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

TECHNICAL MEMORANDUM No. OF52A-1

City Outfall Basin 52A
Catch Basin Solids Sampling Adjacent to Mar Com Inc.

TO: Mike Romero, 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: Tom Roick, DEQ, Northwest Region Cleanup & Portland Harbor Section
Kristine Koch, EPA, Office of Environmental Cleanup
Bruce Brody-Heine, GSI

DATE: June 9, 2006

SUBJECT: **Portland Harbor Source Control Investigation**

Introduction

This technical memorandum summarizes the results of the City of Portland (City) Bureau of Environmental Services' (BES) source control investigation of catch basin solids in the City Outfall Basin 52A stormwater conveyance system. Outfall Basin 52A collects stormwater from an area located adjacent to the Mar Com facility at 8970 N. Bradford Street; the Mar Com facility is a listed Oregon Department of Environmental Quality (DEQ) Portland Harbor upland cleanup site. The basin also includes an area of railroad right-of-way (ROW). The City is concerned that contaminants from Mar Com and the railroad ROW may migrate into the City's stormwater conveyance system. This investigation, conducted in July 2005, is part of the City's ongoing source control program associated with the Portland Harbor City of Portland Outfalls Project. The City is submitting these investigation results pursuant to the August 13, 2003, Intergovernmental Agreement (IGA) between the DEQ and the City.

Purpose and Objectives

The purpose of this investigation is to evaluate whether solids originating from the Mar Com north parcel or the adjacent railroad ROW are transporting contaminants to the City's stormwater conveyance system. According to the DEQ Environmental Cleanup Site Information (ECSI) database site summary report for Mar Com (ECSI Site No. 2350), contaminants of interest identified at the Mar Com north parcel include petroleum hydrocarbons, polynuclear aromatic hydrocarbons (PAHs), and metals (arsenic, copper, chromium, lead, mercury, and zinc) (DEQ, 2005).

City Outfall Basin 52A was designated as a Priority 3 (CH2M Hill, 2004): this priority category is for outfalls where there are some elevated sediment concentrations in the vicinity but these

concentrations are likely attributable to other sources rather than the City outfall. Generally, concentrations in sediment were lowest near the outfall (within the ditch) and increased towards the beach adjacent to Mar Com activities. The only analyte that exceeded Portland Harbor Joint Source Control Strategy (JSCS) (DEQ/EPA, 2005) toxicity screening level values (SLVs) at the outfall was bis(2-ethylhexyl)phthalate (BEHP) but its concentration decreased to below JSCS screening levels in samples closer to the river. Therefore, while it appears that the overall discharge from the outfall is not a significant contributor, the City would like to assure that cleanup at upland sites is conducted appropriately for long-term protection of the collection system and the river.

Background

Figures 1 through 3 show the locations of the City Outfall Basin 52A stormwater conveyance system, the two catch basins that were sampled, and the chemical analytical results of this investigation. As shown in Figures 1 through 3, the Mar Com site is located in the western portion of Outfall Basin 52A, adjacent to a segment of the railroad ROW paralleling N. Bradford Street.

In a letter to DEQ, the City expressed concern regarding the potential for stormwater runoff from the Mar Com north parcel to enter the Outfall Basin 52A stormwater conveyance system along N. Bradford Street (BES, 2004). DEQ visited the site and concluded that migration of hazardous substances from Mar Com to the catch basins near N. Bradford Street was likely to be de minimis (DEQ, 2004). However, the proximity of these catch basins to a cleanup site with contaminants in surface soil and the local drainage pattern prompted the City to sample two catch basins as part of our ongoing source control program.

One of the catch basins (AAE628) is located in a low-lying area within 50 feet of the Mar Com site and is connected to the storm line in N. St. Louis Avenue. Topographic contours indicate that this catch basin may receive runoff from the northeastern portion of the Mar Com site, as well as from the adjacent railroad ROW. Topographic contours are shown in Figure 1.

Three other catch basins are located within the railroad track area, and two more are on the east side of the railroad tracks along N. Bradford Street. All of these catch basins collect runoff from the street and railroad ROW and convey it to the storm line on N. Bradford Street. These five catch basins are separated from the Mar Com site by elevated railroad tracks, and do not receive surface runoff from the site. Thus, solids from these catch basins represent solids discharged from the railroad ROW and the paved roadway to the east of the tracks. To evaluate this potential contaminant source, the City sampled one catch basin (ANE069) from the east side of the railroad ROW.

Field Activities

The City communicated with DEQ regarding this source control investigation before conducting this work. BES Field Operations staff obtained solids from two catch basins, between approximately 11:20 a.m. and 1 p.m. on July 25, 2005. Solids samples from both catch basins were collected using a stainless steel spoon and bowl, in accordance with BES Field Operations' standard operating procedures. Attachment A presents photographs of the sampling locations and solids. Attachment B provides field notes recorded during sampling activities.

One sample was collected near the Mar Com north parcel from a dry catch basin (AAE628), located on the west side of the railroad tracks. The solids in catch basin AAE628 lacked any odor or visual staining. A sample also was collected from the northern-most catch basin (ANE069) on the east side of the railroad tracks adjacent to the Mar Com north parcel. The sampling team noted approximately 1 foot of standing water in catch basin ANE069 and a heavy-oil odor emanating from the solids.

Summary of Results

The catch basin solids were analyzed for metals, semivolatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), and petroleum hydrocarbons. Attachment C includes the laboratory analytical results and data validation report for the samples. Table 1 summarizes the chemical analytical data results for the two samples. The sample results were compared with the JSCS SLVs. Metals concentrations also were compared with DEQ Default Background Concentrations for metals in soil (DEQ, 2002). The results of the comparisons are summarized as follows:

- Three metals (cadmium, copper and zinc) exceeded the bioaccumulation SLVs in both samples but only the eastern catch basin sample exceeded the toxicity SLVs (and then by less than a factor of 1).
  - Metals concentrations in the eastern catch basin were approximately twice as high as those detected in the western catch basin.
  - The concentrations of cadmium detected in both samples did not exceed the background concentration value, suggesting that the metal is naturally occurring at this concentration.
  - Copper and zinc concentrations exceeded the background concentration values, suggesting an anthropogenic source of these metals in soil.
- Fourteen SVOC compounds (13 PAHs and BEHP) were detected in the western catch basin at concentrations exceeding the JSCS SLVs. The concentrations of PAHs were significantly higher at the western catch basin than in the eastern; total PAHs on the western side of railroad ROW were 232,394 ug/Kg versus 10,905.5 ug/Kg on the eastern side. However, phthalate concentrations were significantly higher in the eastern sample compared to the western. Two PAHs, BEHP, and phenol were detected in the eastern sample at concentrations exceeding the JSCS SLVs.
- The PCB Aroclor 1260 was detected in both samples at concentrations below the JSCS SLV.
- Motor oil range petroleum hydrocarbons were detected in both samples: a concentration of 2,610 milligrams per kilogram (mg/Kg) was detected in the western sample and a concentration of 2,730 mg/Kg was detected in the eastern sample. JSCS SLVs for total petroleum hydrocarbons have not been established.

Figures 1 through 3 show the locations and chemical analytical results for the two samples.

Conclusions and Recommendations

The results of the Outfall Basin 52A source control investigation indicate the presence of contaminated solids in City stormwater catch basins located adjacent to the railroad ROW and the Mar Com site. Elevated metals concentrations, petroleum hydrocarbons, PCBs, PAHs, and other SVOCs, including phthalates, were detected in solids samples from both of the sampled catch basins, AAE628 and ANE069. Although a similar suite of contaminants was detected in both catch basin samples, there are some concentration differences that may reflect subtle distinctions between potential contaminant sources on either side of the railroad tracks.

Potential sources of contaminants in the solids sample from catch basin AAE628, located on the west side of the railroad tracks, include the Mar Com north parcel and railroad operations. A portion of the Mar Com north parcel drains toward catch basin AAE628 and the contaminants from this catch basin, including petroleum hydrocarbons, PAHs, and metals, are similar to those that have been detected at the Mar Com parcel. Consequently, the City requests that DEQ require Mar Com to further investigate the stormwater migration pathway of contaminants into the Outfall Basin 52A stormwater conveyance system from the north parcel, and to implement source control measures where appropriate.

The catch basins located on the east side of the tracks, including ANE069, collect runoff from the railroad ROW and N. Bradford Street, which is an undeveloped street ROW adjacent to several commercial/industrial businesses. The nature and degree of contribution of contaminants to catch basin solids by potential sources in the N. Bradford Street and railroad ROW area are unclear. Potential sources of contaminants to the catch basins along N. Bradford Street include railroad operations, the street ROW, and adjacent industrial and commercial businesses, which include machining and metal fabrication facilities. Mar Com is unlikely to be a source of the contaminants detected in the solids sample from catch basin ANE069 because of the presence of elevated railroad tracks between Mar Com and the catch basin.

The City intends to further evaluate other potential sources of contaminants to catch basin solids within Outfall Basin 52A through its industrial source control program.

References

BES. 2004. Letter from the City of Portland Bureau of Environmental Services to the DEQ regarding DEQ's Proposed Source Control Decision at the Mar Com North Parcel, dated February 4, 2004.

CH2M HILL. 2004. Programmatic Source Control Remediation 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 Default Background Concentrations for Inorganic Contaminants in Various Environmental Media. Internal Memorandum from the Toxicology Workgroup to DEQ Cleanup Project Managers, dated October 28, 2002.

DEQ. 2004. Letter from DEQ to the City of Portland Bureau of Environmental Sciences in response to the February 4, 2004 letter, dated May 13, 2004.

DEQ. 2005. DEQ Site Summary Report – Details for ECSI Site No. 2350. DEQ Environmental Cleanup Site Information (ECSI) Database. Accessed December 2005. http://www.deq.state.or.us/wmc/ECSI/ecsidetail.asp?seqnbr=2350

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

Table

Table 1 – *Summary of Chemical Analytical Results, Catch Basin Solids Sampling*

Figures

Figure 1 – *Outfall 52A Catch Basin Solids Sampling – Metals and PCBs*
Figure 2 – *Outfall 52A Catch Basin Solids Sampling – SVOCs*
Figure 3 – *Outfall 52A Catch Basin Solids Sampling – Total Petroleum Hydrocarbons (TPH)*

Attachments

Attachment A – *Field Photographs*
Attachment B – *Field Notes*
Attachment C – *Laboratory Results*

Table 1
Summary of Chemical Analytical Results
Catch Basin Solids Sampling
City Outfall Basin 52A

Class	Analyte	Units	West of RR Tracks Catch Basin Solids IL-52A-AAE628-0705 7/25/2005	East of RR Tracks Catch Basin Solids IL-52A-ANE069-0705 7/25/2005	JSCS Screening Level Value (Toxicity)[5]	JSCS Screening Level Value (Bioaccumulation)[6]	DEQ Default Background Concentrations Soil
Metals (EPA 6020)							
	Arsenic	mg/Kg	5.17	3.22	33	--	7
	Barium	mg/Kg	115	130	--	--	--
	Cadmium	mg/Kg	0.42	0.88	4.98	0.003	1
	Chromium	mg/Kg	25.7	43.8	111	4200	42
	Copper	mg/Kg	61.1	156	149	10	36
	Lead	mg/Kg	30.3	63.1	128	128	17
	Nickel	mg/Kg	21.0	21.6	48.6	316	38
	Silver	mg/Kg	0.10 U	0.10 U	5	--	1
	Zinc	mg/Kg	220	492	459	3	86
Mercury (EPA 7471)							
	Mercury	mg/Kg	0.0226 U	0.0207 U	1.06	--	0.07
PCBs (EPA 8082)							
	PCB 1260	µg/Kg	23	32.1	200	--	
PAHs (EPA 8270-SIM)							
	Acenaphthene	µg/Kg	4500	97.1	300	--	
	Acenaphthylene	µg/Kg	809	24 U	200	--	
	Anthracene	µg/Kg	12200	108	845	--	
	Benzo(a)anthracene	µg/Kg	15400	841	1050	--	
	Benzo(a)pyrene	µg/Kg	8440	1210	1450	--	
	Benzofluoranthenes	µg/Kg	19400	2050	13000	--	
	Benzo(g,h,i)perylene	µg/Kg	2610	811	300	--	
	Chrysene	µg/Kg	21000	1100	1290	--	
	Dibenzo(a,h)anthracene	µg/Kg	877	178	1300	--	
	Fluoranthene	µg/Kg	64800	1510	2230	--	
	Fluorene	µg/Kg	5200	120	536	--	
	Indeno(1,2,3-cd)pyrene	µg/Kg	2540	604	100	--	
	Naphthalene	µg/Kg	118	37.4	561	--	
	Phenanthrene	µg/Kg	26000	859	1170	--	
	Pyrene	µg/Kg	48500	1380	1520	--	
Phthalates (EPA 8270-SIM)							
	Bis(2-ethylhexyl)phthalate	µg/Kg	456	5910	800	330	
	Butylbenzylphthalate	µg/Kg	252 U	11300	--	--	
	Di-n-octylphthalate	µg/Kg	252 U	659	--	--	
Other SVOCs (EPA 8270-SIM)							
	4,6-Dinitro-2-methylphenol	µg/Kg	126 U	254	--	--	
	Dibenzofuran	µg/Kg	1950	60 U	--	--	
	Phenol	µg/Kg	63 U	96.4	50	--	
Total Petroleum Hydrocarbons (NWTPH-HCID Method)							
	Diesel	mg/Kg	50 U	50 U			
	Gasoline	mg/Kg	20 U	Detected			
	Heavy Fuel Oil	mg/Kg	Detected	Detected			
	Lube Oil	mg/Kg	Detected	Detected			
	Other	mg/Kg	100 U	100 U			
Total Petroleum Hydrocarbons (Diesel Range Extended Method)							
	Motor Oil	mg/Kg	2610	2730	--	--	
Total Petroleum Hydrocarbons (Gasoline Range Extended Method)							
	Gasoline Range Hydrocarbons	mg/Kg	NA	4 U	--	--	

Notes:

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

µg/Kg = micrograms per kilogram, dry weight ; mg/Kg = milligrams per kilogram, dry weight.

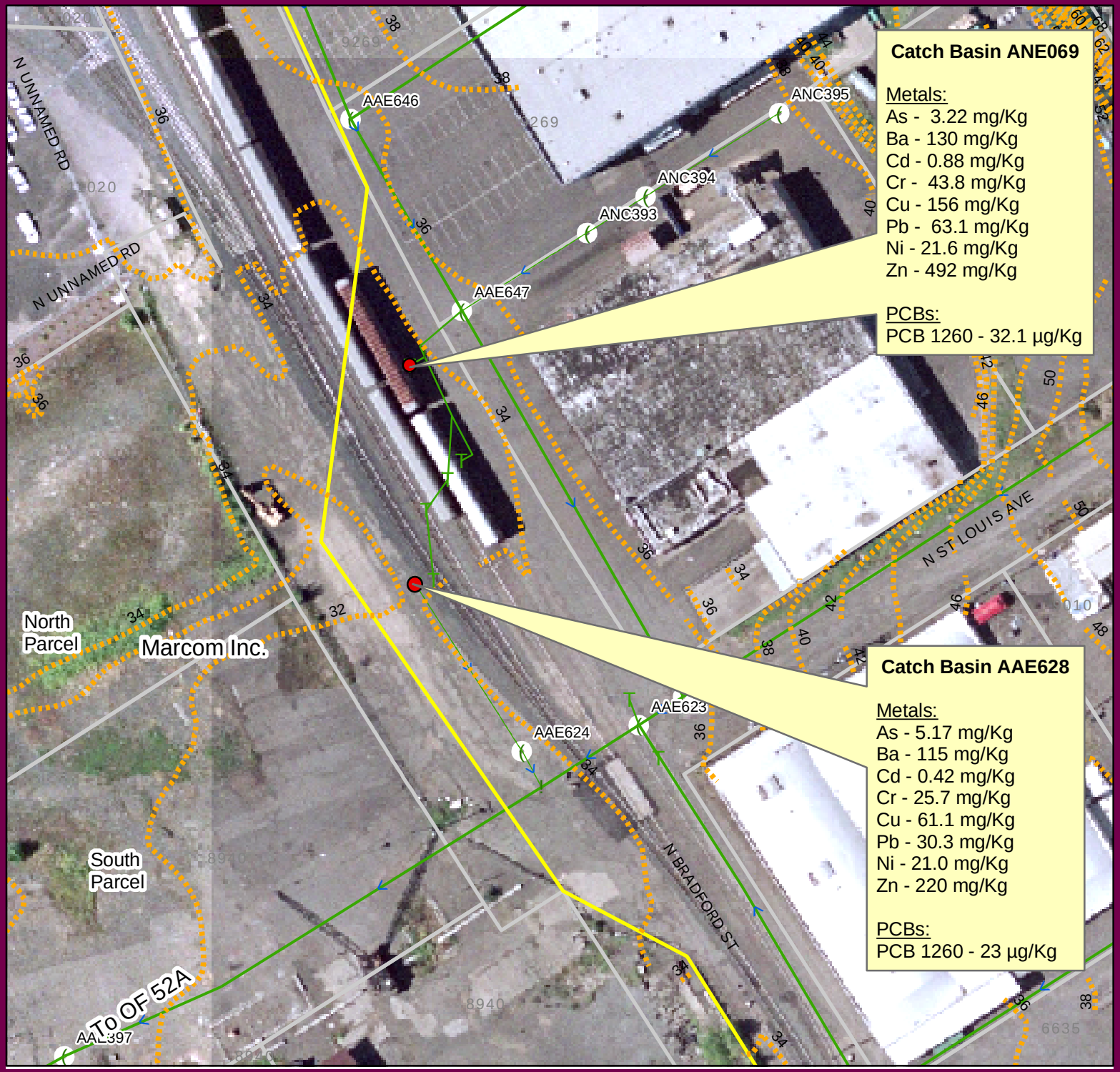
JSCS - Portland Harbor Joint Source Control Strategy (DEQ/EPA Final December 2005).

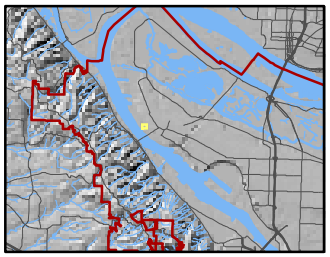
[5] MacDonald PEC and other SQVs Screening level for Soil/Catch Basin Sediment.

[6] DEQ 2001 Bioaccumulative Sediment SLVs Screening level for Soil/Catch Basin Sediment.

-- No JSCS screening level available.

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





Legend

- Storm Inlets
- Storm Pipe
- Manhole
- Taxlots
- 52A Basin Boundary
- Sample Location
- 2ft Contours

0 250 500 1000 Feet

Note: Only detected constituents are shown.

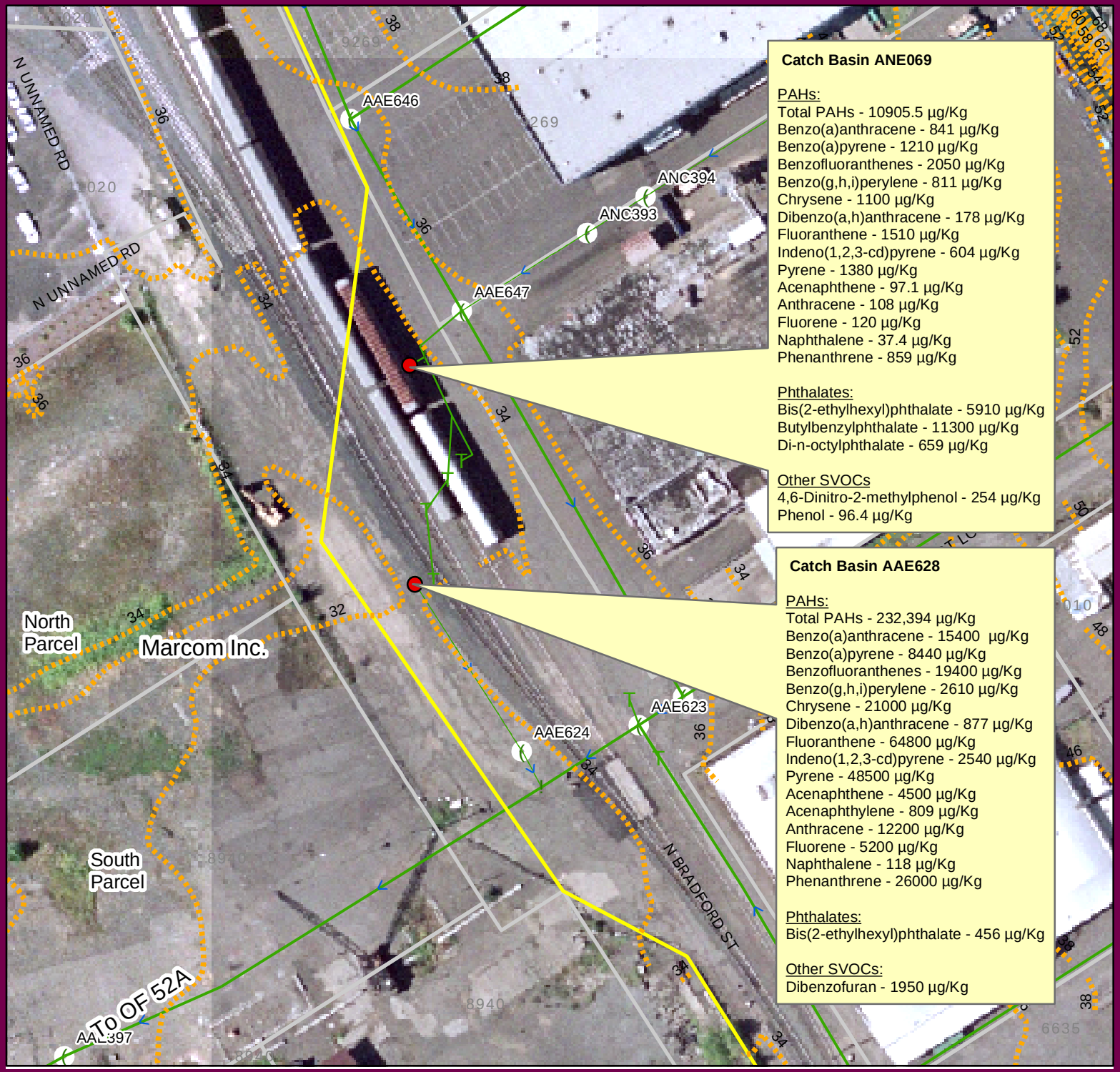
mg/Kg = milligrams/kilogram dry weight

µg/Kg = micrograms/kilogram dry weight

DEQ Environmental Cleanup Sites (ECSI) sites shown on map

Figure 1
Outfall 52A Catch Basin
Solids Sampling
Metals and PCBs
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_52A\figure1.mxd	**Program Manager:** Dawn Sanders Portland Harbor Superfund
Sheet No. 1 OF 1	**Date Printed:** 01/11/2006 **Prepared by:** Sara Gardner



Catch Basin ANE069

PAHs:
Total PAHs - 10905.5 µg/Kg
Benzo(a)anthracene - 841 µg/Kg
Benzo(a)pyrene - 1210 µg/Kg
Benzofluoranthenes - 2050 µg/Kg
Benzo(g,h,i)perylene - 811 µg/Kg
Chrysene - 1100 µg/Kg
Dibenzo(a,h)anthracene - 178 µg/Kg
Fluoranthene - 1510 µg/Kg
Indeno(1,2,3-cd)pyrene - 604 µg/Kg
Pyrene - 1380 µg/Kg
Acenaphthene - 97.1 µg/Kg
Anthracene - 108 µg/Kg
Fluorene - 120 µg/Kg
Naphthalene - 37.4 µg/Kg
Phenanthrene - 859 µg/Kg

Phthalates:
Bis(2-ethylhexyl)phthalate - 5910 µg/Kg
Butylbenzylphthalate - 11300 µg/Kg
Di-n-octylphthalate - 659 µg/Kg

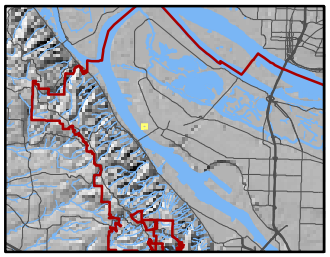
Other SVOCs
4,6-Dinitro-2-methylphenol - 254 µg/Kg
Phenol - 96.4 µg/Kg

Catch Basin AAE628

PAHs:
Total PAHs - 232,394 µg/Kg
Benzo(a)anthracene - 15400 µg/Kg
Benzo(a)pyrene - 8440 µg/Kg
Benzofluoranthenes - 19400 µg/Kg
Benzo(g,h,i)perylene - 2610 µg/Kg
Chrysene - 21000 µg/Kg
Dibenzo(a,h)anthracene - 877 µg/Kg
Fluoranthene - 64800 µg/Kg
Indeno(1,2,3-cd)pyrene - 2540 µg/Kg
Pyrene - 48500 µg/Kg
Acenaphthene - 4500 µg/Kg
Acenaphthylene - 809 µg/Kg
Anthracene - 12200 µg/Kg
Fluorene - 5200 µg/Kg
Naphthalene - 118 µg/Kg
Phenanthrene - 26000 µg/Kg

Phthalates:
Bis(2-ethylhexyl)phthalate - 456 µg/Kg

Other SVOCs:
Dibenzofuran - 1950 µg/Kg



Legend

- Storm Inlets
- Storm Pipe
- Manhole
- Taxlots
- 52A Basin Boundary
- Sample Location
- 2ft Contours

0 250 500 1000 Feet

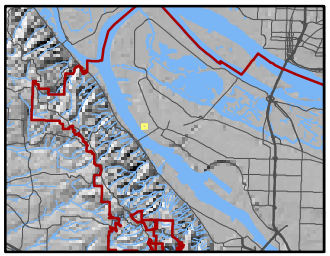
Note: Only detected constituents are shown.

µg/Kg = micrograms/kilogram dry weight

DEQ Environmental Cleanup Sites (ECSI) sites shown on map

Figure 2
Outfall 52A Catch Basin
Solids Sampling
SVOCs
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_52A\figure2_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

- Storm Inlets
- Storm Pipe
- Manhole
- Taxlots
- 52A Basin Boundary
- Sample Location
- 2ft Contours

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 52A Catch Basin Solids Sampling
Total Petroleum Hydrocarbons (TPH)
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_52A\figure3_021506_sg.mxd	**Program Manager:** Dawn Sanders Portland Harbor Superfund
Sheet No. 1 OF 1	**Date Printed:** 02/15/2006 **Prepared by:** Sara Gardner

Attachment A
Field Photographs

Photo 1 (July, 2005). Catch basin AAE628 was sampled for solids.

Photo 2 (July, 2005). Catch basin ANE069, with 12 – 14" of standing water. There are two chambers affiliated with this catch basin; samples were collected from the northern chamber (see Photo 3). Note the slight sheen on the water.

Photo 3 (July, 2005). Collecting solids from the northern chamber of catch basin ANE069.

Attachment B
Field Notes

City of Portland
Environmental Services

DAILY FIELD REPORT

Page 1 of 1

Project PORTLAND HARBOR INLINE SED SAMP
Location
Subject FIELD NOTES

Project No. 1020.001
Date 7/25/05
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 PER
PROCEED TO ALTERNATE. AAE069.

1220 PROCEED TO BASIN 46 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 AAG 647.
SAMPLE COLLECTED IN ENE FROM AAG 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

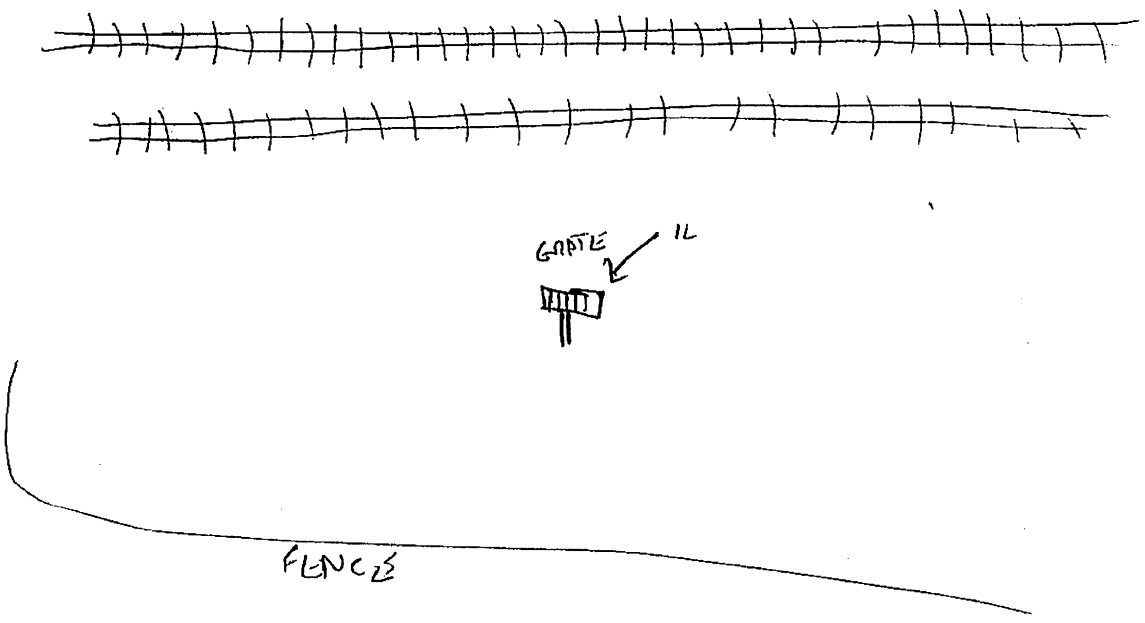
FIELD DATA SHEET

Date: 7/25/05	Time: 1123	Current Weather conditions: SUNNY	
Sampling Team Present: MJH/RJS/RCB			
Basin: 52A	Node: AAE 628	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:	COVER ENTIRE BOTTOM OF BOX TO 4-12" DEEP

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



SECTION 2 - SAMPLE COLLECTION REPORT		Node: AAE 628
Sampling Equipment:	SS SPOON + SS BUCKET	
Equipment Decontamination process:	(Per FOps SOP 70.1a)	Other (Describe)
Sample date: 7-25-05	Sample time: 1128	
Sample Identification: (IL-XX-NNNNNN-mmyy)	IL-52A-AAE628-0705	
Sample location: (number of feet from node of entry)	SAMPLE COLLECTED FROM CATCH BASIN ADJACENT TO TRAIN TRACKS	
Sample collection technique:	SS SPOON USED TO COLLECT SEDS INTO BUCKET.	
Color of sample:	DARK BROWN	
Texture/Particle size:	CLAY + SOME GRAVEL (3/4")	
Visual or olfactory evidence of contamination:	NO.	
Depth of solids in area where sample collected:	4"-12"	
Amount and type of debris:	ROCKS	
Compositing notes:	—	

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

Duplicate sample collected?	—
Duplicate sample fictitious identification # on COC:	
Samples placed in chilled cooler? (Y/N)	
Samples delivered to lab? (Y/N)	Lab ID Number: 10 050757
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

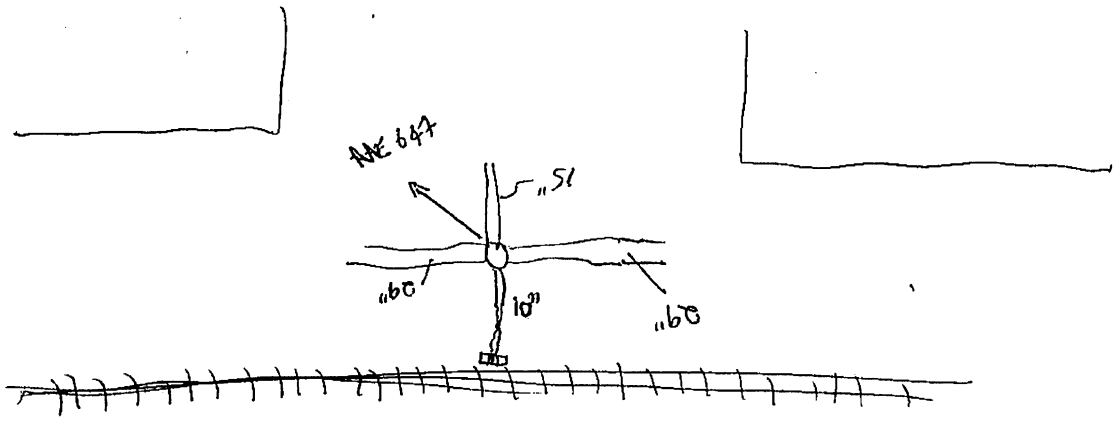
FIELD DATA SHEET

Date: 7/2	Time: 11 45	Current Weather conditions: SUNNY 70's	
Sampling Team Present: MJH / RLB / RJS			
Basin: 52A	Node: ANE 647	Subbasin:	
Address: N. BRADFORD			

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?	~~NO~~ NO (DARK RESIDUE on BOTTOM
Is there enough sediment in the line to collect a sample?	NO - NO SAMPLE COLLECTED. MOVE TO ALTERNATE LOCATION
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



— RIVER —

CITY OF PORTLAND

ENVIRONMENTAL SERVICES

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

PORTLAND HARBOUR INLINE SEDIMENT SAMPLING - 1020.001

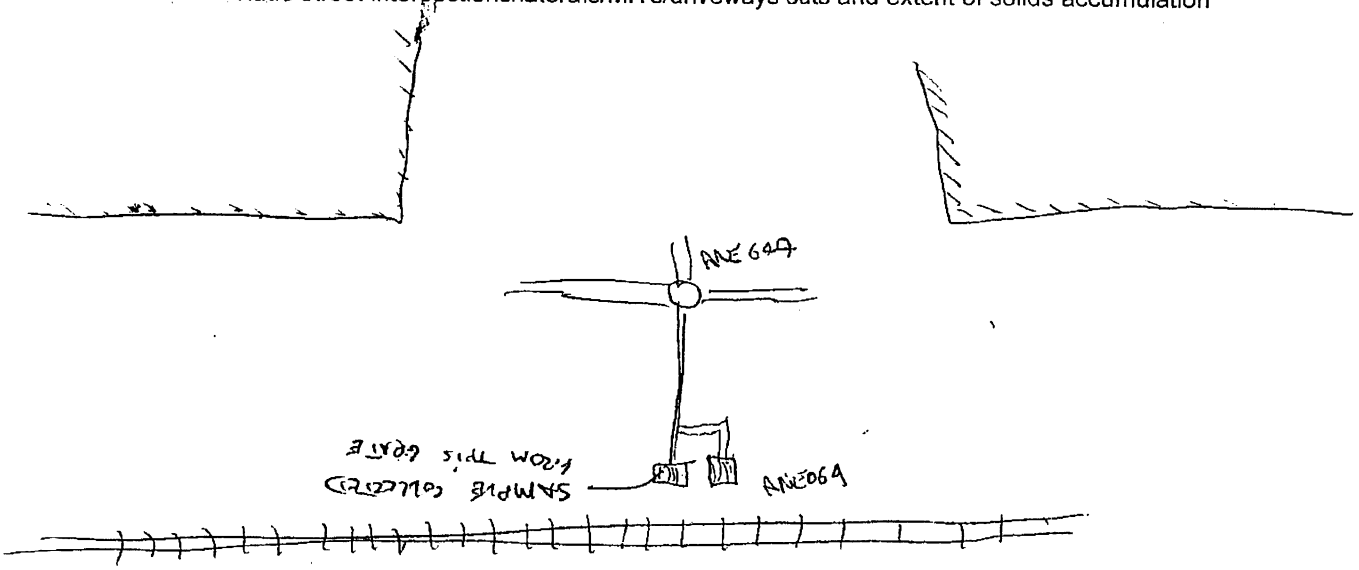
FIELD DATA SHEET

Date: 7/25/05	Time: 1200	Current Weather conditions:	SUNNY 70's
Sampling Team Present:	MJP / RJS / RCB		
Basin: S2A	Node: ANE 069	Subbasin:	
Address:	N. BRADFORD		

SECTION 1 - PRE-SAMPLING VISUAL OBSERVATION REPORT

Describe any flowing or standing water observed in the line?	WATER IN CATCH BASIN 2-3" DEEP GOOSE NECKS
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:	SILT BOX 2"-4" DEEP

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



SECTION 2 - SAMPLE COLLECTION REPORT		Node: ANE 069
Sampling Equipment:	SS SPOON + SS BUCKET.	
Equipment Decontamination process:	Per FOps SOP 70.1a	Other (Describe)
Sample date: 7/25/05	Sample time: 1207	
Sample Identification: (IL-XX-NNNNNN-mmyy)	IL - S2A - ANE069 - 0705	
Sample location: (number of feet from node of entry)	SAMPLE COLLECTED FROM THE NORTH CATCH BASIN.	
Sample collection technique:	SEDS SCOOPED FROM BOTTOM OF BOX	
Color of sample:	BLACK	
Texture/Particle size:	FINE TO SAND	
Visual or olfactory evidence of contamination:	HEAVY OIL SHEEN.	
Depth of solids in area where sample collected:	2"-9"	
Amount and type of debris:	—	
Compositing notes:	SAMPLE 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:	FO 050758
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 52A

To: File

From: Walter Burt, RG – GSI

Robyn Cook, GSI

Date: January 3, 2006

This memorandum presents a quality assurance/quality control (QA/QC) review of the laboratory data generated during source control investigation sampling and analyses recently conducted by the City of Portland (City) in Outfall Basin 52A. The results of the sampling and analysis are presented in Technical Memorandum No. OF 52A-1.

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

- BES Laboratory
  - Metals (EPA Method 6020)
  - Total Petroleum Hydrocarbons – Diesel Range Extended (NWTPH-Dx Method)
  - Total Petroleum Hydrocarbons – Identification (NWTPH-HCID Method)
- STL Laboratory
  - Polychlorinated Biphenyls (EPA Method 8082)
  - Semi-volatile Organics (EPA Method 8270-SIM)
  - Mercury by CVAA (EPA Method 7471)
- North Creek Analytical
  - Total Petroleum Hydrocarbons – Gasoline Range Extended (NWTPH-Gx Method)

Attachment C of the Technical Memorandum No. OF 52A-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.

Total Petroleum Hydrocarbons (NWTPH-Dx, NWTPH-HCID, NWTPH-Gx) Analyses
All samples were extracted and analyzed within the required holding times.

Polychlorinated Biphenyls (PCBs) 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, total petroleum hydrocarbons, PCBs and mercury. No chemicals were detected in the method blanks associated with SVOCs, total petroleum hydrocarbons, PCBs or mercury.

Surrogate Recoveries

Surrogate recoveries were completed during the laboratory analysis of SVOCs, PCBs, total petroleum hydrocarbons. Surrogate recoveries were within laboratory control limits for the PCBs or total petroleum hydrocarbons analyses. One surrogate (p-Terphenyl-d14) was outside of laboratory control limits for one of the SVOC samples. All other surrogates were within laboratory control limits, and laboratory control sample surrogates were within laboratory control limits; consequently no data were qualified.

Laboratory Duplicates

Laboratory duplicates were processed during the laboratory analyses of mercury and total petroleum hydrocarbons. The results from the total petroleum hydrocarbons analysis of both the sample and the laboratory duplicates were non-detect; accordingly, relative percent differences (RPDs) could not be calculated. Relative percent differences (RPDs) calculated for mercury analyses were within analytical accuracy control limits.

Laboratory Control Sample Recoveries

Laboratory control samples were processed during the laboratory analyses of SVOCs, PCBs, total petroleum hydrocarbons, 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 were processed during the laboratory analyses of SVOCs, PCBs. The RPDs between the laboratory blank spikes and the laboratory blank spike duplicates were within laboratory control limits for the analyses of SVOCs. The The RPDs between the laboratory blank spikes and the laboratory blank spike duplicates were outside of laboratory control limits for the analyses of PCBs, but because the percent recoveries were within acceptance range no data were qualified.

Laboratory matrix spike duplicates were processed during the laboratory analyses of SVOCs, PCBs and total petroleum hydrocarbons. The RPDs between the laboratory matrix spikes and the laboratory matrix spike duplicates were within laboratory control limits for seven of ten compounds in the analyses of SVOCs. Matrix interference was indicated based on acceptable blank spike recoveries. The RPDs between the laboratory matrix spikes and the laboratory matrix spike duplicates were outside of laboratory control limits for aroclor 1260 in the analyses of PCBs. Again, because the percent recoveries were within acceptance range no data were qualified. The RPDs between the laboratory matrix spikes and the laboratory matrix spike duplicates were within laboratory control limits for the analyses of total petroleum hydrocarbons.

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 | RLB
RJS

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

Requested Analyses

OUTFALL 52A

[1]Run NWTPH-Dx and NWTPH-Gx if detect on NWTPH-HCID scan
*PCBs and Semi-volatiles 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 of Portland

~~7/25/05~~

WPCL Sample I.D.	Location	Point Code	Sample Date	Sample Time	Sample Type	General: PCBs (STL)	General: NWTPH-HCID[1]	General: SVOCs - LHS Custom List	Metals: Total Metals (Ag, As, Ba, Cd, Cr, Cu, Hg, Ni, Pb, Zn)	Metals: HG - 7471 *	Field Comments
FO 080757	IL-52A-AAE628-~~0705~~ 8940 N BRADFORD ST	52A_1	7/25/05	1128	C	●	●	●	●	●	* Added 8/3/05 per PHA
FO 080758	IL-52A-ANE069-~~0705~~ 9125 N BRADFORD ST	52A_2	7/25/05	1207	C	●	●	●	●	●	
	Original-0705 is correct. ~~7/25/05~~ 8/3/05										

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

City of Portland
Water Pollution Control Laboratory
Laboratory Analysis Report

Sample Date/Time 7/25/2005 11:28 **System ID** AJ07084 **Sample ID** **FO050757**

Page: 1

Proj./Company Name: PORTLAND HARBOR INLINE SAMP
Address/Location: IL-52A-AAE628-0705
8940 N BRADFORD ST

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

Proj Subcategory: REGULATORY PLAN & EVAL
Sample Point Code: 52A_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				
ARSENIC	5.17	mg/Kg dry wt	0.50	EPA 6020
BARIUM	115	mg/Kg dry wt	0.10	EPA 6020
CADMIUM	0.42	mg/Kg dry wt	0.10	EPA 6020
CHROMIUM	25.7	mg/Kg dry wt	0.50	EPA 6020
COPPER	61.1	mg/Kg dry wt	0.25	EPA 6020
LEAD	30.3	mg/Kg dry wt	0.10	EPA 6020
MERCURY	0.032	mg/Kg dry wt	0.010	EPA 6020
NICKEL	21.0	mg/Kg dry wt	0.25	EPA 6020
SILVER	<0.10	mg/Kg dry wt	0.10	EPA 6020
ZINC	220	mg/Kg dry wt	0.50	EPA 6020
OUTSIDE				
MERCURY	<0.0226	mg/Kg dry wt	0.0226	EPA 7471
POLYCHLORINATED BIPHENYLS (PCB)				
PCB 1016	<12.7	µg/Kg dry wt	12.7	EPA 8082
PCB 1221	<12.7	µg/Kg dry wt	12.7	EPA 8082
PCB 1232	<12.7	µg/Kg dry wt	12.7	EPA 8082
PCB 1242	<12.7	µg/Kg dry wt	12.7	EPA 8082
PCB 1248	<12.7	µg/Kg dry wt	12.7	EPA 8082
PCB 1254	<12.7	µg/Kg dry wt	12.7	EPA 8082
PCB 1260	23.0	µg/Kg dry wt	12.7	EPA 8082
SEMI-VOLATILE ORGANICS - CUSTOM				
2-Methylnaphthalene	<25.2	µg/Kg dry wt	25.2	EPA 8270-SIM
Acenaphthene	4500	µg/Kg dry wt	25.2	EPA 8270-SIM
Acenaphthylene	809	µg/Kg dry wt	25.2	EPA 8270-SIM
Anthracene	12200	µg/Kg dry wt	25.2	EPA 8270-SIM
Benzo(a)anthracene	15400	µg/Kg dry wt	25.2	EPA 8270-SIM

Report Date: 9/16/2005

Validated By: Signature on File

City of Portland
Water Pollution Control Laboratory
Laboratory Analysis Report

Sample Date/Time 7/25/2005 11:28 **System ID** AJ07084 **Sample ID** **FO050757**

Proj./Company Name: PORTLAND HARBOR INLINE SAMP
Address/Location: IL-52A-AAE628-0705

8940 N BRADFORD ST

Proj Subcategory: REGULATORY PLAN & EVAL
Sample Point Code: 52A_1
IMS File/Invoice #: 1020.001

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

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
Benzo(a)pyrene	8440	µg/Kg dry wt	25.2	EPA 8270-SIM
Benzo(g,h,i)perylene	2610	µg/Kg dry wt	25.2	EPA 8270-SIM
Benzofluoranthenes	19400	µg/Kg dry wt	50.4	EPA 8270-SIM
Bis(2-ethylhexyl) phthalate	456	µg/Kg dry wt	252	EPA 8270-SIM
Butylbenzylphthalate	<252	µg/Kg dry wt	252	EPA 8270-SIM
Chrysene	21000	µg/Kg dry wt	25.2	EPA 8270-SIM
Dibenzo(a,h)anthracene	877	µg/Kg dry wt	25.2	EPA 8270-SIM
Diethyl phthalate	<126	µg/Kg dry wt	126	EPA 8270-SIM
Dimethyl phthalate	<126	µg/Kg dry wt	126	EPA 8270-SIM
Di-n-butyl phthalate	<126	µg/Kg dry wt	126	EPA 8270-SIM
Di-n-octyl phthalate	<252	µg/Kg dry wt	252	EPA 8270-SIM
Fluoranthene	64800	µg/Kg dry wt	25.2	EPA 8270-SIM
Fluorene	5200	µg/Kg dry wt	25.2	EPA 8270-SIM
Indeno(1,2,3-cd)pyrene	2540	µg/Kg dry wt	25.2	EPA 8270-SIM
Naphthalene	118	µg/Kg dry wt	25.2	EPA 8270-SIM
Phenanthrene	26000	µg/Kg dry wt	25.2	EPA 8270-SIM
Pyrene	48500	µg/Kg dry wt	25.2	EPA 8270-SIM
NWTPH-Dx				
#6 FUEL OIL	<400	mg/Kg dry wt	400	NWTPH-Dx
DIESEL	<200	mg/Kg dry wt	200	NWTPH-Dx
KEROSENE	<200	mg/Kg dry wt	200	NWTPH-Dx
MOTOR OIL	2610	mg/Kg dry wt	400	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

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

Report Date: 9/16/2005

Validated By: Signature on File

City of Portland
Water Pollution Control Laboratory
Laboratory Analysis Report

Sample Date/Time 7/25/2005 11:28 **System ID** AJ07084 **Sample ID** **FO050757**

Proj./Company Name: PORTLAND HARBOR INLINE SAMP
Address/Location: IL-52A-AAE628-0705

8940 N BRADFORD ST

Proj Subcategory: REGULATORY PLAN & EVAL
Sample Point Code: 52A_1
IMS File/Invoice #: 1020.001

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

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
Surrogate Recovery (%)	100	mg/Kg dry wt		NWTPH-HCID

End of Report for Sample ID: FO050757

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Report Date: 9/16/2005

Validated By: Signature on File

City of Portland
Water Pollution Control Laboratory
Laboratory Analysis Report

Sample Date/Time 7/25/2005 12:07 **System ID** AJ07085 **Sample ID** **FO050758**

Page: 1

Proj./Company Name: PORTLAND HARBOR INLINE SAMP
Address/Location: IL-52A-ANE069-0705
9125 N BRADFORD ST

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

Proj Subcategory: REGULATORY PLAN & EVAL
Sample Point Code: 52A_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				
ARSENIC	3.22	mg/Kg dry wt	0.50	EPA 6020
BARIUM	130	mg/Kg dry wt	0.10	EPA 6020
CADMIUM	0.88	mg/Kg dry wt	0.10	EPA 6020
CHROMIUM	43.8	mg/Kg dry wt	0.50	EPA 6020
COPPER	156	mg/Kg dry wt	0.25	EPA 6020
LEAD	63.1	mg/Kg dry wt	0.10	EPA 6020
MERCURY	0.034	mg/Kg dry wt	0.010	EPA 6020
NICKEL	21.6	mg/Kg dry wt	0.25	EPA 6020
SILVER	<0.10	mg/Kg dry wt	0.10	EPA 6020
ZINC	492	mg/Kg dry wt	0.50	EPA 6020
OUTSIDE				
MERCURY	<0.0207	mg/Kg dry wt	0.0207	EPA 7471
NWTPH-Gx				
GASOLINE RANGE HYDROCARBONS	<4.00	mg/Kg dry wt	4.00	NWTPH-Gx
POLYCHLORINATED BIPHENYLS (PCB)				
PCB 1016	<11.7	µg/Kg dry wt	11.7	EPA 8082
PCB 1221	<11.7	µg/Kg dry wt	11.7	EPA 8082
PCB 1232	<11.7	µg/Kg dry wt	11.7	EPA 8082
PCB 1242	<11.7	µg/Kg dry wt	11.7	EPA 8082
PCB 1248	<11.7	µg/Kg dry wt	11.7	EPA 8082
PCB 1254	<11.7	µg/Kg dry wt	11.7	EPA 8082
PCB 1260	32.1	µg/Kg dry wt	11.7	EPA 8082
SEMI-VOLATILE ORGANICS - CUSTOM				
2-Methylnaphthalene	<24.0	µg/Kg dry wt	24.0	EPA 8270-SIM
Acenaphthene	97.1	µg/Kg dry wt	24.0	EPA 8270-SIM

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Report Date: 9/16/2005

Validated By: Signature on File

City of Portland
Water Pollution Control Laboratory
Laboratory Analysis Report

Sample Date/Time 7/25/2005 12:07 **System ID** AJ07085 **Sample ID** **FO050758**

Proj./Company Name: PORTLAND HARBOR INLINE SAMP
Address/Location: IL-52A-ANE069-0705

9125 N BRADFORD ST

Proj Subcategory: REGULATORY PLAN & EVAL
Sample Point Code: 52A_2
IMS File/Invoice #: 1020.001

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

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
Acenaphthylene	<24	µg/Kg dry wt	24.0	EPA 8270-SIM
Anthracene	108	µg/Kg dry wt	24.0	EPA 8270-SIM
Benzo(a)anthracene	841	µg/Kg dry wt	24.0	EPA 8270-SIM
Benzo(a)pyrene	1210	µg/Kg dry wt	24.0	EPA 8270-SIM
Benzo(g,h,i)perylene	811	µg/Kg dry wt	24.0	EPA 8270-SIM
Benzofluoranthenes	2050	µg/Kg dry wt	48.0	EPA 8270-SIM
Bis(2-ethylhexyl) phthalate	5910	µg/Kg dry wt	240	EPA 8270-SIM
Butylbenzylphthalate	11300	µg/Kg dry wt	240	EPA 8270-SIM
Chrysene	1100	µg/Kg dry wt	24.0	EPA 8270-SIM
Dibenzo(a,h)anthracene	178	µg/Kg dry wt	24.0	EPA 8270-SIM
Diethyl phthalate	<120	µg/Kg dry wt	120	EPA 8270-SIM
Dimethyl phthalate	<120	µg/Kg dry wt	120	EPA 8270-SIM
Di-n-butyl phthalate	<120	µg/Kg dry wt	120	EPA 8270-SIM
Di-n-octyl phthalate	659	µg/Kg dry wt	240	EPA 8270-SIM
Fluoranthene	1510	µg/Kg dry wt	24.0	EPA 8270-SIM
Fluorene	120	µg/Kg dry wt	24.0	EPA 8270-SIM
Indeno(1,2,3-cd)pyrene	604	µg/Kg dry wt	24.0	EPA 8270-SIM
Naphthalene	37.4	µg/Kg dry wt	24.0	EPA 8270-SIM
Phenanthrene	859	µg/Kg dry wt	24.0	EPA 8270-SIM
Pyrene	1380	µg/Kg dry wt	24.0	EPA 8270-SIM
NWTPH-Dx				
#6 FUEL OIL	<400	mg/Kg dry wt	400	NWTPH-Dx
DIESEL	<200	mg/Kg dry wt	200	NWTPH-Dx
KEROSENE	<200	mg/Kg dry wt	200	NWTPH-Dx
MOTOR OIL	2730	mg/Kg dry wt	400	NWTPH-Dx
NWTPH-HCID				
DIESEL	<50	mg/Kg dry wt	50	NWTPH-HCID
GASOLINE	DET	mg/Kg dry wt	20	NWTPH-HCID

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Report Date: 9/16/2005

Validated By: Signature on File

City of Portland
Water Pollution Control Laboratory
Laboratory Analysis Report

Sample Date/Time 7/25/2005 12:07 **System ID** AJ07085 **Sample ID** **FO050758**

Proj./Company Name: PORTLAND HARBOR INLINE SAMP
Address/Location: IL-52A-ANE069-0705

9125 N BRADFORD ST

Proj Subcategory: REGULATORY PLAN & EVAL
Sample Point Code: 52A_2
IMS File/Invoice #: 1020.001

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

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
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 (%)	100	mg/Kg dry wt		NWTPH-HCID

End of Report for Sample ID: FO050758

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Report Date: 9/16/2005

Validated By: Signature on File

www.ncalabs.com

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

September 03, 2005

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

RE: Portland Harbor

Enclosed are the results of analyses for samples received by the laboratory on 08/03/05 17:15.
The following list is a summary of the NCA Work Orders contained in this report.
If you have any questions concerning this report, please feel free to contact me.

Work	Project	ProjectNumber
P5H0166	Portland Harbor	40567

Thank You,

Howard Holmes, Project Manager

www.ncalabs.com

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
phone: (425) 420.9200 fax: (425) 420.9210
Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
phone: (509) 924.9200 fax: (509) 924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
phone: (503) 906.9200 fax: (503) 906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
phone: (541) 383.9310 fax: 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
phone: (907) 563.9200 fax: (907) 563.9210

City of Portland Water Pollution Laboratory	Project Name:	**Portland Harbor**	
6543 N. Burlington Ave.	Project Number:	40567	Report Created:
Portland, OR 97203	Project Manager:	Jennifer Shackelford	09/03/05 16:19

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
FO 050806	P5H0166-01	Soil	08/02/05 11:10	08/03/05 17:15
FO 050807	P5H0166-02	Soil	08/02/05 11:45	08/03/05 17:15
FO 050808	P5H0166-03	Soil	08/02/05 12:15	08/03/05 17:15
FO 050809	P5H0166-04	Soil	08/02/05 13:50	08/03/05 17:15
FO 050758	P5H0166-05	Soil	07/22/05 12:07	08/03/05 17:15

North Creek Analytical - Portland

Howard Holmes, Project Manager

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

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City of Portland Water Pollution Laboratory	Project Name: **Portland Harbor**	
6543 N. Burlington Ave.	Project Number: 40567	Report Created:
Portland, OR 97203	Project Manager: Jennifer Shackelford	09/03/05 16:19

Gasoline Hydrocarbons per NW TPH-Gx Method

North Creek Analytical - Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
P5H0166-05 Soil	**FO 050758**	**Sampled: 07/22/05 12:07**								
Gasoline Range Hydrocarbons	NW TPH-Gx	ND	-----	4.00	mg/kg dry	1x	5080187	08/04/05	08/04/05 23:21	
Surrogate(s): a,a,a-TFT		*Recovery: 88.7%*		*Limits: 50 - 150 %*		"			"	

North Creek Analytical - Portland

Howard Holmes, Project Manager

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City of Portland Water Pollution Laboratory	Project Name: **Portland Harbor**	
6543 N. Burlington Ave.	Project Number: 40567	Report Created:
Portland, OR 97203	Project Manager: Jennifer Shackelford	09/03/05 16:19

Percent Dry Weight (Solids) per Standard Methods

North Creek Analytical - Portland

Analyte		Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
P5H0166-05	**Soil**	**FO 050758**	**Sampled: 07/22/05 12:07**								
% Solids		NCA SOP	*78.6*	—	1.00	% by Weight	1x	5080388	08/09/05	08/10/05 10:58	

North Creek Analytical - Portland

Howard Holmes, Project Manager

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City of Portland Water Pollution Laboratory	Project Name: **Portland Harbor**	
6543 N. Burlington Ave.	Project Number: 40567	Report Created:
Portland, OR 97203	Project Manager: Jennifer Shackelford	09/03/05 16:19

Gasoline Hydrocarbons per NW TPH-Gx Method - Laboratory Quality Control Results

North Creek Analytical - Portland

QC Batch: 5080187 **Soil Preparation Method: EPA 5035 Modified**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (5080187-BLK1)							Extracted: 08/04/05 11:05							
Gasoline Range Hydrocarbons	NW TPH-Gx	ND	—	4.00	mg/kg	1x	--	--	--	--	--	--	08/04/05 12:08	
Surrogate(s): a,a,a-TFT		*Recovery: 113%*		*Limits: 50-150%*	"								*08/04/05 12:08*	
LCS (5080187-BS1)							Extracted: 08/04/05 11:05							
Gasoline Range Hydrocarbons	NW TPH-Gx	39.8	—	4.00	mg/kg	1x	--	49.7	80.1%	(70-130)	--	--	08/04/05 12:39	
Surrogate(s): a,a,a-TFT		*Recovery: 112%*		*Limits: 50-150%*	"								*08/04/05 12:39*	
Duplicate (5080187-DUP1)				QC Source: PSH0173-01			Extracted: 08/04/05 11:05							
Gasoline Range Hydrocarbons	NW TPH-Gx	ND	—	4.00	mg/kg dry	1x	5.66	--	--	--	40.6%	(40)	08/04/05 16:05	Q-06
Surrogate(s): a,a,a-TFT		*Recovery: 105%*		*Limits: 50-150%*	"								*08/04/05 16:05*	
Duplicate (5080187-DUP2)				QC Source: PSH0164-01			Extracted: 08/04/05 11:05							
Gasoline Range Hydrocarbons	NW TPH-Gx	ND	—	4.00	mg/kg dry	1x	ND	--	--	--	73.7%	(40)	08/04/05 18:45	Q-06
Surrogate(s): a,a,a-TFT		*Recovery: 104%*		*Limits: 50-150%*	"								*08/04/05 18:45*	
Matrix Spike (5080187-MS1)				QC Source: PSH0173-02			Extracted: 08/04/05 11:05							
Gasoline Range Hydrocarbons	NW TPH-Gx	51.8	--	4.00	mg/kg dry	1x	1.20	59.8	84.6%	(65-130)	--	--	08/04/05 16:36	
Surrogate(s): a,a,a-TFT		*Recovery: 117%*		*Limits: 50-150%*	"								*08/04/05 16:36*	
Matrix Spike Dup (5080187-MSD1)				QC Source: PSH0173-02			Extracted: 08/04/05 11:14							
Gasoline Range Hydrocarbons	NW TPH-Gx	54.9	—	4.00	mg/kg dry	1x	1.20	57.6	93.2%	(65-130)	5.81%	(35)	08/04/05 17:43	
Surrogate(s): a,a,a-TFT		*Recovery: 119%*		*Limits: 50-150%*	"								*08/04/05 17:43*	

North Creek Analytical - Portland

Howard Holmes, Project Manager

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City of Portland Water Pollution Laboratory	Project Name: **Portland Harbor**	
6543 N. Burlington Ave.	Project Number: 40567	Report Created:
Portland, OR 97203	Project Manager: Jennifer Shackelford	09/03/05 16:19

Percent Dry Weight (Solids) per Standard Methods - Laboratory Quality Control Results

North Creek Analytical - Portland

QC Batch: 5080388 **Soil Preparation Method: Dry Weight**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Duplicate (5080388-DUP1)					QC Source: P5H0165-01				Extracted: 08/09/05 11:39					
% Solids	NCA SOP	82.8	---	1.00	% by Weight	1x	82.7	--	--	--	0.121%	(20)	08/10/05 10:58	
Duplicate (5080388-DUP2)					QC Source: P5H0165-02				Extracted: 08/09/05 11:39					
% Solids	NCA SOP	81.8	---	1.00	% by Weight	1x	82.0	--	--	--	0.244%	(20)	08/10/05 10:58	

North Creek Analytical - Portland

Howard Holmes, Project Manager

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City of Portland Water Pollution Laboratory	Project Name:	Portland Harbor	
6543 N. Burlington Ave.	Project Number:	40567	Report Created:
Portland, OR 97203	Project Manager:	Jennifer Shackelford	09/03/05 16:19

Notes and Definitions

Report Specific Notes:

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

Laboratory Reporting Conventions:

DET - Analyte DETECTED at or above the Reporting Limit. Qualitative Analyses only.

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

NR / NA - Not Reported / Not Available

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

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

RPD - Relative Percent Difference. (RPDs calculated using Results, not Percent Recoveries).

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

MDL* - METHOD DETECTION LIMIT. Reporting Level at, or above, the statistically derived limit based on 40CFR, Part 136, Appendix B. *MDLs are listed on the report only if the data has been evaluated below the MRL. Results between the MDL and MRL are reported as Estimated results.

Dil - Dilutions are calculated based on deviations from the standard dilution performed for an analysis, and may not represent the dilution found on the analytical raw data.

Reporting limits - Reporting limits (MDLs and MRLs) are adjusted based on variations in sample preparation amounts, analytical dilutions and percent solids, where applicable.

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: September 13, 2005

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

PROJECT: P5G0989

REPORT NUMBER: 129066 REV

TOTAL NUMBER OF PAGES: _____

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

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

Revision: This report includes Mercury analysis for all samples.

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
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:	P5G0989-01
Lab ID:	129066-01
Date Received:	7/27/2005
Date Prepared:	7/29/2005
Date Analyzed:	8/8/2005
% Solids	77.09
Dilution Factor	10

Semivolatile Organics by EPA Method 8270

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
2 - Fluorophenol	58.4		36	145
Phenol - d5	62.3		38	149
Nitrobenzene - d5	88.9		38	141
2 - Fluorobiphenyl	91.4		42	140
2,4,6 - Tribromophenol	82.7		28	143
p - Terphenyl - d14	207	X9	42	151

Sample results are on a dry weight basis.

		Result		
Analyte		**(ug/kg)**	**RL**	**Flags**
Phenol	ND		63	
bis(2-Chloroethyl)ether	ND		126	
2-Chlorophenol	ND		63	
1,3-Dichlorobenzene	ND		63	
1,4-Dichlorobenzene	ND		63	
Benzyl Alcohol	ND		63	
1,2-Dichlorobenzene	ND		63	
2-Methylphenol	ND		63	
bis(2-Chloroisopropyl)ether	ND		315	
3-&4-Methylphenol	ND		63	
N-nitroso-di-n-propylamine	ND		63	
Hexachloroethane	ND		63	
Nitrobenzene	ND		126	
Isophorone	ND		126	
2-Nitrophenol	ND		63	
2,4-Dimethylphenol	ND		25.2	
Benzoic Acid	ND		756	
bis(2-Chloroethoxy)methane	ND		126	
2,4-Dichlorophenol	ND		63	
1,2,4-Trichlorobenzene	ND		63	
Naphthalene		118	25.2	
4-Chloroaniline	ND		126	
Hexachlorobutadiene	ND		63	
4-Chloro-3-methylphenol	ND		63	
2-Methylnaphthalene	ND		25.2	
Hexachlorocyclopentadiene	ND		63	

STL Seattle

Semivolatile Organics by EPA Method 8270 data for 129066-01 continued...

Analyte		Result (ug/kg)	RL	Flags
2,4,6-Trichlorophenol	ND		63	
2,4,5-Trichlorophenol	ND		63	
2-Chloronaphthalene	ND		25.2	
2-Nitroaniline	ND		25.2	
Dimethylphthalate	ND		126	
Acenaphthylene		809	25.2	
2,6-Dinitrotoluene	ND		63	
3-Nitroaniline	ND		126	
Acenaphthene		4500	25.2	D10
2,4-Dinitrophenol	ND		630	
4-Nitrophenol	ND		630	
Dibenzofuran		1950	63	
2,4-Dinitrotoluene	ND		126	
Diethylphthalate	ND		126	
4-Chlorophenylphenylether	ND		126	
Fluorene		5200	25.2	D10
4-Nitroaniline	ND		252	
4,6-Dinitro-2-methylphenol	ND		126	
N-Nitrosodiphenylamine	ND		25.2	
4-Bromophenylphenylether	ND		126	
Hexachlorobenzene	ND		25.2	
Pentachlorophenol	ND		126	
Phenanthrene		26000	25.2	D10
Anthracene		12200	25.2	D10
Di-n-butylphthalate	ND		126	
Fluoranthene		64800	25.2	D100
Pyrene		48500	25.2	D100
Butylbenzylphthalate	ND		252	
3,3'-Dichlorobenzidine	ND		252	
Benzo(a)anthracene		15400	25.2	D10
Chrysene		21000	25.2	D10
bis(2-Ethylhexyl)phthalate		456	252	
Di-n-octylphthalate	ND		252	
Benzofluoranthenes		19400	50.4	D10
Benzo(a)pyrene		8440	25.2	D10
Indeno(1,2,3-cd)pyrene		2540	25.2	
Dibenz(a,h)anthracene		877	25.2	
Benzo(g,h,i)perylene		2610	25.2	

STL Seattle

Client Name:	North Creek Analytical
Client ID:	P5G0989-02
Lab ID:	129066-02
Date Received:	7/27/2005
Date Prepared:	7/29/2005
Date Analyzed:	8/8/2005
% Solids	82.37
Dilution Factor	10

Semivolatile Organics by EPA Method 8270

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
2 - Fluorophenol	93.4		36	145
Phenol - d5	65.4		38	149
Nitrobenzene - d5	74.1		38	141
2 - Fluorobiphenyl	83.5		42	140
2,4,6 - Tribromophenol	104		28	143
p - Terphenyl - d14	92.7		42	151

Sample results are on a dry weight basis.

		Result		
Analyte		**(ug/kg)**	**RL**	**Flags**
Phenol		96.4	60	
bis(2-Chloroethyl)ether	ND		120	
2-Chlorophenol	ND		60	
1,3-Dichlorobenzene	ND		60	
1,4-Dichlorobenzene	ND		60	
Benzyl Alcohol	ND		60	
1,2-Dichlorobenzene	ND		60	
2-Methylphenol	ND		60	
bis(2-Chloroisopropyl)ether	ND		300	
3-&4-Methylphenol	ND		60	
N-nitroso-di-n-propylamine	ND		60	
Hexachloroethane	ND		60	
Nitrobenzene	ND		120	
Isophorone	ND		120	
2-Nitrophenol	ND		60	
2,4-Dimethylphenol	ND		24	
Benzoic Acid	ND		719	
bis(2-Chloroethoxy)methane	ND		120	
2,4-Dichlorophenol	ND		60	
1,2,4-Trichlorobenzene	ND		60	
Naphthalene		37.4	24	
4-Chloroaniline	ND		120	
Hexachlorobutadiene	ND		60	
4-Chloro-3-methylphenol	ND		60	
2-Methylnaphthalene	ND		24	
Hexachlorocyclopentadiene	ND		60	

STL Seattle

Semivolatile Organics by EPA Method 8270 data for 129066-02 continued...

Analyte		Result (ug/kg)	RL	Flags
2,4,6-Trichlorophenol	ND		60	
2,4,5-Trichlorophenol	ND		60	
2-Chloronaphthalene	ND		24	
2-Nitroaniline	ND		24	
Dimethylphthalate	ND		120	
Acenaphthylene	ND		24	
2,6-Dinitrotoluene	ND		60	
3-Nitroaniline	ND		120	
Acenaphthene		97.1	24	
2,4-Dinitrophenol	ND		600	
4-Nitrophenol	ND		600	
Dibenzofuran	ND		60	
2,4-Dinitrotoluene	ND		120	
Diethylphthalate	ND		120	
4-Chlorophenylphenylether	ND		120	
Fluorene		120	24	
4-Nitroaniline	ND		240	
4,6-Dinitro-2-methylphenol		254	120	
N-Nitrosodiphenylamine	ND		24	
4-Bromophenylphenylether	ND		120	
Hexachlorobenzene	ND		24	
Pentachlorophenol	ND		120	
Phenanthrene		859	24	
Anthracene		108	24	
Di-n-butylphthalate	ND		120	
Fluoranthene		1510	24	
Pyrene		1380	24	
Butylbenzylphthalate		11300	240	D10
3,3'-Dichlorobenzidine	ND		240	
Benzo(a)anthracene		841	24	
Chrysene		1100	24	
bis(2-Ethylhexyl)phthalate		5910	240	D10
Di-n-octylphthalate		659	240	
Benzofluoranthenes		2050	48	
Benzo(a)pyrene		1210	24	
Indeno(1,2,3-cd)pyrene		604	24	
Dibenz(a,h)anthracene		178	24	
Benzo(g,h,i)perylene		811	24	

STL Seattle

Client Name:	North Creek Analytical
Client ID:	P5G0989-01
Lab ID:	129066-01
Date Received:	7/27/2005
Date Prepared:	8/3/2005
Date Analyzed:	8/5/2005
% Solids	77.09
Dilution Factor	1

PCBs by EPA Method 8082

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Tetrachloro-m-xylene	87.9		60	123
Decachlorobiphenyl	109		65	126

Sample results are on a dry weight basis.

Analyte		**Result (mg/kg)**	**RL**	**Flags**
Aroclor 1016	ND		0.0127	
Aroclor 1221	ND		0.0127	
Aroclor 1232	ND		0.0127	
Aroclor 1242	ND		0.0127	
Aroclor 1248	ND		0.0127	
Aroclor 1254	ND		0.0127	
Aroclor 1260		0.023	0.0127	

STL Seattle

Client Name:	North Creek Analytical
Client ID:	P5G0989-02
Lab ID:	129066-02
Date Received:	7/27/2005
Date Prepared:	8/3/2005
Date Analyzed:	8/5/2005
% Solids	82.37
Dilution Factor	1

PCBs by EPA Method 8082

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Tetrachloro-m-xylene	117		60	123
Decachlorobiphenyl	109		65	126

Sample results are on a dry weight basis.

		Result		
Analyte		**(mg/kg)**	**RL**	**Flags**
Aroclor 1016	ND		0.0117	
Aroclor 1221	ND		0.0117	
Aroclor 1232	ND		0.0117	
Aroclor 1242	ND		0.0117	
Aroclor 1248	ND		0.0117	
Aroclor 1254	ND		0.0117	
Aroclor 1260		0.0321	0.0117	

STL Seattle

Client Name	North Creek Analytical
Client ID:	P5G0989-01
Lab ID:	129066-01
Date Received:	7/27/2005
Date Prepared:	8/26/2005
Date Analyzed:	8/26/2005
Dilution Factor	1
% Solids	77.09

Mercury by CVAA - USEPA Method 7471

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	RL	Flags
Mercury	ND	0.0226	

STL Seattle

Client Name	North Creek Analytical
Client ID:	P5G0989-02
Lab ID:	129066-02
Date Received:	7/27/2005
Date Prepared:	8/26/2005
Date Analyzed:	8/26/2005
Dilution Factor	1
% Solids	82.37

Mercury by CVAA - USEPA Method 7471

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	RL	Flags
Mercury	ND	0.0207	

STL Seattle

Lab ID:	Method Blank - SS1486
Date Received:	-
Date Prepared:	7/29/2005
Date Analyzed:	8/8/2005
% Solids	
Dilution Factor	1

Semivolatile Organics by EPA Method 8270

Surrogate	% Recovery	Flags	Recovery Limits Low	Recovery Limits High
2 - Fluorophenol	99		36	145
Phenol - d5	93.6		38	149
Nitrobenzene - d5	81.2		38	141
2 - Fluorobiphenyl	106		42	140
2,4,6 - Tribromophenol	90.6		28	143
p - Terphenyl - d14	107		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 SS1486 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:	SS1486
Date Prepared:	7/29/2005
Date Analyzed:	8/8/2005
QC Batch ID:	SS1486

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	50	33.5	67	34.1	68.2	1.8	
2-Chlorophenol	0	50	38.7	77.4	38.6	77.1	-0.39	
1,4-Dichlorobenzene	0	50	38.2	76.4	37.5	75	-1.8	
N-nitroso-di-n-propylamine	0	50	32	64	32.3	64.6	0.93	
1,2,4-Trichlorobenzene	0	50	40.9	81.8	40.8	81.6	-0.24	
4-Chloro-3-methylphenol	0	50	36.9	73.7	36	72	-2.3	
Acenaphthene	0	50	39.3	78.6	38.9	77.7	-1.2	
4-Nitrophenol	0	50	53.2	106	52.4	105	-0.95	
2,4-Dinitrotoluene	0	50	37.5	74.9	38.6	77.2	3	
Pentachlorophenol	0	50	29	57.9	30.7	61.4	5.9	

STL Seattle

Matrix Spike/Matrix Spike Duplicate Report

Client Sample ID:	P5G0989-01
Lab ID:	129066-01
Date Prepared:	7/29/2005
Date Analyzed:	8/8/2005
QC Batch ID:	SS1486

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	22	62.7	59	59.8	54.9	52.3	-13	
2-Chlorophenol	0	62.7	53.1	84.7	55.1	86.2	1.8	
1,4-Dichlorobenzene	0	62.7	56.2	89.5	60.2	94.1	5	
N-nitroso-di-n-propylamine	0	62.7	51.8	82.5	51.3	80.2	-2.8	
1,2,4-Trichlorobenzene	0	62.7	58.7	93.5	63.7	99.6	6.3	
4-Chloro-3-methylphenol	0	62.7	48.6	77.5	47.5	74.4	-4.1	
Acenaphthene	4500	62.7	7260	4390	26900	35100	160	X7
4-Nitrophenol	0	62.7	602	959	0	0	-200	X7
2,4-Dinitrotoluene	0	62.7	133	213	138	216	1.4	X7
Pentachlorophenol	73	62.7	130	90	141	106	16	

STL Seattle

Lab ID:	Method Blank - SS1487
Date Received:	-
Date Prepared:	8/4/2005
Date Analyzed:	9/2/2005
% Solids	
Dilution Factor	1

Semivolatile Organics by EPA Method 8270

Surrogate	% Recovery	Flags	Recovery Limits Low	High
2 - Fluorobiphenyl	117		42	140
p - Terphenyl - d14	116		42	151

Sample results are on an as received basis.

Analyte		Result (ug/kg)		RL	Flags
Dimethylphthalate	ND			20	
Diethylphthalate	ND			20	
Di-n-butylphthalate			70.1	20	
Butylbenzylphthalate			44.4	20	
bis(2-Ethylhexyl)phthalate			51.2	20	
Di-n-octylphthalate	ND			20	

STL Seattle

Lab ID:	Method Blank - PB0990
Date Received:	-
Date Prepared:	8/3/2005
Date Analyzed:	8/5/2005
% Solids	
Dilution Factor	1

PCBs by EPA Method 8082

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Tetrachloro-m-xylene	88.2		60	123
Decachlorobiphenyl	101		65	126

Sample results are on an as received basis.

Analyte	**Result (mg/kg)**	**RL**	**Flags**
Aroclor 1016	ND	0.01	
Aroclor 1221	ND	0.01	
Aroclor 1232	ND	0.01	
Aroclor 1242	ND	0.01	
Aroclor 1248	ND	0.01	
Aroclor 1254	ND	0.01	
Aroclor 1260	ND	0.01	

STL Seattle

Blank Spike/Blank Spike Duplicate Report

Lab ID:	PB0990
Date Prepared:	8/3/2005
Date Analyzed:	8/5/2005
QC Batch ID:	PB0990

PCBs by EPA Method 8082

Compound Name	Blank Result (mg/kg)	Spike Amount (mg/kg)	BS Result (mg/kg)	BS % Rec.	BSD Result (mg/kg)	BSD % Rec.	RPD	Flag
Aroclor 1242	0	0.1	0.0927	92.7	0.0821	82.1	-12	N
Aroclor 1260	0	0.1	0.0973	97.3	0.0872	87.2	-11	N

STL Seattle

Matrix Spike/Matrix Spike Duplicate Report

Client Sample ID:	P5G0989-01
Lab ID:	129066-01
Date Prepared:	8/3/2005
Date Analyzed:	8/5/2005
QC Batch ID:	PB0990

PCBs by EPA Method 8082

Compound Name	Sample Result (mg/kg)	Spike Amount (mg/kg)	MS Result (mg/kg)	MS % Rec.	MSD Result (mg/kg)	MSD % Rec.	RPD	Flag
Aroclor 1242	0	0.124	0.101	81.8	0.0964	78.5	-4.1	
Aroclor 1260	0.023	0.124	0.143	97	0.133	89.3	-8.3	X7

STL Seattle

Lab ID:	Method Blank - ZS443
Date Received:	-
Date Prepared:	8/26/2005
Date Analyzed:	8/26/2005
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:	PPBP-TP5-S1
Lab ID:	129429-01
Date Prepared:	8/26/2005
Date Analyzed:	8/26/2005
QC Batch ID:	ZS443

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	0.194	0.193	100	

STL Seattle

Duplicate Report

Client Sample ID:	PPBP-TP5-S1
Lab ID:	129429-01
Date Prepared:	8/26/2005
Date Analyzed:	8/26/2005
QC Batch ID:	ZS443

Mercury by CVAA - USEPA Method 7471

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

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 $\leq$ 30%.

C4: Second analysis confirmation was performed. The RPD between the results on the two columns was evaluated and determined to be > 30%. 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

RL: Reporting Limit

N: See analytical narrative

ND: Not Detected

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.

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

00028

CHAIN OF CUSTODY REPORT

Work Order #: 25-0515

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: [X] STD | 7 | 5 | 4 | 3 | 2 | 1 | <1
Petroleum Hydrocarbon Analyses: 5 STD | 4 | 3 | 2 | 1 | <1
OTHER Specify:
* Turnaround Analysis less than standard may incur Rush Charges.

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

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

RECEIVED BY: [signature] DATE: 7/25/05
PRINT NAME: BOB F 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: EMILY JEWSEW FIRM: NCA TIME: 16:30

ADDITIONAL REMARKS:

TEMP: 5.5

COC REV 09/04

PAGE OF

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**	[redacted]	**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**	[redacted]	**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**	[redacted]	**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**	[redacted]	**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

000029