrene	ND	24.8	
Indeno(1,2,3-cd)pyrene	ND	24.8	
Dibenz(a,h)anthracene	ND	24.8	
Benzo(g,h,i)perylene	ND	24.8	
1-Methylnaphthalene	ND	24.8	

STL Seattle

Client Name	North Creek Analytical
Client ID:	P5H0166-01
Lab ID:	129210-01
Date Received:	8/5/2005
Date Prepared:	8/12/2005
Date Analyzed:	8/12/2005
Dilution Factor	1
% Solids	94.35

Mercury by CVAA - USEPA Method 7471

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	RL	Flags
Mercury	0.143	0.0197	

STL Seattle

Client Name	North Creek Analytical
Client ID:	P5H0166-02
Lab ID:	129210-02
Date Received:	8/5/2005
Date Prepared:	8/12/2005
Date Analyzed:	8/12/2005
Dilution Factor	1
% Solids	87.46

Mercury by CVAA - USEPA Method 7471

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	RL	Flags
Mercury	ND	0.0184	

STL Seattle

Client Name	North Creek Analytical
Client ID:	P5H0166-03
Lab ID:	129210-03
Date Received:	8/5/2005
Date Prepared:	8/12/2005
Date Analyzed:	8/12/2005
Dilution Factor	1
% Solids	92.5

Mercury by CVAA - USEPA Method 7471

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	RL	Flags
Mercury	0.28	0.0184	

STL Seattle

Client Name	North Creek Analytical
Client ID:	P5H0166-04
Lab ID:	129210-04
Date Received:	8/5/2005
Date Prepared:	8/12/2005
Date Analyzed:	8/12/2005
Dilution Factor	1
% Solids	79.62

Mercury by CVAA - USEPA Method 7471

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	RL	Flags
Mercury	0.269	0.0232	

STL Seattle

Lab ID:	Method Blank - SS1490
Date Received:	-
Date Prepared:	8/8/2005
Date Analyzed:	8/19/2005
% Solids	
Dilution Factor	1

Semivolatile Organics by EPA Method 8270

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
2 - Fluorophenol	44.3		36	145
Phenol - d5	51.8		38	149
Nitrobenzene - d5	37	N	38	141
2 - Fluorobiphenyl	50.5		42	140
2,4,6 - Tribromophenol	91.4		28	143
p - Terphenyl - d14	85.2		42	151

Sample results are on an as received basis.

Analyte	**Result (ug/kg)**	**RL**	**Flags**
Phenol	ND	5	
bis(2-Chloroethyl)ether	ND	10	
2-Chlorophenol	ND	5	
1,3-Dichlorobenzene	ND	5	
1,4-Dichlorobenzene	ND	5	
Benzyl Alcohol	ND	5	
1,2-Dichlorobenzene	ND	5	
2-Methylphenol	ND	5	
bis(2-Chloroisopropyl)ether	ND	25	
3-&4-Methylphenol	ND	5	
N-nitroso-di-n-propylamine	ND	5	
Hexachloroethane	ND	5	
Nitrobenzene	ND	10	
Isophorone	ND	10	
2-Nitrophenol	ND	5	
2,4-Dimethylphenol	ND	2	
Benzoic Acid	ND	60	
bis(2-Chloroethoxy)methane	ND	10	
2,4-Dichlorophenol	ND	5	
1,2,4-Trichlorobenzene	ND	5	
Naphthalene	ND	2	
4-Chloroaniline	ND	10	
Hexachlorobutadiene	ND	5	
4-Chloro-3-methylphenol	ND	5	
2-Methylnaphthalene	ND	2	
Hexachlorocyclopentadiene	ND	5	

STL Seattle

Semivolatile Organics by EPA Method 8270 data for SS1490 continued...

Analyte	Result (ug/kg)	RL	Flags
2,4,6-Trichlorophenol	ND	5	
2,4,5-Trichlorophenol	ND	5	
2-Chloronaphthalene	ND	2	
2-Nitroaniline	ND	2	
Dimethylphthalate	ND	10	
Acenaphthylene	ND	2	
2,6-Dinitrotoluene	ND	5	
3-Nitroaniline	ND	10	
Acenaphthene	ND	2	
2,4-Dinitrophenol	ND	50	
4-Nitrophenol	ND	50	
Dibenzofuran	ND	5	
2,4-Dinitrotoluene	ND	10	
Diethylphthalate	ND	10	
4-Chlorophenylphenylether	ND	10	
Fluorene	ND	2	
4-Nitroaniline	ND	20	
4,6-Dinitro-2-methylphenol	ND	10	
N-Nitrosodiphenylamine	ND	2	
4-Bromophenylphenylether	ND	10	
Hexachlorobenzene	ND	2	
Pentachlorophenol	ND	10	
Phenanthrene	ND	2	
Anthracene	ND	2	
Di-n-butylphthalate	ND	10	
Fluoranthene	ND	2	
Pyrene	ND	2	
Butylbenzylphthalate	ND	20	
3,3'-Dichlorobenzidine	ND	20	
Benzo(a)anthracene	ND	2	
Chrysene	ND	2	
bis(2-Ethylhexyl)phthalate	ND	20	
Di-n-octylphthalate	ND	20	
Benzofluoranthenes	ND	4	
Benzo(a)pyrene	ND	2	
Indeno(1,2,3-cd)pyrene	ND	2	
Dibenz(a,h)anthracene	ND	2	
Benzo(g,h,i)perylene	ND	2	

STL Seattle

Blank Spike/Blank Spike Duplicate Report

Lab ID:	SS1490
Date Prepared:	8/8/2005
Date Analyzed:	8/19/2005
QC Batch ID:	SS1490

Semivolatile Organics by EPA Method 8270

Compound Name	Blank Result (ug/kg)	Spike Amount (ug/kg)	BS Result (ug/kg)	BS % Rec.	BSD Result (ug/kg)	BSD % Rec.	RPD	Flag
Phenol	0	75	42.4	56.6	34.7	46.3	-20	N
2-Chlorophenol	0	75	43.1	57.5	37.3	49.7	-15	N
1,4-Dichlorobenzene	0	50	30.4	60.8	30.1	60.2	-0.99	
N-nitroso-di-n-propylamine	0	50	25.3	50.7	0.517	1.03	-190	N
1,2,4-Trichlorobenzene	0	50	30.9	61.8	29.7	59.5	-3.8	
4-Chloro-3-methylphenol	0	75	53.9	71.8	50.2	66.9	-7.1	
Acenaphthene	0	50	32.3	64.6	36.4	72.9	12	
4-Nitrophenol	0	75	27.5	36.7	35.8	47.7	26	
2,4-Dinitrotoluene	0	50	21.6	43.3	24	48	10	
Pentachlorophenol	0	75	15.9	21.3	51.4	68.6	110	N
Pyrene	0	50	43.3	86.6	55.3	111	25	

STL Seattle

Matrix Spike/Matrix Spike Duplicate Report

Client Sample ID:	P5H0166-01
Lab ID:	129210-01
Date Prepared:	8/8/2005
Date Analyzed:	8/19/2005
QC Batch ID:	SS1490

Semivolatile Organics by EPA Method 8270

Compound Name	Sample Result (ug/kg)	Spike Amount (ug/kg)	MS Result (ug/kg)	MS % Rec.	MSD Result (ug/kg)	MSD % Rec.	RPD	Flag
Phenol	0	76.8	14.6	19	53.9	70.1	110	X7
2-Chlorophenol	0	76.8	40.3	52.5	49.8	64.7	21	X7
1,4-Dichlorobenzene	0	51.2	56.1	110	52.2	102	-7.5	
N-nitroso-di-n-propylamine	0	51.2	0	0	0	0	0	X7
1,2,4-Trichlorobenzene	0	51.2	21.7	42.3	22	42.9	1.4	X7
4-Chloro-3-methylphenol	0	76.8	39.2	51	38.1	49.6	-2.8	X7
Acenaphthene	0	51.2	71.5	140	141	276	65	X7
4-Nitrophenol	0	76.8	0	0	0	0	0	X7
2,4-Dinitrotoluene	0	51.2	69.1	135	58.3	114	-17	
Pentachlorophenol	0	76.8	23.1	30	19.4	25.2	-17	
Pyrene	430	51.2	409	0	619	375	200	X7

STL Seattle

Lab ID:	Method Blank - ZS426
Date Received:	-
Date Prepared:	8/12/2005
Date Analyzed:	8/12/2005
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:	SE-080305-5106-8-001
Lab ID:	129194-01
Date Prepared:	8/12/2005
Date Analyzed:	8/12/2005
QC Batch ID:	ZS426

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	0.225	0.251	112	

STL Seattle

Duplicate Report

Client Sample ID:	SE-080305-5106-8-001
Lab ID:	129194-01
Date Prepared:	8/12/2005
Date Analyzed:	8/12/2005
QC Batch ID:	ZS426

Mercury by CVAA - USEPA Method 7471

Parameter Name	Sample Result (mg/kg)	Duplicate Result (mg/kg)	RPD %	Flag
Mercury	0	0	NC	

6.5°C
TB 11.4°C

SUBCONTRACT ORDER

North Creek Analytical - Portland

P5H0166

12970

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: P5H0166-01	**Soil**	**Sampled:08/02/05 11:10**		
Subcontract Outside	08/17/05 16:00	01/29/06 11:10		SVOC LHS Custom, see COP chain
Solids, Dry Weight	08/10/05 16:00	08/30/05 11:10		
Hg Total 7471A	08/17/05 16:00	08/30/05 11:10		
Containers Supplied:				
4 oz. jar (A)	4 oz. jar (B)			
Sample ID: P5H0166-02	**Soil**	**Sampled:08/02/05 11:45**		
Subcontract Outside	08/17/05 16:00	01/29/06 11:45		SVOC LHS Custom, see COP chain
Solids, Dry Weight	08/10/05 16:00	08/30/05 11:45		
Hg Total 7471A	08/17/05 16:00	08/30/05 11:45		
Containers Supplied:				
4 oz. jar (A)	4 oz. jar (B)			
Sample ID: P5H0166-03	**Soil**	**Sampled:08/02/05 12:15**		
Subcontract Outside	08/17/05 16:00	01/29/06 12:15		SVOC LHS Custom, see COP chain
Solids, Dry Weight	08/10/05 16:00	08/30/05 12:15		
Hg Total 7471A	08/17/05 16:00	08/30/05 12:15		
Containers Supplied:				
4 oz. jar (A)	4 oz. jar (B)			
Sample ID: P5H0166-04	**Soil**	**Sampled:08/02/05 13:50**		
Subcontract Outside	08/17/05 16:00	01/29/06 13:50		SVOC LHS Custom, see COP chain
Solids, Dry Weight	08/10/05 16:00	08/30/05 13:50		
Hg Total 7471A	08/17/05 16:00	08/30/05 13:50		
Containers Supplied:				
4 oz. jar (A)	4 oz. jar (B)			

Released By	Date	Received By	Date
	8-4-05		8/5/15
Released By	Date	Received By	Date

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
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 #:

NCA CLIENT: City of Portland
REPORT TO: Jennifer Shackelford
ADDRESS:
PHONE: FAX:

INVOICE TO: Charles Lytle
P.O. NUMBER: 405207

PROJECT NAME: Portland Harbor Inline Samp
PROJECT NUMBER:
SAMPLED BY:

TURNAROUND REQUEST in Business Days *
Organic & Inorganic Analyses: STD. | 7 | 5 | 4 | 3 | 2 | 1 | <1
Petroleum Hydrocarbon Analyses: STD. | 4 | 3 | 2 | 1 | <1
OTHER Specify:
* Turnaround Requests less than standard may incur Rush Charges.

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	PRESERVATIVE	REQUESTED ANALYSES: SVOC * LHS-custom	Total Hg * EPA 7471	NWTPH Dx - analyze at NCA	MATRIX (W, S, O)	# OF CONT.	LOCATION / COMMENTS	NCA WO ID
1	FO 050806	8/2/05 1110		X	X		S	2	*	
2	FO 050807	1145		X	X		S	2	*	
3	FO 050808	1215		X	X		S	2	*	
4	FO 050809	1350		X	X		S	2	*	
5	FO 050758	7/25/05 1207				X	S	1	Analyze at NCA	
6										
7										
8										
9										
10										

RELEASED BY: DATE: 8/3/05
PRINT NAME: Samantha Clark FIRM: WPCL BES TIME: 4:36

RECEIVED BY: DATE: 8/3/05
PRINT NAME: Bob FIRM: NCA TIME: 16:36

RELEASED BY: DATE: 8/3/05
PRINT NAME: Bob FIRM: NCA TIME: 17:15

RECEIVED BY: DATE: 8.3.05
PRINT NAME: Vanessa FIRM: NCA TIME: 17.15

ADDITIONAL REMARKS: * To be analyzed by Severn Trent Laboratories - SVOCs + LHS custom List, Hg 7471
- STL to send invoice to Howard Holmes at North Creek, Lab reports to Jennifer Shackelford at COP

TEMP: 1.9

COC REV 09/04

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