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

TECHNICAL MEMORANDUM No. OF22B-2

City Outfall Basin 22B
Upland Source Control Investigation

TO: Matt McClincy, DEQ, Northwest Region Cleanup & Portland Harbor Section

FROM: Dawn Sanders, City of Portland, BES
Linda Scheffler, City of Portland, BES

COPIES:
Rod Struck, DEQ, Northwest Region Cleanup & Portland Harbor Section
Larry Patterson, ARKEMA, Inc
Kristine Koch, EPA
Bruce Brody-Heine, GSI

DATE: November 18, 2005

SUBJECT: **Catch Basin Solids Sampling Adjacent to the ARKEMA, Inc. Cleanup Site**

Introduction

This technical memorandum summarizes the results of the City of Portland (City) Bureau of Environmental Services' (BES) source control investigation of a right-of-way drainage swale that drains to the Outfall Basin 22B stormwater conveyance system. This drainage swale parallels NW Front Avenue and is adjacent to property owned by ARKEMA, Inc. at 6400 NW Front Avenue. Stormwater runoff from the ARKEMA property may currently (or historically) discharge to the swale. Three City catch basins collect stormwater runoff from the swale, which discharges to the Willamette River via City Outfall 22B.

The City sampled solids in the three drainage swale catch basins to evaluate this pathway. This investigation, conducted in June 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 Department of Environmental Quality (DEQ) and the City.

Purpose and Objectives

The purpose of this source control investigation was to evaluate whether catch basin solids originating from stormwater runoff to the drainage swale could be contributing contamination to the Willamette River via the City's conveyance system. According to the DEQ Environmental Cleanup Site Information (ECSI) Database Site Summary Report

and file for ARKEMA, Inc. (ECSI Site No. 398), historical uses of the property included an electrical substation and a chemical/pesticide manufacturing plant (DEQ, 2005a). Contaminants of interest (COIs) associated with these historical uses include polychlorinated biphenyls (PCBs) and chlorinated pesticides. Sediment samples collected in the Willamette River near Outfall 22B also have contained a similar suite of contaminants (Integral, 2005). As part of our ongoing source control program, the City sampled solid material from three drainage swale catch basins and analyzed them for PCBs and chlorinated pesticides.

Background

Figure 1 shows the location of the City Outfall 22B stormwater conveyance system and other basin features. Figure 2 shows a more detailed view of the catch basin locations and their connection to the City's 48-inch diameter concrete pipe in NW Front Avenue. The drainage swale catch basins are located approximately 20 ft. northeast of the curb along NW Front Avenue. Samples were collected from catch basins AMW708, AND879 and AND878.

Field Activities

The City coordinated with DEQ regarding this source control investigation prior to conducting this work. Solids samples from the drainage swale catch basins were collected by the BES Field Operations staff between approximately 10:00 and 10:40 AM on June 21, 2005. Photos of the sampling locations and solids are included in Attachment A. Field notes taken during sampling activities are provided in Attachment B.

On the day of sampling, two of the catch basins were dry (Photos 1-2, 4) and catch basin AND879 contained approximately seven inches of standing water (Photo 3).

Solids samples from all three locations were collected using a stainless steel spoon and bowl, in accordance with BES Field Operations Standard Operating Procedures. The samples had no obvious color, odor, or visible contamination.

Summary of Results

The three catch basin solids samples were analyzed for pesticides and PCBs. Table 1 summarizes the analytical results for the three samples; Figure 2 shows the detected analytes. All three samples had detectable levels of PCB Aroclor 1260. A total of ten different pesticides were detected in one or more of the samples; nine pesticides were detected in sample AMW708, six were detected in sample AND879, and sample AND878 contained three. Pesticide concentrations of 4,4'-DDD, 4,4"-DDE and 4,4'-DDT were greater than the most stringent Portland Harbor Joint Source Control Strategy (JSCS) (DEQ/EPA, 2005) screening levels for soil and catch basin solids. Two of the detected pesticides, Beta-BHC and Heptachlor Epoxide, do not have designated JSCS screening levels available for comparison.

Conclusions and Recommendations

Analytical results for the catch basin solid samples from the drainage swale indicate that contaminants are being discharged to the City stormwater conveyance system along NW Front Avenue. The source of PCBs detected in the samples is likely related to the former electrical substation. Pesticides detected in the samples may be related to identified sources at the ARKEMA site including DDT congeners (DEQ, 2005a) or other sites in the area identified with pesticide sources including Rhone Poulenc (DEQ, 2005b).

The City requests that DEQ require ARKEMA, Inc. and any other sites in the area with known pesticide sources to further investigate their site conditions to ascertain the source and migration pathway of contaminants to the drainage swale, and to identify appropriate control mechanisms to address this source.

References

DEQ. 2005a. DEQ Site Summary Report – Details for ECSI Site No. 398. DEQ Environmental Cleanup Site Database (ECSI). Accessed November 2005. www.deq.state.or.us/wmc/ecsi/ecsidetail.asp?seqnbr=398.

DEQ. 2005b. DEQ Site Summary Report – Details for ECSI Site No. 155. DEQ Environmental Cleanup Site Database (ECSI). Accessed November 2005. www.deq.state.or.us/wmc/ecsi/ecsidetail.asp?seqnbr=155.

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

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

Table

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

Figures

Figure 1 - *Outfall Basin 22B – Catch Basin Solids Sampling -- Location Map*
Figure 2 - *Outfall Basin 22B – Catch Basin Solids Sampling –Pesticides & PCB Compounds*

Attachments

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

Table 1

Summary of Chemical Analytical Results

Catch Basin Solids Samples

Catch Basins Adjacent to ARKEMA - City Outfall Basin 22B

Class	Analyte	Units	Catch Basin Solid IL-OF22B-AMW708-0605 6/21/2005	Catch Basin Solid IL-OF22B-AND879-0605 6/21/2005	Catch Basin Solid IL-OF22B-AND878-0605 6/21/2005	JSCS Screening Level (Most Stringent)
Pesticides/PCBs (EPA 8081)						
	4,4'-DDD	µg/Kg	23.3 J	67.1 J	5.47 J	0.3 (6)
	4,4'-DDE	µg/Kg	51.1 J	34 J	7.89 J	0.3 (6)
	4,4'-DDT	µg/Kg	461 J	80 J	85.7 J	0.3 (6)
	Aldrin	µg/Kg	2.09 UJ	2.47 UJ	2.10 UJ	40 (5)
	Alpha-BHC	µg/Kg	2.09 UJ	2.47 UJ	2.10 UJ	--
	Alpha-Chlordane	µg/Kg	3.29 J	2.47 UJ	2.10 UJ	17.6 (5)
	Beta-BHC	µg/Kg	2.09 UJ	21.3 J	2.10 UJ	--
	Delta-BHC	µg/Kg	2.09 UJ	2.47 UJ	2.10 UJ	--
	Dieldrin	µg/Kg	4.19 UJ	4.94 UJ	4.21 UJ	61.8 (5)
	Endosulfan I	µg/Kg	2.09 UJ	2.47 UJ	2.10 UJ	--
	Endosulfan II	µg/Kg	4.19 UJ	4.94 UJ	4.21 UJ	--
	Endosulfan Sulfate	µg/Kg	5.2 J	4.94 UJ	4.21 UJ	--
	Endrin	µg/Kg	4.19 UJ	4.94 UJ	4.21 UJ	207 (5)
	Endrin Aldehyde	µg/Kg	25.2 J	4.94 UJ	4.21 UJ	--
	Endrin Ketone	µg/Kg	11.9 J	4.94 UJ	4.21 UJ	--
	Gamma-BHC(Lindane)	µg/Kg	2.09 UJ	2.47 UJ	2.10 UJ	4.99 (5)
	Gamma-Chlordane	µg/Kg	8.64 J	7.03 J	2.10 UJ	17.6 (5)
	Heptachlor	µg/Kg	2.09 UJ	2.47 UJ	2.10 UJ	16 (5)
	Heptachlor Epoxide	µg/Kg	9.99 J	4.57 J	2.10 UJ	16 (5)
	Methoxychlor	µg/Kg	20.9 UJ	24.7 UJ	21.0 UJ	--
	PCB 1016	µg/Kg	10.5 UJ	12.3 UJ	10.5 UJ	420 (6)
	PCB 1221	µg/Kg	10.5 UJ	12.3 UJ	10.5 UJ	--
	PCB 1232	µg/Kg	10.5 UJ	12.3 UJ	10.5 UJ	--
	PCB 1242	µg/Kg	10.5 UJ	12.3 UJ	10.5 UJ	2 (6)
	PCB 1248	µg/Kg	10.5 UJ	12.3 UJ	10.5 UJ	4 (6)
	PCB 1254	µg/Kg	10.5 UJ	12.3 UJ	10.5 UJ	10 (6)
	PCB 1260	µg/Kg	68.3 J	39 J	13.9 J	200 (5)
	Total PCBs	µg/Kg	68.3 J	39 J	13.9 J	676 (5)
	Toxaphene	µg/Kg	209 UJ	247 UJ	210 UJ	--

Notes:

All units in micrograms per kilogram
(ug/Kg) dry weight

J = The analyte was detected at concentrations above the MRL but is considered an estimate

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

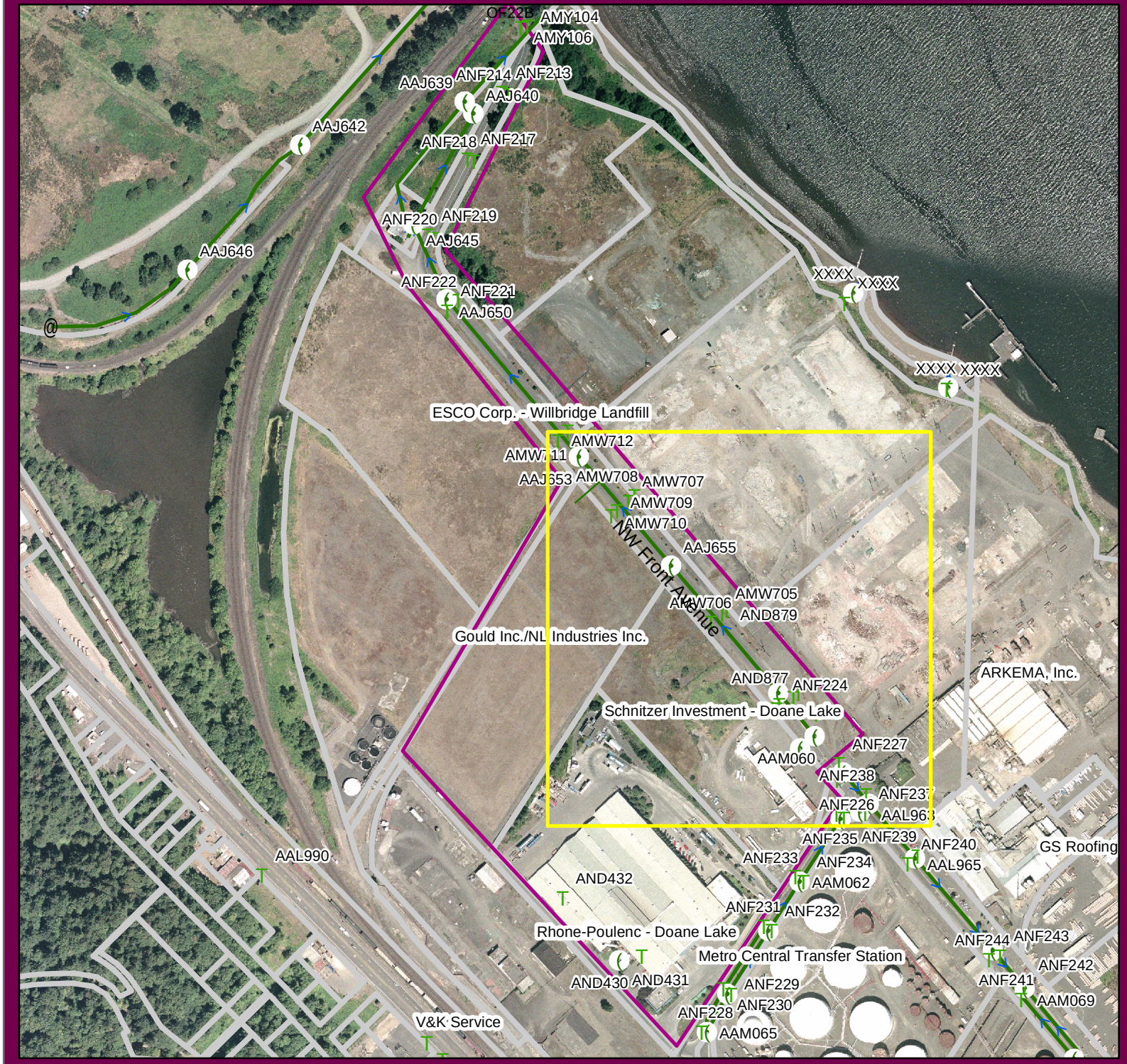
JSCS - Portland Harbor Joint Source Control Strategy (DEQ/EPA Interim Final September 2005)

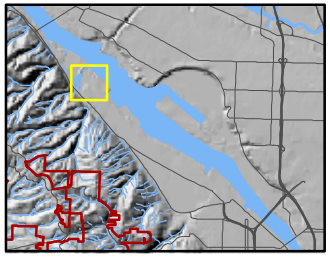
(5) MacDonald PEC and other SQVs Screening Level for Soil/Catch Basin Sediment

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

-- No JSCS screening level available

See Attachment C for copies of laboratory analytical reports.





Legend

- Storm Inlets
- Storm Pipe
- Manhole
- Taxlots
- 22B Basin Boundary
- Area Enlarged Shown in Figure 2

0 250 500 1000 Feet

DEQ Environmental Cleanup Sites (ECSI) sites shown on map

Figure 1
Outfall 22B Catch Basin Solids Sampling Location Map

Source: City of Portland BES Aerial photo 2004

Environmental Services City of Portland 1120 SW Fifth Avenue, Room 1000 Portland Oregon, 97204-1912

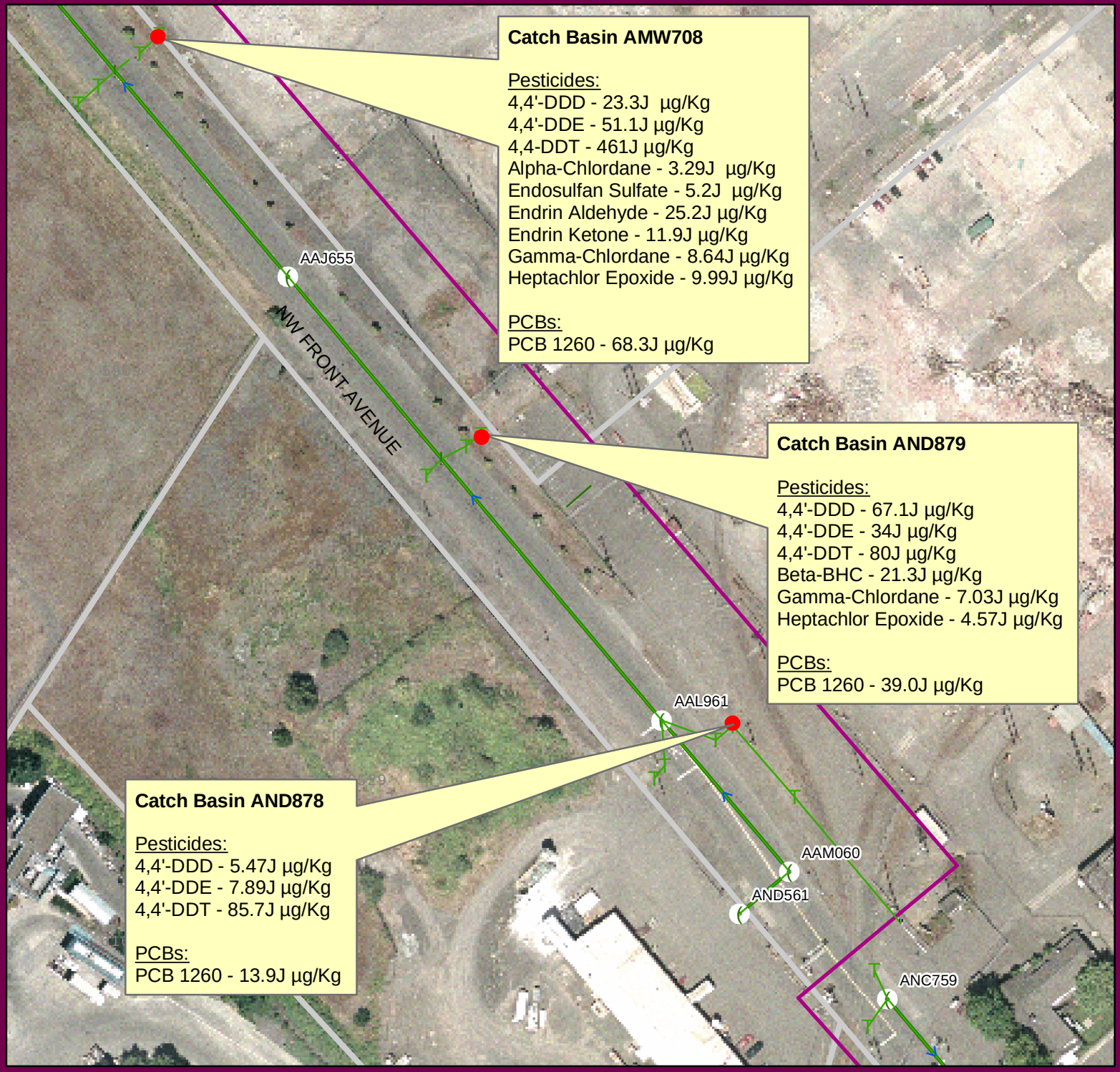
File Name: s:\gis\outfalls\outfalls_22b\of22b_cb_pest.mxd

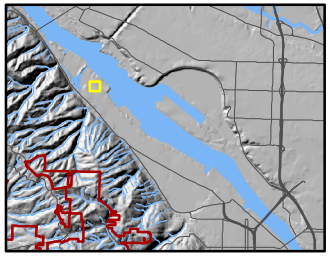
Program Manager: Dawn Sanders Portland Harbor Superfund

Sheet No. 1 OF 1

Date Printed: 11/4/05

Prepared by: Sara Gardner





Legend

- Storm Inlets
- Storm Pipe
- Manhole
- Taxlots
- 22B Basin Boundary
- Sample Location

0 250 500 1000 Feet

Note: Only detected constituents are shown.

µg/Kg = micrograms/Kilogram

J = Estimated value

DEQ Environmental Cleanup Sites (ECSI) sites shown on map

Figure 2
Outfall 22B Catch Basin
Solids Sampling
Pesticides & PCB Compounds
Sample Date: 6/21/05

Source: City of Portland BES Aerial photo 2004

Environmental Services City of Portland 1120 SW Fifth Avenue, Room 1000 Portland Oregon, 97204-1912

File Name: s:\gis\outfalls\outfalls_22b\of22b_cb_pestfigure2.mxd

Program Manager: Dawn Sanders Portland Harbor Superfund

Sheet No. 1 OF 1

Date Printed: 10/17/05

Prepared by: Sara Gardner

Attachment A
Field Photographs

Photo 1 (June 2005). Catch basin AMW708 sampled for solids. These catch basins are located approximately 20 ft. from the edge of the road in the drainage swale adjacent to 6400 NW Front Avenue.

Photo 2 (June 2005). Sampling catch basin AMW708 with a stainless steel spoon and bowl.

Photo 3 (June 2005). Catch basin AND879, with 7″ of standing water.

Photo 4 (June 2005). Catch basin AND878.

Attachment B
Field Notes

City of Portland
Environmental Services

DAILY FIELD REPORT

Page 1 of 3

Project INLINE SEDIMENT SAMPLING Project No. 1020.001

Location NW FRONT AVE Date 6-21-05

Subject FIELD NOTES By MJH

7:30 PREPARE EQUIPMENT FOR TODAYS SAMPLING EVENT. STAINLESS STEEL SPOONS + BUCKETS. DECONNED PER SOP 2.0 BY MJS.

ASSEMBLE SAMPLE BOTTLES, COC'S, PAPERWORK. TODAYS WORK WILL INCLUDE 1 WATER SAMPLE + MULTIPLE SED SAMPLE.

8:30 DJH NOTIFIES L. SCHEFFER THAT WE ARE PROCEEDING TO FIRST SAMPLE SITE.

9:00 ARRIVE AT 5904 NW 61ST (MH 653). SET UP TRAFFIC CONTROL. MH IS IN MIDDLE OF ROAD.

9:10 DJH ENTERS MH TO INSPECT SAMPLING LOCATION.

9:15 REPORTS PRESENCE OF 0.5 GPM COMING FROM LATERAL 85' UP FROM MH MH653.

0920 DJH BEGINS TO COLLECT SAMPLE FROM ABOVE LOCATION USING S.S. BEAKER.

0945 RELINQUISH WATER SAMPLE TO PETE. FOR PETE TO DELIVER TO THE LAB.

0951 MOVE TO AMW705. THIS IS A CATCH BASIN ABOUT 20' TO THE NORTH OF THE ROAD.

1000 COLLECTED SEDIMENT FROM CATCH BASIN.

1012 MOVE TO MH 879. WATER IN CATCH BASIN.

Attachments

City of Portland
Environmental Services

DAILY FIELD REPORT

Project INLINE SEDIMENT SAMPLING
Location NW RDY
Subject FIELD NOTES

Project No. 1020.001
Date 6-21-05
By MJH

1020 SAMPLE COLLECTED FROM CATCH BASIN. WATER IN C.B. SANDY SEDIMENTS IN CB. SANDY SEDS OBSERVED IN AREA AROUND CB.

1031 MOVE TO AND 878. THIS IS ANOTHER CB NORTH OF ~~PARKING ...~~ FRONT AVE. AND S OF SOME TRAIN TRACKS. GENTLEMAN WALKS UP TO US AND TALKS W/ LINDA. LARRY?

1038 SAMPLE COLLECTED FROM CATCH BASIN. LOTS OF GRAVEL

1121 ARRIVE AT SWAN ISLAND. START AT AAQ004 BECAUSE IT HAS AN ALTERNATE.
DJP ENTER MH. RIVER BACKED UP. NO SEDIMENTS IN ANY OF THE LINES AT THIS LOCATION.

1147 MOVE TO MH AAQ003. DJP ENTERS. WATER 5' DEEP AT THIS LOCATION. NO SEDS AT THE BOTTOM.

1155 AAQ118 - COULD NOT GET MH OPEN - DESPITE BEST EFFORTS

1210 AAQ005 - NOT FLOODED. THERE IS MINOR FLOW AT THIS LOCATION. DID NOT ENTER

Attachments

City of Portland
Environmental Services

DAILY FIELD REPORT

Page 3 of 3

Project IN LINE SED SAMP
Project No. 1020.007

Location
Date 6-21-05

Subject FIELD NOTES
By MJH

1210 BASIN M3 - DUE TO LACK OF SUCCESS WE ARE SUSPENDING OPS HERE TODAY. WILL RETURN LATER IN THE SUMMER WHEN RIVER LEVELS ARE LOWER AND TRY AGAIN

1220 PETE ENTERS AAR003. MINOR FLOW, NO SEDIMENTS 48" DIA LINE

1230 LUNCH

1:30 ARRIVE AT OREGON STEEL MILLS. NODE AAM 171 STANDING WATER IN THE LINE
SEDIMENT ALSO PRESENT. SEDIMENT IS A CEMENTED FINE SEDS.

1425 SAMPLES RETURNED TO WPCL + SUBMITTED TO LAB UNDER CHAIN OF CUSTODY. SAMPLES HAVE BEEN IN CHILLED COOLER ALL DAY

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

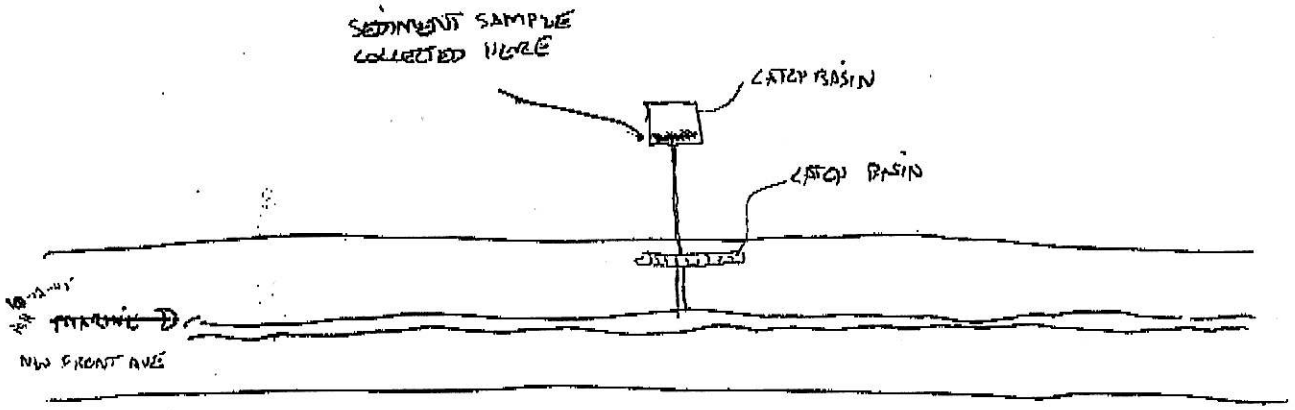
FIELD DATA SHEET

Date: 6/21/05	Time: 0952	Current Weather conditions: LT CLOUDS 60'S	
Sampling Team Present: MSH / DJH / PHA / L.S.			
Basin:	Node: AMW708	Subbasin:	
Address: 6400 NW FRONT – CATCH BASIN N.			

SECTION 1 - PRE-SAMPLING VISUAL OBSERVATION REPORT

Describe any flowing or standing water observed in the line?	AS A CATCH BASIN, DRY.
Does river appear to back up to this location? Describe rate/color/odor of flow:	NO
Are sediments observed in the ~~line~~? CB	YES
Is there enough sediment in the line to collect a sample?	YE
Describe lateral extent and depth of sample-able sediments present in the line:	MAX DEPTH ABOUT 2" DEEP. MOST SEDS NEAR PIPE HOLE.

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



SECTION 2 - SAMPLE COLLECTION REPORT		Node: AMW 708
Sampling Equipment:	SS SPOON + BOWL	
Equipment Decontamination process:	(Per FOps SOP 70.1a)	Other (Describe)
Sample date: 6-21-05	Sample time: 1000	
Sample Identification: (IL-XX-NNNNNN-mmyy)	IL-22B-AMW708-0605	
Sample location: (number of feet from node of entry)	SAMPLE COLLECTED FROM CATCH BASIN	
Sample collection technique:	SAMPLE COLLECTED INTO SS BOWL USING SS SPOON	
Color of sample:	LT BROWN	
Texture/Particle size:	SANDS TO FINE CLAYS LOTS OF ORGANIC	
Visual or olfactory evidence of contamination:	NO.	
Depth of solids in area where sample collected:	2" DEEP	
Amount and type of debris:	—	
Compositing notes:	SAMPLE COMPOSITED PRIOR TO ~~SAM~~ PLACEMENT IN SAMPLE JARS	

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: FO 050675
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

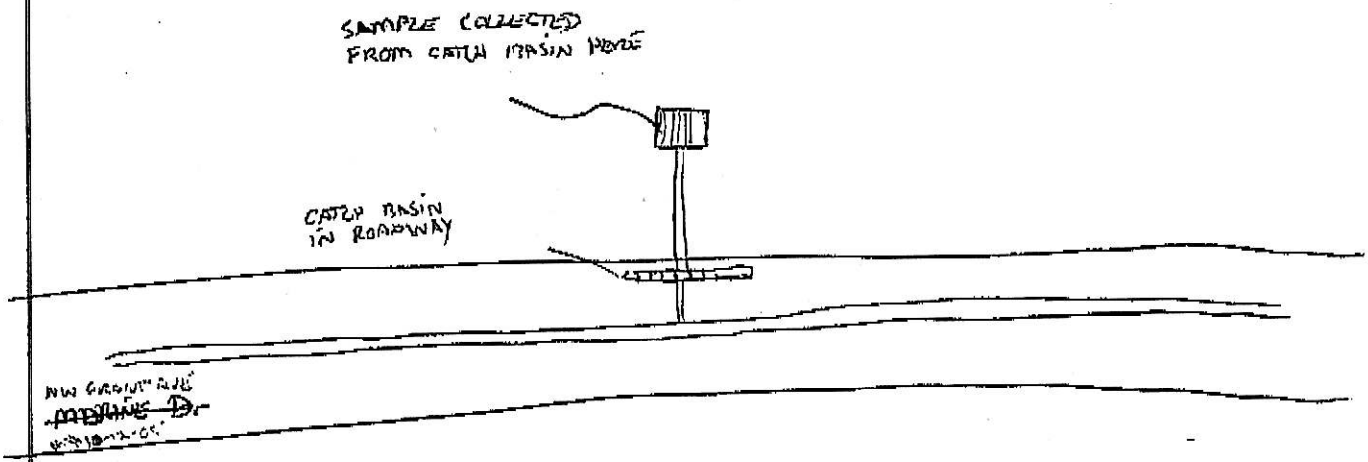
PORTLAND HARBOUR INLINE SEDIMENT SAMPLING - 1020.001
FIELD DATA SHEET

Date: 6-21-05	Time: 1013	Current Weather conditions: CL CLOUDS 60's	
Sampling Team Present: MTJH/ DJH / C-S.			
Basin: 22B	Node: AND 879	Subbasin:	
Address: 6400 N FRONT AVE CATCH BASIN N.			

SECTION 1 - PRE-SAMPLING VISUAL OBSERVATION REPORT

Describe any flowing or standing water observed in the line?	2-8 " OF STANDING WATER
Does river appear to back up to this location? Describe rate/color/odor of flow:	NO
Are sediments observed in ~~the line~~ CB?	YES
Is there enough sediment in the line to collect a sample?	YES
Describe lateral extent and depth of sampleable sediments present in the line:	2"-3" IN THE WHOLE BOX

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



SECTION 2 - SAMPLE COLLECTION REPORT

Node: AND 879

Sampling Equipment:	SS SPOON + BOWL
Equipment Decontamination process:	Per FOps SOP 70.1a (circled) Other (Describe)
Sample date: 6-21-05	Sample time: 1020
Sample Identification: (IL-XX-NNNNNN-mmyy)	IL-22B-AND879-0605
Sample location: (number of feet from node of entry)	FROM CATCH BASIN 20' NORTH OF ROADWAY.
Sample collection technique:	SAMPLE COLLECTED USING SS SPOON INTO SS BOWL.
Color of sample:	DARK GRAY
Texture/Particle size:	SAND (DREDGE MATERIAL)
Visual or olfactory evidence of contamination:	NO. NO SHEENS OBSERVED
Depth of solids in area where sample collected:	2'-3"
Amount and type of debris:	—
Compositing notes:	SAMPLE COMPOSITED [redacted]

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: FO 050676
Describe any deviations from standard procedures:	N/A

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

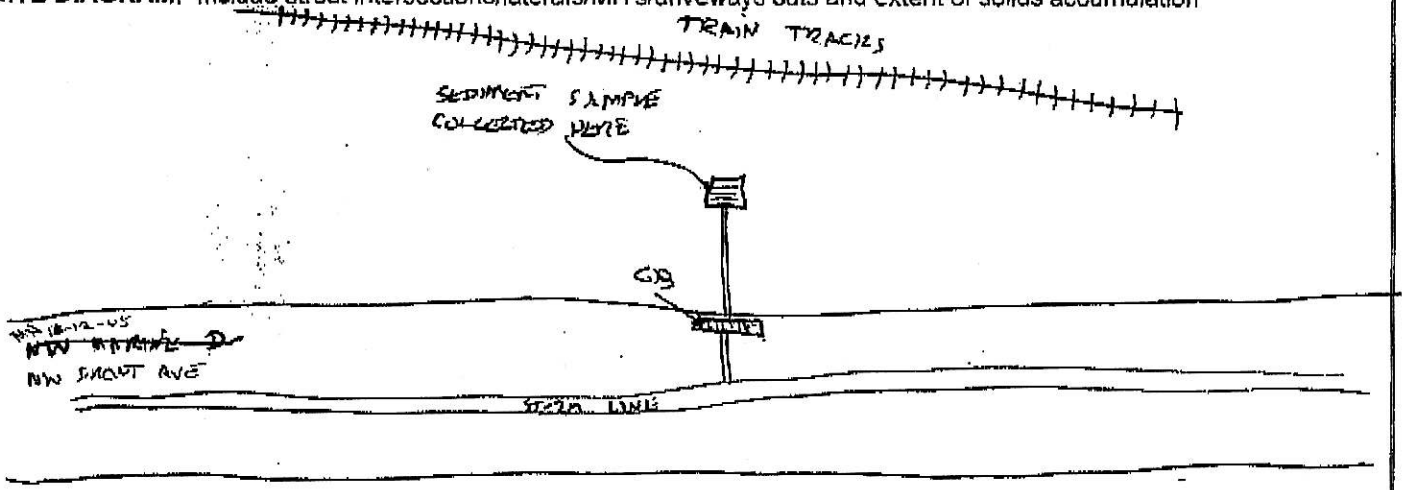
PORTLAND HARBOUR INLINE SEDIMENT SAMPLING - 1020.001
FIELD DATA SHEET

Date: 6-21-05	Time: 1034	Current Weather conditions: LT CLOUDS - 60'S
Sampling Team Present: MSH / DJN / L. S.		
Basin: 22B	Node: PND 878	Subbasin:
Address:		

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:	SEDIMENTS ARE 4" DEEP. LOTS OF LARGE GRAVEL

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



SECTION 2 - SAMPLE COLLECTION REPORT

Node: AND 878

Sampling Equipment:	SS SPOON + SS
Equipment Decontamination process:	~~Per FOps SOP 70.1a~~ Other (Describe)
Sample date: 6-21-05	Sample time: 1038
Sample Identification: (IL-XX-NNNNNN-mmyy)	IL-22B - AND878 - 0605
Sample location: (number of feet from node of entry)	SAMPLE COLLECTED FROM CATCH BASIN
Sample collection technique:	SAMPLE COLLECTED USING SS SPOON.
Color of sample:	DK BROWN
Texture/Particle size:	LARGE GRAVEL / FINE SANDS
Visual or olfactory evidence of contamination:	NO
Depth of solids in area where sample collected:	4"
Amount and type of debris:	—
Compositing notes:	SAMPLE COMPOSITED LARGE GRAVEL ROCKS WERE REJECTED FROM THE SAMPLE

Sample Jars Collected

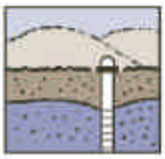
If not enough sample to fill all of the jars, then fill jars in this order:				
	Metals			
	PAHs/SVOCs			
	PCBs			
	TPH (two jars)			
	TOC			

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: FO 050677
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 22B

To: File

From: Bruce Brody-Heine, RG – GSI
Robyn Cook, GSI

Date: November 4, 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 22B. The results of the sampling and analysis are presented in the November 2005, Technical Memorandum No. OF 22B-2.

The laboratory analysis for these source control program samples were completed by a subcontracted laboratory. The following analyses were conducted by STL laboratory:

- Chlorinated Pesticides (EPA Method 8081A)
- Polychlorinated biphenyls (EPA Method 8082)

Attachment C of the Technical Memorandum No. OF 22B-2 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 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 from the field to the BES Laboratory. The chain-of-custody procedures were adequate and sample integrity was maintained through the sample collection and delivery process.

Analysis Holding Times

Pesticides Analyses
All samples exceeded the holding time for extraction (14 days - EPA protocol for 8082) by 8 days. Consequently, these data are qualified as estimates by placing a "J" flag next to the detected compounds, and quantitation limits are qualified as estimates with a "UJ" flag. The samples were analyzed within the required holding times.

PCB Analyses
All samples exceeded the holding time for extraction (14 days- EPA protocol for 8082) by 8 days. Consequently, these data are qualified as estimates by placing a "J" flag next to the detected compounds and quantitation limits are qualified as estimates with a "UJ" flag. The samples were analyzed within the required holding times.

Method Blanks

Method blanks were processed during the laboratory analysis of chlorinated pesticides and PCBs. No analytes were detected in the method blanks.

Surrogate Recoveries

Surrogate recoveries of tetrachloro-m-xylene and decachlorobiphenyl (DCB) were completed during the laboratory analysis of pesticides and PCBs. Surrogate recoveries of tetrachloro-m-xylene were within laboratory control limits for two of the three samples analyzed for pesticides and all PCB analyses. DCB surrogate recoveries were outside of quality control acceptance limits for PCB analyses. Because surrogate recoveries were within EPA guidelines, no data were qualified.

Laboratory Control Sample Duplicates

Laboratory blank spike duplicates and laboratory matrix spike duplicates were processed during the laboratory analyses of pesticides and PCBs. The relative percent difference (RPD) between the laboratory blank spikes and the laboratory blank spikes duplicate were within laboratory control limits for both analyses. The RPD between the laboratory matrix spikes and the laboratory matrix spike duplicates were within laboratory control limits for all pesticide samples except 4,4'DDT, heptachlor epoxide and gamma-chlordane. The RPD between the laboratory matrix spikes and the laboratory matrix spike duplicates were outside laboratory control limits for all of the PCB analyses. Matrix interference was indicated based on acceptable blank spike recoveries.

Matrix Spike Recoveries

A matrix spike was processed during the laboratory analyses of pesticides and PCBs. The matrix spike recovery was within the laboratory control limits for both pesticides and PCB analyses.

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: 6-21-05
Page: 1 of 1
Collected By: MSP/ DSH

Project Name: ~~LOWER~~ PORTLAND HARBOR INLINE ~~HARBOR OF SED SAMP~~
File Number: 1020.001
Matrix: GRNDWTR / SEDIMENT

OUTFALL 22B CHAIN-OF-CUSTODY

Requested Analyses

WPCL Sample I.D.	Location	Point Code	Sample Date	Sample Time	Sample Type	General: Pesticides/PCBs	General: Herbicides	General: SVOCs	General: VOCs	General: Dioxins/Furans	Metals: Total Metals (As, Cd, Cr, Cu, Ni, Pb, Sb, V, Zn)	Metals: Chromium VI	Field Comments
	~~IL-22B-AA1653-0605~~ 5909 NW 61st Ave	22B_1			G / Water	●	●	●	●	●	●	●	~~INFILTRATE SAMPLE~~
FO 050675	IL-OF22B-AMW708-0605 6400 NW FRONT AVE-N	22B_2	6-21-05	1000	C	●							
FO 050676	IL-OF22B-AND879-0605 6400 NW FRONT AVE-M	22B_3	6-21-05	1020	C	●							
FO 050677	IL-22B-AND878-0605 6400 NW FRONT AVE-S	22B_4	6-21-05	1038	C	●							
5													
6													
7													
8													
9													
10													

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.	Relinquished By: 4.
Signature: [signature] Time: 1425	Signature: Time:	Signature: Time:	Signature: Time:
Printed Name: MICHAEL HAUSER Date: 6-21-05	Printed Name: Date:	Printed Name: Date:	Printed Name: Date:
Received By: 1.	**Received By: 2.**	**Received By: 3.**	**Received By: 4.**
Signature: [signature] Time: 1425	Signature: Time:	Signature: Time:	Signature: Time:
Printed Name: C. Christensen Date: 6/21/05	Printed Name: Date:	Printed Name: Date:	Printed Name: Date:

s:\eid\1000\1020.001\Sampdoc\Lower Harbor Sed.COC.xls

City of Portland
Water Pollution Control Laboratory
Laboratory Analysis Report

Sample Date/Time 6/21/2005 10:00 **System ID** AJ06025 **Sample ID** **FO050675**

Proj./Company Name: PORTLAND HARBOR INLINE SAMP
Address/Location: IL-22B-AMW708-0605
6400 NW FRONT AVE CATCH BASIN - N

Date Received: 6/21/2005
Sample Status: COMPLETE AND VALIDATED

Proj Subcategory: REGULATORY PLAN & EVAL
Sample Point Code: 22B_2
IMS File/Invoice #: 1020.001

Sample Type: GRAB
Sample Matrix: SEDIMENT
Collected By: MJH/DJH

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 low matrix spike recoveries, the results analytes Heptachlor Epoxide and gamma-Chlordane may be low estimates.

Test Parameter	Result	Units	MRL	Method
PESTICIDES/PCB'S BY EPA 8081				
4,4'-DDD	23.3	µg/Kg dry wt	4.19	EPA 8081
4,4'-DDE	51.1	µg/Kg dry wt	4.19	EPA 8081
4,4'-DDT	461	µg/Kg dry wt	4.19	EPA 8081
Aldrin	<2.09	µg/Kg dry wt	2.09	EPA 8081
Alpha-BHC	<2.09	µg/Kg dry wt	2.09	EPA 8081
Alpha-Chlordane	3.29	µg/Kg dry wt	2.09	EPA 8081
Beta-BHC	<2.09	µg/Kg dry wt	2.09	EPA 8081
Delta-BHC	<2.09	µg/Kg dry wt	2.09	EPA 8081
Dieldrin	<4.19	µg/Kg dry wt	4.19	EPA 8081
Endosulfan I	<2.09	µg/Kg dry wt	2.09	EPA 8081
Endosulfan II	<4.19	µg/Kg dry wt	4.19	EPA 8081
Endosulfan Sulfate	5.2	µg/Kg dry wt	4.19	EPA 8081
Endrin	<4.19	µg/Kg dry wt	4.19	EPA 8081
Endrin Aldehyde	25.2	µg/Kg dry wt	4.19	EPA 8081
Endrin Ketone	11.9	µg/Kg dry wt	4.19	EPA 8081
Gamma-BHC(Lindane)	<2.09	µg/Kg dry wt	2.09	EPA 8081
Gamma-Chlordane	8.64	µg/Kg dry wt	2.09	EPA 8081
Heptachlor	<2.09	µg/Kg dry wt	2.09	EPA 8081
Heptachlor Epoxide	9.99	µg/Kg dry wt	2.09	EPA 8081
Methoxychlor	<20.9	µg/Kg dry wt	20.9	EPA 8081
PCB 1016	<10.5	µg/Kg dry wt	10.5	EPA 8081
PCB 1221	<10.5	µg/Kg dry wt	10.5	EPA 8081
PCB 1232	<10.5	µg/Kg dry wt	10.5	EPA 8081
PCB 1242	<10.5	µg/Kg dry wt	10.5	EPA 8081
PCB 1248	<10.5	µg/Kg dry wt	10.5	EPA 8081
PCB 1254	<10.5	µg/Kg dry wt	10.5	EPA 8081
PCB 1260	68.3	µg/Kg dry wt	10.5	EPA 8081

Report Date: 8/29/2005

Validated By: Signature on File

City of Portland
Water Pollution Control Laboratory
Laboratory Analysis Report

Sample Date/Time 6/21/2005 10:00 **System ID** AJ06025 **Sample ID** **FO050675**

Proj./Company Name: PORTLAND HARBOR INLINE SAMP
Address/Location: IL-22B-AMW708-0605
6400 NW FRONT AVE CATCH BASIN - N

Date Received: 6/21/2005
Sample Status: COMPLETE AND VALIDATED

Proj Subcategory: REGULATORY PLAN & EVAL
Sample Point Code: 22B_2
IMS File/Invoice #: 1020.001

Sample Type: GRAB
Sample Matrix: SEDIMENT
Collected By: MJH/DJH

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 low matrix spike recoveries, the results analytes Heptachlor Epoxide and gamma-Chlordane may be low estimates.

Test Parameter	Result	Units	MRL	Method
Toxaphene	<209	µg/Kg dry wt	209	EPA 8081

End of Report for Sample ID: FO050675

City of Portland
Water Pollution Control Laboratory
Laboratory Analysis Report

Sample Date/Time 6/21/2005 10:20 **System ID** AJ06026 **Sample ID** **FO050676**

Proj./Company Name: PORTLAND HARBOR INLINE SAMP
Address/Location: IL-22B-AND879-0605
6400 NW FRONT AVE CATCH BASIN - M

Date Received: 6/21/2005
Sample Status: COMPLETE AND VALIDATED

Proj Subcategory: REGULATORY PLAN & EVAL
Sample Point Code: 22B_3
IMS File/Invoice #: 1020.001

Sample Type: GRAB
Sample Matrix: SEDIMENT
Collected By: MJH/DJH

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 low matrix spike recoveries, the results analytes Heptachlor Epoxide and gamma-Chlordane may be low estimates.

Test Parameter	Result	Units	MRL	Method
PESTICIDES/PCB'S BY EPA 8081				
4,4'-DDD	67.1	µg/Kg dry wt	4.94	EPA 8081
4,4'-DDE	34	µg/Kg dry wt	4.94	EPA 8081
4,4'-DDT	80	µg/Kg dry wt	4.94	EPA 8081
Aldrin	<2.47	µg/Kg dry wt	2.47	EPA 8081
Alpha-BHC	<2.47	µg/Kg dry wt	2.47	EPA 8081
Alpha-Chlordane	<2.47	µg/Kg dry wt	2.47	EPA 8081
Beta-BHC	21.3	µg/Kg dry wt	2.47	EPA 8081
Delta-BHC	<2.47	µg/Kg dry wt	2.47	EPA 8081
Dieldrin	<4.94	µg/Kg dry wt	4.94	EPA 8081
Endosulfan I	<2.47	µg/Kg dry wt	2.47	EPA 8081
Endosulfan II	<4.94	µg/Kg dry wt	4.94	EPA 8081
Endosulfan Sulfate	<4.94	µg/Kg dry wt	4.94	EPA 8081
Endrin	<4.94	µg/Kg dry wt	4.94	EPA 8081
Endrin Aldehyde	<4.94	µg/Kg dry wt	4.94	EPA 8081
Endrin Ketone	<4.94	µg/Kg dry wt	4.94	EPA 8081
Gamma-BHC(Lindane)	<2.47	µg/Kg dry wt	2.47	EPA 8081
Gamma-Chlordane	7.03	µg/Kg dry wt	2.47	EPA 8081
Heptachlor	<2.47	µg/Kg dry wt	2.47	EPA 8081
Heptachlor Epoxide	4.57	µg/Kg dry wt	2.47	EPA 8081
Methoxychlor	<24.7	µg/Kg dry wt	24.7	EPA 8081
PCB 1016	<12.3	µg/Kg dry wt	12.3	EPA 8081
PCB 1221	<12.3	µg/Kg dry wt	12.3	EPA 8081
PCB 1232	<12.3	µg/Kg dry wt	12.3	EPA 8081
PCB 1242	<12.3	µg/Kg dry wt	12.3	EPA 8081
PCB 1248	<12.3	µg/Kg dry wt	12.3	EPA 8081
PCB 1254	<12.3	µg/Kg dry wt	12.3	EPA 8081
PCB 1260	39.0	µg/Kg dry wt	12.3	EPA 8081

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

Report Date: 8/29/2005

Validated By: Signature on File

City of Portland
Water Pollution Control Laboratory
Laboratory Analysis Report

Sample Date/Time 6/21/2005 10:20 **System ID** AJ06026 **Sample ID** **FO050676**

Proj./Company Name: PORTLAND HARBOR INLINE SAMP
Address/Location: IL-22B-AND879-0605
6400 NW FRONT AVE CATCH BASIN - M

Date Received: 6/21/2005
Sample Status: COMPLETE AND VALIDATED

Proj Subcategory: REGULATORY PLAN & EVAL
Sample Point Code: 22B_3
IMS File/Invoice #: 1020.001

Sample Type: GRAB
Sample Matrix: SEDIMENT
Collected By: MJH/DJH

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 low matrix spike recoveries, the results analytes Heptachlor Epoxide and gamma-Chlordane may be low estimates.

Test Parameter	Result	Units	MRL	Method
Toxaphene	<247	µg/Kg dry wt	247	EPA 8081

End of Report for Sample ID: FO050676

Report Date: 8/29/2005

Validated By: Signature on File

City of Portland
Water Pollution Control Laboratory
Laboratory Analysis Report

Sample Date/Time 6/21/2005 10:38 **System ID** AJ06027 **Sample ID** **FO050677**

Proj./Company Name: PORTLAND HARBOR INLINE SAMP
Address/Location: IL-22B-AND878-0605
6400 NW FRONT AVE CATCH BASIN - S

Proj Subcategory: REGULATORY PLAN & EVAL
Sample Point Code: 22B_4
IMS File/Invoice #: 1020.001

Date Received: 6/21/2005
Sample Status: COMPLETE AND VALIDATED

Sample Type: GRAB
Sample Matrix: SEDIMENT
Collected By: MJH/DJH

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 low matrix spike recoveries, the results analytes Heptachlor Epoxide and gamma-Chlordane may be low estimates.

Test Parameter	Result	Units	MRL	Method
PESTICIDES/PCB'S BY EPA 8081				
4,4'-DDD	5.47	µg/Kg dry wt	4.21	EPA 8081
4,4'-DDE	7.89	µg/Kg dry wt	4.21	EPA 8081
4,4'-DDT	85.7	µg/Kg dry wt	4.21	EPA 8081
Aldrin	<2.10	µg/Kg dry wt	2.10	EPA 8081
Alpha-BHC	<2.10	µg/Kg dry wt	2.10	EPA 8081
Alpha-Chlordane	<2.10	µg/Kg dry wt	2.10	EPA 8081
Beta-BHC	<2.10	µg/Kg dry wt	2.10	EPA 8081
Delta-BHC	<2.10	µg/Kg dry wt	2.10	EPA 8081
Dieldrin	<4.21	µg/Kg dry wt	4.21	EPA 8081
Endosulfan I	<2.10	µg/Kg dry wt	2.10	EPA 8081
Endosulfan II	<4.21	µg/Kg dry wt	4.21	EPA 8081
Endosulfan Sulfate	<4.21	µg/Kg dry wt	4.21	EPA 8081
Endrin	<4.21	µg/Kg dry wt	4.21	EPA 8081
Endrin Aldehyde	<4.21	µg/Kg dry wt	4.21	EPA 8081
Endrin Ketone	<4.21	µg/Kg dry wt	4.21	EPA 8081
Gamma-BHC(Lindane)	<2.10	µg/Kg dry wt	2.10	EPA 8081
Gamma-Chlordane	<2.10	µg/Kg dry wt	2.10	EPA 8081
Heptachlor	<2.10	µg/Kg dry wt	2.10	EPA 8081
Heptachlor Epoxide	<2.10	µg/Kg dry wt	2.10	EPA 8081
Methoxychlor	<21.0	µg/Kg dry wt	21.0	EPA 8081
PCB 1016	<10.5	µg/Kg dry wt	10.5	EPA 8081
PCB 1221	<10.5	µg/Kg dry wt	10.5	EPA 8081
PCB 1232	<10.5	µg/Kg dry wt	10.5	EPA 8081
PCB 1242	<10.5	µg/Kg dry wt	10.5	EPA 8081
PCB 1248	<10.5	µg/Kg dry wt	10.5	EPA 8081
PCB 1254	<10.5	µg/Kg dry wt	10.5	EPA 8081
PCB 1260	13.9	µg/Kg dry wt	10.5	EPA 8081

Report Date: 8/29/2005

Validated By: Signature on File

City of Portland
Water Pollution Control Laboratory
Laboratory Analysis Report

Sample Date/Time 6/21/2005 10:38 **System ID** AJ06027 **Sample ID** **FO050677**

Proj./Company Name: PORTLAND HARBOR INLINE SAMP
Address/Location: IL-22B-AND878-0605
6400 NW FRONT AVE CATCH BASIN - S

Date Received: 6/21/2005
Sample Status: COMPLETE AND VALIDATED

Proj Subcategory: REGULATORY PLAN & EVAL
Sample Point Code: 22B_4
IMS File/Invoice #: 1020.001

Sample Type: GRAB
Sample Matrix: SEDIMENT
Collected By: MJH/DJH

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 low matrix spike recoveries, the results analytes Heptachlor Epoxide and gamma-Chlordane may be low estimates.

Test Parameter	Result	Units	MRL	Method
Toxaphene	<210	µg/Kg dry wt	210	EPA 8081

End of Report for Sample ID: FO050677

STL Seattle
5755 8th Street East
Tacoma, WA 98424

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

TRANSMITTAL MEMORANDUM

DATE: November 7, 2005

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

PROJECT: P5F0947

REPORT NUMBER: 128669

TOTAL NUMBER OF PAGES: _____

Enclosed are the test results for four samples received at STL Seattle on June 24, 2005.

Analytical Narrative 8082 analysis: The percent recoveries of DCB (surrogate) for samples 128669-1 through 128669-3 and the quality control parameters were outside of quality control acceptance limits. The spiking solution probable become concentrated. New surrogate spiking solution will be prepared for future sample batches.

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
128669-1	P5F0947-02	06-21-05 13:50	solid
128669-2	P5F0947-03	06-21-05 10:00	solid
128669-3	P5F0947-04	06-21-05 10:20	solid
128669-4	P5F0947-05	06-21-05 10:38	solid

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: July 29, 2005

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

PROJECT: P5F0947

REPORT NUMBER: 128669

TOTAL NUMBER OF PAGES: 17

Enclosed are the test results for four samples received at STL Seattle on June 24, 2005.

Analytical Narrative 8082 analysis: The percent recoveries of DCB (surrogate) for samples 128669-1 through 128669-3 and the quality control parameters were outside of quality control acceptance limits. The percent recoveries of decachlorobiphenyl (surrogate) were within acceptance limits. The spiking solution might have become concentrated; a new surrogate spiking solution will be prepared for future sample batches.

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

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

Sincerely,

Darla Powell

Darla Powell
Project Manager

STL Seattle

Sample Identification:

Lab. No.	Client ID	Date/Time Sampled	Matrix
128669-1	P5F0947-02	06-21-05 13:50	solid
128669-2	P5F0947-03	06-21-05 10:00	solid
128669-3	P5F0947-04	06-21-05 10:20	solid
128669-4	P5F0947-05	06-21-05 10:38	solid

STL Seattle

Client Name	North Creek Analytical
Client ID:	P5F0947-03
Lab ID:	128669-02
Date Received:	6/24/2005
Date Prepared:	7/5/2005
Date Analyzed:	7/18/2005
% Solids	87.66
Dilution Factor	1

Organochlorine Pesticides by USEPA Methods 8081A

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Tetrachloro-m-xylene	66		47	144
Decachlorobiphenyl	83.7		51	149

Sample results are on a dry weight basis.

Analyte		**Result (ug/kg)**	**RL**	**Flags**
Aldrin	ND		2.09	
alpha-BHC	ND		2.09	
beta-BHC	ND		2.09	
delta-BHC	ND		2.09	
gamma-BHC (Lindane)	ND		2.09	
4,4'-DDD		23.3	4.19	C1
4,4'-DDE		51.1	4.19	C1
4,4'-DDT		461	4.19	C1,D10
Dieldrin	ND		4.19	
Endosulfan I	ND		2.09	
Endosulfan II	ND		4.19	
Endosulfan sulfate		5.2	4.19	C1
Endrin	ND		4.19	
Endrin aldehyde		25.2	4.19	C2
Heptachlor	ND		2.09	
Heptachlor epoxide		9.99	2.09	C2
Methoxychlor	ND		20.9	
Endrin ketone		11.9	4.19	C2
Toxaphene	ND		209	
alpha-Chlordane		3.29	2.09	C1
gamma-Chlordane		8.64	2.09	C2

STL Seattle

Client Name	North Creek Analytical
Client ID:	P5F0947-04
Lab ID:	128669-03
Date Received:	6/24/2005
Date Prepared:	7/5/2005
Date Analyzed:	7/18/2005
% Solids	78.56
Dilution Factor	1

Organochlorine Pesticides by USEPA Methods 8081A

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Tetrachloro-m-xylene	68.1		47	144
Decachlorobiphenyl	100		51	149

Sample results are on a dry weight basis.

Analyte		**Result (ug/kg)**	**RL**	**Flags**
Aldrin	ND		2.47	
alpha-BHC	ND		2.47	
beta-BHC		21.3	2.47	C1
delta-BHC	ND		2.47	
gamma-BHC (Lindane)	ND		2.47	
4,4'-DDD		67.1	4.94	C1
4,4'-DDE		34	4.94	C1
4,4'-DDT		80	4.94	C1
Dieldrin	ND		4.94	
Endosulfan I	ND		2.47	
Endosulfan II	ND		4.94	
Endosulfan sulfate	ND		4.94	
Endrin	ND		4.94	
Endrin aldehyde	ND		4.94	
Heptachlor	ND		2.47	
Heptachlor epoxide		4.57	2.47	C2
Methoxychlor	ND		24.7	
Endrin ketone	ND		4.94	
Toxaphene	ND		247	
alpha-Chlordane	ND		2.47	
gamma-Chlordane		7.03	2.47	C2

STL Seattle

Client Name	North Creek Analytical
Client ID:	P5F0947-05
Lab ID:	128669-04
Date Received:	6/24/2005
Date Prepared:	7/5/2005
Date Analyzed:	7/18/2005
% Solids	87.17
Dilution Factor	1

Organochlorine Pesticides by USEPA Methods 8081A

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Tetrachloro-m-xylene	44.3	X9	47	144
Decachlorobiphenyl	71.5		51	149

Sample results are on a dry weight basis.

Analyte	**Result (ug/kg)**	**RL**	**Flags**
Aldrin	ND	2.1	
alpha-BHC	ND	2.1	
beta-BHC	ND	2.1	
delta-BHC	ND	2.1	
gamma-BHC (Lindane)	ND	2.1	
4,4'-DDD	5.47	4.21	C1
4,4'-DDE	7.89	4.21	C1
4,4'-DDT	85.7	4.21	C1
Dieldrin	ND	4.21	
Endosulfan I	ND	2.1	
Endosulfan II	ND	4.21	
Endosulfan sulfate	ND	4.21	
Endrin	ND	4.21	
Endrin aldehyde	ND	4.21	
Heptachlor	ND	2.1	
Heptachlor epoxide	ND	2.1	
Methoxychlor	ND	21	
Endrin ketone	ND	4.21	
Toxaphene	ND	210	
alpha-Chlordane	ND	2.1	
gamma-Chlordane	ND	2.1	

STL Seattle

Client Name:	North Creek Analytical
Client ID:	P5F0947-03
Lab ID:	128669-02
Date Received:	6/24/2005
Date Prepared:	7/13/2005
Date Analyzed:	7/18/2005
% Solids	87.66
Dilution Factor	1

PCBs by EPA Method 8082

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Tetrachloro-m-xylene	98.3		60	123
Decachlorobiphenyl	178	N	65	126

Sample results are on a dry weight basis.

Analyte		**Result (mg/kg)**	**RL**	**Flags**
Aroclor 1016	ND		0.0105	
Aroclor 1221	ND		0.0105	
Aroclor 1232	ND		0.0105	
Aroclor 1242	ND		0.0105	
Aroclor 1248	ND		0.0105	
Aroclor 1254	ND		0.0105	
Aroclor 1260		0.0683	0.0105	

STL Seattle

Client Name:	North Creek Analytical
Client ID:	P5F0947-04
Lab ID:	128669-03
Date Received:	6/24/2005
Date Prepared:	7/13/2005
Date Analyzed:	7/18/2005
% Solids	78.56
Dilution Factor	1

PCBs by EPA Method 8082

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Tetrachloro-m-xylene	95.7		60	123
Decachlorobiphenyl	145	N	65	126

Sample results are on a dry weight basis.

Analyte	**Result (mg/kg)**	**RL**	**Flags**
Aroclor 1016	ND	0.0123	
Aroclor 1221	ND	0.0123	
Aroclor 1232	ND	0.0123	
Aroclor 1242	ND	0.0123	
Aroclor 1248	ND	0.0123	
Aroclor 1254	ND	0.0123	
Aroclor 1260	0.039	0.0123	

STL Seattle

Client Name:	North Creek Analytical
Client ID:	P5F0947-05
Lab ID:	128669-04
Date Received:	6/24/2005
Date Prepared:	7/13/2005
Date Analyzed:	7/18/2005
% Solids	87.17
Dilution Factor	1

PCBs by EPA Method 8082

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Tetrachloro-m-xylene	93.9		60	123
Decachlorobiphenyl	177	N	65	126

Sample results are on a dry weight basis.

Analyte		**Result (mg/kg)**	**RL**	**Flags**
Aroclor 1016	ND		0.0105	
Aroclor 1221	ND		0.0105	
Aroclor 1232	ND		0.0105	
Aroclor 1242	ND		0.0105	
Aroclor 1248	ND		0.0105	
Aroclor 1254	ND		0.0105	
Aroclor 1260		0.0139	0.0105	

STL Seattle

Lab ID:	Method Blank - PE1867
Date Received:	-
Date Prepared:	7/5/2005
Date Analyzed:	7/18/2005
% Solids	
Dilution Factor	1

Organochlorine Pesticides by USEPA Methods 8081A

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Tetrachloro-m-xylene	84.8		47	144
Decachlorobiphenyl	125		51	149

Sample results are on an as received basis.

Analyte	**Result (ug/kg)**	**RL**	**Flags**
Aldrin	ND	2	
alpha-BHC	ND	2	
beta-BHC	ND	2	
delta-BHC	ND	2	
gamma-BHC (Lindane)	ND	2	
4,4'-DDD	ND	4	
4,4'-DDE	ND	4	
4,4'-DDT	ND	4	
Dieldrin	ND	4	
Endosulfan I	ND	2	
Endosulfan II	ND	4	
Endosulfan sulfate	ND	4	
Endrin	ND	4	
Endrin aldehyde	ND	4	
Heptachlor	ND	2	
Heptachlor epoxide	ND	2	
Methoxychlor	ND	20	
Endrin ketone	ND	4	
Toxaphene	ND	200	
alpha-Chlordane	ND	2	
gamma-Chlordane	ND	2	

STL Seattle

Blank Spike/Blank Spike Duplicate Report

Lab ID:	PE1867
Date Prepared:	7/5/2005
Date Analyzed:	7/18/2005
QC Batch ID:	PE1867

Organochlorine Pesticides by USEPA Methods 8081A

Compound Name	Blank Result (ug/kg)	Spike Amount (ug/kg)	BS Result (ug/kg)	BS % Rec.	BSD Result (ug/kg)	BSD % Rec.	RPD	Flag
Aldrin	0	20	14.9	74.4	15.4	76.9	3.3	
alpha-BHC	0	20	13.1	65.5	13.4	67.2	2.6	
beta-BHC	0	20	14.2	70.8	14.8	73.8	4.1	
delta-BHC	0	20	9.99	49.9	10.7	53.4	6.8	
gamma-BHC (Lindane)	0	20	13.8	69.1	14.2	71.1	2.9	
4,4'-DDD	0	20	14.8	73.8	15.5	77.4	4.8	
4,4'-DDE	0	20	15.8	79	16.3	81.6	3.2	
4,4'-DDT	0	20	13.6	68.1	13.9	69.5	2	
Dieldrin	0	20	15	74.8	15.6	78.1	4.3	
Endosulfan I	0	20	13.4	66.9	13.9	69.5	3.8	
Endosulfan II	0	20	16.2	81	16.9	84.7	4.5	
Endosulfan sulfate	0	20	12.4	61.8	13.1	65.4	5.7	
Endrin	0	20	14.8	74	14.2	71	-4.1	
Endrin aldehyde	0	20	16.5	82.3	18.2	91.2	10	
Heptachlor	0	20	13.8	69.2	14.1	70.4	1.7	
Heptachlor epoxide	0	20	14	69.9	14.4	72	3	
Methoxychlor	0	20	17.4	87.2	17.5	87.6	0.46	
Endrin ketone	0	20	14.1	70.5	15.2	75.8	7.2	
alpha-Chlordane	0	20	13.1	65.3	13.6	67.8	3.8	
gamma-Chlordane	0	20	13.4	66.8	13.8	69.2	3.5	

STL Seattle

Matrix Spike/Matrix Spike Duplicate Report

Client Sample ID:	P5F0947-03
Lab ID:	128669-02
Date Prepared:	7/5/2005
Date Analyzed:	7/18/2005
QC Batch ID:	PE1867

Organochlorine Pesticides by USEPA Methods 8081A

Compound Name	Sample Result (ug/kg)	Spike Amount (ug/kg)	MS Result (ug/kg)	MS % Rec.	MSD Result (ug/kg)	MSD % Rec.	RPD	Flag
Aldrin	0	21.4	16.3	76.3	16.2	74	-3.1	
alpha-BHC	0	21.4	14.9	69.7	15.2	69.4	-0.43	
beta-BHC	0	21.4	21.9	103	21.6	98.8	-4.2	
delta-BHC	0	21.4	12.2	57.3	12.2	55.8	-2.7	
gamma-BHC (Lindane)	0	21.4	15.7	73.4	15.3	69.8	-5	
4,4'-DDD	23	21.4	36.4	61	39.1	72.2	17	
4,4'-DDE	51	21.4	73.3	104	74.2	105	0.96	
4,4'-DDT	460	21.4	429	0	465	14.9	200	X7a
Dieldrin	0	21.4	17.8	83.3	16.9	77.1	-7.7	
Endosulfan I	0	21.4	22	103	23.3	107	3.8	
Endosulfan II	0	21.4	17.6	82.4	18	82.2	-0.24	
Endosulfan sulfate	5.2	21.4	16.5	52.7	17.2	54.8	3.9	
Endrin	0	21.4	16.6	77.6	17.2	78.7	1.4	
Endrin aldehyde	25	21.4	34	41.4	37	54	26	
Heptachlor	0	21.4	16.5	77.4	16.7	76.2	-1.6	
Heptachlor epoxide	10	21.4	18.4	39.1	18.6	39.5	1	X7
Methoxychlor	0	21.4	28.8	135	29.8	136	0.74	
Endrin ketone	12	21.4	25.1	62.2	27.9	73.1	16	
alpha-Chlordane	3.3	21.4	15.1	55.5	15.5	55.9	0.72	
gamma-Chlordane	8.6	21.4	14.6	28.1	15.1	29.7	5.5	X7

STL Seattle

Lab ID:	Method Blank - PB0981
Date Received:	-
Date Prepared:	7/13/2005
Date Analyzed:	7/18/2005
% Solids	
Dilution Factor	1

PCBs by EPA Method 8082

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Tetrachloro-m-xylene	97.8		60	123
Decachlorobiphenyl	130	N	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:	PB0981
Date Prepared:	7/13/2005
Date Analyzed:	7/18/2005
QC Batch ID:	PB0981

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	0.102	102	0.106	106	3.8	
Aroclor 1260	0	0.1	0.105	105	0.106	106	0.95	

STL Seattle

Matrix Spike/Matrix Spike Duplicate Report

Client Sample ID:	P5F0947-03
Lab ID:	128669-02
Date Prepared:	7/13/2005
Date Analyzed:	7/18/2005
QC Batch ID:	PB0981

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	0.109	0.15	137	0.153	142	3.6	X7
Aroclor 1260	0.068	0.109	0.169	92.1	0.188	111	19	X7

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.

000016

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

CHAIN OF CUSTODY REPORT

Work Order #: P5F0947

NCA CLIENT: City of Portland

REPORT TO: Jennifer Shackelford

ADDRESS:

PHONE: FAX:

INVOICE TO: Charles Lytle

P.O. NUMBER: 40567

PROJECT NAME: Portland Harbor

PROJECT NUMBER:

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 Requests less than standard may incur Rush Charges.

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	Pests/PCBs 8081/8082	Herbs EPA 8151	PCBs 8082 Low Level	MATRIX (W, S, O)	# OF CONT.	LOCATION / COMMENTS	NCA WO ID
1	F0050657	6/21/05 0928	X	X		W	2		
2	674	1350			X	S	2		
3	675	1000	X			S	2		
4	676	1020	X			S	2		
5	677	1038	X			S	2		
6									
7									
8									
9									
10									

PRESERVATIVE

REQUESTED ANALYSES

RELEASED BY: Masha Faroqui DATE: 6/22/05

PRINT NAME: Masha Faroqui FIRM: City of Portland TIME: 1:30

RECEIVED BY: Bob E DATE: 6/22/05

PRINT NAME: Bob E FIRM: NCA TIME:

RELEASED BY: Bob E DATE: 6/22/05

PRINT NAME: Bob E FIRM: NCA TIME: 14:30

RECEIVED BY: Camille Fukushima DATE: 6/22/05

PRINT NAME: Camille Fukushima FIRM: NCA TIME: 1430

ADDITIONAL REMARKS: Water Pests/PCBs are sent to GERG for analysis. Soil Pests/PCBs and PCBs are sent to STL-Seattle for analysis. Only water Herbs are to be analyzed at NCA.

TEMP: 1.0

PAGE 1 OF 1

21000 COC REV 09/04

SUBCONTRACT ORDER

North Creek Analytical - Portland

P5F0947

128669

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: P5F0947-02	**Soil**	**Sampled:06/21/05 13:50**		For City of Portland Low Level Analysis
Solids, Dry Weight	06/29/05 16:00	07/19/05 13:50		
8082 PCB LL	07/07/05 16:00	07/05/05 13:50		
Containers Supplied:				
4 oz. jar (A)	4 oz. jar (B)			
Sample ID: P5F0947-03	**Soil**	**Sampled:06/21/05 10:00**		
Solids, Dry Weight	06/29/05 16:00	07/19/05 10:00		
8081A/8082 Pest/PCB	07/07/05 16:00	07/05/05 10:00		
Containers Supplied:				
4 oz. jar (A)	4 oz. jar (B)			
Sample ID: P5F0947-04	**Soil**	**Sampled:06/21/05 10:20**		
Solids, Dry Weight	06/29/05 16:00	07/19/05 10:20		
8081A/8082 Pest/PCB	07/07/05 16:00	07/05/05 10:20		
Containers Supplied:				
4 oz. jar (A)	4 oz. jar (B)			
Sample ID: P5F0947-05	**Soil**	**Sampled:06/21/05 10:38**		
Solids, Dry Weight	06/29/05 16:00	07/19/05 10:38		
8081A/8082 Pest/PCB	07/07/05 16:00	07/05/05 10:38		
Containers Supplied:				
4 oz. jar (A)	4 oz. jar (B)			

Released By	Date	Received By	Date
[signature]	6-23-05	KR	6/24/05
Released By	Date	Received By	Date